

APPENDIX

Still other interesting possible alternative explanations exist but are ruled out by the data: (a) universities and research institutes themselves became more profit oriented and sought to invest in the ventures they knew most about, those of their own students, and the university had better information on underlying ability levels; (b) the demography of the funders/lead investor community itself might have changed and its preferences perhaps leaned towards higher ability individuals or technically skilled entrepreneurs with real marketable research output; (c) the nature of the economic opportunities or competition changed as China liberalized and the available opportunities required those with higher ability levels; (d) increased college student enrollment led to a flood of graduate students with limited wage job opportunities; (e) payoff to skills, demand for innovation/R&D in the economy increased; (f) increased legitimacy may have led higher status individuals to become entrepreneurs and higher status also happens to be correlated with ability. The available evidence is used to address these mechanisms.

University investing. First is the idea that the universities and research institutes became more profit oriented and then invested preferentially in the spinoffs created by their own students or professors for which they had more information. A question on the survey asked whether Tsinghua played a role in either directly funding the startup or in helping to find funding. Only 13 respondents indicated “yes” to either question. Thus, it seems that university funding does not explain the results.

Shifting investor community. The demography or preferences of the investor community may have changed. This explanation is harder to rule out since the question cannot be addressed head-on without data on the demography of investors and their investment preferences. Specifically, the dotcom boom in the U.S. inspired both investors and entrepreneurs to seek out

internet and software opportunities in China. To test this explanation, the analyses were re-run, dropping all internet and software firms from the sample and the results hold with coefficients of slightly higher magnitude. Nonetheless, it is important to note that the venture capitalists that we spoke with indicated that VCs in China primarily tended to focus on later stage private equity deals and non-technology start-ups. Certainly changes were occurring in the investor community during this time. However, the main effects should have been for later stage firms.

Changing Opportunities. The nature of the entrepreneurial opportunities or the competition increased such that potential entrepreneurs located relatively lower in the talent distribution were screened out and the opportunities were only available to entrepreneurs with higher human capital levels. Other forms of this same argument are that perhaps the payoff to skills in entrepreneurship increased or the demand for innovation and R&D in the economy increased. Again, the fact that the result remains and grows stronger with the elimination of software and internet firms provides some evidence inconsistent with this interpretation. The results also hold when all 193 firms indicating that intellectual property would be important for their success were dropped. The results in Panel A of Table 5 provide evidence against the idea that there was a decrease in entrepreneurship among the lower tail of the talent distribution. Finally, Appendix Table 5 shows that there were not increases in the returns to talent in the wage sector after the reform. More generally, one might be concerned about demand-side shifts that occurred. A number of the robustness checks offer evidence against a demand-shift explanation. First, the placebo regression and the time trend of the effects provide assurance that this was not the result of a smooth increase in demand factors over time. Second, if this were a dotcom boom effect only then the results should not have held when removing software firms. Next, the results in Appendix Table 6 show that even when macro-economic factors such as GDP are controlled

for, there is still a shift in the supply of entrepreneurs. Finally, I would not expect the pattern of results seen in the U.S. data from the dotcom boom if this were solely an effect resulting from economic growth and increases in overall demand. Together this pattern of results argues strongly against a demand-shift interpretation.

A final concern related to changing opportunities is that it may be that the opportunities that became available after 1999 were primarily accessible by more wealthy individuals and that wealth happens to be correlated with the various human capital measures. While it is difficult to entirely eliminate this concern, it does not appear to be solely driving the results. Family wealth, which may be more relevant than solely individual wealth and should be less correlated with talent, is controlled for in the regressions and the results still hold. Next, as financial reforms and venture capital spread, wealth constraints should have been decreasing, not increasing. Lastly, the amount of registered capital is controlled for in regressions such as Table 5, so if more wealthy individuals were investing more of their own capital then this should control for that effect. The results show that the increased returns to entrepreneurship post-reform were not solely available to those who could gather more initial capital. It does not appear that solely wealthier individuals benefited.

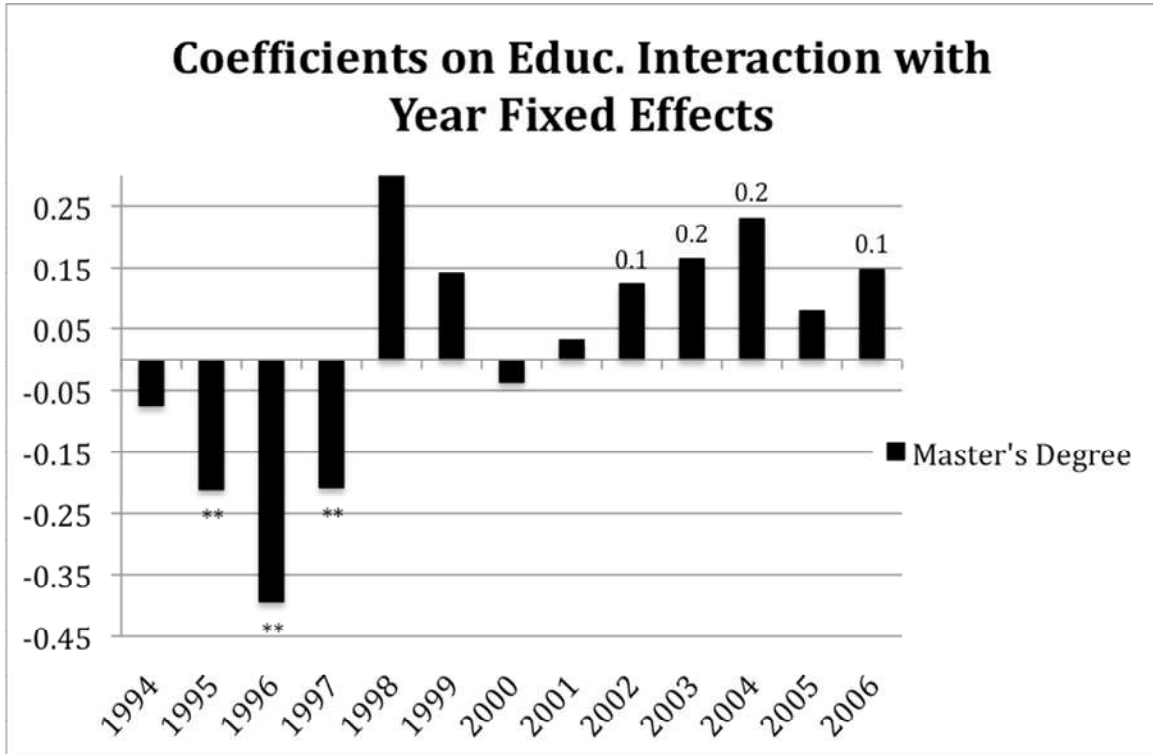
Labor Market. On the supply side, the number of students enrolling in tertiary education in China dramatically increased since the 1990s. According to the National Bureau of Statistics of China, restricting the definition to four year colleges and universities, the total number of graduates has gone from 830,000 in 1998 to just over three million in 2005. Since 1999, the number of undergraduate and graduate students has grown at nearly 30 percent per year. If traditional job demand could not accommodate this increased supply, many of these individuals may have turned to entrepreneurship. However, while possibly true more broadly, this type of

explanation does not seem likely for the individuals in this study since alumni from the top engineering school in the country should have had no problems finding employment. Second, for this account to be correct, one would expect that it is primarily the individuals from the lower end of the talent distribution who both have trouble finding acceptable wage employment and thus who opt into entrepreneurship. This implication is contradicted by the data in 5-3 on the increase coming from the higher end of the talent distribution. Similarly, township and village enterprises (TVEs) were declining over this time period, however Tsinghua graduates would not be expected to typically be found in TVEs.

Increased legitimacy. An alternative explanation is that the increase in entrepreneurship among more talented individuals is not due to changing incentives in the institutional environment, but rather to the increasing legitimacy of entrepreneurship in China during this time. Changes in legitimacy may be highly correlated with changes in the institutional environment. Xu and Zhao (2008) use a national dataset from 1978-1996 in the China Statistical Yearbook and argue that as entrepreneurship became fully legitimized by 1996, particularly at the local level, greater numbers of high-status individuals (Communist party cadres and those with more education) became entrepreneurs at a more rapid rate. However, status and education also tend to correlate with ability. Interviews seem to indicate that by the end of the 1990s, entrepreneurship was already seen as a legitimate career option. According to Xu and Zhao (2008), entrepreneurship was already fully legitimized by the mid-1990s, and legitimate enough by 1996 (when their data end) that government officials and highly educated, high status individuals were becoming entrepreneurs at faster rates than lower status individuals. They measure legitimacy by the state's official recognition of private enterprise in 1988 when private businesses with eight or more employees were granted "organization" status. Their analysis ends

in 1996, the year before the state “fully recognized private business as an important component” in the economy. It is reasonable to believe that entrepreneurial activity was seen as quite legitimate by 1997 by when most (74 percent) of the pre-2000 foundings occurred. Also, a control for the graduation year controls for more recent graduates viewing entrepreneurship as more desirable. Even controlling for such trends, the propensity for higher ability entrepreneurs to found firms appears to increase. Perhaps most convincing are the results in Appendix Table 10. If the effect is due to legitimacy, then one should see higher status individuals (who had more to lose previously) becoming entrepreneurs at a higher rate (Giordano, 1983; Xu and Zhao, 2008). Thus, a dummy variable was added indicating whether the individual was high status (government officials, and Communist party members) and this variable is interacted with the dummy for the post-1999 time period. The coefficient is insignificant while the human capital measure remains significant indicating that a change in legitimacy does not appear to explain away the results. Furthermore, the analysis here controls for many status factors, such as level in the government, education and academic positions, so the results indicate that even after controlling for status, still individuals located higher in the talent distribution became entrepreneurs at significantly higher rates post-2000. The current paper offers support for a different explanation for the rise in entrepreneurship, one that focuses more on incentives for more talented individuals to form private businesses and less on the roles of status and legitimacy.

FIGURE 1



This figure shows the time trend of the effects by year. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Wald tests show differences at the 5% level between 1995-1997 and 2002-04 and 2006.

FIGURE 2

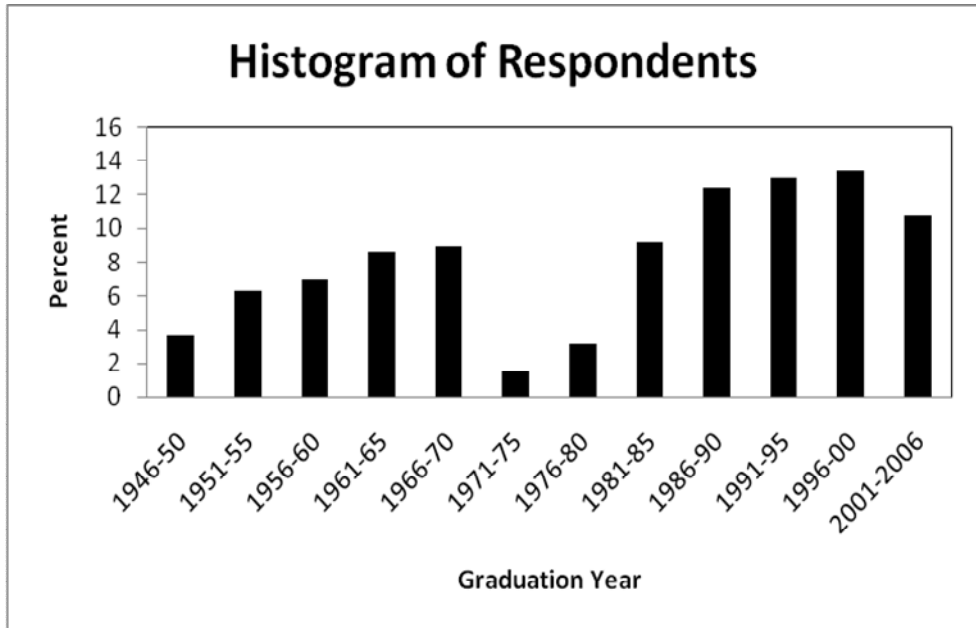


FIGURE 3

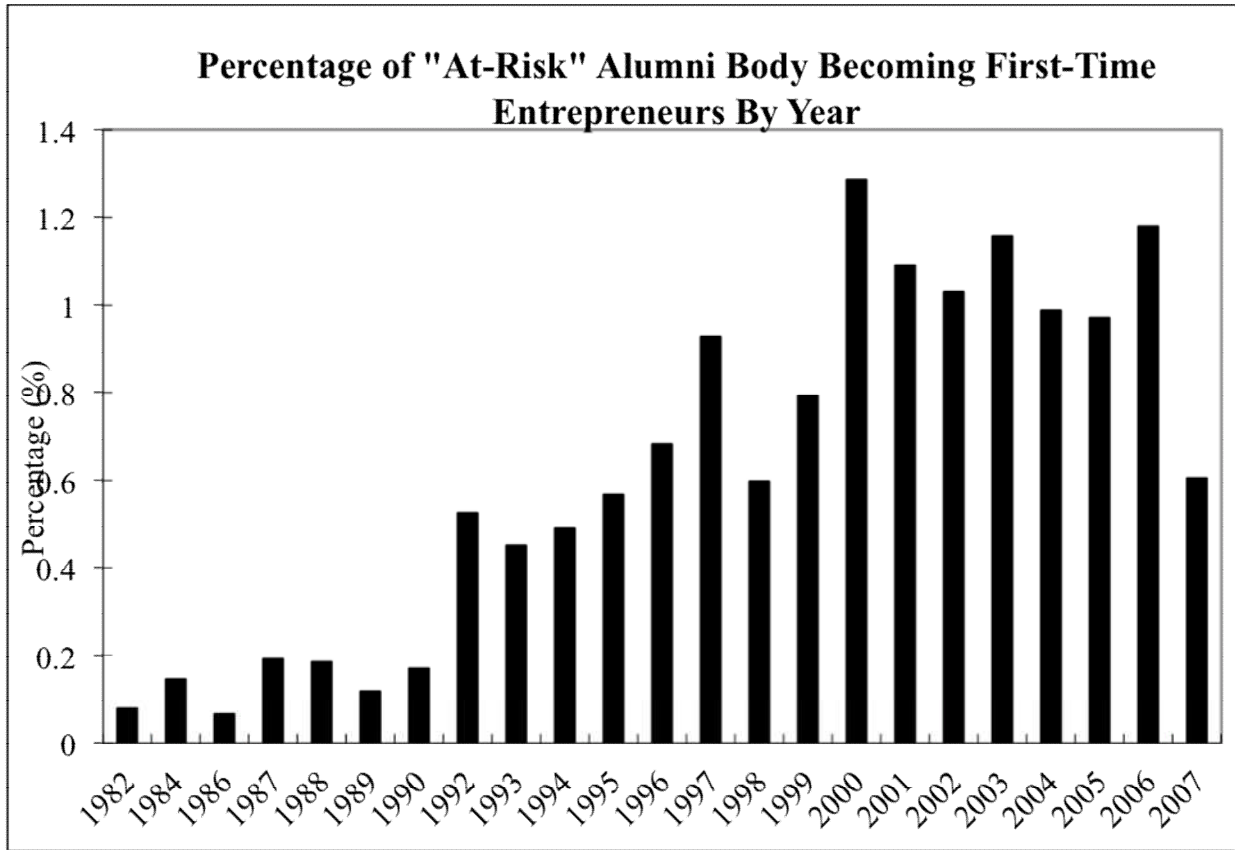


TABLE 1
Industry Breakdown

Industry	Number of Firms	Percentage
AEROSPACE	3	0.90
ARCHITECTURE	13	3.88
BIOTECH AND DRUGS	7	1.09
CHEMICALS	8	2.39
CONSUMER PRODUCTS	17	5.07
ELECTRIC	12	3.58
ELECTRONICS	69	20.60
ENERGY	14	4.18
FINANCE	10	2.99
INTERNET	33	9.85
LAW, ACCOUNTING	22	6.57
MACHINERY	19	5.67
MANAGEMENT	21	6.27
MATERIALS	13	3.88
MED DEVICES	4	1.19
OTHER MFG	16	4.78
PUBLISHING	11	3.28
SOFTWARE	34	10.15
TELECOM	9	2.69
TOTAL	335	100

TABLE 2
Comparison of Key Demographic Characteristics by Survey Wave

<i>Variable</i>	Responded before Aug. 2007 (N=2,667)	Responded during/after Aug. 2007 (N=299)	<i>t</i> -stat for equal means
Age	49.3	54.1	-4.216**
Age (founders only)	38.4	37.4	0.602
Bachelor's Graduation Yr	1980.9	1977.4	3.777**
Bach. Grad yr (founders only)	1991.6	1993.2	0.941
Years of Education	17.2	17.0	2.381**
Entrepreneur parents	0.09	0.12	-0.713
Entrepreneur	0.29	0.40	-2.168**
Privatized	0.10	0.05	1.392
First start-up founded	2000.3	2001.1	-0.661
Tech only	0.28	0.29	0.757
Business only	0.10	0.09	0.235
Gender	0.88	0.90	0.901
Family economic status	3.75	3.85	-1.871*
High Salary	3.21	2.93	3.351**
Avg. Tenure	6.94	8.01	-2.045*
Overseas work exp.	0.26	0.26	-0.126
Number of positions	2.39	2.26	-2.012*
High government	0.03	0.03	-0.239
Low government	0.18	0.17	0.617
Last job academia	0.19	0.19	-0.051
Ever job academia	0.32	0.27	2.323**
Last job business	0.62	0.61	0.348
Student Leader	0.61	0.57	0.874
GPA Rank	2.28	2.58	-2.661**
Bach. Grad Yr. 10 th percentile	1954	1953	--
Bach. Grad Yr. 25 th percentile	1965	1961	--
Bach. Grad Yr. 50 th percentile	1986	1979	--
Bach. Grad Yr. 75 th percentile	1996	1993	--
Bach. Grad Yr. 90 th percentile	2001	2001	--

** , and * indicate statistical significance at the 1% and 5%, respectively.

TABLE 3

Independent Variables	Dependent Variable = Start-up founded (subjects start being at risk upon graduation) Note: reported coefficients are hazard ratios	
<i>Indiv. F.E. 90th quartile</i>		0.651 (0.203)
<i>Indiv. F.E. 90th * POST</i>		1.293* (0.206)
<i>Indiv. F.E. 10th quartile</i>		0.976 (0.479)
<i>Indiv. F.E. 10th * POST</i>		1.130 (0.810)
<i>Indiv. F.E. > median</i>	0.624** (0.144)	
<i>Indiv. F.E. median*POST</i>	7.329*** (2.165)	
<i>Overseas</i>	0.653** (0.128)	0.916 (0.205)
<i>Last job acad.</i>	0.929 (0.299)	0.458** (0.182)
<i>Last job govt.</i>	0.687 (0.200)	0.557* (0.181)
<i>High govt.(ever)</i>	0.830 (0.322)	0.882 (0.360)
<i>Low govt. (ever)</i>	1.315 (0.305)	1.479 (0.382)
<i>Ever job acad.</i>	1.055 (0.237)	1.131 (0.293)
<i>Num. positions</i>	1.396*** (0.081)	1.040 (0.071)
<i>Gender</i>	1.407 (0.457)	2.071** (0.735)
<i>Family Econ. Status</i>	0.920 (0.070)	0.849* (0.076)
<i>Communist Party</i>	1.022 (0.153)	0.951 (0.162)
<i>Years 2000-07</i>	0.026*** (0.005)	0.001*** (0.000)
<i>Years 1991-99</i>	0.112*** (0.022)	0.007*** (0.002)
Observations	1815	1480

Note: coefficients below 1.0 represent a decreased likelihood of entrepreneurship; 102 failures; 30,716 total years at risk; ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All models include controls for Bachelor's graduation year (age), and region fixed effects

TABLE 4 Income regression

Ordered Logit Independent Variables	Dependent variable = salary category (1-6)
Master's degree	0.466*** (0.051)
Doctorate degree	0.905*** (0.051)
Work exper. (0-10 yrs.)	0.938*** (0.054)
Work exper. (10-30 yrs.)	1.065*** (0.047)
Work exper. (>30 yrs.)	0.500*** (0.055)
Gender (male=1)	0.498*** (0.058)
GPA quartile (1 st = top)	-0.199*** (0.046)
GPA quartile (3 rd)	0.514*** (0.046)
GPA quartile (4 th = bottom)	0.047 (0.045)
Overseas exper.	0.407*** (0.043)
Academia	-0.943*** (0.051)
Business	0.335*** (0.052)
Government	-0.326*** (0.044)
Family Econ. Status	-0.273*** (0.015)
Comm. Party	-0.062 (0.045)
<i>Region Effects</i>	YES
<i>Bachelor's Dept. Effects</i>	YES
<i>Year Effects</i>	YES
<i>Cut point 1</i>	24.296*** (0.026)
<i>Cut point 2</i>	25.714*** (0.020)
<i>Cut point 3</i>	27.111*** (0.021)
<i>Cut point 4</i>	28.614*** (0.022)
<i>Cut point 5</i>	30.256*** (0.028)
Pseudo-R squared	0.148

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. Robust standard errors are used. N=561

TABLE 5
Returns to Talent in Wage Employment

Ordered Logit Independent Variables	Dependent variable = salary category (1-6)	
<i>Master's degree</i>	0.693*** (0.137)	
<i>Master's x POST</i>	-0.228 (0.157)	
<i>Doctorate degree</i>	1.211*** (0.237)	
<i>Doctorate x POST</i>	-0.782*** (0.243)	
<i>High GPA</i>	-0.028*** (0.005)	0.384** (0.170)
<i>High GPA x POST</i>	0.179 (0.149)	-0.292 (0.193)
<i>Tenure</i>	-0.883*** (0.160)	-0.033*** (0.008)
<i>Business</i>	-0.646*** (0.165)	0.24 (0.238)
<i>Government</i>	0.073*** (0.008)	-1.054*** (0.244)
<i>Academia</i>	0.044 (0.084)	-0.659*** (0.248)
<i>Bachelor's grad. year</i>	0.812*** (0.112)	0.096*** (0.012)
<i>Communist Party</i>	0.542*** (0.128)	-0.032 (0.104)
<i>Overseas</i>	0.069*** (0.009)	0.995*** (0.135)
<i>Gender (male=1)</i>	1.760*** (0.157)	0.638*** (0.148)
<i>Age (at end of job spell)</i>	-0.276*** (0.045)	0.095*** (0.012)
<i>Years 2000-07 (POST)</i>	-0.228 (0.157)	1.348*** (0.177)
<i>Family Economic Status</i>	0.69273*** (0.137)	-0.309*** (0.058)
<i>Bachelor's Dept. effects</i>		YES
<i>Region effects</i>		YES
<i>Observations</i>	3,276	2,043
<i>Pseudo R-squared</i>	0.206	0.171

***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. The unit of analysis is the job spell. Robust standard errors clustered at the individual level are used.

TABLE 6
Negative Binomial Regressions on Macro-economic Data

Independent Variables	Dependent variable = number of firm foundings (1959-2007)		
	(1)	(2)	(3)
<i>R&D to GDP ratio (t-1)</i>			-0.143 (0.723)
<i>GDP per capita (in RMB, t-1)</i>		3.43E-04*** (8.59E-05)	3.30E-04*** (8.63E-05)
<i>Shanghai Stock Exchange Market Cap (t-1)</i>		-2.52E-05** (1.16E-05)	-2.36e-05** (1.20E-05)
<i>Domestic Patents Issued (t-1)</i>	5.01E-06 (3.60E-06)	-1.01e-05** (4.82E-06)	-9.48E-06* (5.04E-06)
<i>Post-1999 dummy</i>	4.326*** (0.652)	3.856*** (0.530)	2.901*** (0.590)
<i>1988-1998 dummy</i>	3.521*** (0.434)	2.978*** (0.421)	1.967*** (0.656)
<i>Constant</i>	-1.257*** (0.368)	-1.376*** (0.360)	-0.241 (1.066)
Log likelihood	-96.992	-90.102	-81.378
Num. obs. (years)	48	48	29
Pseudo R2	0.265	0.317	0.260

The results show that there was an increase in entrepreneurship after the two institutional reforms even after controlling for other indicators of the economic environment. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

TABLE 7
Placebo Regression

Independent Variables	Dependent Variable = Year start-up founded (subjects start being at risk upon graduation) Note: reported coefficients are hazard ratios									
<i>Years of Education</i>	0.630*** (0.086)									
<i>Educ. x POST</i>	1.082 (0.205)									
<i>GPA High</i>			0.726 (0.231)							
<i>GPA x POST</i>			0.716 (0.317)							
<i>Promoted</i>					0.218** (0.131)					
<i>Promoted x POST</i>					7.714** (7.210)					
<i>Ln(workexp)</i>							0.454*** (0.116)			
<i>Work exp. X POST</i>							0.367*** (0.119)			
<i>Talent (Income residual)</i>									0.717 (0.179)	
<i>Residual x POST</i>									1.333 (0.450)	
<i>Years 1997-99 (POST)</i>	0.160	(0.521)	0.69	(0.256)	0.083***	(0.079)	4.362*	(3.346)	0.887	(0.349)
<i>Years 1990-96</i>	0.206***	(0.065)	0.307***	(0.098)	0.216***	(0.070)	0.258***	(0.097)	0.479*	(0.182)
<i>Overseas Experience</i>	0.743	(0.205)	0.619*	(0.170)	0.703	(0.189)	1.033	(0.338)	0.749	(0.299)
<i>Last job academia</i>	2.340*	(1.068)	1.877	(0.845)	2.299*	(1.055)	1.875	(0.986)	4.526**	(2.863)
<i>Last job government</i>	1.258	(0.519)	1.107	(0.477)	1.437	(0.569)	1.739	(0.831)	0.996	(0.568)
<i>Ever job high gov.</i>	1.159	(0.465)	1.129	(0.456)	1.108	(0.443)	1.804	(0.772)	3.835**	(2.160)
<i>Ever job low gov.</i>	0.892	(0.295)	0.657	(0.217)	0.663	(0.215)	0.318***	(0.140)	0.335**	(0.173)
<i>Ever job academia</i>	0.807	(0.277)	0.748	(0.252)	0.639	(0.216)	0.831	(0.338)	0.546	(0.252)
<i>Number of Positions</i>	1.344***	(0.115)	1.320***	(0.117)	1.410***	(0.128)	1.309**	(0.140)	1.607***	(0.231)
<i>Gender (male=1)</i>	1.111	(0.443)	1.212	(0.484)	1.093	(0.438)	2.124	(1.247)	2.686	(1.797)
<i>Family Econ Status</i>	0.740***	(0.079)	0.824*	(0.090)	0.781**	(0.083)	0.843	(0.114)	0.618***	(0.103)
<i>Communist Party</i>	0.939	(0.211)	1.033	(0.234)	1.014	(0.231)	0.765	(0.215)	0.587	(0.207)
<i>Observations</i>	1882		1225		1882		1829		526	

Note: 119 failures; 20,541 total years at risk; ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All models include region, Bachelor's dept., and graduation year dummy variables.

TABLE 8
U.S. Data Dotcom Boom Robustness Check

Independent Variables	Dependent Variable = Start-up founded (subjects start being at risk upon graduation) Note: reported coefficients are hazard ratios		
	Software firms only, only EE&CS grads	Software firms only, all grads	All Grads, All firms
Master's degree	0.281*** (0.120)	0.767 (0.204)	1.226 (0.098)
Doctorate Degree	0.249** (0.153)	0.733 (0.333)	1.261 (0.127)
Master's x Years 98-00	7.466** (5.844)	1.936* (0.741)	0.936 (0.152)
Doctorate x Years 98-00	5.560* (5.683)	1.446 (0.849)	0.905 (0.185)
Non-U.S. citizen	1.866* (0.634)	1.172 (0.292)	0.825 (0.078)
Gender (male=1)	5.814* (5.934)	3.305*** (1.302)	1.495 (0.169)
Years 1998-2000	0.001*** (0.001)	0.002*** (0.001)	0.011 (0.002)
Years 1991-1997	0.755 (0.060)	0.665 (0.194)	0.240*** (0.089)
Graduation year fixed effects	YES	YES	YES
Degree fixed effects	NO	YES	YES
Obs.	3,266	18,896	19,188

Note: Grad. Years 1980 and after (~age 40 and younger); 52 failures; 44,525 total years at risk; ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All models include controls for Bachelor's graduation year (age), Bachelor's Major (academic department).

TABLE 9

Indep. Vars.	log(revenue)		log(employees)	
<i>POST-1999</i>	1.262**	(0.744)	0.510**	(0.309)
<i>Master's degree</i>	0.370	(0.348)	0.083	(0.164)
<i>Doctorate degree</i>	-0.342	(0.631)	0.200	(0.305)
<i>Privatized</i>	1.407**	(0.690)	1.409***	(0.315)
<i>Bought</i>	-1.212	(0.751)	0.087	(0.349)
<i>Firm Age</i>	0.460***	(0.085)	0.278***	(0.034)
<i>Communist Party</i>	0.128	(0.346)	0.039	(0.163)
<i>Overseas</i>	0.710	(0.449)	0.328*	(0.198)
<i>Family Economic Status</i>	-0.078	(0.179)	-0.018	(0.083)
<i>Constant</i>	2.544**	(1.208)	1.420**	(0.518)
<i>Obs.</i>	195		267	

TABLE 10

Independent Variables	Dependent Variable = Year start-up founded (subjects start being at risk upon graduation) Note: reported coefficients are hazard ratios (N = 1,910)			
	(1)		(2)	
<i>Master's degree</i>			0.342***	(0.086)
<i>Master's x Post-1999</i>			2.215***	(0.664)
<i>Doctorate degree</i>			0.360*	(0.191)
<i>Doctorate x Post-1999</i>			2.646	(1.566)
<i>High Status (Gov. and Comm. Party)</i>	0.987	(0.243)	0.858	(0.211)
<i>Status x Post-1999</i>	0.924	(0.268)	1.098	(0.319)
<i>Post-1999 dummy</i>	0.102***	(0.023)	0.049***	(0.015)
<i>1991-1999 dummy</i>	0.075***	(0.011)	0.070***	(0.010)
Controls				
<i>Overseas Experience</i>	0.806	(0.133)	0.834	(0.139)
<i>Last job academia</i>	0.681	(0.213)	0.675	(0.211)
<i>Ever job academia</i>	1.186	(0.242)	1.222	(0.253)
<i>Number of positions</i>	1.296***	(0.067)	1.297***	(0.067)
<i>Gender</i>	1.363	(0.388)	1.257	(0.363)
<i>Family Econ. Status</i>	0.900	(0.060)	0.903	(0.062)
Log likelihood	-1460.714		-1466.769	

Note: 317 failures; 45,021 total years at risk; ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. All models include region, Bachelor's dept., and graduation year dummy variables. High Status is equal to 1 if the individual was a communist party member or worked in a government position. The pair wise correlations between *High Status* and various human capital measures are all at or below 0.101.