Boon or Boondoggle? Business Incubation as Entrepreneurship Policy: A Report from the National Census of Business Incubators and their Tenants

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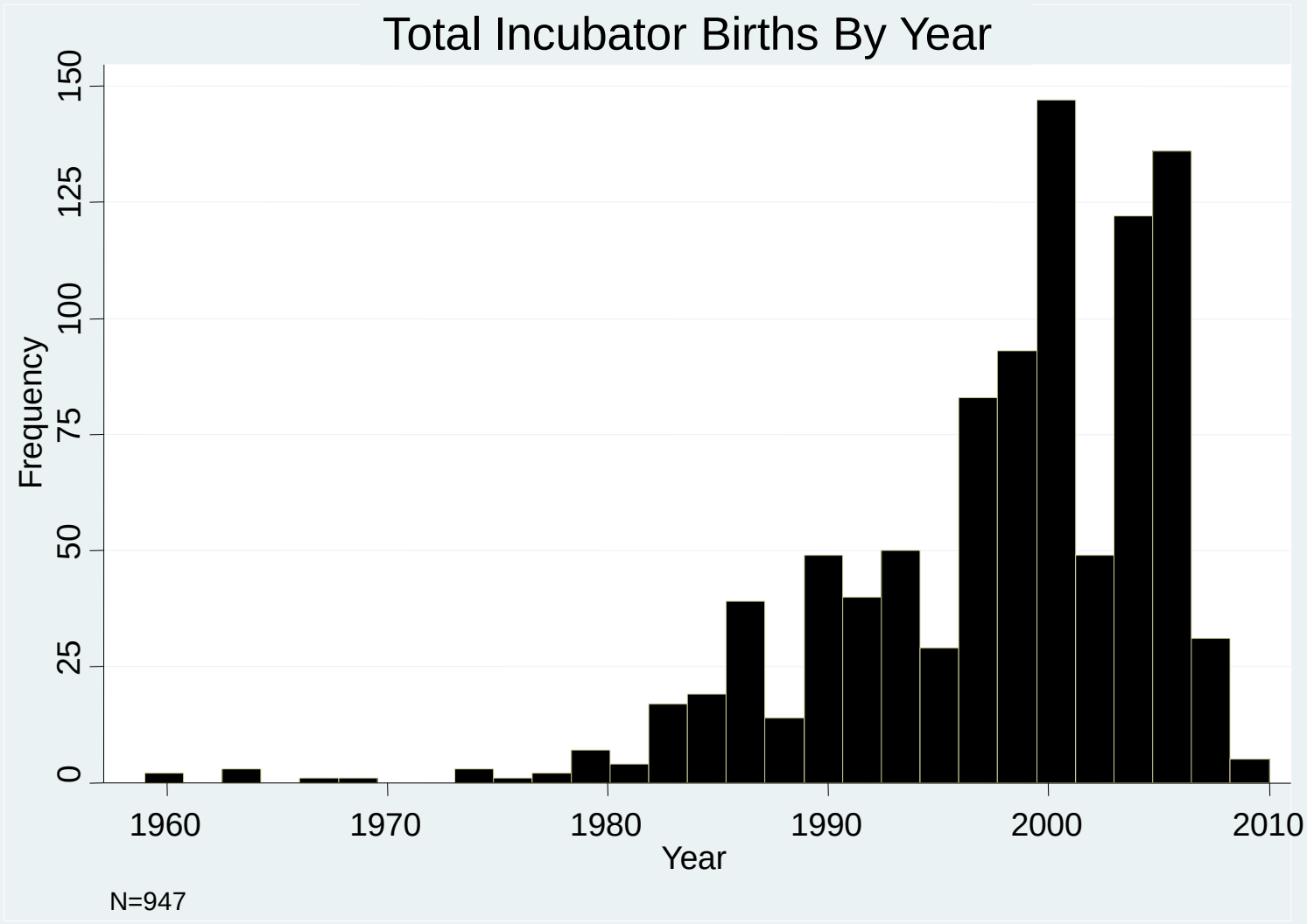
Outline

- **Why Business Incubation?**
- **Research Question**
- **Data Collection**
- **Findings**
- **Discussion and Questions**

Business Incubator Definition

- **An organization that provides free or below market operating space to young businesses**
- **Often provide one or more of the following: shared administrative services, access to capital and financing, networks, and assistance with legal, technology transfer, and export procedures**
- **Motivated by the opportunity to create economic value by helping reduce the rate of failure of young businesses**

Why Incubators?



Incubators Cost Money

- **Economic Development Administration**
  - 30 construction grants in 2010 with matching requirements
  - Average grant size $1.5m
  - $3 million to build an incubator on average
- **Other Federal Funding Sources**
  - US Departments of Agriculture, Commerce, Energy, Health & Human Services, and Housing & Urban Development
- **Average Operating Budget of an Incubator**
  - $500,000
  - $475 million annually
  - Paid primarily by state and local government sources

Research Question

- **Is this a good investment?**
- **Do incubated businesses outperform their unincubated peers?**
- **Performance measures**
  - Survival
  - Employment Growth
  - Sales Growth

Organizational Evolutionary Theory

- **Emergence and survival of new organizations**
- **Liability of Newness**
  - Market
  - Production
  - Management
- **Selection**
  - Organizations that can cover underneath the structure of larger organizations face different selection pressures
  - Organizations that stand-alone must rely on their own competencies to survive

Hypotheses

H1. **Incubated new businesses will perform at higher levels than their non-unincubated counterparts, indicating incubation helps overcome the liability of newness.**

H2. **Incubated firms will outperform their non-incubated counterparts post-incubation, indicating incubation helps firms adapt to the external environment.**

Data Collection

- **National Census of Business Incubators**
- **National Database of Incubated Businesses**
- **Matched Control Group of Unincubated Businesses**

National Census of Business Incubators

- **950 business incubators**
  - 1,121 unique locations
- **Sources**
  - National Business Incubator Association
  - State associations of business incubators
  - Economic development departments of all 50 states
- **Useful data archives**
  - Internet Archive, Dun & Bradstreet, National Center for Charitable Statistics, Lexis-Nexis
- **Collected data on incorporation, founding year, university affiliation, and physical addresses**

Data on Incubated Businesses

- **National Establishment Time Series Database (NETS)**
  - Annual snapshot of Dunn & Bradstreet databases
- **Incubated firms identified through address matching**
  - Approximately 19,000
  - Observations span from 1990 to 2008
- **Verification process**
- **Key variables: survival, sales, employment, industry, gender, racial/ethnic identity, history of relocations**

Data on Non-Incubated Businesses

- **Challenge: Creating a valid comparison group without full access to the NETS**
- **Stage 1: Extract from NETS based on strata matching**
  - 420 strata representing year founded, industry, county, & gender of the entrepreneur
- **Stage 2: Propensity Score Matching**
  - Measures the likelihood of incubation based on observed characteristics
  - Matched based on year founded, industry, county, and gender & ethnic/racial identity of the entrepreneur
  - Weighted data: 3 to 1
  - Nearest neighbor selection method

Identification of Common Support

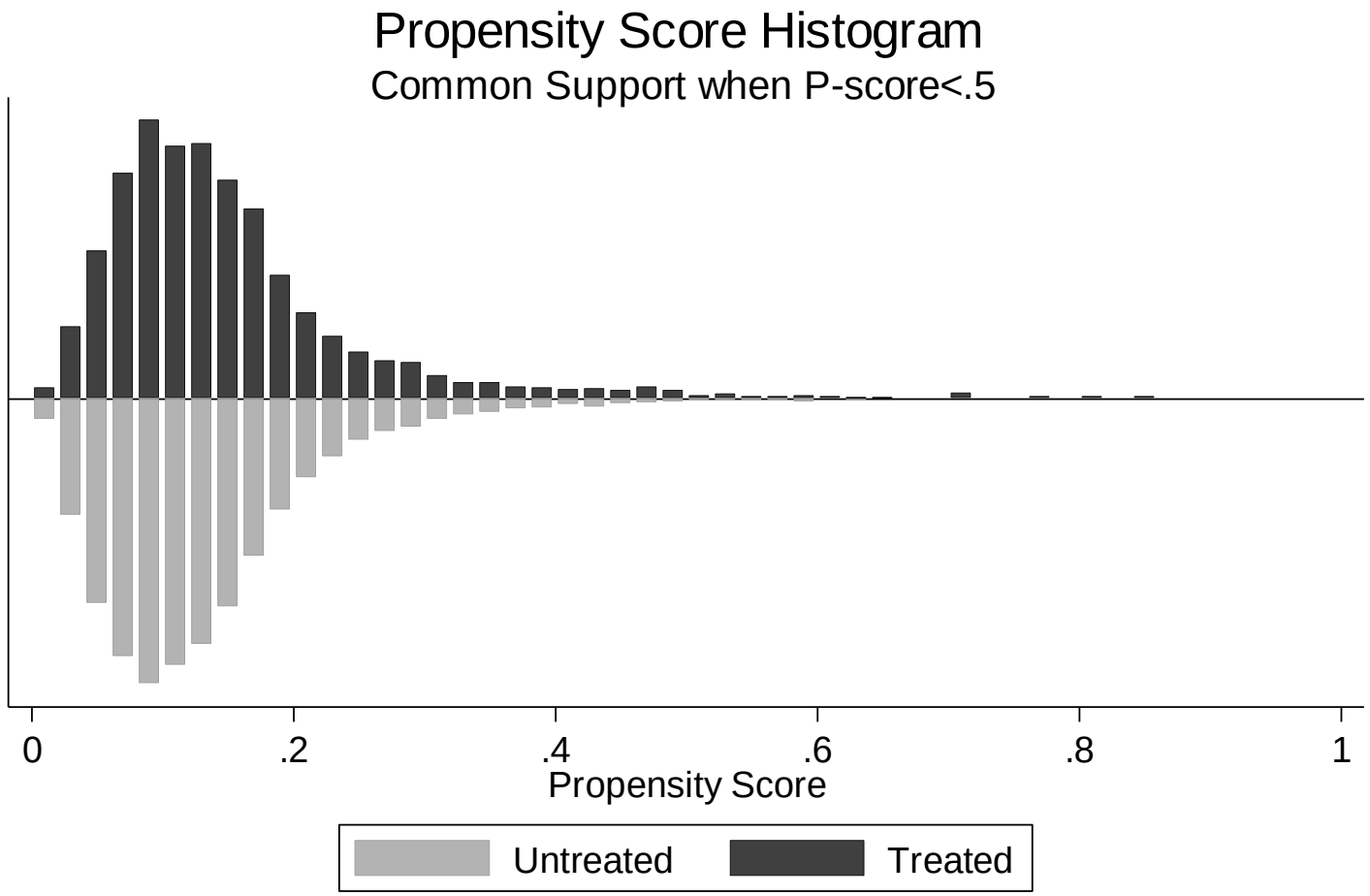


Figure 1

Incubated Firms Descriptive Statistics

	N	Average or %	Min	Max
* Founding Year (ave)	18426	2000	1990	2006
Firm Failure (%)	18426	42%	0	1
Age (ave)	18426	5.03	1	18
Age of Surviving Firms (ave)	10761	6.03	2	18
Age of Failed Firms (ave)	7665	3.63	1	17
Years Spent in Incubator (ave)	18426	4.55	0	18
Graduates	655	4%	0	1
Failed Graduates	193	29%	0	1
Years Spent in Incubator (ave)	657	3.84	0	17
Age at Graduation (ave)	657	4.51	0	17
Initial Sales (ave)	18397	$ 692,783	$ 307	$ 805,000,000
Latest Sales (ave)	18397	$ 695,305	$ 500	$ 304,000,000
Initial Employment (ave)	18426	4.43	1	100
Latests Employment (ave)	18426	5.81	1	2500
* Minority Owned (%)	18426	0.5%	0	1
* Women Owned (%)	18426	6.1%	0	1
* Finance & Insurance	18426	11%	0	1
* Services	18426	59%	0	1

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Estimating Model I

- **Sales and Employment Growth**

$$\Delta\text{growth rate}_{i,t} = \beta_{0i,t} + \gamma_1\Delta\text{growth rate}_{i,t-1} + \beta_2\Delta\text{incubation}_{i,t} + \beta_3\Delta\text{post-incubation}_{i,t} + \beta_4\Delta\text{lag\_size}_{i,t} + \beta_5\Delta\text{firm\_age}_{i,t} + \Delta\varepsilon_{i,t}$$

- Double-difference model controls for the existence of unobserved heterogeneity
- Arellano-Bond system GMM estimator
  - Used to control for autocorrelation and endogeneity

Estimating Model II

- **Survival**

$$S_{\theta}(t_i|x_i) = [1+\{\exp(-\beta_0 - x_i\,\beta_x)\,t_i\}^{1/\gamma}]^{-\theta i}$$

- **Log-logistic distribution**
- **Frailty model**
  - To control for firm level fixed effects
  - θ_l is defined as an unobserved observation-specific effect

Measurement 1: Employment Growth

	Model 1	Model 2
Incubation		**0.0355*** (0.0023)**
Post-incubation		0.0665*** (0.0122)
Employment growth lag	-0.0077 (0.0071)	-0.0073 (0.0071)
Sales lag	-0.0470*** (0.0017)	-0.0498*** (0.0018)
Firm age	0.0002 (0.0003)	0.0004 (0.0003)
Constant	0.6321*** (0.0240)	0.6553*** (0.0243)
Number_obs.	147483	147483
Number_firms	35282	35282
Instruments	41	43
Model degrees of freedom	25	27
Wald chi-squared	995.3589	1068.9515
Wald chi-squared p-value	<0.0001	<0.0001
AR(1) test statistic	-27.5777	-27.5802
AR(1) p-value	<0.0001	<0.0001
AR(2) Test Statistic	-0.5786	-0.5104
AR(2) p-value	0.5629	0.6098
Hansen J statistic	20.6210	20.6767
Hansen J p-value	0.1117	0.1102

NOTES: Robust standard errors in parentheses.

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

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Measurement 2: Sales Growth

	Model 1	Model 2
Incubation		**0.0215*** (0.0025)**
Post-incubation		0.0513*** (0.0147)
Sales growth lag	-0.0527*** (0.0181)	-0.0526*** (0.0181)
Employment lag	-0.0017*** (0.0004)	-0.0017*** (0.0004)
Firm age	-0.0002 (0.0004)	-0.0002 (0.0004)
Constant	-0.0131* (0.0074)	-0.0239*** (0.0075)
Number_obs.	147478	147478
Number_firms	35280	35280
Instruments	41	43
Model degrees of freedom	24	26
Wald chi-squared	1443.9119	1523.4264
Wald chi-squared p-value	<0.0000	<0.0000
AR(1) test statistic	-15.5638	-15.5634
AR(1) p-value	<0.0000	<0.0000
AR(2) Test Statistic	-0.9801	-0.9634
AR(2) p-value	0.3271	0.3353
Hansen J statistic	17.5076	17.4320
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Measurement 3: Firm Survival

	Survival 1(a)	Survival 2(a)(b)	Logit
Incubation		**0.9812*** **	**1.0616*** **
		(0.0045)	**(0.0164)**
Post-Incubation		0.9070***	1.2198**
		(0.0193)	(0.1052)
Employment lag	1.0024***	1.0025***	0.9997
	(0.0006)	(0.0006)	(0.0006)
Firm age	1.2850***	1.2854***	0.9223***
	(0.0032)	(0.0032)	(0.0025)
Women owned	1.1288***	1.1282***	0.5734***
	(0.0104)	(0.0104)	(0.0186)
Minority owned	0.9648*	0.9654*	1.2251**
	(0.0187)	(0.0186)	(0.1099)
Constant	1.9668***	1.9802***	0.1437***
	(0.0997)	(0.0989)	(0.0164)
Gamma	0.2208***	0.2207***	
	(0.0040)	(0.0040)	
Rho			.0000303
Frailty (theta)		0.000	
Number_obs.	237274	237274	237274
Number_firms	36859.667	36859.667	46772.000
Log-likelihood	-3.10e+04	-3.10e+04	-6.74e+04
AIC	62133.605	62098.600	1.35e+05

NOTES: (a)Weighted results (b)Robust standard errors in parentheses.

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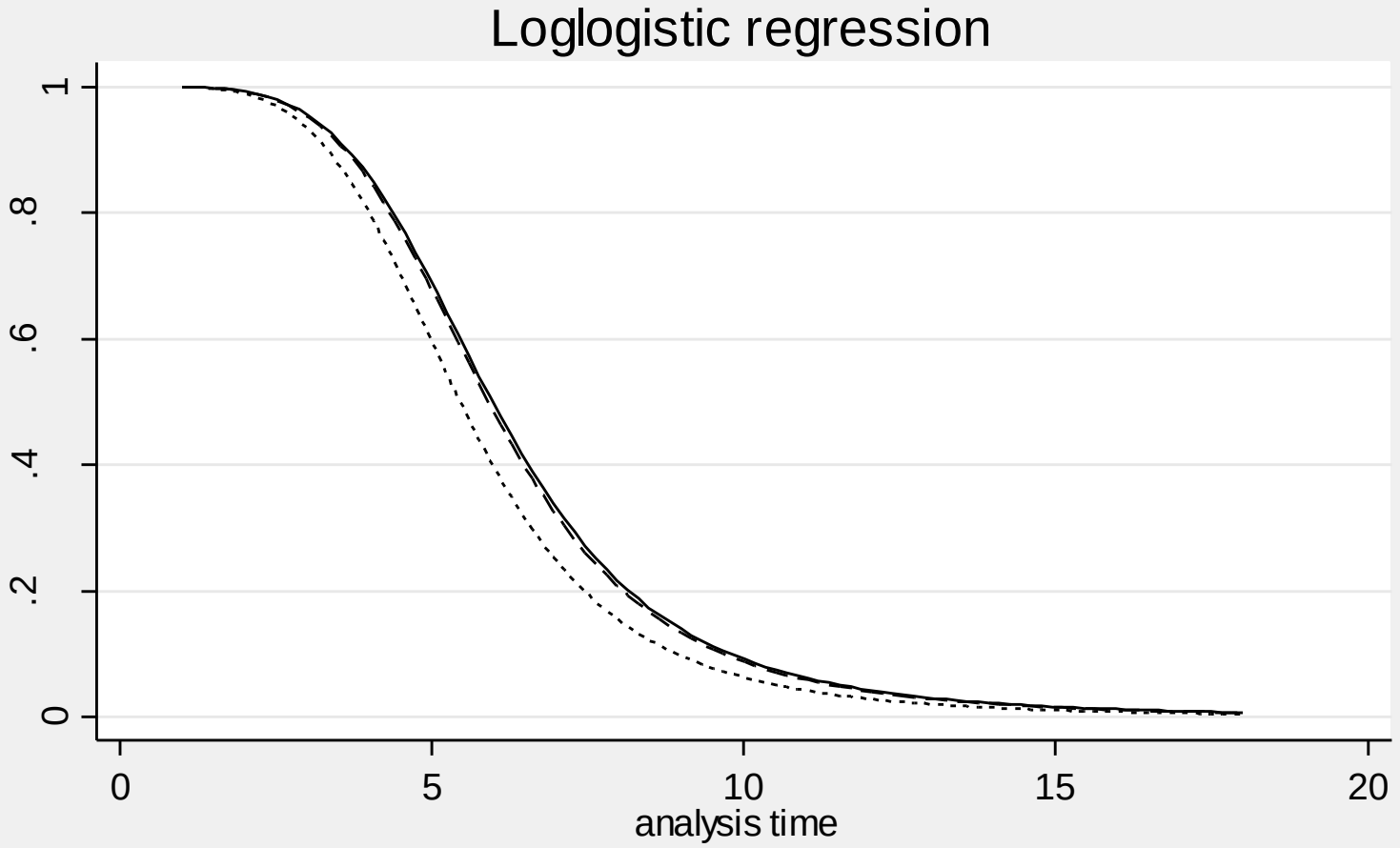
Survival Curves



Summary

- **Employment Growth**
  - Incubation is associated with an increase of 3.5 percentage points in employment growth
  - Exiting the incubator is associated with an increase of 6.6%
- **Sales Growth**
  - Incubation is associated with an increase of 2.2 percentage points in sales growth
  - Exiting the incubator is associated with an increase of 5.13%
- **Survival Analysis**
  - Incubation is associated with a decrease of 2% in expected time to failure
  - Exiting the incubator is associated with a decrease of 10% in expected time to failure

Thanks and Questions

- **Thanks to Professors Stuart Bretschneider, Bruce Kingma, David Popp, Johan Wiklund, and Peter Wilcoxen**
- **Thanks to the Kaufman Foundation**
- **Questions**