

# Firm Growth After Dotcom

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Do scaling laws for manufacturing firms apply to dotcoms and startups with limited physical capital and no product?

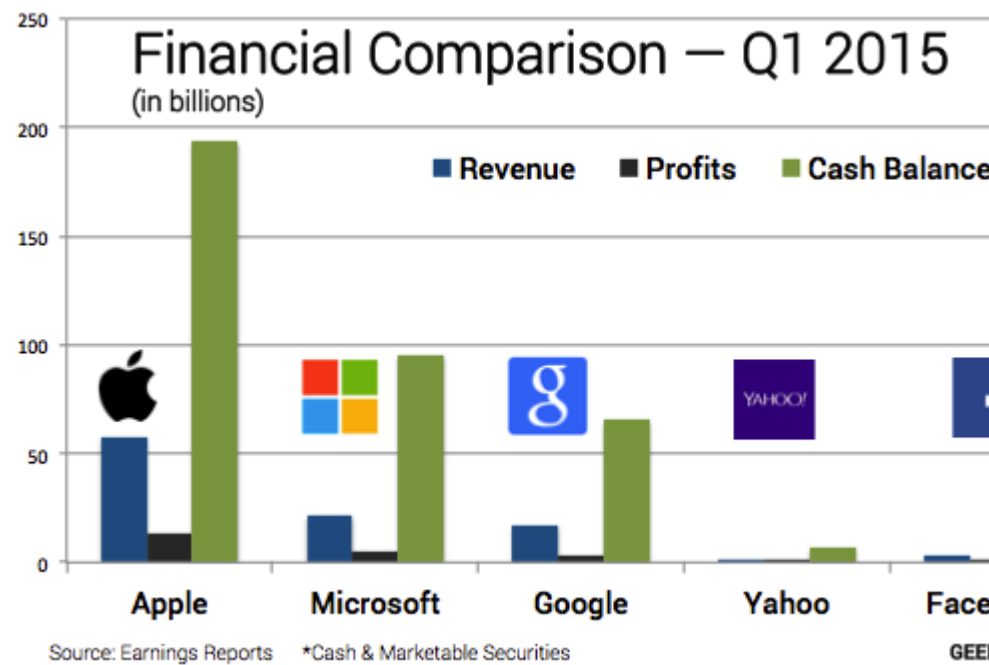
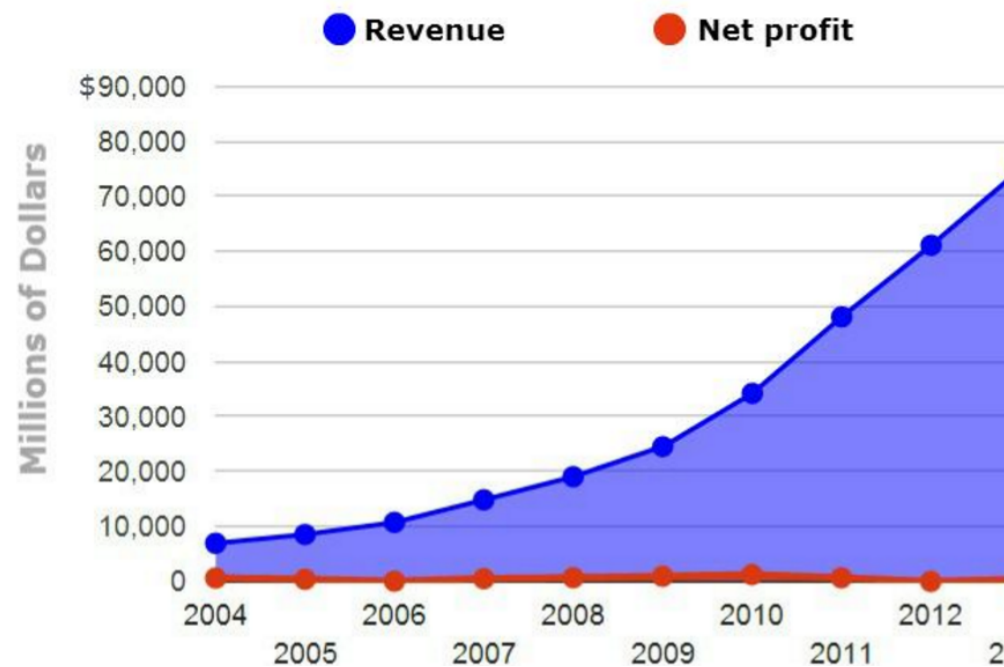
# Outline

1. What companies are we interested in?
2. Compustat
3. Classic results
4. “Modern” companies
5. Evolving towards power laws

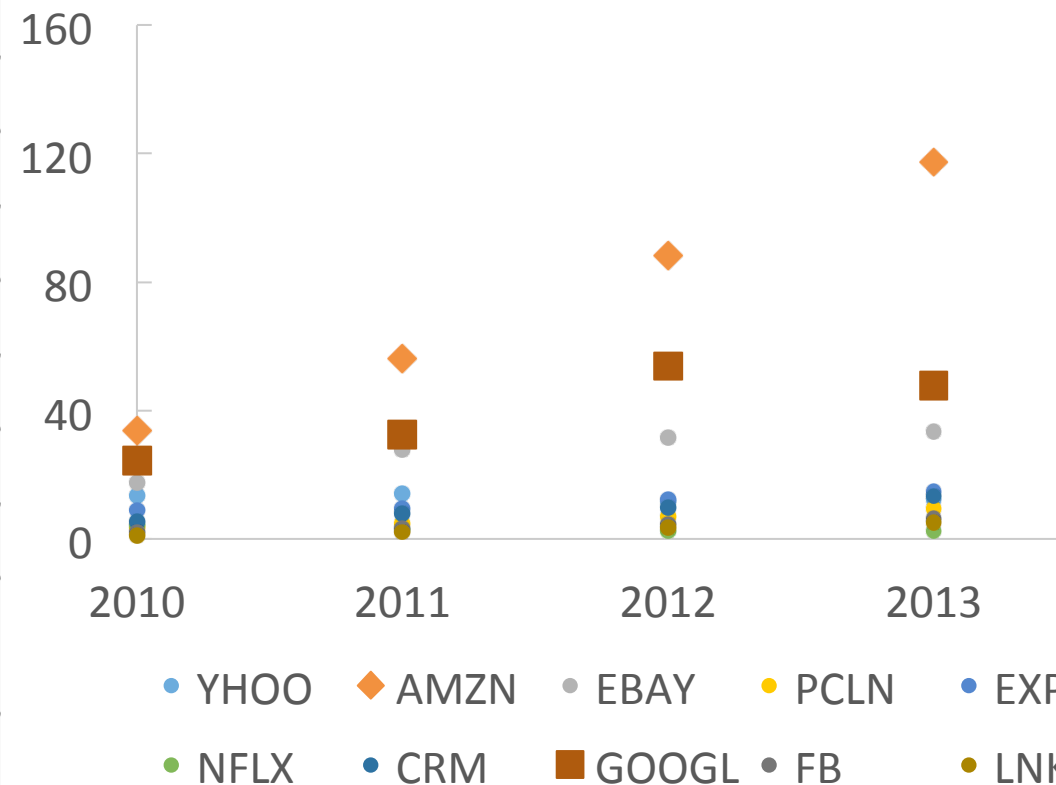


◆	Company	Industry	Revenue (\$B)
	Amazon	E-commerce	\$107
	Google	Search	\$74.98
	JD.com	E-commerce	\$28.00
	Facebook	Social	\$17.93
	Tencent	Social	\$12.89
	Alibaba	E-commerce	\$12.29
	Priceline Group	Travel	\$9.22
	eBay	E-commerce	\$8.59
	Netflix	Web portal	\$6.77
	Expedia, Inc.	Travel	\$6.67
	Rakuten	E-commerce	\$6.3
	Salesforce.com	Cloud computing	\$5.37
	Baidu	Search	\$5.21
	Yahoo	Web portal	\$4.97
	Groupon	E-commerce	\$3.1
	LinkedIn	Social	\$2.99
	Twitter	Social	\$2.22

## Amazon.com's revenue & profit 2004-



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	Twitter	Social	\$2.22



# Compustat/WRDS

99% of market capitalization

From 1950 on

99,000 global securities

> 200TB data (WRDS)

Matlab, R, Python integration

\$35,000 subscription fee





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| » <a href="#">Bank Regulatory</a>              | » <a href="#">Factset Trial</a>                       | » <a href="#">PHLX</a>                           |
| » <a href="#">Blockholders</a>                 | » <a href="#">Fama French &amp; Liquidity Factors</a> | » <a href="#">Public</a>                         |
| » <a href="#">CBOE Indexes</a>                 | » <a href="#">Federal Reserve Bank</a>                | » <a href="#">RavenPack News Analytics Trial</a> |
| » <a href="#">Compustat - Capital IQ</a>       | » <a href="#">GSIOnline</a>                           | » <a href="#">Research Quotient</a>              |
| » <a href="#">Compustat - Capital IQ Trial</a> | » <a href="#">IBES</a>                                | » <a href="#">SEC Order Execution</a>            |
| » <a href="#">CRSP</a>                         | » <a href="#">ISS (formerly RiskMetrics)</a>          | » <a href="#">Thomson Reuters</a>                |
| » <a href="#">CUSIP</a>                        | » <a href="#">Markit Trial</a>                        | » <a href="#">TRACE</a>                          |
| » <a href="#">DMEF Academic Data</a>           | » <a href="#">MSCI (formerly KLD and GMI)</a>         | » <a href="#">WRDS SEC Analytics Suite Trial</a> |
| » <a href="#">Dow Jones</a>                    | » <a href="#">Option Metrics Trial</a>                | » <a href="#">Zacks Trial</a>                    |
| » <a href="#">Event Study by WRDS</a>          |   |  |

# Compustat

1. Choose date range
2. Apply company codes & conditionals
3. Variable types
4. Output preferences

TIC    GVKEY    CUSIP    SIC  

Select an option for entering company codes

*Please enter Company codes separated by a space*  
*Example: IBM MSFT DELL [ [Code Lookup](#) ]*

AND    OR



# Compustat

Search All 5/973

Identifying Information 0/7

Identifying Information, cont. 4/34

Company Desc >>>

Select  All

Search All

- Company Name ?
- Ticker Symbol ?
- CUSIP ?
- CIK Number ?

Selected  Clear All

(5)

- GGROUP -- GIC Groups
- GIND -- GIC Industries
- GSECTOR -- GIC Sectors
- GSUBIND -- GIC Sub-Industries
- EMP -- Employees

# GICS

## GICS sub-industries: 8 digit identifier

Following is a sample of the GICS classification codes for IBM (GVKEY 006066):

**Sector:**

45 ? Information Technology

**Industry Group:**

4520 ? Technology Hardware & Equipment

**Industry:**

452020 ? Computers and Peripherals

**Sub-Industry:**

45202010 ? Computer  
Hardware

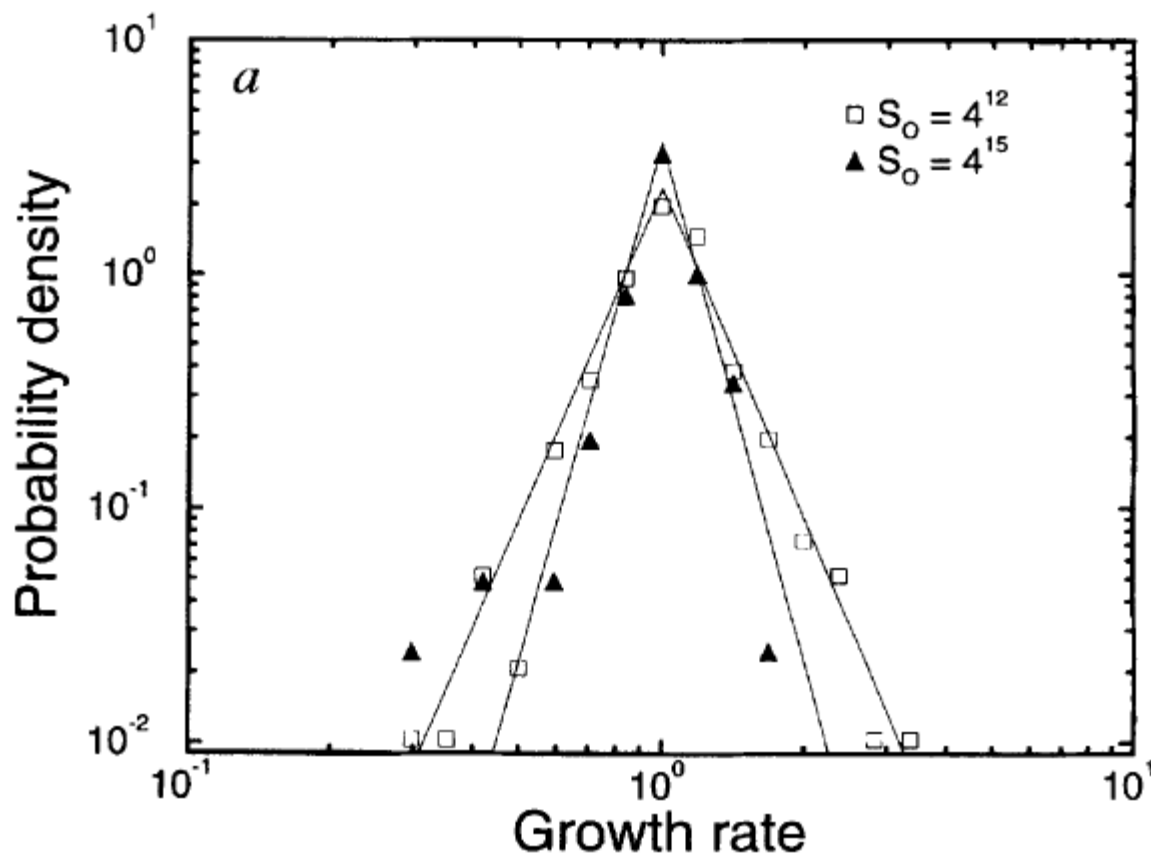
# Alphabet Inc. (GOOGL)

datadate	fyear	tic	gsubind	emp
20101231	2010	GOOGL	45101010	24.4000
20111231	2011	GOOGL	45101010	32.4670
20121231	2012	GOOGL	45101010	53.8610
20131231	2013	GOOGL	45101010	47.7560
20141231	2014	GOOGL	45101010	53.6000
20151231	2015	GOOGL	45101010	61.8140



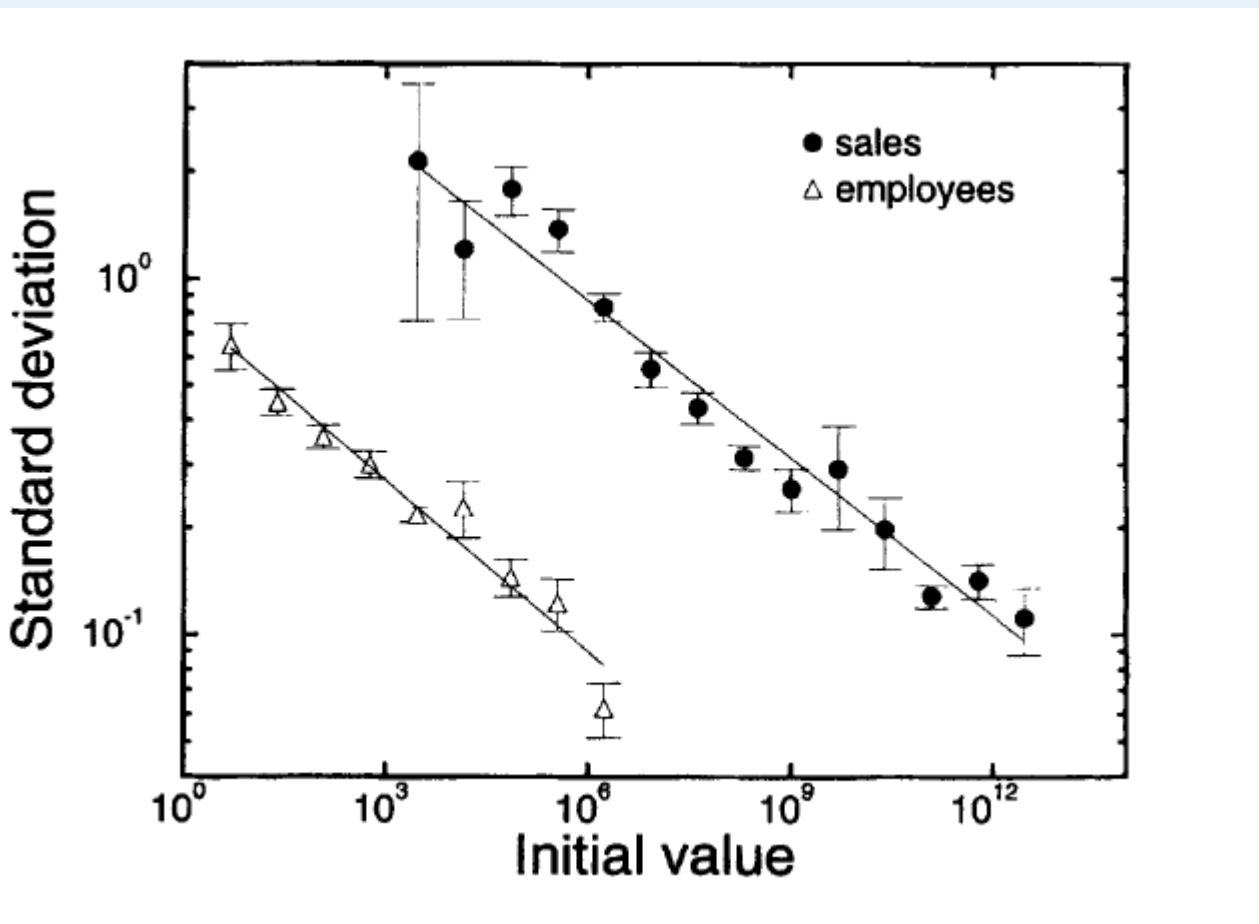
Internet Software & Services

# Scaling behavior in the growth of companies



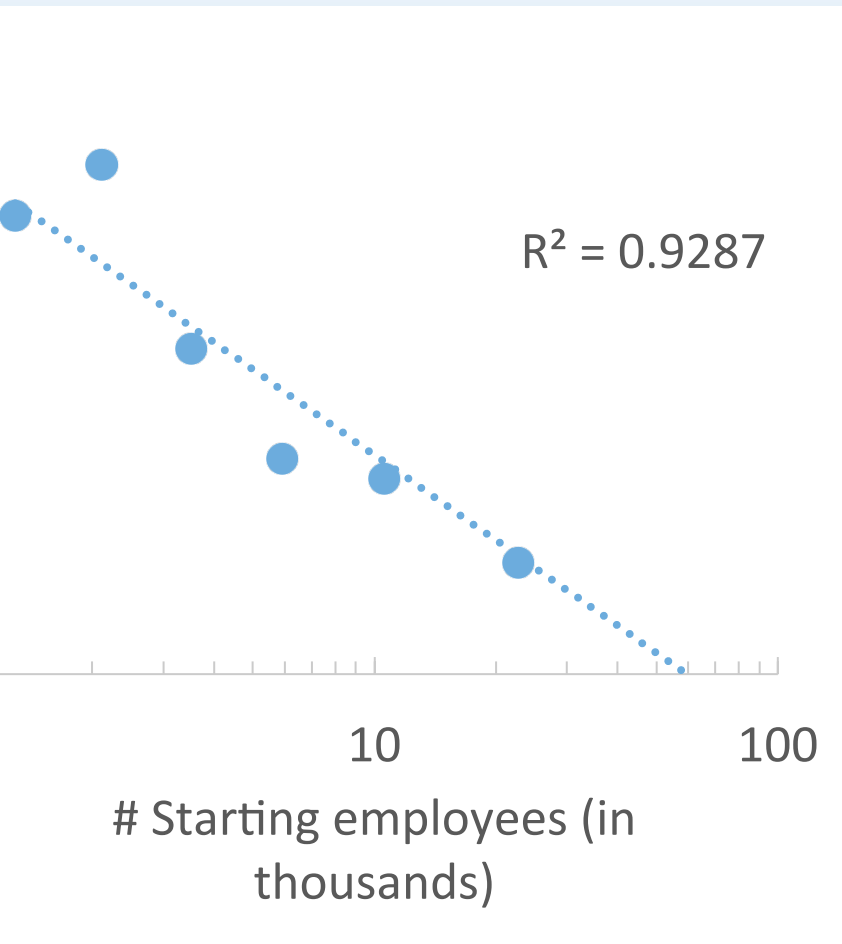
- Prob density of growth rate  $r$  from year 1990 to 1991 for all publicly traded US manufacturing firms
- Two bins of initial sales
- Fit to exponential distribution (not Gaussian)

# Scaling behavior in the growth of companies



- Stdev of one-year growth rates of sales and # employees

# All public companies (2013-2014)

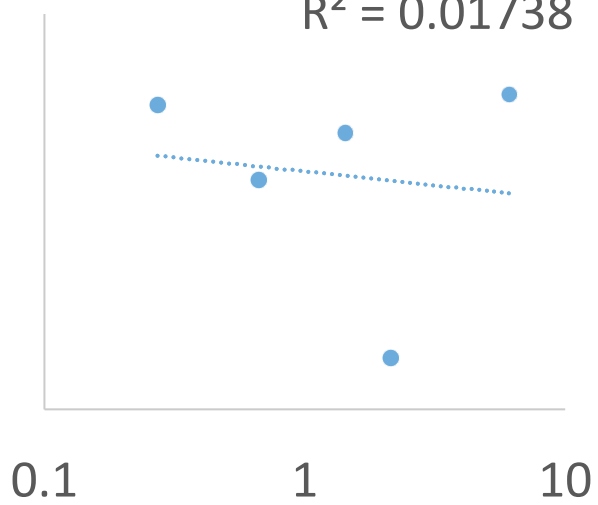


> 1000 employees  
Power law

5 -> 2010 -> 2013

2005-2006

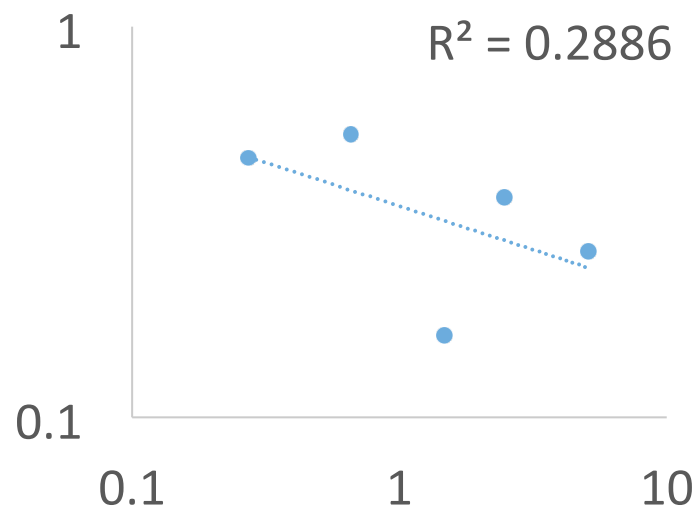
$R^2 = 0.01738$



5, [106, 9800]

2010-2011

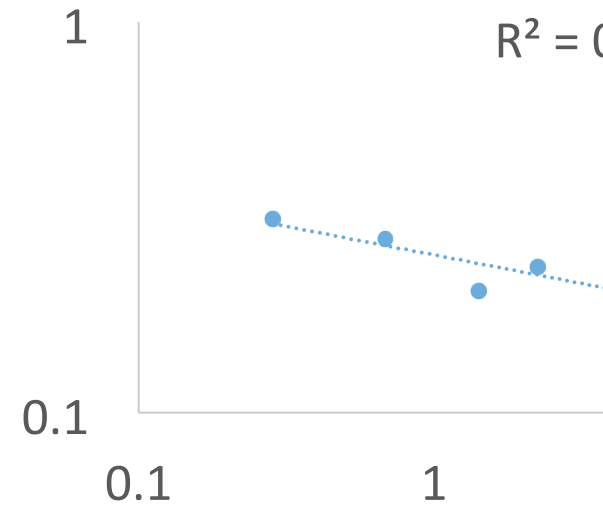
$R^2 = 0.2886$



N=83, [111, 7353]

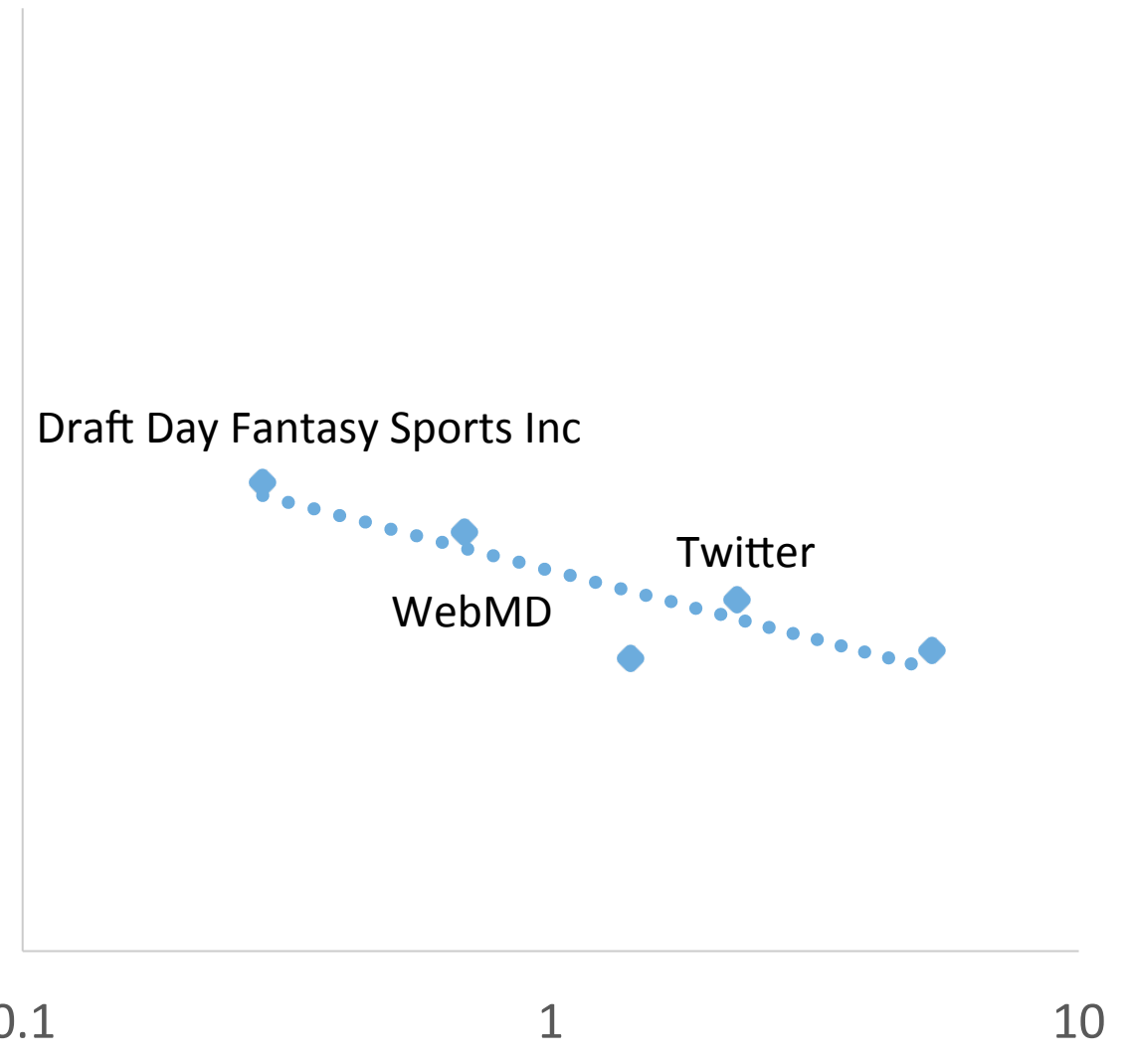
2013-2014

$R^2 = 0$



N=138, [108, 9175]

2013-2014



## Take Home

- Scaling behavior applies universally to industries
- Dependent upon some size/ time-like parameters
- Not restricted by plant, property & equipment