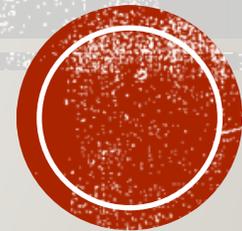


**THE INFLUENCE OF INSTITUTIONAL OWNERSHIP  
ON EQUITY VALUATION VARIABILITY**

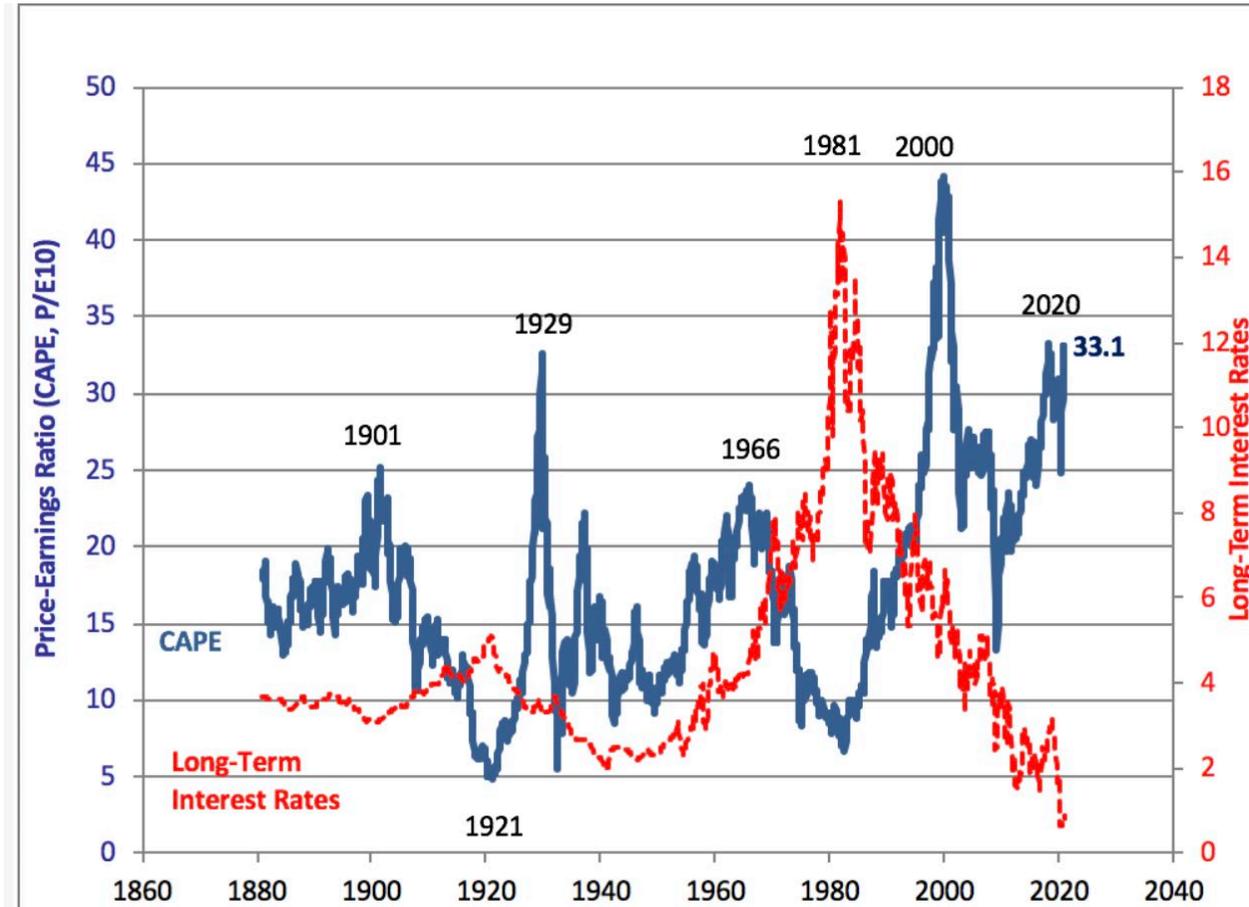
**Benjamin Cutler**



**Professor Tang**

# RESEARCH QUESTION(S)

- Why have valuations become more volatile since 1980?
- Did a decrease in transaction costs for amateur traders influence this trend?
- Are technology stocks part of this behavior?
- Importance



# Stock Market Valuation Confidence



<https://som.yale.edu/faculty-research-centers/centers-initiatives/international-center-for-finance>



# REVIEW OF LITERATURE

- *Trading by Professional Traders: An Experiment* (Cipriani, et al 2020) Performed an experiment that showed evidence amateur investors trade differently than institutional investors
- *Herding in trading by amateur and professional investors* (Nashikkar, & Shapira 2009) Certain behavioral effects are present and can be observed in capital markets “herding”
- *Changes in Institutional Ownership and Stock Returns: Assessment and Methodology* (Sias, Starks, & Titman 2006) Established a connection between same quarter stock returns and Institutional ownership
- *Market Underreaction and Overreaction of Technology Stocks* (Akhigbe, Larson & Madura 2002) Technology stocks are particularly susceptible to over and under reaction behavior



# HYPOTHESIS(ES)

- Hypothesis 1: As the percentage of institutional ownership decreases (amateur investors increase), the variability of the Price to Earnings Valuation Ratio should increase.
- Alternative Hypothesis: As the percentage of institutional ownership decreases, the variability of the P/E ratio decreases
- Tested using quarterly data from 10 randomly selected Technology stocks from the S & P 500 from 2010 Q1 – 2019 Q4
- Dependent Variable=  $STDV(P/E \text{ Ratios})$
- $P/E \text{ Ratio} = \text{Quarterly Average Normalized Stock Price} / \text{Quarterly Earnings}$



# FINANCIAL THEORY AND VARIABLE SELECTION

- Capital Asset Pricing Model =  $RR=RF + B(RM-RF)$
- Sharpe (1964) & Fama and French (1992)
- 10 year bond yield= $RF$ , STDV of stock= Beta,  $RM= S$  and P 500 return
- Gordon (1959) Growth Model =  $D1/(r-g)$

Real GDP Growth= $G$ , Earnings = $D1$

- $NPV= \text{Cash Flow}/((1+i)^t)$
- CPI included since nominal interest rates differ from real interest rates



# INDEPENDENT VARIABLES

- Institutional Ownership-Percentage of shares held by 13 F filers (>100MM AUM)
- LN(Average Quarter Stock Price)
- LN(Quarterly Earnings)
- Average Quarterly Bond Yield
- Quarterly Standard Deviation of 10 Year Bond Yield-
- S and P 500 return
- Quarterly Cape (cyclically adjusted price earnings ratio)- Shiller's Website



# 10 RANDOMLY SELECTED STOCK TICKERS

- ADP-Automatic Data Processing Inc
- AMAT-Applied Materials, Inc.
- MSFT-Microsoft Corporation
- QCOM-QUALCOMM, Inc.
- CSCO-Cisco Systems Inc
- ADI-Analog Devices, Inc
- NLOK-NortonLifeLock Inc
- CDNS-Cadence Design Systems, Inc
- NVDA -NVIDIA Corporation

Sample Median Market Cap  
\$1.18 billion  
Tech Median  
\$379 million

The large difference in the median can be explained by a survivorship bias from sampling method



### Simple Statistics

Variable	N	Mean	Std Dev	Sum	Minimum	Maximum
Insitutional_Ownership	399	45.39596	11.13022	18113	29.55667	98.20500
lag_Insitutional_Ownership	398	45.40156	11.14366	18070	29.55667	98.20500
Years_After_IPO	400	29.40000	13.15190	11760	9.00000	58.00000
CPI	400	1.76750	0.82243	707.00000	-0.10000	3.70000
lag_S_and_P_500_return	399	3.10018	4.15930	1237	-7.05925	12.51082
Average_Quarterly_10_year_Bond	400	2.40544	0.52918	962.17657	1.56438	3.71787
lag_GDP	399	2.30346	0.67282	919.08185	0.94904	4.14775
In_Quarterly_Earnings	376	12.86312	1.52428	4837	8.75195	16.39474
In_Average_Quarterly_Stock_Price	400	3.62590	0.73769	1450	1.85791	5.53106



# METHODS

- Observational Panel
- 400 observations spanning 10 stocks over a 10 year period
- T tests
- F Tests



# MODEL SELECTION

- OLS Model inadequate and Institutional Ownership Insignificant
- Hausmann Test was significant indicating no random effects
- F test for fixed effects is significant
- Fixed one panel selected



# Correlation Matrix

Pearson Correlation Coefficients  
 Prob > |r| under H0: Rho=0  
 Number of Observations

	Insitutional_Ownership	lag_Insitutional_Ownership	Years_After_IPO	CPI	lag_S_and_P_500_return	Average_Quarterly_10_year_Bond	lag_GDP	In_Quarterly_Earnings	In_Average_Quarterly_Stock_Price
<b>Insitutional_Ownership</b>	1.00000 <.0001 399	0.80393 <.0001 397	0.09213 0.0660 399	0.07962 0.1123 399	-0.06394 0.2030 398	-0.05348 0.2866 399	0.03682 0.4639 398	-0.20791 <.0001 375	0.06050 0.2279 399
<b>lag_Insitutional_Ownership</b>	0.80393 <.0001 397	1.00000 <.0001 398	0.03526 0.4831 398	0.09261 0.0649 398	-0.04531 0.3673 398	0.13756 0.0060 398	-0.03296 0.5120 398	-0.21739 <.0001 374	-0.04554 0.3649 398
<b>Years_After_IPO</b>	0.09213 0.0660 399	0.03526 0.4831 398	1.00000 0.02329 400	0.02329 0.6424 400	-0.04359 0.3852 399	-0.05780 0.2488 400	-0.02117 0.6733 399	0.03985 0.4411 376	0.26097 <.0001 400
<b>CPI</b>	0.07962 0.1123 399	0.09261 0.0649 398	0.02329 0.6424 400	1.00000 0.02329 400	0.06085 0.2252 399	0.13491 0.0069 400	-0.08061 0.1079 399	0.05852 0.2576 376	0.12517 0.0122 400
<b>lag_S_and_P_500_return</b>	-0.06394 0.2030 398	-0.04531 0.3673 398	-0.04359 0.3852 399	0.06085 0.2252 399	1.00000 0.06085 399	0.37026 <.0001 399	-0.16068 0.0013 399	-0.00059 0.9909 375	-0.08240 0.1003 399
<b>Average_Quarterly_10_year_Bond</b>	-0.05348 0.2866 399	0.13756 0.0060 398	-0.05780 0.2488 400	0.13491 0.0069 400	0.37026 <.0001 399	1.00000 -0.34431 400	-0.34431 <.0001 399	-0.00640 0.9015 376	-0.09361 0.0614 400
<b>lag_GDP</b>	0.03682 0.4639 398	-0.03296 0.5120 398	-0.02117 0.6733 399	-0.08061 0.1079 399	-0.16068 0.0013 399	-0.34431 <.0001 399	1.00000 0.6079 399	-0.02658 0.6079 375	-0.09809 0.0502 399
<b>In_Quarterly_Earnings</b>	-0.20791 <.0001 375	-0.21739 <.0001 374	0.03985 0.4411 376	0.05852 0.2576 376	-0.00059 0.9909 375	-0.00640 0.9015 376	-0.02658 0.6079 375	1.00000 0.9015 376	0.29158 <.0001 376
<b>In_Average_Quarterly_Stock_Price</b>	0.06050 0.2279 399	-0.04554 0.3649 398	0.26097 <.0001 400	0.12517 0.0122 400	-0.08240 0.1003 399	-0.09361 0.0614 400	-0.09809 0.0502 399	0.29158 <.0001 376	1.00000 0.0502 400



Panel Fixed Effects R <sup>2</sup> =.5485 ADJ R <sup>2</sup> =.5373 F value=.0001*** N=374	Panel Fixed Effects R <sup>2</sup> =.5359 ADJ R <sup>2</sup> =.5283 F value=.0001*** N=374	Panel Fixed Effects R <sup>2</sup> =.5356 ADJ R <sup>2</sup> =.5292 F value =.0001*** N=374	Panel Fixed Effects R <sup>2</sup> =.5482 ADJ R <sup>2</sup> =.5382 F value=.0001*** N=374	Panel OLS R <sup>2</sup> =.3942 ADJ R <sup>2</sup> =.3775 N=374
Intercept 1.9654 .1779 <.0001***	Intercept 1.8805 .1716 .0001***	Intercept 1.8541 .1638 .0001***	Intercept 1.9643 .1777 .0001***	Intercept 1.0516 .1109 .0001***
Institutional Ownership .0016 .0008 .0525*	Institutional Ownership .0017 .000837 .0431**	Institutional Ownership .001663 .000833 .0468**	Institutional Ownership .001643 .000841 .0515*	Institutional Ownership -.0008 .000782 .3075
Years After IPO -.0107 .0051 .0351**	Years After IPO -.01096 .00500 .0289**	Years After IPO -.0101 .00471 .0326**	Years After IPO -.01091 .00503 .0307**	Years After IPO -.0131 .0176 .4565
CPI .0239 .0088 .0070***	CPI	CPI	CPI .024 .00881 .0067**	CPI .0229 .0101 .0272**
Average Bond yield -.02244 .0162 .1667	Average Bond yield -.0074 .0050 .6040	Average Bond yield	Average Bond yield -.0203 .0155 .1904	Average Bond yield -.0131. .0176 3785
Lag GDP -.013 .0114 .2543	Lag GDP	Lag GDP	Lag GDP -.02033 .0114 .2415	Lag GDP -.00896 .0128 .4838
Lag S and P 500 return .000832 .00182 .6475	Lag S and P 500 return	Lag S and P 500 return	Lag S and P 500 return	Lag S and P 500 return .00036 .00207 .8620
Ln Quarterly Earnings -.16768 .0133 .0001***	Ln Quarterly Earnings -.16509 .0133 .0001***	Ln Quarterly Earnings -.1645 .0133 .0001***	Ln Quarterly Earnings -.16755. .0132 .0001***	Ln Quarterly Earnings -.08115 .00565 .0001***
Ln Stock Price .1352 .0133	Ln Stock Price .1419 .0248	Ln Stock Price -.1645 .0242	Ln Stock Price .1354 .0248	Ln Stock Price .046434 .0154

# INTERPRETING THE COEFFICIENT

- For every one percent increase in institutional ownership the STDV of the PE ratio increases .002 or about 1/20 of a cent . This is a fairly large increase in variability.
- For reference the median PE ratio of the S and P 500 is 14.85. A 5 percent increase would equate to about a 1.6 percent of total PE in the median stock
- Limits



# KEY FINDINGS

- There is evidence to suggest that institutional ownership has an effect on the variability of Valuation Ratios of Tech Stocks within the S and P 500.
- The direction of the relationship was positive indicating that as institutional ownership increases STDV of PE Increases
- There is support that Institutional Ownership is associated with volatility
- Financial Data is highly correlated therefore further research should be done before claiming causation.



# DISCUSSION AND RECOMMENDATIONS

- The regression showed that institutional ownership was a significant variable
- If causation were established this would have broad implications regarding the efficiency of markets
- Future research should consider the effect across several types of stocks and time periods
- 13 F filers include hedge funds who engage in speculative asset trades with tremendous volume





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