In Search of Earnings Predictability

Zhi Da*, Joey Engelberg‡ and Pengjie Gao*

*** University of Notre Dame**
‡ University of North Carolina – Chapel Hill

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Motivation

- Search queries reveal the intentions of those who query
- According to Choi and Varian (2009) "query data may be correlated with the current level of economic activity in given industries and thus may be helpful in predicting the subsequent data releases.“
  - Provide evidence that search volume can predict subsequent reports of home sales, automotive sales and tourism.
- Firms announce earnings four times a year with a lag
- Search data may be well-suited to predict well-suited to predict lagged releases of firm fundamentals

Summary

- The search volume index (SVI) of a firm's most popular product is strongly related to the revenue announced by the firm
  - Increases (decreases) in SVI strongly predicts positive (negative) revenue surprises for the firm on its announcement day
- This predictability extends to the standardized unexpected earnings (SUE) of the firm
- We also find that SVI innovations predict earnings surprise relative to the consensus analyst forecast (SAFE),
  - especially among firms with high information uncertainty (high forecast dispersion)
- SVI changes predict announcement-window returns, *even after controlling for contemporaneous revenue and earnings surprises*.
  - Suggests information contained in SVI is value-relevant and incremental to other fundamental information about the firm.

Contribution

- Most non-GAAP leading indicators come *from the firm*
  - Linguistic content of firm announcements (Demers and Vega ,2009; Feldman et al, 2009; Li 2006; Li 2008)
  - Firm patents (Deng, et al., 1999; Hall et al., 2000; Gu and Lev, 2002, 2004)
  - Vocal affect (Mayew and Venkatachalam, 2009)
  - Order backlogs (Rajgopal et al. (2003a))
  - Same-store sales growth rates (Yang, 2007)
  - …. and others!
- Our leading indicator comes *from the customers*
  - Available in real-time
  - Fewer concerns about bias and selective disclosure
  - May be especially useful when firms have little information
- Closest to ours: Trueman et al. (2001) and Rajgopal et al. (2003b)
  - Which look at web traffic and profitability among Internet firms

Literature

- Others have recognized the advantages of using search volume
  - Da, Engelberg and Gao (2009) examine search volume for stock tickers (e.g., "MSFT" and "APPL") as a predictor of retail demand for shares
  - Ginsberg et al. (2008) found that search data for forty-five terms related to influenza predicted flu outbreaks one to two weeks before Centers for Disease Control and Prevention (CDC) reports

> "*Harnessing the collective intelligence of millions of users, Google web search logs can provide one of the most timely, broad-reaching influenza monitoring systems available today*."
>
> - **Ginsberg et al.** (2009)

What is Google's Search Volume Index (SVI)?

- Weekly volume of search for that term scaled by the time-series average

Search for Firm Products

- We gather data on firm products from Nielsen Media Research (NMR)
  - NMR provided to us a list of all firms which advertised a product on television during our time period of 2004 - 2008.
  - From this list of 9,764 unique firms, we hand-match the set of firms which are publicly traded - this results in a list of 865 firms
  - Unmatched firms are private firms (e.g., the Law Offices of James Sokolove; Empire Today and City Mattress) or non-profit organizations (e.g., Habitat for Humanity; the American Red Cross and the Public Broadcasting Service)
- These 865 firms are associated with 12,259 brand/products
  - Time Warner Inc. has 886 products in the database (magazines such as *People* to home videos such as seasons of *Friends* and the *West Wing*)
  - Lojack Inc. has one product – the Lojack Security system.
  - 337 firms which only advertise one product according to NMR

Search for Firm Products (cont'd)

- To make the data collection process manageable, we select each firm's most popular product according to NMR
- Next, we consider how these 865 products might be searched in Google
  - We do this by having two independent Ras report how they would search for each product
  - Where there are differences between the reports, we use Google Insights "related search" feature to determine which query is most common
- The resulting database is a list of firms and associated with search terms for its most popular product

Table 1: Sample of Firms and Search Terms

Firm	Search Term	Firm	Search Term	Firm	Search Term
A M R CORP	AMERICAN AIRLINES	HANESBRANDS INC	PLAYTEX	MIDAS INC	MIDAS SHOP
ALLERGAN INC	RESTASIS	HOME DEPOT INC	HOME DEPOT	NAUTILUS INC	BOWFLEX
AMGEN INC	NEULASTA	HONDA MOTOR LTD	HONDA	NETFLIX INC	NETFLIX
APPLE INC	IPOD	I H O P CORP NEW	APPLEBEES	NEWELL RUBBERMAID	SHARPIE
ASHLAND INC	VALVOLINE	IAC INTERACTIVE	MATCH.COM	NUTRISYSTEM INC	NUTRISYSTEM
AUTOZONE INC	AUTOZONE	INTUIT INC	QUICKEN	OHIO ART CO	ETCH A SKETCH
AVAYA INC	AVAYA	INVACARE CORP	INVACARE	PEPSICO INC	GATORADE
BEBE STORES INC	BEBE	IROBOT CORP	ROOMBA	POPULAR INC	ELOAN
BOSTON BEER INC	SAMUEL ADAMS	JARDEN CORP	FOODSAVER	PRICELINE COM INC	PRICELINE.COM
C A INC	CA COMPUTER	JETBLUE AIRWAYS	JETBLUE	PROCTER & GAMBLE CO	FEBREZE
CEC ENTERTAINMENT	CHUCK E CHEESE	KIMBERLY CLARK	KLEENEX	RC2 CORP	BOB THE BUILDER
COCA COLA CO	COKE	KNOT INC	THE KNOT	RESEARCH IN MOTION	BLACKBERRY
CONSECO INC	COLONIAL PENN	KOHLS CORP	KOHLS	RUBY TUESDAY INC	RUBY TUESDAY
DELL INC	DELL	KONAMI CORP	KONAMI	SARA LEE CORP	HILLSHIRE FARMS
DIAMOND FOODS INC	EMERALD NUTS	KRAFT FOODS INC	OREO	SEPRACOR INC	LUNESTA
EARTHLINK INC	PEOPLEPC	KROGER COMPANY	FRED MEYER	SUPERVALU INC	ALBERTSONS
EBAY INC	EBAY	L C A VISION INC	LASIKPLUS	TIVO INC	TIVO
ECOLAB INC	NASCAR AUTOCARE	LEVITT CORP FLA	BOWDEN HOMES	TREE COM INC	LENDINGTREE
ENDOCARE INC	CRYOCARE	LIZ CLAIBORNE INC	LIZ CLAIBORNE	U A L CORP	UNITED AIRLINES
EVERCORE PARTNERS	NATIONAL ENQUIRER	LO JACK CORP	LOJACK	UNITED ONLINE INC	NETZERO
FEDEX CORP	FEDEX	MACYS INC	MACYS	V F CORP	WRANGLER JEANS
GANNETT INC	CAREERBUILDER	MASCO CORP	DELTA FAUCETS	VIVENDI	ACTIVISION
GAP INC	OLD NAVY	MCDONALDS CORP	MCDONALDS	WYETH	ADVIL
GARMIN LTD	GARMIN	MERCK & CO INC	SINGULAIR	YAHOO INC	YAHOO
GENERAL MILLS INC	CHEERIOS	MICROSOFT CORP	MICROSOFT	YUM BRANDS INC	PIZZA HUT

Google Insights for Search beta

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Compare by	Search terms	Filter
Search terms Locations Time Ranges	Tip: Use the plus sign to indicate OR. (tennis + squash) CHUCK E CHEESE + Add search term	Web Search Worldwide 2004 - present All Categories Search

Web Search Interest: chuck e cheese

Worldwide, 2004 - present

Categories: Food & Drink (50-75%), Shopping (10-25%), Local (0-10%), Entertainment (0-10%) , more...

Interest over time Forecast News headlines

How can I see numbers?

New! Google New! Embed this chart

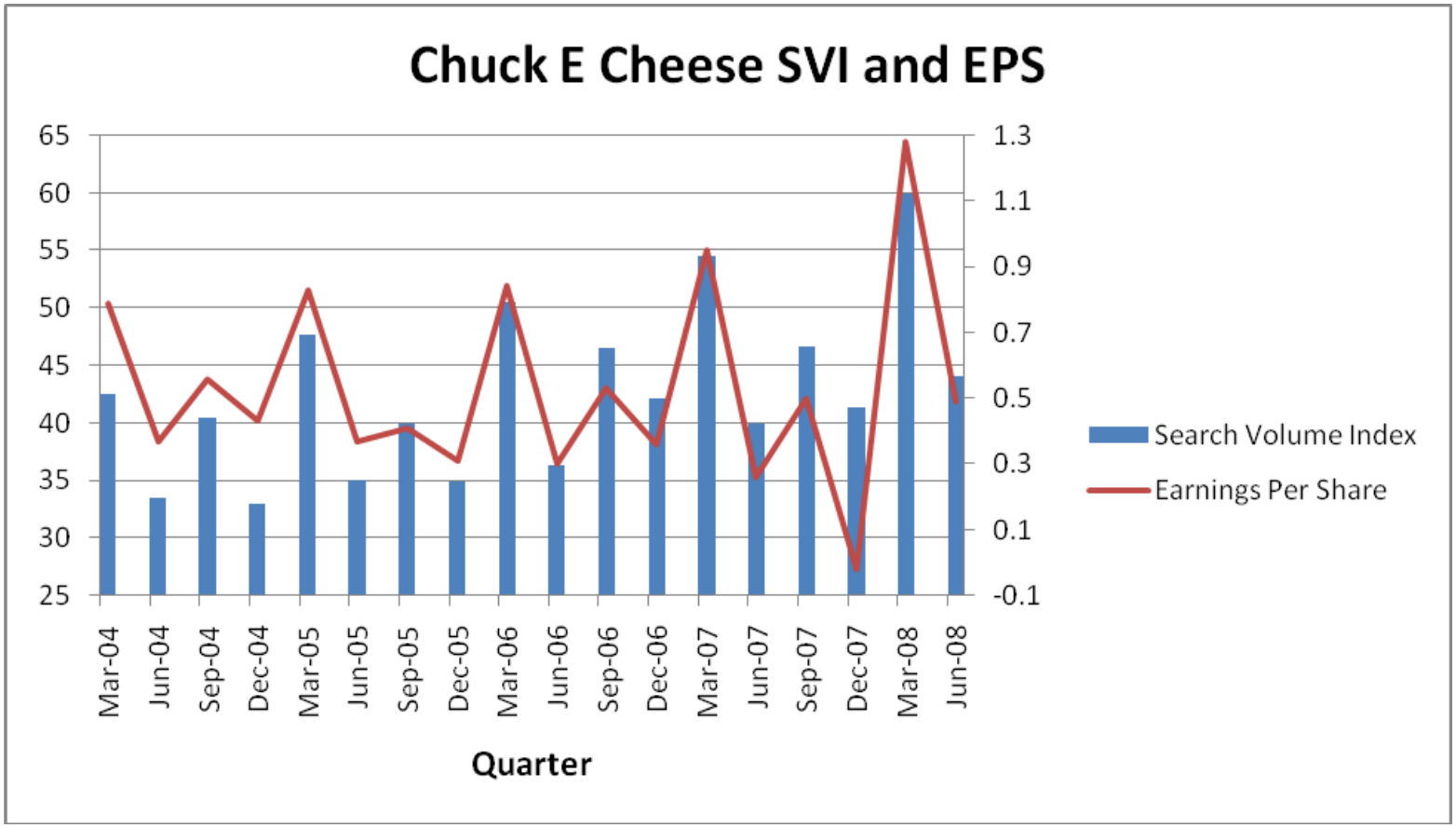

Chuck E Cheese SVI and EPS
65
60
55
50
45
40
35
30
25
1.3
1.1
0.9
0.7
0.5
0.3
0.1
-0.1
Mar-04
Jun-04
Sep-04
Dec-04
Mar-05
Jun-05
Sep-05
Dec-05
Mar-06
Jun-06
Sep-06
Dec-06
Mar-07
Jun-07
Sep-07
Dec-07
Mar-08
Jun-08
Quarter
Search Volume Index
Earnings Per Share

Table 3: Revenue Surprise

	Dependent Variable: Revenue Surprise							
SVI Change	0.825***	0.823***	0.875***	0.878***	0.873***	0.875***	0.875***	0.919***
	(0.084)	(0.085)	(0.088)	(0.088)	(0.088)	(0.088)	(0.088)	(0.082)
Size		0.023***	0.023***	0.025***	0.023***	0.023***	0.020***	0.026***
		(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Market-to-Book			0.006	0.006	0.003	0.003	0.001	0.003
			(0.007)	(0.007)	(0.005)	(0.005)	(0.004)	(0.006)
Turnover				-0.015***	-0.013**	-0.012**	-0.012**	-0.011*
				(0.005)	(0.005)	(0.005)	(0.005)	(0.006)
Prior Return					0.410***	0.407***	0.364***	0.536***
					(0.085)	(0.085)	(0.084)	(0.083)
Institutional Ownership						-0.014	-0.013	-0.015*
						(0.010)	(0.010)	(0.009)
Firm Guidance: Negative							-0.191***	-0.172***
							(0.045)	(0.046)
Firm Guidance: Neutral							0.066*	0.077**
							(0.034)	(0.035)
Firm Guidance: Positive							0.273***	0.291***
							(0.052)	(0.054)
Lag(Revenue Surprise)								-0.260***
								(0.013)
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	11727	11408	10699	10692	10692	10667	10667	10642
R-Squared	0.02794	0.02975	0.03327	0.03363	0.03637	0.03674	0.04097	0.1068

Table 3: Revenue Surprise (Seasonally-Adjusted)

	Dependent Variable: Revenue Surprise (Seasonally Adjusted)							
SVI Change	0.487***	0.417***	0.394***	0.402***	0.370***	0.366***	0.357***	0.116***
	(0.094)	(0.092)	(0.095)	(0.095)	(0.092)	(0.092)	(0.091)	(0.049)
Size		0.079***	0.075***	0.079***	0.074***	0.074***	0.068***	0.025***
		(0.012)	(0.012)	(0.013)	(0.013)	(0.013)	(0.013)	(0.006)
Market-to-Book			0.041	0.042	0.034	0.033	0.032	0.011
			(0.030)	(0.031)	(0.026)	(0.026)	(0.025)	(0.009)
Turnover				-0.024*	-0.018	-0.015	-0.014	-0.016**
				(0.012)	(0.013)	(0.014)	(0.014)	(0.007)
Prior Return					0.909***	0.909***	0.884***	0.479***
					(0.101)	(0.101)	(0.100)	(0.065)
Institutional Ownership						-0.035	-0.034	0.021*
						(0.032)	(0.032)	(0.011)
Firm Guidance: Negative							-0.116*	-0.149***
							(0.069)	(0.039)
Firm Guidance: Neutral							0.181***	0.058**
							(0.055)	(0.029)
Firm Guidance: Positive							0.302***	0.168***
							(0.068)	(0.042)
Lag(Revenue Surprise)								0.614***
								(0.012)
Industry Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Year Fixed Effects	YES	YES	YES	YES	YES	YES	YES	YES
Observations	9516	9437	8857	8857	8837	8837	8837	8802
R-Squared	0.04639	0.06342	0.06803	0.08062	0.08086	0.08086	0.08574	0.4236

Table 4: Time-Series Earnings Surprise

	Dependent Variable:	
	SUE	SUE - no special items
SVI Change	1.221**	0.383*
	(0.603)	(0.238)
Size	-0.030	0.000
	(0.075)	(0.049)
Market-to-Book	0.271***	0.207***
	(0.084)	(0.070)
Turnover	-0.697***	-0.479***
	(0.266)	(0.180)
Prior Return	7.632***	3.692***
	(2.493)	(0.849)
Institutional Ownership	1.790**	1.209**
	(0.755)	(0.563)
Firm Guidance: Negative	0.020	-0.169
	(0.256)	(0.130)
Firm Guidance: Neutral	0.087	-0.109
	(0.258)	(0.202)
Firm Guidance: Positive	0.816**	0.411**
	(0.371)	(0.187)
Lag(SUE)	0.049	0.027
	(0.041)	(0.027)
Industry Fixed Effects	YES	YES
Year Fixed Effects	YES	YES
Observations	7225	7231
R-Squared	0.03282	0.04829

Table 5: Analyst Earnings Surprise

	Dependent Variable: Analyst Earnings Surprise		
	ALL FIRMS	Low Dispersion Firms	High Dispersion Firms
SVI Change	0.098*	-0.017	0.134*
	(0.052)	(0.015)	(0.081)
Size	0.028**	0.000	0.039*
	(0.013)	(0.006)	(0.020)
Market-to-Book	0.010	-0.008**	0.042
	(0.014)	(0.004)	(0.027)
Turnover	-0.033	-0.018	-0.046
	(0.023)	(0.013)	(0.032)
Prior Return	0.411***	0.249**	0.418*
	(0.143)	(0.105)	(0.213)
Institutional Ownership	0.167	-0.079	0.226
	(0.129)	(0.060)	(0.175)
Firm Guidance: Negative	0.073***	-0.005	0.134***
	(0.026)	(0.018)	(0.048)
Firm Guidance: Neutral	0.005	-0.008	0.026
	(0.034)	(0.010)	(0.103)
Firm Guidance: Positive	0.105***	0.034*	0.173***
	(0.033)	(0.017)	(0.062)
Lag(SUE)	0.009	0.037**	0.002
	(0.007)	(0.016)	(0.005)
Industry Fixed Effects	YES	YES	YES
Year Fixed Effects	YES	YES	YES
Observations	6595	3330	3131
R-Squared	0.03052	0.05533	0.0324

Table 6: Announcement Return

	Dependent Variable: Announcement Return		
SVI Change	95.086***	102.041***	78.377**
	(36.017)	(36.617)	(34.864)
Size	1.762	2.155	-1.870
	(4.637)	(4.647)	(4.551)
Market-to-Book	-6.642	-4.855*	-6.278*
	(9.820)	(2.825)	(3.298)
Turnover	-8.481	-4.666	-9.427
	(8.310)	(8.000)	(7.896)
Prior Return	-94.012	-143.205**	-143.368**
	(69.756)	(71.201)	(70.946)
Institutional Ownership	91.723*	75.246	93.379**
	(46.869)	(46.453)	(46.252)
Firm Guidance: Negative	-11.951	-8.077	-10.165
	(27.925)	(27.440)	(27.484)
Firm Guidance: Neutral	-24.052	-28.790	-39.804
	(25.627)	(25.539)	(25.476)
Firm Guidance: Positive	-6.114	-9.727	-23.319
	(35.828)	(35.809)	(35.375)
Lag(SUE)	-1.339		
	(0.990)		
Current SUE		25.934***	
		(4.982)	
Current Revenue Surprise			57.891***
			(7.107)
Industry Fixed Effects	YES	YES	YES
Year Fixed Effects	YES	YES	YES
Observations	7244	7349	7345
R-Squared	0.004551	0.01062	0.01459

Conclusion

- Find evidence that search volume predicts revenue and earnings surprises as well as announcement returns
- Suggests search volume is a value-relevant leading indicator of firm fundamentals
- Future work could identify key situations in which search volume may be most helpful (very little alternative information)
  - New product introductions
  - Example: The Nissan Leaf

Nissan Sales and Search Volume (FY '09)

	Sales (millions)	Relative Search
Versa	$479.47	28.77%
Sentra	$541.77	47.95%
Maxima	$749.38	75.34%
Altima	$2,410.70	100.00%

Google Insights for Search beta

Help | Sign in | Download as CSV | English (US)

Compare by

- Search terms
- Locations
- Time Ranges

Search terms

Tip: Use a comma as shorthand to add comparison items. (tennis, squash)

- Nissan Versa
- Nissan Sentra
- Nissan Maxima
- Nissan Altima

+ Add search term

Filter

Web Search

United States | All subregions | All metros

Jul 2008 - Jun 2009 Reset

All Categories

Search

Web Search Interest: nissan versa, nissan sentra, nissan maxima, nissan altima

United States, Jul 2008 - Jun 2009

Categories: Automotive, Local, Shopping

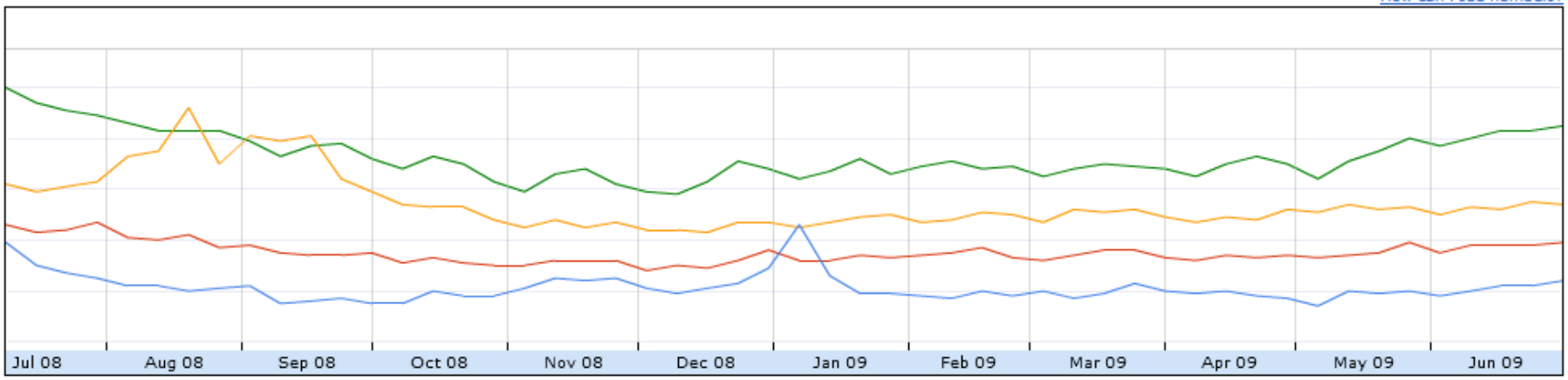
Totals

- nissan versa
- nissan sentra
- nissan maxima
- nissan altima

Interest over time

Forecast | News headlines

How can I see numbers?



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