

# FinTechs and the Market for Financial Analysis

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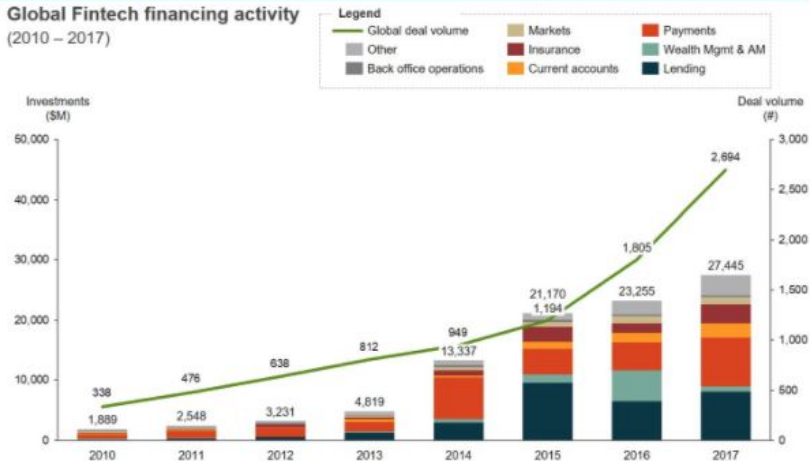
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October 16, 2018

# FinTechs Are Rapidly Expanding

**FinTech** covers digital innovations and technology-enabled business model innovations in the financial sector.

**Global Fintech financing activity**  
(2010 – 2017)

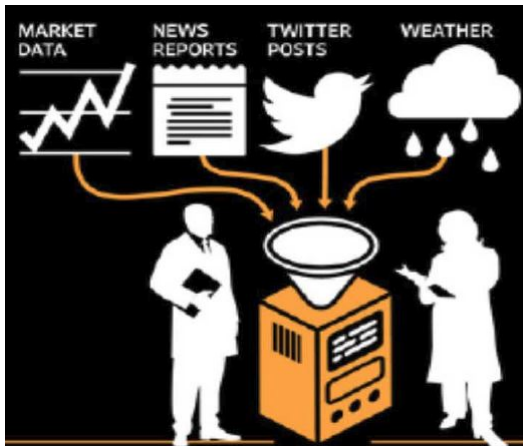


Source: Accenture Research analysis of CB Insights data



# We Focus on Market Intelligence FinTechs

**Market intelligence** FinTechs streamline and synthesize many data sources relevant for investment recommendations.



# Research Question

**“With 80% of the data in the world created in the last two years, judgment matters more than ever. Technology is a complement to sound judgment and knowledge, not a substitute.”**

– Joyce Chang, Global Head of Research, J.P. Morgan

**RQ:** How do market intelligence FinTechs change the information environment for equities?

**Important RQ:** In an ideal market, prices fully reflect information. FinTechs can disrupt the status quo but it is unclear what their consequences are.

# Literature Review

## **FinTechs, Big Data, and Information Aggregation**

- Zhu (2017), Dasgupt and Foucault (2017), Farboodi and Veldkamp (2017), Athey, Mobius, and Pal (2017), Chiou and Tucker (2015), Calzada and Gil (2016), Da and Huang (2017).

## **Disclosure, Technology, and Market Efficiency**

- Diamond (1985), Bond, Edmans, and Goldstein (2012), Goldstein and Yang (2017), Grennan and Musto (2017), Fuster et al. (2018).

## **Analysts Role in Capital Markets**

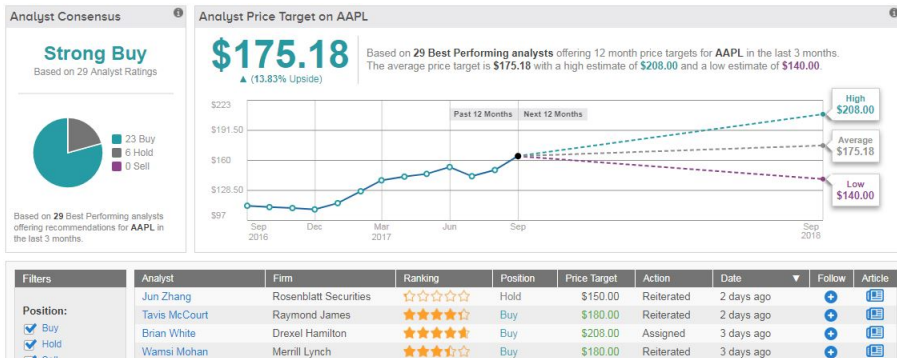
- Michaely and Womack (1999), Hong and Kubik (2003), Hong and Kacperczyk (2010), Cohen, Frazzini, and Malloy (2010), Ljungqvist, Marston, and Wilhelm (2006), Michaley, Merkeley, Pacelli (2017).

## **(Social) Media and Bias**

- Mullainathan and Shleifer (2005), Gentzkow and Shapiro (2006), Gentzkow and Shapiro (2008), Zhi, Engelberg, and Zhao (2012), Tetlock (2015), Antweiler and Frank (2004), Das and Chen (2007), Niessner and Cookson (2017).

# FinTechs Leveling the Playing Field

- Without FinTechs, investors need to search for financial analysis.
- With FinTechs, investors could learn about the best analysts and click-through to their research.



# FinTechs Crowding Out Incumbents

- With FinTechs, investors learn the best analysis is from bloggers so pay less attention to deep information producers such as analysts.

Filter Opinions	Blogger Name	Blog	Sentiment	Date	Follow	Article
<b>Blogger Opinions:</b> <input checked="" type="checkbox"/> Bullish <input checked="" type="checkbox"/> Bearish <input checked="" type="checkbox"/> Neutral  <b>Ranking:</b> <input type="checkbox"/> ★ <input checked="" type="checkbox"/> ★★ <input checked="" type="checkbox"/> ★★★ <input type="checkbox"/> ★★★★ <input checked="" type="checkbox"/> ★★★★★	D.M. Martins Research ★★★★★	Seeking Alpha	Bullish	2 days ago		
	DoctoRx ★★★★★	Seeking Alpha	Bullish	2 days ago		
	Jeremy Bowman ★★★★☆	Motley Fool	Bearish	5 days ago		
	SVI ★★★★★	Seeking Alpha	Bullish	8 days ago		
	Investing.com ★★★★★	Investing.com	Bullish	8 days ago		

- With FinTechs, investors rely only on the signal and forgo reading original-content financial analysis altogether.

Sep 27, 2017

### Buy Recommendations

Company	Rating	Analyst
CBS Corp	BUY Price Target: \$81	Daniel Kurnos, Benchmark
MU	BUY Price Target: \$39	Joseph Moore, Morgan St...
CHSP	BUY	Tyler Batory, Janney Mont...

Sep 27, 2017

### Hold Recommendations

Company	Rating	Analyst
FHN	HOLD Price Target: \$20	Ken Zerbe, Morgan Stanley
AXON	HOLD Price Target: \$6	Brian Skorney, Robert W. ...
TWLO	HOLD	Brent Bracelin, KeyBanc

Sep 27, 2017

### Sell Recommendations

Company	Rating	Analyst
INTU	SELL	Wayne Johnson, Raymon...
INT	SELL Price Target: \$36	Ken Hoexter, Merrill Lynch
ED	SELL Price Target: \$74	Greg Gordon, Evercore ISI

# Empirical Predictions

- ① For markets
  - Ambiguous effect: tension between investor and analyst channels.



# Empirical Predictions

- 1 For markets
  - Ambiguous effect: tension between investor and analyst channels.
- 2 For investors
  - FinTechs are complements; directing attention to valuable non-traditional data.
  - FinTechs are substitutes; investors rely on aggregated recs.

# Empirical Predictions

- 1 For markets
  - Ambiguous effect: tension between investor and analyst channels.
- 2 For investors
  - FinTechs are complements; directing attention to valuable non-traditional data.
  - FinTechs are substitutes; investors rely on aggregated recs.
- 3 For traditional information producers (i.e., sell-side analysts)
  - FinTechs are competition; analysts increase reporting quality.
  - FinTechs crowd-out incumbents; analysts decrease quality.

# What We Do

- 1 **Data:** Gather novel data on market intelligence FinTechs, non-traditional financial analysis online, and how investors discover such analysis.
  - Business plans for 290 FinTechs, 1.3 million pieces of non-traditional analysis, click data for 1+ million investors.
- 2 **Descriptive statistics:** Describe financial analysis online and how market intelligence FinTechs make use of such analysis.
- 3 **Regression evidence:** Examine three responses: investors, analysts, and market.

# Data on Market Intelligence FinTechs

# Business Model of Market Intelligence FinTechs

- Most start with an aggregator (news, experts, etc.)
- Advertisement revenue plus paid add-ons:
  - Investment signals derived via data mining
  - Wealth management or stock screening tools
- Big variation in investment signals and fees:
  - **Coverage:** data sources and structure vary widely (e.g., news, social media, retweets, audio, sensors, satellite images, etc. . .)
  - **Customization:** simple sentiment signals up to customized signals
  - **Speed:** market-moving news tends to break early on social media (e.g., train crash) vs. signals from social media trying to capture harder-to-measure concepts (e.g., consumer mindset)
- Rather than sell a signal, some focus on debiasing info, via:
  - **Ranking:** analysts, bloggers, hedge funds, etc.
  - **Crowd-sourcing:** EPS estimates, research questions, etc.

# Market Intelligence FinTechs

- We observe 290 FinTechs with a mean founding year of 2008.
- 72% of the FinTechs target retail investors and 60% target professional investors with some targeting both.
- Capabilities include: aggregating financial news (83%), datamining for investment signals (57%), evaluating and ranking existing financial advice (27%), crowdsourcing financial advice (16%), and aggregating financial experts (11%).

## Other Data



THOMSON REUTERS I/B/E/S



CHICAGO BOOTH | CRSP | Center for Research in Security Prices

# Is Non-traditional Data and Analysis Any Good?

- 1 **Bloggers rarely make buy/sell recs.** 90% of blogs provide commentary on the information that moves markets rather than specific stocks.
- 2 **Investors prefer stock recs.** Blogs with recs rank 40 percentiles above those without in terms of page views and dwell time.
- 3 **Investors mostly skim.** Investors view 16 pages of market commentary on blogs in 6.6 minutes per month.
- 4 **The analysis they read is probably bad.** 90% of the time, the market-adjusted returns to blog recs were negative at an investment horizon of 6 or 12 months.



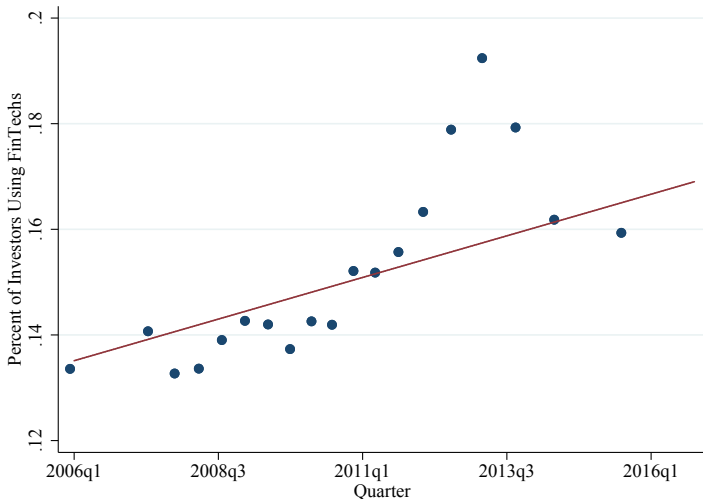
# Focusing on the Blogs with Recommendations

Blog Site	Minutes on Site Percentile	Monthly Visits per User	Page Views per Visit	Minutes per Visit	Pct. of Tot. Blog Posts	Pct. of Posts with Rec.	Num. of Unique Bloggers	Num. of Stocks Covered	Market-adjusted 1-month Returns	Market-adjusted 6-month Returns
MarketWatch	99.9	4.8	2.7	3.8	1.6%	11%	953	2,110	-0.5%	-3.0%
MotleyFool	99.5	2.0	1.9	2.4	17.1%	30%	1,204	4,424	0.2%	-2.4%
TheStreet	99.4	2.5	3.3	4.8	18.5%	18%	664	5,172	0.7%	-4.3%
SeekingAlpha	97.2	2.8	2.4	4.3	32.9%	43%	10,442	6,501	0.3%	-2.5%
Zacks	96.6	1.8	2.9	2.8	10.6%	23%	111	4,369	0.2%	-3.7%
InvestorPlace	95.0	2.2	3.3	3.2	7.8%	83%	207	5,040	0.0%	-4.0%
MoneyMorning	93.1	1.3	1.2	1.6	0.1%	35%	46	482	0.4%	-3.3%
StreetAuthority	89.6	1.7	2.3	2.3	0.3%	67%	82	1,219	0.1%	-2.4%
GuruFocus	82.1	1.8	5.0	3.1	3.2%	34%	796	4,168	0.0%	-2.1%
Kapitall	60.6	1.3	5.8	2.0	0.3%	51%	40	1,764	0.1%	-2.6%
MarketRealist	70.4	1.4	2.7	2.5	0.7%	20%	47	287	0.1%	0.8%
Amigo Bulls	60.5	1.1	4.1	3.4	0.1%	47%	46	157	0.0%	-0.1%
MoneyShow	71.1	1.9	6.3	3.5	0.3%	47%	352	1,231	0.0%	-4.0%
Investing	69.3	4.7	7.5	3.8	1.4%	28%	480	3,105	0.1%	-1.8%
Who Trades	54.7	1.1	1.9	1.1	0.3%	28%	67	856	0.7%	1.3%
TopStockAnalysts	65.5	1.4	1.8	1.7	0.4%	34%	175	1,647	0.2%	-3.3%
SmarterAnalyst	47.0	1.6	2.2	1.5	0.1%	97%	75	546	0.6%	-1.7%
ProfitableTrading	58.2	1.3	1.6	1.8	0.0%	95%	24	405	0.5%	0.0%
SumZero	29.8	1.5	2.6	2.1	0.0%	98%	1	90	1.5%	10.6%
WSObserver	34.7	1.5	1.5	1.3	4.3%	27%	18	3,335	0.1%	-3.9%

# Investors Relationship with FinTechs

# More Investors are Using FinTech Websites

- FinTech use by investors has risen 50% over the sample period.



# For Investors, FinTechs Replace Traditional Research

- Using ComScore's U.S. sample with full internet click history.
- Investors visit 31 p.p. fewer websites with original-content financial analysis, view 17 p.p. fewer pages, and spend 5 p.p. less time there when they visit a FinTech.

	Reads original-content financial analysis	Dep. var. = Page views of original-content financial analysis	Time spent on original-content financial analysis
<b>Visits a FinTech website</b>	<b>-0.31*** (0.30)</b>	<b>-0.17*** (0.01)</b>	<b>-0.05*** (0.01)</b>
User FE	Y	Y	Y
Time FE	Y	Y	Y
Adjusted R-squared	25.5%	1.2%	2.0%
Obs.	260,003	260,003	260,003

# FinTech Websites Broaden Overall Equity Coverage

- Coverage of equities is positively correlated yet some differences, reflecting market segmentation.

Determinants of Coverage	Analyst Coverage	Newspaper Coverage	FinTech Coverage	High Quality FinTech Coverage
Firm Size	0.41*** (0.01)	0.41*** (0.04)	0.71*** (0.02)	0.50*** (0.01)
Profitability	0.03*** (0.01)	0.10*** (0.02)	0.01 (0.01)	-0.00 (0.01)
ROE	-0.02*** (0.00)	-0.00 (0.01)	-0.02*** (0.01)	-0.02*** (0.01)
Market-to-book	0.22*** (0.01)	0.26*** (0.02)	0.41*** (0.01)	0.28*** (0.01)
Momentum	0.02*** (0.00)	-0.08*** (0.01)	0.12*** (0.01)	0.06*** (0.01)
Institutional Ownership	0.20*** (0.01)	0.62*** (0.02)	0.08*** (0.01)	0.01 (0.01)
Hedge Fund Ownership	0.00 (0.01)	0.01 (0.02)	-0.08*** (0.01)	-0.03*** (0.00)
Adjusted R-squared	41%	17%	33%	26%
Observations	81,597	81,597	81,597	81,597

# Analysts Relationship with FinTechs

# Test Linking Analysts' Research Quality to FinTechs

- $ReportQuality_{it} = \alpha + \beta FinTechs_{it} + \Gamma X_{it} + f_i + \delta_t + \epsilon_{it}$

Obs. at the level of stock  $i$  in quarter  $t$ .

$ReportQuality_{it}$  is consensus analyst optimism bias or accuracy.

$FinTechs_{it}$  measures the competition from non-traditional sources for equity  $i$  in quarter  $t$ .

$X_{ijt}$  is a vector of observables (analyst coverage, firm size, market-to-book, volatility, etc.)

$f_i$  is an equity fixed-effect;  $\delta_t$  is a quarter fixed-effect.

- Instrument for  $FinTechs_{it}$  using short newspaper titles.
  - Relevance stems from randomized experiment showing short titles attract attention and bloggers write about what is on their mind.

# Relevance of the Headline Instrument

- Short newspaper headlines attract attention (Umar (2016)).
- Bloggers and people on social media write about what's popular.



- By controlling for total news, identification is from incremental changes in non-traditional info induced by headline length.



# Exclusion Restriction and Headline Instrument

- Headline length does not convey content.
- Example short vs. long headline for Apple
  - Nokia Sues Apple Over iPhone Patent Infringement
  - Elan to Expand Patent Lawsuit Against Apple to Include the iPad
- Evidence suggests headline length is quasi-random.

<b>Dep. Var. = Headline Length</b>	
Log Market-to-Book	0.00 (0.00)
Profitability	-0.53 (0.77)
ROE	0.01 (0.00)
Momentum	1.32 (0.79)
Firm Size	-0.02 (0.05)
Newspaper Fixed Effect	Y
Adjusted R <sup>2</sup>	0.10%
Observations	7,538,452

# LASSO Variable Selection Suggests No Content

	R <sup>2</sup> When Word Is Included
quarterly	2.25%
available	7.42%
annual	7.94%
stories	8.11%
market	8.34%
talk	8.41%
events	8.71%
financial	10.78%
agreement	10.87%
million	10.96%
morning	11.08%
mgmt	11.26%
billion	11.31%
investors	11.59%
capital	11.62%
sells	11.76%
china	11.89%
week	12.22%
fund	12.37%
bank	12.37%

# FinTechs Increase Analysts' Optimism Bias

<b>Dep. Var. = Consensus Bias (As % of EPS)</b>		
<b>FinTech Coverage</b>	<b>0.14***</b>	<b>0.15</b>
	<b>(0.04)</b>	<b>(0.19)</b>
Controls	Y	Y
Time FE	Y	Y
Equity FE	N	Y
First Stage F-Stat	195.6	38.9
T-Stat on Instrument	14.0	14.0
Adjusted R <sup>2</sup>	39%	76%
Observations	81,597	81,597

- Controls include newspaper coverage, analyst coverage, firm size, daily return volatility, mean monthly return, log market-to-book, volatility of ROE, profitability, and S&P 500 membership.
- In comparison to controls, FinTech coverage ranks in middle.

# FinTechs Decrease Analysts' Forecast Accuracy

<b>Dep. Var. = Consensus Accuracy (As % of EPS)</b>		
<b>FinTech Coverage</b>	<b>-0.23***</b>	<b>-0.34**</b>
	<b>(0.04)</b>	<b>(0.18)</b>
Controls	Y	Y
Time FE	Y	Y
Equity FE	N	Y
First Stage F-Stat	195.6	38.9
T-Stat on Instrument	14.0	14.0
Adjusted R <sup>2</sup>	41%	79%
Observations	81,597	81,597

- Evidence suggests FinTechs reduce analysts' reporting quality, indicating a change to the information production process.

## Change Driven by High-quality FinTech Coverage

- When limit to only high-quality non-traditional analysis (i.e., positive CAR associated with it), analysts' change in reporting quality significant and similar to any FinTech coverage.

	Consensus Bias		Consensus Accuracy	
	Best Short-term	Best Long-term	Best Short-term	Best Long-term
<b>Quality FinTech Coverage</b>	<b>0.14***</b> <b>(0.04)</b>	<b>0.17***</b> <b>(0.05)</b>	<b>-0.22**</b> <b>(0.04)</b>	<b>-0.27**</b> <b>(0.05)</b>
Controls	Y	Y	Y	Y
Time FE	Y	Y	Y	Y
Equity FE	N	N	N	N
First Stage F-Stat	183.6	165.5	183.6	165.5
T-Stat on Instrument	13.5	12.9	13.5	12.9
Adjusted R <sup>2</sup>	39%	39%	40%	40%
Observations	81,597	81,597	81,597	81,597

# Talented Analysts Quit and Leave the Profession

- When focus on turnover, see talented analysts leaving when FinTech coverage is high. Consistent with Bar-Isacc (2005).

	Analyst Quits			Top 10% for Accuracy & Quits		
<b>FinTech Coverage</b>	<b>0.114***</b> <b>(0.023)</b>			<b>0.059***</b> <b>(0.021)</b>		
Growing FinTech Coverage	1.626*** (0.466)			0.959*** (0.356)		
No Change in FinTech Coverage	-3.216*** (1.062)			-1.896** (0.784)		
Additional Controls	Y	Y	Y	Y	Y	Y
Time Fixed Effects	Y	Y	Y	Y	Y	Y
First Stage F-Stat	195.9	35.5	15.7	195.9	35.5	15.7
T-Stat on Instrument	14.0	2.7	2.4	14.0	2.7	2.4
Adjusted R-squared	11%	10%	10%	1%	1%	1%
Observations	81,597	63,544	63,544	81,597	63,544	63,544

## Some Strategic Response: Rational Bias & Lower Effort

- If analysts' optimize publicity, then FinTechs could lead them to make bold revisions. No evidence for this, in fact increased herding.
- If FinTechs through aggregation reduce monitoring of analysts, then FinTechs could lead them to cater. Some evidence for this with bias concentrated among affiliated stocks.

# Markets Relationship with FinTechs



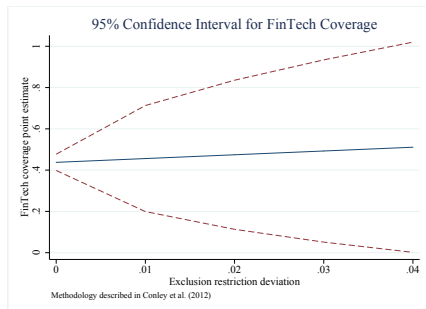
## For Markets, Price Informativeness Increases

- Price informativeness is measured by price nonsynchronicity. Robustness using price jump ratio (Weller 2018) is similar.

Dep. Var. = Price Informativeness		
<b>FinTech Coverage</b>	<b>0.460***</b>	
	<b>(0.04)</b>	
<b>Quality FinTech Coverage</b>		<b>0.454***</b>
		<b>(0.04)</b>
Controls	Y	Y
Time FE	Y	Y
First Stage F-Stat	190.4	179.9
T-Stat on Instrument	13.8	13.4
Adjusted R-squared	48%	48%
Observations	79,543	79,543

# For Markets, Evidence Is Statistically Sound

- Figure shows how the estimate of FinTech coverage changes as potential deviations from the exclusion restriction increase.



- Any hidden factor would need to be a more important determinant of price informativeness than earnings volatility (0.03) or analyst coverage (0.04) to nullify market finding.

# Market Is Less Responsive To Analysts

- Lower returns and volume is consistent with information crowd-out or market recognizing change in reporting quality.

<b>Response to Analyst Recs (2010-2016)</b>	<b>Excess Returns</b>	<b>Excess Volume</b>
<b>FinTech Coverage</b>	<b>-0.24%***</b>	<b>-0.047***</b>
<b>T-stat</b>	<b>(5.01)</b>	<b>(5.91)</b>
Time FE	Y	Y
Analyst FE	Y	Y
Obs. (Recommendations)	39,454	39,454

# Market Results Hold Even When Isolate Analyst-Equity Pairs

<b>Response to Analyst Recs (2010-2016)</b>	<b>Excess Returns</b>
<b>FinTech Coverage</b>	<b>-0.25%*</b>
<b>T-stat</b>	<b>(1.87)</b>
Time FE	Y
Firm-Analyst Pair FE	Y
Obs. (Recommendations)	18,905
Firm-Analyst Pairs	7,593

- Even when using a very tight specification with analyst-equity fixed effects, markets are less responsive to analysts.

# Analysts Contribute Less to Price Informativeness

Dep. Var. = Analyst Info Ratio		
<b>FinTech Coverage</b>	<b>-0.107***</b>	
	<b>(0.04)</b>	
<b>Quality FinTech Coverage</b>		<b>-0.106***</b>
		<b>(0.04)</b>
Controls	Y	Y
Time FE	Y	Y
First Stage F-Stat	195.9	183.6
T-Stat on Instrument	14.0	13.5
Adjusted R-squared	24%	23%
Observations	81,597	81,597

- FinTechs diminish analysts' role in markets by incorporating non-traditional data sources.
- Overall, our analysis suggests FinTechs are beneficial.

# Implications from FinTech Findings

# Implications

- 1 **Useful innovation:** Overall, investors are prudent to look to FinTechs for investment advice.
- 2 **Not-traditional form of competition:** Prior evidence suggests competition reduces bias (Hong and Kacperczyk 2010), but FinTechs through incorporation of alternative information and investors' responses to such information increase bias of analysts.
- 3 **For efficiency to stay underlying algorithms cannot be static:** FinTechs algorithms need constant updating to account for feedback effect of traditional information-producers' changing their input.
- 4 **Scope of industry:** Talented analysts quitting cannot be quickly solved, suggesting this is a structural shift. Parallels to credit rating agencies suggest FinTechs move toward monopolies with more regulation.

# Conclusion

- 1 **Original data:** Gather novel data on FinTechs, financial analysis online, and how investors discover such analysis.
- 2 **FinTechs are substitutes for traditional research:** FinTechs divert attention from deep information producers such as sell-side analysts.
- 3 **Analysts reporting changes in response:** Analysts produce less accurate, more biased research.
- 4 **FinTechs help overall goal of market efficiency:** Price informativeness increases, yet market response to analysts' recs decline as well as their contribution to price informativeness.