BAN432 – FINAL PROJECT

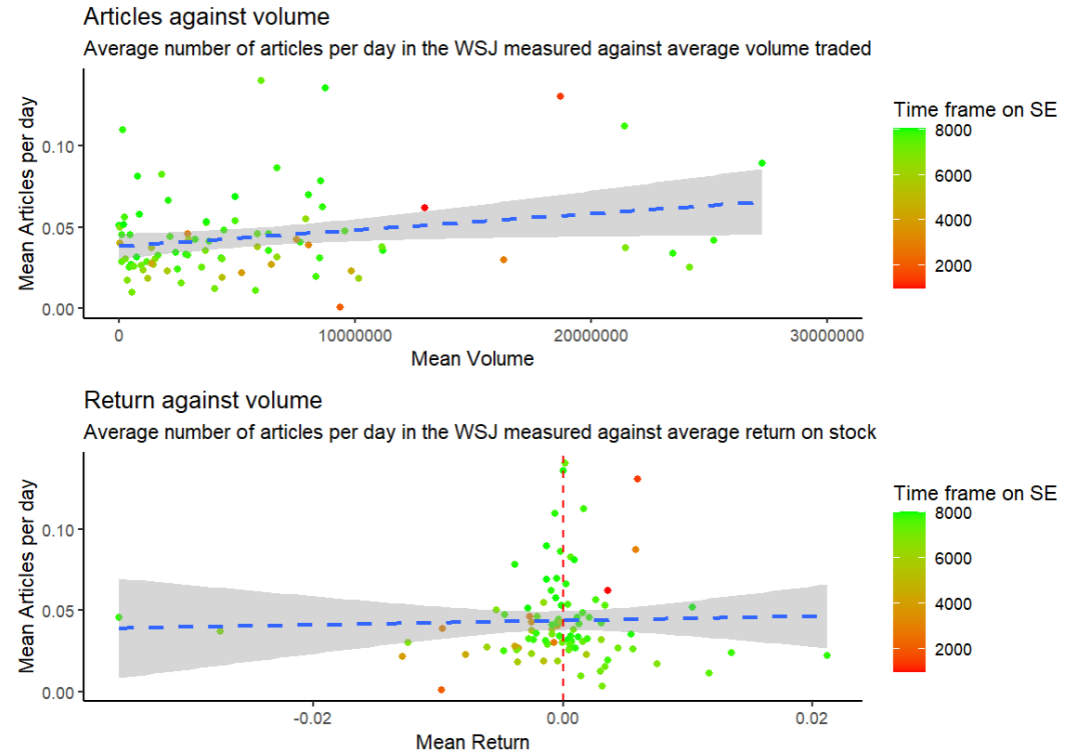# MARKET REACTIONS TO WALL STREET ARTICLES

A SENTIMENT ANALYSIS

Candidate numbers: 7, 26, 59, 65

# AGENDA

- Explorative analysis
- Sentiment analysis
- Internal validity
- External validity
- Conclusion

Explorative analysis

Articles against volume
Average number of articles per day in the WSJ measured against average volume traded

Return against volume
Average number of articles per day in the WSJ measured against average return on stock

News Coverage:
- Slight favour towards high volume stocks
- Little to no correlation between average returns and coverage

Exploratory analysis → Sentiment dictionary → Validity of the model → Discussion and Conclusion
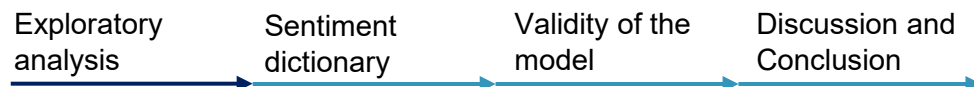
Explorative analysis

Volatility relative to article publication date[1]

Where `day t` is article publication date

Return	Day t-1	Day t	Day t+1	For all days
Mean	0.02944	0.02480	0.02136	0.01846
Std	0.05375	0.04119	0.03684	0.02426
N	19691	21262	16714	369417

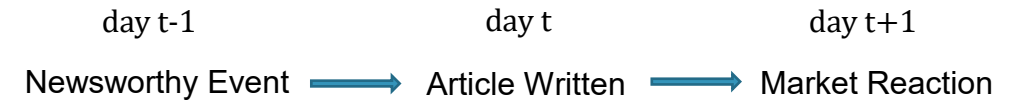[1] *Volatility* refers to the absolute value of return

Data gathered from transformed `main.df` and `returns.df` datasets

- Volatility is highest the day before an article
- Significantly different than the mean for all days (Student's T-test)
- Points to *news* being an external factor

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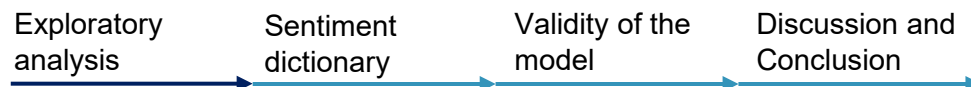
Explorative analysis

Initial assumption:

	day t-1	day t	day t+1
	Newsworthy Event →	Article Written →	Market Reaction

Data backed assumption:

day t-1
Newsworthy Event

day t
Article Written

Market Reaction
day t-1
(Quick reaction)

- Volatility is highest the day before an article
- Significantly different than the mean for all days (Student's T-test)
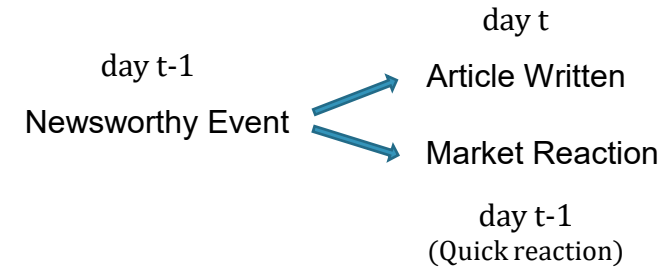- Points to *news* being an external factor

Exploratory analysis → Sentiment dictionary → Validity of the model → Discussion and Conclusion →

Sentiment Dictionary

Corpus creation with MNIR

- Pre-work and bounds

- Document term matrix

- Sentiment analysis

  - Multinomial Linear Regression

- Results

Results from sentiment analysis
The 10 highest and lowest scoring words

Pos Tokens	MNIR Coef Pos	Neg Tokens	MNIR Coef Neg
gain	2.356	fell	−4.220
rose	2.023	lower	−2.119
board	1.148	drop	−1.792
posit	1.082	fall	−1.643
improv	1.060	program	−1.375
fund	0.958	line	−1.261
interest	0.951	reduc	−1.239
deal	0.906	general	−1.050
return	0.904	quarter	−1.039
hold	0.872	think	−1.032

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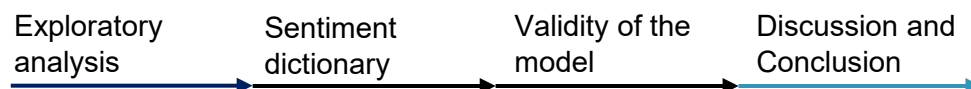
Internal Validity

Applying the model to the test set

- Stronger correlation in Group A than B → Overfitting

- Significant coefficients and similar explanatory power in the two subgroups in group B → Acceptable internal validity

- Changing relevant parameters in the model usually drastically changes the model's performance

	Regressions with parameter tuning							
	Results from tuned parameters juxtaposed against the main model							
	Main Model		Bounds		Word Length		Word Count	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Sentiment	0.010***	0.006***	0.020***	0.0004	0.004***	-0.0003	0.009***	0.003***
	[16.980]	[11.930]	[36.090]	[0.811]	[7.113]	[-0.578]	[14.250]	[7.448]
Constant	0.001**	0.001	-0.001*	0.001*	0.001**	0.001*	0.002***	0.001*
	[2.319]	[1.530]	[-1.728]	[1.781]	[2.048]	[1.724]	[3.081]	[1.781]
Test or Train?	Test	Train	Train	Test	Train	Test	Train	Test
Observations	6,834	8,212	6,834	8,212	6,834	8,212	8,013	9,818
R^2	0.040	0.017	0.160	0.0001	0.007	0.00004	0.025	0.006

Note: *p<0.1; **p<0.05; ***p<0.01

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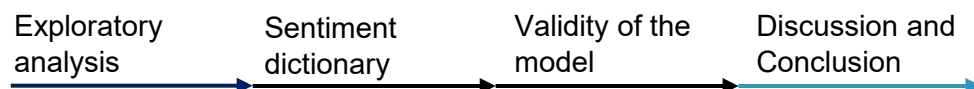
External Validity

Applying the to earning call transcripts

- Significant correlation between positive Q&A earning calls and return

- Not significant correlation between negative Q&A earning calls and return

- Only one group has significant coefficients when splitting between Group A and B firms

- Lower external validity than internal validity

	Transcript of earning calls and stock return		
	Ret t		
	Full sample	Splitted sample	
	(1)	(2)	(3)
Negative sentiment	0.136	0.832	-0.044
	[0.204]	[0.568]	[-0.058]
Postive sentiment	1.631^{**}	1.040	2.016^{**}
	[2.431]	[0.943]	[2.358]
Constant	-0.0005	0.001	-0.002
	[-0.118]	[0.217]	[-0.388]
Test or train?	Full set	Training	Test
Observations	319	157	162
R^2	0.018	0.007	0.034
Adjusted R^2	0.012	-0.006	0.022
Note:		$^*p<0.1$; $^{**}p<0.05$; $^{***}p<0.01$	

Exploratory analysis → Sentiment dictionary → Validity of the model → Discussion and Conclusion

Conclusion

Objective ➡ *Create a sentiment analysis of Wall Street Journal Articles with change in market price as indicators of reaction from the market*

Approach ➡ *Used MNIR in order to create a corpus of words which indicated either positive or negative market returns*

"The model managed to produce significant results and decent internal validity when applied to WSJ articles. It didn't however reproduce as good results on the earning calls corpus, and the external validity of the model is therefore limited"

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