Can Online Data Anticipate Economic Behaviour?

Suzy Moat
Warwick Business School
Suzy.Moat@wbs.ac.uk

With Tobias Preis, Chester Curme, Adam Avakian, Dror Kenett and Gene Stanley
Financial markets: “big data”
The Internet: “big data”
Decision making

information gathering → action
Does Google data anticipate stock market moves?
Hypothetical trading strategy

Search volume decreased:

BUY stock in week t+1

number of Google searches for keyword

<table>
<thead>
<tr>
<th>t-3</th>
<th>t-2</th>
<th>t-1</th>
<th>t</th>
<th>week</th>
</tr>
</thead>
</table>

Graph showing search volume decrease with a recommendation to buy stock in the following week.
Hypothetical trading strategy

Search volume decreased: **BUY** stock in week t+1

Search volume increased: **SELL** stock in week t+1

number of Google searches for keyword

<table>
<thead>
<tr>
<th>week</th>
<th>t-3</th>
<th>t-2</th>
<th>t-1</th>
<th>t</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>red</td>
<td>red</td>
<td>red</td>
<td>blue</td>
</tr>
</tbody>
</table>
Example: “culture”

% profit

“culture” trading strategy
buy and hold strategy
mean ± 1 sd of random strategies
Example: “debt”

“debt” trading strategy
buy and hold strategy
mean ± 1 sd of random strategies
Example: “debt”

“debt” strategy: 326% profit
All strategies tested

```
return (random strategy sds)
```

- Random strategy mean + 2 sds
- Random strategy mean + 1 sd

“Dow Jones” strategy

buy and hold strategy
Does Wikipedia data anticipate stock market moves?
Wikipedia: Dow Jones companies

Return [Std. Dev. of Random Strategies]

Wikipedia Edits
DJIA Companies

Random Strategy

Wikipedia Views
DJIA Companies

Strategies profitable
Wikipedia: Financial topics

Strategies profitable
3. Which topics are searched for before market falls?
Wikipedia: Actors and filmmakers?

Strategies NOT profitable
What is searched for before falls?

return \( \text{(random strategy sds)} \)

-1

0

1

2

Random strategy mean + 2 sds

Random strategy mean + 1 sd

“debt”

“credit”

“culture”

“stocks”

“garden”

“train”
What is searched for before falls?

Financial relevance

- Returns significantly correlated with indicator of financial relevance but more explanation needed
- # occurrences in FT
- # hits on Google

return (random strategy sds)

Random strategy mean + 2 sds
Random strategy mean + 1 sd
What is searched for before falls?

debt
housing

apple
orange
tree

housing
debt
What is searched for before falls?

55 groups of search terms

Business and politics most related
Summary

• What we look for online may anticipate what we decide to do later in the real world.

• Curme, C., Preis, T., Stanley, H. E., & Moat, H. S. (submitted) Quantifying the semantics of search behavior before stock market moves.

