Social Value of Public Information

By Stephen Morris and Hyun Song Shin

This explains why the authors want to investigate the impact of public information in a new setting where the utility function considers “following” behaviour of the agents (the second part of the utility function). They further state that media is an important part of the diffusion of public information. They mean that due to the increased intensification of today’s media the impact of public information has increased. This is the idea behind the article. The statement below justifies the assumption that the agents has a “following” behaviour. The assumptions are not explicitly explained in the paper but rather included in the model which mainly consists of the utility function.

“The economy seems to experience a increased potential for bubbles and panics. Such significant market events generally occur only if there is similar thinking among large groups of people, and the news media are essential vehicles for the spread of ideas.”

<table>
<thead>
<tr>
<th><strong>Public Information</strong> (The authors’ definition)</th>
<th><strong>Private Information</strong> (The authors’ definition)</th>
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<tbody>
<tr>
<td>• Shared by everyone</td>
<td>• Available only to the relevant individual</td>
</tr>
<tr>
<td>• Government agencies</td>
<td>• Acquisition of information from analysts</td>
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<tr>
<td>• Central Banks</td>
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You make a decision under uncertainty and in isolation from others. How does information affect your choice?

More information is better no matter if it is public or private

This is the usual assumption. The important thing here is to notice that the choice is done in isolation of other agents. The behaviour above is a consequence of the first part of the utility function. Simply speaking you want to be as close as possible to the underlying fundamental (theta). You can think about theta as the “truth”.
Here you have the explanation of the second part of the utility function. Now the agents are interested of what the other agents are doing too. The agents are not isolated anymore. Below the impact of public and private information are explained and what effects the agent’s behaviour has on the social welfare. Social welfare is the aggregated utility of all the agents given their choices.

But what happens if the decision makers also are interested parties in the actions of the others?

Private information will always increase social welfare

Public information

Conveys information on the underlying fundamentals which increase social welfare

Serves as a focal point for the believes of the group as a whole. A signal even if the information is noisy
This is the two main questions and the results in the paper. The agents overreact on public information and the incorrect (noisy) public information results in decreased social welfare in a certain area of private and public precision even though the precision increases. (See the graph on slide 7)

1. What happens with the relation between public and private information?

   Agents overreact on public information!

   Why?

   Strategic incentive to follow the group as a whole

2. What is the social value of public information?

   Agents overreact also on incorrect (noisy) public information and therefore valuable private information goes lost and the social value decreases
The utility function is the engine of the paper. It reflects the behaviour of the agents and from this utility function the results are derived. The assumptions are included in the utility function. If the reader dose not agree with this model of the agents behaviour then of course the results are of less interest. This model leads to a unique equilibrium. The reader might notice that the authors assume one single theta. What happens if there is more than one theta? In reality there is a lot of situations when there is not one “truth” but rather several. Then you have a system with different stable equilibrium under different environmental circumstances and the path between occurs rapidly. This model also assume identical agents. Perhaps the size of the agents affects the “following” pattern? Perhaps it is rational to “follow” large agents and that would result in additional weights in the L functions.

\[
\begin{align*}
    & u_i(a, \theta) = - (1 - r) (a_i - \theta)^2 - r (L_i - \bar{L}) \\
    & \bar{L} = \int_0^1 L_j \, dj \\
    & L_i = \int_0^1 (a_j - a_i)^2 \, dj
\end{align*}
\]

\[ a = \text{action profile over all agents} \]
\[ \theta = \text{underlying fundamental} \]
\[ r = \text{weighting factor for the strategic incentive} \]
Utility function

\[ u_i(a, \theta) \equiv -(1 - r)(a_i - \theta)^2 - r(L_i - \bar{L}) \]

\[ L_i \equiv \int_{0}^{1} (a_j - a_i)^2 \, dj \]

\[ \bar{L} \equiv \int_{0}^{1} L_j \, dj \]

Information with noise

\[ y = \theta + \eta \quad \eta \in N(0, \sigma_\eta^2) \]

\[ x_i = \theta + \varepsilon_i \quad \varepsilon_i \in N(0, \sigma_\varepsilon^2) \]

The graph shows the result that in a certain range of precision increased public precision results in decreased social welfare. To the left of the line.

\[ \beta = \frac{a}{(2r - 1)(1 - r)} \]

Precision

\[ \alpha = \frac{1}{\sigma_n^2}, \text{ public} \]

\[ \beta = \frac{1}{\sigma_\varepsilon^2}, \text{ private} \]
Overreaction of public information

\[ a_i = \frac{\alpha y + \beta x_i}{\alpha + \beta} + (y - x_i) \times \left( \frac{\alpha}{\alpha + \beta} \right) \frac{\beta r}{\alpha + \beta (1 - r)} \]

Overreaction of public information, a consequence of the strategic incentive to follow and the second part of the utility function.
Conclusions

The agents are individually rational, but socially inefficient

Agents overreact on public information

Agents overreact also on incorrect (noisy) public information which has a negative impact on social welfare.

The weight $r$, that determines the coordination incentive, may have become larger in recent years

Increased potential for bubbles, panics and bank runs.
The statement below justifies the authors' idea of increased and intensified "following" behaviour.

“In the highly sensitized world of today’s financial markets populated with Fed watchers, economic analysts, and other commentators of the economic scene, disclosure policy assumes great importance. In effect, private and public information end up being substitutes rather than cumulative.”
So what did they do in this paper?

“We examine the impact of public information in a setting where agents take actions appropriate to the underlying fundamentals, but they also have a coordination motive arising from a strategic complementarity in their actions.”