Ralph's Information Cascade

Ralph is pondering the wisdom/utility of commitment to public, financial reports given the multitude of more timely and less aggregated private information sources than accounting information. In other words, the issue revisited involves value of information and the decision to produce/collect information in the first place. Ralph knows there is a delicate tension to balance as shared information can lead to more efficient resource allocation but no one is willing to pay to produce public information as the benefits are competed away.

Ralph's exploration of commitment to regular public reports is in the context of expansionary investment by the firm. To keep things simple, the investment decision is the firm's owners support investment if the probability the firm's future uncertain economic conditions are favorable ($s=f$) exceeds ½ then but if the probability that prospects are unfavorable ($s=u$) exceeds ½ then the owners do not support expansion. Private information will be collected when beneficial to the information producer. Throughout, assume the benefits of "desirable" expansion sufficiently outweigh the cost of information production so that if the information is useful then it is produced. Common prior beliefs are that favorable/unfavorable economic conditions are equally likely.

The following table summarizes the common knowledge, independent information, where private (non-accounting) information sources y are more finely tuned than accounting y^a. ($\Pr(\cdot)$ refers to probability beliefs and $\Pr(\cdot \mid s)$ refers to probability beliefs conditional on s.)

Non-accounting (private) information:	$s=f$ $\Pr(s=f) = 0.5$	$s=u$ $\Pr(s=u) = 0.5$
$\Pr(y=g \mid s)$	0.7	0.3
$\Pr(y=b \mid s)$	0.3	0.7
Accounting information:		
$\Pr(y^a=g \mid s)$	0.68	0.32
$\Pr(y^a=b \mid s)$	0.32	0.68

Information, when produced/collected, arrives sequentially.

Required:

1. Will the first private information signal be produced? That is, will the investment decision depend on the signal generated? (Hint: use Bayesian probability belief revision.)

2. Suppose, if produced, the first private signal reveals $y_1=g$. Will a second private information signal be produced? (Hint: use Bayesian probability belief revision with updated priors based on the first signal.)

3. Suppose, if produced, the first two private signals reveal $y_1=y_2=g$. Will a third private information signal be produced?

4. Suppose, if produced, the first three private signals reveal $y_1=y_2=y_3=g$. Will a fourth private information signal be produced? Why might this be referred to as an information cascade? How might it lead to "herding" behavior and be associated with "market bubbles"?

5. Now suppose accounting reports follow two private signals that reveal $y_1=y_2=g$. Accounting information is produced irrespective of its perceived usefulness. Suppose $y^a_3=y^a_4=y^a_5=b$, is investment pursued following the third, fourth, or fifth report irrespective of the signal? If we rely solely on private information production what would happen? Would contradictory evidence be discovered? Without public (accounting) information, how informative would private information need to be to break the information cascade? (hint: surely perfect information that is not too costly will always be pursued.)

6. Suppose two private signals $y_1=y_2=g$ are followed by two accounting signals $y^a_3=y^a_4=b$, will a fifth (private) information signal be produced? That is, what happens to private information production?

7. What benefits, if any, are associated with committing to produce public accounting information? Is correction of "market bubbles" ex ante or ex post welfare-enhancing?