A dog believes that his barks make UPS trucks go away. He knows that his belief is true because UPS trucks always leave the driveway after he barks. We chuckle at the silly dog, but we are all a little bit like him. The dog suffers from confirmation bias, and so do we.

Psychologists describe confirmation bias as the bias that occurs when we look for evidence that confirms our beliefs but overlook evidence that disconfirms them. As physicist Robert Park said about the belief that high-voltage lines cause cancer despite strong evidence to the contrary: “It’s often not deliberate fraud. … People are awfully good at fooling themselves. They’re so sure they know the answer that they don’t want to confuse people with ugly-looking data.”

We hear confirmation bias in the voices of money managers who crow victory when they beat the market one quarter and dismiss their lagging performance over one, three, and five years as merely an aberration. “You are comparing me to the wrong benchmark,” they say. “Judge me over a full business cycle,” they say. “I’m right and the market is wrong,” they say. They’ll accept anything but evidence that disconfirms their cherished belief that they can beat the market.

Science offers remedies to the confirmation bias with a structure that forces us to consider all the evidence, confirming and disconfirming alike, and guides us to tests that tell us whether our hypotheses are supported by the evidence or rejected by it. For example, investment consultants who want to test the hypothesis that hedge funds beat the market must collect the returns of all hedge funds, not only the funds that proudly report terrific returns. And investment consultants must use prescribed tests to see whether any difference between the returns of hedge funds and the return of the benchmark is statistically and economically significant. Wise investment organizations create structures that highlight disconfirming evidence as brightly as confirming evidence. For example, wise investment organizations divide meetings about new investment ideas into two parts: one where all participants are encouraged to point out the strengths of the new idea and one where all are encouraged to point out its weaknesses.

Consider the belief that price-to-earnings (P/E) ratios can be used to forecast stock returns and time the market. By now, the story of the great rise of stock prices in the late 1990s and their great fall in the early 2000s is well-known. In the late 1990s exuberant investors lifted P/E ratios to levels much higher than their historical average. True to form, stock prices fell in early 2000. And by now, the lesson seems equally clear. Sell stocks when P/E ratios are high. But is this belief true? A proper examination must consider both confirming and disconfirming evidence.

When people talk about P/E ratios being high, they rarely tell us what kind of P/E ratio they consider high. Imagine that we call the P/E ratio of the S&P Index high if it exceeds or equals the median P/E ratio at the end of each of the 275 quarters from the 4th quarter of 1936 through the 2nd quarter of 2005. That median P/E ratio was 15.01. We call the P/E ratio low if it falls below the median. Imagine also that we call a quarterly S&P 500 return in the following quarter high if it exceeds or equals the median quarterly return. That median return was 3.68 percent. We call the return low if it falls below the median. Table 1 presents the frequency of the 275 quarters in the four cells of a matrix.

The first cell contains observations where P/E ratios were high and returns during the following quarter were low. These are positive hits. For example, the P/E ratio at the end of the 4th quarter of 2004 was high, 20.70, and the return in the following quarter was low, −2.15 percent. The fourth cell contains observations where P/E ratios were low and returns during the following quarter were high. These are negative hits. For example, the P/E ratio at the end of the 3rd quarter of 1982 was low, 8.88, and the return in the following quarter was high, 18.14 percent. Positive hits and negative hits are confirming evidence, observations consistent with the belief that high P/E ratios forecast low returns and low P/E ratios forecast high returns.
The other two cells contain disconfirming evidence. The second cell contains false positives where P/E ratios were high but subsequent returns were high. For example, the P/E ratio at the end of the 3rd quarter of 2004 was high, 19.29, but the return in the following quarter was also high, 9.23 percent. The third cell contains false negatives, where P/E ratios were low but subsequent returns were low. For example, the P/E ratio at the end of the 4th quarter of 1981 was low, 7.98, but the return in the following quarter was low, –7.23 percent. Correct analysis of the hypothesis that high P/E ratios forecast low returns and low P/E ratios forecast high returns requires examination of all four cells. Those who examine only the positive and negative hits fall prey to confirmation bias. There are 73 positive hits in the first cell and 73 negative hits in the fourth. These are confirming evidence, consistent with the belief that high P/E ratios forecast low returns and low P/E ratios forecast high returns. The disconfirming evidence is a bit weaker than the confirming evidence. There are 65 false positives in the second cell and 64 false negatives in the third cell. The prescribed statistical test is the Chi-square test, and it tells us that the difference between the confirming evidence and the disconfirming evidence is too small to support the hypothesis that P/E ratios forecast future returns at a statistically significant level.

The dog that believes his bark makes UPS trucks go away can test his belief by looking for disconfirming evidence. How about not barking next time when the UPS truck is in the driveway? If the truck stays in the driveway, that would be confirming evidence, but if the truck leaves, that would be disconfirming evidence. The dog is not smart enough to overcome his confirmation bias, but we should be. We have many beliefs, some true and others false. We should not overlook disconfirming evidence if we care about distinguishing true beliefs from false ones.

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Endnotes