Epistemically Virtuous Risk Management

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Epistemically Virtuous Risk Management: Financial Due Diligence and Uncovering the Madoff Fraud

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1

The greatest fraud in the history of the US, the biggest Ponzi scheme ever, a stunning $65 billion lost to some 5,000 clients, a maximum prison sentence of 150 years – the perpetrator, Bernard Madoff, has found a secure place in the history of finance. In 1960 he founded Bernard L. Madoff Investment Securities, LLC with $5,000 he had saved while working as a sprinkler installer, plus a loan from his father-in-law (Independent 2009). The firm soon became a frontrunner in the computer technology that would considerably help establishing NASDAQ, the world's first electronic stock market. Madoff went on to gain a reputation on Wall Street as one of the biggest market makers. He was one of the first to use computer technology for automated trading. He was to become Chairman of the National Association of Securities Dealers, donate generously to various charities and political campaigns, and enjoy great respect among the Jewish community in New York City – the community that he was so ruthlessly to defraud (Berkowitz 2012). He also gained a name within the financial world and had close connections to the overseeing authorities. In an interview with Inspector General H. David Kotz and Deputy Inspector General Noelle Frangipane on 17 June 2009, he described Securities and Exchange Commission (SEC) Commissioner Elisse Walter as a 'terrific lady' whom he knew 'pretty well', and SEC Chairman Mary Shapiro as a 'dear friend' who 'probably thinks "I wish I never knew this guy"' (Kotz and Frangipane 2009).

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The discovery of the fraud is a story of epistemic virtue. Many people on Wall Street may have had their suspicions about Madoff, and at least some of the funds feeding money to Madoff will have performed some kind of financial due diligence on him. But it was Harry Markopolos, a 'quant' working for Rampart Investment Management, LLC, who ultimately uncovered the Ponzi scheme. In this chapter, I look at the Markopolos case through the lens of epistemic virtues. Epistemic virtues are virtues that are concerned with the way we deal with information and investigation. They contribute to our adoption of true and justified beliefs and lead us to acquire genuine knowledge. They make us critical and careful, patient and persevering. It is the possession of these virtues, I argue, that distinguishes Markopolos from others who performed financial due diligence on Madoff.

Epistemic virtues are very novel in applied ethics (Marcum 2009; De Bruin 2013). So far, they have almost exclusively surfaced in foundational debates in the philosophical theory of knowledge. In defending the claim that epistemic virtues have to complement financial due diligence practices, the present study attempts to show that epistemic virtues have a serious contribution to make to business ethics. This chapter presents what can be considered as a case study in epistemic ethics. A case study is an investigation of one single case with the explicit aim to obtain a deeper understanding of a larger class of similar cases (Gerring 2007; Ruzzene 2012) as well as to develop new theories or further explore – or 'test' – existing theories (Brigley 1995). The Madoff fraud has attracted quite a lot of attention in the academic literature (Eenkhoorn and Graafland 2011; Freeman et al. 2009; Nielsen forthcoming), but, to my knowledge, the role of Markopolos in uncovering the fraud has not been examined in detail. While the primary purpose of the case study is to shed light on financial due diligence, simultaneously it will put to the test the theory of epistemic virtues in as yet unexplored terrain. In sum, the present case study further explores and 'tests' a novel theory in applied ethics (epistemic virtues) in a novel context (financial due diligence) which is also interesting in its own right (Markopolos and Madoff).

The chapter is structured as follows. Section 2 introduces the strategy Madoff claimed to be following and provides some further relevant background information. Section 3 introduces the theory of epistemic virtues. Section 4 traces epistemic virtues in Markopolos' investigative and financial due diligence research, defending the claim that it was epistemic virtues that led him to continue investigations where others stopped. Section 5 concludes.

2

What Madoff claimed to be offering his clients involved a *split strike conversion* approach (Bernard and Boyle 2009; Schneeweis and Szado 2010), which is based on buying shares in S&P100 companies and simultaneously selling and buying particular options on the S&P100 index. A *call option* on XYZ shares is the option to buy, at or before a particular moment in time (the expiration date), a specified number of XYZ shares at a predetermined price (the exercise or strike price). A *put*

option is similarly an option to sell particular shares. Suppose you have an XYZ call option to buy 100 XYZ shares for $20 at or before January 2013. Suppose, moreover, that today XYZ shares are trading at $10. If you wanted to purchase XYZ shares it would be senseless to exercise the right that the option grants you. The call option, in the jargon, is *out of the money*. Similarly, a put option is out of the money if the strike price is lower than the market price of the underlying shares.

A split strike conversion approach much like the one that Madoff used can now be illustrated by means of the following example. You buy 100 shares at $10 per share. To person A, you sell a call with a strike price of $20, and from person B you buy a put with a strike price of $5. Now there are three scenarios. If the price of the shares rises above the strike price of the call, then A will want to exercise their right to buy them from you at $20, and since you bought them at $10 you will earn $10 per share for a total of $1000 minus the fees, the price of the option, and other expenses. If the price of the shares sinks below the strike price of the put option, then B will want to exercise their right to sell them at $5, and you will lose $5 per share for a total loss of $500 plus fees and so on. And if the share price remains between the strike price of the call and put options, neither A nor B will want to deal with you. You will neither lose nor gain.

This example clearly shows a relevant characteristic of a split strike: you will never gain more than $1000 and never lose more than $500. By choosing the strike prices differently you can of course determine any other interval within which gains and losses will remain. As a result, a split strike is unlikely to lead to spectacular results.

What Madoff claimed to be engaged in was a variant of this. He claimed to hold a basket of 30–35 securities from the S&P100 index. He would sell an out-of-the-money call option on the S&P100 index and buy an out-of-the-money put option, and if the option prices were too high, he would switch to holding a portfolio of 100 % treasury bills, the alleged epitome of riskless assets. Moreover, Madoff claimed, he would only trade once a month.

As one would expect from a split strike strategy, Madoff's returns were not particularly spectacular – if each month were considered in isolation. But very much unlike a split strike approach, Madoff's strategy was claimed to reach returns of more than 10 % per annum consistently over almost 20 years, and to arrive at a volatility of only 3 % on average (Culp and Heaton 2010). This is exceedingly improbable for split strikes.

Madoff's returns did not come from split strike conversion. They were fake. They were the result of a Ponzi scheme. Named after the Italian Charles Ponzi, a Ponzi scheme is a very simple mechanism by means of which the money that investors pay into the scheme is not invested but rather used to pay returns to the investors in the scheme. I offer you and other investors 20 % per annum on your investments with me. Instead of investing the money that you and others bring in, however, I use the money to pay out the 20 %. Of course, the risk is that the money dries up, which makes it imperative for me to attract new investors, who also have to be paid 20 %, which spirals into an increasingly pressing demand to raise new capital. Ponzi schemes are highly unsustainable (Artzrouni 2009).

Madoff's fundraising capacities were unequalled, though. Somewhere in the 1990s – some believe even much longer ago – Madoff had stopped investing the money from his clients. He would use his respectability, status and apparent trustworthiness to attract enormous sums of money for his Ponzi scheme. Part of his strategy was precisely to offer rather unspectacular returns, to keep silent about his investment tactics, to require absolute confidentiality from his investors, and to give a decidedly exclusive feel to his investments to make people feel privileged to be accepted in his fund. Many succumbed to his charms (Sarna 2010).

Harry Markopolos is generally credited with having discovered the fraud (Arvidlund 2009; Henriques 2011; Sarna 2010). While it is true that many people in the finance industry had suspicions about Madoff's operations, their usual response was that he was probably engaged in illegal activities on the verge of insider trading and frontrunning, and that as long as Madoff paid you when you wanted, clients should not care. Working for Rampart Investment Management Company, LLC, an options trader, Markopolos was asked by his employer to investigate Madoff's investment strategies in order that Rampart could emulate them. Rampart had heard from a partner, Access International Advisors, LLC, that they were dealing with a hedge fund that claimed returns of 2 % a month on the basis of split strike conversion strategies and that this fund was managed by Madoff. Markopolos analysed information about the fund's revenues obtained from Access CEO René Thierry Magon de la Villehuchet, and this started a lengthy investigation which ultimately led Markopolos to the conclusion that Madoff was indeed running a large Ponzi scheme. Warnings that Markopolos and a few people working with him on the investigation started to issue from 1999 onward to Access and other funds working with Madoff, to journalists, and to the SEC were ignored. Madoff's fund did not start to wind up until the end of 2008.

How did Markopolos find out? Markopolos used models from mathematical finance, which are part of the usual financial due diligence which Access and other clients of Madoff ought to have carried out. The mere use of these models cannot explain why Markopolos succeeded, however, because it is highly unlikely that he was the only person ever to have done the maths on Madoff. Rather, I argue, Markopolos succeeded where others failed because his use of financial due diligence methods was complemented by epistemic virtues. One way to put the difference would be to say that Markopolos just did his job where others did not. But when some do their jobs and others do not, many factors may explain the difference including such things as lack of knowledge and skills, dysfunctional management, desire to frustrate one's superiors, and so on. The claim the present chapter seeks to defend is that the difference between Markopolos and other financial analysts – due diligence analysts among them – is a lack of epistemic virtue.

To obtain a deeper understanding of epistemic virtues, I shall devote some attention to virtues in general before turning to Markopolos' investigations. I explore the thesis that his success was due to a combination of financial due diligence and epistemic virtues.

3

A traditional Aristotelian and Thomistic conception of virtues underlies the present chapter (Pouivet 2010). This conception views virtues as motivators and/or enablers of action. A virtue motivates you to perform certain actions by influencing your preferences and desires. A virtue enables you to do certain things by removing internal obstacles that lie in the way of performing virtuous actions. Moreover, most virtues actually do both: they enable and they motivate (Driver 2000).

The virtue of courage illustrates how virtues motivate. Imagine that at t_0 individual S has not yet acquired the virtue of courage. S is a coward at t_0. He sees a child drowning in a raging river. He has his mobile phone ready, so he can ring the emergency number 999 (let us call this action A), and were it not for his cowardice, he could have jumped in the water and attempted to rescue the child (action B), or he could have called one of the tourists nearby and asked them to help (action C). But being the coward that he is, he neither jumps nor calls but only rings 999. The coastguard arrives only barely in time. Shocked by the sight of the guards' resuscitation attempts and the child's suffering, S decides to work on his lack of courage, and he succeeds. At t_1 he has acquired the virtue, and as if to put him to a test, he again sees a child drowning. He waits no longer, searches for a place where he can safely jump into the water, swims out and rescues the child.

Courage has enabled S to rescue the child and to perform other actions requiring courage by removing what one could call 'internal obstacles' to the performance of such actions. In the treatment of epistemic virtues below, we shall see that these internal obstacles often involve so-called *behavioural biases*, which lead us to behave suboptimally with respect to investigative activities and other forms of belief formation (Barberis and Thaler 2002). For the purpose of illustration, however, I focus on a non-epistemic instance of courage. S at t_0 was blocked by his cowardice to perform actions B and C. His choice situation was a singleton set containing action A only. Acquiring courage, then, led to the removal of these internal obstacles, as a result of which his choice set at t_1 contained the actions B and C besides to A.

If courage illustrates how virtues enable, the Aristotelian virtue of liberality provides an example of how a virtue may motivate. S at t_0 is a Scrooge spending nothing on anyone – 'Bah, humbug!'. Haunted by the three Ghosts of Christmas, he decides it is time for a change and acquires the virtue of liberality. It works. At t_1 we see him treating his relatives, neighbours and his clerk's family with generosity and concern. Liberality has not so much removed obstacles to performing generous actions; it would be wrong, for instance, to describe S at t_0 as incapable of giving. Rather, at t_0 he had no preference whatsoever for giving; he was miserly in wanting to keep his money. What the three ghosts did was make him change his preferences so as to become motivated to be generous.

Two things have to be said about this very succinct virtue theory. I must say something about the theory of the mean (virtues lay in the middle of two extremes) and also about the idea that most virtues both involve motivation and enabling. First,

the examples discussed so far only involve one vice, that is, one extreme of the virtue. I considered a move from cowardice to courage, not a move to courage from recklessness, nor did I consider a move from prodigality to liberality. These moves can be described in exactly the same way, though; interestingly, showing this will also cover the second point about motivation and enabling.

To start with recklessness: a reckless person is one who is, one could say, 'too courageous'. A reckless *S* seeing a drowning child dives into the river without thinking but injures himself because the water is too shallow. One might think that for a reckless person to learn how to steer the middle course between cowardice and recklessness requires a form of 'disenabling'. On that count, *S* would have to acquire internal obstacles to the performance of reckless acts. A reckless *S* might, however, just as well learn to change his preferences and acquire a motivation for more careful and considerate, but still courageous, behaviour. Courage, then, is a virtue that both enables and motivates.

This is not generally true, though. To move from the extreme of prodigality to the mean of liberality only involves a preference change: roughly, a change to give less and keep more. When a person who is 'too generous' learns to acquire the right attitude to getting and giving, this does not involve disenabling certain prodigal actions but only demoting these actions in their preference ordering.

While virtue ethics has a long tradition in twentieth century philosophy (Anscombe 1958; Jankélévitch 1949; MacIntyre 1981; Pieper 1934; Solomon 1992), the theory of epistemic virtues is a very new development. Two streams were developed simultaneously. A *reliabilist* version of virtue epistemology was pioneered by Sosa (1980) and focused on such cognitive faculties as perception and memory. A *responsibilist* version was advanced by such authors as Code (1984), studying not so much innate human faculties but acquired character traits conducive to the acquisition of epistemic goods (knowledge, understanding, wisdom, enlightenment). It is the responsibilist version of virtue epistemology that I use in this chapter, but before reviewing the most important *epistemic* virtues it is important to distinguish them from what Aristotle called *intellectual* virtues. In the *Nicomachean Ethics* and other works, Aristotle famously discussed moral virtues (*ethikes arêtes*) which describe such acquired character traits as courage and temperance, distinguishing them from the five intellectual virtues (*dianoetikes arêtes*) of art, science, prudence, wisdom and imagination. Responsibilist virtue epistemology sees epistemic virtues as instances of moral not intellectual virtues. They are character traits fostering the good life of *eudaimonia* and leading their possessor to steer the middle course between two extreme vices. As a result, just as its non-epistemic version, epistemic courage leads a person to pursue inquiry and investigation, even if this means they will face certain risks, but without them performing their inquiry recklessly as that would turn to the other extreme.

What are the most important epistemic virtues? I list them briefly here and discuss each virtue in more detail when I turn to Markopolos' financial due diligence. The current presentation owes much to Baehr (2011), Montmarquet (1993), Roberts and Wood (2007) and Zagzebski (1996). The prime epistemic motivator is *love of knowledge*, which can be traced at least as far back as

Augustine's *studiositas* (Trottmann 2003). Love of knowledge is complemented by epistemic *courage*. An intellectually courageous person is eager to subject their beliefs to thorough scrutiny and to continue their inquiry irrespective of potential resistance or disdain from others until they have reached a conclusion. They keep trying to answer the questions they ask and they are not deterred by the fact that this may graphically reveal their ignorance. Epistemically *temperate* or sober-minded individuals, in turn, are disposed to avoid adopting beliefs overly enthusiastically without any good evidence, but they also shun an inert disinterestedness which might lead them to be unwilling to adopt any beliefs at all. Temperate persons are sceptical enough to take with a grain of salt what salespeople tell them, for instance, but they are not so sceptical as never to believe anyone. Epistemic *justice* is a form of open-mindedness, a readiness, that is, to confront one's ideas with those of others, and it includes an active awareness of one's epistemic shortcomings and fallibility. Epistemically just people will want to hear both sides of the story, and not draw any firm conclusions as long as they have only partial evidence. Epistemic *generosity* and *humility*, finally, are dispositions to share one's knowledge freely with others (but not in a way that would unjustifiably harm one's own interests) and to avoid being overly confident and arrogant concerning one's knowledge, intelligence or wisdom.

To anticipate a possible objection, does this mean that one cannot perform one's job without epistemic virtues? It may be that particular jobs require little in the way of gaining knowledge, and performing such jobs may be possible without the possession of epistemic virtue. But it is hardly likely. Even the most routine sort of work requires that one gets acquainted with the routines, and this requires at least a rudimentary level of epistemic virtue. More importantly, however, we are here engaged with a highly knowledge-intensive industry where doing one's job well – or 'excellently', as some virtue theorists might want to say – does require epistemic virtue. To the extent that the failure of many financial due diligence analysts to detect the Madoff Ponzi scheme was a failure to do their jobs, the difference between these analysts and Markopolos is one of epistemic virtue.

4

When Markopolos' employer, Rampart Investment Management Company, LLC, first heard about Madoff's fund, he was told by his boss to imitate – and emulate – Madoff's split strike conversion strategy. He responded to the challenge with vigour. Describing himself as a 'research geek', Markopolos saw it as a question purely of mathematical finance that it was 'only logical' to see 'as an academic exercise, and not as the largest fraud in Wall Street history'. Writing about himself and a few colleagues, he said that 'we weren't looking for crime; we simply wanted to see how [Madoff] made his numbers dance' (Markopolos 2010, 20).

While strictly speaking Markopolos' work started as a form of reverse engineering rather than financial due diligence, the methods that he applied were exactly

the methods that financial due diligence analysts use, and as soon as the maths suggested that it was fraud instead of financial genius that made the number 'dance', Markopolos indeed turned to financial due diligence and abandoned the ambition to emulate Madoff.

Financial due diligence is the process by which one ascertains the risks and returns of prospective investment decisions. I give a brief sketch of what financial due diligence agents do, which is based on a recent overview article by Culp and Heaton (2010). This, incidentally, contains a treatment of the Madoff case that is very similar to the work that Markopolos carried out.

Financial due diligence uses both qualitative and quantitative methods. Qualitative methods involve scrutinising the reputation of the fund manager, the quality of internal control in the investment firm, the adequacy of their reporting, and their regulatory compliance. Quantitative methods are primarily drawn from mathematical finance and are more specifically used to gauge risks and returns.

The first thing that Markopolos was interested in was Madoff's returns. The concept of *return* is the analogue of interest received on a deposit account. If you earn 5 % interest per year, your return is 5 % per year. Return on equity (company shares) is similar, but because shares pay out dividend and shares change in value, calculations are unlike compounding interest. If shares of, say, $100 pay a dividend of 5 % after the first year and have appreciated to $120, your return is 25 %.

Even if the concept of return on equity is simply a generalisation of interest on deposits, investing in equities is very unlike saving money in a deposit account. The difference is an epistemic one: one knows one's interest rate, but one does not know the returns on equity in advance. This is why financial due diligence analysts desire to develop methods to estimate one's returns.

The premise on which methods from mathematical finance are built is that the riskier the investment the higher the expected return investors will demand on their investments. But what is risk in finance? Especially in the context of several other contributions to this volume, it should be noted that the conception of risk used in finance is rather different from rational choice theoretic understandings of risk. In rational choice theory, one faces a choice situation with risk if one has attached subjective or objective probabilities to all possible outcomes of all actions one can perform. Roughly speaking, risk is probability. In finance, by contrast, risk is not captured by probability but by the concept of *volatility* and its cognates. To illustrate this concept, suppose you consider buying shares in one company. To get some idea of what the return might be, you first calculate the empirical mean of the returns based on historical data from, say, the past 10 years. This gives you some idea of what to expect, but it does not tell you how risky the investment is. To that end, the standard deviation is used.

Yet it would be misleading to claim that volatility is the only concept financial due diligence analysts have in order to ascertain the risks of an investment. To understand why, another idea from finance should be discussed: *diversification*. If your investment portfolio only contains shares in one company, you bear risks which you may partly eliminate by buying shares in other companies as well. It is better, so to speak, to buy shares in five different food companies than in one, and it is

even better to buy shares in companies in five different industries than in one. The risk eliminated from one particular asset when one holds that asset in a diversified portfolio is called *unsystematic* risk, but some risk still remains attached to that asset: its *systematic* risk.

Why would we be particularly interested in this sort of risk? The assumption that underlies the finance theory of risk is that if markets are functioning efficiently, one may expect that the unsystematic risks of an asset, which can be eliminated by diversification, will *not* be reflected in the price of the asset. If I were to demand a reduction in the price of one asset because of its unsystematic risk, a competing buyer would accept a lower price because they would see that they could remove that risk by diversification. Risk that cannot be removed by diversification will be reflected in the price, however.

It is an asset's systematic risk that financial due diligence analysts are concerned with. Several measures of systematic risk exist, but I shall focus here on the measures that are most frequently used in financial due diligence. They involve the well-known *alpha* and *beta*. Roughly, an asset's beta captures the systematic risk of that particular asset in that it measures the extent to which its volatility is correlated with the volatility of the market. An asset's alpha, on the other hand, describes whether the investment offers investors enough to compensate for the risks they run. One of the models to estimate alpha and beta is the Capital Asset Pricing Model (CAPM) developed by Sharpe (1964) and others. This is too elegant not to discuss here in a little detail, but readers who know the material or who are less interested in the mathematical details may skip the next paragraph.

Suppose you invest a proportion X of your assets in a market portfolio (that is, invest it in shares reflecting the market such as the S&P100 index), and you invest a proportion $1 - X$ in risk-free securities (Madoff opted for treasury bills). The market proportion of your portfolio is by definition perfectly correlated with the market and therefore has a beta of 1. The risk-free proportion, moreover, has a beta of 0 because it has by definition no correlation with the market at all. Since betas are linear, the beta of your portfolio is $\beta_p = X \cdot 1 + (1-X) \cdot 0 = X$. Let us denote the return we can expect from the entire portfolio as $E(R_p)$. The expected return can be analysed entirely in terms of the expected returns of its two parts: the market share (which following the same notation is $E(R_m)$), and the risk-free share (of which, since it has no risk, $E(R_f) = R_f$). This yields $E(R_p) = (1-X) \cdot R_f + X \cdot E(R_m)$. Now substituting β_p for X we easily derive from this equation the CAPM formula: $E(R_p) - R_f = \beta_p(E(R_m) - R_f)$.

Back to Markopolos. Seeing the challenge to mimic Madoff's success as a purely 'academic exercise' at first, he needed to study historical time-series of Madoff's returns on investment. As a proxy Markopolos used return streams he had obtained from his company's trading partner, Access International Advisors, LLC, from which earlier information on Madoff had been forthcoming. Access had dealt extensively with Madoff. Closely scrutinising the data, Markopolos soon ventured the hypothesis that the returns were fake. 'There's no way this is real. This is bogus' (Markopolos 2010, 30).

Fig. 1 Estimates of alpha and beta

	Culp and Heaton	*Markopolos*	
Fund	Unknown	Fairfield Limited	Sentry
Period	1989–2001	1990–2005	
Alpha	0.007	0.009	
Beta	0.05	0.06	

In order to confirm his suspicions, Markopolos developed a model to estimate alpha and beta. The model attempted to copy Madoff's alleged split strike conversion approach. If Madoff were indeed applying this approach to baskets of 30–35 securities from the S&P100 index, a rather strong correlation with the S&P100 index (a high beta) should be expected, because if a basket picks around a third of a market, it is going to covary with the market quite significantly. Because Madoff claimed to be trading only once a month, this is largely true even if for whatever reason – insider dealing or telepathy – he would always select the best 30 or 35 from among the 100 shares available.

Markopolos does not provide information on how he estimated the risks on the basis of the data available to him around 1999, when he started his investigations. He does give details of a study involving years 1990–2005, though (Markopolos 2005). For those years, he estimated alpha and beta by applying such models as CAPM to data from Fairfield Sentry Ltd. This was a so-called *feeder fund* doing little more indeed than feeding its clients' money to Madoff's scheme. Culp and Heaton (2010) provide a similar analysis on the basis of an unnamed feeder fund for the period 1989–2001. Since this is closer to the time period when Markopolos had access to data when he started his research in 1999, these data are included here too. The differences from the later Markopolos study are minimal. See Fig. 1 for the results.

Anyone familiar with CAPM would be perplexed. The feeder funds show a beta of 5 % or 6 %. This means that for practical purposes they are entirely risk free. (Recall that risk-free assets have a beta of 0 %.) Markopolos writes that he expected the beta

> to be around 50 per cent, but it could have been anywhere between 30 and 80 per cent. Instead Madoff was coming in at about 6 per cent. Six per cent! That was impossible. That number was much too low. It meant there was almost no relationship between those stocks and the entire [S&P100] index. I was so startled that the legendary Bernie Madoff was running a hedge fund that supposedly produced these crazy numbers that I didn't trust my math. *Maybe I'm missing something*. (35)

Markopolos cannot have been the only one doing the maths. There is evidence that numerous people on Wall Street had their suspicions about Madoff, some based on quantitative financial due diligence (Arvidlund 2009). Moreover, even though Markopolos himself describes his modelling strategy as 'complex' because it had 'a lot of moving parts' (34), there is, from a mathematical point of view, nothing difficult about the model. Dan diBartolomeo (2010), a mathematician who taught Markopolos and whom Markopolos later approached to check his maths, described the methods as 'textbook simple quant methods of due diligence', which could yield

conclusions 'in a few hours'. The mathematics of asset pricing appears in many undergraduate economics curricula; it is therefore hard to believe that no one else had done the same financial due diligence and run the same regressions at the time.

Take Fairfield Greenwich Group (FGG), the investment firm offering feeder funds such as Fairfield Sentry Ltd. The firm had a detailed description of its financial due diligence practices on its website – which was, incidentally, removed during the Madoff windup – which stated that

> [a] core area for further analysis is to attempt to dissect and further understand investment performance, how a manager generates alpha, and what risks are taken in doing so. As portfolio management and risk management incorporate elements of both art and science, FGG applies both qualitative and quantitative measures.

Fairfield Greenwich even went so far as to claim that 'the nature of FGG's manager transparency model employs a significantly higher level of due diligence work than typically performed by most fund of funds and consulting firms' (quoted by Blodget 2009). This is of course very doubtful; it is rather likely that due diligence was carried out at a very low level. This is not to say, however, that if Fairfield Greenwich had indeed run the regressions and estimated alpha and beta – as their financial due diligence statement claims they did – they would have come to the conclusions Markopolos had arrived at. Like many others, Fairfield Greenwich financial due diligence analysts might have blamed the maths rather than a person with a long-standing and unrivalled reputation – Bernard Madoff.

Indeed, other feeders simply admitted they had not gone beyond investigating Madoff's reputation, which at the time, of course, was spotless. De la Villehuchet, CEO of Access Internation Advisors, LLC, and another Madoff feeder, told Markopolos that he was 'totally committed' to Madoff and that he had done his 'own form of due diligence'. He told Markopolos that 'I'm comfortable with it. He comes with an impeccable reputation. I mean, my God, he's one of the biggest market makers in the U.S.' (Markopolos 2010, 91).

In the end, then, Fairfield Greenwich financial due diligence analysts may have found a beta of 5 %. But if, as Access CEO de la Villehuchet held, you are estimating the beta of a man with an 'impeccable reputation' who had held important positions in the financial services industry, highly respected in society, with close connections in politics and elsewhere – and praised for investor ingenuity and technological innovation – then you might indeed have doubted the maths and the beta rather than the man and his fund.

Markopolos, however, using similar methods of financial due diligence, went much further; and that he went further is to be explained, I argue, because epistemic virtues motivated and enabled him to go further. The most important epistemic virtue is *love of knowledge*. Following a view that goes back at least as far as Augustine, a person who loves knowledge is a person who does not just desire to obtain *true* beliefs; more than that, the person wishes to acquire relevant beliefs which can be *justified* on the basis of available evidence. Beliefs based on rumours or gossip are excluded, as are mere speculation and other beliefs formed on the basis of unjustified evidence (Roberts and Wood 2007).

Markopolos persistently displays this important epistemic virtue. Several people with whom he would talk about Madoff would admit that Madoff's returns were 'unreal'. But they would not care to investigate how to explain the lack of realism, only speculating about the possibilities of illegal insider trading, frontrunning and so on. Markopolos, on the other hand, employed a great diversity of methods to confirm his hypothesis. A report entitled 'The World's Largest Hedge Fund Is a Fraud', which he sent to the Securities and Exchange Commission on 22 December 2005, contained no fewer than 30 red flags uncovered by a large diversity of qualitative and quantitative methods (Markopolos 2005).

Epistemic *humility* is another virtue that characterises Markopolos' work. This virtue contrasts with two vices that may usefully be spelled out (Weiss and Knight 1980). One vice is that of *vanity*. A vain person is continuously demonstrating their knowledge and status, and when sharing information they are typically more interested in what the recipients of the information will think about them as a person than whether they will actually learn something from it. Epistemic humility also contrasts with *arrogance*. An epistemically arrogant person unjustifiably defends knowledge claims by reference to their superiority or authority. This is not to say that superiority and authority cannot deliver such justificatory grounds. If one's superiority entails a better access to data, one's justification is probably going to be better. A manager who claims to know, however, simply because he is the manager, is epistemically arrogant. Epistemic humility, in other words, leads a person to acknowledge their lack of knowledge and to allow for the possibility that the other person may be right. It makes you aware of your own fallibility, but without being self-effacing and without being tempted to engage in what psychologists call *groupthink,* merely following the crowd due to an unjustified lack of confidence in your own reasoning capacities.

Markopolos showed great humility when he had his mathematical models checked by various others inside and outside his firm and by invoking the assistance of many other individuals. Michael Ocrant, for instance, was a journalist who had uncovered various Ponzi schemes during his career. After Markopolos explained his suspicions to him, Ocrant simply decided to ring Madoff. He was invited over to Madoff's office the same day. Madoff made a tremendous impression on Ocrant, showing him around the office, allowing him to ask any question he might fancy, and answering them in seemingly consistent and plausible ways (Ocrant 2001). Ocrant concluded that if Madoff were indeed running a Ponzi scheme, 'he's either the best actor I've ever seen or a total sociopath' (82). To Markopolos and his colleagues he reported back that

> [t]his guy was as cool as can be. I mean, I didn't see the slightest indication that anything was wrong. In fact, rather than worrying about the story I was writing, he acted like he was inviting me over for Sunday tea. He doesn't act like he's got something to hide. He spent more than two hours with me. He showed me around the whole operation. He even offered to answer any other questions. Guilty people usually don't act this way.

Markopolos replied to Ocrant that 'The numbers don't lie.' But Ocrant doubted that. 'Is it possible we're missing something?' (Markopolos 2010, 83).

Markopolos was sober-minded enough to have asked that question himself after he had done his initial mathematical modelling and had concluded that the Fairfield Sentry Ltd feeder fund had a beta of 6 %. He had gradually discarded alternative explanations for the beta, though, and accepted his mathematical knowledge as a firm basis to conclude that Madoff was operating a Ponzi scheme.

Another virtue that benefited Markopolos was epistemic *courage*. Courage lies between cowardice and recklessness, and apparent examples of courage needed in investigation are the courage of the war reporter, the volcanologist or the NASA test pilot (Baehr 2011). We also need epistemic courage, however, when we are to ask questions the posing of which may risk others to ridicule us, to speak up in public debates about minority issues, to criticise our superiors, and other epistemic activities that may lead to personal harm. Ocrant, for one, did not ask Madoff straightaway whether he was running a Ponzi scheme. With courage, however, Markopolos did voice suspicions about investments which many clients of Rampart Investment Management, LLC, firmly believed in. Thereby he risked the firm's relationship with the clients. He risked his own position in the firm when he made clear that he would not emulate Madoff's success for Rampart, and he endangered his status as a quant when he admitted that he had failed to develop mathematical models that would even consistently explain Madoff's successes. And when he started going public with his suspicions, he claims to have risked his own and his family's life because of alleged connections between the financial world and organised crime (Henriques 2009).

Arguably the most important epistemic virtues that contributed to Markopolos' success, however, are *temperance* and *justice*. Epistemic *temperance* is a disposition to choose the right amount of inquiry and investigation, to adopt one's beliefs not too quickly and not too hesitantly, and to strive for the right degree of justification for one's beliefs (Battaly 2010). To find out if a certain marketing strategy works, a manager may decide to set up an experiment and a field study with thousands of subjects, a crew of award-winning researchers, and adopt a time frame of one year. That would be too thorough, too careful – 'too temperate'. The manager could also ask three friends what they think about the new strategy. That would be too quick. An epistemically temperate manager knows how to strike the balance. Epistemic *justice*, in turn, refers to the disposition to consider the views of different parties impartially and open-mindedly and to listen to both sides when opinions or bits of evidence conflict. Epistemically just agents will carefully sort out and weigh the evidence provided by both sides before adopting a belief, and they will not set aside particular sources of information on irrelevant grounds such as race and ethnicity (Fricker 2007). Epistemic justice is a particularly difficult virtue, as witnessed by evidence from behavioural economics on *confirmation bias* and the phenomenon of *belief perseverance* (Barberis and Thaler 2002). Tax professionals, for instance, who are supposed to estimate the legal risks of particular ways of reporting company taxes, tend to spend more time searching for cases that confirm their client's position than cases that would go against it, and this lack of epistemic justice has the undesirable effect that their clients report their taxes in overly aggressive ways, leading to their being fined by the tax authorities (Cloyd and Spilker 1999).

Markopolos had started entertaining doubts about the legality or reality of Madoff's strategy as soon as he had seen the revenue streams that Access International Advisors, LLC, had handed to him. He did not rush to a conclusion, though. He developed mathematical models which he had checked by others. He used a great range of methodologies to examine the issue. For instance, his research led him to the observation that for Madoff to really engage in the split strike conversion approach he would have had to own more than 100 % of all existing put options. He used qualitative methodologies when he worked with Michael Ocrant, the journalist who interviewed Madoff, and he relentlessly discussed his findings with colleagues. Most importantly, even though quite early on he voiced the hypothesis that Madoff was running a Ponzi scheme, he gave careful consideration to alternative explanations provided by colleagues and clients of Rampart. One alternative was that Madoff would obtain his results from insider trading, frontrunning in particular. Access CEO de la Villehuchet had explained Madoff's competitive advantage as that Madoff's decision on what shares to buy or sell is 'based upon his knowledge of the market and his order flow' (Markopolos 2010, 27), a form of insider knowledge. Markopolos' Rampart colleague Frank Casey accused Madoff of frontrunning, that is, of using knowledge obtained as a market maker about customers' upcoming trades. Then there was the third hypothesis that Madoff was actually borrowing the money at an interest rate of around 15 % from his clients for him to use in his work as a market maker. Markopolos paid attention to all these hypotheses, and many others, and refuted all of them.

5

In the end, the story of Markopolos' success is a story of epistemic virtue. If the mathematical models show something very strange – a beta of 6 % for a strategy that basically follows a third of the market – but the strategy originates from a person with tremendous reputation, one needs epistemic virtue in order to dare to question not only the maths (which Markopolos did) but also reputation (which he also did). This chapter could have looked into the lack of epistemic virtue on the part of the Securities and Exchange Commission, for which Markopolos gives ample evidence. As the title of his book suggests, almost no one would listen to what he had to say. SEC officials would not listen because they did not understand the maths and did not dare to admit it, because they were obsessed with internal power struggles, because they were biased toward the assumption that Madoff was to be believed and not Markopolos, because they lacked open-mindedness, epistemic courage and humility. The story of SEC's inability to deal adequately with a large fraud, however, is more a story of a failure to establish epistemic virtues at a *corporate* level. The study of corporate epistemic virtues requires a very different theoretical approach, and that is why I have not dwelt on the SEC (De Bruin 2013). That Markopolos' story is a positive story is another reason.

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Bibliography

Anscombe, E. 1958. Modern moral philosophy. *Philosophy* 33: 1–19.

Artzrouni, M. 2009. The mathematics of Ponzi schemes. *Mathematical Social Sciences* 58(2): 190–201.

Arvidlund, E. 2009. *Madoff: The Man who stole $65 billion*. London/New York: Penguin.

Baehr, J. 2011. *The inquiring mind: On intellectual virtues and virtue epistemology*. Oxford: Oxford University Press.

Barberis, N., and R. Thaler. 2002. *A survey of behavioral finance*. Cambridge: NBER.

Battaly, H. 2010. Epistemic self-indulgence. *Metaphilosophy* 41(1–2): 214–234.

Berkowitz, M. 2012. The Madoff paradox: American Jewish sage, savior and thief. *Journal of American Studies* 46(1): 189–202.

Bernard, C., and P. Boyle. 2009. Mr. Madoff's Amazing returns: An analysis of the split-strike conversion strategy. *Journal of Derivatives* 17(1): 62–76.

Blodget, H. 2009. Fairfield greenwich group's amazing sue diligence practices. *Business Insider,* 1 April 2009

Brigley, S. 1995. Business ethics in context: Researching with case studies. *Journal of Business Ethics* 14(3): 219–226.

Cloyd, C.B., and B.C. Spilker. 1999. The influence of client preferences on tax profesionals' search for judicial precedence, subsequent judgments and recommendations. *The Accounting Review* 74(3): 299–323.

Code, L. 1984. Toward a 'Responsibilist' epistemology. *Philosophy and Phenomenological Research* 65: 29–50.

Culp, C.L., and J.B. Heaton. 2010. Returns, risk and financial due diligence. In *Finance ethics*, ed. J.R. Boatright, 85–101. Hoboken: Wiley.

De Bruin, B. 2013. Epistemic virtues in business. *Journal of Business Ethics* 113(4): 583–595.

DiBartolomeo, D. 2010. Risk and attribution in the Post-Madoff Era, lecture CFA Institute, 25 Feb 2010.

Driver, J. 2000. *Uneasy virtue*. Cambridge: Cambridge University Press.

Eenkhoord, P., and J.J. Graafland. 2011. Lying in business: Insights form Hannah Arendt's 'Lying in Politics'. *Business ethics: A European Review* 20(4): 359–374.

Freeman, E.R., L. Stewart, and B. Moriarty. 2009. Teaching business ethics in the age of Madoff. *Change* 41(6): 37–42.

Fricker, M. 2007. *Epistemic injustice: Power & the ethics of knowing*. Oxford: Oxford University Press.

Gerring, J. 2007. *Case study research: Principles and practices*. Cambridge, UK: Cambridge University Press.

Henriques, D.B. 2009. Madoff witness tells of fear for safety, *New York Times*, 3 Feb 2009.
Henriques, D.B. 2011. *The wizard of lies: Bernie Madoff and the death of trust*, New York: Macmillan.
Independent. 2009. The Madoff files: Bernie's millions, *The Independent*, 29 Jan 2009.
Jankélévitch, V. 1949. *Traité des vertus*. Paris: Bordas.
Kotz and Frangipane. 2009. Interview with Bernard L. Madoff, 17 June 2009. http://www.sec.gov/news/studies/2009/oig-509/exhibit-0104.pdf. Accessed 5 Oct 2012.
MacIntyre, A. 1981. *After virtue: A study in moral theory*. Notre Dame: University of Notre Dame Press.
Marcum, J.A. 2009. The epistemically virtuous clinician. *Theoretical Medicine and Bioethics: Philosophy of Medical Research and Practice* 30(3): 249–265.
Markopolos. 2005. The world's largest hedgefund is a fraud, 7 Nov 2005. http://www.sec.gov/news/studies/2009/oig-509/exhibit-0293.pdf. Accessed 5 Oct 2012.
Markopolos, H. 2010. *No One would listen: A true financial thriller*. Hoboken: Wiley.
Montmarquet, J. 1993. *Epistemic virtue and doxastic responsibility*. Lanham: Rowman & Littlefield.
Nielsen, R.P. 2012. Whistle-blowing methods for navigating within and helping reform regulatory institutions, *Journal of Business Ethics* 112(3): 385–395.
Ocrant, M. 2001. Madoff tops charts; skeptics asks how. *MAR/Hedge* 89: 1.
Pieper, J. 1934. *Vom Sinn der Tapferkeit*. Leipzig: Jakob Hegner-Verlag.
Pouivet, R. 2010. Moral and epistemic virtues: A thomistic and analytical perspective. *Phorum Philosophicum* 15: 1–15.
Robert, H. 1997. Third market broker-dealers: Cost competitors or cream skimmers? *Journal of Finance* 52(1): 341–352.
Roberts, C.R., and W.J. Wood. 2007. *Intellectual virtues: An essay in regulative epistemology*. Oxford, UK: Oxford University Press.
Ruzzene, A. 2012. Drawing lessons from case studies by enhancing comparability. *Philosophy of the Social Sciences* 42(1): 99–120.
Sarna, D.E.Y. 2010. *History of greed: Financial fraud from Tullip Mania to Bernie Madoff*. Hoboken: Wiley.
Schneeweis, T., and E. Szado. 2010. Madoff: A returns-based analysis. *The Journal of Alternative Investments* 12(4): 7–19.
Sharpe, William F. 1964. Capital asset prices – A theory of market equilibrium under conditions of risk. *Journal of Finance* 3: 425–442.
Solomon, R.C. 1992. Corporate roles, personal virtues: An Aristotelean approach to business ethics. *Business Ethics Quarterly* 2(3): 317–339.
Sosa, E. 1980. The raft and the pyramid: Coherence versus foundations in the theory of knowledge. *Midwest Studies in Philosophy* 5(1): 3–26.
Trottmann, C. 2003. Studiositas et superstitio dans la Somme de Théologie de Thomas d'Aquin, enjeux de la défiance à l'égard des 'sciences curieuses. In *Ratio et superstitio: Essays in honor of Graziella Federici Vescovini*, ed. T. Marchetti et al., 137–154. Louvain-La-Neuve: Brepols.
Weiss, H.W., and P.A. Knight. 1980. The utility of huminity: Self-esteem, information search and problem-solving e. *Organizational Behavior and Human Performance* 25: 216–223.
Zagzebski, L.T. 1996. *Virtues of the mind: An inquiry into the nature of virtue and the ethical foundations of knowledge*. Cambridge, UK: Cambridge University Press.