# Review Essay
## The politics of algorithmic finance*

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Robert Harris, *The Fear Index* (2012 [2011], Random House, New York)

'THE COMPANY OF THE FUTURE WILL HAVE NO WORKERS
'THE COMPANY OF THE FUTURE WILL HAVE NO MANAGERS
'THE COMPANY OF THE FUTURE WILL BE A DIGITAL ENTITY
'THE COMPANY OF THE FUTURE WILL BE ALIVE'

This dystopic and disturbing prophecy is the company slogan of the (fictional) Geneva-based hedge fund Hoffmann Investment Technologies, as revealed in the concluding chapter of Robert Harris's 2011 sci-fi thriller *The Fear Index*. Briefly stated, *The Fear Index* tells the story of a scientist and hedge fund owner, Dr Alexander Hoffmann, whose ground-breaking invention, the

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VILAX-4 machine learning algorithm, gradually escapes from the company's and thus its creator's control. Although the trading algorithms used in today's financial markets are not sophisticated enough to threaten the global economy, Harris's novel does address some of the political, economic, and regulatory issues emanating from the growing automation of financial market trading.

The financial sector has been heavily criticised for some aspects of its commercial 'ingenuity' which gave rise to the 2008 financial crisis, notably the creation of highly complex and bubble-instigating financial products such as collateralised debt obligations (CDOs), credit default swaps, and subprime mortgages (see, for example, Langley 2010). If the crisis helped shed light on an overly innovative financial sector, the recent propagation of trading algorithms has sparked debates about the consequences of the increased automation[1] and, more broadly, the changing face of trading in today's financial markets. What becomes of the human trader in this increasingly automated market? Trading algorithms are clearly faster, more alert, and more capable of processing large quantities of information than their human counterparts (Kunz and Martin 2013: 137). Another obvious yet crucial advantage of algorithms over human traders is that they do not get carried away by emotion, which Harris's protagonist, Dr Hoffmann, regards as the defining difference between the perfectly rational trading algorithm and the feeble human actor (Harris 2012: 84).

This helps to underline that the rise and dominance of algorithmic trading has resituated and altered the practices of financial market participants (including traders), thereby also reconfiguring the power relations and institutional framework which constitute the politics of the market (Lenglet 2011: 47). Trading algorithms are, in this sense, 'political objects' (Lenglet 2011: 51), giving rise to concerns about the stability of the global economy, global politics, and the reach and scope of market regulation, as well as



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

problematising the diminishing role of human traders in the trading process (I get back to how Harris aptly unfolds the interconnectedness of global finance, economy and politics in *The Fear Index*).

One of the most pertinent political concerns about algorithmic trading is the fact that it has turned the global securities markets into a regulatory nightmare. Since, according to Karen Kunz and Jena Martin, the 'very nature of the market has been fundamentally changed', market regulations have to change accordingly, and regulators arguably need to reorient their attention towards trading algorithms (Kunz and Martin 2013: 136; Snider 2014: 757). Instead of focusing on the regulatory challenges posed by algorithmic finance, though, this review essay examines its political implications – the broader meaning of the way in which the changed relationships between human traders and algorithms have changed former trading practices and market configurations.

These changing dynamics are analysed via a reading of Harris's imaginative account of financial capitalism 'gone rogue' in the financial district of Geneva. Besides examining how algorithms colonise the market space formerly occupied and controlled by human traders, the review essay draws on ongoing IR discussions of popular culture, and the potential contribution of popular imaginaries (in this case, literary fiction) to an understanding of politics and the political. Pop culture is said to do more than merely reflect established political structures; it affects the construction of the political, just as the political is reflected in pop culture (Grayson, Davies and Philpott 2009). Compared to what could crudely be called 'conventional empirical IR theory', pop-cultural accounts of politically contested phenomena (including the automation of financial market trading) allows nuances to surface which are difficult to grasp empirically (Moore 2010: 312, 316). In the process, they help us to understand some political aspects (such as the social,



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

psychological, cultural and historical underpinnings) of a complex phenomenon such as algorithmic finance.

## Pop-cultural imaginaries and market politics

While social scientists don't often write about sci-fi thrillers, I'm not the first to write about Harris's novel; Paul Crosthwaite (2013)[2] has already contributed a compelling and inspiring analysis. Whereas Crosthwaite mainly examines the animal metaphors and behavioural finance connotations underpinning the plot of *The Fear Index*, I will largely deal with Harris's portrayal of the problematic and ambiguous relationships between humans and machines in an increasingly digitised and automated financial market.

The trend towards automation has been a popular topic in scholarly circles in recent years, given further impetus by Michael Lewis's book *Flash Boys* (2014). In his controversial (non-academic) account of the algorithmic trading subset High Frequency Trading (HFT), Lewis boldly declares that HFT companies are 'rigging the market' by creating an unfair speed advantage over those who do not use HFT algorithms. Conversely, several financial economists have claimed that mechanisation is a good thing because it improves liquidity and information efficiency in the market (see, for example, Chaboud et al 2014; Hendershott et al 2011). Social studies of finance (SSF) scholars have not concentrated on whether algorithmic trading is good or bad, but rather on the ways in which increased mechanisation and automation have dramatically changed the market infrastructure (see, for example, Lenglet 2011; MacKenzie, Beunza, Millo, and Pardo-Guerra 2012; Muniesa 2011). In addressing some of the more speculative issues surrounding contemporary finance – such as the fantasy of the perfect trading algorithm, and the concomitant fear of not being able to understand or control the workings of algorithms when they are set



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

in motion – many scientific studies and journalistic accounts seem to fall short, while accounts of financial markets in literary fiction appear to be a valuable and rich resource. This liberty to imagine, which fiction allows, is fully exploited by Harris in *The Fear Index*. Despite its occasional frivolousness, and its overdramatisation of algorithmic trading, dismissing Harris' account as 'unrealistic' and therefore of no value to social scientist is misguided, since 'imagination' is precisely what social science often lacks in order to unpack political issues that are difficult to observe empirically (Park-Kang 2015).

Instead of perceiving politics and pop culture, or global finance and pop culture, as entirely separate spheres, they should be understood as part of a continuum of 'world politics as popular culture, and popular culture as world politics' (Grayson, Davies, and Philpott 2009: 156). In such an understanding, pop culture does more than merely reflect established political structures; it actively participates in the construction of the political, just as the political forms pop-cultural imaginaries:

> [ … ] visual and representational imaginaries are sites where politics and political subjectivity are constituted and where the politics of affect, emotion, feeling and reaction challenge cosy assumptions about rationality, rational political actors and the decisions said to flow from them. (Grayson et al 2009: 157, italics in the original).

Hence pop culture and, in this case, literary fiction seldom ascribe to the simple and abstract version of the human actor found in financial economics, for example. Instead, literary fiction has the ability to bring emotional, historical, social and political aspects to light which are unutterable and therefore invisible in the conventional finance discourse (Davies 2012: 321-2). Using fiction as data can therefore cultivate the imagination of IR scholars (Park-Kang 2015) as well as



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

other social scientists, for that matter. Imagination brings nuance and depth to our understanding of politics (and in this case the politics of financial markets) insofar as it helps us to perceive 'fact' and 'fiction' not as polar opposites, but as interwoven and mutual adaptive sources of knowledge. Instead of embarking on the problematic and arguably fruitless task of discovering political facts, and distinguishing them from political fictions, capturing the interrelatedness of the two seems to be a much more awarding endeavour (Park-Kang 2015: 363).[3] Using fiction as a source of data therefore challenges researchers to re-conceptualise the very idea of data itself (Park-Kang 2015: 373).

Fictional data, Sungju Park-Kang writes, 'relativise the state-centric data production and subsequently state-oriented construction of the world', and thus offer 'some space for marginalised, ordinary people' (2015: 372-3). I would add that the fictional does more than render the marginalised and ordinary visible and representable; it also makes the extraordinary and illusory articulable and visible. The line between the factual and fictitious is indeed blurred in *The Fear Index*;[4] by merging fiction and actual events, Harris manages to address, articulate and visualise concerns generated by algorithmic trading which have not yet fully materialised as actual market problems, but are still very real.

## The dehumanisation of financial markets

Some events in financial markets in recent years have fuelled suspicions that not even professionals and programmers are fully aware of the effects of trading algorithms when 'let loose' in a market in conjunction with other algorithms. One such incident was the famous 'Flash Crash' of 6 May 2010 when the market dropped almost 600 points in five minutes, and almost completely recovered in 25 (CFTC and SEC 2010). The ongoing debate and legal



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

controversy about this incident suggests that it is still unclear what really happened between 2:42 pm and 3:07 pm (EST) on 6 May. The dramatic conclusion of *The Fear Index*, in which the trading algorithm runs amok and creates a market frenzy that literally pushes the already manic protagonist Hoffmann over the edge, is interlaced with the 'Flash Crash', as if the author wanted to acknowledge that real events sometimes trump the imagination (Harris 2012: chapter 18). By stitching the fictitious crash into the real one, Harris casts doubt on whether the disastrous conduct of VILAX-4 is really that far removed from real market events.

Another less famous but equally interesting incident was the 'Hack Crash' of 23 April 2013. At 13h07, hackers inserted a false tweet into the Associated Press (AP) Twitter account which read: '@AP: Breaking: Two Explosions in the White House and Barack Obama is Injured'. As a result, the Dow Jones dropped by 143,5 points. Just as after the 'Flash Crash', the market bounced back shortly after the story was invalidated – in less than five minutes. The fake tweet caused the short-lived market crash because algorithms were carrying out the task they were designed to, namely to execute trades on the basis of information relevant to the market. The algorithms allegedly picked up the Tweet, which, if real, would certainly have caused a massive and sustained sell-off (Gambini 2015; Karppi and Crawford 2015: 2, 14).

A similar incident occurs when Hoffmann and his partner Hugo Quarry perform the first live demonstration of the VILAX-4 in front of an excited audience of potential investors. The excitement quickly turns into skepticism when it becomes clear that the algorithm is short-selling gigantic quantities of options in companies that seem to be faring well in terms of their fundamentals. One short position in particular captures the attention of the audience: 'Twelve and a half million options to sell Vista Airways at seven euros twenty-eight a share'. Skepticism then turns to horror and utter bafflement when



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

Bloomberg and the CNBC show footage of a Vista Airways plane crashing at Moscow's Domodevodo Airport (Harris 2012: 92–3, 98–100). It takes almost 100 pages before the author reveals that the crash was not caused by a mechanical failure but by terrorists, and that VILAX-4 was able to pick up and respond to a preceding warning 'posted on a jihadist website while the plane was still in the air' (Harris 2012: 193–4). The major difference between the 'Hack Crash' and the market drop instigated by the Vista Airways crash is that the tweet about the explosion in the White House was false, while the plane crash actually happened (in the novel, that is). However, in both cases the algorithms did not malfunction, but processed market information and executed trades in accordance with their design. In the 'Hack Crash', algorithms were also responsible for rapidly correcting the market, which deflates the argument that human traders would have prevented the crash from happening (Karppi and Crawford 2015). In this particular context the algorithm was, in an equivocal concept borrowed from Plato, a 'pharmakon', meaning both the poison and the cure; the toxin and the remedy (see Derrida 1981).

These events (real and fictive) are concrete reminders of the ongoing changes in the politics of financial markets, with human traders playing increasingly peripheral roles, algorithms an increasingly central one. It also shows how complex phenomena such as algorithmic trading tend to produce material that stimulates our imagination, because it is extremely difficult to observe empirically what is actually happening in the market. The mysterious, secretive, and near-mythical aura around the spatial manifestations of high finance (the exchanges, the big investment banks, and hedge funds) combined with the 'rags-to-riches' stories as well as stories of devastating personal ruin are some of the reasons why pop culture has, from late 19th century until today, regularly turned to the financial markets for drama and plot-lines. One of the more iconic literary depictions of financial market trading and the characters



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

conducting it is found in Tom Wolfe's debut novel *The Bonfire of the Vanities* (2010 [1987]). While Wolfe's protagonist, the bond trader Sherman McCoy, thinks of himself as a 'Master of the Universe' (Wolfe 2010: 11), it seems as though today's masters of the financial universe may be algorithms and not humans.

## The new 'masters of the universe'

This radical shift is reflected in the spatial organisation of Wolfe's and Harris's trading rooms. The trading room at Pierce & Pierce is testosterone-charged, noisy, and explicitly corporeal, occupying the 50th floor of a 'glass tower that rose up sixty stories from out of the gloomy groin of Wall Street' (2010: 57–8). In order to make space for wires, cables, lighting, and air-conditioning, the floor of the trading room had been raised by a foot and the ceiling lowered by a foot as well, which heightened the intense atmosphere in the room:

> The writhing silhouettes were the arms and torsos of young men, few of them older than forty. They had their suit jackets off. They were moving about in an agitated manner and sweating early in the morning and shouting, which created a roar. It was the sound of well-educated young white men baying for money on the bond market (2010: 59).

The Pierce & Pierce bond traders are not called by their names, but their prestigious universities, and the year in which they graduated: thus a 'chubby, pink-faced member of the Harvard Class of 1976' screamed at another trader, 'Stanford '79 rose from his chair', a 'member of the Yale Class of 1973 with a neck that seemed to protrude twelve inches out of his shirt' screamed into a telephone, and so on (2010: 58–61).

By contrast, Hoffmann Investment Technologies is a far more clinical and even civilised environment:



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

> To reach Quarry's office it was necessary to cross the trading floor. The Japanese stock market would close in fifteen minutes, the European exchanges would open at nine, and already four dozen quantitative analysts – quants, in the dismissive jargon of the trade – were hard at work. None talked above a whisper. Most starred silently at their six-screen arrays. Giant plasma televisions with muted sound carried CNBC and Bloomberg, while beneath the TVs a glowing red line of digital clocks noiselessly recorded time's relentless passage in Tokyo, Beijing, Moscow, Geneva, London and New York. This was the sound that money made in the second decade of the twenty-first century. The occasional soft clatter of strokes on a keyboard was the only indication that humans were present at all (2012: 54–5).

The quants (who are not really the equivalents of bond traders, but perhaps the closest equivalent left in algorithmic trading) at Hoffmann Investment Technologies have entirely different backgrounds than the bond traders at Pierce & Pierce. They are not necessarily Ivy League graduates, and don't have generalist degrees such as law or economic science; only natural science backgrounds count. Hoffmann 'would not even consider hiring anyone without a PhD in maths or the physical sciences'; nationality did not matter ... nor did social skills (Harris 2012: 55). This change from traders with prestigious educational backgrounds to quants perceiving themselves as scientists rather than capitalists helps to underline that the role of the human actor in trading is diminishing. At Hoffmann's hedge fund, the actual trading is decoupled from human interference: humans merely maintain the algorithm, and do not participate in the market as such. As Hoffmann puts it in a sales pitch: 'the humans that computers are replacing are members of the educated classes: translators, medical technicians, legal clerks, accountants, financial traders' (Harris 2012: 83).



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

One of the main reasons why Hoffmann finds human traders imperfect and eventually – as the sophistication of his algorithm increases – obsolete, is that they tend to get carried away by their own and others' emotions. Therefore, it is not surprising that the book lover Hoffmann has a penchant for crowd psychology, as evident from the fact that he has a first edition of Gustave Le Bon's *Le psychologie des foules* in his study, and his use of a quote from Elias Canetti's *Crowds and Power* as a screensaver while designing the VILAX-4 algorithm (Harris 2012: 28, 82). According to crowd psychology, one of the most recurrent instigators of suggestibility and thus irrational crowd behaviour is the emotion of fear, and fear is exactly what VILAX-4 is programmed to detect and react upon (Harris 2012: 85). During the demonstration of VILAX-4, Hoffmann explains how the company intends to profit from the 'epidemic of fear' propelled by digitalisation by saying that '[t]he rise in market volatility, in our opinion, is a function of digitalisation, which is aggregating human mood swings by the unprecedented dissemination of information via the internet' (Harris 2012: 86). Therefore, what is at stake here is not the fantasy of the human becoming a machine, or the machine becoming human, but the fantasy or nightmare of a machine that is decoupled from human intervention. Put differently, it is the machine – in other words, the algorithm – that has realised the dream of the perfectly rational, impervious market actor. The algorithm becomes the vehicle for our aspirations towards seemingly limitless possibilities, while illuminating the limits to the intellectual capabilities of human traders. This is what turns the algorithm and automated trading into a contested space, and therefore a political one.

The machine-learning algorithm is not created in the image of the human intellect; on the contrary, it is designed to take advantage of the presumed fact that the human intellect has become inferior to the machine's artificial intelligence. This becomes strikingly clear towards the end of *The Fear Factor* when Hoffmann contemplates



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

that 'VILAX may be making decisions that are not entirely compatible with our interest' (Harris 2012: 231). He does not mean, however, that it acts against the company's interests, which is to maximise profits, but against human interest as such. The algorithm perfectly meets its capitalist purpose, and makes tons of money for the company, but does so without any regard to morals or person-sensitive information. What Hoffmann had managed to create is the perfect market actor and market maker: 'VILAX was purely mechanical and possessed no emotion or conscience; that it had no purpose other than the self-interested pursuit of survival through the accumulation of money' (Harris 2012: 263). In the end, human susceptibility, fallibility, and impotence have become means to VILAX-4's capitalist end, which is indeed a discouraging thought.

*The Fear Index* paints a bleak and at times overly dramatised picture of the world of algorithmic finance. Its empirical accuracy is questionable; however, as fiction, it does not have to be. Instead, it provides the reader with an insight into the financial markets which is thought-provoking, and engages the imagination. It has allowed me to discuss some of the issues raised by contemporary finance, notably the political nature of algorithmic trading. Literature on its own cannot define reality, but, when it supplements conventional empirical research, it can help to render political issues visible, and reveal their essentially political nature. If nothing else, *The Fear Index* shows that the financial market is, as it has been almost since its dawn, a rich source of popular imaginaries and political contestations.

## Notes

**1.** It is estimated that over 80 percent of all trading in contemporary financial markets is now being carried out by algorithms (French 2014).



Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

**2.** Also worth mentioning is Arne De Boever's recent paper on financial realism in Harris's novel, drawing on the Italian philosopher Franco 'Bifo' Berardi's notion of panic (2015).

**3.** For a more philosophically informed discussion of the interrelatedness of political facts and fiction, and the problems with the notion of 'political facts' more generally, see Latour (2005).

**4.** Search for Hoffmann Investment Technologies on the internet, and you will land up at www.hoffmanninvestment technologies.com, which creates the impression that this is a real hedge fund. This one-page website has the company slogan on the right, and describes the fund as featured in the The Fear Index. (For example, the CEO is said to be Hugo Quarry, Dr Alexander Hoffmann's partner in the novel.) This mock website (whose link to the book is not explained) further serves to blur the line between the real and the fictive.

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Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

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Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015

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Contexto Internacional (PUC)
Vol. 37 nº 3 – set/dez 2015
1ª Revisão: 11/10/2015
2ª Revisão: 22/10/2015