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Algorithmic Finance and (Limits to) Governmentality: On Foucault and High-Frequency Trading

Christian Borch

Department of Management, Politics and Philosophy, Copenhagen Business School, DK
cbo.mpp@cbs.dk

In this essay I discuss algorithmic finance, specifically the use of fully automated trading, including high-frequency trading, in the light of Michel Foucault's notion of governmentality. I argue that a governmentality perspective offers a fruitful way of understanding particular aspects of high-frequency trading, such as how algorithms are designed to govern other market participants' anticipations of market dynamics. However, I also argue that, to fully understand the realm of algorithmic finance and high-frequency trading, it is important to supplement a governmentality approach with an analytical lexicon which is not primarily centred on productive forms of power. Specifically, I suggest that, according to media discourses on high-frequency trading, algorithmic finance often works in ways that are better grasped through, e.g. Elias Canetti's work on predatory power and Roger Caillois's work on mimesis.

1. Introduction

Financial markets have undergone considerable transformations throughout the past century. Some of these are well-known, including changing forms of regulation (and deregulation) or the increasing complexity of the financial instruments and contracts that are being traded. Yet other significant changes could also be listed such as profound shifts in the composition of market participants or the emergence of novel tools and techniques deployed for trading. A visit to one of the iconic exchanges, such as the New York Stock Exchange or the Chicago Mercantile Exchange, will convey an immediate sense of some of these latter transitions. While exchanges used to be lively, buzzy places, in which traders were amassed on so-called trading floors replete with often noisy, energetic commotion, such trading floors are today – if they have not been altogether abandoned – quiet locations with little activity going on and with an inescapable sense of dullness attached to them. So, even if traditional trading floors with busy human traders might still occupy a central place in the popular imagery of financial markets, their role in these markets has been greatly reduced. The buzz of traders yelling and pushing has been replaced by a set of new market actors – namely, fully automated computer algorithms that are programmed to execute trades under specific conditions.

The transition from human traders to non-human algorithms has had a number of intermediary steps. Computers obtained a certain prominence in financial markets in the 1970s, but it was only in the 1990s that the transition away from traditional trading floors became widespread. Rather than being physically co-present, traders would now interact in large trading rooms, each facing a number of computer screens and each executing orders in markets by clicking their mouse.[1] Since the early 2000s this computerization has further intensified so that today the vast majority of orders that are executed in financial markets are placed by fully

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[1] For analyses of these transformation, see e.g. Christian Borch, Kristian Bondo Hansen and Ann-Christina Lange: Markets, Bodies, and Rhythms: A Rhythm Analysis of Financial Markets from Open-Outcry Trading to High-Frequency Trading, in: *Environment and Planning D: Society and Space*, 33/6 (2015), pp. 1080–1097; Karin Knorr-Cetina and Urs Bruegger: Traders' Engagement with Markets: A Postsocial Relationship, in: *Theory, Culture & Society*, 19/5–6 (2002), pp. 161–85; Caitlin Zaloom: *Out of the Pits: Traders and Technology from Chicago to London*, Chicago: University of Chicago Press 2006.

automated computer algorithms. Of course, these algorithms are developed by humans, but once they are set to operate they do so independently, without direct human intervention.

The notion of fully automated algorithms covers over quite some variety. Some algorithms are extremely complex in the sense that they draw upon a lot of data, which enables them to take into account multiple pieces of information, but therefore also slows down their operational capacity. Other algorithms concentrate on being extremely fast, utilizing sub-second time intervals, which requires that the informational input they consider is comparatively limited. In this essay I shall focus on the latter type of algorithms, more specifically those algorithms that are deployed in so-called *high-frequency trading* (HFT), in which orders are executed in fractions of a second and positions held only very shortly. I will use this empirical phenomenon as a stepping stone for discussing what might be called, with due credit to Michel Foucault, 'algorithmic governmentality'. More precisely, I will argue that algorithmic finance in the form of HFT certainly engages in particular governmental practices and that a Foucauldian approach is therefore well suited to shed light on some of the ways in which HFT operates. However, a Foucauldian governmentality perspective is also characterized by a set of analytical weaknesses when it comes to understanding the domain of algorithmic finance and HFT. This applies especially to Foucault's emphasis on productive forms of power. I shall argue that, while this interest in productive power is in many (other) cases right and important, it fails to address the more negative dimensions of the kinds of power that are attributed to HFT-dominated financial markets.

The analysis draws on empirical work collected under a three-year research project ('Crowd Dynamics in Financial Markets') that was funded by The Danish Council for Independent Research in 2013. In the context of that project a team member, Ann-Christina Lange, and I have conducted around 100 interviews with people engaged in algorithmic finance, with a particular emphasis on HFT. Such people include traders, programmers, developers, CEOs, etc. (mainly from Chicago and New York City) who were asked in the interviews to explain their work, algorithmic design, etc. Lange conducted the majority of the interviews and further did ethnographic

observations of an HFT firm near Wall Street.[2] This entailed participant observation in the form of following algorithmic traders at work at their desks, including their conservations, algorithmic development, recruitment discussions, etc. I have conducted around 30 interviews, some of which were conducted jointly with Ann-Christina Lange.[3] I shall not draw extensively on this empirical archive in this essay, but nonetheless want to stress that the below insights into HFT are based on this type of empirical work, i.e. on qualitative interviews and ethnographic fieldwork.

The essay has two analytical parts. In the first I demonstrate the usefulness of a governmentality approach for understanding algorithmic finance and HFT. In the second part I discuss how the field of algorithmic finance poses particular challenges to common governmentality emphases. While the first part of the essay draws on findings from the abovementioned empirical work, carried out within the auspices of the 'Crowd Dynamics in Financial Markets' research project, the second part attends to a broader discourse about HFT which portrays this kind of market activity as deeply problematic. To reduce complexity I shall focus on one manifestation of this portrayal – namely, the critique of HFT that is articulated in the American journalist Michael Lewis's bestseller, *Flash Boys*.[4] My point is not to endorse Lewis's critique. I shall take no normative stance on HFT here, nor on the validity of Lewis's analysis (although, it is fair to say, his account is contested). Instead I use Lewis's book simply as an exemplary incarnation of a particular discourse that emphasizes elements pointing to the existence of negative forms of power in the HFT domain. I shall argue that Foucault's work is less apt at understanding such power modalities, for which reason I instead turn to work by Elias Canetti and Roger Caillois.

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[2] See e.g. Ann-Christina Lange: Organizational ignorance: an ethnographic study of high-frequency trading, in: *Economy and Society*, 45/2 (2016), pp. 230–50.

[3] For methodological reflections and discussions of the empirical archive, see Christian Borch and Ann-Christina Lange: High-frequency trader subjectivity: emotional attachment and discipline in an era of algorithms, in: *Socio-Economic Review*, 15/2 (2017), pp. 283–306.

[4] Michael Lewis: *Flash Boys: Cracking the Money Code*, London: Allen Lane 2014.

2. Governmentality and Algorithmic Finance

There are several ways in which Foucauldian inspirations may be put to productive use in analyses of algorithmic finance and HFT. I shall give a couple indications of this by evoking three key themes from the Foucauldian lexicon – namely, power, knowledge, and subjectivity. While these are obviously closely intertwined in Foucault's work, I shall treat them separately in the following and, in addition to that, will say only little about knowledge and subjectivity.

To begin with the *knowledge* dimension, one of the fascinating features of algorithmic finance is that it reshuffles the types of knowledge that co-shape the ways in which financial markets operate. Several of the people we interviewed for the empirical study have backgrounds that, on the surface, bear little or no relation to financial markets, such as physics, engineering, computer science, etc. These are backgrounds that, perhaps, one would not expect to be valued as the most precious ones at the core of financial markets. The presence of such types of knowledge in a financial market context is, however, not new. So-called *quants* have populated financial markets for many decades. Yet, what is distinctively novel is that the skills these backgrounds bring to the table, such as highly complex modelling, programming, and math skills, have moved from occupying a more peripheral function to assuming an absolutely core role.[5] Aspects of this development, including some of the more specific skills and types of knowledge that are deemed important, have been analysed elsewhere.[6] What still awaits systematic analysis are the broader implications that the increasing dominance of knowledge based on disciplines such as physics, computer science and engineering might have for financial markets. What might it entail that firms engaged in algorithmic trading such as HFT are looking for people who are not trained in finance, but are rather, say, computer scientists and physicists who, in some cases, are given only extremely brief introductions to how financial markets

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[5] For an illuminating insider account of the initially somewhat marginal, more ad-hoc-like function of quants in financial markets, see Emanuel Derman: *My Life as a Quant: Reflections in Physics and Finance*, Hoboken, New Jersey: John Wiley & Sons 2004.

[6] See Christian Borch, Kristian Bondo Hansen and Ann-Christina Lange: Markets, Bodies, and Rhythms; Christian Borch and Ann-Christina Lange: High-frequency trader subjectivity.

operate? What might it, in other words, mean for trading decisions, strategies, types of collaboration, etc. that some HFT firms are looking for people with emphatically non-finance backgrounds?[7] In answering these and related questions a sociology of knowledge approach may join hands with a Foucauldian emphasis on knowledge regimes.

When it comes to *subjectivity* some work has already been conducted, demonstrating that particular types of subjectivity can be identified for traders working with algorithmic finance and HFT.[8] Thus, in a discussion of subjectivity within the subfield of HFT, Lange and I have demonstrated – along Foucauldian lines, and on the basis of interviews, ethnographic observations, and 'how to' literature giving practical advice for success – that traders are supposed to possess particular skills such as especially math and programming skills. But they are also expected to deploy certain *techniques of the self* in order to avoid too much emotional attachment.[9] While this is an old trope that predates algorithmic trading, it assumes particular forms in an era of HFT. Thus, the struggle that HFT traders face is not the classical problem of being too attached to the market itself, to an extent where they might lose their sense of rational judgment and begin to make highly speculative bets in order, e.g. to make up for recent losses. Rather, what many HFT traders struggle with is an over-attachment to their algorithms, which might materialize in them adjusting the algorithms too much (letting emotions interfere in the algorithmic set-up) or believing too much in the alleged rationality of the algorithms (letting the algorithms run even though it is clear that they lose money). In order to avoid emotional over-attachment, HFT traders may deploy some of the techniques of the self that are recommended in the 'how to' manuals. These are books that "suggest rules of

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[7] The reason why firms are looking for such candidates is that market fundamentals (such as company earnings, macro-economic data, etc.) play hardly any role for this type of algorithmic trading behaviour. Instead, HFT strategies are often based on reacting to (or, as I shall demonstrate below, producing) tiny order-book signals.

[8] See Christian Borch and Ann-Christina Lange: High-frequency trader subjectivity.

[9] Michel Foucault: Sexuality and Solitude [1981], in: *Ethics: Subjectivity and Truth. The Essential Works of Michel Foucault, 1954–1984, Vol. 1*, New York: The New Press 1995, pp. 175–184, p. 177.

conduct"[10] by outlining specific ways of acting. One piece of advice is to create some emotional distance to the algorithms by focusing more on the underlying strategies, including defining clear parameters for when to stop trading a particular strategy.[11]

These are, admittedly brief, indications of how Foucauldian inspirations and analytical emphases on knowledge and subjectivity might shed light on aspects of algorithmic trading. The question of *power* is trickier. One of the central achievements of Foucault's analytics of power is its insistence on power modalities that need not fit the characteristics of the "juridico-political" discourse and its negative conception of power.[12] As Foucault famously stressed, the central analytical task for him was to develop a conception of power that did not subscribe to a notion of "power whose model is essential juridical, centred on nothing more than the statement of the law, and the operation of taboos".[13] Power need not assume negative shapes, but might just as well be exercised in productive modalities of discipline, biopolitics, governmentality, etc.[14] Foucault's conception of government as the "conduct of conduct" or the attempt to "structure the possible field of action of others" seems particularly helpful for understanding important aspects of algorithmic finance and HFT.[15]

For example, a common tactic in HFT and algorithmic trading is to try to affect the anticipation other market participants have of market dynamics.[16] This takes place in the so-called electronic order book which, briefly put, displays the buy ('bid')

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[10] Michel Foucault: *The Use of Pleasure: The History of Sexuality, Vol. 2*, trans. Robert Hurley, London: Penguin 1992 [1984], p. 12.

[11] Christian Borch and Ann-Christina Lange: High-frequency trader subjectivity, p. 299.

[12] Michel Foucault: *The History of Sexuality, Vol. 1: An Introduction*, trans. R. Hurley, New York: Vintage Books 1990 [French 1976], p. 87.

[13] Michel Foucault: *The History of Sexuality, Vol. 1*, p. 85.

[14] Michel Foucault: *Discipline and Punish: The Birth of the Prison*, trans. A. Sheridan, London: Penguin 1977 [French 1975]; Governmentality, trans. Rosi Braidotti [Italian 1978], in: Graham Burchell, Colin Gordon & Peter Miller (eds.): *The Foucault Effect: Studies in Governmentality*, Chicago: University of Chicago Press 1991, pp. 87–104.

[15] Michel Foucault: The Subject and Power, in: Hubert L. Dreyfus & Paul Rabinow (eds.): *Michel Foucault: Beyond Structuralism and Hermeneutics*, Chicago: University of Chicago Press 1982, pp. 208–26, here p. 221.

[16] This type of behaviour is also well known to non-algorithmic markets, yet it is easier to execute in HFT, partly because the algorithms are so fast, and partly because they operate anonymously.

and sell ('ask') interest for particular financial instruments at any given moment. More specifically, this buy and sell interest is materialized in a visualization of the quantities of, say, particular shares that various market participants are willing to buy or sell at specific prices. Much of this buy and sell interest is never realized, in the sense of these orders finding a counterparty who is willing to sell/buy. Yet, whatever is displayed in the order book nonetheless has significance on the market, as it is treated by market participants, including fully automated algorithms, as valuable information about where the market might be moving. In other words, market participants make anticipations on the basis of the order book dynamics, and they act according to those anticipations. This, of course, creates opportunities for governing those anticipations, and thus for structuring the possible field of action of others, and this is exactly what some algorithmic market participants seek to exploit: they may, for example, add a certain buy or sell interest to the order book while never intending to actually have those orders filled, and cancelling the orders before they are indeed filled. This generates particular order book dynamics that might lead other market participants to generate wrong anticipations of where the market is heading. While some might find this type of behaviour manipulative, it nonetheless operates in a register of productive power relations: it is not based on taboos, law, or repression, but rather on governing small market signals in order to move other market participants to behave in certain ways. So similar to how, e.g. particular forms of crime prevention deploy governmental strategies when seeking to structure the possible field of action of others through architectural design,[17] so HFT algorithms are engaged in 'conduct of conduct' when they seek to structure the possible field of action of others by deploying strategies that effectively change the market environment in which other algorithms are operating.

While particular features of HFT may thus be analysed on the basis of Foucault's analytics of power, this field of trading is also often associated with more negative

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[17] Christian Borch: Crime Prevention as Totalitarian Biopolitics, in: *Journal of Scandinavian Studies in Criminology and Crime Prevention*, 6/2 (2005), pp. 91–105; *Foucault, Crime and Power: Problematisations of Crime in the Twentieth Century*, London and New York: Routledge 2015.

forms of power that are not adequately examined by Foucault (hence the *trickiness* referred to above). I shall develop this particular point in the next section.

3. Limits to Governmentality

While HFT has received some attention from both scholars and the media for quite some years now, the wider public interest in the phenomenon was triggered especially by the publication in 2014 of Michael Lewis's *Flash Boys*. In it, Lewis presents a devastating critique of HFT, alleging that financial markets have become rigged due to the work of HFT firms. More specifically, Lewis argues that HFT firms are able, through their sophisticated, superfast technological infrastructure, to front-run other market participants who might not even be aware that their investment decisions are being exploited by these 'parasitic' entities. Lewis deploys a vocabulary of "predators" and "prey" to account for this relationship between HFT firms and other, slower market participants.[18]

As mentioned earlier, my aim here is not to suggest that Lewis's account is necessarily offering a fair and adequate rendition of how algorithmic finance is working. In fact, his critical portrayal of HFT is highly contested and has, not surprisingly, been fiercely attacked by firms deploying this type of market behaviour. I nonetheless wish to take seriously his predator/prey distinction and discuss what this distinction might entail for a Foucauldian analysis of algorithmic finance and HFT.

The immediate observation to make here is that Lewis's terminology is closely tied to a notion of negative rather than productive power: rather than being a manner of the conduct of conduct, he essentially suggests that HFT firms act as predators waiting for slower prey to appear. How helpful is Foucault's analytical toolkit for an investigation of such negative forms of power? Not particularly helpful, I will argue. There are good reasons for this, as Foucault's objective with his analytics of power was precisely to suggest that power need not assume a negative attire. As mentioned earlier, Foucault's central achievement was to develop an analytics of power that is sensitive to the *productive* shapes that the exercise of power might take, and this

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[18] Michael Lewis: *Flash Boys*, p. 54.

achievement is difficult to overestimate. However, it comes at a certain cost, as the sophistication of his analysis of productive forms of power has not been paralleled by an equally rich analysis of negative forms of power. To be sure, discussions of negative forms of power are not absent from Foucault's work. His opening portrayal, in *Discipline and Punish*, of the public execution of Damiens is legendary.[19] And his discussion of how state racism interlaces biopolitics as a productive form of power with racism is equally original.[20] Still, Foucault's analyses of negative power are few and scattered compared to his extensive examinations of productive forms of power. This does not necessarily invalidate Foucault for the purpose of understanding algorithmic finance, and as I mentioned earlier, some features of algorithmic finance can be productively grasped through a governmentality perspective. Yet, I would nonetheless argue for the relevance of other non-Foucauldian analytical resources if the aim is to better understand the potentially negative forms of power in algorithmic finance.

Foucault famously developed his analytics of power, and its strong emphasis of productive forms of power, in an objection to how, "[i]n political thought and analysis, we still have not cut off the head of the king".[21] The sovereign image of power has no doubt had (and continues to retain) a strong hold of much political science. But inspiration to understand the many refined ways in which such sovereign power might be exercised can also be drawn from outside of political science. One example is Ryszard Kapuściński's highly original, but also controversial, journalistic account of negative power at the court of Haile Selassie.[22] Another is Elias Canetti's masterful analysis of *Crowds and Power*, in which he devotes three chapters to studying "the

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[19] Michel Foucault: *Discipline and Punish*, pp. 3–6.

[20] Michel Foucault: *"Society Must Be Defended": Lectures at the Collegè de France, 1975–1976*, trans. D. Macey, New York: Picador 2003, pp. 254ff. I have deployed his analysis of state racism elsewhere, see Christian Borch: Body to Body: On the Political Anatomy of Crowds, in: *Sociological Theory*, 27/3 (2009), pp. 271–90.

[21] Michel Foucault: *The History of Sexuality, Vol. 1*, pp. 88–9.

[22] Ryszard Kapuściński: *The Emperor: Downfall of an Autocrat*, trans. W. R. Brand and K. Mroczkowska-Brand, London: Penguin 2006 [Polish 1978].

entrails of power".[23] The profoundly original analysis he puts forward here conceives of power as an inherently negative relationship between predator and prey. More specifically, it proposes to conceive of this relationship as one in which a predator physically incorporates the prey by way of eating. Canetti notes:

> The approach, with hostile intent, of one creature to another falls into several distinct acts, each of which has its particular traditional significance. First there is the lying in wait for prey; the prey is marked down long before it is aware of our designs on it. With feelings of pleasure and approval it is contemplated, observed and kept watch over; it is seen as meat whilst it is alive, and so intensely and irrevocably seen as meat that nothing can deflect the watcher's determination to get hold of it. Already while he [*sic*] is prowling around it he feels that it *belongs* to him. From the moment he selects it as his prey, he thinks of it as incorporated into himself.[24]

Canetti uses this observation as a starting point for developing a rich analysis of how the prey is captured and then enters a long process in which is chewed, swallowed, and so on. The specifics of this analysis are not crucial for the purposes of the present essay.[25] More important is (a) his insistence that power be understood as intimately related to such predator/prey relationships, and (b) that what Canetti writes about such relationships is in striking accord with Lewis's account of HFT predator firms lying in wait for slow market prey to emerge.

   Canetti's analysis is based on a zero-sum-game conception, according to which incorporation means annihilation. While this could be seen as an analytical weakness, it follows closely from the conceptual framing he proposes. Arguably more

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[23] Elias Canetti: *Crowds and Power*, trans. C. Stewart, New York: Farrar, Straus and Giroux 1984 [German 1960], pp. 201ff.

[24] Elias Canetti: *Crowds and Power*, p. 203, italics in the original.

[25] For a broader discussion of Canetti's analysis, see Christian Borch: *The Politics of Crowds: An Alternative History of Sociology*, Cambridge: Cambridge University Press 2012, chapter 7. And for a discussion of connections between Canetti and Foucault, see Andrea Mubi Brighenti: Power, subtraction and social transformation: Canetti and Foucault on the notion of resistance, in: *Distinktion: Journal of Social Theory*, 12/1 (2011), pp. 57–78.

problematic is the fact that Canetti's reflections are asymmetric in the sense that they give primary attention to the predator side of the relationship: the majority of his analysis concerns how the predator attacks and incorporates the prey. Yet, in keeping with basic Foucauldian ideas, the prey might obviously also hold certain possibilities of resistance. More specifically, the potential prey may deploy a set of strategies and techniques with which to avoid becoming actual prey. While Canetti is relatively silent on this aspect, other social theorists offer analytical entries into understanding this dimension. One such theorist is the French sociologist Roger Caillois who has examined how animals engage in mimicking forms of behaviour, in which they, e.g. imitate and blend in with their environment and do that so fully that predators are likely to ignore them.[26]

It is not possible for me to discuss Caillois's analysis extensively in this essay. Let me make just three points. First, Caillois argues that there are three main functions of mimicry. He calls these, and I am quoting here from a recent paper by Andrea Mubi Brighenti and Alessandro Castelli:

> masquerading, disappearing and intimidating. Roughly, these three func-
> tions correspond to three different forms of becoming or transformations
> which are undertaken by the mimic. We might call them, respectively, (a)
> *becoming-another-one*, that is, copying an external, individual model; (b)
> *becoming-furniture*, that is, hiding in the environment (*assimilation au décor*,
> as Caillois put it) and (c) *becoming-monstrous*, that is, assuming an imposing
> and intimidating colour, shape, voice, etc.[27]

While these different functions might at times overlap, it is helpful for analytical purposes to treat them separately. As I shall come back to below, it is not least the

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[26] Roger Caillois: Mimicry and Legendary Psychasthenia, in: Claudine Frank (ed.): *The Edge of Surrealism: A Roger Caillois Reader*, Durham and London: Duke University Press 2003, pp. 91–103.

[27] Andrea Mubi Brighenti and Alessandro Castelli: Social camouflage: functions, logic, paradoxes, *Distinktion: Journal of Social Theory*, 17/2 (2016), pp. 228–49, p. 232, italics in the original.

two former functions, relating to *becoming-another-one* and *becoming-furniture*, that seem to be of particular relevance to HFT practices.

Second, although it might make sense to interpret these forms of mimicry as purely defensive strategies deployed by animals to avoid predation and ensure self-preservation (an interpretation I shall largely follow below), it should be noted that Caillois found such a reading too limited. Indeed, he demonstrates that animal mimicry often rather assumes a form of "*luxury*", even "dangerous luxury", as particular species can mimic their environment so well that members of the same species mistake their fellows for being, e.g. a leaf, and start eating them in an essentially cannibalistic manner.[28]

Third, while Caillois's examples are taken from an animalistic domain, they also clearly point beyond the animal realm. His reflections have wider sociological purchase in that he conceives of the three functions of mimicry "as three fundamental drives that permeate animal as well as human existence".[29] But, I will argue, the mimicking forms of behaviour analysed by Caillois might even apply to fully automated computer algorithms as well. Indeed, interviews with HTF programmers and traders suggest that their fully automated algorithms are designed in part to resemble *becoming-another-one* and *becoming-furniture* types of behaviour. It is, for example, often important to market participants that their orders leave as little a market footprint as possible: if a firm wants to sell, say, 50,000 shares, then trying to sell the entire lot at once might drive down the price (due to the sudden sell pressure in the market), meaning that the firm might risk receiving an overall lower amount of money for the shares. In order to avoid this, firms would usually split up their order into a series of minor orders that are unlikely to affect the overall price. The use of such so-called 'iceberg orders', in which a particular buy or sell order reveals only part of the larger parent order, are commonly used in financial markets, also by non-algorithmic market participants, and amounts to a *becoming-furniture* type of behaviour.

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[28] Roger Caillois: Mimicry and Legendary Psychasthenia, p. 97, italics in the original.
[29] Andrea Mubi Brighenti and Alessandro Castelli: Social camouflage, p. 232.

Yet, what is specific to algorithmic finance are strategies in which the algorithmic market participants seek to hide their algorithmic identity by blending into the market environment. Reportedly, a problem algorithmic firms confront is that if one algorithm is able to identify particular other algorithms in the market, then it may be able to infer their strategies and trade against them. In the vocabulary of Lewis, but going beyond his opposition between algorithmic predators and human prey, one algorithm might detect other algorithms as possible prey. And so in order to avoid being identified as an algorithm, and marked down as prey, algorithmic firms deploy various techniques of "dissimulation"[30] in order, for instance, to appear as human traders rather than algorithmic ones. In this specific case, algorithmic firms implement *becoming-another-one* types of behaviour.

The central point I have tried to make here is that Foucault's governmentality perspective as well as his broader emphasis on the productive modalities of power fall short if we follow Lewis's discursive portrayal of HFT as a matter of some sophisticated algorithmic firms predating on less advanced market participants. This type of behaviour is one that is difficult to reconcile with a notion of productive power. Instead such behaviour evokes particular forms of negative-destructive power as analysed by Canetti as well as particular defensive strategies as analysed by Caillois.

4. Conclusion

This essay has discussed the fruitfulness and limitations of applying Foucauldian inspirations in an analysis of algorithmic finance, including HFT. I have argued that Focuault's emphasis on knowledge and subjectivity opens up important analytical avenues. So does the notion of governmentality since it directs analytical attention to how, for example, some algorithms seem to be engaged in 'conduct of conduct' types of behaviour. However, I have also argued that if we take seriously the discourse on the allegedly predatory nature of some algorithms, then Foucault's inclination to zero in on productive forms of power will miss the target. Indeed, I have

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[30] Donald MacKenzie: How Algorithms Interact: Goffman's "Interaction Order" in Automated Trading, in: *Theory, Culture & Society*, forthcoming, pp. 13–20.

argued, Foucault's analytics of power generally seems ill-suited to really excavate negative forms of power, and for that reason I suggested turning to the work of Canetti and Caillois. That move allowed me to better bring into relief the ways in which fully automated computer algorithms avoid becoming prey by, e.g. mimicking and blending in with the market environment.

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