

Notes

Introduction – For an Abstract Market Theory

1. Émile Benveniste, *Problems in General Linguistics*, Vol. 1, trans. M. Meek (Florida: University of Miami Press, 1971), 223.
2. Michel Callon, 'Introduction: the embeddedness of economic markets in economics', in Michel Callon (ed.) *The Laws of the Markets* (London: Blackwell, 1998), 1. The point here is not, *pace* Michel Foucault's masterful analysis, that the categories of the market qua object of study, did not or do not exist (*The Order of Things* [New York: Vintage Books, 1994], 166–7; 257; 279), but rather that there is no rigorously elaborated formulation of the category of 'the market' in economic thought today.
3. Georg Simmel, *The Philosophy of Money*, ed. David Frisby, trans. Tom Bottomore and David Frisby, from a first draft by Kaethe Mengelberg (New York: Routledge, 2005), 52.
4. Simmel, *The Philosophy of Money*, 53.

1 Probability and Contingency

1. John Downes and Jordan Goodman, *Dictionary of Finance and Investment Terms*, 8th edition (New York: Barron's Educational Series, Inc., 2002), 182.
2. A fourth sub-category exists here, that of futures contracts. These are broadly the same to forwards but for the nature of the contracts involved and the more regulated settings in which they are traded.
3. See, however, Alireza M. Gharagozlou, 'Unregulable: why derivatives may never be regulated,' *Brooklyn Journal of Corporate, Financial & Commercial Law* 4 (2010), 273. Gharagozlou argues that the fact that derivatives are contracts from the point of view of the law that they are unable to be adequately regulated at all. Later, we will see that there is a more significant reason yet again for thinking that market regulation, considered as a set of rules that restrict the range of formulations of pricing mechanisms, is a poorly formulated notion.
4. Aristotle, *Politics*, trans. T.A. Sinclair, revised Trevor J. Saunders (London: Penguin, 1992), 90; §1259a3ff.
5. Louis Bachelier, 'The Theory of Speculation,' in *Louis Bachelier's theory of speculation: the origins of modern finance*, trans. Mark Davis and Alison Etheridge (Princeton, NJ: Princeton University Press, 2006), 15–79.
6. For a summary of the most important objections, see D.H. Goldenberg, 'A unified method for pricing options on diffusion processes,' *Journal of Financial Economics* 29 (1991), 3–34.
7. Fischer Black and Myron Scholes, 'The Pricing of Options and Corporate Liabilities,' *Journal of Political Economy* 81 (1973), 637–54; Robert Merton, 'The Theory of Rational Option Pricing,' *Bell Journal of Economics and Management Science* 4 (1973), 141–83. On their respective roles, see Ayache's

- footnote at *The Black Swan: The End of Probability* (Chichester: Wiley & Sons, 2010), 67n4. The Section (66–70) to which the notes belongs also provides a good summary presentation of the mathematics of the partial differential equation that constitutes BSM. For a helpful comparison of Bachelier's account of options pricing with that of BSM, see Walter Schachermayer and Josef Teichmann, 'How Close are the Options Pricing Formulas of Bachelier and Black-Merton-Scholes?,' *Mathematical Finance* 18:1 (2008), 155–70.
8. See Donald Mackenzie, *An Engine, Not a Camera* (Cambridge, MA.: The MIT Press, 2006), 141–2.
 9. Nassim Taleb, *The Black Swan: The Impact of the Highly Improbable* (New York: Random House, 2007)
 10. Taleb, *The Black Swan*, xvii.
 11. Nassim Taleb, *Antifragile: Things that Gain from Disorder* (London: Random House, 2012).
 12. Immanuel Kant, *Critique of Pure Reason*, ed. and trans. Paul Guyer and Allen Wood (Cambridge: Cambridge University Press, 1998), A235B295.
 13. David Hume, *A Treatise of Human Nature*, ed. LA Selby-Bigge (Oxford: Clarendon Press, 1896), 69–175.
 14. Kant, *Critique of Pure Reason*, B278. Kant's argument here turns around the requirement for something that persists in-itself in order that my existence and the meaningfulness of my sequential experience, as determined in time, might have a temporal ground ('the condition of time-determination' [B275]). However, it is far from clear that persistence is the correct temporal notion here, since my synthetic unity as a subject of experience (and the coherence of the objects of this experience) in fact requires only the *relative* longevity of or rhythmic compatibility with its time and the time of the outer object in order to experience itself as unified, and not, as Kant asserts, something '*which always exists*' (A182B225). This is one case in which Kant's critical thought clearly falls back on a pre-critical assertion – and such a classical one: namely, the absolute and timeless existence of substance. Moreover, despite his unquestionable advances at the level of the philosophy of time, change and its avatar death remain, finally, unthinkable within the Kantian framework.
 15. Kant, *Critique of Pure Reason*, B307.
 16. Kant, *Critique of Pure Reason*, B276.
 17. I note in passing that, for Ayache, Meillassoux's engagement with this 'necessitarian probabilistic argument' (BSEP 135) constitutes the weakest moment of *After Finitude*, insofar as it impoverishes the temporal dimension of the analysis. In a passage whose obliquity should not distract from its import (as the discussion of the temporal character of the market and of debt in chapters to come will argue), Ayache writes that 'Meillassoux's speculation is relieved from the depth of the past, as well as from its debt [...] As to the future of the world as such, my claim is that Meillassoux is relieved from its responsibility too because of his responsibility only towards speculation and of his escape from philosophical credit' (BSEP 151). The necessity of refounding the project of *After Finitude* in relation to time is treated in the final chapter below.
- In a related series of passages (BSEP 155ff), Ayache aligns this weakness in Meillassoux's argument with an impoverished theory of the event, and argues

that, rather than trying to derive the necessity of contingency finally from the impossibility of mathematical totalization (which he cannot achieve in absolute terms, something Meillassoux himself admits [AF 105]), a theory of the event qua form of the future is what is missing, it is 'his missing derivation' (BSEP 156).

It is also worth pointing out that this line of critical argumentation is grounds for rejecting some of the more ridiculous suggestions about the underlying cause of the credit crisis, such as the claim advanced by the president of the rating agency Standard and Poor's that losses of the kind experienced in the credit derivatives market are rare but predictable, and would likely take place every 763 years: 'the implied risk-neutral probability of a catastrophic meltdown scenario is very small with an expected (risk-neutral) waiting time of about 763 years on average.' (Francis Longstaff and Arvind Rajan, 'An Empirical Analysis of the Pricing of Collateralized Debt Obligations,' *The Journal of Finance* 63:2 [April 2008], 551.)

18. Gilles Deleuze, *Bergsonism*, trans. Hugh Tomlinson (New York: Zone Books, 1991), 98.
19. On the notion of badly analysed composites and the Bergsonian method for addressing their role in thought, see Keith Ansell-Pearson, 'Bergson' in *The Routledge Companion to Nineteenth Century Philosophy*, ed. Dean Moyar (New York: Routledge, 2010), 419–21.
20. Deleuze, *Bergsonism*, 98.
21. Quoted at BSEP 31.
22. Deleuze, *Bergsonism*, 98.
23. Elie Ayache, 'Single-case Statistics?' *Wilmott* (February 2011), 13.
24. It is worth noting that Ayache also critically pursues a range of other formulations of probability directly and outside of the framework of these analyses. 'Actuarial Value versus Financial Price,' *Wilmott* (October 2011), 18–25, which addresses von Mises, Popper and others, and which dwells on the meaning of the single-case in the probabilistic calculus, is particularly pertinent here.
25. Ayache, 'Single-case statistics,' 12.
26. Ayache also argues, traders themselves have no particular investment in the implicit metaphysics of probability and make use of BSM and the other forms of probabilistic inference in just this direct fashion. He is supported in this view, as it happens, by Nassim Taleb – see Emanuel Derman and Nassim Taleb, 'The Illusions of Dynamic Replication,' *Quantitative Finance* 5:4 (2005), 323–6, esp. 323.
27. Ayache, 'Actuarial value versus market price,' *Wilmott* (2011a), 24.

2 From Price to the Market

1. Frank E. Fetter, 'The Definition of Price,' *The American Economic Review* 2:4 (1912), 783–813.
2. Fetter, 'The Definition of Price,' 784.
3. Fetter, 'The Definition of Price,' 783.
4. Fetter, 'The Definition of Price,' 806.
5. Fetter, 'The Definition of Price,' 813.
6. Ruyer, R. 1956. 'Le relief axiologique et le sentiment de la profondeur,' *Revue de Métaphysique et de Morale*, 61(3/4), 242–58.

7. Ayache, 'Actuarial value vs Financial Price,' *Wilmott*, October, 18–25.
8. We must therefore resist the idea that prices have a causal relationship in and of themselves, as if the relationship between the past price and the new price just written formed a kind of Markov chain. See, for example, John van der Hoek and Robert J. Elliott, 'American option prices in a Markov chain market model,' *Applied Stochastic Models in Business and Industry*, 28 (2012), 35–59; and John van der Hoek & Robert J. Elliott, 'Asset Pricing Using Finite State Markov Chain Stochastic Discount Functions,' *Stochastic Analysis and Applications* 30(5), 2012, 865–94. This second paper is notable for its opening line, which betrays the entire problematic of contingency: 'The future is uncertain.'
9. For a summary of his position on these instruments and their role in the credit crisis, see Elie Ayache, 'How not to bid the market goodbye,' *Wilmott* Nov 2007, pp. 42–52. For a more introductory account, which charts the rise and fall of CDOs and other complex securities and the role of ratings agencies in this history, see Joshua Coval, Jakub Jurek and Erik Stafford, 'The Economics of Structured Finance,' *Journal of Economic Perspectives* 23:1 (2009), pp. 3–25.
10. For a brief summary of the various means used to model the prices of CDOs, and their sometimes dramatic deficiencies, see Damiano Brigo, Andrea Pallavicini and Roberto Torresetti, 'Credit models and the crisis: An overview,' *Journal of Risk Management in Financial Institutions* 4:3 (2011), pp. 243–53.
11. See also the following related passage: 'nobody believes that implied volatility really holds of the market. This has nothing to do with the indubitable fact that BSM is wrong and that implied volatility, as a consequence, doesn't hold. This disbelief is logically prior to the sentence of falsity or truth that would descend on the model as a *result* of the trial of empirical reality. It concerns the initial intention of the model: what it is meant for. The meaning of the mathematics of price is not the same as the mathematics of the physical world. *From the start*, BSM doesn't apply to the market and doesn't hold for the market because the market is in the hands of the market-maker who is using BSM to create the option market.' (BSEF 52)
12. For an excellent overview, see Marc Lenglet, 'Conflicting Codes and Codings: How Algorithmic Trading is Reshaping Financial Regulation,' *Theory Culture Society* 28:44 (2011): 44–66. This piece includes a very clear account of the composition of algorithms – both in terms of their complex authorship and with respect to their programming – and the way they are used on a day-to-day basis.
13. Lenglet, 'Conflicting Codes,' 49.
14. Cited in Lenglet, 'Conflicting Codes,' 53.
15. The speed of algorithmic trading, which has given rise to the phrase high frequency trading (or HFT) is often taken to be a decisive socio-political development on its own terms – see for example Nick Srnicek and Alex Williams, 'On Cunning Automata,' *Collapse* 8: 463–506. This speed does indeed have a great deal of interest and importance in the social and political registers (it is in this conjunction that arguments about contemporary forms of inequality), but by itself it tells us precisely nothing about the market. On this point I entirely agree with Ayache when he says that 'Sadly, HFT is distracting the attention of thinkers and of philosophers away from the hard problem of the market, which is the real metaphysical and ontological problem that

derivatives pose.’ (Elie Ayache, ‘Proofs and Calibrations: An Interview with Elie Ayache’ <https://linguisticcapital.wordpress.com/2014/06/08/proofs-and-calibrations-an-interview-with-elie-ayache/> last accessed 9 February 2015). The further equally serious philosophical question, though, is whether the automats in question have access to the market or not.

16. Of course, Ayache is not the only one to yoke together the market and the agent of the trader in this way. A particularly striking case, which differs greatly from Ayache while maintaining the same grip of the human agent over the act of pricing, can be found in Maurizio Lazzarato’s, *Signs and Machines: Capitalism and the Production of Subjectivity*, trans. Joshua David Jordan (New York: semio-text(e), 2014), 96–101.

3 The Writing of Price

1. Jacques Derrida, *Of Grammatology*, trans. Gayatri Chakravorty Spivak (Baltimore: Johns Hopkins University Press, 1997), 6.
2. Derrida, *Of Grammatology*, 52.
3. Nelson Goodman and W.V. Quine, ‘Towards a Constructive Nominalism’, *The Journal of Symbolic Logic*, 12:4 (1947): 105–22.
4. Goodman and Quine, ‘Towards a Constructive Nominalism’, 105.
5. Goodman and Quine, ‘Towards a Constructive Nominalism’, 112.
6. Goodman and Quine, ‘Towards a Constructive Nominalism’, 111.
7. Hilbert, ‘On the Infinite’, in *From Frege to Gödel*, (Cambridge, MA.: Harvard University Press, 1967), 377. This is to further leave aside the fact that, for Hilbert, mathematics is concerned in the first instance with thought: ‘Let an object of our thought be called a thought-object [*Gedankending*], or, briefly, an *object* and let it be denoted by a sign.’ (Hilbert, ‘Foundations of Logic and Arithmetic’, in *From Frege to Gödel*, 131) It is this relationship of denotation that is undermined or rather exceeded by Quine and Goodman.
8. Hilbert, ‘Foundations of Logic and Arithmetic’, in *From Frege to Gödel*, 131.
9. In his very early piece ‘Mark and Lack’, Alain Badiou shows himself to be definitively Hilbertian on this score, since while he insists on the irreducibility of inscription (marks) for mathematics, these marks remain thematized in an entirely vague, even idealist, fashion. The issue of the individuation of the sign, which will be key here, remains unexamined by Badiou. It is no surprise then that Justin Clemens, in a wide-ranging comparative piece on Badiou that turns around the figure of the inscribed letter, writes the following: ‘The attentive reader will undoubtedly have noticed that [...] I have never posed the question: what *is* a letter for Badiou? This question is unanswerable in anything but a metaphorical fashion. Letters are as close as one gets to the real [...] Being *is* literal, as we would expect from a devotee of Lucretius and Mallarmé. Yet letters, in some radical way, must be non-phenomenal for Badiou.’ Justin Clemens, ‘Letters as the Condition of Conditions for Alain Badiou’, *Communication and Cognition* 36: 1–2 (2003), 94.
10. Goodman and Quine, ‘Towards a Constructive Nominalism’, 111.
11. Goodman and Quine, ‘Towards a Constructive Nominalism’, 106.
12. Dena Shottenkirk, ‘The Consequences of Goodman’s Nominalism for his Terminology’, in *Nominalism and Its Aftermath: The Philosophy of Nelson Goodman*, ed. Dena Shottenkirk, (Dordrecht: Springer, 2009), 52.

13. This text – the written version of a seminar given in Berlin on 20 April 2012 – can be found circulating online in an excellent translation by Robin Mackay. A revised version will be published shortly in Suhail Malik and Armen Avanessian (eds.) *Genealogies of Speculation: Materialism and Subjectivity since Structuralism* (forthcoming, Bloomsbury).
14. In fact, Goodman and Quine – in keeping with Goodman’s more general position – consider something akin to Hilbert’s position, which would ‘construe marks phenomenally, as events in the visual (or in the auditory or tactual) field’, to be consistent with their nominalism (Goodman and Quine, ‘Towards a Constructive Nominalism’, 111n11). The extent of this consistency would have to be carefully examined, and would turn around the strength of Hilbert’s commitment to his particular form of Husserlian neo-Kantianism.
15. David Hilbert cited in Paolo Mancosu, *From Brouwer to Hilbert* (Oxford: Oxford University Press, 1997), 195.
16. The empty sign cannot be determined as *a* sign by reference to a concept, since to do so would be to determine at the same time the material instance that expresses or realizes this concept. As we will see shortly, the meaningless sign is and must always be an arbitrary sign as well.
17. That this phrase, along with Meillassoux’s entire treatment of the sign, so innocently skirts Derrida’s early, subtle analyses of writing, not to mention the discussion of the necessary supplement or support, is symptomatic, revealing with respect to Meillassoux’s project but also, perhaps, the contemporary reception (institutional, philosophical, etc.) of Derrida’s early work.
18. Though it cannot be broached here (a version of the analysis will be advanced in the final chapter concerning the intersection of habit and sociality) the issue is more severe yet again, for what guarantees empirical recognition is not some placid perceptual faculty, but a fragile capacity, shot through with every tension already in play in the socius at large. Here, Meillassoux’s Cartesianism exposes him to the whole suite of subtle and powerful analyses concerning the social composition of the phenomenological field – what Paul Virilio calls the logistics of perception.
19. See, on this point, Deleuze’s analysis of the opposition between natural and artificial signs in *Difference and Repetition* (DR 77–8). This critique also comes to bear on Alain Badiou’s set-theoretic ontology – it is not insignificant, in this regard, that Meillassoux chooses ZF set theory as his example of the mathematical deployment of the meaningless sign (IRR 21–2).
20. Gilles Deleuze, *Cinema 2: The Time-Image*, trans. Hugh Tomlinson and Robert Galeta (London: Athlone Press, 1989), 27.
21. Haïm Vidal Séphipa, ‘Introduction à l’étude de l’intensif’, *Langages* 18 (1970): 104–20.
22. Séphipa, 114; 115. The ‘Introduction’ discusses 27 genres of utterance in which the intensive features of language are deployed, including exclamation (*Ça alors!*), denumeration (*mille et une choses*), repetition (not just *Vrai, vrai* but also *zigzag*, etc.), emphasis (*Toi, tu...*), negation (*ne... rien*) and force (*fort!*).
23. Séphipa, ‘Introduction’, 113.
24. Séphipa, ‘Introduction’, 113.
25. Deleuze, *The Time-Image*, 29, translation modified.

26. Gilles Deleuze, *Nietzsche and Philosophy*, trans. Hugh Tomlinson (London: Continuum, 2008), 3.
27. See, of course, Jacques Derrida, 'Freud and the scene of writing', in *Writing and Difference* (New York: Routledge, 2001), 246–91.
28. Sigmund Freud, 'Beyond the Pleasure Principle', in *On Metapsychology*, trans. James Strachey (London: Penguin, 1991), 303.
29. Freud, 'Beyond the Pleasure Principle', 303.
30. Sigmund Freud, *The Interpretation of Dreams part 2* (Standard Edition of Freud Volume IV), trans. James Strachey (London: Vintage, 2001), 540.
31. Deleuze provides a brief but excellent discussion of this thematic in Freud but also Nietzsche in *Nietzsche and Philosophy*, 104–7.
32. Quoted by James Strachey in Freud, *Interpretation of Dreams*, 540n1.
33. Freud, *Interpretation of Dreams*, 540.
34. Freud, *On Metapsychology*, 357.
35. It is significant that both 'Beyond the Pleasure Principle', and the 'Note on the "Mystic Writing Pad"', two texts in which inscription is closely considered, lead Freud to speculation about the nature of the order of time. We will return to this in the final chapter.
36. David Hume, *A Treatise of Human Nature*, ed. Ernest Mossner (London: Penguin, 1985), I.4.6; 300, 301.
37. Freud, *On Metapsychology*, 296.
38. Freud, *On Metapsychology*, 433.
39. Gilles Deleuze, *The Logic of Sense*, trans. Mark Lester with Charles Stivale, ed. Constantin Boundas (London: Athlone, 1990), 230.
40. Freud, *On Metapsychology*, 229.
41. J. Lacan, *Compte rendu du Seminaire d l'ethique* in *Ornicar? No.28* (Paris: Navarin, 1984), 17.
42. Lacan, *Compte rendu*, 17.
43. Freud, *On Metapsychology*, 236.
44. Jacques Lacan, 'The Direction of the Treatment and the Principles of Its Power', in *Ecrits: The First Complete Edition in English*, trans. Bruce Fink in collaboration with Héloïse Fink and Russell Grigg (London: WW Norton and Company, 2002), 496.
45. Freud, *Interpretation of Dreams*, 670–1.
46. Lacan, 'The Direction of the Treatment', 497.
47. Michel Foucault, *The Order of Things: An Archeology of the Human Sciences* (New York: Vintage Books, 1994), 167.
48. Michel Foucault, *The Archeology of Knowledge* (London: Routledge, 1989), 63.
49. Duncan Foley, *Adam's Fallacy: A Guide to Economic Theology* (Cambridge, Ma.: Harvard University Belknap Press, 2006).
50. Foucault, *Archeaology*, 127.
51. Foucault, *Archeaology*, 54.
52. Foucault, *Archeaology*, 116.
53. Foucault, *Archeaology*, 103.
54. Foucault, *Archeaology*, 108.
55. Gilles Deleuze, *Foucault*, trans. Séan Hand (Minneapolis: University of Minnesota Press, 1988), 4–6.
56. Michel Foucault, *The Order of Things*, xi.

57. Foucault, *The Order of Things*, x.
58. Foucault, *Archeaology*, 143.
59. Foucault, *Archeaology*, 144.
60. Foucault, *Archeology*, 144.
61. Michel Foucault, *The Birth of the Clinic: An Archeology of the Medical Gaze*, trans. AM Sheridan (London: Taylor and Francis, 2003), 199.
62. Foucault, *Archeology*, 160.
63. Fabien Muniesa also presents an analysis of price as sign in 'Market technologies and the pragmatics of prices', *Economy and Society* 36:3 (2007), 377–95. Arguably, his approach, which makes use of Peirce's semiotics and emphasizes the multifarious ways in which prices function as signs, is compatible with the approach pursued here in broad terms. However, by nesting the sign-function of price in the social, Muniesa's account seems to rule out a thinking of the sign in-itself, and therefore as meaningless.

4 The Intensive Pricing Surface

1. Campbell Jones' excellent little study *Can the Market Speak?* (Winchester: Zer0 Books, 2013) provides a thoroughgoing analysis of the attribution of subjectivity to the market and its viscidities.
2. Karen Knorr Cetina and Urs Bruegger, 'Global Microstructures: The Virtual Societies of Financial Markets,' *The American Journal of Sociology* 107:4 (2002): 908
3. Knorr Cetina and Bruegger, 'Global Microstructures,' 915.
4. Discussions of these two concepts and their intersection with Nicholas de Weydenthal, whose work on them has paralleled my own, has greatly helped the formulation of this chapter.
5. Several texts have addressed this concept in Deleuze and in the history of thought that proceeds his treatment, including Simon Duffy, *The Logic of Expression: Quality, Quantity and Intensity in Spinoza, Hegel and Deleuze* (Aldershot: Ashgate, 2006), esp. Chapters 4 and 5. The work of Mary-Beth Mader, however, is perhaps the locus of the most important developments on this front. See in particular her *Sleights of Reason: Norm, Bisexuality, Development* (Albany: SUNY Press, 2011), 13–41.
6. See Gilles Deleuze, *Expressionism in Philosophy: Spinoza*, trans. Martin Joughin (New York: Zone, 1990), 191–3. There has been some critical attention directed at the Spinoza–Scotus connection deployed by Deleuze in his account of Spinoza's modal essence. See Duffy, *The Logic of Expression*, 5, and ch. 4., for a discussion of Charles Ramond's particularly direct criticisms on this point.
7. Alain Badiou, *Number and Numbers*, trans. Robin Mackay (Cambridge: Polity, 2008), 228n6.
8. Gilles Châtelet presents an altogether remarkable and illuminating treatment of this topic in the Middle Ages and Oresme's contribution in particular. See *Figuring Space [Les enjeux du mobile]*, trans. Robert Shore and Muriel Zagha (Dordrecht: Kluwer, 2000), 38–44.
9. Châtelet, *Figuring Space*, 39.
10. Châtelet, *Figuring Space*, 44.

11. Carl Boyer's comparison of Oresme's diagram with Cartesian geometry is symptomatic in precisely this way. See Boyer, *The History of the Calculus and its Conceptual Development* (New York: Dover, 1959), 82; on this point, c.f. Mary-Beth Mader, 'The Difference of Intensity: Deleuze and Nicolas Oresme,' (unpublished paper presented at the Society for Phenomenology and Existential Philosophy Annual Meeting 2008), 7–8. Châtelet also notes a later development, which he dubs 'Romantic,' that 'no longer allows the separation horizontal/vertical or right/left to be self-evident' (*Figuring Space*, 99n4). Clearly, this development is not conceived, from the point of view of the contemporary (analytic) philosophy of mathematics, to have been a point on the line that leads to the present. For a very important corrective to the contemporary analytic-foundational view (one that the Romantic moment certainly attacks), see Fernando Zalamea, *Synthetic Philosophy of Contemporary Mathematics*, trans. Zachary Luke Fraser (London: Urbanomic, 2012).
12. Châtelet, *Figuring Space*, 39.
13. Châtelet, *Figuring Space*, 39.
14. It is here that one of the major differences between the Deleuzian and Hegelian accounts of intensive quantity can be found. On this point, see Duffy, *Logic of Expression*, 106.
15. Mader, 'The Difference of Intensity', 3.
16. For an excellent example of the divergence in different social contexts of the meaning and nature of calculation, see Helen Verran, *Science and an African Logic* (Chicago: University of Chicago Press, 2001). Here, we must avoid a knee-jerk relativism with respect to mathematics. Even if the human *capacity* for mathematics can be accounted for genetically – see, for example, Jean Piaget, *The principles of genetic epistemology*, trans. Wolfe Mays (London: Routledge, 1972), or the more phenomenologically indebted text by George Lakoff and Rafael E. Nafiez, *Where Mathematics Comes From: How the Embodied Mind Brings Mathematics into Being* (New York: Basic Books, 2000) – we have no grounds to assert that it remains bound *by* its social context, neurobiology or anything else. This particular case of the genetic fallacy is a partner to another that will be discussed later in this book, regarding the socio-historical genesis of the market in relation to its subsequent role as a foundation for the unfolding of the history of the social.
17. Ruyer, *La conscience et le corps* (Paris: PUF, 1959), 57. The chequerboard table, a staple of the few existing English commentaries on Ruyer, is invoked at NF 95.
18. Ruyer, *La conscience et le corps*, 64.
19. In 'L'averse de sable, l'atome et l'embryon', *Critique* 804 (2014): 402–16, Anne Sauvanargues demonstrates the ultimate consequences of Ruyer's attempt to conceive of this unity itself (ie., form) as unchanging. Here, we are not interested in going quite so far in the direction of Ruyer's project as a whole; Sauvanargues' critique is undoubtedly correct.
20. Raymond Ruyer, 'Raymond Ruyer par lui-même', cited in Jean-Claude Dumoncel, 'Une archéologie du structuralisme', *Critique* 804 (2014): 417–18.
21. On the situation of the object and the subject who perceives it as an object, see Sauvanargues, 'L'averse de sable, l'atome et l'embryon'.

22. Such is the case, for example, when we consider death in terms of the destruction of an absolute surface: 'an absolute domain can be violently destroyed by relatively immense forces, resulting from the accumulation of physical forces in the world of physical aggregates. Its liaisons have a primacy relative to those of the step-by-step physical world, they are quantitatively too weak to resist these forces'. (NF 122)
23. This thesis is elsewhere pursued in the context of aesthetics in Philip Turetsky, 'Pictorial Depth: Intensity and Aesthetic Surface,' *Axiomathes* 15 (2005): 1–28. This piece includes an excellent summary of the theme of intensive magnitude in Kant, and a fascinating analysis of the notion of a pictorial surface. Due to the heterogenous character of intensive systems (that, as we have seen, Deleuze insists upon) Turetsky's analysis is not of direct assistance in the construction of the concept of the market surface, in the first instance due to the fact that the market as such is not an object of direct perceptual experience.
24. Mandelbrot's characteristic approach is already to be found in Benoit Mandelbrot, 'On the Distribution of Stock Price Differences,' *Operations Research* 15 (1967): 1057–62. For a fuller account, see *Fractals and Scaling in Finance: Discontinuity, Concentration, Risk* (New York: Springer, 1997), and more recently, the seemingly prophetic text with Richard L. Hudson, *The Misbehaviour of Markets: A Fractal View of Financial Turbulence* (New York: Basic Books, 2004).
25. Colonna, 'L'homme ruyerien', *Les études philosophiques* 80(1), 2007: 63–84; 84.
26. Gilles Deleuze and Félix Guattari, *What is Philosophy?*, trans. Hugh Tomlinson and Graham Burchell (New York: Columbia University Press, 1994), 210.

5 Social Inscription

1. Daniel W. Smith shows very clearly that Deleuze and Guattari draw from economic theory here, specifically the work of Keynes. See 'Flow, Code, and Stock: A Note on Deleuze's Political Philosophy', in *Essays on Deleuze* (Edinburgh: Edinburgh University Press, 2009, 160–72).
2. Jean-François Lyotard, *Libidinal Economy*, trans. Iain Hamilton Grant (Indianapolis: Indiana University Press, 1993), 26, translation modified.
3. Clearly the notion of coding is extended well beyond the realm of the social in the straightforward sense of the word by Deleuze and Guattari in *A Thousand Plateaus*. The modal distinction between desiring-production and social-production in *Anti-Oedipus* provides grounds for holding to the social situation in the current analysis. In any case, our goal here is not hermeneutical; we are not interested in pursuing the goals of Deleuze scholarship in this context.
4. Eugene Holland also provides a basic schematic of the distinctions between the three social formations, though in terms of power and economics, in *Deleuze and Guattari's Anti-Oedipus: Introduction to Schizoanalysis* (New York: Routledge, 2003), 58–60. The account here differs from Holland's admirable analysis to the degree that the concept of the social surface is taken to be

- primary, and to the extent that the framework of economics and the reference to capital has – for the reasons discussed in the introduction – been put aside.
5. The anachronistic choice of this term is perhaps justified best and most briefly by Miguel Abensour, when he writes that ‘The societies described as primitive are [...] societies without a State, not due to any lack or deficit, but rather a refusal of the State, such that they can [be] named, not “societies without a State,” but instead “societies against the State”. This passage from “without” to “against” [*contre*] leads us to cast light on an ensemble of *dispositifs* that function to prevent, to block the emergence of a political power separated from society.’ (Abensour in Pierre Clastres, *Entretien avec l’anti-mythes* [Paris: Sens & Tonka, 1974], 8.
 6. Pierre Clastres, *Archeaology of Violence*, trans. Jeanine Herman (Los Angeles: Semiotext(e), 2010), 163.
 7. Clastres, *Archeaology of Violence*, 164.
 8. Pierre Clastres, *Society Against the State*, trans. Robert Hurley and Abe Stein (New York: Zone Books, 1987), 205–6.
 9. Eugene Holland, *Nomad Citizenship: Free-Market Communism and the Slow-Motion General Strike* (Minneapolis: University of Minnesota Press, 2011), 33–4.
 10. Clastres, *Archeaology of Violence*, 166. The same point is made with respect to social norms elsewhere: the norms of non-State societies are asserted ‘by the whole society, and not norms imposed by a particular group on the whole society. These are the norms of the society itself, norms according to which the society is maintained. These are the norms that every person respects, but which are not imposed by any one person... These are not norms of a particular group imposed upon the rest of society, they are the norms of the society itself.’ (Clastres, *Entretien*, 23).
 11. Pierre Clastres, in Gilles Deleuze, *L’île désertes et autres textes* (Paris: Editions de Minuit, 2002), 316.
 12. Clastres, *Entretien*, 20.
 13. Eduardo Vivieros de Castro has recently presented a nuanced and powerful treatment of the role of anthropology in *Anti-Oedipus* in his *Métaphysiques Cannibales* (Paris: PUF, 2009). This volume is one of the very small handful of genuinely insightful readings of *Anti-Oedipus*, not least because it speaks (masterfully) to one of the book’s major theoretical referents from its own point of view.
 14. Dudley Dillard, ‘The Barter Illusion in Classical and Neoclassical Economics’, *Eastern Economic Journal* 14:4 (1988): 299–318.
 15. Deleuze and Guattari’s relationship to Bataille is a complicated one. On the one hand, they associate his work with the Nietzschean break with exchange, writing that like Nietzsche and unlike Mauss, Bataille ‘does not hesitate’ when choosing between the relative primacy of debt over exchange. (AO 190) Nevertheless, they have no time for the entire thematic of transgression and its concomitants; Vivieros de Castro is quite likely correct in the supposition that the relative absence of references to Bataille’s work in *Anti-Oedipus* is due to this ‘contempt’. (*Métaphysiques Cannibales*, 96). On this point, Eugene Holland’s insistence on the role of Bataille in the construction of *Anti-Oedipus* seems unconvincing. He writes, for instance, that ‘Bataille’s insights are so important that, had he not existed, schizoanalysis would have

- had to invent them', (Holland, *Deleuze and Guattari's Anti-Oedipus*, 62) even though it seems clear that the way in which the analysis goes beyond the exchangeism that is also Bataille's target does not require him, finding all the resources it needs in Nietzsche, in Marx, and in the foundational works in anthropology that Bataille also draws upon in his own way.
16. David Graeber's particularly weak reading of this text misses the element of inscription so important for Deleuze and Guattari, describing Nietzsche as 'a man able to see with uncommon clarity what happens when you try to imagine the world in commercial terms'. (David Graeber, *Debt: The First 5000 Years* [New York: Melville, 2011], 96) Such a perspective is only possible because he fails to see the genetic element of Nietzsche's analysis, according to which exchange is only possible *after* and *on the basis of* the system of cruelty and inscription. Correlatively – and on this point Bill Maurer's argument that Graeber confuses contingency and ontology at the level of origins is certainly a propos (Bill Maurer, 'David Graeber's Wunderkammer, *Debt: The First 5000 Years*', *Anthropological Forum: A Journal of Social Anthropology and Comparative Sociology* 23:1 [2013], 79–93.) – Nietzsche's argument is not straightforwardly for the thesis of primordial debt, but rather primordial inscription.
 17. Friedrich Nietzsche, *The Genealogy of Morals*, in Walter Kaufmann (ed.) *Basic Writings of Nietzsche* (New York: The Modern Library, 1992), Second Essay, §3, 496–7.
 18. On the whole question of inscription, and its role in Nietzsche and then Deleuze and Guattari, see Keith Ansell-Pearson's excellent analysis in *Germinal Life: The Difference and Repetition of Deleuze* (New York: Routledge, 1999), especially 216–9.
 19. This account of the social surface takes us back to the analysis of Ruyer conducted in the previous chapter. Ruyer distinguishes between three orders of forms or absolute surfaces (Forms I, II and III) that mark out a gradual increase in specialized capacities and increased means for the organization of time and space. The social surface constitutes a Form IV, a form that pertains properly and by right to the social.
 20. Repeating his principal argument in terms of inscription, Clastres expresses his admiration of Deleuze and Guattari's opposition, writing that 'As the authors of *L'Anti-Oedipe* have so forcefully argued, primitive societies are first of all societies that *mark*. And to that extent, they are in fact societies without writing; but what this statement means primarily is that writing points to the existence of a separate, distant, despotic law of the State [...] one cannot emphasize too strongly the fact that it is precisely in order to exorcise the possibility of that kind of law – the law that establishes and guarantees inequality – that primitive law functions as it does; it stands opposed to the law of the State. Archaic societies, societies of the mark, are societies without a State, *societies against the State*' (Clastres, *Society against the State*, 188).
 21. On this point too the current account parts ways with Eugene Holland's excellent reconstruction of *Anti-Oedipus*, when he asserts that 'It is not only the socius, as the social focal-point for the investment of productive desire, that varies historically: so does the very nature of the relationship between desiring-production and social-production' (Holland, *Deleuze and Guattari's*

- Anti-Oedipus, 61). In our view, the former does not vary, even if the latter variation explains the need to rename the surface in each social formation.
22. The term is deployed by Deleuze, first in *The Logic of Sense* and then later in *Anti-Oedipus*. That these two works propose two diverging metaphysical accounts complicates matters – indeed, these two books advance two different theories of the surface while maintaining the use of ‘quasi-cause’ to describe their causal modality: *Anti-Oedipus* capitalizes on the line of argument first presented in *The Logic of Sense* while changing its register of application, from the virtual to the intensive.
 23. The account of the quasi-cause in *Anti-Oedipus* includes a discussion of what Deleuze and Guattari call the ‘miraculating’ character of the surface, namely its appearance as the source, origin and cause (properly speaking) of everything that is related to it. While this aspect is an important part of the argument of *Anti-Oedipus* (constituting something like the analysis of a transcendental illusion), the project here is constructive rather than critical and we will not therefore consider it here.
 24. Putting the matter in this way signals a disagreement with Ian Buchanan’s reading of the three syntheses of desire in *Deleuze and Guattari’s Anti-Oedipus: A Reader’s Guide* (London: Bloomsbury, 2008). On Buchanan’s view, the only coherent way to treat these syntheses is to conceive of them as ‘fundamentally virtual in nature’, (57) effectively aligning the metaphysics of *Anti-Oedipus* with *Difference and Repetition* along the lines of the virtual-actual distinction. In fact, though, these syntheses, and the surfaces that they involve (the body without organs and the socius) are intensive rather than virtual. Deleuze and Guattari’s point in invoking bodily connections and flows (breast-milk-mouth) does not mislead, since the conception of bodies they are using is intensive rather than actual (in the way that Deleuze uses this term in *Difference and Repetition*).
 25. See, eg. Malcolm Steinberg, ‘On the Mechanism of Tissue Reconstruction by Disassociated Cells, I. Population Kinetics, Differential Adhesiveness, and the Absence of Directed Migration’, *Proceedings of the National Academy of the Sciences* 48 (1962): 1577–82; and Ramsey Foty, Cathie Pflieger, Gabor Forgacs and Malcolm Steinberg, ‘Surface tensions of embryonic tissues predict their mutual envelopment behaviour’, *Development* 122 (1996): 1611–20. The major question in embryology, as Steinberg puts it in the first of these pieces, concerns the interaction of cells: ‘To interact with one another to different degrees, the surfaces of the various kinds of cells must be encoded with characteristic differences which become translated into cellular adhesive differentials.’ (324) Of course, the entire problematic here turns around the meaning of the term ‘translates’, though Steinberg does insist upon the fact that these characteristic differences are not constants, but ‘rather to be regarded as norms, about which the strengths of adhesion vary’, and that this variation also characterizes the surface of most cells, which are themselves heterogenous.
 26. For an extremely helpful and nuanced discussion of Althusser on these points, see Giorgios Fourtounis, ‘On Althusser’s Immanentist Structuralism: Reading Montag Reading Althusser Reading Spinoza’, *Rethinking Marxism* 17: 1 (January 2005): 101–18.

27. An analysis of this kind is presented by Deleuze and Guattari in their discussion of the State image of thought in *A Thousand Plateaus* (TP 374–80).
28. Erica Reiner, *Journal of Near Eastern Studies* Vol. 19, No. 1 (Jan., 1960), pp. 23–35.
29. Félix Guattari, *The Anti-Oedipus Papers*, ed. Stéphane Nadaud, trans. Kéline Gotman (Los Angeles: Semiotext(e), 2006), 227.
30. This term plays a central role in Malcolm Steinberg's research into the reorganization of disassociated cells during embryogenesis. See for example 'On the Mechanism of Tissue Reconstruction by Disassociated Cells'; see too once more Foty et al, 'Surface tensions of embryonic tissues'.

6 States of the Market

1. As it happens, Deleuze and Guattari's own discussion of axioms is not framed by a direct encounter with Cantor or his axiomatizing heirs, but with Roberte Blanché, a mathematician and philosopher of mathematics, and his programmatic little text *L'axiomatique* (Paris: PUF, 1955).
2. Formally, the axiom of infinity is written: $\exists \alpha [\emptyset \in \alpha \ \& \ \forall \beta [\beta \in \alpha \rightarrow \{\beta\} \in \alpha]]$; the power set axiom may be rendered as: $\forall \alpha \exists P(\alpha) [\forall \beta: \beta \in P(\alpha) \leftrightarrow [\forall \delta: \delta \in \beta \rightarrow \delta \in \alpha]]$.
3. Gilles Deleuze and Félix Guattari, *What is Philosophy?*, trans. Hugh Tomlinson and Graham Burchell (New York: Columbia University Press, 1994), 107.
4. In a speculative sense then, we can say that the problem of cosmopolitanism can only arise once the absolute surface of the State has been shattered. From between the cracks of the old world new problems emerge, and here it becomes difficult indeed to choose on behalf of either the old terror or the new fidelity, total obedience to the political order of the master or the slurry of rights discourse.
5. A detailed argument for this claim can be found in Jon Roffe, 'Axiomatic set theory in the work of Deleuze and Guattari: a critique,' forthcoming.
6. The other four are derivative of these five, and turn around the use of the second, third and fifth axioms to define relative size.
7. Blanché, *L'axiomatique*, 46n1
8. Blanché, *L'axiomatique*, 46.
9. Annelise Riles, *Collateral Knowledge* (Chicago: University of Chicago Press, 2011). Deleuze and Guattari themselves make heavy use of anthropological work in the *Capitalism and Schizophrenia* volumes. It seems, as a result, no less than imperative that we continue to bring to bear work in this discipline to their analyses with an eye to making ourselves equal with the contemporary situation.
10. Riles, *Collateral Knowledge*, 246.
11. Riles, *Collateral Knowledge*, 226.
12. A good précis of this (additional) policy capacity of large State-based market participants is provided by Shannon Murphy, 'Leviathan's Double Bottom Line: Sovereign Wealth Funds as Tools of Strategic Statecraft,' <http://fletcher.tufts.edu/SWFI/~-/media/Fletcher/Microsites/swfi/pdfs/Spring%202013%20Bulletin/Leviathans%20Double%20Bottom%20LineShannon%20Murphy.pdf> (last accessed 10 December 2014).

13. Given its influence, a familiarity with Eugene Fama's work is a near requisite. See both 'Efficient Capital Markets: A Review of Theory and Empirical Work,' *The Journal of Finance* 25:2 (1970), 383–417, and 'Efficient Capital Markets: II,' *The Journal of Finance* 46:5 (1991), 1575–617; and the earlier less technical piece, 'Random Walks in Stock Market Prices,' *Financial Analysts Journal* (Sept 1965), 55–9.
14. Fabien Muniesa's work on price as sign, which we have already seen and which does not require as much by way of metaphysical commitments as the argument here does, is already more than enough to scuttle Fama's approach, since, as he argues, there is a plurality of ways in which price 'ensigns'. Not only is 'the pragmatics of pricing' (379) immensely varied, the tripartite distinction between icon, index and symbol that Muniesa draws from Peirce also fractures the presupposed unity of prices as signs that Fama's work collects under the extremely charged term 'reflects'. See Fabian Muniesa, 'Market technologies and the pragmatics of prices,' *Economy and Society*, 36:3 (2007), 377–95.
15. Fama, 'Efficient Capital Markets,' 383.
16. Fama, 'Random Walks in Stock Market Prices,' 59.
17. Jens Bartelson makes this point in 'The Social Construction of Globality,' *International Political Sociology* 4:3 (2010), 219–35.
18. Donald MacKenzie, *An Engine, not a Camera* (Minneapolis: MIT Press, 2008), 242.
19. Karen Knorr Cetina and Urs Bruegger, 'Global Microfinance: The Virtual Societies of Financial Markets,' *American Journal of Sociology* 107:4 (2002), 907.
20. Knorr Cetina and Bruegger, 'Global Microfinance,' 908.
21. It is due to this analysis that Henri Lefebvre's entirely unwarranted critique of Deleuze and Guattari – that they '[neglect] centres and centrality; in a word the global' (quoted in Stuart Elden, *Understanding Henri Lefebvre: theory and the possible* [London: Continuum, 2004], 240) – is clearly false, the product of a particularly miserly reading of the text.
22. Karl Marx, *Capital: A Critique of Political Economy*, Vol. 1, Part 2, edited by Friedrich Engels (New York: Cosimo, 2007), 827.
23. Pierre Clastres, *Archeaology of Violence*, trans. Jeanine Herman (Los Angeles: semiotext(e), 2010), 203–4.
24. Clastres, *Archeaology of Violence*, 204.
25. The key passage are found in David Graeber, *Debt: The First 5000 Years* (New York: Melville, 2011), Chapter 3, 'Primordial Debts.' (43–72).
26. See, eg. Graeber, *Debt*, 67.
27. Graeber, *Debt*, 67.
28. Note too the difference around the notion of paying the debt, the moral problematic that opens and frames Graeber's book: the infinite debt to the State is by definition unpayable, and it is precisely this feature of debt – its deathless rule over life and death – that characterizes its State and capitalist forms.
29. Leibniz quoted in Brandon Look, 'Leibniz and the Substance of the *Vinculum Substantiale*,' *Journal of the History of Philosophy* 38:2 (2000), 203–20.
30. The term 'could' here marks the fact that there is still no consensus about the degree to which Leibniz endorses the doctrine of the *vinculum substantiale*,

nor precisely what it amounts to. Deleuze, for example, gives a very strong reading of the concept that makes it integral to the Leibnizian system in *Le Pli: Leibniz et la baroque* (Paris: Minuit, 1988), 140–63, drawing in particular on Christiane Frémont's research on the topic (*L'être et la relation* [Paris: Vrin, 1999]). For an excellent survey of extant interpretations, and a critique of Frémont and Deleuze's approach, see Look, 'Leibniz and the Substance of the *Vinculum Substantiale*.'

31. This is an allusion to Deleuze and Guattari's concept of the stratum (see TP 502–3); the connection between debt and this concept will be investigated elsewhere.

7 Temporality

1. This line of argument clearly follows Deleuze's reading of Hume in *Empiricism and Subjectivity: An Essay on Hume's Theory of Human Nature*, trans. Constantin Boundas (New York: Columbia University Press, 1991). The relationship between the current argument and Deleuze's construal of Humean social thought will be the object of future work.
2. See, for example, Pierre Bourdieu, 'Social Space and Symbolic Space,' in *Practical Reason: On the Theory of Action*, trans. Randall Johnson (Stanford: Stanford University Press, 1998), 1–13.
3. Michel Foucault, 'The Subject and Power,' in *Power*, ed. James D. Faubion, trans. Robert Hurley (New York: The New Press, 2000), 341.
4. Foucault, 'The Subject and Power,' 341
5. Michel Foucault, *Discipline and Punish*, trans. Alan Sheridan (London: Penguin, 1977), 141.
6. Bergson, H. 2002. *Bergson: Key Writings*, ed. K. Ansell-Pearson and J. Mullarkey. London: Continuum
7. Bergson, 'Bergson: Key Writings,' 147.
8. Sigmund Freud, 'Screen memories,' in *Standard Edition of the Complete Works of Sigmund Freud*, Vol. 3, ed. and trans. James Strachey, in collaboration with Anna Freud, assisted by Alix Strachey and Alan Tyson (New York: Vintage, 2001), 301–22.
9. Freud, 'Screen memories,' 321.
10. Freud, 'Screen memories,' 321.
11. Freud, 'Screen memories,' 321.
12. Freud, 'Screen memories,' 321.
13. Freud, 'Screen memories,' 322.
14. Freud, 'Screen memories,' 322.
15. Jacques Lacan, *The Four Fundamental Concepts of Psychoanalysis*, ed. Jacques-Alain Miller, trans. Alan Sheridan (New York: Norton, 1978), 56. This is what lies behind Roberto Harari's assertion that parapraxes are acts of successful speech, because what is genuinely at stake in that speech is partially revealed, *mi-dire* (Roberto Harari, *Lacan's Four Fundamental Concepts of Psychoanalysis*, trans. Judith Filc [New York: The Other Press, 2004], 62).
16. Jacques Lacan, 'The Subversion of the Subject and the Dialectic of Desire,' *Écrits: The First Complete Edition in English*, trans. B. Fink in collaboration with

- Hélène Fink and Russell Grigg (London: WW Norton and Company, 2002), 676.
17. See Gilles Deleuze and Félix Guattari, *What is Philosophy?*, trans. Hugh Tomlinson and Graham Burchell (New York: Columbia University Press, 1994), 153.
 18. Karl Polanyi, *The Great Transformation: The Political and Economic Origins of Our Times* (Boston: Beacon Press, 2001), 3.
 19. The remarks that follow are found in somewhat expanded form in Jon Roffe, 'Time and Ground: A Critique of Quentin Meillassoux's Speculative Realism,' *Angelaki*, 17:1 (2012), 57–67; and in 'The Future of An Illusion,' *Speculations: Journal of Speculative Realism* 4 (2013). The latter text also criticizes Graham Harman's object-oriented philosophy on the same point, but a much more elaborate and forceful presentation of the point can be found in Peter Wolfendale, *Object-Oriented Philosophy* (Falmouth: Urbanomic, 2014), 188–99.
 20. This is not only a term that recurs throughout *The Blank Swan* and its attendant publications, but the name of this book's nascent sequel (*The Medium of Contingency: The Market from the Inverse View*).
 21. See Elie Ayache, 'The Writing of the Market,' *Collapse* 8 (2014), 572f.
 22. It is all too easy to reply, in the spirit of a crude reading of his work, that Deleuze himself insists on the heterogeneity of the social, and indeed of being as such. What this claim overlooks is the *formal* character of the heterogeneity that Deleuze asserts. It is not merely that beings are different, but that difference itself is the formal character of being. By remaining at the level of what *Difference and Repetition* calls diversity, all of the worst charges against Deleuze's philosophy are vindicated, up to and including its isomorphism with the capitalist order of opinion and commodification.

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Index

- absolute surface, 77–83, *see also* Ruyer
market as, 85
- abstract, abstraction, 5
- algorithm, *see* automat
- Althusser, Louis, 104, 165n26
- Amin, Samir, 112
- Aristotle, 10
- automat, trading, 33–4, 156–7n15, *see also* VWAP
- axioms, capitalist axiomatic, and,
106–10, 110–18, 131, 166n5
immanence, of, 4–5, 31, 87, 150
inclusion, of, 5, 9, 30, 36, 150
surfactant, as, 122
see also Peano arithmetic; Zermelo-
Frankel set theory
- Ayache, Elie, 3, 9, 12, 21–3, 27–9,
29–30, 35, 62, 65, 84, 86, 122,
137, 146–7, 155n24
- Black-Scholes-Merton, 22–3, 156n11
- collateralised debt obligations, *see*
collateralised debt obligations
- Meillassoux, and, 19–20, 21–2,
154–5n17
Posterior writing, 39
Taleb, and, 13–14, 155n26
trading automats, on, 33–4
- Bachelier, Louis, 11, 154n7
- Badiou, Alain, 67, 97, 157
- Bataille, Georges, 99, 163–4n15
- Benveniste, Émile, 2
- benzene, 79
- Bergson, Henri, 44, 46
memory, on, 137, 143
past, on the, 137
possibility, on, 20
- Black-Scholes-Merton pricing model
(BSM), 11–13, 19, 22, 23, 31, 70,
122, 137, 146, 155n26
- Blanché, Roberte, 115, 166n1
- Bourdieu, Pierre, 135, 137, 168n2
- Boyer, Carl, 161n11
- Bruegger, Urs, 65, 125, 127
- Callon, Michel, 3, 153n2
- Cantor, Georg, 67, 107, 166n1
- Capitalism, 2, 5, 115–16, 124, 151,
152
axiomatic, *see* axioms
global, *see* globality
market as the surface of, 117–18
State, and the, 110–13, 116, 131–3
states of the market, 116–22
- Châtelet, Gilles, 70–1, 160n8, 161n11
- Clastres, Pierre, 95–7, 163n10, 164n20
debt, 129
- Clemens, Justin, 157n9
- coding, 93–7, 101, 105, 117–18, 124
overcoding, *see* overcoding
unconscious, and the, 141
versus capitalist axioms, *see* axioms
- collateralised debt obligations (CDOs),
10, 13, 14, 31–3, 156n9–10
- Colonna, Fabrice, 85
- counter-State society, 95–6, 101–2,
110, 127, 129
- debt, 2, 3, 127, 128–33, 168n31, *see also* Bataille; Graeber
memory, 100
- Deleuze, Gilles, 3, 145, 160n6, 168n30
Foucault, on, 59
inscription, 99–102
intensity, 65–9, 72–3, 160n5, *see also* intensive quantity
probability, 20–1, 137–8
psychoanalysis, 50, 98, 149
quasi-cause, *see* quasi-cause
repetition, 44, 46
Ruyer, on, 75, 85, *see also* Ruyer
signs, 47–50, 158n19
society, *see* capitalism, axiomatic;
coding; State
time, 134–5, 136
unconscious, 51–4, 61, 141–3

- derivatives, 9–11, 29, 30, *see also*
 orthodox theory of derivatives
 pricing; Riles
 barrier options, 10
 collateralised debt obligations, *see*
 collateralised debt obligations
 (CDOs)
 Nassim Taleb's critique, *see* Taleb
 pricing, 21–3, *see also* Black-Scholes-
 Merton
 regulation, 153n3
 vanillas (options, forwards and
 swaps), 10
 writing, and, 38
- Derrida, Jacques, 38–9, 50, 158n17
 despot, the, 95–6, 102, 127, 129, 131,
 164n20, *see also* State
- Dillard, Dudley, 98–9, 163n14
 dreams, interpretation of, 52, 55–6
 Driesch, Hans, 80–1
 Duffy, Simon, 160n6
- economics, 1–5, 26, 50, 74, 162n4
 behavioural, 123
 exchange, and, 98–9
 neo-classical, 27, 28
- Efficient market hypothesis (EMH),
 122–4
- embryogenesis, 76–7, 83, 103, 166n30
 empty sign, the, *see* meaningless sign
 equilibrium, 28, 30, 99–100
- Fama, Eugene, 122–4, 167nn13–14
 Fetter, Frank, 25–6, 122
 Fischer Black, *see* Black-Scholes-
 Merton
- flows, 92–7, 100–2, 107, 112, 118,
 124, 128, 151, 165n24
 decoded, 106–8, *see also* capitalism,
 axiomatic
- Foucault, Michel, 50, 56–61, 62,
 135–6, 153n2, *see also* statement
- Freud, Sigmund, 50–5, 62, 73, 75, 86,
 101, 142
 dream interpretation, and, *see*
 dreams, interpretation of
 memory, 139–41
- global, 119, 121, 124–8
 absolute and relative, 126–8
 capitalist axiomatic, *see* Capitalism
 State overcoding, 97, 111
 global financial crisis (GFC), 2, 12
 Goodman, Nelson, 40–2, 43, 45, 49,
 61, 158n14
 Graeber, David, 130, 164n16, 167n28
- habit, 14, 35, 46, 48, 81, 91, 132,
 135–8, 145, 148, 151
 Hamurrabi, 105
 hierarchy, 93–6, 97–8, 111, 129, 151
 within markets, 121
 Hilbert, David, 40–3, 49, 61
 Hobbes, Thomas, 92
 Holland, Eugene, 95, 162n4,
 164n21
 human rights, 109–10
 Hume, David, 13–14, 19, 21, 53, 138,
 168n1
- intensive quantity, 49, 54, 65–74, 84,
 86, 161n14
- Jones, Campbell, 160n1
- Kant, Immanuel
 'Refutation of Idealism', *see also*
Critique of Pure Reason
- kenotype, *see* meaningless sign
 Keynes, John Maynard, 3, 162n1
 Knorr Cetina, Karen, 65, 125, 127
- Lacan, Jacques, 50, 55, 61, 101, 141–2,
see also the letter
- Lashey, Karl Spenser, 80
 Lazzarato, Maurizio, 157n16
 lecanomancy, 105
 Leibniz, G.F.W., 14, 18, 53, 82
 vinculum substantiale, 131,
 168n30
- Lenglet, Marc, 33, 156n12
 letter, the, 46, 49, 50, 102, 157n9
 Lacan, in, 48
 Lévi-Strauss, Claude, 98
 Lyotard, Jean-François, 93
- MacKenzie, Donald, 125–6
 Mader, Mary-Beth, 73, 160n5

- Mandelbrot, Benoît, 84, 162n24
- Marx, Karl, 92, 112–13, 115, 127–8, 164n15
- mathematical formalism, 40, 51, 53, *see also* Goodman; Quine
- Mauss, Marcel, 99–100, 131, 163n15
- meaningless sign, *see* Meillassoux
- Meillassoux, Quentin, 15–19, 21, 58, 146–7, 169n19
- Ayache's critique of, *see* Ayache
- meaningless sign, the, 42–6, 47–9, 58, 158nn17–19
- radical contingency, 144–5
- memory, 35, 52–3, 138, 143, 145, 151
- screen memories, 139–41
- social memory, 98, 100–1, 105, 124, 128
- Menger, Carl, 26
- models of realisation, 111–12, 115, 116, 123
- Muniesa, Fabien, 160n63, 167n14
- Myron Scholes, *see* Black-Scholes-Merton
- mystic writing pad, 52–3, 159n35
- Nietzsche, Friedrich, 100, 101, 128, 159, 163–4n15
- North, Douglass, 3
- The Oedipus Complex, 149
- Oresme, Nicolas, 66, 70–1, 160n8, 161n11
- orthodox theory of derivatives
- pricing, 12, 13–14, 21–4, 29, 33–4, 74, 150
- overcoding, 71–8, 102, 107, 109, 110–11, 116, 117, 126
- Peano arithmetic (PA), 114–15
- Peirce, Charles Sanders, 43
- physics of surfaces, 103, 166n30
- Plato, 91, *see also* *Timaeus*
- Platonism, 83
- Polanyi, Karl, 36, 144
- pre-conscious, 55, 62, 101
- pre-State society, *see* counter-State
- Primitive society, *see* counter-State
- psychoanalysis, 51, 55, 105, 138, 148–9, *see also* Freud; Lacan
- critique of, 98
- quasi-cause, 102–5, 165nn22–3
- Quine, Willard Van Ormond, 40–2, 43, 45, 49, 61, 158n14
- resonance, 96–8, 102, 111, 131
- Riles, Annelise, 119
- Robert Merton, *see* Black-Scholes-Merton
- Ruyer, Raymond, 27, 65, 75–83, 84–5, 103, 137, 164n19
- Sauvanargues, Anne, 161n19
- semiotics, 47–9, 51, 160n63
- sensori-motor schema (SMS), 137–8
- Séphiba, Haïm Vidal, 47
- Simmel, Georg, 3
- Smith, Daniel W., 162n1
- social surface, 92, 98–105, 117, 123–4, 129, 130–1, 141–2, 144, 146, 148–9, 151, 152, 162n4
- Social transcendence, *see* hierarchy
- socius, 98–100, 147, 158n18, 164n21, 165n24, *see also* social surface
- Socrates, 4
- sovereign wealth funds (SWFs), 120, 166n12
- space, 43–4, 72, 161n11, 164n19
- correlative and collateral, 59–61
- phase space of the State, 113, 121
- social, 94, 95, 135, 137
- striated, 126–8
- Spinoza, Benedict de, 66, 92, 160n6
- in the State, 102
- State, 93–9, 102, 104, 126–32, *see also*
- Capitalism
- debt, 129–30
- image of thought, 166n27
- states of the market, 118–22, 124
- statement, 57–61
- subprime mortgage crisis, 10, *see also*
- global financial crisis
- supply and demand, 26, 28
- Taleb, Nassim, 12–14, 21–2, 155n26
- Thales, 10
- Timaeus*, 70
- type-token distinction, the, 42–3, 46

- Vienna Circle Manifesto, 82
- Volume Weighted Average Price
 - algorithm (VWAP), 33
- von Hayek, Friedrich, 1, 3, 105, 122
- writing, 34, 38–9, 50–1, 54, 63, 64, 146, 158n17, 164n20
- Zermelo-Frankel set theory, 107, 114