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Capital's Media

Armin Beverungen

Why search for media in markets? The other contributions to this book provide two answers. One answer is that markets, at least for neoliberal economists, have for a long time been understood as information-processing machines and are designed—also on the basis of a number of digital media technologies—with that function in mind. Moreover, the political and cultural program of neoliberalism has sought to reconfigure states, organizations, subjects, and their relations in the image of "the market" at least since the 1980s.[1] One question for media theory that follows is whether we want to become handmaidens of engineering economists designing markets, to find ways of designing markets differently, or to design other media for a different kind of relationality. Another answer is that in markets we find money as a prerequisite medium, one that provides the general equivalent by which commodities can be exchanged. Money points us beyond markets, since as a medium it determines our situation and precedes other media, and it points to capital accumulation, which depends on it and which is historically shaped by different kinds of money. One question for media theory here becomes whether we want to provide a media archaeology of money, or get involved in building alternative currencies or forms of exchange and equivalence.

To situate the other contributions contained in this book within a media theory of markets, which is very much yet to come, we will refer to a number of debates and works that one could count and enroll in the project. To begin, however, it might be worth briefly to consider what kind of media theory of markets is not offered here, and why. To do so, let's start at the so-called end of history, if only because the only thing that was said to survive this end was the market; or, rather, everything that was to exist was expected to pass through the market.[2]

The Market as Invisible Hand and Site of Truth

In an essay on postmodernism and the market contained in his book on the cultural logic of late capitalism, Fredric Jameson famously rallied his readers against the rhetoric and ideology of the market promoted by neoliberal economists, since the "surrender to the various forms of market ideology on the left . . . not to mention everybody else has been imperceptible but alarmingly universal" (1991, 263). Jameson asserted: "'The market is in human nature' is the proposition that cannot be allowed to stand unchallenged; in my opinion, it is the most crucial terrain of ideological struggle in our time" (1991, 263–64). Among other things, Jameson speculates on why markets have become so popular, which he finds astonishing: "namely, how the dreariness of business and private property, the dustiness of entrepreneurship, and the well-nigh Dickensian flavor of title and appropriation, coupon-clipping, mergers, investment banking, and other such transactions . . . should in our time have proved to be so *sexy*" (1991, 274, emphasis in original).

The answer for Jameson resides in the "illicit metaphorical association" of the market with "the media itself in its largest contemporary and global sense (including an infrastructure of all the latest media gadgets and high technology)," wherein "two systems of codes are identified in such a way as to allow the libidinal energies of the one to suffuse the other" (1991, 275). Jameson suggests that this operation takes place in three steps: the commodities produced for the market also populate our television screens; technological gadgets promising the end of class provide a pleasure that is manifest and celebrated in media consumption; and finally, media content itself is commodified and marketed, so that market and media ultimately become indistinguishable (1991, 275–77). Jameson here, in a cultural Marxist register, speculates on a media theory of markets whose principal task is to provide a critique of the ideology of the market at the level of representation, with media primarily playing the role of legitimating the market through associating it with *jouissance.*

This is not exactly the media theory of markets on offer here, since, at least for Philip Mirowski, it deals with less than half of the story that needs to be told when it comes to the rise and dominance of neoliberal exhortations of the market. As Mirowski has extensively argued elsewhere (2013), a key difference between classic liberal economists and neoliberal economists is that the latter no longer deem markets to be natural. Instead, neoliberals have, since at least the 1980s, been in the business of constructing markets, and this is where we need to direct our attention also, as media theorists, as digital media technologies are intimately enrolled in this project. Jameson, therefore, at least if we follow Mirowski, mischaracterizes neoliberalism and thereby misconstrues the political task at hand. The claim that markets are natural still gets made by members of the Neoliberal Thought Collective, but only as part of its "double-truth doctrine" (Mirowski 2013, 68–83): the exoteric version of this doctrine—directed at nonmembers of the collective—upholds the claim that the market constitutes a spontaneous, natural order of exchange; the esoteric version—directed at members of the collective—quite happily admits that markets should be designed and constructed.

Nonetheless, a media theory of markets might want to ask how the exoteric part of the double-truth doctrine of neoliberalism functions. How is it that markets are framed for us (assuming we are not part of the Neoliberal Thought Collective), if not as natural or spontaneous then as harbingers of truth? How is it that the market gains authority over practically every realm of life, as something God-like, most famously through the figure of the “invisible hand”? And how, if the market is said to offer truth, does it speak? Campbell Jones has, in a deconstructive, psychoanalytic register, explored the ascription of personhood and speech to markets. For Jones, to “imagine that something like the market is a kind of person that has a will, intentions and might speak” is “a shared or collective psychosis in which two or more share a common delusion” (Jones 2013, 20). What is particular about how the market speaks to us is its structural similarity to God, where the market is turned into “an imagined external agent with special powers” (17). Much like God, the market mumbles, as Jones puts it, and the speaking subject that is the market “involves a fundamental and almost permanent mystery as to which intending subject might lie behind the speech of the market and animate it” (38).

Although Jones focuses on the metaphysical and abstract features of markets and their political consequences, a media theory of markets might want to ask, with Jones, how precisely the market speaks, and how its speech is mediated. While the market appears largely supersensual, Jones already notes that to participate in markets “often involves a radical overstimulation of the senses”: “It is not that the market does not surround us with sounds, but rather what to do with these sounds and how to understand what it means to listen to them” (20). Jones’s focus on sound partially derives from one case where he engages with the media of markets, specifically the TickTrola,[3] a software that turns financial market signals into music. Yet there is certainly a plethora of media of markets, some of which we will discuss below in relation to high-frequency trading.[4] For contemporary media theory, it will certainly not come as a surprise that markets are as little disenchanted as media, that media might be at work in conjuring spirits (Geoghegan 2016), or that markets involve a certain spectrality (Vogl 2015). So, media theory might want to turn its analytical capacities toward the media of markets that sustain its speech, personhood, and spirituality.

One key consideration here will be to what extent a Foucauldian register may be built upon in this vein. The publication and subsequent translation of Michel Foucault's lectures on the birth of biopolitics have been central to a renewed analysis of neoliberalism and the way it establishes the market as a "site of veridiction" (Foucault 2008, 30–37). Yet, as Mirowski (2013) and Wendy Brown (2015, 54) have noted, Foucault does not sufficiently distinguish between liberalism and neoliberalism. This is politically counterproductive, since it associates neoliberalism with *laissez faire* or the deregulation of markets. Joseph Vogl—to take a key figure in German media and cultural studies writing in a Foucauldian register—in *The Specters of Capital* focuses in much detail on the figure of the invisible hand (2015, 23–27 and throughout)—a liberal metaphor associated with *laissez faire.* Even as Vogl considers the importance of economic theory (specifically Black-Scholes) for the design of markets (2015, 72–74), and discusses the media of markets in terms of the coincidence of the expansion of derivative trading with computing history and information technology (2015, 75), this approach seems to foreclose a more careful engagement with the constructive side of neoliberalism.

For the exoteric part of the double-truth doctrine of the neoliberals, i.e. that part directed at nonmembers of the Neoliberal Thought Collective, what is more important than portraying the market as governed by an invisible hand is to claim it as a site of truth. In Mirowski's view, Foucault and many who follow him take this part of the neoliberal doctrine too much at face value: the crucial feature to note is that the governmentality construed by the neoliberals "elevates the market as a site of truth *for everyone but themselves*" (2013, 98; emphasis in original). This is why much of Foucauldian scholarship on the market in neoliberalism has disregarded the other side of the double-truth doctrine—namely, how neoliberals construct markets. Neoliberals are seen as politicians reforming the state, not as economists reconstructing markets. In this way, Ute Tellmann notes, "economy never becomes an object of analysis in its own right; therefore the mediation of relations of power through money and objects drops from view" (2009, 8). The invisible hand here serves to defy "the forms of critical visibility commonly associated with Foucault's work," and the "invisibility of the market is directed against the very analytical perspective Foucault typically assumes, one aimed at detecting the instruments, positions, and architectures that produce such epistemological claims and privileges" (2009, 22).

Tellmann therefore calls for a "more typical Foucauldian approach" (22) to counteract this blindness. One might wonder also whether other strands of contemporary media theory working, for example, with a Kittlerian reading of Foucault could contribute to this endeavor. Notwithstanding the reasons for the scarcity of such literature (outlined by Schröter in this book), Ralph and Stefan Heidenreich's book on money as a *dispositif* of power, even if only loosely associated with this tradition, might be one contribution (Heidenreich and Heidenreich 2008).

Neoliberal Engineering and Market Design

This is where Mirowski's work with Edward Nik-Khah here and in their book entitled *The Knowledge We Have Lost in Information* (2017) comes in. In their contribution to this volume, Nik-Khah and Mirowski unravel the "deep history" of Friedrich Hayek's impact on the economics profession, in particular the way in which his views on information in markets correspond to key precepts of emerging approaches to market design. In so doing, our authors contend that despite the economists' version of history in which Hayek has hardly been influential in orthodox economics, "neoliberalism has occupied the profession's heartland, and has planted its flag." While Nik-Khah and Mirowski show how market design is "the unintended consequence of orthodox economists grappling with themes introduced by Hayek," today market design "constitutes the precepts of neoliberalism taken to their logical conclusion." It is not simply the market as governed by an invisible hand, but the market as an “*omnipotent* processor of information” (emphasis in original), which justifies the reorganization of the economic lifeworld on the basis of markets.

Around a decade ago, Mirowski had suggested that a key challenge for intellectual history to come would be to explain how economics, which had “eschewed most considerations of the specificity of markets” subsequently managed to convince others that it “possessed special expertise to construct all manner of actual usable markets, tailor-made for their narrowly specified purposes” (2007, 218). This is partly what his project with Nik-Khah is about, taking up the history of the relation between information theory and economics provided in *Machine Dreams* (Mirowski 2002) by writing the history of the economics of information and extending it up to the present.[5] This history is one where the market becomes an information processor, tasked with the epistemic challenge of “serving as the primary mechanism for the validation of truth” (Mirowski in Lash and Dragos 2016, 130), as Foucault had already recognized. What Nik-Khah and Mirowski add to Foucault’s account is the role information theory plays in this story, and that this is closely related to the influence of Hayek, so that “you can’t understand the spread of the idea of a market as an information processor without understanding the concomitant rise of neoliberalism” (130).

Contrary to prevalent historical accounts of Hayek’s work, Nik-Khah and Mirowski argue that there are three phases to Hayek’s view on information, which lead to different schools of market design. The first phase is part of the Socialist Calculation Controversy, where Hayek argues that knowledge is dispersed and therefore planning faces huge epistemological difficulties, but the market can act as a “mechanism for the communication of information.” This view is today visible in what our authors (in their 2017 book) call the Walrasian School of Design, but do not discuss further here. A media theory might want to intervene here to revisit the earlier controversies, since some important recent work by Eden Medina on Project Cybersyn in Chile (2014) and by Ben Peters on the Soviet Internet (2016) offers not just a conceptual but technological history of socialist calculation. Even if these are mostly histories of failure or at least of premature endings, they certainly demonstrate that for many the controversy was not simply won by Hayek, and perhaps these histories of media provide different avenues for thinking (and designing) alternatives to neoliberal markets.

The second phase of Hayek's views on information and knowledge, where knowledge is considered to be not just inarticulate but tacit and inaccessible, and the market's role is to make this knowledge accessible for calculation, corresponds to the Bayes-Nash School of Design. Here Hayek considers rationality itself to be largely unconscious. It would be curious for media theorists to read this Hayek alongside the recent work of N. Katherine Hayles on the cognitive nonconscious (2017), perhaps to note some correspondences and differences between neoliberal economics and theories of the nonhuman. Importantly, where Hayek's view on unconscious rationality leads to an evacuation of knowledge from the human, so that the human is mired in radical ignorance while the market provides ultimate truth, Hayles does provide an account of human-machine assemblages in which the human is not simply stupid or ignorant.

Hayek's third view further displaces the human as the subject of knowledge, where he introduces a "species of *knowledge not 'known' by any individual human being at all*" (Nik-Khah and Mirowski, this volume, emphasis in original), with Hayek then replacing the term *knowledge* with the term *information.* Where the individual actor becomes ignorant, the market in turn becomes a "Super Information Processor." This in Nik-Khah and Mirowski's account leads to the Experimentalist School of Design, which, acknowledging its debt to Hayek, focuses on computational capacities of markets, doesn't trust agents and their cognitive capacities, and offloads the task of information processing onto markets in designing "smart markets."

Our authors contend that this is the school of market design that is winning out, and in their discussion of Alvin Roth's work in the concluding section of their chapter, they show what bleak futures this envisions and prepares for us. Economists have become apolitical pragmatists, who design markets for every part of our lives, with the help of artificial intelligence. These markets operate no longer for what people want, but regardless of their wants. We offload thinking onto markets, which are increasingly designed to be devoid of people; only engineering economists have a stake and agency in their operation.[6]

Cathedrals of Computation and Finance

Now at this point one might take a step back and return to Jameson's gesture. Here we find a not so-illicit and more-than-metaphorical association of markets with media—no longer with television but with computers. More precisely, as market design embraces computation and artificial intelligence, it enters what Ian Bogost (2015) has called the "cathedral of computation," where computers are imbued with theological powers, which rub off on markets. Yet the association between markets and media is now even more direct: markets are designed on the basis of digital media technologies. This is perhaps most visible in automated trading in financial markets, and particularly in high-frequency trading. These developments build on a long history in which financial markets "have been structured by the close connection between price formation on stock exchanges and innovations in media technology," as Vogl (2015, 75) recounts with reference to the telegraph, the ticker tape, and other media of markets. These media technologies seem archaic in light of the "billion-dollar technological arms race" that has gripped the global financial market as "the world's largest and most powerful techno-social system" (Johnson et al. 2013, 1).[7]

We can witness this, for example, when providers of market infrastructure drill through mountains to provide more direct links between exchanges, for the purpose of shaving a few milliseconds off information flows in which the speed of light comes to matter as a natural limit to the speed of trading (MacKenzie et al. 2012). In high-frequency trading, every millisecond counts. The introduction of microwaves and other technologies to overcome latency has created further information inequalities at different speeds; the focus on information equality in co-location facilities at data centers demonstrates rather than alleviates this (Zook and Grote 2017). In this way, high-frequency trading perpetuates concentrations of wealth and power (Golumbia 2013). Yet these may also be undermined, as these media technologies achieve what the neoliberals imagined. As Michael Lewis famously explored in *Flash Boys,* the same market does not exist for everyone—you may never be able to buy or sell at a price given to you, if a high-frequency trader has faster access to the order book of the exchange and can front-run you (see Lanchester 2014). The result of this, ultimately, is that no agent can know the market, since no one can rely on the data provided—only “the market” knows.

The social studies of markets and finance literature is perhaps the closest we have already to a media studies of markets. Some of this literature explicitly builds upon Mirowski’s earlier work on information in markets and introduces a consideration of media. Consider, for example, Juan Pablo Pardo-Guerra’s (2010) work on the automatization of the London Stock Exchange, which argues that the category of information in markets is not given but is constructed in sociotechnical assemblages of financial markets, which change with media revolutions. Pardo-Guerra “socializes” the category of information in this way via a media history of markets. Or consider recent work by Tero Karppi and Kate Crawford (2016) exploring, through the example of the “hack crash” of April 23, 2013, caused by a hacked AP Twitter account announcing a terrorist attack on the White House, the infrastructural relations of social media and automated financial trading. In their view, these algorithmic connections produce a kind of machine ecology among other things displacing the human as a knowledgeable market actor. Ann-Christina Lange, Marc Lenglet, and Robert Seyfert also note, in their introduction to a collection on cultures of high-frequency trading, how the centrality of questions of “epistemic uncertainty” in high-frequency trading results from “the promise . . . that objectivity and profitability can be realized through the use of numerical codes and material infrastructures" (2016, 161).

How would a media theory of markets, informed by Nik-Khah and Mirowski's work on the complicity of market design with neoliberalism, build upon this work? Now, even a cursory reading of those parts of the literature informed by actor-network theory (ANT) specifically shows very quickly that much of it is far removed from the kind of political and critical program that Nik-Khah and Mirowski propose here in their reading of engineering economics and market design as neoliberal. In fact, our authors have elsewhere (Mirowski and Nik-Khah 2008) expressed serious criticisms vis-à-vis particular varieties of this work proposed by Bruno Latour, Michel Callon, and Donald MacKenzie. In brief, their point of criticism is that the presumed "performativity" of economics, which specifically the more recent variants of ANT engages, is far too congruent with the neoliberal project of constructing markets. The authority of neoliberal economists in constructing markets is too easily taken for granted, very little is added to the account of the market designers, and ANT aligns itself politically with their work. In doing so, ANT doesn't acknowledge the specificity of the actors from economics (such as game theorists or experimental economists) and their divergent agendas, and they discount and ignore other key actors in political economy such as states and corporations—but also media.

There are, however, parts of the literature on high-frequency trading that do take the "notorious quasi-material shape-shifter the computer" (Mirowski and Nik-Khah 2008, 118) left out by ANT into account, and thereby come to the conclusion that the performativity thesis "does not suffice to explain the spatial relations that now perform or shape the interaction that plays out between adaptive algorithms" (Lange 2017, 103; on performativity, see also Schröter 2017). It is this literature, drawing on media theory to understand the topology of financial markets and their media technological constitution, that a media theory of markets could build upon.

Jens Schröter’s contribution to this volume picks up here, with an attempt to assess the contribution of the work of Michel Callon and Bruno Latour for a media theory of money. Where, perhaps unexpectedly, in the neoclassical economic tradition discussed by Nik-Khah and Mirowski, by and large “the concept of the market was treated as a general symptom for the phenomenon of exchange itself, and hence rendered effectively redundant” (Mirowski and Nik-Khah 2008, 89–90), Schröter sees money similarly ignored in media theory. The same may be true for economics. David Graeber, in his five-thousand-year history of debt, which is also an anthropological history of money, notes that in economics: “Money is unimportant. Economies—‘real economies’—are really vast barter systems” (2011, 44–45). Money is considered necessary but coincidental to generalized exchange in markets. As the latest anthropologist to uncover the economists’ “myth of barter” (see Maurer 2013), Graeber insists that money did not come into being as people discovered the limits of barter and wanted to trade more freely in markets. Rather, money comes into being with debt, which requires money in order to be quantified: “money and debt appear on the scene at exactly the same time“ (Graeber 2011, 21).

Let’s provide a little background to Schröter’s undertaking. This critique of two representatives of ANT contributes to a wider project that Schröter is involved in with his collaborator Till Heilmann, namely to constitute and develop a “neo-critical media studies,” in which a media theory of money plays a key role (Schröter and Heilmann 2016). Drawing on a resurgence in a critique of political economy after the 2007–8 financial crisis, Schröter and Heilmann seek to reinvigorate a critical media studies that, at least in its German variant (see Horn 2008; Pias 2016), has very little to say about capitalism. They, for example, note that Friedrich Kittler’s materialism is not historical or concerned with social or social-technical relations but merely with technical apparatuses, so that it constitutes a materialism not of relations but of things. They liken Kittler's dismissal of the social *tout court* to neoliberal rhetoric ("there is no society" Margaret Thatcher famously proclaimed) and suggest it already points to ANT's equally assertive dismissal of the social. The critical thrust of Kittler's media materialism in that way targets not the economic relations of the capitalist social order, but his historical genealogies unmask only the particular economic interests and strategies of individual actors (Schröter and Heilmann 2016, 10–12).

Schröter and Heilmann suggest that a neo-critical media studies should concentrate on three inputs to establishing a relation between a theory of capitalism and a theory of media: (1) it should systematically explicate the media-theoretical contribution to the description of money, as opposed to economic, philosophical, and sociological conceptualizations; (2) it should historically develop a "monetary media archaeology" that understands media history to be essentially marked by the forms and functions of money; and (3) this should lead not only to a historical reformulation but also a critical evaluation of media history, in which technics, as a specific form in which capitalist sociality reproduces itself, appears in its historicity and contingency (2016, 22–23). Money, then, is the potential link between a theory of media and a theory of capital; it becomes central to making media studies critical and to a media theoretical contribution to the critique of capital. Money offers itself up as *the* capitalist medium, as a medium that makes capital possible and potentially makes all other media capitalist. Schröter's contribution here, then, is part, alongside some other preliminary texts (Schröter 2011; 2016), of a project to sketch this media theory of money, which will also yield a book. Yet apart from an empirical observation that media seem to determine our situation, and the preliminary discussions of money as a medium in Marshall McLuhan and elsewhere, why is money so central for Schröter?

Key to Schröter's understanding of money is his engagement with contemporary Marxian theoretical currents. Where on previous occasions Schröter already called for an encounter of media studies with Marx and diverse Marxist traditions (see Schröter et al. 2006),[8] here and elsewhere (in particular Schröter 2011) he builds on the tradition of the "critique of value," which is only slowly being received in Anglophone debates (see Larsen et al. 2014 for a collection of translated texts in the journal *Mediations*). This current, which is organized around the two German-language online journals *Krisis* and *Exit!,* is perhaps most well-known for its critique of Marxist and social democratic politics embracing labor. It sees labor as a coercive social principal, with labor subsumed in the machinations of capital as its other, so that labor is something not to be freed but something we need to free ourselves from—the "Manifesto Against Labour" ends with the demand: "Workers of all countries, call it a day!" (Krisis-Group 1999). This Marxian current thus distinguishes itself quite significantly from other currents such as cultural Marxism or autonomist Marxism, also with regards to its emphasis on circulation and the dominance of the valorization of value as the primary force of history in capitalism, as its "automatic subject" (Kurz 1999; Schröter 2011), leading to a structural crisis of capitalism.

Money is central here, since, as Robert Kurz puts it: "Within this system, money is the tangible form of the appearance of value, which is linked to itself. In the self-expanding movement of capital, which breeds money out of money, money becomes a relentless and restless end-in-itself" (1999, np). The valorization of value—the very definition of capital—is an end-in-itself, as the authors regularly state, and money is its medium. Schröter (2011, 222–23) explicates how in the critique of value money appears as "*Selbstzweck-Medium,*" as "medium as end-in-itself," that is, as the medium that represents the most abstract form value can take in its self-valorization. We can see how, if Schröter follows this line of analysis, money can be understood as the most important and widespread medium today that determines our situation.[9] It is also *the* medium of capital, and dealing with money may also lead us to a critique of capital. Yet is the concept of money as medium we find in the critique of value already sufficient, so that there would be no task left for media theory except to adapt it? For Schröter this is clearly not the case. Kurz certainly provides a clue and challenge for a media theory of money when he writes: "abstract wealth in the form of money is by its nature limitless and interminable, and only its material content is subject to an absolute historical limit"; and "there can be no accumulation without its material bearer, however much the latter's absence would be the ideal of capital" (Kurz in Larsen et al. 2014, 50).

Yet it is not clear at all whether Kurz here and elsewhere also considers money as a "material bearer" of value. But it must certainly bug a media theorist that precisely these Marxians, who insist regularly on the necessity precisely to not ignore materiality, when it comes to money seem to systematically ignore or at least neglect its materiality and mediality, because they see in it the most abstract and pure—and therefore immaterial—form of capital. At the same time, conversely, it clearly bothers Schröter that media theory pays so little attention to the abstractions of capital. For example, in a critique of general ecology—a competing contemporary current of media theory associated with Erich Hörl (see Hörl 2015, and most recently Hörl 2017)—Schröter (2014) laments how there the future of media is discussed without reference to the social or economic relations that mark them, and he sets out to uncover the "economic unconscious" of general ecology. If we set this project alongside Kurz's consideration of how capitalist abstraction marks reality, where he notes that it "is through money that society encounters its own unconscious abstraction as an independent, alienated power" (1999), we can see how money becomes the primary means by which to uncover the economic unconscious of media theory, and of our times.

Elements of a Media Theory of Money

Schröter, then, explores media theory to develop an understanding of the mediality and materiality of money. Before proceeding with his critique of Callon and Latour, he gathers elements of a media theory of money from existing, mostly German media theory. He argues against those, such as Norbert Bolz and Jochen Hörisch, who, in drawing on Niklas Luhmann's definition of money as "symbolically generalized medium of exchange," see money as mostly an abstract, immaterial medium. Considering the relation between the symbolism and materialism of money, Schröter notes that certainly the materiality and mediality of money is not simply an "earthly remainder" which capital will one day be able to abandon (see the discussion of Kurz above). Rather, agreeing with Walter Seitter and Hartmut Winkler, money always relies on material infrastructures and law, so that its materiality, Schröter argues, constitutes "*a very precondition of the operability of money as such*" (this volume, emphasis in original). Trust in money is precisely a question of the relation between the symbolic and infrastructural in money. This is for Schröter the "first, decisive step toward an analysis of money from the perspective of media theory."

To proceed, Schröter suggests engaging with other disciplines such as philosophy, sociology, and economics in search of traces of a media theory of money. We would add anthropology, which perhaps offers the most detailed history of money, with some implicit media archaeology (see Maurer 2006). This literature also becomes key in considering Schröter's argument that follows. He suggests there are two key aspects that qualify materials as potential money: durability and countability. Money must be durable so that it can act as store of value and can travel the distances of trade. It must be countable so that it can serve as a measure of value, and to attach numbers as values to things. Here Schröter notes, drawing on Seitter and Alexander Galloway, that money is already digital, that this already makes the mathematization of production implicit to capitalism, and that therefore "Capitalism is from its very beginning the formalization and digitization of economy, even of society as a whole." While this in itself challenges contemporary accounts of the digital economy, the central argument Schröter makes follows. Because money can be counted, practices of counting proliferate, and there can be more or less of everything.

Schröter concludes (emphasis in original): “*The countable, digital specificity of money leads (at least potentially) to the phenomenon of accumulation.*”

Let’s pause for a moment to consider the implications of this statement. A weak interpretation would be that capital requires money, that there can be no capital without money, since nothing can be accumulated and thereby no valorization of value can take place. There would be little reason to contest this historically or conceptually. Yet Schröter also seems to imply more: it is because of money that capital can exist and comes into being in the first place. While accumulation is impossible without money, money itself leads—“at least potentially”—to accumulation. That is certainly an unusual assertion, considering various accounts of the emergence of capitalism, in which money does not play such a central role—notwithstanding the economists’ “myth of barter” in which money is invented to make generalized commodity exchange (another definition of capitalism) possible. Now, Schröter hesitates to expand on these strong implications of his statement, turning it into a question of the relation between the medium of money and society, in which he wants to avoid a certain media determinism. He suggests that “this complicated problem (which at least is the problem of the emergence of capitalism as such) is better described as a kind of *co-constitution* of money and capital” (this volume, emphasis in original).

What could this co-constitution amount to? A cursory glance at anthropological literature on money questions this coincidence of money and capital *tout court.* By now quite notoriously, Graeber (2011) writes the history of money as the history of debt, and, as we noted above, money enters the stage of history with debt—not with capital. We encounter various kinds of money before we encounter capital, both in Graeber’s story and also in other anthropological histories and contemporary accounts of money (see Maurer 2006; 2015). In fact, Graeber notes that certain kinds of interest-bearing loans, as early forms of debt, even “appear to predate writing” (Graeber 2011, 64)—which can only lead to speculation as to how such loans were accounted for. How then can we insist, with Schröter, that money coincides with capital? Do Graeber and the anthropologists perhaps have a different conception of money, or does the money they encounter follow different, noncapitalist scripts? One aspect of Graeber's account is potentially congruent with Schröter's argument. Graeber notes that a consequence of the imposition by states and the subsequent extensive use of money led to a different relation to objects and value. At the origins of capitalism, we don't find "the gradual destruction of traditional communities by the impersonal power of the market"; instead, we discover how "an economy of credit was converted into an economy of interest" (Graeber 2011, 332).

Money in Graeber's account destroys relations of credit that formed social life before it was separated into realms of the economy and all else, and the economy of interest is marked by a morality that demands that interest be paid on debt, in that sense foreshadowing the valorization of value. Graeber's insight potentially refines Schröter's argument, which could in this way take into account how state currencies precipitated the birth of capitalism, and how money was perhaps imbued with the kinds of scripts that make it coincide with capital. This is also key in relation to current discussions around the design of alternative currencies such as Bitcoin (see Lovink et al. 2015). Schröter notes how Micronesian stone money might have been imbued with an excessive materiality precisely to block accumulation. Bitcoin, the most notorious of the new cryptocurrencies, today tries something similar, in that bitcoins are limited and at one point mining bitcoins for the verification of the blockchain will no longer be possible. Now Bitcoin can hardly be offered here as a currency that eschews capital; as David Golumbia (2016) has forcefully argued, Bitcoin expresses a certain "right-wing extremism" in that its open avoidance of state regulation and taxation and its media technological setup mean it has become an object of speculation and extremely unequal distribution of wealth. Nonetheless, Bitcoin does not simply seem to provide the same kinds of scripts as state currencies, and for a media theory of money it may well be worthwhile to explore how these scripts work and where they lead us.

Schröter also mentions financial derivatives in passing, noting that they stem from the same "basic mathematical logic of money" we mentioned above. That may be the case, yet what kind of discontinuities with earlier forms of money mark derivatives? Accounts like those of Dick Bryan and Michael Rafferty in their book on capitalism with derivatives (2006) suggest that much is at stake. They acknowledge that derivatives "perform functions integral to accumulation" (2006, 5) and that, "as a commodification of risk, derivatives are a form of calculation and market transaction that is intrinsic to the logic of a capitalist economy" (8). Yet they also note that derivatives "are bringing some profound changes to the way capitalism is organized: changes as fundamental as the nature of capitalist ownership, the nature of money, and the process of competition" (9). Derivatives have become a kind of "*meta-capital* whose distinctive role is to bind and blend different sorts of 'particular' capital together," providing monetary functions in allowing different bits of capital to be priced (13), and thereby intensifying competition between capital and putting pressure on labor. More than simply continuing previous scripts, then, derivatives and their (post–Black-Scholes) scripts confirm and extend Schröter's account of the coincidence of money and capital: money's scripts are dependent upon its mediality, and with derivatives money's coincidence with capital takes on new qualities.

Repressions of ANT

At this point we can briefly discuss Schröter's critique of Michel Callon and Bruno Latour. Schröter turns to ANT for a conceptualization of the determinations of money, but what he finds is a repression of money and the disregard in Callon and Latour of some basic postulates of ANT, which he seeks to recover for a media theory of money. There are two points to Schröter's criticism of Callon's understanding of capitalism. First, as Callon denies that Capitalism with a capital "C" exists, Schröter accuses him of a "praxeological fallacy": for Callon there are lots of capitalisms with a small "c," but how can we even call these capitalisms when we don't acknowledge that there is something like "capital" that they have in common? For Schröter, this makes little sense and a "radical praxeocentrism" is "*logically impossible*" (emphasis in original). Second, although Schröter acknowledges that Callon's work on calculative devices is quite useful for understanding how markets are constituted, what is missing in Callon for Schröter is any account of value. It is simply unclear what is calculated, and "value" largely only appears in Callon's text as a moral term, not an economic one.

Now for Callon the point of focusing on practices of calculation is precisely to negate the idea that there is a "great divide" between capitalism and its prehistory. Here Schröter returns to money. Whereas he agrees with Callon that money and therefore calculation exists prior to capitalism, what matters is that with the rise of capitalism, society comes to be centered around money and its scripts: namely M-C-M'—that is, the valorization of value in which money is transformed into commodities and back again in order to yield more money. Although devices are supposed to play a central role in Callon's approach, Schröter argues that Callon "follows the neoclassical mainstream's exclusion and oblivion of money," and thereby ignores money as a medium with certain scripts. Where he also follows the economists is in focusing on markets rather than production. For Callon commodities are framed as such; only the framing of things in markets with the help of money turns them into commodities. Schröter argues that this is simply false, since a capitalist society is precisely one in which commodities are produced for markets. In proceeding in this way, Callon erases the basic logic of capitalism, by tearing apart the relation of money and the commodity in the process of accumulation.

This becomes particularly apparent to Schröter in a discussion of a quote by Callon in which he discusses how money's symbolism can easily be changed, e.g. when a grandmother gives her grandchild a silver coin, which the grandchild subsequently doesn't treat as money. Schröter considers this to be beside the point—money is money, and even if the grandmother were to create "private money," the latter can't be considered money at all. Money has "*an irreducible script that cannot be easily changed by different practices*" (emphasis in original), but Callon simply ignores this script. Now the anthropological accounts, including the one by Viviana Zelizer on which Callon draws (see also Maurer 2006; Graeber 2011), partially support Schröter's critique of Callon in that they wouldn't suggest that money's scripts can so easily be changed. Yet these accounts also point to how, in history, there have often been many moneys in existence, and they have produced their own economies. As contemporary work for example with regards to mobile money like M-Pesa (Maurer 2015) shows, mobile money functions to a certain extent independently of state currencies. Certainly, most of the examples of mobile money are pegged to state currencies, but they also in certain ways defy commensurability, and the control of their volume exceeds the capacities of central banks. Schröter rightly points out that M-Pesa and other kinds of mobile money aren't "private money" but stand in a complex relation to state currencies. The challenge here is, then, to explain how money's scripts remain stable despite the ways the symbolism of money is adapted in practice, and how state currencies relate to other moneys and remain dominant despite other moneys that offer potentially different forms of exchange and equivalence.

Schröter's critique of Latour proceeds along similar lines. Schröter doesn't deny that it might be productive to think of money as an immutable mobile, but there are two ways in which Latour treats money that disturb him. The first is that Latour seems to insist on the symmetry of immutable mobiles, whereas for Schröter this would be a premise but not a conclusion one can arrive at once we notice how money determines our situation. Money also determines other immutable mobiles due to its centrality in capitalist societies; it is therefore "precisely not *one immutable mobile among others,* but their *conditio sine qua non*" (emphasis in original). In a footnote Schröter qualifies this and notes that one better speaks of “a kind of interdependent accretion” of different media, in which however “money is ultimately, unlike other immutable mobiles, never dispensable.” The second criticism of Latour is that his whole model is based on assuming there is an agonistic situation, and that immutable mobiles are enrolled to assert one’s position. For Schröter, this assumption is unacceptable for an ANT that seeks to avoid universals and doesn’t prefer any kinds of social aggregates. Yet much like Thomas Hobbes’s “war of all against all,” Latour seems to presume that we are always already stuck in a competitive, agonistic situation. Latour seems to precisely assume the market to be ahistorical, whereas its institution needs to be explained. Money seems to be the model for immutable mobiles, but, Schröter argues, this is repressed.

Schröter doesn’t stop with a total dismissal of Callon, Latour, and ANT. Rather, he wants to rescue ANT from the “*double repression of money in the discourse of ANT*: One concerning the relation between money and human actors and one concerning the relation between money and nonhuman actors” (emphasis in original). What would an actor-network theory look like without this double repression? Perhaps some of this is already visible in the kinds of social studies of finance and markets we explored above. Recent work in economic anthropology, drawing quite extensively on traditions of ANT, might also yield some important contributions on which a media theory of money could build, by focusing on capitalization as a notion “indefectibly related, more or less literally, to the mundane idea of *capital*: money, or something comparable, that can be used to make more money, or something comparable” (Collectif CSI 2017, 12).

At the very end of his contribution, Schröter suggests that the critique of money might point to “the possibilities of postmonetary societal structures.” If, in doing so, we want to avoid Proudhonist traps and the fantasy that by simply getting rid of money we can also get rid of capital, Kurz warns that the “emancipatory ‘abolition of money’ is only possible in the context of an abolition of the labor-substance, its value-form, and the complementary, socially extrinsic state machine" (1999, np). Schröter would presumably concur, which means that, as long as we are not content with building alternative currencies that might lead to some (minor?) alternatives within capitalism, a media theory might also need to think about contributing to a more extensive project of critiquing and dismantling capital. At least that seems to be in the cards for Schröter.

IIIIIIIIIIIIIIIII

This volume, then, searches for media in markets through various pathways. Edward Nik-Khah and Philip Mirowski primarily concentrate on unmasking contemporary economists occupied with market design as neoliberals in their adherence to key precepts of Hayekian information theory. Since information theory is key to understanding contemporary economics, and economists are involved in building markets also with the help of media technologies, media studies here face the challenge of coming to terms with how dominant the computer has become as a metaphor, model, and actual media technological basis of markets. Rather than becoming handmaidens of the neoliberal market designers (Mirowski and Nik-Khah 2008), media theory is here invited to consider how it can contribute both to unmasking how the dominance of markets is supported by the metaphorical power of computers in the "cathedrals of computation" (Bogost 2015), and to conceiving alternatives to the dominance of neoliberal markets, perhaps in drawing on contemporary work in media studies that conceives of other forms of computing the economy and different human–machine relations (Medina 2014; Peters 2016; Hayles 2017), as well as work in the social studies of finance and markets.

Jens Schröter focuses on excavating a media theory of money from existing media theory and drawing on the Marxian tradition of the critique of value. Money determines our situation, in Schröter's view, and in exploring how precisely money as the primary medium of capital's valorization of value conditions both other media and the world around us in general, media theory can contribute to a burgeoning critique of capital. To do so, however, it must first excise its own economic unconscious. The challenge for media studies here will be to establish its contribution to a theory of money and a critique of capital, and perhaps to consider its role in designing different forms of money, whether cryptocurrencies or mobile moneys, which may not be so easily amenable to capitalist accumulation, and which would certainly have to escape Silicon Valley's not-so-unconscious economic drives in the form of venture capital and speculation on our media technological futures. Recent debates around commons propose an end to capitalism, with the commons as the cell-form of a "commonism" opposed to the commodity as the cell-form of capital (see Beverungen et al. 2013). While these commons might require their special kind of money that defies accumulation (see Terranova and Fumagalli in Lovink et al. 2015), efforts are also underway to conceive of societies beyond money.[10] This invention of life beyond money is certainly a task beyond media theory (see also Berardi in Lovink et al. 2015).

Now, this is a volume in search of media in markets, and perhaps it is symptomatic of media studies' economic unconscious that the term that was set here isn't "capital," even if, more or less explicitly, both contributions are framed in larger projects involving precisely a critique of neoliberal capital. Yet, this roundabout way, proceeding via markets and money, might still be a suitable path. Michael Mayer (2006) has taken the direct path in considering capital as medium. He importantly refers to colonial history, specifically to Christopher Columbus's "discovery" of the New World as thoroughly determined by capitalist speculation and the preparation of that new world for capital accumulation, and to Adam Smith's blindness toward slavery as an effect of capital understood as an operational medium or dispositif that does not see what it systematically denies (i.e. the colonial and other violence of primitive accumulation). Mayer sees, extending Foucault, the "totally economized life" as having become a fact since 1989 (Mayer 2016, 129), and he tries to account for it via capital as a medium that shapes our relationship to reality and can be read in its performative effect. Yet this life precisely becomes decipherable not through reference to an "autonomous market" or its "invisible hand" (even if these are understood as features of a programmatic marketization) but through the combined projects that Nik-Khah and Mirowski and Schröter propose here: a sociohistorical account of the politico-scientific neoliberal project, and a media-archaeological account of money as medium of capital.

Mayer's conclusion that "capital as medium determines our situation" (2016, 145) certainly chimes with Schröter's contribution, but it is precisely a move away from a focus on capital as an abstract worldview or relation, which still reverberates in Mayer's text, toward a focus on markets, money, and their media technologies that offers much more explanatory power for the history of capital and its medial constitutions. In taking on such a task, this contribution suggests, media studies must also take stock of some of the key traditions that have shaped the field, whether these derive from Marxism, Foucault, Kittler, or ANT, and to engage with key debates today, for example around financial markets, cryptocurrencies, and mobile money, in which we can already perceive a media theory to come. In that way, media studies might be able to escape the capitalist realism (Fischer 2009) that marks future visions of cybernetic capitalism (*Tiqqun* 2001) and that is enabled and sustained also by media technologies.

Notes

1 "Neoliberalism" is a widely used yet highly contested term, and media theorists might be hesitant to use it. For reasons why it is an indispensable term for political-economic analysis today, see Mirowski (2014) and Davies (2016).

2 What is noteworthy about Fukuyama (1992) is that he speaks of liberalism and free-market economics rather than neoliberalism. For a comment on how financial markets imagine an end of history where the future "is always already priced in," see Vogl (2015, 80–82).

3 As the website cheerfully pronounces: "Combining the philosophies behind two of Thomas Edison's greatest inventions—the ticker-tape and the Victrola: TickTrola converts stock data to tones so that you can keep your ear on the market!" See http://www.geneffects.com/ticktrola/.

4 A brief history of the media of financial markets is available in Reichert (2009, 83–157).

5 See Lash and Dragos (2016) for a useful interview in which Mirowski outlines

what is at stake in his current project and how it relates to his intellectual work so far. See Golumbia (2017) for a preliminary account of Mirowski as a critic of the digital.

6 Here, apart from the history of information theory and neoliberalism, one might also wonder how this constitutes another chapter in the forms of non-knowledge that digital cultures bring forth. See Bernard et al. (2018).

7 Schröter suggests elsewhere (Schröter and Heilmann 2016, 20) that this speed-up of trade is caused not by computers but is programmed by the escalation of the logic of accumulation of capital. We will discuss this below with reference to derivatives.

8 This edited collection of texts on media and Marx already includes a chapter on the medium money (Gernalzick 2006). Curiously, Schröter does not reference this text, presumably because it rather restrictively (with the help of Schumpeter) characterizes Marx as a metallist, considers Marx's theory of value to be outdated and in need of abandonment, and summarily dismisses the work of Robert Kurz, a key representative of the ”critique of value” stream of Marxian thought, as unscientific. As we will see shortly, both the theory of value and the work of Kurz are central to Schröter's arguments here.

9 Bill Maurer, in his book on technology and the future of money, notes that the mobile phone is ”the second-most ubiquitous technology after money” (2015, 34), which explains why mobile money has become a terrain of experimentation, as we will discuss below.

10 “Society after Money” is precisely the title of a research project in which Jens Schröter is involved alongside sociologists, economists, and commons-theorists, among others. See http://nach-dem-geld.de/projekt/.

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