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Assetization

Turning Things into Assets in Technoscientific Capitalism

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1 Introduction: Assetization and Technoscientific Capitalism

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Introduction

Contemporary capitalism is increasingly defined by its technoscientific aspects—that is, by the development of new technological products and services (e.g., smartphones, apps, platforms), the emergence of trendy scientific specialties (e.g., big data, AI, biotech, fintech), and the alignment of innovation processes, actors, and institutions with powerful investment rationalities and financial imperatives. The very notion of “technoscientific capitalism”—terminology whose origins can be traced back at least to Jean-Francois Lyotard (1984, 1992)—aptly captures the defining problematics of our political-economic time.

But how can we best characterize the gist of this moment? What is the prevailing form that things take within technoscientific capitalism? Because of its innovation-based nature and its concomitant promissory rationale, technoscientific capitalism has often been interpreted in terms of a speculative logic (e.g., Sunder Rajan 2006, 2017). The prevalence of processes of commercialization and privatization have repeatedly motivated a reading of technoscientific capitalism as a commodification movement that orients science and technology toward a market destiny (e.g., Mirowski 2011; Berman 2012). It is undeniable that the market plays a crucial role in technoscientific capitalism, offering the commodity form as a template of choice for all things scientific and technological, and prompting accordingly the relevance of a speculative gaze. The full picture, though, lacks analytic traction if we rely solely on this perspective.

Our argument in this book is that the dominant *form* that technoscientific capitalism affords is not the commodity but the asset, and that the financial contours it entails are not those of market speculation but of

capital investment. Those are very different things, and the aim of contributors to this book is to flesh out this central point. Our perspective, then, is that we cannot characterize and analyze technoscientific capitalism solely in commodity terms anymore, not in the era of Uber and Airbnb, Google and Amgen. Can we understand the “unicorns” stalking Silicon Valley (i.e., firms whose notional valuations top \$1 billion, promising huge returns to shrewd investors), the biopharmaceutical firms ramping up drug prices (while buying back their shares to shore up their share value), and governments turning the atmosphere into financial assets (and giving them away to polluters) without struggling within prevailing conceptions of the commercialization, marketization, and commodification of technoscientific research and innovation? As the latest stage of capitalism entrenches, it becomes even more difficult to see what is driving the accumulation of capital. As the marginal cost of production approaches zero, it is increasingly evident that productivity increases will not lead to sustainable profits. What will? Business model sorcery perhaps?

Intriguing things are going on indeed, we contend, as a consequence of an emerging “asset form” that has come to replace the commodity as the primary basis of contemporary capitalism. By asset, we mean something that can be owned or controlled, traded, and capitalized as a revenue stream, often involving the valuation of discounted future earnings in the present—it could be a piece of land, a skill or experience, a sum of money, a bodily function or affective personality, a life-form, a patent or copyright, and so on. Discounting reflects an assumption about the future value of money, which is framed by expectations about future inflation, risks, and uncertainties (Muniesa et al. 2017). Assets can be bought and sold, yes. But the point is to get a durable economic rent from them, not to sell them in the market today; here we use the term *rent* to mean the extraction of value through the ownership and control of an asset, which usually entails limiting access to it (Birch 2020).

How do things become assets, then? They are made so: the asset form is not, it is important to stress, the consequence of some inherent or embodied quality. One intention with this book is to show how assets are constructed, how a variety of things are and can be turned into assets, examining the interests, activities, skills, organizations, and relations entangled in this process. Another is to stress that technoscientific capitalism entails specific practices that make the uncertainty inherent in innovation understandable

and calculable as part of a broader capitalist system. The asset form reflects the tumult in contemporary technoscientific capitalism, in which it becomes harder and harder to draw clear boundaries around what counts as or comes to constitute capitalism. For example, it is not clear whether the entitlements created by governments (e.g., emissions credits, see Felli 2014) or the expansion of private ownership claims over more and more aspects of our lives (e.g., social media content, see Arvidsson and Colleoni 2012) reflect the dynamics of earlier, entrepreneurial capitalist processes. Are they something new altogether? It is for these and comparable reasons that we think it is now important to turn our gaze toward the specificity of the asset form and to the “assetization” process as key political-economic practices (Birch 2017a; Muniesa et al. 2017).

What Is the Asset Form? What Is Assetization?

A simple question like “What is an asset?” is hard to answer without resorting to an understanding of the asset form embedded in a range of epistemic and ontological assumptions. To an accountant or businessperson, the term *asset* might have a particular resonance with a balance sheet of liabilities and equity. To a Marxist political economist, the term might hold no relevance, with a preference for the term *capital* instead. To a banker or a financial analyst, the term might mean the securities in an investment portfolio and prompt ideas of valuation, hedging, and arbitrage. And to the middle-class homeowner, it might refer to a way to secure a family’s future. As we want to make evident here, there are many different orientations that people can have toward the definitions of asset and assetization. At its base, though, an asset is defined technically by the International Accounting Standards Board (IASB) as “a resource controlled by the entity as a result of past events and from which future economic benefits are expected to flow to the entity” (Burton and Jermakowicz 2015, 39). We can already see how ductile this terminology is, however, reflecting many conceptual uses that do not fall within the scope of the technical jargon of accounting standards.

The notion of asset certainly speaks to the notion of capital, both in the vernaculars of financial accounting and business life and in the formalization of accountable profit within capitalism (Levy 2014). Something whose “control” may warrant “future economic benefits” pretty much sounds like capital—that is, wealth (money or something else) considered in terms of

an investment with an aim to generate revenues, yields, or rents in a more or less distant future. Both notions—capital and asset—often appear in the literature as substantive things (something that someone may or may not have), but they are also open to interpretations in terms of form, process, condition, or relation (Levy 2017). For us, the term *asset* is less loaded with theoretical controversies and terminological quandaries than the term *capital* (e.g., Hodgson 2014). And this is the main, practical reason that explains our inclination for the former in the pages that follow. Another obvious reason is to provide our inquiry with an opportunity to retain the processual intuition of the asset not as a thing but as a form—it may be too late to impose this standpoint on the notion of capital.

Our adoption of the notion of the asset is also meant to disentangle considerations of the asset as both an objective resource (aka factor of production) and as a subjective value (or effect of valuation practices) (Muniesa 2012)—that is, its form *and* the condition it engenders. The term *capitalization* can certainly work usefully in the direction of capturing the processual aspect of the asset form (Leyshon and Thrift 2007). That being said, unless explicitly defined as a wide cultural process consisting precisely in turning things into assets (e.g., Muniesa et al. 2017), that term runs the risk of directing attention to its special meanings in the accountant's technical terminology. Using *assetization* here serves our purpose better, since it emphasizes the socially transformative character of the phenomenon of turning things into assets—it can refer to that phenomenon proper as much as to its societal consequences (i.e., “asset condition”).

The notion of capital, in contrast, is used to refer to everything from fixed capital (e.g., machinery) through circulating capital (e.g., goods, labor) to commodity-capital and money-capital in critical political economy (Chiapello 2007). Its underpinning in a theory of labor value, moreover, does not do enough to help us understand contemporary capitalist phenomenon (Nitzan and Bichler 2009). As Durand (2017) argues, even the likes of Thomas Piketty (2014) in his magisterial *Capital in the 21st Century* ends up using the term *capital* in contradictory ways, mixing up the analytical (e.g., capital as factor of production) and the empirical (e.g., capital as wealth). Our focus on the asset form and the process of assetization provides a means for cutting across such potential impasses while enabling overlapping analyses of accounting practices, cultural metaphors, and political-economic trends, each of which entails a different analytical tone.

The notion of assetization surely speaks to the notion of financialization too. Despite its limits and ambiguities, financialization has opened up multiple fruitful paths to characterize contemporary technoscientific capitalism and its wider economic, political, and social contexts (van der Zwan 2014; Christophers 2015). Whether financialization refers to the rise of shareholder value, or the liberalization of financial regulation, or the spread of specific techniques of securitization, or wider cultural transformations involving the emergence of new forms of subjectivity, the idea of financialization certainly captures a movement that involves or implies the turning of things into assets we are concerned with here. The political and policy turn toward finance since the 1970s in the United States, for example, is definitely accompanied by processes of assetization (Krippner 2011). The same applies to transformations of corporate strategy through the spread of financial views and metrics, as the requirements of shareholder value prompt corporate focus on the asset form (Froud et al. 2006).

The gradual realization of the relevance of the asset base in the everyday experiences of personal finance constitutes a prominent feature of these financialization debates (Langley 2008). And the spirit of the resulting asset condition is unquestionably a crucial ingredient of the cultural complex that goes by that name (Aitken 2007). Is there a reason, then, why we prefer *assetization* to *financialization* in the pages that follow? As the motto of the studies gathered in this book suggests—“turning things into assets”—a focus on the asset form calls for an inquiry into the contours this form ought to consist of in specific circumstances. Talking of “turning things into finance” would grant too wide a scope, as finance—and financialization—is a process of more abstract proportions. Besides, it is perfectly possible that processes of assetization can occur outside the professional perimeters usually attributed to the rise of finance and financialization.

What then sets the asset form and assetization process apart? Drawing on the work of Birch and Tyfield (2013) and Birch (2017a, 2017b)—among others—it is possible to identify at least seven aspects that mark out the asset form as a distinct analytical and practical entity worthy of our intellectual interest, and the contributors highlight several further issues in the following pages. First, assets are legal constructs, in that ownership and control rest on the state enforcement of property and control rights (Pistor 2013, 2019; Dreyfuss and Frankel 2015). Critically, assets can entail the separation of rights from the thing involved as well as the differentiation

between the ownership and control of an asset through forms of contract and property law. For example, although they cannot be owned, customers can still be classified as an asset in that access to them can be controlled (MacKenzie 2009). Second, assets involve distinct *modes* of ownership and control (Perzanowski and Schultz 2016; Birch 2020). In particular, knowledge, creative, or data assets (e.g., intellectual property rights or IPRs) have been legally instituted to give owners both exclusion rights to the use of the asset itself and to the use of any copies derived from the asset (Frase 2016). Such “flow-through” rights enable asset holders to control the way that copies or derivatives of an asset are used or experienced, in contrast to commodities. For example, no one can tell you how to wear a coat you have bought, but they can tell you how to use the copyrighted music or data they have sold you.

Third, assets often involve forms of “rentiership” in which monopoly control—derived from, for example, IPRs or government fiat—enables the extraction of economic rents (Fuller 2002; Zeller 2008; Birch 2017a, 2020; Mazzucato 2018; Fields 2019). Assets are often unique, meaning that their value derives from their asset specificity (Teece 1986); as such, it is not possible to reproduce them easily, cheaply, or even at all. For example, a parcel of land is unique and nonreproducible, while a specific copyright cannot be legally reproduced without permission. Fourth, as the result of being unique or constructed monopolies, assets have distinct supply and demand logics in which rising asset prices do not lead to new producers or creators entering a market and thereby lowering prices (Birch and Tyfield 2013). Fifth, asset value can be discounted in light of forward-looking expectations about future returns on investments, whether or not those expectations are met. For example, Birch (2015), Cooper (2017), Kiely (2018), and Adkins et al. (2019) highlight the ways that expectations about ever-rising house prices in Anglo-American economies have instituted a new accumulation regime (asset-based economy), which configures social relations and inequalities in particular ways. This raises serious questions about whose future interests come to shape current policies and institutions.

Sixth, asset prices and valuations are subject to the actions of owners who may seek to reduce the economic value of their assets, or turn an asset into another form, transfer ownership, or use it to attract new partners (Lezaun and Montgomery 2015). As this would imply, valuation does not reflect an inherent or fundamental quality (such as labor-power). Rather, value is very much temporal since it changes over time as the result of the

configuration of its social, discursive, and material dimensions and uses (Muniesa et al. 2017). In contrast, a commodity's economic value is determined at the specific point of exchange. Finally, as Birch (2017a) argues elsewhere and the previous discussion highlights, asset value and valuation are dynamic, in that they are constituted by an active and ongoing management of that value by social actors who are both internal (e.g., managers) and external (e.g., financial analysts) to an organization. For example, an asset's value is configured by an ecosystem of diverse financial, technoscientific, political, and social actors, ranging from corporate lawyers through stockbrokers and stock analysts to policy-makers and universities (Birch 2016; Owen and Hopkins 2016; Muniesa et al. 2017).

Lineages of the Asset Form in Economics

Important clues to the theorization of the asset form can certainly be gathered from economic thought, particularly from thinkers who have emphasized the institutional nature of this form. Writing at the start of the twentieth century, Thorstein Veblen represents a critical early influence on the subject matter (see Nitzan and Bichler 2009). Veblen (1908a, 1908b) published two journal articles called "On the Nature of Capital" in the *Quarterly Journal of Economics*. Although less well known than his other work, these articles provide an important groundwork for later thinkers, especially in the critical, constructivist tradition (see below). As Veblen understood the term, *asset* is a "pecuniary concept" that "connotes ownership as well as value" (1908b, 518n1), where the latter represents "capitalizable value" (1908a, 105). As such, an asset is tied to pecuniary investment and pecuniary gain in both value and ownership—that is, an asset is not a resource contributing inherently or by itself to industrial efficiency and productivity. An asset is instead a financial entity as much as it is a resource—material or immaterial—that contributes to production; for Veblen, "assets are a matter of capitalization, which is a special case of valuation" (1908a, 121). As capitalized property, an asset reflects the assessment of future earnings that accrue to the owner, rather than rising productivity. Moreover, intangible assets are a way to capitalize "habits of life" like trust and loyalty (e.g., brands), taste (e.g., fashion), love (e.g., gifts), and so on.

John R. Commons features prominently, next to Veblen, in the genealogy of an institutionalist approach to the economics of the asset form. In

his *Legal Foundations of Capitalism* (1924), he provided a characterization of the notion of asset as a pivotal piece within a conception of economic value in which the latter would derive not from the properties of things or their commercial appraisal but from their expected earning power. The idea of earning power as the key to valuation was already well established in the incipient curriculum of North American business schools in the interwar period (Dewing 1920). The prime quality of the finance-savvy businessperson ought to reside in the capacity to detect earning power, prospectively, in any possible business venture. Authors such as Commons offered a refined conceptual formulation; the very notion of capital—a “business notion of capital”—had to boil down to the power that assets had by virtue of the return that could be expected from them.

But the seminal economic theorist, duly acknowledged by Commons, on the asset form and condition as a key to the understanding of capital is certainly the neoclassical economist Irving Fisher. The basis of the value of capital, as Fisher made explicit in *The Nature of Capital and Income* (1906) and in *The Rate of Interest* (1907), is the *future*; the value of capital is the present worth of the future income obtained from that capital. The formalization of the rate at which the latter will be discounted in order to obtain the former provides the answer to the prime enigma of business valuation—namely, how to value the risk incurred by the capitalist that puts money in the business. The practice of the allocation of money finds there the fundamental principle that will maximize earning power.

The elaboration of a neoclassical theory of the asset by Fisher reflected, to some extent, the institutional—if not pragmatist—intuitions developed by Veblen or Commons but also later the ideas of John Maynard Keynes. In *The General Theory of Employment, Interest and Money* (1936), Keynes famously offers a conjecture on how such rates form in practice as conventions that prompt the “inducement to invest.” Contention existed among economists of the time on how spontaneous or legitimate such an order of value was and on how it ought to be better formalized. But the asset form and condition govern the discussion, and the general approach is to locate within the perspective of an investor the template for the valuation of all things economic.

The quantitative turn in post–World War II financial economics followed, which further complicated the concept’s tortuous history (see MacKenzie 2006, 2009). This turn can be read as a further formalization—and mathematical articulation—of the principles and doctrines that configured the

economic theorization of asset valuation developed in earlier decades, particularly in the North American landscape (see Bryer 2012, 2013a, 2013b). A key contribution in that respect is the formalization, by Franco Modigliani and Merton Miller, of the conditions in which the cost of capital (or the return required by an investor) can be optimally calculated in order to guide investment policies. Further developments in corporate finance by authors such as Harry Markowitz and William F. Sharpe provided a more complete formalization of the construction of investment portfolios that would minimize risk. Such is the role of asset valuation formulas like the capital asset pricing model (CAPM). A further landmark in that history is the development by Fischer Black, Myron Scholes, and Robert C. Merton of a mathematical model (the Black-Scholes model) that provided criteria for determining the supposedly fundamental underlying prices of derivative contracts (financial options and futures) and which was later abundantly used in order to hedge portfolios of financial assets—that is, to cancel their risk (Bjerg 2014).

Such developments were both prompted by and operational in the augmentation and complexification of North American financial markets from the 1960s onward. These offered a growing variety of instruments—portfolios of bonds, stocks, futures, and options—from which to seek earning power and on which to exert financial imagination. Developments in the area of financial accounting and business valuation proper were perhaps less salient and basically revolved around the refining of the recipes already found in Fisher. Notions such as discounted cash flow (DCF), net present value (NPV), and weighted average cost of capital (WACC) offer the kernel of the practices and techniques of capital budgeting, investment policy, and financial analysis found worldwide in businesses of all kinds (Doganova 2018a, 2018b). Key to the understanding of the history and practice of such calculative instruments is their concomitant association with distinct managerial practices and epistemic visions. The entire doctrine of the shareholder value maximization and the refinement of precepts for corporate governance strategy by financial economists such as Michael C. Jensen and Eugene Fama is a case in point, as such visions aim at transforming the very nature of the corporation (Baars and Spicer 2017).

As the above should illustrate, there has been and continues to be a long-standing interest in neoclassical circles in assets and asset valuations from a practical (or even practitioner) perspective. Specific examples might

include the business interest in and research on reputation as an asset (e.g., Helm et al. 2011), although a more general and pertinent analytical example is the notion of asset specificity introduced by the new institutional economist Oliver Williamson in the 1970s. According to Riordan and Williamson (1985), transaction costs are differentiated by asset specificity, by which they mean that the more an organization's assets (e.g., land, workers, reputation, machinery) are distinct and unique (i.e., specific), the more that "exchange relations take on a progressively stronger bilateral trading character" (367). Simply put, firms need to trade when they are different from one another, but market competition ends up being replaced by other forms of economic governance due to fears about opportunism (since each side does not know the value of the other side's assets) (see also Williamson 1979). Such analytical claims can be traced back to work by Ronald Coase (1937) on the theory of the firm, and they foreground later debates around incomplete contracts that were deemed to result from the uncertainty engendered by asset specificity foreclosing the capacity of business to write affordable complete contracts (see Joskow 1988).

As part of a broader theoretical lineage, concepts like asset specificity have proved highly influential in management circles, especially to academic theories like the resource-based theory of the firm—first proposed by Edith Penrose in the 1950s—and the later capability-based theory of the firm put forward by David Teece and others (see, for example, Pisano 1991; Pitelis and Teece 2009). In both cases, management thinkers theorized organizational performance as the result of the asset base of firms, rather than market competitiveness. As with financial economics, these theoretical concerns in management literatures often collapse into business practices. For example, David Teece founded a consultancy firm—Berkeley Research Group—whose primary service seems to be providing expert economic advice to clients who want to overcome antitrust suits against them. More generally they illustrate the extent to which economic and management scholars, managers and executives, financiers and investors, and others at the sharp edge of business are all concerned with understanding assets as objects of political-economic study and political-economic intervention. Study and intervention feed off each other, in fact, reflecting the influence of abstract models and theories on business decision-making. The capital asset pricing model (CAPM), developed in financial economics, along with the efficient market hypothesis (EMH) came to inform how value was understood *and* created in

investor decision-making (Fourcade and Khurana 2017). It is these sorts of relations—between the theory and the practice of asset valuation—that have engendered a growing interest in assets and assetization in critical constructivist scholarly circles, to which we turn next.

Critical and Constructivist Takes on the Asset Form

Early work by Veblen, Commons, and others illustrated the extent to which the asset form has been a conceptual and practical focus for several generations of scholars, especially in the quarters of institutional economics. More recent research streams have provided further bases from which to approach the subject matter in a productive manner, offering perhaps tighter connections to the social and political concerns prompted by contemporary technoscientific capitalism. Those streams are recognizable today through a number of heterogeneous disciplinary tags, such as cultural economy, heterodox economics, critical political economy, critical accounting, and science and technology studies (STS).

Cultural Economy and Anthropologies of Finance

Calls for a qualitative, ethnographic appraisal of economic expertise, financial knowledge, and accounting technique have found fertile terrain in cultural studies in the past two decades. Finance features prominently in academic areas labeled “cultural economy” (Du Gay and Pryke 2002; Pryke and Du Gay 2007) or “cultural political economy” (Sum and Jessop 2013; Jessop, Young, and Scherrer 2015). Valuation processes are made sense of there from the perspective of both the moral imaginaries they carry and the political setup they establish. The implications of financialization—especially the spread of financial views and techniques for which the asset form is an essential ingredient—are aptly tackled from such perspective, including as a set of arrangements that permeate everyday life (see, for example, Langley 2008; McFall 2014; Deville 2015; Fridman 2017).

This emergent area is connected to developments in the anthropology of finance and money that see in global finance the key to understanding the forms that reflect the nexus between cultural meaning and social hierarchy (see Maurer 2006; Hart and Ortiz 2014; Hart 2017). A number of ethnographies of valuation practices in large investment banks have in this respect examined the links between representations of worth among

analysts, traders, and accountants; the organizational and technological arrangements within which they evolve; and the structural consequences of their operations (e.g., Beunza and Stark 2004; Zaloom 2006; Ho 2009; Lépinay 2011; Ortiz 2014). Ortiz (2013, 2014), in particular, has introduced the “limits of financial imagination”—that is, the extent to which financial operations are controlled by the ideal of a free investor operating in an efficient market—as a crucial object in the examination of the meaning of considering and treating things as assets, an anthropological path further developed in Muniesa et al. (2017).

Heterodox Political Economy and Economic Geography

Further attempts at tackling the problematics of assetization through a conceptual, economic critique of the notion of financial capital include the idea that contemporary global finance is governed by a specific logic of “fictitious capital” (Durand 2017). Such developments certainly require reconsidering the categories of the Marxian critique of value, as pertinently explored by Ascher (2016). Examples of literature worth considering here include critical and heterodox economics and political economy, as well as economic geography.

Working within a Veblenian tradition, scholars like Herman M. Schwartz, Ronen Palan, and Nitzan and Bichler have all contributed significantly to the dissection of assets and assetization in recent times, even if they do not use these specific terms. In their grand challenge to both neoclassical and Marxist economics, Nitzan and Bichler (2009) aim to rethink capitalism as a mode of accumulation based on capitalization. Drawing on classical and neoclassical ideas about the valuation of capital—such as discounting developed by Irving Fisher—but also on the conceptual idiom of Cornelius Castoriadis, Nitzan and Bichler argue that an array of human activities can be and are capitalized, thereby constituting asset values as an assessment of future earnings, suitably adjusted for risk. As Bjerg (2014) notes, this identification of risk in valuation is a relatively recent phenomenon. However, at this point Nitzan and Bichler argue that while tangible assets can be priced relatively easily, the opposite is true of intangible assets, even though the latter have become increasingly important over time (Palan 2013; Haskel and Westlake 2018). Understanding intangible assets has ended up as a major focus of study for many heterodox economists and political economists as a result, although we can only mention a few here. Perhaps the

clearest examples are Schwartz (2016, 2017) and Bryan et al. (2017). In his work, Schwartz is interested in how firms externalize their tangible assets and outsource production as part of a strategy to rely on IPRs as a source of monopoly rents. In their work, Bryan et al. are more interested in the “new ways of *managing and deploying* intangible assets” as part of a broader concern with offshore financial flows, tax evasion, and wealth management (59). It is obvious that both concerns are valid and pressing issues, and it raises the important geographical question regarding assets—namely, how place specific and dependent are they?

Several economic geographers, broadly speaking, have focused on these aspects of assetization, especially as it relates to infrastructure finance and financing (Leyshon and Thrift 2007), although others are now addressing things like carbon finance (e.g., Bridge et al. 2019). An early and notable example of the former is a book by Graham and Marvin (2001) called *Splintering Urbanism* in which they highlighted the increasing fragmentation of urban infrastructure resulting from the privatization of public assets. This unbundling of specific infrastructure assets (such as roads) from an urban system resulted from new forms of asset management and its monetization (Birch and Siemiatycki 2016). More recently, geographers interested in financial geographies have highlighted the reconfiguration of place-based things like infrastructure (e.g., railways) and farmland as a new asset class (e.g., Adisson 2015; O’Brien and Pike 2015; Larder et al. 2017; Ward and Swyngedouw 2018; Ouma 2019), which have become popular with pension funds in particular (Orr 2007), as well as so-called idle assets (e.g., cars, spare rooms, labor) that are brought into economic circulation through new social media platforms (e.g., Uber, Airbnb, TaskRabbit)—see Langley and Leyshon (2017) for example. While some of these arguments are premised on the idea that these sorts of assets are a form of financial capital (e.g., O’Neill 2013), it is noticeable that much of the work highlights the spatial and physical dimensions of assets that the emphasis on finance often obscures. For example, an infrastructure asset can be defined by the immediate costs of its physical construction as much as by the life-cycle costs of its use and maintenance (Birch and Siemiatycki 2016). As such, the technical calculation and accounting of costs and benefits constitute an asset as much as its form, which brings us to accounting.

Critical Accounting Studies and the Sociology of Capitalism

One promising attempt at situating the asset form within a wider assessment of the evolution of capitalism is to be found in recent work by Luc Boltanski and Arnaud Esquerre (2016). The asset appears in their analysis as a paradigmatic form of arranging and displaying objects of valuation, a form that derives analytically from the “collection form” (their main topic of investigation). While the latter enriches the value of things (i.e., it justifies higher prices) by situating them in a context that augments their memorial force (signature, heritage, singularity), the asset form appears in speculative appraisal to be the key to such process of enrichment. Contrary to concomitant perspectives that see in financial valuation a paradigmatic critique of the market (Muniesa et al. 2017), Boltanski and Esquerre base their analysis on a generalization of the commercial transaction as the basic template of the capitalist arrangement.

The specificity of the accounting apparatuses that govern a regime of assetization has been submitted to closer scrutiny by Chiapello (2015). The very notion of financialization, which is often used in reference to securitization, is best understood (according to Chiapello) as an all-encompassing process of “colonization” by finance of various kinds of valuation practices. The asset form is considered here as a properly capitalistic form—that is, a form that presents assetized things as capital rather than as commodities. The connection of this approach to critical perspectives in accounting is obvious; it links to a productive tradition in accounting studies that has examined the genealogies of financial accounting and its uses (see, for example, Miller 1991; Toms 2010; Bryer 2012, 2013a, 2013b).

Science and Technology Studies

Another field that is starting to engage with assets, especially as technoeconomic objects, is science and technology studies (STS). As a discipline focused on the coproduction of technoscience and society, STS is well placed to provide critical, constructivist accounts of assetization, especially in terms of *how* things are turned into assets. Although it is a topic that stretches back several decades (e.g., Levidow and Young 1981), the last few years have witnessed a surge in STS scholars interested in assets as a distinct analytical category relevant to understanding contemporary technoscientific capitalism. A few examples of this work, this book aside, include discussions of intangible assets such as intellectual property (Birch and Tyfield

2013; Lezaun and Montgomery 2015; Martin 2015), which is probably the most prevalent type of analysis, as well as human capital (Cooper and Waldby 2014), business models and valuation practices (Birch 2017a; Muniesa et al. 2017; Doganova 2018a), and new kinds of assets such as personal or health data (Vezyridis and Timmons 2017; Geiger and Gross 2019; Sadowski 2019). While their substantive topics may be highly differentiated, these scholars share a common interest in examining assets as distinct from commodities and as constituted by and coming to constitute, in a performative fashion, value and valuation in technoscientific capitalism.

Notably, these STS scholars seek to engage with the issue of understanding how future value is constructed in the present through technoeconomic processes, practices, and knowledge (Doganova 2018a). While there has been growing interest in “promissory economies” in STS (e.g., Petersen and Krisjansen 2015), much of this work tends to assume that it is the inherent, embodied, or latent material qualities of life released by technoscience that generates value. However, as Paul Martin (2015, 425) notes, expectations—and thus value and valuation—are not “spontaneously created...but have to be socially organised through the authoring of expectations and the enrolment of actors.” In this sense, assets are made; they do not simply emerge from the ether or the earth. Returning to Chiapello’s (2015) work, assetization necessitates the definition of what an asset’s boundaries are, the measurement of its quantity and quality, and a valuation of its monetary worth—all of which requires an enormous amount of work by technical experts, economists, valuation analysts, policy-makers, and others.

Paradoxes, Problems, and Open Questions

Assetization studies certainly do not constitute a unified field or a clear-cut research program. They are rather characterized by the conjunction of gray zones and unsettled issues. The aim of this book is to make these explicit and submit the subject matter to collective scrutiny, especially as this relates to the various implications of the asset condition (Muniesa et al. 2017; Birch 2018). Among the unsolved paradoxes and problems that assetization raises, the following seem to be particularly pressing. One is the difference between assetization and commodification and the concomitant problem of the place of markets versus finance in the determination of capitalism.

Another one is the extent to which the dominance of an investment viewpoint in assetization processes runs counter to an entrepreneurship perspective—or alongside. Whether the asset form is essentially oriented toward private appropriation or, on the contrary, is a form that can be articulated in terms of the public interest also constitutes a pending question. The wobbly status of the immaterial in assetization processes is an equally relevant question. And so is, we believe, the legal configuration of these processes and the extent to which they are marked by a transition to contractual regimes of governance, as opposed to more classic forms of ownership.

Financial Valuation and the Problem of the Market

A research agenda on the breadth and boundaries of the processes that fall under the rubric of “assetization” is evidently linked to a wider, critical appraisal of the tendencies of contemporary capitalism. Finance comes here at the forefront, as contemporary capitalism is insistently examined in critical accounts in the light of the conditions and consequences of “financialization.” But the critique of capital is also often associated with a critique of markets, with commodification—the commodification of everything—presented as the prime engine of the advancement of capitalism. And still, as the literature presented above tends to suggest, there is something specifically central about market valuation in the type of appraisal that assetization offers. The standard distinction that is done in financial analysis between the fundamental value of an asset (determined with the help of discount methodologies, such as DCF, that place future revenues or earning power at the crux of value) and its market price (which basically depends on the present dynamics of strategy and information among buyers and sellers) is essential to the debate (Ortiz 2014). This market price that the finance-savvy analyst can deem overvalued or undervalued in the light of so-called rational valuation methodologies is often termed “speculative” in both financial parlance and technical literature.

The true value of the asset, as the vernaculars of financial valuation have it, is the one that stems from its capacity to create value (Ortiz 2014; Muniesa 2017). A well-known paradox links both kinds of value through notions of “efficient market,” which stipulates that market prices ought to converge toward fundamental value insofar as the market is supposed to be composed of finance-savvy investors who calculate financial value. Still, in some remarked critiques of finance, it is precisely the speculative aspect

of market appraisal that is signaled as the prime characteristic of finance (e.g., Orléan 2014; Ascher 2016; Boltanski and Esquerre 2016; Adkins 2018). For example, Konings (2018) has problematized the foundationalist understanding of value that critical conceptions of speculative finance need to rely on (see also Cooper and Konings 2015). The debate remains open on whether—or to what extent—assetization partakes of a logic of commodification and therefore of speculative potential or, rather, participates in a capitalistic logic that aims in part at canceling the threat that a market logic poses to the security of revenue appropriation.

Debates around notions of biocapital and bioeconomy are also pivotal in the articulation of this question. Once considered the main angle of the problem, the commodification of biological entities seems to give way to situations of massive value creation in which the commodity form is less important. The key STS scholars writing in this area, including Kaushik Sunder Rajan, Nikolas Rose, Catherine Waldby, and Melinda Cooper, tend to frame discussions around speculative or promissory value, implying that value is largely speculation—a bet by investors, essentially (Birch and Tyfield 2013). Critics of these thinkers point out that some biotech firms, like Amgen, do create value—although how is an important issue to consider—while other biotech firms are primarily financial “artifacts” (Mirowski 2012; Birch 2017a, 2017b). The latter might imply some speculation, but it is premised on an innovation regime in which risk is outsourced (Glabau 2017), necessitating the careful management of value and valuation (Birch 2017a) and the deployment of a business model culture for which assetization is a distinctive objective (Doganova and Muniesa 2015). The very notion of assetization has already been explicitly used by Geiger and Gross (2019) in order to address precisely those issues in the case of the consumer genomics testing industry where firms engage in new forms of health data brokerage.

Thinking like an Investor, Thinking like an Entrepreneur

Locating in the investor’s viewpoint the matrix from which assetization makes sense highlights an alternative viewpoint that is increasingly sidelined—namely, that of the entrepreneur. Both personas certainly feature as proxies for complex institutional formations, and both represent central characters in the narratives that dominate the jargon of value creation (Muniesa 2017). In many vernacular (and scholarly) accounts of

contemporary business life, the entrepreneur may appear as a virtuous character fighting a moral fight against an investor-qua-rentier that stifles the creation of real value with a short-term, purely financial view (Mazzucato 2018). In other accounts, it is a visionary investor (e.g., the archetypical venture capitalist or “business angel”) who stimulates the entrepreneur on the path to economic success. But to what extent do these ideal types oppose each other? To what extent do they form a cultural complex that assetization requires in order to *make sense* as a moral and political narrative? To what extent does this narrative leave other characters out of the value narrative? As assetization becomes the template according to which value creation is gauged, the investor and the entrepreneur-qua-investor become the dominant ingredients of that narrative, with other figures such as the state or publics being left out (or transformed accordingly).

Assetization is, as much as anything else, a process of narrative transformation. Things are accounted in terms of the asset, but social actors participating in economic activity are also reframed, altered, and conceptualized anew. Understanding these shifting visions and identities is critical, since it is the techno-economic practices of social actors that define an asset’s boundaries, measure its characteristics, and evaluate its worth. An especially important transformation, in this regard, is the take-up of financial logics by social actors, including managers and executives, government officials, individual consumers, and more. Chiapello (2015), for example, has highlighted how mainstream valuation approaches in modern finance all share the same goal of taking the investor viewpoint as the basis for assessing the societal value of any investment based on the assumption that “investors—thanks to their special knowledge—are seen as the most capable of allocating available economic resources in an optimal way” (19). This idea, more fully developed by Ortiz (2014; see also Muniesa et al. 2017), can be also observed beyond the technical realm of financial valuation. It is, for instance, the investor that stands as the prime semiotic engine around which revolve the efficacy of business models (Doganova and Muniesa 2015).

In an article titled “Seeing like a Market,” Fourcade and Healy (2017, 10) argue that the “digital economy’s classificatory architecture allows market institutions to apprehend their clients, customers, or employees through new instruments of knowledge, efficiency and value extraction.” As Fourcade and Healy frame it, markets increasingly force individuals to accrue “übercapital,”

representing a narrative resource—or asset—resulting “from one’s position and trajectory according to various scoring, grading and ranking methods” (14). Whether übercapital is more of an asset for individuals themselves or for the companies collecting the data that constitutes übercapital is hard to disentangle—it seems to be both, according to the authors—which offers us an insight into the complexities underlying assetization. This concept highlights how different entities—imaginary or not—are enrolled in the pursuit of specific narrative and objectives (see also Sadowski 2019).

Managers and executives are exhorted to “think like an investor” rather than as entrepreneurs; as a result, they bind themselves to thinking and acting like an investor (such as adopting “opportunity cost” thinking). A recent *Vital Signs* report from Ernst & Young (2015, 5) stresses the need for company executives “to think more like investors than managers.” Paradoxically, this implies that in order to avoid “activist” shareholder interventions they do not want, executives have to think more like shareholders in the first place. It goes without saying that thinking like an investor entails equating value creation with return on investment rather than with the research or development of new products and services (Birch 2017d; Muniesa 2017; Glabau 2017). Assetization is linked here with the prevalent power of the investor, raising the question of whether there is an alternative to seeing the world like an investor. The very notion of the “investee” displacing the “worker” as the main political identity in matters of resistance against financialization, as examined by Michel Feher (2018), is certainly part of this syndrome. Attempts at capturing (and reclaiming) the role of the state in value processes are also pivotal in the conversation. Proposals for the study and articulation of notions of state-driven entrepreneurialism are promising in this respect (see, for example, Mazzucato 2013; Goldstein and Tyfield 2018). But how far can they go in questioning the investor regime that seems to control the spread of assetization?

Private Profit and the Public Interest

A social inquiry into assetization certainly meets in the private interest a crucial driver. Considering something in terms of an asset usually means preparing it for the appropriation by an investor (shareholder or creditor) of the revenue—the rent—that derives from the entitlement (stock, bonds, or other investment forms). But still, many of the traits that we recognize in processes of assetization can be recognized too in contemporary

developments in public finance. The rationalization or modernization of public investment and public management—whose aim remains the realization (or rather optimization) of the public interest—can rely, sometimes abundantly, on the methodologies that financial valuation offers. The diffusion in advanced liberal democracies of policy doctrines and operational tools derived from public choice paradigms or from management accounting is certainly a topic that an inquiry into assetization might capture.

As competitiveness becomes the driving rationale of neoliberal public policy (Davies 2014), the urge to attract investors becomes a crucial political imperative. The evaluation of large infrastructural projects that take into account intergenerational responsibility or long-term effects is more and more dependent on discount methods that require thinking of expenditures as an asset form—for example, in the case of nuclear waste management (Muniesa et al. 2017; Saraç-Lesavre 2017, 2018). The extent to which the neoliberal development often dubbed “New Public Management” is an extension of the asset condition (taxpayer as investor, public budget as investment fund, public holdings as capital assets, public service as return) is indeed a central part of the agenda for assetization studies. Analyzing how the nature, scope, and function of the state are made explicit in different manners through changing performance indicators furthers the understanding of the way in which the allure of the asset affects the political meaning of the state (Muniesa and Linhardt 2011; Mennicken and Lodge 2015; Mennicken and Muniesa 2017).

Multiple research objects stand as obvious sites in which this problem can be explored in depth. One area of prime interest to an STS agenda is the governance of science. The connections that are established in government bodies and state agencies between public policies on scientific research and economic objectives (e.g., technological innovation, economic growth, and value creation) are marked by the diffusion of metrics and models that tend to describe scientific value in terms of a future return (Robson 1993, 1994; Godin 2004, 2007; Muniesa and Linhardt 2011). The fact that public funding bodies look at innovation projects through the lens of the business model is also of particular relevance (Doganova and Eyquem-Renault 2009). Other topics such as the development of entanglements with private-sector practices in order to ensure the economic viability of public service are equally relevant. Public-private partnerships (PPP) are a particular interesting case, as their failures or successes need to be made sense of, besides

their effective or ineffective delivery, from the perspective of the alteration of the balances of strength between states and private actors (Birch and Siemiatycki 2016). The rapid development of social impact bonds and other forms of impact investment in the modernization of public social policies also provides a fertile ground on which to explore how the object of public service (e.g., the homeless) can be turned into an asset (Cooper et al. 2016). Contemporary practices of “philanthrocapitalism,” which in part also rely on the idea that an investor’s viewpoint is best positioned to see where money can do most good, add to this accumulation of situations in which the assetization of public policy can be observed (McGoey 2015). The key question of what it means to interpret these shifts and practices in terms of a crisis of political sovereignty is still open to scrutiny and debate.

The Material and the Immaterial

Notions of incorporeal or intangible property were already crucial in the theorization of the asset form by the likes of Veblen (1908a, 1908b) and Commons (1924). And this discussion stretches back into history. In distinguishing between incorporeal (i.e., financial) and intangible (e.g., goodwill, brands, reputation) assets, Ronen Palan (2013) points out that concepts of “intangible property”—to use his term—can be found as far back as late sixteenth-century English court rulings, especially as it related to trust and trustworthiness in a person or their products. As for today, see Helms et al. (2011) on “reputation management.” Assets come in all sorts of shape, size, tangibility, and corporeality, potentially confusing our discussion even further. And the distinction between materiality and immateriality seems to govern, to quite an extent, the conversation on what assets are or should be about. The extent to which these distinctions rely on prephilosophical or nonconstructivist ideas of materiality remains debatable (Muniesa 2016). But the physical materiality or immateriality of an asset is certainly—and interestingly—used in the literature in a manner that highlights a series of questions worth considering. Intangible assets are also increasingly highlighted as the primary source of company value (Nitzan and Bichler 2009; Birch 2015; Bryan et al. 2017; Haskel and Westlake 2018), prompting us to ask how we might differentiate between asset forms and assetization on the basis of their materialities. To use simple binaries, an asset can be large/small, complex/simple, heterogeneous/homogenous, perpetual/exhaustible, rivalrous/nonrivalrous, and so on.

While the physical materialities theorized by economic geographers (e.g., Adisson 2015; O'Brien and Pike 2015; Christophers 2016; Ouma 2019) might seem relatively clear-cut—for example, a railway is a physical piece of equipment that cuts across national and international landscapes and borders—this belies the complexity at play in these examples. As Birch and Siemiatycki (2016) note, certain socio-technical structures and systems are easier to unbundle and assetize than others; for example, a road with easily tolled entry and exit points is easier to monetize than a regional railway system with multiple and multilayered entry and exit points. Similar concerns could be raised regarding any other tangible asset: What are the physical constraints on monetization? Or capitalization? Each is potentially unique, as a result of its siting and spatiality, meaning that turning these things into assets also entails a huge supporting cast of social actors, including accountants, engineers, analysts, financiers, and so on, able to make valuations on a social basis (Chiapello 2015). All of this, it is worth emphasizing, is complicated further when looking at intangible assets.

As we and the contributors to this book are arguing, almost anything can be turned into an asset given the right techno-economic configuration. Even personality sells; for example, the YouTube star PewDiePie has more than 100 million subscribers and earns millions of dollars every year by (without wanting to denigrate the effort he puts into it) playing computer games and making gurning noises. A growing chorus of critical political economists, particularly drawing on ideas in autonomist Marxism, have sought to theorize the growing importance of intangible assets in a range of emerging capitalist forms and formations constituted by immaterial, cognitive, and affective labor (Moulier Boutang 2011; Marazzi 2011). Building on broader societal and policy discourses around the shift to a knowledge economy (Luque 2001), these thinkers focus on the extension of ownership and control over knowledge, emotions, and socialities as part of a process which Moulier Boutang (2011, 14) describes as the “systematic conversion of rent positions in intellectual activities into tradable assets.” It is not all theoretical either, with international agencies like the OECD promoting the idea of “knowledge markets,” “knowledge-based capital,” and “intellectual property assets” (OECD 2008, 2010, 2012). Likely inspired by the expansion of the Internet, there has been a major shift in the theoretical and social understandings of knowledge—including research, creative works, and user-generated content—as both private property *and* public commons

(Arvidsson and Colleoni 2012). This has led to ongoing conflict and contestation between multiple social actors, such as hackers, hobbyist groups, patent offices, trade organizations, multinational corporations, and governments (Hope 2008). As such, examining how things are turned into assets means understanding how material and immaterial assets are maintained or challenged as such.

Ownership and Property versus Contracts and Licenses

The fact that turning something into an asset is in part a juristic operation is certainly well established within a tradition of legal scholarship that examines the constitutive role of law in capitalism (Deakin et al. 2017; Pistor 2019). Doctrines of investor protection, as developed in the tradition of the economic or financial analysis of the law, are an important element in the establishment of the juristic contexts in which the asset condition can thrive (La Porta et al. 1988; but see Pistor 2013). But assetization is increasingly framed by a shift from regimes of ownership to regimes of contract. Ownership rights are often described as a bundle of rights, including exclusion, use, sale, and so on (Hodgson 2003; Kang 2015). Despite their potential complexity, what marks them out is that they are publicly constituted by state legislative action and legal enforcement; for example, it is not possible to limit the future use of property after it has been transferred (Perzanowski and Schultz 2016). Focusing on real or personal property, many of these rights are specific to tangible things like land, housing, apparel, cars, and so on.

More recently, the expansion of intangible assets has engendered a transformation in intellectual property rights (IPRs) to protect those assets. Such IPRs cover things like copyright, patents, and trademarks, and represent the main way that companies have sought to ensure that they can avoid the effects of the marginal zero cost of production (Rifkin 2014)—namely, once an initial investment in production has happened, subsequent costs of production tend toward zero. As content, in whatever form, has become almost costless to reproduce, companies and individuals have turned to IPRs to secure their profits (Schwartz 2017). According to Perzanowski and Schultz (2016), the ongoing institutional transformation of ownership in intangible assets has led to a shift in juristic operations from property rights to contract law, represented specifically by license agreements.

License agreements, while remaining obscured behind a rhetoric of ownership, reflect a transformation in the ownership and control of “purchased”

goods and services. Really, consumers are simply licensing things (such as a downloaded music track) produced with intellectual property (such as a copyright). As Birch (2016) and Perzanowski and Schultz (2016) argue, however, the value of these intangible assets is constituted by the contractual costs they impose on the public, including access limits, licensing complexity, and anticompetitive effects. For example, it is difficult for consumers to switch technologies (e.g., Apple) after they have spent so much on complementary products and services (e.g., iTunes music). As a result, the rights of asset holders come to trump consumers, who can end up locked into one asset enclave economy or another, or platform owners extract rent from other people's assets rather than their own (e.g., Uber) (Birch 2020). Such consequences are some of the reasons that many people turn to open source (or open science) mechanisms as a way to coordinate the social organization of research and development (Benkler 2002).

Turning Things into Assets

The collection of studies gathered in this book originated in an open call for proposals for a panel on "Turning Things into Assets" at the 4S/EASST 2016 conference in Barcelona. The Society for Social Studies of Science (4S) and the European Association for the Study of Science and Technology (EASST) are two major scholarly associations established in the academic field of STS, but their conferences also attract researchers well beyond that field. The "Turning Things into Assets" panel constituted a space in which the interdisciplinary dialogue we referred to above took place. And the contributions that are included in this book provide, we believe, palpable evidence of the emergence of a fruitful conversation. The chapters are organized into four sections that roughly correspond to four broad and inter-related topics on how different things are turned into assets: knowledge, infrastructure, nature, and publics.

Turning Knowledge into Assets

The OECD's lingo on the "valuation and exploitation" of intellectual property constitutes a case in point for understanding the operations that the assetization of knowledge requires, as Hyo Yoon Kang suggests in her contribution. This is entirely about refining the contours of the intangible asset (e.g., Kamiyama et al. 2006), and these contours are essentially juristic. The

analysis Kang offers can be read as a theory of the *abstract tangibility* that the law enables for intangible knowledge. Patents configure knowledge with the material, objectified contours that the asset condition requires. That this comforts the now-dominant view that “wealth mainly lives in intellectual property,” to quote the *Financial Times* comment cited by Kang (Foroohar 2017), is clear. The knowledge economy stands certainly as the medium in which the value creation function of intellectual property is most visible. The emergence of patent portfolios as a legal problem (Risch 2013), Kang tells us, illustrates the extent to which the investment logic of patents as financial assets introduces novel, forward-looking concerns that can be disconnected from the logic of the actual use or actual commercial potentiality of the patented invention.

The rise of “platform capitalism,” to use the expression developed by Srnicek (2017) and Langley and Leyshon (2017), certainly comes into the picture too when we try to grasp the business model culture of the data-driven economy (see Sadowski 2019). Data sets—or “datassets” as Thomas Beauvisage and Kevin Mellet call them in their contribution—here stand as the paramount asset form. The talk of an emerging “asset class” in relation to personal data, Beauvisage and Mellet claim, serves as an indication of the political concern with the “untapped opportunities for socioeconomic growth” and “the importance of collecting, aggregating, analysing and monetising personal data” (World Economic Forum 2011, 7). Beauvisage and Mellet focus on the success and vicissitudes of behavioral data capture: data brokers, tracking technologies (“cookies”), and data management platforms. They provide assetization studies with a useful connection to marketing studies, especially of the kinds that have focused on the “cultural economies” of market attachment (McFall 2014; Cochoy, Deville, and McFall 2017). They observe, though, a fundamental contrast between commodification and assetization: monetizing personal data may mean at some point selling these personal data away, but as the relative failure of consumer-to-business schemes in personal data illustrates, that strategy tends to be replaced by an investment, forward-looking, rent-seeking rationale.

Emphasis on the future (expectations in the form of future value) is at the center of the asset condition (Doganova 2018a). This is an insight that Victor Roy develops in his contribution on the political economy of biomedical innovation. The logic of the “pharmaceutical asset,” he claims, increasingly controls the dynamics within the industry. The spread and

articulation of the doctrine of shareholder value maximization create, according to Roy, quite a specific situation. Rather than being evaluated in the light of their current profitability, large pharmaceutical companies are considered through their potential to deliver future earnings for shareholders. This translates into a somewhat paradoxical form of *limitation*—if not cancellation—of the very finality of pharmaceutical innovation, which is (or ought to be) to develop cures *in the present*. The way in which this movement affects biomedical knowledge and biomedical reality at large (starting with the patient's) is patent in Roy's investigation. Current sociological research on the nature of economic expectations and on the spread of future narratives finds here a crucial test bed for the examination of the *futures* that assetization both produces and requires (Beckert 2016; Beckert and Bronk 2018).

Turning Infrastructures into Assets

That infrastructures are mundanely relational is today commonsense in the STS-inspired social sciences (Star 1999). But what about the financial investment that infrastructures are the product of? Its *relational nature* needs to be captured too. If an infrastructure is a compound of localized, hybrid elements, all the more so when that infrastructure adopts the asset form. In their contribution, Alain Nadaï and Béatrice Cointe draw from the Callonian vocabulary of the “agencement” (Callon 2016). Examining the case of environmentally motivated co-ops investing in mutualized photovoltaics or wind farms, they observe the multiple territorial and spatial dimensions of the future value potential of the investment projects. Of particular importance is the role the state plays in such assemblages: feed-in tariffs ensure the stability and predictability of the revenue stream that make the entire project economically viable. This role is not without relevance to the *safe ground* that the state ought to provide, in general, to the investor's gaze through the notion of the “risk-free asset” (Boy 2015). And it is also connected to the emergence of a society of engaged, conscientious stakeholders that adopt the shape of a “society of investors” (Davis 2009).

Railroads, an infrastructure crucially dependent on (and interlocked with) the state, offer promising opportunities for furthering the examination of the shapes of infrastructural assetization. Timothy Mitchell has signaled how railroads have played a central role in the material history of the construction of “durable structures of accumulation where a certain

amount of the income that can be expected in the future is sold to investors in the present” (Abourahme and Jabary-Salamanca 2016, 740). In her contribution, Natalia Buier further explores that type of angle. A contemporary case study of an ambitious high-speed rail infrastructure program in Spain allows her to expose the essentially unstable aspects of the process of turning railway transportation into a viable, competitive asset. The program was abundantly contested, and the recourse to “respectable” economic metrics such as cost-benefit analysis merely rendered more explicit the political nature of the project—Buier draws here a parallel with Porter (1995). As a process, the assetization of infrastructures requires the constant production of its conditions of possibility. It also involves, rather than a straightforward process of privatization, an ongoing reconfiguration of the public sector.

Turning Nature into Assets

Offering the keys of the valuation and management of natural resources to properly equipped investment managers and financial analysts is a movement that can be identified in several relevant episodes in the history of financial valuation. This is certainly the case of forestry, where the establishment of rotation and yield precipitated remarked-upon innovations, such as DCF methods (Doganova 2018a, 2018b; Muniesa et al. 2017). Mining too; in his contribution, Paul Robert Gilbert ethnographically explores the valuation talk and work that underpins the mineral exploration investment industry. The material side of assetization processes is highlighted, as managing the assets means literally determining where to excavate and how. The sophistication of project finance in this area has also prompted valuation controversies—for example, through the attempted introduction of “real options” analysis—that further stimulates an assetization gaze, as Gilbert shows. But the crux of an assetization analysis can also reside in the examination of the political identifications these techniques accompany. Who are the enemies of value creation in this complex of metrics and narratives? Gilbert emphasizes the rise of resource nationalism as a major threat and the ethnographic record of the menace of the “next Venezuela,” in reference to the fragile nationalization of mining business in some Latin American jurisdictions. Political risk indeed becomes one crucial ingredient of the risk rhetoric of assetization (Boy 2015; De Goede 2005) and the call for “durable legal foundations” the juristic cement of the asset condition (Commons 1924).

Natural entities, however, tend to blur a too-sharp analytical distinction between the commodity and the asset forms. Once it enters the realm of farming, a cereal seed, for example, can obviously work as a commodity good that can be bought and sold at a price in the market but also as the source of a future yield (i.e., asset). Veit Braun explores this shifting condition in his contribution, using the detaching properties of market transactions as a compass. One well-known formal property of market goods is their alienation capacity—that is, the propensity to make the parties to the transaction “quits” (Polanyi 1944), a propensity often compared in economic anthropology to the bonds, obligations, and attachments prompted by exchanged gifts (Carrier 1995; Godelier 1999). The asset, though, is certainly characterized, too, as the gift (anthropologically understood), by its capacity to maintain attachments between investor and investee so as to secure a future yield, rent, or return. Braun rightly confirms the importance that patent law has in the determination of the conditions in which seeds ought to be protected as assets. Patent politics, assetization studies ought to definitely note, is a crucial ingredient of the way in which natural resources and life-forms are made economically, capitalistically accountable (Parthasarathy 2017).

Turning farmland into an investable thing has gained relevance as a global prime concern in recent years, calling for a series of technoscientific (but also legal and political) measures that have not gone unnoticed in assetization studies (Ducastel and Anseeuw 2017; Fairbairn 2014; Li 2014, 2017; Larder et al. 2018; Ouma 2019). A more overarching idea is also gaining momentum in the face of the rush to develop economic solutions to the environmental crisis—namely, that of considering all environmental resources, or nature altogether, as an asset or pool of assets. In his contribution, Les Levidow deconstructs the interplay of capitalistic metaphors that accompany the establishment of novel (and much touted) templates such as natural capital accounting (see also Akerman 2005; Moore 2015; Coffey 2016; Muniesa et al. 2017). Emphasis on the power of the metaphor of nature as capital enables an understanding of the cultural dimension of assetization processes. But as the communication materials put forward at the World Economic Forum on Natural Capital clearly demonstrate, there is an essential political dimension to this, since emphasis on the asset means emphasis on the expertise and legitimacy of the asset manager in determining which parts of nature should be valued or not (see Felli 2014). Levidow

signals in particular how this process can disorient critical voices that see in the commodification of nature the prominent menace of capitalism and that (inadvertently or not) help promote a revaluation of nature (meaning a revaluation as asset) in order to protect it from the perils of market dilapidation. The convergence in language that the capital metaphor prompts might serve well as an environmentalist strategy, but it also precipitates, Levidow shows, a depoliticizing focus on reputational concerns.

Turning Publics into Assets

The rise of an “asset base” rhetoric in the provision of social services reflects another key object of inquiry for assetization studies (Langley 2006, 2008). The UK often features as an example of this trend, probably due to the intimate experience of this jurisdiction with neoliberal policies (Davies 2014; Springer et al. 2016; Birch 2017c). And British higher education is certainly well ranked among the topics suitable for this elucidation (Mennicken and Muniesa 2017). The introduction of performance measurements (such as the Research Excellence Framework and the Teaching Excellence Framework), variable tuition fees, and autonomy in university governance have led to the development of a British “new cultural epoch of managerialism” (Shore and Wright 2000). The extent to which this is a cultural epoch of assetization requires that we examine how higher education and its publics are transformed (or not) into the asset form. Sveta Milyaeva and Daniel Neyland answer this question in their contribution. Their investigation of the introduction and consequences of income-contingent repayment loans for university students in England and Wales illustrate the way in which such reforms involve important shifts in the accounting view, with some things (i.e., loans) not being categorized as spending anymore but finding their way into the asset column of the accounting imagination. They also observe how the assumption made about the discount rate becomes a key driver of the policy debate (Britton and Crawford 2015). Alongside the naturalization of net present value, the politics of discounting definitely strikes us as a defining feature of the political trajectory of the asset form and condition in public services.

Technoscientific capitalism entails a wide variety of financial instruments that rely on the identification of “monetizable social ills,” to cite an informant quoted by James Williams in his contribution, as a way to improve social services. Williams scrutinizes the case of the investment-based funding model known as social impact bonds (SIBs). These recent

financial instruments already stand as an intriguing research object for studies of financialization and marketization (see Cooper et al. 2016; Neyland 2018). However, Williams argues that the realities of the SIB industry are difficult to square with the financialization and marketization narratives featured in many critical accounts. A large study, which includes interviews with SIB developers and investors in Canada, the US, and the UK, enables Williams to locate the core of an assetization approach to the subject matter in the problem of valuation. The emergence of a genuine concern for “evaluation risk” (namely, the influence that particular benchmarking and impact assessment procedures such as randomized controlled trials can have on the very profitability of the investment scheme) provides a vivid illustration of the centrality of that problem. How can impact be properly defined and deadweight properly controlled, for whom and by whom, ask SIB practitioners? The fact that return on investment is typically dependent on social phenomena (recidivism, rough sleeping, unemployment) that need to translate into measurable individual behavior also constitutes a unique valuation challenge. Beyond discussions of whether a SIB can be considered a viable asset (a question that raises the issue of its liquidity), we perceive how the public’s “social ills,” which definitely need to acquire the shape of a delineated human behavior, adopt the contours of a monetizable asset form—or, in other words, of an investee condition (Feher 2018).

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