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To cite this article: Koray Çalışkan & Michel Callon (2010) Economization, part 2: a research programme for the study of markets, *Economy and Society*, 39:1, 1-32, DOI: [10.1080/03085140903424519](https://doi.org/10.1080/03085140903424519)

To link to this article: <http://dx.doi.org/10.1080/03085140903424519>



Published online: 22 Apr 2010.



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# Economization, part 2: a research programme for the study of markets

Koray Çalışkan and Michel Callon

## Abstract

Presented in two parts, this article proposes a research programme devoted to examining 'processes of economization'. In the first instalment, published in *Economy and Society* 38(3) (2009), we introduced the notion of 'economization'. The term refers to the assembly and qualification of actions, devices and analytical/practical descriptions as 'economic' by social scientists and market actors. Through an analysis of selected works in anthropology, economics and sociology, we discussed the importance, meaning and framing of economization, unravelling its trace within a variety of disciplinary backgrounds. This second instalment of the article explores what it would mean to move this research programme forward by taking processes of economization as a topic of empirical investigation. Given the vast terrain of relationships that produce its numerous trajectories, to illustrate what such a project would entail we have limited ourselves to the examination of processes we call 'marketization'. These processes, which constitute but one modality of economization, are discussed here from five vantage points: the things in the market, agencies, encounters, prices and market maintenance.

Keywords: market; anthropology; sociology; marketization; economization; economy.

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The end of market society means in no way the absence of markets. These continue, in various fashions, to ensure the freedom of the consumer, to indicate the shifting of demand, to influence producer's income, and to serve as an instrument of accountancy, while ceasing altogether to be an organ of economic self regulation.

(Polanyi, 1944, p. 252)

### Introduction

In the first instalment of this article (Çalışkan & Callon, 2009) we built up a foundation for a research programme that addresses what we have named 'processes of economization'. Instead of hypothesizing that in all cases there are activities and/or forms of behaviour which can be located in *the* economy of *the* society (irrespective of the definition given to the word 'society'), to speak of economization is to consider that economies, in all of their diversity, depend heavily upon divergent and often controversial analyses – both scholarly and lay – that define, explain and enact economic forms of life. The theoretical approach we have been introducing is acutely attentive to the plurality and open-endedness of 'the economic' as it is brought into being through processes of economization. It shifts attention from 'the economy' (noun) to 'the economic' (adjective) and is therefore appropriate for both contemporary cases and those remote in time and space.

We use the term 'economization' to denote the processes through which behaviours, organizations, institutions and, more generally, objects are constituted as being 'economic'. Through a selection of work drawn from economics, economic sociology and anthropology of valuation we drew out the traces of this concept and grounded it in the extant literature. We identified three key agents in economization processes: (1) the theories of the economy; (2) the institutional and technical arrangements that enhance the capacities of human agents for action and cognition; (3) the things which are being valued whose materiality influences the modes of valuation that are possible and their outcomes.

Once framed in this way, the study of economization constitutes a research programme encompassing a vast field of empirical investigation which would exceed the scope of an article or even a book. In this instalment we will focus on one particular form of economization, the one corresponding to the establishment of markets. We propose to giving this modality of economization its own name, *marketization*.

The study of marketization would be altogether too difficult if it were not for an agreement in contemporary societies on the characteristics of markets, this particular organizational form for economic activities. Notwithstanding their variety, because of active and deliberate intervention, the markets surrounding us actually do share what Wittgenstein would have called a 'family

resemblance'. This does not mean that market forms are all identical; to the contrary, we will stress their diversity. Nonetheless, in practice, there is a certain coherence to the overall process of marketization. As such, the notion of a market can be treated as though it encompasses a set of significations, realities and practices whose content and expected outcome has become a matter of widespread agreement.<sup>1</sup>

The academic literature as well as a survey of 'popular' meaning of markets sees these as institutions that favour the creation and the production of values by organizing competition between autonomous and independent agents. This conceptual coherence leads us to define markets as socio-technical arrangements or assemblages (*agencements*) which have three characteristics:<sup>2</sup>

1. Markets organize the conception, production and circulation of goods, as well as the voluntary transfer of some sorts of property rights attached to them. These transfers involve a monetary compensation which seals the goods' attachment to their new owners.
2. A market is an arrangement of heterogeneous constituents that deploys the following: rules and conventions; technical devices; metrological systems; logistical infrastructures; texts, discourses and narratives (e.g. on the pros and cons of competition); technical and scientific knowledge (including social scientific methods), as well as the competencies and skills embodied in living beings.
3. Markets delimit and construct a space of confrontation and power struggles. Multiple contradictory definitions and valuations of goods as well as agents oppose one another in markets until the terms of the transaction are peacefully determined by pricing mechanisms.<sup>3</sup>

We define the study of marketization as the entirety of efforts aimed at describing, analysing and making intelligible the shape, constitution and dynamics of a market socio-technical arrangement as outlined above. Our definition is consistent with the academic literature. It is coherent with our comments on the family resemblance of markets and on the role of economics and social science in enacting this resemblance. And it is also compatible with the 'popular' meanings of markets as institutions that favour the creation of values by organizing competition between autonomous and independent agents.

Our definition of markets highlights two noteworthy elements present in the literature but infrequently emphasized. First, although our insistence on materialities and technicalities is not entirely new (Weber, for one, puts it at the centre of his conception of the market economy), the way in which we appeal to these does contrast with the standard definitions of economists and sociologists. Second, by taking into account the social sciences, as well as knowledge and skills developed by market agents themselves, we have drawn attention to an entirely under-studied field of research.

This general definition enables us to distinguish markets from other types of economic organization. It is compatible with the wide diversity of forms that markets have taken on, are taking on or could take on. It also encompasses capitalist and non-capitalist markets; formal and informal markets; markets centred on exchange and those centred on productive activities; markets localized in space and those which are distributed between distant and changing sites; markets in which agents have set roles (e.g. they are producers or consumers); as well as those in which they constantly change roles (e.g. financial markets). Our definition is therefore open to the diversity of markets.

Because of the diversity of markets – which, as we will see, stems primarily from the infinite ways of configuring calculating equipment and material devices – processes of marketization must be referred to in the plural. The trajectories taken towards the achievement of markets are never of a singular course.

Some might respond that marketization is an elaborate name for an acknowledged and extensively documented process better known as the social construction of markets. However, the study of marketization differs from a social constructivist approach to markets in several crucial respects. In anticipation of this potential misreading, it is worth demonstrating that three hypotheses shared by social constructionist approaches to markets must be jettisoned before arriving at the study of marketization we are proposing.

Constructivism focuses on the mechanisms usually qualified, in the first place, as ‘social’. As we have previously argued (Çalışkan & Callon, 2009) what this means in concrete terms is that markets are analysed as a particular case of social networks, institutions, conventions, rules, legal arrangements, norms or social fields. The important limit of this approach is that in social construction, which can be applied to any object considered to be in the purview of the social sciences, the specificity of the *arrangements* being analysed is completely lost. The claim that sociology tends to flatten differences instead of transforming them into problems to be solved by the sociologist originates in this observation (Latour, 2005).

The second distinct drawback of social construction that follows from the first, is that, even when the deconstructionist approach is complemented by an analysis of the mechanisms of market construction (as Fligstein or Bourdieu have done), the explanation for the soundness of markets and for their objective reality either brackets off their material and technical dimensions or reduces these to generalized abstract notions such as ‘resources’ or ‘capital’. This effectively evacuates all elements that cannot be qualified as social from the case, while inflating the analysis around those that can.

Third, the reflexive or theoretical activity increasingly involved in market design is largely underrated and devalued by a social constructionist approach. The role of what Callon (2007a) called ‘economics at large’ – that is to say, academic economics, but equally the array of knowledges and the know-how on markets that non-academic agents elaborate and employ – is overlooked. Social reductionism, which makes social relationships the

principal explanatory element, is attended by an epistemological ambition to grant itself the monopoly on true discourse. It sees orthodox economics, and even more so economic activity being practised in the wild, as nothing but an ideological endeavour or a false science.

Our definition of markets as arrangements configured during a marketization process raises the question of how the elements that determine the diversity of markets can be identified. On the basis of existing research, partially reported on in this section, we have tentatively selected five basic issues – what we refer to as types of framing – to which it seem crucial to be attentive when it comes to examining marketization:

1. Pacifying goods
2. Marketizing agencies
3. Market encounters
4. Price-setting
5. Market design and maintenance

These five focal points of markets contribute to an understanding of the processes of marketization or, in other words, of market framings.<sup>4</sup> Perhaps more importantly, their identification draws attention to areas where it might be possible to exert control over market design. It is on this point, the possibility for creative intervention in markets, that the piece will close.

### **Pacifying goods**

Markets are not possible without generating and then reproducing a stark distinction between the ‘things’ to be valued and the ‘agencies’ capable of valuing them. Two basic types of entities result: entities with pacified agency<sup>5</sup> that can be transferred as property, and entities that are able to engage in operations of calculation and judgment. The creation of this asymmetrical ontological divide, in which only the latter are considered to have agency in the valuation process,<sup>6</sup> is an essential property of the regular functioning of markets (see Box 1).

Given our previous definition of markets, is it possible to conceive of one in which goods are authorized to destroy this asymmetry of their own initiative and to contribute multiple suggestions of their own value or that of the agencies trading them? The answer is a resounding no,<sup>7</sup> for it is the passivity of things that transforms them into goods, and that enables agencies to form expectations, make plans, stabilize their preferences and undertake calculations. By ensuring that their qualities evolve predictably, passive goods create an environment whose stability favours organized action and establishes the possibility of entering into cooperative or competitive relationships of exchange.

This ontological divide usually implies that objectification work (quite literally the work of making objects) must be done to disentangle things from

To refer to goods as being passive may strike the reader uninitiated into science studies as redundant if not somewhat bizarre. A quick parenthesis to situate this premise is in order. The claim that goods must be rendered passive is derived from the empirical observation that when scientists approach natural objects, these do not express stable qualities without resistance. Scientific investigations involve controversy because objects participate in producing conflicting data about themselves. For a scientific fact to emerge, scientists must successfully pacify natural objects, reducing them from wild unknowns to things with fixed qualities. While in science only human scientists have generally been considered as 'active', science studies has argued that the agency of humans is the outcome of processes of fact production, which by definition seek to make objects incapable of expressing novelty or unexpected characteristics – that is, to render them passive.

### Box 1

their networks of connections (Thomas, 1991). An inventory and analysis of the investments required to transform entities from entangled beings into passive things is a key issue for the study of marketization.<sup>8</sup> To give a taste of the type of investigation that needs to be further developed, consider the following four potential topics of research.

#### *The commodification of living beings*

This topic is a very old problem that addresses the construction of a labour market which separates the 'labour force' from the persons executing the work. The question of commodification has taken on a new salience due to the proliferation of 'living' entities that have become candidates for marketization. Things such as genes, proteins, embryonic cells, GMOs and so on, currently being produced in laboratories through biomedical practices, raise difficult problems in terms of economic framing. By nature, novel entities tend to behave in ways that can be astoundingly difficult to predict or control. The domestication of novelty takes time, and not infrequently stabilization can prove to be impossible. The question of controlling biological entities is nothing new, as the history of livestock shows.<sup>9</sup> Yet the expanding industrialization of the life sciences contributes powerfully to the proliferation of such entities and to their dissemination. Hence the emergence of haunting questions about the possibility of their being subject to marketization.

#### *Service provision*

Services involve the performance of a set of operations that have been designed to provide a solution to a problem or an answer to the beneficiary's demand. The

gradual shift from an economy of material goods to a service economy only reinforces the importance of perpetually managing entities, which, at any point in time, can turn into unpredictable courses of action that are difficult to frame.<sup>10</sup> The constitution of service industries is a fertile subject by which to follow the controversies generated by processes of economic objectification. Services are framed with a view to objectifying and transforming them into packages, 'things' which can be valued. Like other goods, they must be made describable and predictable, with built-in safeguards to warn of unexpected overflows.

Although the nature of services as intangible goods is often emphasized, empirical investigations show that producing services requires the implementation of specific socio-technical arrangements (Akrich, 1992; Callon, Millo & Muniesa, 2007). For example, in addition to the cars themselves, car rental service implies a network of agencies located in places such as airports, maintenance units to repair and inspect the vehicles, reservation points through travel agents, liability insurance plans, legally binding rental agreements and so on, all of which must be coordinated and mobilized towards the satisfaction of the customer. It is at the price of these investments that 'renting a car' becomes packaged so that it can be reliably exchanged.

### *Property rights*

For a market to function, the framing of entities as passive objects must also be compatible with their attachment to property rights. In other words, it must become possible to assign the thing to an owner(s).<sup>11</sup> The assembly of devices and procedures that are necessary to make appropriation possible constitutes another prime subject in the study of marketization.

For example, the content of patent laws makes certain goods less easy to appropriate (or at least makes it costly to do so). Patent rights on living and especially genetic material, as well as software and basic scientific knowledge, confer ownership on specific entities to the exclusion of others. In the case of embryonic stem cells, legal and material problems associated with ownership are compounded by ethical or political considerations. Yet, even in the absence of debates and controversies, the ultimate association of property rights with things necessarily involves the establishment of specific technical, material, textual and legal devices which allow an owner(s) to be identified, which define the nature of the rights attached, and which dictate the terms of their enforcement.<sup>12</sup>

### *Standardization*

Disentanglement is more stable (that is, less vulnerable to the constant pull of re-entanglement) when a commodity has undergone specific processes of standardization that transform it into an entity described in both abstract and



precise terms, certified and guaranteed by a series of textual and material devices. High-quality empirical studies on the dual process of standardization and certification exist, most notably Cronon's (1991) seminal study of the Chicago grain market.<sup>13</sup> These kinds of studies should be pursued further.

Strategies borrowed from science and technology studies (STS) exist for empirically analysing the process through which entities are framed as passive and valuable, are arranged to be attached to owners and/or are detached from their designer-producers. The first – such as in the case of cell stems, genes or software – is to study the legal, ethical, scientific or economic debates triggered by actions of framing and assigning ownership. The directions taken by marketization processes are profoundly shaped by the content of these controversies and by their resolutions.

Another point of empirical entry is provided by what Callon (1998, 2007b) has called 'overflowing mechanisms'. As he has observed, all framings are incomplete and imperfect because by definition, to frame is to make selective inclusions and exclusions. In the sense that it structures an exterior to itself, a framing is its own inescapable source of the threat of overflows. Moments of overflow mark the emergence of a frame's shortcomings, and in so doing make material, legal or other framing devices visible while inspiring debates on how these might be improved. These debates and the solutions which they generate constitute privileged objects for analysing how goods become pacified.

### **Marketizing agencies**

In comparison with other possible forms of economization, marketization's key characteristic is that a multiplicity and diversity of actors compete to participate in defining goods and valuing them. From an empirical point of view, the most visible and well-known forces that set markets in motion are firms, trades unions, state services, banks, hedge funds, pension funds, individual consumers and consumer unions and NGOs. To be more complete we could also mention the public- and private-sector research centres that prepare new products and processes, the international monetary or financial institutions, the regulatory or standardization agencies (whether they concern hard technologies or social technologies such as accounting rules and practices), as well as experts, lawyers, economists, think-tanks and other spin doctors. There is no standard list. Part of the analysis would involve drawing up an inventory for each and every case.

The notion of *agencement* that we are going to introduce into the following sections is a methodological term designed to respect and render the diversity of these forces. It demands that a panoply of entities be flexibly taken into account and described, in detail, whether they are human beings or material and textual elements. The term is also designed to facilitate the study of the variety of forms

of action these forces are capable of generating. Moreover, because *agencements* create differentiated agents and positions in the market, it is possible to trace relationships of domination as they are dynamically established.<sup>14</sup> Finally, and this is crucial from our point of view, the notion serves to capture what *agencements* have in common when they are engaged in markets.

The notion of socio-technical *agencement* (Callon, 2007a) sums up a series of studies undertaken in various fields on the fringes of the social science. Three particularly relevant and valuable groups of studies are worth mentioning here: (a) studies concerning distributed action and cognition (Bowker & Star, 1999; Giere, 2002; Hutchins, 1995; Varela & Thompson, 1991),<sup>15</sup> (b) the contributions of the anthropology of science and technology, especially actor-network theory (ANT) with its insistence on assemblages of humans and non-humans (Latour, 2005);<sup>16</sup> and, finally, (c) recent research devoted to developing a socio-anthropology of disability that is attentive to socio-technical arrangements and the courses of action they allow (Callon, 2005a; Moser, 2003).

In concert, these studies have shown that action, including its reflexive dimension which produces meaning, takes place in hybrid collectives (Callon & Law, 1995), hereafter called socio-technical *agencements* (STAs). STAs are comprised of human beings (bodies) as well as material, technical and textual devices. Actions such as piloting or steering (a boat or aeroplane, or a firm) (Hutchins, 1995), or cognitive activities such as those of an astronomer who tries to identify and locate new galaxies, to determine their evolution and calculate their trajectories (Giere, 2002), mobilize a large number of (human and non-human) entities that take part in the action and in the cognitive process. That is why it is more exact to talk about socio-technical *agencements* rather than agencies.

The term *agencement* is a French word that has no exact English counterpart. In French its meaning is very close to 'arrangement' (or 'assemblage'). It conveys the idea of a combination of heterogeneous elements that have been adjusted to one another. But arrangements (as well as assemblages) could imply a sort of divide between human agents, those who do the arranging or assembling, and things that have been arranged. This is why Deleuze and Guattari (1998) proposed the notion of *agencement*, which has the same root as agency: *agencements* are arrangements endowed with the capacity to act in different ways, depending on their configuration.

Nothing is left outside *agencements*. That is to say, there is no need for analysts to seek further explanation, because the (eventual) construction of its own meaning is by definition an integrated part of the *agencement*. An STA eventually includes the statement(s) pointing to it and interpreting it, just as creating instructions are part of a device that participate in making it work.<sup>17</sup> We therefore choose to use the French word *agencement*, instead of arrangement, to stress the fact that agencies and arrangements are not separate. *Agencements* denote socio-technical arrangements when they are considered from the point view of their capacity to act.

The concept of *agencement* has several distinct advantages. First, it frees the analyst from *a priori* distinctions between categories of agency. Depending on the configurations and equipments of STAs, agencies can be deliberative (Kelty, 2009), have adaptive behaviour, reflexive competencies, calculative or non-calculative capacity or disinterested or selfish subjectivity, whether collective or individual (Callon & Law, 2005). Through STAs, the making of (new) agencies is an infinite and never-ending project; the classification of the different forms of agency is a finishing point, not a starting point of investigation. Rather than establishing great divides, this approach to agency aims for the (continuous) proliferation of differences. The study of agencies can be conflated with the study of STAs. Exploring, describing and analysing *agencements*, as well as their diffusion/transportation, constitutes an immense research project whose achievement still lies ahead.

Second, the notion of *agencement* enables us to make changes of size intelligible. For example, as ANT has so clearly shown, other than size, there is no difference in the nature of macro-actors and micro-actors (Callon & Latour, 1981); all that changes is their composition and the way in which their constituent elements are arranged, aggregated or deployed. An appropriately arranged firm can act as a single entity: it is neither simpler nor more complicated than a single human being. Through various devices – including, for example, laws, rules of the game, calculation and reporting tools or decision-making procedures – *agencements* can considerably simplify or conversely complicate their own existence. Consequently the same analytic tools can be used to study an ‘individual’ consumer, a firm or an international organization: the size and strength are compound realities that can be studied and elucidated by analysing *agencements*.

Finally, a frame of analysis based around *agencements* leaves the question of the assignment of agency wide open. Collective action can either be shared between several entities (as in the case of a football team or a team of workers) or attributed to only one of them (as in the action of steering a firm or piloting an aircraft). The notion of socio-technical *agencement* is a protection against the temptation to contrast individual and collective action. All action is collective since it is distributed; what vary are the mechanisms for attributing the source of the action. The shape, content and architecture of the *agencement*, with equipment that facilitates the action to a greater or lesser degree, from a distance, decisively influence the modalities of attributing action. So does the inclusion of specific legal or regulatory texts which distribute responsibility or property.

### *Market agencements and cross-calculation of values*

STAs are everywhere – in politics, in science and, of course, in the economy. The pressing question, however, is how to define the particularities of market-making STAs. The answer provided must, of course, respect the diversity of

competencies, knowledge, know-how, material resources and forms of organization of the agencies engaged in a market. Such diversity, which explains the creative capacity of markets, has been highlighted by all those who have studied the dynamics of innovation. But to be included in the market participating entities cannot escape the requirement of involving themselves in processes of valuation, that is to say of participating in the calculation of the relative values of the goods intended for the exchange, and consequently their prices. Without exchange, the market as a set of interdependent forces ceases to exist. Thus, the valuation process depends on the realization of exchanges in the agonistic market space. Any agency unable to calculate values towards the end of exchanging, and in particular unable to take the calculations of the other agencies into account in their own calculations, would rapidly jeopardize its business. A market implies the execution of these crossed calculations and includes only the agencies capable of performing them. The study of these agencies' (cross-)calculating competencies, and the asymmetrical relationships generated by the unequal distribution of such competencies, is at the heart of the marketization research programme. We will indicate some references that constitute the beginnings of a sound base for this endeavour.

For the firms, or more generally speaking, the organizations engaged in markets, the pioneering works on accounting, and more generally management tools, are well worth mentioning. The claims made by Weber, Schumpeter and Sombart concerning the importance of double-entry book-keeping in the rise of capitalism are fundamental in this respect.<sup>18</sup> Further research has shown that the tools equipping agents that enable (or habilitate) them to undertake certain types of action are not only instruments used to reach certain ends, but they contribute actively to making the realm that constitutes the action itself as a possibility (Hopwood & Miller, 1994; Miller, 1994; Miller & Rose, 2008; Power, 2004).

The know-how, practices and methods that contribute to calculation, however, are not limited to accounting techniques. They also include activities that exist in both the academic and business worlds, such as the so-called management sciences (on marketing, see Cochoy, 1998). The exploration of management tools, the disciplines, as well as the more or less formalized knowledge and know-how equipping firms (like strategic planning or operational research) must be pushed forward. Such research has to go beyond the supply side, to include the calculating equipment of the intermediaries and of consumption-related agencies. The existence of powerful consumer unions, the active role of users in the design of products intended for them and the social movements promoting fair trade are all arguments for research on the calculating forces of consumption (Mallard, 2007).

Whether the subject being tackled is supply or demand, the analysis of under-equipped weak agencies is as interesting as that of strong agencies (Bourdieu, 2005). From this point of view, sociology and anthropology must be included within the analysis, like the academic disciplines discussed above.

This is particularly important when they act as spokespersons for those who are usually disregarded but demand to be taken into account (such as groups affected by negative externalities or excluded from existing markets). In these cases the social sciences can participate, along with weak agencies, in the redefinition of the calculation of goods and their values. In a similar fashion, the numerous laws and institutions governing competition or protecting consumers become relevant research subjects as they contribute, directly or indirectly, to altering the established calculating powers. They might, for instance, limit them, complicating things for agents, or furnish tools that increase the calculating capacities of weak agencies.

One type of market that has already been systematically and extensively analysed with these considerations in mind is financial markets. Recent research on financial markets, and more generally electronic markets, has demonstrated the advantages of an approach centred on the various tools available to agencies. In financial markets, what agencies (can) do depends increasingly on their computer and mathematical equipment. In this respect, the pioneering work not only of MacKenzie (2006) but also of Knorr-Cetina and Bruegger (2002) and Muniesa (2000, 2003) is noteworthy. In more specific example, the formulas used by traders (Lépinay, 2007b), as well as the ticker analysed by Preda (2006), have contributed powerfully towards shaping calculative agencies. The study of arbitrage in trading rooms has shown the complexity of socio-technical *agencements* that are involved in calculating value. These include not only information and communication technologies, but equally, and every bit as importantly, the bodies of traders and the desks at their disposal (Beunza & Stark, 2004).

Likewise, the now abundant work on commercial distribution contributes to a better knowledge of this other set of calculative agencies: in this case the product presentation, the spatial organization of shelves, the labels, shopping carts and lists can all be analysed as so many pre-calculated operations constituting agencies' calculative capacities – whether those agents are consumers or sales professionals (Barrey, Cochoy & Dubuisson, 2000; Grandclément, 2006; Kjellberg, 2001). A recent book (Callon *et al.*, 2007) groups together a set of empirical studies presenting various technologies that contribute to the framing and equipment of agencies. The quality of existing or ongoing research should not conceal the importance of what remains to be undertaken, for the number and diversity of agencies participating in the constitution and calculation of tradable values are constantly increasing.

The analytical framework provided by the socio-technical *agencement* concept enables us to take into account the diversity of the calculative equipment of agencies engaged in a market. From this point of view, controversies on calculating tools are a good entry point to understanding the development of calculative agencies. It also allows us to describe and to study the variable contribution of this equipment to the marketization process, that is, to structuring markets. As noted above, and as we will re-emphasize now, STAs renew the analysis of the power struggles at the heart of any market.<sup>19</sup>

### *Relations of domination*

Analyses of the various calculating devices equipping market socio-technical *agencements* have furthered understanding of relations of domination. Inequalities derive from the unequal power of calculating agencies that loop back to reinforce themselves. Due to these asymmetries, the most powerful agencies are able to impose their valuations on others and consequently to impact strongly on the distribution of value (Bourdieu, 2005; Fligstein, 2001). Where certain descriptions of markets simply see competition or confrontation between autonomous agents, studies of marketization discover an ambivalent reality: it is by affirming the autonomy of calculating agencies that markets are able to conceal and to legitimately impose the asymmetries that develop out of the achievement of calculative capacities.

To study these relationships of domination which stem, above all, from differences in calculative equipment, the anthropology of disability is illuminating. Disability introduces the idea of a prosthesis to describe a strategy of filling the gaps between unequal agencies. It also introduces the dimension of exclusion and the demands such exclusion may fuel. The study of disability provides an analytical framework to account for relations of domination-exclusion between agencies and to interpret any behaviours of resistance or recalcitrance there may be (Moser, 2003). Callon has thus invoked the notion of '*habilitation*' (a French word that means to proffer a capacity to act to someone who lacks it) to analyse what it is that certain economic agencies, deprived of calculative capacities, are making claims for (Callon, 2005a, 2008).

The equipment required, for instance, for a liberal subject (either collective or individual) – who should be capable of interacting, defining objectives, calculating interests and even entering into sophisticated cooperative games – to be able to exist and act is particularly costly to obtain and is not equally distributed. Some agencies lack such equipment and rapidly sink into exclusion or cease to exist. Health markets are particularly interesting fields for exploring this form of socio-technical *agencement* (Rose, 2006; Van Hoyweghen, 2007). This is because of the increasing importance of chronic illnesses and the progressive disabilities that result from these. Information and communication technologies (ICTs) contribute to accentuating this trend towards market agencies in the form of interactive responsible agencies (Callon, 2007b).

Another fertile field for studying the mechanisms of formatting agencies, the models enforced and the resulting relations of domination is the one consisting of relations established locally between countries of what is referred to as the global South and those of the North (Çalışkan, 2005, 2007b; Elyachar, 2005; Mitchell, 2002, 2007). Of particular relevance is Julia Elyachar's (2005) rich analysis of the programme for the development of micro-enterprises and micro-credits in the El-Hirafiyen neighbourhood of Cairo. Elyachar has followed how this programme, run by NGOs that mobilize the notion of social capital (social network) borrowed from the social sciences, is designed to

produce and maintain economic agents capable of having projects and taking responsibility for their debts and profits. Households thus become micro-enterprises whose main assets consist of the webs of relations and the solidarity that they produce.<sup>20</sup> By documenting actors' innovative capacity when they are provided with calculative equipment, in the definition of which they have not been involved, Elyachar's analysis of processes of dispossession demonstrates the limits of Harvey's claims (2003): markets do indeed extend themselves by dismantling existing institutions and practices that protected poor people from capitalist accumulation, but at the same time unprecedented forms of economy are invented. These arise when new agents (NGOs and international organizations [IOs]) are created which promote new forms of valuing goods that are explicitly attentive to relationships of solidarity.<sup>21</sup>

These examples show the degree to which studying the shaping of market agencies is promising and fertile. It enables us to grasp and to document the socio-technical diversity of agencies and of the forms they take, the complexity of their calculative capacities and relations of domination which develop between *agencements*.

### Market encounters

For things to be valued, it is necessary to have agencies capable of valuing them. But for the activity of valuing to take place, calculating agencies and goods have to meet one another. These encounters are the third characteristic of the marketization process.

Treating 'the encounter' in the singular is misleading. So is the assumption that supplies and demands can be formulated without preliminary intermediation, especially by marketization professionals. In reality, markets involve a series of multiple encounters and overlapping processes of calculations. Contingencies certainly play a part, as do the initiatives taken by agencies and the unpredictable movements of goods which overflow and follow unexpected trajectories. Yet encounters are not produced haphazardly. Like goods and agencies, they are also framed and formatted by a series of devices.

The existence of encountering devices was demonstrated a long time ago. Braudel (1985), for instance, maintains that markets spawned capitalism as soon as the chain of intermediaries between producers and consumers was lengthened, causing consumers to be placed in situations where they depend on specific producers. In such situations encounters are so closely framed that long chains are formed. These chains prevent free and open competition while facilitating accumulation. Braudel's historical approach thus shows that organizing and framing the encounter is the product of the activity of mediators (we prefer this word to the less dynamic term 'intermediary', since the idea of mediation stresses active participation in producing an outcome). In anthropology, a classic text by Geertz (1978) has shown how, thanks to the social organization of the bazaar, different categories of customers follow

different paths and end up at different shops. Finally, in economic sociology a large number of studies that use social networks (especially applied to markets like the labour market, lawyers' markets and financial markets) also consider this question (Granovetter, 1973).<sup>22</sup>

Taking the analysis of these mediating activities as its object of investigation, the ANT approach emphasizes the analytic importance of non-humans. The existence and strategic roles of non-human mediators has become more clearly visible only with the computerization of operations in certain markets. Sites for studying these socio-technical mediating devices abound, especially with the upsurge of the electronification of markets. Electronic markets are ideal for raising questions about how things and humans encounter one another, because automation and computerization have required precise descriptions of the procedures to be followed. For instance, in his study of the automation of the Paris stock exchange, Muniesa (2000) details the problems that designers and engineers had to solve. At the end of the day, a sophisticated mediation device was set up, including networked computers, data flow systems and connections providing access to the stock exchange not only to brokers but also, as was previously the case, to individual clients and banks. The socio-technical arrangements organizing these encounters have consisted of machines, software, material devices and human beings whose activities were entangled and interconnected. Beyond the studies devoted to high financial markets we should also mention those on consumer credit markets (Poon, 2007), as well as on B2B markets (Lindberg & Bergström, 2005), agricultural markets (Çalışkan, forthcoming), labour markets (Mellet, 2006), funeral business (Trompette, 2007) and on mass consumption markets (Barrey, 2007).

The visibility and diversity of such devices have certainly been rendered more obvious through the eruption of electronic technologies, but have existed for much longer than these. The existence of such arrangements as well as their functioning are highlighted, elucidated and explicated by automation projects whose purpose is to substitute a mechanized device for pre-existing processes. Muniesa (2003; Muniesa and Callon, 2007), to whom we owe the notion of explication, analysed this precise point in his study of technological change at the Paris Stock Exchange. As a consequence of his work it has become particularly interesting to analyse how these devices are transformed and the effects that they produce on organizational forms and the modalities of market encounters. Mallard (2004) and Muniesa (2008) have, for instance, discussed the massive and sudden introduction of telecommunication technologies in very different setting, from the activities of small and medium enterprises in general to their role within financial markets in particular. Elsewhere, Thrift (2004) has identified yet another form of technology that is becoming essential for organizing encounters: addressing. Encounters (between goods and agencies) mean localization, identification of addresses and monitoring of movements. These technologies (postal addresses, ZIP codes) have become extraordinarily efficient and performative with GPS, bar codes and so on. The investigation of these



devices should be attentive in a general sense to their diversity, to the manner in which they evolve and to the debates that their conception generates. The simplest forms taken by the devices that frame encounters constitute opportune sites of analysis. A wonderful and simple illustration of know-how and of the techniques that enable one to discover ‘captation’<sup>23</sup> (Cochoy, 2007) is the work of Clark and Pinch (1995) on ‘pitchers’ (figures who are able ‘to routinely transform a patch of bare ground into a sea of eager purchasers using little more than the “gift of the gab” . . . to determine what is needed to convince their customers to buy’). Understanding the mechanisms through which the attribution and apportioning of agency to humans and non-humans established inside encountering devices is of equal interest. Several pioneering studies have already tackled this question such as Hennion and Méadel (1989) on the radio, Méadel and Rabeharisoa (2000) on the food industry or Hennion (2007) on artistic taste.

In spite of the richness of existing scholarship, the various social or material technologies that play a part in structuring encounters still need to be recorded and studied in detail. By taking up socio-technical mediating devices, studies of markets will rid themselves of the paralysis that gripped them when they started showing an interest in Western markets. Remember that Polanyi, who contributed so much to the understanding of markets, strangely repeated the famous definition of abstract markets proposed a century earlier by Cournot (1927 [1838]) when he considered the market as an area of encounters between two blocs, that of demand and that of supply (Polanyi, Arensberg & Pearson, 1957).

### Price-setting

The three forms of framing (of goods, agencies and encounters) are closely interrelated and shape the process of marketization in its generality.<sup>24</sup> Bringing these framings to bear on the analysis of markets is a must, but remains incomplete without a theory to approach prices ethnographically. The existence of a market implies that the valuations, and the calculations that produce them, come out in the form of prices (see our definition of markets, above).<sup>25</sup>

Fixing a price is always the outcome of a struggle between agencies trying to impose their modes for measuring a good’s value and qualities (Stark, 2009). This point was clearly noted by Weber:

Money prices are the product of conflicts of interest and of compromises; they thus result from power constellations . . . [the] price system [is] a struggle of man against man; and prices are *expressions* of this struggle; they are instruments of calculation only as estimated quantifications of relative chances in this struggle of interests.

(Weber, 1978 [1922])

Weber insists moreover on two points which support the approach that we have adopted until now. Prices are (a) estimated *quantifications* and therefore (we add) imply the mobilization of calculation tools. As such, they are (b) at the heart of agents' struggles to produce asymmetries in the distribution of value.

We suggest the term 'valorimeters' to denote the various tools, procedures, machines, instruments or, more generally, devices effecting this controversial translation of values into figures and, more precisely, into monetary amounts (Maurer, 2006). Calculative agencies which are able to achieve the imposition of their valorimeters, that is, their numeric calculation tools and algorithms, with their calculatory modes have a good chance of simultaneously being able to impose prices that those tools make it possible to calculate; they become positioned to transform their own valuation into an obligatory passage point and can spread the definitions of value that are more closely aligned with their interests (Guyer, 2004). The study of marketization that we propose is keenly interested in these valorimeters. It focuses on their design (by agents and/or by social scientists and especially economists, marketing professionals, experts in accounting or in the evaluation of costs and in management control), their implementation and their use, whether these prices correspond or not to the transactions actually carried out.

Two striking facts have emerged from the available (although as yet rare) studies on price-setting. The first is that there is a multiplicity of prices which, at a given point in time, are available in markets and used (Çalışkan, 2007a, 2009). In the spirit of celebrating diversity in value at all costs, the temptation here is to treat these various prices without any interest in the relationships between prices introduced in different places and times by different agencies. However, this would ignore the existence of collective forms of organization that have specific effects on pricing. For the price of any particular transaction – and this is the second fact – is always calculated on the basis of other prices.

The process of using prices to calculate prices is a powerful mechanism for unifying markets, by the singular interdependencies that it creates between a multitude of local (potential or actual) transactions carried out or envisaged at different times. Recent anthropological research showing how agencies calculate prices on the basis of scalar valuations (which include other prices), even when they are engaged in bilateral transactions, opens up new avenues for understanding pricing (Guyer, 2004).<sup>26</sup> This particular calculation often consists of elaborating and applying formulas that constitute preferred research subjects (Lépinay & Callon, submitted).

Numerous noteworthy studies have analysed different sorts of formulas designed and used for calculating prices. These include the pioneering work by MacKenzie (2006) on the Black and Scholes (mathematical) option pricing formula which links the price of derivatives to the prices of the underlying assets. Beunza and Garud (2007) have shown how financial analysts cling to the

use of established formulas for assigning a value to shares issued from emerging companies that develop new technologies. Another example is the notion of pricing scripts proposed by Velthuis (2005) for the art market, also an interesting type of formula. Zbaracki and Bergen's (2008) detailed empirical study of price adjustments in a Midwest manufacturer convincingly shows how (performative) routines can explain how prices are fixed, and simultaneously how economics intervenes in this process. And finally, Faulhaber's and Baumol's (1988) comment that agents frequently use the gold strategy of marking up underscores the fact that the good old formula 'sales cost = cost + margins' is the simplest pricing script or, more generally speaking, the commonest way of setting prices on the basis of existing prices or numbers (Hall & Hitch, 1939).

Çalışkan, in his ethnographic study of the world cotton market, has opened a new perspective by introducing the notion of *prosthetic* prices, which are distinguished from *actual* prices. He argues that a price is not prosthetic by nature, it becomes so when an agency uses it as input into a calculation (or a formula) aimed at imposing an actual price to conclude a given transaction. Observing the constant proliferation of prices, he shows that this multiplicity is produced by the calculative work of certain agencies which use a price as a reserve. They then transform this reserve, when they can, into prosthetic prices to impose their own calculations (Çalışkan 2005, 2007a, forthcoming).<sup>27</sup>

The study of pricing formulas has, moreover, demonstrated the diversity of variables other than existing prosthetic prices, which are taken into account in the calculation of (new) prices. Some variables are physical. Take Hughes' (1983) work on Edison, that of Mirowski (1990) on relationships between physics and economics, that of Yakubovitch, Granovetter and McGuire (2005) or of Hecht (1998) on the electricity industry. These studies have all documented the role played by material parameters such as yields, traffic and network loads in the calculation of rates.<sup>28</sup> In a somewhat similar spirit, Velthuis (2005) has shown that the size of paintings is a key criterion for establishing the price of works by well-known artists.

Apart from material variables, other criteria that can be qualified as social are sometimes also used in formulating prices. Several studies have shown, for example, that the actors themselves directly link the question of the fairness of prices to the content and construction of formulas serving to calculate them: it is not the prices that are fair or unfair, but their modalities of calculation, i.e. their formulas (Muniesa, 2003; Guyer, 2009). The contribution of calculative formulas becomes obvious when prices are established by administrative rules as is frequently the case for health care, medications, energy or interest rates. Work exploring the relationship between social networks and pricing (Baker, 1984; Uzzi & Lancaster, 2004) confronts this question albeit indirectly. For example, the correlation between the volatility of prices and the size of a trader's social networks brought to light by Baker can be interpreted as the outcome of the cross-calculations of agents, such that the form (and formula) of these cross-calculations – and therefore their results – might depend on the

morphology and the size of the networks attached to the agents involved in calculating. As Callon (1998) has shown, networks can be likened to calculative formulas that contribute to translating systems of social relations into monetary values.

The analysis of valorimeters and of private and public formulas for calculating prices is crucial in the study of marketization. It affords access to the diversity of modalities of organization and functioning of markets. It also makes it possible to shed new light on the question of market domination discussed above. On this last point, for example, as Çalışkan has shown, the more an agency is capable of complicating its own calculation by linking it to a large number of other prices (which are thus transformed temporarily and locally into prosthetic prices), the higher will be that agency's capacity to determine the terms of the exchange.

### Market design and maintenance

The definition of markets as socio-technical *arrangements or agencements* (STA) raises the question of their design, implementation, management, extension and maintenance – in short, of their dynamics. The topics to explore and the problems to examine are numerous. In this section we consider only a few aspects of the research fields raised by a consideration of STAs and some of the questions concerned.

The first research avenue corresponds to a set of questions that we group together under the term 'performativity'. The aim in the performativity programme is to study all the theoretical and practical, expert and lay knowledge, know-how and skills developed and mobilized in the process of designing and managing market STAs (Callon *et al.*, 2007; Kjellberg & Helgesson, 2006; MacKenzie, 2009b; MacKenzie, Muniesa & Siu, 2007).

An examination of the specific role of academic economics in the structuring of markets has produced some remarkable work (MacKenzie, 2006). Guala (2007) has analysed in detail the role of the theoretical economy in designing auctions. Other work worth mentioning is that of Holm (2007) on individual transferable quotas (ITQs). The role of economics in marketization is becoming pervasive. It is supported by the upsurge of ICTs, as the creation of electronic markets demands a process of explication and abstraction (Muniesa, 2003), which paves the way for economics' intervention. Academic economics, moreover, has its own institutions and professional organizations which constitute research subjects to explore (see Fourcade [2006] for an original approach to the movement of professionalization of economists; also Babb [2001, 2003]).

The performative function of the economy deployed by academic economics is increasingly indissoluble from practices of *experimentation* and *modelling*. The complexity of relationships between *agencements* means that prior precise modelling is hardly realistic, especially when it comes to explaining the establishment of prices. Models need to be tested through *in vitro* or *in vivo*

experimentation. Experimental economics, which for a long time was conceived of as a strategy for validating theories, has taken this turn; it is now engaged in a programme close to social engineering (Guala, 2007; Roth, 2007). This turn towards economic experimentation is reflected at the theoretical level primarily in the booming growth of behavioural economics (Camerer, Loewenstein & Robin, 2003). At the same time experiments on the ground, previously seen as marginal and peripheral, are sources of reflection and ideas for economics (see Muniesa & Callon [2007] for scale-one experiments).

The upsurge of economic experimentation (both *in vitro* and *in vivo*) is strongly related to a transformation of the modelling itself, which in certain respects has become closer to simulation (Collier, 2008). The models are intended less to stylize and purify reality (Breslau, 2003) than to reproduce its complexity and richness (the same shift can be observed in the natural sciences).

Another characteristic of performativity is that it is gradually taking on the form of a collective engagement extending beyond the academic world. The ability that actors themselves have to conceive, explicate and shape markets is obviously nothing new. But until recently the interactions and collaboration between actors and professional economists (which, as we have seen, include specialists in marketing, accounting, etc.) were occasional and rarely deliberately organized. This type of cooperation may well be becoming more frequent, systematic and reflexive. This is shown by several studies such as those devoted to carbon markets (MacKenzie, 2009a; Callon, 2009). These collective investigations, which can be qualified as economics at large, involve cooperation between those whom Callon has proposed calling researchers in the wild and confined researchers (Callon, Lascoumes & Barthe, 2009).

Collaboration between wild and confined researchers is inevitable in the process of marketization which feeds, precisely, on the work and interventions of economics at large. This collaboration leads to the proliferation of issues and matters of concern resulting from operations of market framing (Callon, 2007b). Taking these issues into account revives the engagement of economics at large, which, through ongoing controversy, finds itself at the heart of a dynamic process of marketization. Economics at large makes the possible diversity of forms of organization and of modalities of the functioning of markets visible and debatable (Gibson-Graham, 2006; Roelvink, 2008). By acknowledging a multiplicity of actors, grouping them together and addressing the variety of issues that can be raised, the role of economics at large is thoroughly political.

Up to this point, we have insisted on the design of markets as a whole; in short, on their permanently fragile framing. We should not, however, forget the regular functioning of markets and the ongoing work of maintenance that this requires.<sup>29</sup> Maintenance includes many operations that still need to be identified and studied. Çalışkan's (2005, 2007a, forthcoming) documentation of worldwide circulating physical commodities has shown how fragile even a

promissory act of price-taking is, and how much work is required to maintain a market. During the very exchange, which may take months if a trader is shipping thousands of bales of cotton from California to Turkey or millions of baseball caps from Beijing to Rotterdam, the deal may collapse for a variety of reasons. For a transaction to be successful, an enabling setting, which realizes the promissory act of price-taking and concludes the promise made by taking a price, the market, has to be construed and maintained.

The question of maintenance has been addressed in an oblique manner by economists, and later by economic sociologists through the notion of 'trust'. For a long time economists have proposed trust, and more generally 'lubrication' (Arrow, 1994), to capture the demands related to the everyday life of markets. The theoretical importance of the concept of trust to markets has been steadily increasing as an explanation of how coordination between agents is possible when uncertainty about the qualities of products is high.

To explain market maintenance, the notion of lubrication is, however, insufficient for several reasons: first, because the notion of trust covers only a portion of the realm of affects and emotions, without which markets would collapse. Beyond the contributions of Hirschman (1977), Latour and Lépinay (2008) and Rothschild (2001), who have shown just how much market function depends on the subtle interplay of interests, passions and moral sentiments, we must also mention the work of Miyazaki (2003) on hope. In the case studied, hope is shown to enable Japanese traders to take risks and therefore to facilitate the survival of financial markets. For her part, Elyachar (2005), in an analysis reminiscent of Adam Smith's *Theory of moral sentiments*, has shown how the evil eye – an avatar of the invisible spectator – contributes actively to the structuring and maintaining of a type of market relationship and behaviour that is designed to resist excessive individualism. In the same vein, Sloterdijk (2005) has emphasized the connection between the celebration of the taste for adventure and the modern movement of globalization.

The attention to emotions and moral competencies concerns not only so-called individual agencies and the *agencements* which make them effective (Roelvink, 2008); it applies equally to collective agencies (like firms): we now talk of the moral responsibility of firms and even of 'citizen enterprises' and the measures they should take to defend human rights (Barry, 2004). But these can never be carried out as coordinated projects on a wide scale without the aid of material apparatuses. Ultimately, then, our objection to trust is that it is used as an undifferentiated explanation of coordination that black-boxes maintenance operations and socio-technical devices, instead of demanding that these be studied. It would be useful to develop further studies of market emotions that grant a key role to materialities in the production of these very emotions. It is important to recognize that the notion of STA is designed to encompass the emotional, corporal, textual and technical elements that contribute to the maintenance of markets.

## Conclusion

Marketization becomes a dominant modality of economization. If the dynamics of economic markets are to be understood, then they must be placed within the context of broader movements that bring the economic into being. This is the complete message of this article when read conjointly with its previously published companion.

Rather than starting from the hypothesis that all societies have activities and/or forms of behaviour which can be located in *the* economy of *the* society (irrespective of the definitions given to these words), we have, in this two-part series, explored an alternative position. We consider that economies, in all of their diversity, have depended heavily upon scholarly and lay analyses and interventions that define, explain and enact versions of the economic, both in our societies and in others distant in time and space. Contributing analyses to what is to be included in the economy is divergent and often controversial. Discourses on the modalities of the economy's organization – whether theoretically structured or not, whether scholarly or not – are an active part of this process that contribute powerfully to its unfolding dynamics. Yet, our position is not relativist – the economy, in its different forms and manifestations, can be seen as the substantial outcome of a longstanding process in which conflicting institutional, material and cognitive forces are engaged.

To outline the main orientations of a study of economization and, more specifically, of marketization, we have found it appropriate to start with a critical presentation of a selection of authors and disciplines. The studies we chose to review in the first instalment of this article have worked directly or indirectly on the characterization of the economy or on what we have called the economic *Xs*. This literature review of work from recent decades enabled us to highlight the importance of the notion of economization as an object of research. Each of the authors we discussed has, in their own way, illuminated mechanisms that produce economic behaviours: no economization without either economics or the institutional assemblages that act as socio-cognitive prostheses to ensure the coordination of agents. Economization is equally impossible without the active participation of materialities or of practical and cognitive competencies in valuing agencies.

In this second instalment we have drawn upon a selection of contributions to outline what a study of economization and, more specifically, of marketization could and should be. We have identified problems to solve, sites to explore and analytical categories that should be developed and enriched. At the centre of this programme lies the notion of market *arrangement* or *agencement*. For markets to emerge involves various framings (framing of goods, of agencies and of encounters), price-setting mechanisms, as well as issues of their design and implementation. The emphasis on the notion of *socio-technical agencements* (STAs) should perhaps give way, then, to a more specific notion of *market socio-technical agencements* (mSTAs). mSTAs give access to questions which are all potential research avenues to explore.

First and foremost, the analysis of mSTAs highlights the role of knowledge – whether academic or not, professional or amateur, explicit or tacit – as well as of the materialities that are mobilized in the marketization process. Knowledge and materialities participate in the design, elaboration, experimentation, change, maintenance, extension and operation of *agencements*. Inquiring into the role of knowledge and materialities in the elaboration of markets enables us to articulate a connection between the study of marketization and the performativity programme. More precisely, we can draw a link between marketization and the co-performance of mSTAs by economics (see Callon, 2007a; and Mackenzie *et al.*, 2007). Hence, the analysis of the mechanisms of this co-performance process is one of the priorities of this new programme.

Such analysis must be inclusive of the effect of actors that are stakeholders in the process of co-performance. A preliminary list whose composition depends on the market under consideration must certainly always include the ‘usual suspects’: academic economists, management science specialists and, more generally, all of the relevant scholars who are based in university departments and take economy and economic behaviours as a subject of analysis. But, as we have emphasized on several occasions, the list most certainly does not end there. Depending on the case it is possible to find researchers from private enterprises or government labs (from the natural or life sciences), technological engineers, lawyers, accountants, civil servants drawing up regulations, consultants, politicians, NGOs and international agencies among numerous others. These different forces confront one another around different programmes in the design and building of institutions and tools. One of the first tasks of a marketization study is, therefore, to identify the forces participating in these networks and to understand how they interrelate.

The analysis of these mSTAs further introduces the question of the place of the marketization process in the broader historical process of economization. By pairing and comparing the detailed descriptions of specific markets, a further research objective might be to check whether certain configurations are shared by different markets, thus revealing the emergence of new, more general forms of market organization. Nonetheless, despite emerging tendencies, the idea of a market is indeed sufficiently open that original significations and alternative forms of organization are still imaginable. Moreover, the movement towards markets is by no means irreversible; other forms of economization can always be envisaged.<sup>30</sup>

Exploring alternative possibilities of markets can be greatly facilitated by the awareness that the social sciences, and especially economics but also the material technologies, can be mobilized in the service of a veritable economic engineering based on trial and error. Because experimentation opens onto new forms of organization and theorization, it also introduces an explicitly political dimension into the process of economization, especially when it means marketizing objects and behaviours that have previously defied marketization (on the case of carbon trading, see MacKenzie [2009a] and Callon [2009]).



Within this exploration markets could well continue to serve as points of reference. Indeed, they have shown certain qualities that explain why we are not ready to do without them:

Yet there are freedoms the maintenance of which is of paramount importance. They were, like peace, a by-product of nineteenth-century economy and we have come to cherish them for their own sake . . . . Civic liberties, private enterprise, and wage system fused into a pattern of life which favoured moral freedom and independence of mind . . . . We must try to maintain by all means in our power these high values inherited from the market economy which collapsed.

(Polanyi, 1944, p. 255)

What experimentation should enable us to explore is the potential diversity of markets (see the quotation from Polanyi at the beginning of this article).

Markets have a history; they also have a future that cannot be reduced simply to an extrapolation of the past. In the future, the study of economization may no longer be content simply to step back and explain the world, for (as history has shown) it will be able to do so only by participating in its transformation and onward development. From this point of view, the research programme that we are proposing could prove to be useful for elucidating the range of possible choices (in terms of calculative equipment, modalities of framing goods, socio-technical algorithms for market encounters, price-setting, etc.). It could serve as a framework for experiments and the collection of their results. Theory and practice, then, will finally engage in a collective strategy of trial and error oriented towards producing differences that are debated and controlled, but never imposed.<sup>31</sup>

### Acknowledgements

The comments and criticisms of many colleagues have helped us to revise and rewrite this paper. We would like to extend a specific word of thanks to Andrew Barry, Julia Elyachar, Bruno Latour, Bill Maurer, Tim Mitchell, Janet Roitman and two anonymous reviewers of *Economy and Society*. We are also grateful to our colleagues at the CSI and Boğaziçi University for their suggestions and support, as well as to Martha Poon for her cautious rereading.

### Notes

1 The analysis of this agreement and how it is reached are an integral part of the study of the marketization process. A path dependency phenomenon, the longstanding contribution of economics and economists to the construction of this agreement has surely been decisive. The elaboration and diffusion of the tools and instruments –

notably calculative – through which markets are enacted has also mattered. On the diversity of economists' contributions, see Fourcade (2009).

2 For a more precise definition of the notion of socio-technical *agencement*, see the 'Marketizing agencies' section below.

3 These valuations are based on calculations that are simultaneously qualitative and quantitative, which is why Cochoy (2002) considers markets as spaces of 'qualculation'.

4 For a first presentation of this approach, see Callon and Muniesa (2005).

5 On passivity as a form of agency (to be related to passion), see Gomart and Hennion (1999). They argue that passivity is produced and made possible only once it is arranged.

6 As seen further, there is no valuation without the transformation and production of meaningful differences.

7 There are borderline situations where the achievement of passivity is perpetually ambiguous, such as the important case of slavery and its unending history.

8 For a complete study of such a process, see Holm (2007). He shows how the constitution of the Norwegian market for fishing quotas was rendered possible through the ontological reconfiguration of wild fish, difficult to assess in that state, into what he calls cyborg fish, a kind easier to manipulate and exchange. This reconfiguration required immense scientific, material, technical and institutional investment. In the process the vast open sea has been simultaneously transformed into an aquarium, a closed and manageable space.

9 For an example of how the care of domestic animals might structure social relations, see Evans-Pritchard (1937).

10 The specialists insist on the multidimensional character of the service and the problems that it poses for the integration and coordination of the multiple entities mobilized (Gallouj, 2002).

11 In Anglo-Saxon law, where bundles of rights can be attached to things, greater flexibility can be achieved in the objectification of goods.

12 The ownership may be collective, as in the commons whose modernity is illustrated by the success of free software. The FLOSS (Free/Libre/Open Source Software) example shows how collective and individual property systems can be efficiently combined (Lakhani & von Hippel, 2003).

13 The literature concerning what is known as the economics of convention, in particular the works of Eymard-Duvernay (1994), also shows the importance of pacifying goods by standardizing them and fixing their qualities. Among the growing number of equivalent studies in the anthropology of economization, see Cochoy (2002), Grandclément (2008), Hayden (2007) and Millo (2007). For an intriguing analysis of the role of language in the qualification of a financial product, see Lépinay (2007a). For an account of how the qualification of a financial product can take theological constraints into account, see Maurer (2005). For the qualification of products more generally, see Callon, Méadel & Rabeharisoa (2002).

14 We are not referring to domination in the conventional sociological sense. In our definition, domination is the creation of asymmetries in which agencies are unequally distributed within socio-technical arrangements (Callon, 1998, 2007a).

15 Studies of situated knowledge (Lave, 1988; Suchman, 1987) and its extension to epistemic communities or communities of practice (Amin and Cohendet, 2004; Knorr-Cetina, 1999) are also a valuable source of inspiration.

16 These approaches can be connected to the concept of devices (Foucault 1994) or to the socio-technical diagram (Barry, 2001; Deleuze and Guattari, 1998).

17 Work done by social scientific analysts is also part of STAs when they write about, define or describe them.

18 For a comprehensive overview, see Carruthers and Espeland (1991).

19 The calculative competencies of agencies can be related to the analysis of markets as collective devices for calculating values (Callon & Muniesa, 2005).

20 See also Barbara Harris-White (2007).

21 The work of Guyer (2004), Mitchell (2007) and Roitman (2005) devoted to Africa give examples of how dominated agents can nonetheless succeed in redesigning new calculative tools and prostheses.

22 Economics has almost totally lost interest in the study of these devices and especially in these chains of mediators. Yet we do need to mention the interesting contribution by Spulber (1999) who takes a neo-institutionalist approach and introduces the contributions of studies of financial markets into micro-economics.

23 'Captation' designates all the devices and mechanisms which allow the opposite poles of the organization and the market to be brought together through specific modes of articulation.

24 Callon and Muniesa (2005) have proposed an empirical and theoretical analysis of these interrelations that construe markets as collective calculative devices.

25 Pricing, a continuation of the valuation process, often implies physical marking such as labelling, the distribution of discount coupons or comparative displays. These markings can be analysed, from a semiotic perspective *à la* Peirce, as a material alteration of the good. Like any valuation, pricing re-qualifies the good and transforms it. For an analysis of pricing in supermarkets, see Grandclément (2008); for a semiological analysis of prices, see Muniesa (2007).

26 Guyer (2009) proposes that we study how arguments are developed in controversies over price levels, to justify or condemn the way in which prices are set on the basis of other prices. The determination of the oil price is a good example of such a controversy.

27 For an analysis of the manner in which prices (prosthetic) can impose themselves in the calculation of further prices, see Beunza, Hardie and MacKenzie (2006).

28 These studies provide highly useful information on the models and calculation tools designed by economists and, more particularly, by economics engineers. On the role of engineers, see also Faulhaber and Baumol (1988) and Porter (1995).

29 We continue to borrow from Goffman a terminology that is complementary to that of the notion of framing.

30 Mitchell (1998, 2008) has studied how a process of economization beginning at the turn of nineteenth into the twentieth century towards the constitution of an imposing thing called 'The Economy', which in this case took the form of national economies.

31 For reflection on the politics of economic experimentation, see Gibson-Graham (2006), Guala (2007) and Muniesa and Callon (2007). For the importance of producing differences instead of actualizing capitalism by criticizing it, see Callon (2005b).

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