An introduction to market devices

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The social sciences have been providing fertile ground for programmatic calls in recent decades, and this seems particularly true within contemporary economic sociology. Explorations moving in new directions have emerged in this field, often out of epistemic discomfort or as a result of problematic positioning vis-à-vis mainstream economics. Of particular relevance has been the development of a 'pragmatic turn' in the study of markets and economic activities in general. Some aspects of this pragmatic turn might be identified in a number of recent contributions that have considered multiple regimes of worth or multiple conventions of valuation (eg, Beunza and Stark, 2004; Boltanski and Thévenot, 2006; Favereau, Biencourt and Eymard-Duvernay, 2002; Stark, 1999; Thévenot, 2000, 2001), that have examined practical operations of testing, critique and verification (Bessy and Chateauraynaud, 1995; Chateauraynaud, 2004; Hennion, 2004; Maurer, 2005; Millo and Lezaun, 2006; Power, 1997; Teil and Muniesa, 2006), that have explored how economic things become calculable through particular metrics and languages (Desrosières, 1998; Espeland and Stevens, 1998; Hopwood and Miller, 1994; Miller and Rose, 1990; Power, 1996), that have studied the performative capacities of economic knowledge (Callon, 1998; MacKenzie, 2003, 2004, 2006; MacKenzie, Muniesa and Siu, 2007; Fourcade, 2007; Kjellberg and Helgesson, 2006), that have analysed networks of economic innovation (Callon, 1991; Garud and Karnøe, 2001, 2003), that have revealed the agency of documents and instruments in organizations (Cooren, 2000, 2004; Czarniawska and Hernes, 2005), or that have emphasized the materiality of economic settings and devices (Appadurai, 1986; Beunza, Hardie and MacKenzie, 2006; Callon and Muniesa, 2005; Cochoy, 2004; du Gay and Pryke, 2002; Keane, 2003; Miller, 2005; Muniesa, 2007).

The works offered in this volume further contribute to these types of concerns, bringing to them new analytical perspectives and empirical materials. They are pragmatic in a number of ways. They tend, for instance, to avoid ex-ante explicative principles and they adopt an anti-essentialist position that is particularly suited to the study of situations of uncertainty. They also focus on actors' capacities to operate across multiple spaces and are attentive to the empirical intricacies of agency. They pay particular attention to the trials in which actors test the resistance that defines the reality of the world surrounding them.

We believe that the notion of 'market device' – a simple way of referring to the material and discursive assemblages that intervene in the construction of markets – can be useful in addressing these concerns. After all, can a market exist without a set of market devices? From analytical techniques to pricing models, from purchase settings to merchandising tools, from trading protocols to aggregate indicators, the topic of market devices includes a wide array of objects. As crucial as market devices are in practice, they have often been overlooked by social scientists. The authors participating in this volume are working at the intersection of economic sociology and science and technology studies, an intersection that has proved particularly fruitful in considering market devices as objects of sociological inquiry.

A set of introductory precautions may be necessary in order to approach market devices from a sociological or anthropological perspective. The notion of 'device' is useful. With this notion, objects can be brought inside sociological analysis (see Beuscart and Peerbaye, 2006). Moreover, these objects can be considered as objects with agency: whether they might just help (in a minimalist, instrumental version) or force (in a maximalist, determinist version), devices do things. They articulate actions; they act or they make others act. But the notion of 'device' can also suggest a bifurcation of agency: the person on one side and the machine on the other, the trader on one side and the trading screen on the other, Bourdieu's *dispositions* on one side and Foucault's *dispositifs* on the other. In our view, this bifurcation needs to be avoided or, at least, handled with caution. Instead of considering distributed agency as the encounter of (already 'agenced') persons and devices, it is always possible to consider it as the very result of these compound *agencements* (and this applies to economic action in particular).

The notion of agencement is particularly helpful in tackling this issue (Callon, 2007; Hardie and MacKenzie, 2007). Close to notions of ordinary language that foster a similar intuition (display, assemblage, arrangement), the notion of agencement is also a philosophical concept whose proponents, Gilles Deleuze and Félix Guattari, can be considered as part of a French pragmatist tradition (Deleuze and Guattari, 1980). In his discussion of Foucault's notion of 'device' (*dispositif* in French), Deleuze (1989) develops an account that is closer to the idea of agencement. For Deleuze, the subject is not external to the device. In other words, subjectivity is enacted in a device – an aspect, we think, that is better rendered through the notion of agencement. In Deleuze's phrasing, a device 'is a tangle, a multi-linear ensemble. It is composed of different sorts of lines. And these lines do not frame systems that would be homogeneous as such (eg, the object, the subject, the language). Instead, they follow directions, they trace processes that are always at disequilibrium, sometimes coming close to each other and sometimes getting distant from each other. Each line is broken, is subjected to *variations in direction*, bifurcating and splitting, subjected to *derivations*' (Deleuze, 1989: p. 185, our translation, emphasis in original). In actor-network theory, a perspective always attentive to the distributed character of action, the notion of 'socio-technical device' (*dispositif socio-technique* in

French) is also close to this idea of agencement, an idea that emphasizes the distribution of agency and with which materiality comes to the forefront. An agencement is constituted by fixtures and furnishings, by elements that allow tracing lines and constituting a territory. It is only when devices are understood as agencements that the evolving intricacies of agency can be tackled by the sociologist or the anthropologist (otherwise she may need to conform to the great agency divides that so often characterize the sociological tradition).

What is for a device to be a 'market device' or for an agencement to be an 'economic agencement'? We can imagine that there are several kinds of agencements that do not need to be economic in nature, but they can turn economic through some aspect. A sexual relation, for instance, can be considered in certain circumstances as a biological agencement (an encounter between cells) or as an affective agencement (an encounter between affected bodies). But it can also be qualified as an economic agencement (an encounter between exchange counterparties), as in the cases analysed by Zelizer (2005). A nuclear reactor can be considered as a molecular agencement (an encounter between atomic particles), but can be also 'economized', as shown by Hecht (1998) in her analysis of French nuclear power econometrics. A shopping cart is a material device for sure. But it is also enacted, in particular, as a 'market' device because it reconfigures what shopping is (and what shoppers are and can do), as shown by Grandclément and Cochoy (2006). The same happens to the stock ticker analysed by Preda (2006): it is a telecommunication device that reconfigures what trading is (and what traders are) in financial markets. The pricing equation studied by MacKenzie (2006) can be considered, as such, as a mathematical device, but it is definitely an economic one too, because it contributes to the construction of markets widely considered as genuinely economic ones.

An economic agencement is, in a broadest sense, one that renders things, behaviours and processes economic. Emphasis is put here on the 'rendering', not on any substantive definition of what should 'economic' mean. The meaning of what it is to be 'economic' is precisely the outcome of a process of 'economization', a process that is historical, contingent and disputable. It seems undeniable that, in so-called advanced liberal societies, 'economic' often refers to the establishing of valuation networks, that is, to pricing and to the construction of circuits of commerce that render things economically commensurable and exchangeable; but 'economic' can also be said of a particular configuration that aims at 'economizing' in the sense of saving or rationing. The fact that an institution, an action, an actor or an object can be considered as being economic is precisely the result of this process of economization. And the historical contingency of this process does not call its reality into question. The reality of this process is as hard as the trials it imposes and the resistance that it triggers. Local and durable irreversibilities of economization are possible that stabilize the forms and meanings of what is to be considered as economic in a particular site and at a particular time.

The multiplicity of possible (and sometimes contradictory) definitions of what may be 'economic' about an agencement should not be regarded as a sign of arbitrariness. This ambivalence is the result of a history, a history of agencements. 'Being economic' is a path-dependent feature, which implies that the economy is always an issue whose formulation partly depends on (but is not fully determined by) previous events and trajectories. In addition, 'being economic' is not a qualification that comes from outside the agencement: this qualification is included in the agencement, for instance through the presence of instruments for the calculation of prices, of rules that organize competition, or of accounting methods that identify and allocate profit. The presence of economics (its categories and vocabulary, its tools and methods, its theories and models) inside an agencement is another prominent indicator of the fact that an economization process might be going on.

Market agencements are one kind of economic agencements. Like any other socio-technical agencements involved in a process of economization, markets contain devices that aim at rendering things more 'economic' or, more precisely, at enacting particular versions of what it is to be 'economic'. Emphasis is put on the conception, production and circulation of goods, their valuation, the construction and subsequent transfer of property rights through monetary mediation, exchange mechanisms and systems of prices. Market agencements detach things from other things and attach them to other things. The same is done to persons (physical or moral), to their reciprocal duties and to their relations to things. Although attachment and detachment – or entanglement and disentanglement (Callon, 1998) – are phenomena that can be identified in many realms, we observe that in market agencements these movements are particularly effervescent and purposeful. Markets are one form of economic agencement that is marked typically by circulation, pricing and exchange. Without devices such as the ones analysed in this book, these movements that animate markets would be virtually impossible.

Market devices can also help us with abstraction, a difficult topic for economic sociology. Abstraction has been at the centre of many analyses of monetary mediations, mercantile enterprises and capitalistic forms (Maurer, 2006). One common way of phrasing what economic agencements do is indeed to say that they 'disembed', ie, they 'abstract'. Not exactly 'from society' – because abstraction is in itself a social operation – but from other agencements which were probably less economic. But then, what does abstraction mean? From our point of view, abstraction needs to be considered an action (performed by an agencement) rather that an adjective (that qualifies an entity). Abstraction, or rather 'to abstract', is an action, an action of transformation and displacement, close to 'to extract' or 'to draw away', as suggested by its etymology: *'abs'* (away) *'trahere'* (tract).

To a large extent, 'to abstract' is to transport into a formal, calculative space (Callon and Muniesa, 2005). Market socio-technical agencements are cluttered with a variety of abstractive calculative devices: pricing techniques, accounting methods, monitoring instruments, trading protocols and benchmarking procedures are abstractors that enter into the construction of economic agencements. Economists too are abstractive agencies: they calculate aggregates; they produce formal models or metric configurations that can be, almost by definition, parts of economic agencements.

Several aspects of market devices are addressed by each contribution to this volume, based on original empirical material. Of general concern is the part played by market devices in configuring economic calculative capacities and in qualifying market objects. Calculation is neither a universally homogeneous attribute of humankind, nor an anthropological fiction. It is the concrete result of social and technical arrangements. Likewise, the qualities of goods and services are the output of complex operations of qualification, of framing and reframing, of attachment and detachment. The ways in which market devices are tinkered with, adjusted and calibrated affect the ways in which persons and things are translated into calculative and calculable beings.

Financial products and their abstractive properties provide good examples of this process; they appear in several of the chapters in this book. Other paramount illustrations of contemporary market devices that are present in these chapters show also how these devices enact economic properties, how they provoke economic behaviours, and how they render economic qualities explicit, in a variety of (frequently disputable) manners. This is true not only for openly instrumental or operational devices but also for devices that are meant to work on a more analytical or observational level (like a financial chart, a focus group or a health-economics indicator such as 'quality-adjusted life years').

The analyses of market devices provided in this book are also characterized by close attention to the different types of knowledge required to produce and stabilize these devices, which points to the issue of performativity. In markets, representation and intervention are intertwined. Markets are both the objects and the products of research. From financial engineering to marketing research, the sciences of the market are in themselves a part of markets. Experimental practices (or testing practices at large) play a crucial role in these kinds of research. It is therefore important to clarify how these forms of knowledge perform their objects, that is, how they enact or help rendering them explicit.

The book opens with a contribution by Daniel Beunza and Raghu Garud, who explore one of the many interfaces that mediates decisions in financial markets: the analyst's report. How do securities analysts value companies in contexts where information is unclear and subject to multiple interpretations? How do their analyses operate so as to provide guidance in investment assessments? Beunza and Garud study the reports written on Amazon.com by securities analyst Henry Blodget and by rival analysts during the years 1998–2000. The authors show that analysts' reports are structured by internally consistent associations. They refer to these associations as 'calculative frames', and propose that analysts function as 'frame-makers'. Their contribution helps put controversial issues such as analysts' accuracy and independence in new light. In addition, it provides important clues about how to study the cognitive prostheses that populate contemporary financial markets.

In the following chapter, Alex Preda presents a sociological inquiry into the practice of financial analysis with an exploration of its historical origins. The market device Preda focuses on is the financial chart. He studies the emergence of technical analysis (or chartism) and how it gained legitimacy in a period where the chart's explanatory frame was at odds both with academic economics and with standard notions of value. Preda shows how chartism was legitimated by a 'double loop' between groups of producers and users of technical charts, highlighting the ways in which an interest in using charts as a forecasting instrument was generated. He explains how financial chartism emerged when a group of users switched to the production of an expert knowledge, which they monopolized. Financial chartism was constituted not only as an interpretation of the market but also as a tool used in market actions. This case provides useful insights for the study of performativity: the theory of the market (here, technical analysis) describes its domain of reference but, at the same time, forms an intrinsic part of this domain.

In the third contribution, Hans Kjellberg studies the economic encounter between wholesalers and retailers in Swedish food distribution in the late 1940s. The case focuses on Hakonbolaget, the largest privately owned wholesale company in Sweden, and on its attempt to reorganize the established economic order of that time. Of particular interest is how Hakonbolaget developed the purchasing centre, a market device explicitly aimed at 'economizing' the market. Kjellberg analyses the way in which a new calculative space was carefully adjusted so as to bring buyers and sellers together through an order form, thereby rendering the human intermediary (the salesperson) disposable. Did this innovation intend to 'remove the market' or rather to 'produce more market'? The author goes beyond this question by focusing on the proliferation of devices that aim at organizing economic communications and transactions. Actors in charge of economizing the wholesale exchange needed to concentrate in the procedures and protocols that allowed transactions to be carried out between wholesaler and retailers.

The next contribution also inquires into the different techniques that aim at producing purchasing connections in a specific market setting. Sandrine Barrey analyses the birth and development of merchandising techniques in the French agro-food retail industry. Merchandising is a crucial management instrument that helps construct the encounter of supply and demand through a controlled arrangement of products at the point of purchase. The author analyses how retailers progressively gained control over merchandising techniques, and the concomitant shift in the balance of power with producers. Barrey documents the formation of these types of techniques in France using archival material and interviews with merchandising practitioners. She also presents a case study on the merchandising techniques put forward by a producer in the frozen agro-food sector. Through her emphasis on the materiality of supermarket display, Barrey provides crucial insights on how market devices contribute to product attachment and, ultimately, to purchase by consumers.

For Franck Cochoy too the analysis of material devices is crucial for a sociological understanding of how different market scenes are framed. Cochoy pursues this research goal with an ethnographic study of choice in supermarkets. Supermarket settings work as 'capturing devices' that aim at orchestrating the deployment of choice. In supermarkets, Cochoy observes, interactions with objects are more frequent than face-to-face social interactions – thus it is necessary to modify the ethnographic gaze in order to capture the richness and complexity of these 'things' as market participants. The sociologist who aims at analysing the encounter between supply and demand is forced to take a detour (in this case, equipped with a camera), passing along the shelves in search of market gestures and signs that, although completely familiar to us as supermarket users, often go unnoticed in sociological analysis.

Market devices do not only intervene at the point of purchase: market professionals make extensive use of research instruments that intervene upstream. One particularly pervasive device of market research is the focus group. Provoking a conversation among a small group of people assembled in a room has become a popular way of generating useful knowledge. Javier Lezaun analyses some features of this device, which has become a pervasive technology of social investigation, a versatile experimental setting where a multitude of ostensibly heterogeneous issues, from politics to economics, are productively addressed. It is perhaps in the marketing sciences, and through its utility in producing forecasts of economic behaviour, that the focus group has acquired its most visible and widespread form. Lezaun draws attention to some of the strategies used by focus group moderators to extract 'tradable opinions' (statements representing authentic and genuine viewpoints) out of experimentally generated conversations. His goal is to regain a sociological appreciation of the extent to which opinions about the market, or about any other issue under experimental investigation, evolve as problematic objects in focus groups, and the ways in which expert actors, the professional focus group moderators, interpret, reconfigure and represent these opinions.

Focus groups are just one example of the variety of testing devices that take part in the construction of markets. Alexandre Mallard focuses on other kinds of market experiments: consumer tests. Consumer press and consumer organizations are key player in today's markets. On the one hand, they help to shape demand through recommendations and advice given to the public on products and services. On the other hand, they tend to impact on supply, through a series of operations targeted at firms or public authorities. The visibility of these operations in the public sphere helps to generate decisions with economic consequences: denunciation of dishonest manufacturers, alerts concerning dangerous products and even court cases to trigger changes in legal decisions on consumption. Mallard investigates the performative features of consumerist tests. He studies the construction of comparative tests with a deliberate focus on the work of the professionals involved in comparative testing. This including the practical operations they bring into play and the difficulties they encounter. The author shows that this activity, apart from being relatively rich and fairly original, aims at defining a very particular position for the consumer.

Markets are sites for economic innovations that can proliferate in many directions. But one mainstream axis seems to inform a great portion of such innovations in today's economies: commoditisation, in the neo-liberal (or neo-classical) sense. Petter Holm and Kåre Nolde Nielsen focus on the emergence of a market for quotas in Norwegian fisheries. Twenty years ago, there was open access to fish. Today, fish has become private property and fishermen have become quota owners and property managers. The authors examine the trajectory that has turned fish from common to private property. What kind of framing is capable of producing fish quotas as tradable objects? What constitutes the fish quota? What ingredients – besides the fish – go into the stew that makes up property rights? More specifically, the authors analyse the historical sequence of events that has led to the particular kind of quota that emerges now. They explain the actual form of quotas in detail (reference to vessel size, group identity and county residency) and ask if a slight hitch in the historical sequence might not have turned the quota into a completely different entity. Individual Transferable Quotas (ITQs) play here the role of the market device whose meanders happen to shape the life of fish and fishermen as it is.

Increasingly sophisticated devices allow for the proliferation of increasingly complex markets. Yuval Millo's contribution draws attention to what is arguably one of the most salient market innovations in recent decades: financial derivatives. A fundamental aspect in the evolution of markets is the dynamic process through which items acquire certain qualities that make them tradable, that is to say, the qualification of products. Millo analyses the qualification process of financial derivative contracts, focusing on the historical process leading to one of today's most popular financial products: index-based derivative contracts. He focuses on the various controversies and qualification processes that the underlying product for such derivative contracts underwent. He draws attention to the fact that the birth and development of genuinely 'financial' derivatives (ie, derivative contracts not based on agricultural commodities) was controversial, demanding an intensive efforts in order to prevent these products from being regarded as gambling, and to exempt them from the obligation of delivering the underlying product. These difficulties in the qualification process were also present, in a peculiar manner, in the framing of index-based derivatives in the 1980s. The author shows the shifting nature of the qualification of financial products: the qualities that the markets assigned to index-based contracts were remarkably different from the ones that were assigned to the products initially.

In their study of Swedish markets for subsidized pharmaceuticals, Ebba Sjögren and Claes-Fredrik Helgesson also explore the economic qualification of products, with an emphasis on the crucial role played by classification schemes. Settling the qualities of an exchanged good and determining who should pay what for it are central activities in markets. It is well understood by now that not only sellers and buyers are engaged in such activities. They also involve entities such as classification tools, standardization bodies, consumer organizations, advertising agencies, etc. Sjögren and Helgesson examine a Swedish governmental agency whose task is to characterize pharmaceuticals as equivalents or non-equivalents for the purpose of deciding what pharmaceuticals are to be reimbursable. The authors focus on the agency's work to determine the qualities of pharmaceuticals and particularly on how this work draws on and mediates between several pre-existing classifications systems (ie, clinical effect, chemical groups, etc.), a process that ends up with the pre-eminence of properly economic qualification. As the authors show, establishing metrics for the description and the assessment of products is a crucial ingredient of the performative processes that shape markets.

The next chapter explores further the different processes that lead to the performance of markets. Here, attention is drawn on pricing. Koray Caliskan proposes an ethnographic account of the production of cotton's global price. Suggesting that practices of pricing are always articulated in particular geographies, the author focus on one local instance of the pricing chains of cotton markets: the Izmir Mercantile Exchange, in Turkey. Caliskan studies the exchange relationships and the market technologies deployed by regional and local traders in Izmir. He analyses several kinds of prices that play important roles in the composition of global pricing chains: not only actual prices that engage traders in economic exchange but also 'prosthetic' prices that are used in order to explore or anticipate pricing possibilities, and 'rehearsal' prices that help framing trading activity as a performance, in an almost theatrical sense.

Vincent-Antonin Lépinay's contribution turns attention back to derivative contracts: not to the standardized products, such as options and futures, that are traded in exchanges but to rather more complex, 'over the counter' financial products. Lépinay analyses the characteristics and behaviours of a 'parasitic' derivative contract: a capital guarantee product. The author explores the work of the financial engineers in charge of designing, pricing, and selling this complex, sometimes cumbersome product. How do they manage to 'derive' value? In what sort of drift do they embark? The product is a parasite, in Michel Serres' sense, as it is based on the manipulation of already available underlying goods, subverting their initial project. The author observes how this particular kind of product challenges the calculative practices of the financial engineering team, but also the overall 'industrial' routines of the investment bank. His account allows for an understanding of the materiality of these 'abstractive' derivative devices.

In the last chapter of this book, Martha Poon focuses on consumer credit scoring as a market device. Consumer credit is an interesting product because its production poses particular risks to its 'maker'. Of specific concern is the possibility that the credit that has been extended may not be repaid. In a consumer credit market, then, the point of account origination involves important managerial decision making to control which people should be included as consumers in the market. Since the end of the 1950s, these decisions have increasingly been delegated to statistical tools designed by engineers, statisticians and operations researchers. This chapter traces the innovation of one of these tools, known as a 'scorecard' from its humble roots as a table of points on a printed sheet of cardboard, to its gradual dissolution, in the USA, into a distributed calculative apparatus that produces a system of commercially circulating, brand-name, individual consumer credit scores (FICO® credit bureau scores).

Examining the scorecard at three moments in its development (custom application scorecards, application pre-screening, credit bureau scores), the chapter demonstrates how the same calculative apparatus, from the point of view of math and statistics, has had diverse ways of constituting risk. The technology, Poon argues, has therefore had different effects on extending consumer credit markets, depending on the conditions under which it has been implemented.

We believe that all these chapters contribute to a 'pragmatic turn' in economic sociology that is deeply inspired by science and technology studies. The notion of device, re-adjusted through the concept of agencement, serves this approach or set of approaches well. It is of great help in tackling materiality and in pointing to the distributed nature of economic actions and skills. It helps also to overcome a major danger: that of reverting to an idea of pure instrument. Pure instruments in the hand of pure agents reproduce the idea of pure objects in the hands of pure subjects. With such a divide, the analysis of economizing processes is in trouble. The idea of agencements, on the contrary, allows overcoming it without falling either into essentialism (considering that some behaviours or institutions are intrinsically economic) or into relativism (considering economic qualification as a mere convention).

Finally, market devices – thus characterized as economic agencements – do allow for a reformulation of the problem of economic agency and to the opening of newer paths for sociological research. We think that all the contributions to this book, although stemming from a variety of research concerns, present analytical innovations that permit progressing in such direction. They highlight several features of what we have called here 'market devices': the importance of display and material composition in the achievement of purchase or transactions, the highly consequential investments in economic knowledge and analytical techniques, the emphasis on experimental methods for the elicitation of economic properties, and the establishment of pricing or valuation networks.

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