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Back in the bazaar: taking Pierre Bourdieu to a trading room

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ABSTRACT

Drawing on Pierre Bourdieu's theory of aesthetic judgment, this text offers an inductive account of financial reasoning inside a trading room. Driven to maximise bank profits, trading room operators do not find 'one best way'. Rather they choose among several possible winning strategies: *mathematical arbitrage*, *economic analysis*, *chartist analysis*. These strategies differ sharply from one another in their conception of the market, method, proximity to scholarly knowledge, and legitimacy. We show that the choice of one method depends on a system of tastes and distastes that are both historical – depending on individuals' social and educational background – and relational – depending on the individual's relative position within the trading room viewed as a field.

In the late 1990s, Olivier Godechot set to work at the trading desk of a financial brokerage firm in Paris, beginning a period of fieldwork that would result in an early contribution to the then-inchoate social studies of finance. The editors of the *Journal of Cultural Economy* are pleased to publish in translation one piece of that research. Originally published in 2000 as "Le Bazar de la Rationalité" in *Politix* (13:52, 17–57), Godechot's article represents one of the first efforts to think through the rationalities of finance using the sociological lessons of Bourdieu. Godechot's Forward – composed specifically for this translation – lays out the implications of this work for a contemporary social studies of finance oriented to the sociotechnical systems and performative repertoires through and with which human beings-as-market actors reason. Godechot's piece underlines the continued importance of understanding intersecting lines of difference and inequality – of class and rank, race and status, gender and sexuality, education and family background – that unite and divide the persons who populate financial markets. While refusing to "re-embed" finance in some overarching social domain, Godechot's work nonetheless reminds us of the interrelational dispositions and subject positions of the actors who – alongside and interwoven with technological prostheses, systems for accounting and payment, legal and institutional architectures – make the markets. For a field that still, at times, takes financial calculation for granted, it remains important to remember that the seeming neutrality of the particular knowledges that ground such calculation is itself a product of patterned relations of power and privilege. Indeed, much of what Godechot describes is about a struggle not only to find a way to turn a profit – the pragmatic experimentation with "winning strategies" – but also to validate one's chosen method in the eyes of others. This is a classic – dare I say it? – social problem, one that has occupied anthropologists since Malinowski's observations of the role of prestige in Trobriand Islanders' battles over kula valuables and political economists since Adam Smith wrung the discipline's first questions out of a moral philosophy concerned with how others judged – valued and evaluated – one's actions. Such contests are sites of political struggle between

persons who are formed and informed by the histories Godechot is at pains to account for. Perhaps it is time that we return to these foundational questions, now fortified with the lessons of the socio-technical and the performative.

–Taylor C. Nelms

1. Foreword

'The Bazaar of Rationality' (Godechot 2000)[1] was first discussed during early meetings of the French social studies of finance research group.[2] In sharp contrast with the rest of the group, which was mainly inspired by Science and Technology Studies (STS), this paper offered a bourdieusian view of financial activities. It emphasised the continuing importance of classical arguments about social determinisms – due to social and educational background (i.e. habitus) and field position – to understanding ordinary financial reasoning.

Like many papers inspired by Pierre Bourdieu, it tried to make a theoretical contribution through a case study, to offer food for thought rather than an extensive discussion of the literature (Bourdieu & Wacquant 1992). Moreover, the literature on this topic was at the time very scarce. Fourteen years later, a substantial amount of sociological literature now addresses the way people think and behave in financial markets. Nonetheless, I would like to offer here an explanation for why my paper continues to make an important contribution to the literature until today.

How should we understand financial rationality? Contrary to economists who consider financial rationality a given from which they model financial consequences, sociologists are more interested in explaining inductively the various forms of rationality, especially through the *in situ* analysis of ordinary work. Research in this area has some cumulative conclusions, and most work will recognise financial rationality as a combination of technology and people (MacKenzie & Millo 2003; Beunza & Stark 2004), financial incentives and social norms (Abolafia 1996; Hassoun 2000), cold calculation and high-tempered emotions (Beunza & Stark 2004; Hassoun 2005), or culture and division of labour (Hertz 1998; MacKenzie 2011). But beyond this broad agreement, approaches remain opposed in terms of the emphasis they put on answers to the three following alternatives.

First alternative: Is financial rationality a matter of technology or of people? Inspired by STS, an important strand of sociological literature highlights the first option. Financial actors are embedded in a technological environment of market devices that perform economic theory (Callon 1998; Callon Millo, & Muniesa 2007). These market devices can be as rudimentary as a ticker (Preda 2006) or a printed listing of prices (MacKenzie & Millo 2003) or as complex as a market algorithm (Muniesa 2000), mathematical formula, or software programme (MacKenzie & Millo 2003). Moreover, new technological means are a way of achieving day-to-day distributed cog-nition (Beunza & Stark 2004). Nevertheless, insistence on market devices might lead one to think that financial rationality only depends on the latter and that people hardly intervene. Most studies of concrete financial decisions (MacKenzie 2003) show that these are not automatic and that they do not derive solely from technological devices. There are interactions, discussion, debates, speculations of people who collectively weigh the relevance of arbitrage or prediction (Beunza & Stark 2004; Simon et al. 2012). In the end, technology does not replace people.

Second alternative: As people do not just mechanically follow market devices, we might ask, how do they act, with their minds or with their bodies? Listening to people explain with great detail their vision of the market shows that they clearly use their mind (Schwager 1989; Smith 1999) and sometimes engage in some form of reflexivity when they start thinking about the way they and others think about the market (Rose 1966; Beunza & Stark 2004; Godechot 2008). However, minds are not just cold calculators. They are embedded in flesh. Traders are subject to emotions that they both value and fear (Hassoun 2005; Zaloom 2006). A 'super-trader' (Widick 2003) is capable of managing strong emotions and trading with a lack of concern for both profits and losses. Although the body is a threat when it becomes emotional, it also constitutes an important asset when it becomes intuitive. Traders describe the sacred moment when they 'enter the zone' (Zaloom 2006,

p. 135), when they can trade totally intuitively 'beneath the level of reflexive application of the rules of the game' (Widick 2003, p. 679). Although it would be misleading to overemphasise the corporeality of the financier, a sound sociological approach to financial markets should consider an enlarged rationality, in which calculation mixes logic, emotions, and intuitions with moral, social, and normative evaluations.

Third alternative: Is financial rationality unique or plural? Studies on the performativity of financial theories show a trend towards the unification of financial rationality, such as the general use of the same pricing formulae (MacKenzie & Millo 2003) or the adoption of the moral and political ideology of the efficient market hypothesis (Ortiz 2014). High powered incentives, through sky-high year-end bonuses, contribute to transform actors into *homo economicus* (Abolafia 1996; Godechot 2001; Zaloom 2006). Moreover, within the same trading room, day traders who trade synchronously achieve higher returns (Saavedra, Hagerty, & Uzzi 2011). Does this mean that all financiers act the same? Fieldwork shows a great diversity in market behaviour (Aaron, Galanti, & Tadjeddine 2004). Smith (1999) paints the portrait of six ideal-typical brokers who differ dramatically in terms of their approach to financial markets: a fundamentalist using 'fundamental' economic figures, an insider trying to discover insider knowledge, a cyclist-chartist looking for patterns in past prices, a trader using his intuition, an efficient market believer who replicates indexes, and a transformationalist focused on the new growth sectors that will revolutionise the economy. Those different and sometimes antagonistic approaches often cohabitate within the same trading space. According to Beunza and Stark, the trading room itself institutes a technological and cognitive division of labour, which results in a heterarchy (Beunza & Stark 2004; Stark 2009). Zaloom adds the social dimension, showing how the head of the traders in one trading room wanted to have a certain amount of social, ethnic, national, gender, and educational diversity in order to produce a diversity of approaches to the market that could nourish one another and help to profit from a variety of market structures (Zaloom 2006). Hence, the various market approaches do not constitute separate and independent cultures, as Smith tends to present them (Smith 1999), but they are linked to one another by relations of hybridisation and sometimes confrontation (Beunza & Garud 2007).

'The Bazaar of Rationality' proposes an original way of addressing these alternatives by using a theoretical apparatus derived from Pierre Bourdieu's theory of cultural distinction (Bourdieu 1984). Aesthetic judgement is seen as a good guide for modelling concrete financial rationality. First, aesthetic judgement offers a combination of reflexive thinking and pre-reflexive practical sense. Trading strategies combine intense calculation with intuitions, tastes, and distastes. Second, aesthetic judgment as a market approach is very diverse. In 'The Bazaar', I study three approaches traditionally opposed to one another: mathematical arbitrage, economic fundamentalism, and chartism. Third, aesthetic judgement has social origins. It is the result of long-term class socialisation (encompassed by the concept of *habitus*): upper classes have a formalistic aesthetic valuing the opposition of art and life while lower classes are characterised by their 'taste of necessity', valuing useful and pleasant art in the continuity of ordinary life. In 'The Bazaar', the more highly educated fans of mathematical arbitrage clearly value Black and Scholes formulas and the efficient market hypothesis for their formal properties: purity, generality, transposability, counter-intuitiveness; financiers coming from lower classes are fans of chartism, finding in those methods some continuity with life, an unsystematic collection of flexible hints learned on the job through a mentor–mentee relationship, similar to the kind of hints used by anglers or farmers. Fourth, aesthetic judgement is not just a matter of separate cultures and education but is genuinely relational. The relation of distinction is both a relation of imitation – we value the things (or the people) that value the people (or the things) we value – and a relation of demarcation – we disvalue the things (or the people) that value the people (or the things) we disvalue. Hence, in 'The Bazaar', I show how deep controversies among proponents of various approaches follow the logic of aesthetic controversies. For advocates of mathematical arbitrage, chartism is an intellectual scandal that needs to be both explained and delegitimised. In contrast, advocates of chartism hesitate between proudly erecting the counter-cultural value of their method and imitating mathematical arbitrage in order to obtain social recognition.

In the end, the trading room can be viewed as a field, whose functioning relates to cultural, scientific, or economic fields (Bourdieu 2005; Bourdieu 1996; Bourdieu 1999). Systems of oppositions within the field are not only knee-jerk reactions to distastes, but also ways of reconsidering the value of the various capitals within the field and hence the profits of its various actors. Within the trading room, valuing and supporting one method over another also influences the managers of the trading room, who distribute bonuses and promote people accordingly, based on their appreciation of the causal link between profits, trading methods, and their users. Hence, convincing others that your trading method is powerful improves your position in the distribution of bonuses and opens a way toward a dominant position within the trading room.

These results rest decisively on the mixed-methods empirical strategy used during my original research. I did a four-month fieldwork stint in 1998 in a major equity derivative trading room in Paris, as a trainee at the equity lending and borrowing desk. This activity, which was necessary to all other desks (when they needed to short the market), provided a good observatory of the trading room's diversity. Combining daily observations, informal discussions, and formal interviews, I could size up financiers' emotional engagement in different trading strategies and learn about the harsh debates in which they were involved. A questionnaire, to which half of the trading room responded (94 total responses), added a crucial objectification of the relational system at the root of that financial diversity.

One might wonder how much 'The Baazar's' specific findings still hold true. Although answering this question would require new in-depth research, the general principles of oppositions uncovered in the paper still structure the financial field today. Oppositions between chartism, fundamental economic analysis, and mathematical arbitrage have manifested themselves in the long run, fuelling financial discussions for more than a century (Bernstein 1993; Smith 1999; Preda 2006). Moreover, a small update of my research in 2007 led to similar results (Godechot 2008). Nevertheless, we should stress two factors of inflexion: the arrival of new products and strategies like statistical arbitrage and high-frequency trading, which fill the paradigmatic gap between chartism and mathematical arbitrage; and the growing concentration of top engineering school graduates in derivative trading rooms in France. While this has led to a decline of chartism, this strategy remains popular in the more heterogeneous trading rooms of the UK and the USA, as well as among small online traders.

In sum, 'The Baazar' offers an image of financial rationality that differs from the one developed by the performativity approach, which often tends to depict financial rationality as technological, consciously calculative, and unique. On the contrary, my paper reintroduces the people, a thinking people indeed, but a people whose thoughts are also governed by non-reflexive social dispositions, a people structured by a system of relations between its members, from which emerges a diversity – a true bazaar – of financial strategies.

2. The bazaar of rationality: towards a sociology of concrete forms of reasoning

Rationality is a concept debated in many academic disciplines, from philosophy to sociology to economics, giving rise to many definitions. A common feature of its various uses in economics is that rationality – whether parametric or strategic, perfect or limited – is a behaviour attributed a priori to human beings. Rationality is therefore treated as a causal category (since it enables economic models, especially those with 'micro-economic' foundations, to be established), but rationality is itself without causes. This unilateral attribution of a uniform rationality to actors is justified by an instrumentalist 'as if', which generally does not measure the difference with the concrete behaviours of actors it introduces. Studying rationality from a sociological point of view involves, on the contrary, not affirming dogmatically that 'all is calculation' or 'nothing is calculation', but trying, inductively, to give an account of the ordinary reasoning of ordinary people. For such a programme, it is necessary to endeavour, insofar as it is possible, to describe the diversity of forms of reasoning and seek to identify their possible social determination.[3]

Very few working environments use calculation to the extent that trading rooms do: calculation of equivalencies, arbitrage, exchange rates, instant profits, but also of efforts, investments, hits, and career opportunities. Trading rooms are thus a privileged place in which to study sociologically (rather than logically) rationality, or more specifically – since the term 'rationality', an essential attribute given to man in many disciplines, implies its own perfection – reasoning, with its lucky finds, imperfections, short cuts, associations, and computations. Moreover, financial markets are characterised not only by their high level of economic and mathematical calculation, but also by their plurality of winning strategies. Incited to maximise the bank's profits, financial operators (traders and sales people) do not have 'one best way' but must instead choose one among several winning strategies (or use them concurrently, which is a form of choice). This choice is partly imposed by the trading room, its history and function, the economic situation, or the product. However, as these people are relatively autonomous at work, they can partly avoid those constraints or seek to occupy positions in which they will be able to use the strategy of their choice. One can thus regard the complete set of winning strategies in the trading room as a true *bazaar of rationality*, within which people find their way not only according to their position and associated constraints, but also according to dispositions acquired during primary socialisation in the family or secondary socialisation at university or at work. The valorisation of their winning strategy consists not only in turning financial profits, but also in fashioning that strategy's symbolic value, for themselves, their peers, and those in charge of the bank, which means gambling not only its power and share of redistributed profit, but also the construction and confirmation of a professional and social identity – in short, the invention of a position, which remains precarious and contestable.

Within the trading room of a large bank devoted to the arbitrage of equity derivatives,[4] three stabilised forms of reasoning, relatively institutionalised, with their own histories and traditions of teaching, are available to the actors: a method for arbitrage and brokering, the *mathematical arbitrage* of options, and two methods for speculation, *economic analysis* and *chartist analysis.* On the basis of these three forms, financial operators develop their own form of reasoning, more or less reflexive and intuitive, which results in a financial transaction.

3. Discovering equivalencies: mathematical 'arbitrage' and volatility management

3.1. The outlet for scholastic dispositions

There are all kinds of arbitrage. Some are mathematically quite simple (like spatial arbitrage or currency arbitrage). However, the most profitable arbitrage in recent years has been the arbitrage of derivatives (options, exotic options) according to underlying securities (equities, fixed-income securities), a technique that is based on complex mathematical knowledge.

This form of arbitrage was made possible by the discoveries of Black and Scholes. In 1973, they uncovered a general formula for the pricing of options. Because the solution was imperfect – due to the reductive nature of the adopted assumptions – this scientific discovery triggered, even within banks themselves, a dynamic of research that sought to improve the formulas and extend this type of solution to other products. Therefore, when the head of the trading room decided to follow a policy of arbitrage for a given product, the activity was implemented in the following stages: importation and improvement of a pricing formula; adaptation of the formula to the design and legal features of the product; computerisation of the formula; research of the first customers; initiation of the first transactions; routinisation of transactions through the daily reading of parameters permanently displayed on-screen. These various stages in the activity of arbitrage correspond increasingly to the division of labour within the trading room: the importation, improvement, and adaptation of the formulas, as well as their computerisation, is increasingly the domain of engineers, while the marketing of the products is the responsibility of salespeople. The traders only manage the securities portfolio. However, even at the time of my investigation, there were still cases where new activities were being developed and the entire chain was entrusted to the traders.

This method of organising the activity shows several possible uses of mathematics, associated with several forms of excellence in the markets. The importation, improvement, and adaptation of formulas are closer to academic mathematical research and require considerable, well-maintained scholastic capital. On the other hand, carrying out daily transactions (and, a fortiori, canvassing customers) requires a more basic understanding of pricing formulas. This knowledge can decrease once these other supporting elements are established, particularly the practical routine of handling the pricing indications shown on the screen. Thus for the first population, the improvement of the arbitrage formula and its replacement by a more powerful one is a regular concern. The others, meanwhile, must know, at most, what type of errors the formula entails; they might even treat pricing indicators on the screen as indicators like any other, some of which they would follow strictly and others less.

Therefore, complex mathematics played a historical role and founded the legitimacy of trading positions in the trading room at Universal Company (UC). However, as increasing computerisation deprives traders of their control over arbitrage formulas, and with greater importance given in the room to the commercialisation of derivatives and to speculation rather than arbitrage, complex mathematics has become more of a moral guarantee than a skill used on a daily basis.

Thus, only 50% of the members of the room answered that they use mathematical relations based on stochastic mathematics. For the majority of them, the use of Black–Scholes is somewhat instrumental, since 13% of the room's members state that it is a 'push-button' relation and 26% say that it is a relation whose results they could, at most, interpret. Those with an advanced knowledge of the stochastic equivalence between financial products – in other words, those who can demonstrate or modify the Black–Scholes formula – make up only 24% of the trading room. A regression helps us show which properties favour this kind of skill in the room (Figure 1).

According to this regression, position in the division of labour (objectified by the dummy variable: being or not being a financial engineer or R&D engineer) and degree (objectified by the variable possession or non-possession of a degree higher than the baccalaureate + five years) offer the best probability of having such capabilities. This result is explained by the degree of the division of labour and by the academic nature of the knowledge used. With such a small sample (94 people), it is not possible to establish very precise results. The principal effect is 'absorbed' by the position held or the

Explanatory variables		Rough ratios	'All things being equal' effect
All (n=94)		24%	
Position	*Engineer*	62%	+31% **
	Others	19%	-3% **
Degree	≥ Master or equivalent	40%	+22% **
	< Master or degree not available	15%	-8% **
Gender	Male	29%	+3%
	Female	13%	-7%
Experience	> 4 years in finance	21%	+2%
	≤ 4 years in finance	27%	-2%
Father's degree	≥ Bachelor or equivalent	20%	-7% *
	< Bachelor or degree not available	30%	+11% *
Father's profession	'Economic' profession (CS 10 to 31 and 38)	13%	-8% *
	Other professions	32%	+8% *

Figure 1. Knowing Black & Scholes. A regression model. Regression modelling the probability of having or not having advanced mathematical knowledge.
Note: $^{**}P < 5\%$; $^{*}P < 10\%$.

degree obtained, both of which are also the result of social discrimination. While under the threshold of significance used by econometrics (5% or 10%), the parameters nevertheless indicate the sense of a correlation and require further commentary and possibly confirmation with a larger study. The seniority parameter is positive but not very significant, which undoubtedly reflects the demographic structure of the jobs more than a tendency to improve mathematical capabilities with seniority (rather, the opposite is true). Women, poorly represented in both the trading rooms and in scientific disciplines, are consequently also under-represented among those with a strong grasp of Black–Scholes. Finally, the social origin of the parents plays a rather significant role. It is measured by two variables: having or not having a father in an 'economic' occupation (farmers, craftsmen, tradesmen, heads of company, liberal professionals, and administration executives in the private sector); having or not having a father with a bachelor's degree (French *licence*). The respondents whose fathers work in an economic profession have, all things being equal, a lower probability of knowing how to demonstrate or modify complex stochastic relations. Thus, even in a world of equivalences between all kinds of prices and products, the conversion of one form of capital into another, of initial economic capital into cultural capital, comes at a high price. One may note also the negative impact and relevance of a father's high-level degree on the probability of mastering the Black–Scholes formula. This finding shows that the holders of this cultural capital are more 'parvenus' than 'heirs' of the school system. Indeed, the fathers of members of the room with a high-level degree (liberal professionals, managers in the private sector) often acquired this degree more for its economic value that for its cultural value. On the other hand, parents of the mathematical virtuosos, who often work in public service, may give relatively greater value to its cultural component than to its economic component, even if they often have a lower level degree.

Those whose fathers belong to the dominant classes, in particular the economic sectors, are, relatively speaking, more numerous among salespeople and the heads of the room. These people, although often more highly educated, do not need to know – or no longer need to know – complex mathematical relations. On the other hand, the parents of engineers are slightly more likely (even if, due to the sample size, the difference is minor) to be from the 'cultural' sectors of the dominant classes (such as engineers and especially public office managers and professors) or from the middle or working classes. R&D engineers also have slightly lower level and less prestigious degrees (ENSIMAG, Télécom, ENSAE) than the most dominant members of the room, who have often studied at the Ecole Polytechnique or Ecole Centrale. Far from preventing the less highly educated engineers from entering the field of mathematics, this initial difference in mathematical ability seems, on the contrary, to favour it. Power and money are primarily of interest to the dominant individuals in the room: of the students from the Ecole Polytechnique and the Ecole Centrale, those who go into trading are those who have the greatest economic dispositions and are most willing to give up their educational values. Once in the room, they thus readily delegate mathematical modelling to lower level engineers. The intellectual interest of these lower level engineers in complex mathematical relations does not only lie in the occupational structure. In a somewhat more working-class background, it is also to be found in the cultural goodwill that guarantees the educational investment enabling this type of acquisition. This educational investment is not limited to its economic aspect, but rather affects the whole moral being and entails an adhesion to the educational order and its values, all the more so as it is the university that allowed the employees to become what they are. Thus, at UC, the orientation towards financial mathematics has, in many respects, the same constants as the university field (Bourdieu 1988).

While for the lower level engineers (promoted from minor engineering schools), the assertion of mathematical expertise and adhesion to the commercial order of the room seem somewhat compatible, the same cannot be said for those who possess greater cultural capital in its academic form.

> Marc, a former researcher in theoretical physics at the Atomic Energy Commission (CEA), is the 'quant', that is, the mathematics expert in the room. After a few years spent at the CNRS, faced with a lack of opportunities to progress within his field of research and finding himself under financial pressure, he chose to move into finance. Given that his academic disposition goes against the commercial spirit of the room, he has an unhappy

relationship with finance. Indeed, he does not particularly like the atmosphere in the room or his 'mono-configured' colleagues who have 'cut all the cables plugged into any outputs' other than money. 'Modelling arbitrage relations', he explains, 'is like throwing a chair out the window and trying to model the distribution of the pieces! It can be done, it can become very complicated, but it is quite limited'.

What's more, Marc is only given trivial problems to solve, such as minor improvements and arrangements of existing models in order to price new products. In 1998, UC's head of room was not interested in developing a real team of mathematics researchers (similar to those employed in Anglo-Saxon banks). So Marc is not given time to implement alternative models to the Black–Scholes paradigm, still in use for modelling prices. He would like to develop alternative models where the volatility presumed constant by the Black–Scholes model would itself follow a stochastic process. But the traders are not interested, because this type of modelling prevents them from calculating the 'marked-to-market' book value (according to the daily prices), and forces them to work blind for a long period before being able to observe whether the arbitrage is winning or losing. He even says that he would like to do 'proprietary trading', that is, to have his own securities portfolio in the long run. The aim of such a trading position would not be to find the right formula in order to earn money but rather to earn money in order to show that the arbitrage formula is right.

R&D engineers are thus in a position where they wage a symbolic struggle with the financial operators (traders and salespeople). Even if they are responsible for most of the room's financial profit through the quality of the equivalence relations they establish and the performance of the software they develop, R&D engineers do not succeed, at UC at least, in obtaining a political and economic position that matches their contribution. It is the financial operators who harness the activity and transactions and thus succeed in making others believe that they are responsible for the profit.

In 1998, the power struggle did not favour R&D engineers. While data-processing modelling might still progress and lead to the suppression of some trading jobs, further mathematical modelling does not appear to have been so advantageous. Thus, during a meeting in which the results of the room were presented, an analyst working in modelling questioned the head of room on the advisability of hiring a second quant:

'There's only one quant?'
'The value added of a new model is falling', answered the head of the room. 'There are some people who believe in Graal and magic formulas!'
'If the model's bad, we lose money!'
'If we have a better model, we don't earn that much more money than the market!'

Contrary to the opinion of some American banks, which invested massively in developing teams of research in financial mathematics, UC, formerly at the forefront of arbitrage modelling, now considers that the marginal output of more powerful mathematical models is decreasing. This strategic orientation is undoubtedly linked with the increasingly commercial orientation of the room.

3.2. Consequences and limits of mathematisation

The traders who deal structured products, in particular the six traders working at the financial engineering desk, are familiar with the mathematical foundations of arbitrage relations. First, they are highly qualified and have chosen to work for the financial engineering desk because it has the highest positions and products in the hierarchy of technicality. Second, they must arbitrate some very complex products such as double-barrier options. For that, they have to make proper use of arbitrage relations. For this kind of product, the ideal is not so much to deal but to make a few major transactions with very high margins. Since they often deal in new products, they ask the R&D team to improve the software used for pricing or sending orders. They have to explain their needs to this team, sometimes taking part in modelling or supervising. Thus, the relationship between engineers and traders is a mixture of rivalry and complicity.

While most of the traders on exotic options and structured products have in-depth knowledge of complex mathematics, the same cannot be said for traders on more traditional options. Indeed, they work on standardised products for which modelling has already been carried out. They do not really need to ask anything of the engineers or speak the language of mathematical modelling.

When they have been trained in finance or at engineering school, these traders have a very rough knowledge of the main stages of mathematical modelling, or they are at least able to provide the financial interpretation of the principal parameters that result from this modelling. However, it is not necessary to know this in order to be good at options trading. Moreover some traders on warrants (that is, options issued directly by private banks), often foreigners, have not obtained a degree and have a working-class background. The trader has a screen in front of him, with the parameters of the formula: *delta, gamma, vega, theta*, the buying and selling advice. The job then becomes rather 'push-button'. One of the risks of mathematical rationalisation is the elimination of certain parts of arbitrage-based trading, now performed entirely by computers. This is already the case for Ivan, whose job is to set the parameters of the computer, which then deals for him.

Competing against less well-educated people, beginners, and middle-management office workers, trading operators will, on the one hand, boast about their mathematical abilities in order to justify their right to occupy such advantageous positions. On the other hand, however, faced with the growing importance of mathematical and computer modelling in trading, they try to maintain a certain autonomy, for instance by giving more and more importance to speculative trading, in which profit is not guaranteed by a necessary mathematical relation between two products. To maintain their position and autonomy, they take advantage of the present imperfections in mathematical modelling. This type of modelling, for instance, does not take sufficient account of developments in the volatility of securities. To arbitrate an option against an underlying security can be regarded as speculation on the development of the security's volatility. Ordinary options traders thus maintain their autonomy by taking advantage of flaws in the model and can carry out a hybrid form of arbitrage that is closer to ordinary speculation.

4. Rather economical economic analysis

4.1. Pragmatic use

Economic analysis is not only a type of academic knowledge, like mathematical arbitrage. It is also, in part, general knowledge, which does not need to be learned at university. In the trading rooms, many have never studied economics as part of their degrees but nevertheless use basic analysis on a daily basis. Thus, according to our questionnaire, 53% of the respondents use macroeconomic reasoning: 10% because it is scientific, 27% because it works, and 16% because everyone else does.

Of operators – a category that has to develop winning strategies on the market – salespeople (89% of them) use economic reasoning more than traders do (67%). Salespeople must canvass customers (fund managers, company treasurers) and offer them derivatives managed by the traders. Therefore, they have to make a sales pitch in which economic reasoning features prominently in order to convince the customer either to try a bold speculation or protect himself from the risks incurred: 'With the crisis in Asia, your portfolio is vulnerable. You need to be covered, we can guarantee your portfolio'. On the other hand, the traders in a room devoted to arbitrage do not often have to predict variations in prices based on economic aggregates. Nor do they need to explain their choice with clear reasoning. Other categories of personnel who intervene very little in the market (especially the engineers, who are often wary of macroeconomics) do not have the chance to use economic reasoning and are not interested in this type of analysis.

4.2. Agents and distribution tools

As for stochastic calculation, some agents in the room occupy a structural and functional position in the spread of 'economic rationality'. Economic reasoning was deemed significant enough during the 1980s and 1990s for all the trading rooms to adopt a method of organisation with an economic analysis expert (the market economist) and a time frame for the presentation of its forecasts (the morning meeting). Ian, the market economist of the room, therefore explains the economic news

during the morning meeting and distributes a written summary. He comments on changes in the markets on the previous day and draws his listeners' attention to the figures that are to be announced during the day (inflation, growth, etc.). For those figures, Ian reminds everyone of the 'market consensus', that is, the average prediction made by the main forecasters, and the expected evolution of the markets depending on whether the figure announced is below or above the forecast.

The work of economists does not require a very high level of expertise. In this case, the economist uses neither macroeconomic models nor econometric forecasts. His work consists more in popularising economic articles produced by the economic services of banks among operators. 'The room is only interested in consensus', he says, as an excuse for not taking a greater interest in more theoretical economics. As the trading room of UC is dedicated to equity derivatives and favours arbitrage over speculation, economic reasoning is perhaps given less importance than in other trading rooms, in particular those which favour speculation over arbitrage and brokerage or those which trade fixed-income securities, on which major macroeconomic variables and the economic policy of states have a much greater impact.

The market economist, whose audience is limited, is merely one mediator of economic reasoning among others in the trading room. Whether or not they listen to the economist, the members of the room will keep an eye on news about companies' progress. By reading financial newspapers on a daily basis and referring continually to Reuters and Bloomberg, they fill their mind with information, advertisements, rumours, and even ready-to-use economic reasoning. Although less visible, their working tools also contain condensed economic reasoning, whether assumptions for pricing algorithms or economic forecasts integrated into their databases.

Hence, through many different sources (economists, media, rumours, conversations, searches), market operators find themselves immersed in a universe where economic reasoning, more or less elaborate and orthodox, is available – in simple narrative forms that do not require prior theoretical knowledge – for adoption, handling, composition, and appropriation.

4.3. The mistrustful and the virtuosos

Unequally informed, the members of the trading room are differentiated by their capacity to implement economic reasoning. Some use it as an extra that may be of use, for example, in convincing the customer, but which requires a cautious approach because of its high degree of inaccuracy. Others are true virtuosos of economic reasoning and connect consecutions of macroeconomic variables to prices with surprising speed.

> Patrick, a salesman at Loan R., has very little faith in economic reasoning, which he considers uncertain: 'Economists often make more mistakes than chartists. We went to see the economist with a customer who was very exposed to the strong sterling. And so he said to us, 'Well, the sterling will come down in the next six months, because interest rates are too high. Therefore the government will lower the rates and the sterling will be at around 9.30'. Now, the sterling costs 10 francs. You see, it is an enormous difference. And so, you see, he was totally wrong. You never know with economists: they always have the right explanations at the right time, but for the future … it is not so easy, and that's only to be expected'.

> On the other hand, a portfolio manager questioned by Claudine Carluer (1994, p. 351) links fast causal sequences in order to explain why, in period of economic growth, he is more aware of interest rates than companies' results: 'It's obvious. It's what is happening now in the United States. Fast growth, overheating, a rise in interest rates because of inflationary anticipations: that it is the current path'.

It is not easy to identify social causes of the use of economic reasoning. It seems to depend on the overall orientation of the trading room and the local position of economic reasoning within the symbolic hierarchy. At UC, the people in the room whose father had an 'economic' profession, such as businessman or liberal professional, use economic reasoning more than others (57% as opposed to 44%). However, these people, over-represented among salespeople, perhaps use it more because of their function than on account of their social origins. In the local context of UC's trading room, where economic reasoning occupies a lower position in the symbolic hierarchy than mathematical

arbitrage, those with the greatest cultural capital generally prefer to excel in mathematical arbitrage. In the Banque Parisienne de Placement (BPP) trading room, on the other hand, which focuses on currency and fixed-income securities speculation, economic reasoning occupies a more significant position and a higher level in the hierarchy of values. At the time of its morning meeting, traders from this room, who are often very highly educated (Ecole Polytechnique, ENSAE, and a former philosophy professor), compete to perform the best economic reasoning – in this case, that which is more complex and closer to academic discourse.

4.4. Neo-classical reasoning

In general, when an economic event occurs, it is possible to deduce a number of economic consequences from it, which may be contradictory (Lordon 1997). Some economists have often pointed out that, when such alternatives occur, the economic reasoning used in the market is generally neo-classical. Some economists have even studied the self-fulfilling nature of neo-classical predic-tions, thanks to the financial markets and their belief in neo-classical economics. In her studies of the form of reasoning used by portfolio managers, Carluer (1994) observes that the reference model they use is neo-classical economic reasoning.

A large number of factors contribute to this uniformity of economic reasoning: the newspapers and the media; official publications which, one way or another, tend to reflect the 'Washington Consensus' (Dezalay & Garth 1998); the fact that neo-classical reasoning is fairly simple and systematic; and the need to predict the actions of the central banks (which tend to be extremely neo-classical).

> These are the words of Thierry, an older left-wing trader and witness to the spontaneous spread of neo-classical reasoning:
> And then in '80, when the left came to power, there was a high level of debt, that is, a whole lot of public programmes were planned, which had to be financed. And the state then took the place of everything – normally in economics, only the company should borrow on the capital market and not the State. (Thierry)

To test this tendency to adopt neo-classical reasoning, we proposed two alternative forms of economic reasoning in the questionnaire, which were equally plausible (figure 2). One is somewhat ortho-dox and the other somewhat heterodox (or at least Keynesian). From 1994 to 1997, the American rate of unemployment was the variable on which the stock exchange market was polarised. The dominant reasoning was inspired by the Phillips curve, which is a 'classical' version of some Keyne-sian forms of reasoning. According to this approach, there is a decreasing relation between the rate of unemployment and inflation. Any fall in unemployment was interpreted during these years as a sign of a return to inflation and an imminent rise in interest rates, which would entail a fall in prices. After 1997, as this relation had no empirical verification, the interpretation lost ground. Some even started talking of a 'New Era' in the USA – a new economic era of low unemployment, strong economic growth, and low inflation.

While the neo-classical answer was the most popular (45%), the alternative answer was frequently selected (29%), maybe because unemployment failed to have an impact on American inflation. Some (5%), perhaps with a better understanding of economics, ticked both answers and sometimes gave

A fall in unemployment in the United States means for you:	
A rise in salaries, thus in inflation, thus in interest rates, thus a *drop in prices.*	45%
A rise in consumption, thus in profits, thus a *rise in prices.*	29%
(Ticks both answers)	(5%)
No answers	18%

A rise in public debt means for you:	
Revival of activity, rise in future profits and thus a *rise in prices.*	10%
A rise in public debt, thus a rise in interest rates, thus a *fall in prices.*	56%
(Ticks both answers)	(5%)
No answers	29%

Figure 2. Economic opinion of members of the room.

Salary	Proportion
Less than 250 000 F	36%
250-350 000 F	44%
350-500 000 F	55%
More than 500 000 F	67%
No salary declared	29%
All (n=94)	40%

Figure 3. Proportion of people who expressed an orthodox or subtle (i.e. they chose both options) opinion regarding the two questions of economic forecasts, according to their annual salary.

explanations in the margins. The question on the rise in public debt was less striking to members of the room. Apart from Japan, where a public revival of the economy was attempted a number of times, and some of the revival plans could have brought about a rise in the markets, the budgetary revival had not been on the agenda in the OECD countries since the beginning of the 1980s. On the other hand, the disengagement of the state became the standard for good economic policy. The members of the room had assimilated this standard; in their answers, they generally chose the orthodox vision over the Keynesian one (Figure 2).

To gain a better understanding of what motivates orthodox opinions, we drew up the following table (Figure 3) containing the proportion of people who expressed an orthodox or subtle opinion according to annual salary levels (Figure 3). This proportion clearly increases in line with salaries. Seniority in finance, income, and hierarchical positions are somewhat narrowly correlated. Everything occurs as if the propensity to be 'orthodox' increases along with integration within the financial world. Junior workers' answers depend more on their preliminary knowledge of economics (the economics taught in school is more Keynesian than that used in the trading rooms), or even on their political or ethical convictions. In the ordinary world, any fall in unemployment is thus considered 'good' and any rise is 'bad'. Junior employees may think that what is 'good' in the world of politics and economics must be also 'good' for the market. With a little experience, they learn that the opposite is true (during the 1990s at least). Initially shocked, they eventually get used to such a sequence of economic consecution.

Even if the tendency to use orthodox reasoning is very strong and is reinforced through integration into the financial world, one should not think that all economic opinions are uniform or neoclassical. It is important to remember that the consensus is all the more difficult to establish because the group is so large. As Baker showed, the larger the group of traders in a pit of options quotation, the more cliques are formed, the greater the dissensus between the cliques, and the more volatile the price of the option (Baker 1984). Moreover, some economists observed that on many markets, if economic reasoning and future forecasts were identical, transactions would not be possible. Sometimes, when some anticipated figures are announced, the market has a short period of hesitation. It often happens that it goes in one direction and then makes a sudden turnaround. This phenomenon is due to the unequal financial power of people who interpret the figure's impact on the price differently.

4.5. Economic reasoning as an unconscious exercise of semiology

As Carluer explains (1994), even if the types of reasoning are integrated into a stable and homogeneous neo-classical reference model, the particular reasoning of portfolio managers is unstable and multiple. The great variability of the types of reasoning within the dominant referent is partly due to the cycle of figures selected by the market. This cycle of significant figures also corresponds

to a cycle of economic causal reasoning, which at any given time will appear significant, more significant than those underpinned by other figures which no longer move the market.

However, instability in reasoning is not due solely to the instability of the market itself, but to the type of reasoning. As Claudine Carluer observes, economic reasoning is relatively simple and unilateral: 'They are pronounced in a manner that leaves room for neither doubt nor contradiction, and they are relatively short and simple' (Carluer 1994, p. 235). The reasoning generally consists either in 'considering the direct influence of the economic indicator' on the price or in 'considering its influence through the influence it exerts on an intermediate element' (Carluer 1994, p. 236) – generally interest rates. This type of highly economic reasoning enables very swift intervention in the markets and allows people to seize profits before they disappear. However, it also favours the formulation of causal chains that can become contradictory.

> In the following example, the portfolio manager almost contradicts himself when he answers two questions in succession on the influence of growth on the stock exchange market. In the first case, the fall in the unemployment rate means economic growth, a rise in interest rates, and thus a fall in the markets, and in the second case, a rise in production implies economic growth, profit, and a rise in the market.
>
> *For stock exchange markets, does a strong increase in job creation cause an economic rise or fall? Why?*
> I would say job creation is synonymous with growth. Synonymous with growth means synonymous with inflation, and where there is inflation there is risk … a bit like what occurred in the United States recently, a risk of inflation and so a rise in rates and thus fall in the markets […]
>
> *For the stock exchanges, does a rise in industrial production cause a rise or a fall? Why?*
> A rise in industrial production means growth; where there is growth there is an improvement in financial results, and the markets are quite keen on that. (Carluer 1994, p. 352)

In this example, the portfolio manager uses the term 'synonymous' to characterise the stages of his reasoning. Undoubtedly this is just a manner of speaking, and he could easily have used a more scientific term such as 'implies'. Beyond the contingency of the terms employed, however, we might say that by using the word 'synonymous', this person is unconsciously telling us the truth about the exercise of economic reasoning in the trading rooms, where the economic analysis of ordinary operators may be compared to an unconscious exercise of semiology: it is more an investigation into the connotation of the terms of economics or economic policy than a rigorous exercise in establishing macroeconomic sequences.

The spontaneous schemas of interpretation of economic information are added to a vague knowledge of economics. They allow an automatic intervention, without reflection, when economic figures are announced.

> Ivan had a small 'spiel' portfolio (an authorisation to speculate with the funds of the bank without being covered). But he had to remove this 'position' because he faced some losses on CAC 40 futures. He tried to speculate on one of Jospin's important political speeches. Nine times out of ten he won, but at the tenth try he lost everything. He believed that what Jospin had said was bad for the market (thus he sold), whereas it was bullish.

These schemas are organised. Anything that could be interpreted as a *threat* to monetary stability in the economic policy figures or speeches will be interpreted as a factor causing a rise in interest rates and a drop in prices. On the other hand, anything that resembles *calming* allows a fall in interest rates and a rise in prices. Thus, the 'fall in prices/rise in prices' pair is partly determined by the paradoxical schemas of *tension* and *relaxation*, *threat* and *calming*.

5. Pagan knowledge: charts

While mathematised arbitrage and economic reasoning are, to some extent, linked to academic knowledge, chartist analysis, on the other hand, also known as 'technical analysis', is an indigenous knowledge with no academic extension. It is a rather old technique. Charles Henry Dow (founder of the Wall Street Newspaper and the father of the Dow Jones index) invented it in the late 1880s. In France, it was not properly adopted until the major transformation of the financial markets in the

middle of the 1980s. Trading rooms organised according to the American model, with their operators often coming from Anglo-Saxon countries, were a more favourable place for the importation and spread of such techniques than the traditional stockbroking agency.

The general principle of technical analysis is to try to predict future prices from past prices. Chartists therefore try to detect trends and typical configurations. This type of forecast, although used in many fields, such as economic forecasting – with its time series and econometrics – is regarded by dominant neo-classical economics as irrelevant in the financial field. According to neo-classical economists, since prices will immediately reflect all forecasts by all financial agents made on the basis of all available information, only new information, not past information (like the shape of prices), can lead to a move in prices. The result of this reasoning is that it should be impossible from a theoretical point of view to predict prices on the basis of past prices.

3.1. Basic chartist figures There are several chartist techniques: techniques for graphic representation, such as bar and line graphs (the most commonly used), 'Japanese candlesticks', or points and figures; various important figures such as 'support' or 'resistance' lines, 'head-and-shoulders', 'V formation', 'W formation', triangles, inverted triangles, 'flag and pennants', ascending channels, gaps; forecasting techniques using the Elliott wave principle or the Fibonacci numerical series; trend indicators, such as moving averages; and so on.

5.1. Some basic chartist figures

The chartist technique of 'resistance' lines is at the origin of many chartist figures. This technique consists in isolating some maxima (or minima) and plotting straight lines between them (Figure 4). These lines are called 'resistance' lines (or 'support' lines), and the price is supposed to bounce against them. For example, in the case of an ascending triangle or ascending channel, the price remains confined for a time between the two lines of resistance. In this case, it is said that the price 'tests the line'. However, it can just as easily 'break the line' (for example at the end of the ascending channel). Technical analysis is used to locate significant points. The reasoning is of an either/or type. Either the price tests the resistance line and returns to its previous level, or the price breaks the line and will strongly rise (or fall).

Elliott waves are a collection of 'rules' that are supposed to predict the succession of 'waves' (a wave is a price movement consisting, at least, of a rise and a fall, but maybe more). It is supposed to be a 'philosophical' method. Here are some examples of these very strange rules: 'the third wave is never shortest', 'the second wave never traces more than 100% of the first', and so on.

Moving averages are a well-known method of studying time series (in history and statistics), because they have the advantage of smoothing discrepancies and determining trends. However, chartists' use of moving averages is rather odd. For example, chartists use two moving averages (a 10-day small one and a 30-day large one) and use sayings like 'when the short-term moving average breaks above the long-term one, it is a sign of a rise' (also called 'golden cross') o r 'when the short-term moving average breaks below the long-term one, it is a sign of a fall' ('death cross').

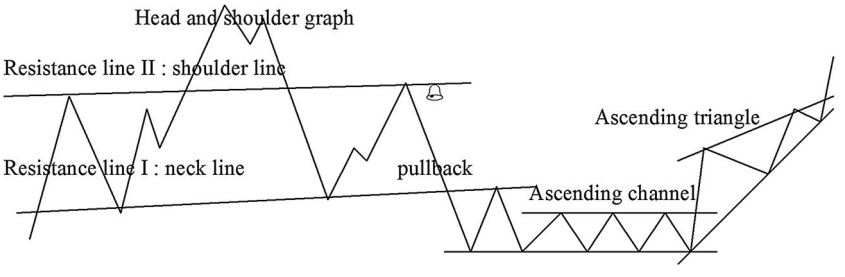


Figure 4. Prices with some basic chartist figures.

To understand its success, one should not, like the neo-classical theorists, reduce chartist analysis to a simple linear interpolation of past prices. Rather, it is a subtle art of interpreting prices based on the recognition of forms and the search for the appropriate saying. The difficulty with technical analysis based on resistance lines stems entirely from the fact that it is possible to plot a large number of lines, which will eventually become irrelevant. Often, chartists state that they need to have an idea of the market's evolution before checking whether this idea is confirmed graphically by a series of lines.

> Ronan, after finishing business school and obtaining a Diploma of Advanced Studies (DEA) in stochastic mathematics, was hired at UC where his predecessor in the room taught him technical analysis. His principal work consists in envisioning future trends in the markets with the use of chartist techniques, and explaining his forecasts every morning (in English) at the morning meeting.
>
> On 20th December 1997, he made the following forecast for the CAC 40, which had closed at 2822 points the previous day. He envisioned a fall that should either stop at 2812, or at 2784, or in the worst case at 2650, unless prices should rise, in which case it would reach 2857 or 2885:
>
> In the longer term, an interpretation of the rise from a low of 2475 still favours the X-wave (min: 2880 already met, norm: 3000, max: 3100). The major downward movement seems to confirm: caution. The risk is a retest of the 2650 area.
>
> In the short term, a downward movement seems to confirm: a break below 2812±4 will target 2784±2 then the 2650 area.
>
> If an impulsive downward movement is on the horizon, 2857±7 must remain unchallenged. Be aware that a break above this level will target the 2885±3, which, if broken, would invalidate the immediate downward structure.

Even if it employs several contradictory strategies, technical analysis can produce financial profits, because it enables operators to prepare financial orders at key points, which are often important for the market.

5.2. A popular technique

In the trading room of UC, 41% of the population use technical analysis, 16% because everyone else does so, 21% because it works, and 3% because it is scientific. The majority use resistance lines (26%) and Elliott waves (24%), followed by moving averages (14%). The members of the room generally learned these techniques alone (7%) or thanks to the presentations given by the company analyst (17%). Only 4% of them learned these techniques at university.

The probability of using technical analysis depends on the position held within the trading room. The traders use chartist techniques the most (63% of them), almost as much as economic analysis. Sales people (58%) also use chartist techniques to develop their sales pitch and convince the customer. Other people who carry out fewer market operations use it very little. The position held does not entirely explain the use or non-use of 'charts'.

According to their social and academic origins, the members of the room acquire dispositions that encourage or discourage the use of these unscientific, quasi-proverbial formulas, all the more so given that these techniques compete with and sometimes contradict nobler, more legitimate techniques in the academic hierarchy. 50% of the children of liberal professionals and 46% of the children of businessmen thus use charts, as opposed to 36% of the children of engineers. The most highly educated people and those from educated families feel reluctant to use such a rudimentary technique in comparison with mathematical arbitrage or economic analysis. On the other hand, people from more working-class backgrounds can make (excellent) use of technical analysis as a way to compensate for their lower ability to carry out more academic reasoning.

A regression model for the use of Elliott waves enables us to see the determinants of the use of charts (Figure 5). The person's function – salesperson or trader – is one of the most significant factors. Being integrated within the financial world, measured by the dichotomous variable 'having or not having four years of seniority in finance', strongly increases the 'all things being equal'

Explanatory Variables		Rough ratios	'All things being equal' effect
All (n=94)		24%	
Function	*Salesperson*	36%	+19% **
	Trader	42%	+16% *
	Others	10%	-10% ***
Degree	≥ Master or equivalent	17%	-3%
	< Master or degree not available	29%	+2%
Experience	> 4 years in finance	40%	+13% **
	≤ 4 years in finance	12%	-7% **
Gender	Female	17%	+1%
	Male	27%	-0%
Father's degree	> Baccalaureate or degree not available	21%	-4% (*)
	≤ Baccalaureate	30%	+5% (*)

Figure 5. The use of chartist methods. Probability of using Elliott waves: Rough ratios and 'all things being equal' effects. Note: $^{**}P < 5\%$; $^{*}P < 10\%$; $(^{*})P < 20\%$. Active variables are in normal text; supplementary variables are in italics.

probability of using Elliott waves. As these techniques are only learned in trading rooms, it is fairly normal that seniority favours their use. One can also see that the higher one's cultural capital, the lower one's probability of using 'charts'. Those individuals from working-class families, or from backgrounds in which economic capital is relatively more important than cultural capital, are capable of showing economic goodwill and therefore adopt the techniques that work easily, even though those techniques are unworthy of people who are capable of cultural goodwill and who are more attached to academic knowledge.

5.3. Controversies over the capacity of the charts

One of the characteristics of chartist analysis, unlike other methods, is that people always have a strong opinion on it. It has both its detractors and its advocates.

> Some, like Patrick, who can be characterised by his economic goodwill, are fascinated by the forecasting capacity of charts. They are ready to spend large sums in order to acquire an economic technique that makes it possible to make so much money, despite of its dubious bases.
>
> 'It is true that when you look at charts, you think that they might even be too powerful. You could almost forget about economic analysis and only trust chartists' analyses, because they are so powerful', Patrick says.
>
> Some, on the other hand, despise charts and consider these techniques ridiculous.
>
> 'The tradition [at the BPP] is rather to make fun of it, but to look at it anyway because you have to. In principle everyone finds this absurd! But at the same time, you can't deny the self-fulfilling nature of the charts, and so we look at them', says Quentin, a former philosophy professor.

For operators who do not like this technique and for economists who study finance, the fact that charts work is rather mysterious. It is not enough to simply denounce the stupidity of the technique. It is also necessary to be able to provide real reasons as to why technical analysis works on the basis of bad assumptions. Some will explain charts by their self-fulfilling nature. Others will explain why there are trends. Others will say that some chart figures (for instance, movements like an ascending channel) work because of insider trading And so on.

It could be said that economists have not completely solved the reasons behind the power of technical analysis. The economists who developed the assumption of efficient markets denied it had any validity and argued that money made from technical analysis was simply due to the random

distribution of profits. Many economists are not so unequivocal today, and heterodox economists, thanks to the financial successes produced by technical analysis, denounce the empirical fragility of neo-classical theories. In general, heterodox economists consider technical analysis a self-fulfilling phenomenon, the simplest model of which is the 'rational bubble'. We cannot doubt that most of the success of technical analysis comes from this kind of mechanism. And if astrology, recently introduced to the financial markets, ever manages to be similarly successful, we will see a confirmation of the possibility of self-fulfilling phenomena. The problem, however, is that 'conventionalist' theory cannot explain how people adopt this technique and why some individuals on the market will use some techniques that are very rare. As shown here, there are social reasons that promote the adoption of such techniques. A dialogue between economists and sociologists would help to reveal more about the reason for this adoption.

6. Overall picture

A description of the various forms of reasoning and winning strategies shows that they are relatively differentiated. It is therefore possible to describe the trading room as a competitive space for the appropriation of economic and symbolic profits. The following multiple correspondence analysis gives an overall picture of the orientation of operators in this true bazaar of rationality (Figure 6).

In this multiple correspondence analysis, the answers to the following questions were used as active variables: attending the morning meeting (always, sometimes, or never); the usefulness of presentations given by economists, chartists, and colleagues; the use of charts; the chartist techniques used; the reasons for their use (speculating, predicting the evolution of prices, finding the right moment, seeking reassurance); the means by which these were learnt (presentations, university, or self-study); the use of economics; the orthodoxy and heterodoxy of opinion on the effect of debt and unemployment on prices; the type of economic information used; the use of complex mathematics; favourite type of prices.

In this multiple correspondence analysis, axis 1 contrasts the most integrated on the right with those who are least integrated on the left. Axis 2 contrasts various forms of strategies, technical analysis, and mathematics at the top, with economic analysis or the absence of any method at the bottom. In fact, this multiple correspondence analysis allows four areas to be quite clearly distinguished. In the upper left quadrant are the mathematics virtuosos who can demonstrate or modify Black and Scholes relations. These technicians of volatility can use fine arbitrage so well that they are able to confront the low volatility that produces smaller profits. Like those in the lower left quadrant (who do not use mathematics at all), people in the upper left use neither charts nor basic economics. They do not go to the morning meeting, and they find the presentations made in the morning meeting to be of no use. They tend to have a heterodox opinion on the impact of public debt and unemployment on prices.

In the upper right quadrant are all the experts of chartist techniques. Those who use the rarest techniques such as Japanese candlesticks, points and figures, and moving averages are generally self-taught and use them to speculate. These chartists can make money under difficult conditions such as stagnation or during a fall. Even if they do not seem to know much about economics, they also use economic analysis because it works. They use mathematical relations as well, but they can only interpret those relations or use them in a push-button way. In the lower right quadrant are those who use economic reasoning. Some would say they use economic reasoning because it is scientific. They can give orthodox answers to macroeconomics questions and are interested in all kinds of economic information, such as take-over bids, downsizing, etc. They are informed about all the possible techniques through Bloomberg, Reuters, newspapers, and so on. If they use charts, it is rather because they say that everybody else does so. They are structurally rather bullish.

The study of supplementary variables allows us to see a clear juxtaposition of working positions and desks with different winning strategies. To the far left of the first axis are employees in less dominant positions, such as back-office staff with no real access to the market. In the upper left, we see

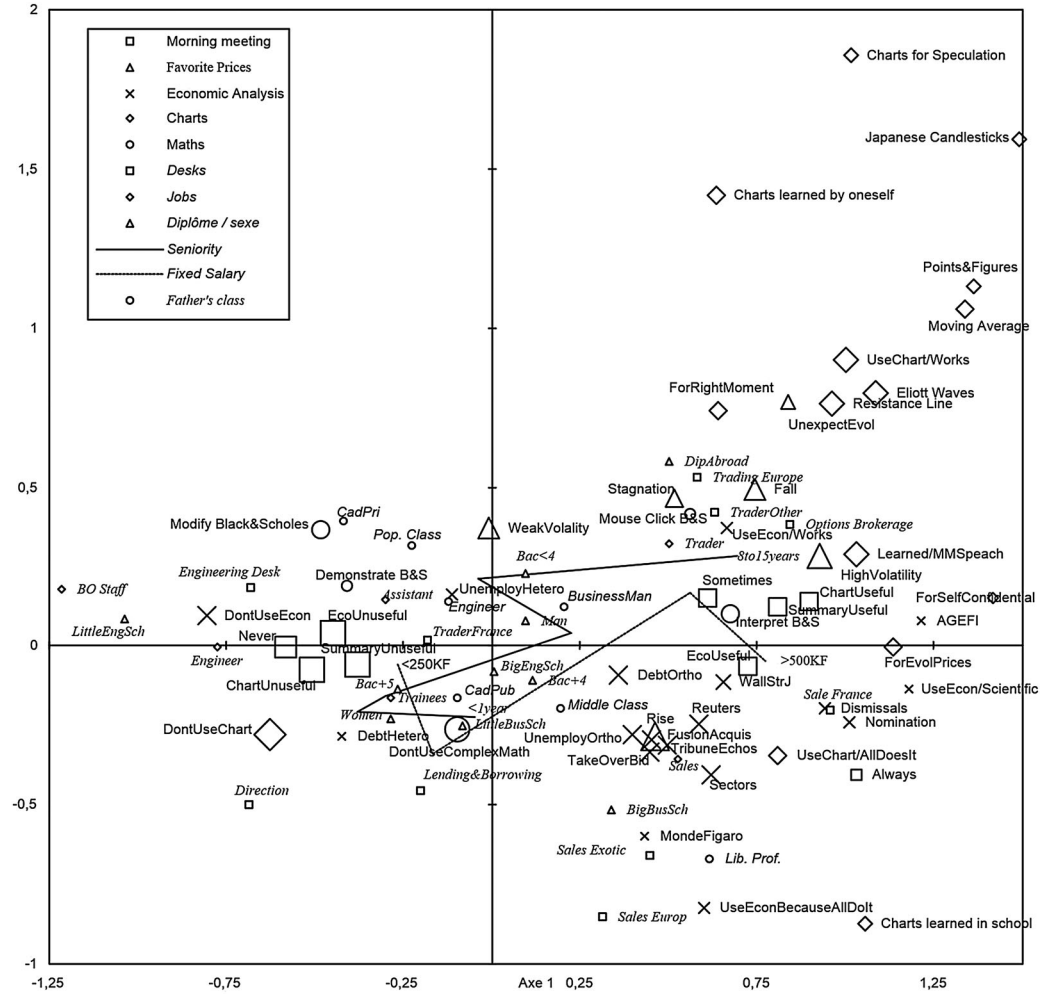


Figure 6. Multiple correspondence analysis of the winning strategies.

engineers, often from minor engineering schools, who work on the engineering desk. In the lower left are those who use almost no methods, such as heads of desk, female employees, or the securities lending desk (which remains closer to economic analysis). Most of the traders and trading desks are in the upper right, whereas most of the selling desks and sales people are in the lower right. The hierarchies according to seniority and salary are projected along axis 1.

A principle of orientation in this bazaar of rationality might be the search – conscious or unconscious – for lower costs, since operators tend to use the techniques for which they have the greatest affinity, capital, and disposition. More than the initial amount of capital, it is the *total investment amount* that seems to govern orientation in the trading room – investments that can confirm the initial capital or convert it into another type of capital. Thus, those who employ mathematics and charts commonly differ from supporters of economic analysis by their lower amount of capital. However, they could also be differentiated according to the nature of their investments. Some, often those from a slightly more 'cultural' background and more likely to make cultural and aca-demic investments, express *cultural goodwill* (here scientific), and seek to extend their academic experience by holding positions in which mathematics is required (structured products traders, financial engineers, or R&D engineers). Others, who tend to come from working-class or lower-middle-class backgrounds, in other words from a more modest background, express *economic*

goodwill, invest themselves academically only if their studies lead to a profitable position, and seek the most profitable positions and techniques at work. Those from the wealthiest social backgrounds (in this case the sales people, although this is not necessarily the case in all banks) are the most predisposed to using economic analysis. The opposition between traders and engineers, on the one hand, and sales (or users of economic analysis), on the other, does not lie solely in the degree to which they make use of economic analysis. Traders, engineers, chartists, and arbitrageurs, to some extent, all remain attached to the technique that enables them to be what they are, whether the cultural and legitimate value of mathematics for some or the 'counter-cultural' value of charts for others. (Financial operators from the lowest social background, who therefore have less knowledge of the legitimate hierarchies, often take the most pride in their illegitimate techniques.) Sales people and 'historical' traders who today work as heads of the room, who come from higher social backgrounds and have relatively lower capital, have more successfully internalised the requirements of economic domination. They see techniques as economic techniques alone, which they measure only according to their profitability. They use one technique or another indifferently, provided that it works, but are able to maintain a kind of 'axiologic neutrality'. For this reason, they find it much easier than most to 'leave the market', contradict the fundamental values of the market (deals, volatility), and hang back in 'juicier', more political positions such as head of the desk or head of the room.

Notes

1. A preliminary version was a chapter of my master thesis (Godechot 1998). It also constitutes a chapter of my book *Les Traders* (Godechot 2001). A shortened version was hastily translated into English for the *The culture of financial markets* conference in Bielefeld in 2000. This last version was edited and slightly revised thanks to Susannah Dale's and Taylor Nelms's help. The longer version includes more contextualisation in long footnotes, additional extracts from interviews and a small section devoted to the often-proposed financial strategy of 'feeling', which I analyzed as a way of informally (and often unconsciously) hybridizing more explicit strategies such as those described in the paper.
2. This label was coined in 1999 by a group of young Ph.D. researchers in Social Sciences in Paris studying finance differently, guided by the model of the social studies of science. Cf. http://ssfa.free.fr
3. Hence Bourdieu shows that house-buyers begin calculating their budget very gradually (Bourdieu 2005).
4. The observation was done between December 1997 and April 1998 within the trading room of a large bank we shall refer to as Universal Company (UC). Some interviews were also conducted. A questionnaire was given to members of the room, half of whom responded (94 total responses).

Disclosure statement

No potential conflict of interest was reported by the authors.

Notes on contributor

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