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THE CIRCULATION OF WEALTH

LOST IN SPACE:
A CRITICAL APPROACH OF ACTOR-NETWORK THEORY (ANT) AND OF THE SOCIAL STUDIES OF FINANCE (SSF)

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Abstract

The increasing power of the financial industry in today's economies has important spatial consequences. This article will examine the relevance and limits of applying concepts from certain recent social sciences' and humanities' theories to the financial field; these theories are collectively referred to as Social Studies of Finance (SSF), which are in large part inspired by Actor Network Theory (ANT) This then leads into two critiques: firstly, that Social Studies of Finance works are limited to the financial sphere and scarcely consider any connection with the rest of the economy. Secondly, that their conception of space remains embryonic, if not entirely metaphorical. Therefore, to understand and evaluate the effects of the financial industry, it is necessary to take account of its spatial and historical contexts.

Keywords:

ANT,
Social Studies of Finance, Financial industry,
Real economy,
Geography.

INTRODUCTION

Over the last thirty years, market finance has occupied a predominant position in contemporary economies and societies (Orléan, 1999; Lordon, 2008). And the 2008 recession did nothing to change this! In the social sciences, it has only been subject of intense research since the 1990s, thanks to several pioneers (Hertz, 1998; Leyshon and Thrift, 1997; Martin, 1999; Sassen, 1991). In the 2000s, two concurrent schools of thought emerged: on the one hand, *Social Studies of Finance* (SSF) which grew out of *Actor Network Theory* (ANT), and on the other hand works in territorial economy and economic geography, which we will call *Territorial Approaches to Finance* (TAF).

Pryke (2006) considers that ANT has the potential to breathe new life into this field. Others, Leyshon (2008) for example, demand a critical re-evaluation of these theories. With this in mind, this article re-articulates the SSF and TAF whilst comparing their respective limitations. On the one hand it borrows a number of concepts from ANT which seem especially relevant to TAF, for instance concepts such as *calculation* and *performativity*, as well as the complementary ideas of *framing* and *overflowing*; on the other hand it demonstrates the limits relating to SSF and ANT in two particular ways.

Firstly the SSF do not "join up", the chain is incomplete. In fact, when transformations in the financial world and the interactions which link the financial "actants" to each other are examined, these works do not give any understanding as to how these transformations affect the rest of the economy. However, it is vital they be taken into consideration if we wish to understand and evaluate the role of finance within the economy and society. Secondly, the conception of space which underpins both ANT and SFF remains embryonic, if not entirely metaphorical. The argument advanced in this article is that this conception of space limits any understanding that ANT can have of the current market finance situation, from both an empirical and a theoretical point of view.

By "metaphorical" we mean that the ideas advanced by ANT, such as *place*, *node*, *network*, *connection*, *knots*, etc. are spatial metaphors but in no way take account of territory. The network which is being built is conceptualised by these theories without any concrete geographical dimension and independently of any spatial and historical context. With TAF on the other hand, in order to understand the relationship linking two financiers, one in São Paulo and the other in London, it is vital that we also take account of the Brazilian and British contexts, as well as the overall contexts (for example WTO agreements, or the contemporary use of English as the language of finance, etc.).

This incomplete chain, this metaphorical use of space and the exclusion of spatial and historical contexts are closely connected.

The first part of this article introduces the concept of *calculation* and *performativity* and shows how when financial players calculate and quantify, they profit from making changes to not only to their connections but also the deployment of their action in space. They thus manage to control other economic actors over considerable distances.

The second section examines the distinction between metaphorical space and concrete space, i.e. the difference between ANT and the territorial approaches. It then sets out the way in which the

financial industry forms calculating *milieus*, which interconnect to form the Global City (Sassen, 1991), the city which links various businesses, regions and nations to financial resources in a selective, specialised and hierarchical manner.
The third section shows how the financial industry is developing in the context of the economy and society. Having detailed the way in which it is distinct from the rest of society, from which it is separated by clear boundaries, we complete the chain and show how the influence of this industry extends well beyond the trading rooms. The Global City is thus outstripping the real economy, companies, regions and nations.
Finally the fourth section examines the way in which the real economy, which remains largely fenced in by local and national social, economic and environmental constraints, is disrupted by overflows from financial industry. Moreover, in order to understand and evaluate the effects of the financial industry, in addition to relationships we also need to take both geographic and temporal context into account right from the outset. This operational geography enables it to by-pass the constraints of the real economy and to defer the costs of competitiveness onto local and national societies.

1. FINANCE, CALCULATION AND PERFORMATIVITY

Numerous works have applied ANT concepts to the economic and particularly the financial world. Michel Callon's writing is representative of this trend within the Francophone world, whilst Donald MacKenzie epitomises it within the English-speaking world. In the three subsections which follow, we will look at calculation and performativity, two concepts central to this trend. In effect, there are two behaviours which characterise financial players' practices: calculation and quantification.

1.1 Calculation and socio-technical systems

Michel Callon (1998) proposes a veritable market anthropology based around the notion of *calculation*. It focuses on the calculation practices of financial and economic actors as well as the way they are organised, i.e. the social and technical systems which enable these calculations to be implemented. More specifically, with Callon, we are no longer necessarily interested in the conceptual limits of these theories, in ontological terms (the extent to which they reflect reality, what they can or can't explain, etc.), but rather in the way in which the theories are applied and enacted, transforming the world. Moreover it is on this basis that Callon believes *Homo economicus* can exist, because certain realities are constructed on the basis of standard economic theory (Callon and Ferrary, 2006). Callon endorses a highly concrete approach to examining what makes calculation possible. He also takes a very broad definition of *calculation*, which for him means a process of identifying and ordering the possible states of the world as well as determining the actions required to produce each of these states of the world. Therefore "calculation" leads to the arranging and ordering of possible choices and actions (Callon, 1998). Some elements will therefore be selected for calculation (the notion of *framing*) and others will be excluded and may later return to disrupt the calculations applied in a particular field (the notion of *overflow*); moreover,

for Callon, “calculation” does not necessarily mean making a numerical calculation. “Calculation” may in fact simply mean the arranging/ordering of things and states, and not necessarily in numerical form.
Technology is also a central issue in these works. These days, for example, finance is not an exclusively human system: it also includes various different technologies and technological devices. These human and non-human combinations form collective hybrids. Thus, although Markowitz (1959), the father of modern portfolio theory, had already developed the greater part of his argument in the 1950s, it demanded calculation methods beyond the scope of contemporary financiers. Although the financial theory’s most influential ideas have now pervaded practice, it took until computerisation for mathematical models to be of practical use (Rainelli-Le-Montagner, 2003). The financial markets have thus become some of the biggest users and promoters of integrated IT and telecommunications systems (O’Brien, 1992).
Although certain past technological innovations, for example the role played by the stock ticker (Preda, 2003; 2006) or more recent devices such as trading screens (Knorr Cetina and Brugger, 2003) or even the range of technologies for Paris stock exchange listing (Muniesa, 2003) have already been subject of numerous studies, the focus here is on statistics and mathematics.

1.2 Calculation and quantification

The modern world is passionate about calculation, statistics and quantification, to the extent that *qualculation* (Thrift 2004) has come to epitomise modern science (Porter, 1995). Modern finance is emblematic of this movement. Although computerisation has enabled the concrete implementation and dissemination of the financial theory pioneered by Markowitz, the increasing power of very large investors such as institutional investors and pension funds, has also played an important role. “Investors, particularly the large institutional investors, have increasingly used formal quantitative methods to construct portfolios of assets that optimise expected risk and return. Such allocation procedures are typically based on Markowitzian (or mean-variance) concepts of optimising the risk-return characteristics of the portfolio” (Hammelink et al., 2000).
Based on the key concepts of modern financial theory, i.e. risk and return, the aim is to evaluate, calculate and compare assets from the same or different classes. Using the information thus gathered, financiers can then not only compare shares against each other, but also, say, an investment in a Russian mining company and a Swiss chemicals company in a mutual fund containing a mix of bonds and equity with a real estate fund, etc. This comparability relies on transparency, i.e. the availability of standardised, public information enabling the comparison of items which are *a priori* highly diverse. The notion of *transparency* can be problematic (see section 3.4). It is however an essential prerequisite for effective market operation and liquidity development. Moreover, “market”-oriented financial systems tend to spurn close, bilateral or private relationships (themselves typical of “bank”-oriented systems), as these are “non-public” and are therefore considered opaque.
In a more general investigation into the specific role of numbers in our modern society, Porter (1995) defends the idea that, in the Western tradition, statistical technology makes the objects to

which it is applied “objective” and universal: the defining characteristic of science. From a spatial point of view, it should be considered as a standardising technology which enables distance-related constraints to be brushed aside.
This standardisation allows objects which are *a priori* highly diverse to be compared, by reducing them to a limited number of criteria. They thus become “transparent” in calculation. Ultimately, this standardisation/reduction allows the comparison of items on the basis of quantitative data, between “assets” (to use the financial jargon) which are very different in nature. As Engelen states (2007), “standardisation and simplification, or the reduction of complex, more multidimensional objects, into simple, one-dimension ones, which can be compared around a small number of shared dimensions... the reduction of complexity that is inherent in each and every form of quantification and is seen by some as the hallmark of science... is greatly enhanced by a booming industry of financial data producers such as accountants, analysts, actuarists and exchanges...”. Following this observation, Theurillat, Corpataux and Crevoisier (2010) show how the real estate industry has, for Swiss pension funds, become just another asset class whilst, at the same time, the financial industry has maintained its own self-development.
This framing process, i.e. the selection of relevant elements, enables the finance-discipline to play a key role in this move towards quantification. It provides ideas, models, equations, etc and institutionalises financial operators’ contemporary calculation practices. Economic and financial theory is therefore not merely descriptive or prescriptive, it is also performative (Callon, 2007) as it shapes this reality.

1.3 Economic and financial performativity as a discipline

According to Callon (2007) studying the performativity of the economics-discipline ultimately means taking an interest in the social and technical set-ups which constitute and shape economic activities and following the mechanisms by which these set-ups, their conception and their reconfigurations can be linked to points of economic theory. One could say it is the study of how the economics-discipline contributes to the processes of economicization of human activity.
From a financial theory point of view, MacKenzie (2003; 2006) shows how Black and Scholes’ equation has spread, transforming institutional frameworks and pervading current financial practice. It has taken ten years and the construction of often complicated arrangements for the performativity of the theory to increase and maintain its sphere of influence. In short, once disseminated and applied, certain models, equations or products form part of “standard practice”. Standardisation plays a key role in this process as it creates “immutable mobiles”, entities and inscriptions which take the form of signs, archives, documents, pieces of paper, trails, etc. These inscriptions maintain stability and are unchanging, whilst circulating within networks. In this case, financial models and equations take the form of networking “technologies” which simultaneously allow the transfer and standardisation of knowledge. These evaluation processes become standardised “entities” which are disseminated and thus come to create, in the words of Latour (1987), “circulating references”.
The notion of *performativity* extends ANT theories beyond their methodological ethnography. By

showing how a theory is able to influence institutional frameworks and practices, these theories genuinely conceptualise a structuring effect. Unfortunately, most of the time they do not question the impact these changes will have on the economy, society and their geography.

We therefore have two critical observations on SSF works as influenced by ANT. Firstly, the chain of their work does not fully link up. Essentially, although they are studying transformations within finance and interactions between financial operators, they are content to continue to breathe the rarefied air of professional financial markets as Leyshon and Thrift (2007) put it. This is somewhat paradoxical as in its original incarnation, ANT invites us to track the chain of all entities, to follow networks in their "globality", from beginning to end. Why not then leave the trading rooms and try to understand the effects and the interactions which today's financial industry has with other industries i.e. the "non-financial" sectors of the economy? Yet it is, in our view, at this level of interaction (i.e. between the financial and the real spheres) that the major economic, political and social issues can be seen.

The second aspect which is insufficiently considered by SSF is space. Finance is fundamentally a spatial industry, which creates and organises hyper-mobility of capital in space (Corpataux and Crevoisier, 2011), yet this relationship also works the other way round: finance changes the spatial allocation of capital and beyond that, transforms the geography of productive activities and spatial hierarchies. The majority of SSF studies do not, strictly speaking, have any spatial dimension, with the exception of the work of Beunza and Stark (2004), although their work is limited to a description of social and spatial division of work between actors in a trading room.

Despite its use of spatial metaphors, ANT is not used as a theoretical tool to deal with these issues as it has no real conception of space. In the next section, we return to this problem before showing how *Territorial Approaches to Finance* enable us to overcome it.

2. SPATIAL CONCEPTIONS IN THE ERA OF GLOBAL FINANCE

Social Studies of Finance struggle to get out of the trading rooms, whilst ANT has failed to theorise space. We will argue in this section that these two limitations are related and can be overcome. We outline the works of territorial economics and economic geography in this part, before applying them to demonstrate how current transformations taking place in the financial systems originate in some specific places. In return, these places shape contemporary economies and their geography. We thus show that performativity does not spring from a social and spatial void. The performance of financial theory cannot in any way be likened to a simple "application" or even a "transposition" into the concrete world. To do so would mean reintroducing the territorial context in which these performances are forged, as each time, the final result is a function of these contexts, their history and their responsiveness.

2.1 ANT and space: quo vadis? a network without geography

Although Latour's approach (2005; 2006) is fundamentally relational (an ontology of associations, (Smith and Doel, 2011)) and takes a network-centred approach, it is still not very geographical in the sense that actors, objects and relationships are not localised. Change mostly occurs within a space which is reduced to a single point. In ANT studies, 'local' is defined by a small number of actors who are maintaining relationships whilst 'global' is defined by a large number of actors interacting. This is a mathematical conception of space, in which the number of entities and the "length" of the network[1] are what differentiate the "local" from the "global". Latour makes abundant use of spatial metaphors or words with strong geographical connotations in his works. To take a couple of examples, consider his famous epistemological and conceptual slogan "keep it flat" (2005) and his definition of network: "The word network indicates that resources are concentrated in a few places–the knots and nodes–which are connected with one another–the links and the mesh: these connections transform the scattered resources into a net that may seem to extend everywhere." (Latour, 1987). But is there anything really "spatial" in these quotations? Any analysis of actants in relationships and mediation is viewed in one dimension, part of a chain "without boundaries". The latter vanishes[2].

Nor do the knots and nodes of the previous quotation refer to any kind of concentration of elements or relationships within a geographical location. These "nodes and knots" can therefore be intensely linked "places" which are dispersed in space. Latour's favoured entry point is micro-economic and relational, with humans and non-humans forging relationships. That being the case, to which space(s) do these networks correspond? Taken as a whole they constitute a sociogram rather than a map. In the absence of any consideration as to how to pass from the first to the second, ANT never manages to tackle nevertheless vital questions, such as for example the fact that certain nations, regions or towns, in certain contexts, experience a different dynamic (both qualitatively and quantitatively) to certain others.

Thus although Latour's approach to space is relatively limited, its intent is still dynamic: an ontology of action and movement. Deleuze's "spiritual descendents" have never really appreciated boundaries and limits, nor fixity and permanence… Although conceptualising movement, change and renewal is a key aspect of thought, it is also important to conceptualise fixity, stability and permanence (Corpataux and Crevoisier, 2007), (i.e. what Latour (2006) defines as the "pre-existing social set-up" and tends to neglect), not in a positivist scientific manner, where these aspects are generally viewed as natural "givens", but rather as historically constructed "givens", handed down

[1] The work of Mackenzie (2004a) is fairly clear on this point. In the conceptual section of his article, he sticks to the above definition. It is only in the empirical section, when he manages to make concrete certain elements, that he feels the need to give certain entities a boundary. In his work devoted to a spatial rereading of ANT theories, Murdoch (2006) indicates the same limit. Indeed, it is only at the point where he deals concretely with space, i.e. in the empirical section of his work, that the issue of boundaries comes up. Moreover, these are created by the action of the agents. They therefore only appear at the point of dealing with aspects "in the field".

[2] See Smith (2003) for a more positive critical approach to this point, despite the boundary generally being seen as a basic conceptual category for the geographer!

and subject to change, particularly through the influence of humans and their actions. It is this dual aspect which seems to have been neglected in ANT works, a dual aspect which we personally consider to be of crucial importance[3].
Although the virtue of Latour's approach is that it emphasises networks which are under construction, his theory does not deal with concrete spaces and places. Nor does it deal with history or boundaries. How then are we to proceed?

2.2 Metaphorical space and geographical space

According to Massey (2005), the way in which we define and conceptualise space changes the way we conceive and perceive reality. This brings us back to the distinction between territorial space and metaphorical space, as well as the effects of such a distinction.

2.2.1 From metaphorical space to territorial space

Through the evolutionary process, human cognitive capacity has broadly developed so as to be better able to find one's way around and to act in space. It is therefore unsurprising that our species' present-day capacity to conceptualise the world reflects this ancient skill. Today, humans use spatial categories to conceptualise phenomena which are not necessarily located in a concrete space. We talk for example of the "top" and "bottom" of a hierarchy. Similarly, in social sciences and there is much confusion between the concrete space on the one hand, and the abstract space we use to conceptualise phenomena on the other. The arrangement of abstract categories and the way we imaginatively connect them is ultimately very similar to the geometric representation of a concrete space. There is a great similarity between a geographical map which represents the arrangement of features in a concrete space and a diagram showing the abstract function of a network of actants, and this is down to the way in which we think about reality.
ANT views reality in the form of abstract spaces created through graphs and diagrams. The problem posed by such views is that right from the outset they exclude concrete space: paradoxically, they are imagined as systems located (in the real and physical sense) at a particular point, they have no (concrete) dimension. Thus in ANT network representations, two actants linked by an arrow can be defined as "close" without there being any physical proximity. Conversely, two entities connected by a series of arrows may be defined as "distant" whilst being physically close to each other. There are therefore two types of space which, initially, we need to make quite distinct: on the one hand, that space which is simply a tool and the product of our imagination and which is only located in our internal and subjective world, and, on the other hand, that which is external, social and objectifiable.
Of course, one might counter that what we are dealing with here are "social spaces" and not geographical spaces, and therefore consequently it is quite correct to think of two actants which

[3] For a comparable critical approach, see Elder-Vass, 2008.

are physically close but not in a direct relationship as “distant”. Effectively however, this prevents us from conceptualising the “pre-existing social set-up”, a “context” which nevertheless already exists. Geographers have of course long developed the territorial concept or rather approach. The latter is due to the way that, throughout history, humans have both physically and imaginatively appropriated space. It therefore comprises all dynamic, material and immaterial relationships between humans and between humans and objects.
Although it was initially necessary to separate space as a tool from our thought and from our social space, we now need to reconnect them to understand the way in which humans -and amongst them, researchers- think about society, produce models (whether recognised as “scientific” or not), and act upon this society.

2.2.2 Some categories of the territorial approach

The territorial approach could be defined as one which uses the near and the far, the local and the global, the generic and the specific, the past and the present, the present and the future and the real and the imagined to understand and explain economic phenomena (Colletis-Wahl et al., 2008). These are not abstract categories, they always refer to the way in which the humans, (and amongst them, the researchers) that use them both conceptualise phenomena and/or take action.
The near and the far are relational categories which enable proximity be conceptualised in a social and/or spatial manner. These relationships can be used to describe the network observed and/or the pre-existing social set-up, the context, in short the territory in/on which this network is deployed. Distinguishing between here and there, between us and them, indicates that a limit has been identified, a boundary which makes the difference discernible. Reconnecting these categories is therefore a way of opening up our understanding of how, in a given context, actants can form a learning impetus which will lead to their assimilation or differentiation.
The local and global, and all points on the scale between them, are categories which seem to contradict Latour’s edict of “keep it flat”. Indeed, the notion of scale implies spaces which cover, or even encompass others, thereby referring to an “all” which is exactly what Latour wishes to deconstruct. Scale may however be reintroduced in two ways. On the one hand, clearly identifiable relations exist between, for example, a citizen and the state, relations which can be expressed in a “flat” manner. On the other hand, we need to express context, the pre-existing social setup; here, the notion of scale is vital in identifying those institutions which will (or will not) share different actants in the same network.
The distinction between the generic and the specific really starts to make sense when we examine how the financial “sphere” interacts with the so-called “real” economy. It is not simply a matter of identifying the functional boundaries between these two functional “spaces”, but also the geographic spaces for each of these entities. We will therefore discuss not only trading rooms, but also financial markets, the Global City (Sassen, 1991), etc.
The concept of the *innovative milieu* as developed through various GREMI works (Camagni, 1991; Maillat, 1995; Vazquez-Barquero, 2002; Crevoisier, 2004) deals with this dynamic between the network and its context, whether the latter be local (the milieu) or global, at the beginning or at the

end, underpinning it or overhanging it, acting upon the network or enacted by it.
The milieu, when articulating the local and global, the near and the far, the specific and the generic, enables us to conceptualise the way in which global finance connects and excludes, dominates, organises and disseminates. Through this prism, we hope to bring some light to bear on the dynamic of the financial industry today and its effects on the contemporary economic landscape.
As we have set out in points 1.1 and 1.2, ANT brings to territorial economics concepts such as *calculation* and *performativity*. However, it is only when ANT combines with the territorial approach that we can fully understand how calculation and performativity work within their context and what effect they have upon it. Global finance is firmly situated within a territory, which it deploys for its own purposes while defining itself in relation to it, particularly in the trading rooms, to then transform it yet further.

2.3 The spatial organisation of financial systems

Some see the mass of financial flows as global forces which "come from nowhere". They are, however, managed from a few well-identified places. The network of financial cities which manage these flows distribute them both selectively and unequally in space. Thus is created a form of segregation between those who are part of the network dynamic and those who are excluded from it.

2.3.1 Financial centres as innovative and calculative milieus

The spatial distribution of international finance is extremely hierarchical, with jobs and decision-making powers being concentrated in a few urban areas. Sassen (1991) shows for example that financial activities have developed in tandem with their concentration in certain locations. These cities which make up the Global City can no longer be considered merely regional capitals but the "command posts" of the global economy, where multinationals' headquarters and the international financial markets are concentrated, and which are, moreover, laboratories of technological and financial innovation.
The concept of the Global City prompts two remarks. Firstly, the nodes and the knots described in the works of Latour have a definite concrete geographic foundation in the form of a very limited network of strictly selected cities which are strongly linked to each other over long distances. This foundation does not appear ANT in works. Secondly, the actors who make up the cities are not "Robinson Crusoes", i.e. actors who take decisions without ever meeting each other. Indeed, in standard economic and financial theory, agents are only differentiated from each other by their degree of risk aversion. It is postulated that they are rational and independent of each other. Strategic interactions between agents, designed for example to cause prices to rise or fall, are not taken into account. In fact, these postulates end up destroying the notion of the financial milieu, a milieu in which the most competent, best informed people, when working together, are far more likely to see success than the average investor. However, financial geography shows that the financial markets are places in which information circulates in a privileged manner, and in which

one finds the greatest concentration of actors able to draw up, interpret, share (or not!) and use this information (Sassen, 1991). Although synergies between sectors tend to work best in these places and although all kinds of close-knit and multiple relationships develop there (trade, non-trade, competitive, cooperative, etc.), they have equally been the site of the major financial innovations, which have burgeoned in the era of liberalised finance. These global cities thus become genuinely innovative milieus, in the GREMI sense. Add to that, as we have previously mentioned, that finance today involves enormous amounts of calculation and quantification and we can then start to talk about genuinely innovative, calculative milieus.

In short, financial power is concentrated in the financial markets, which operate within the network known as the Global City and which at the same time cut their ties with their *hinterland.* Innovations in the financial sector (securitisation, the appearance of new financial products and practices, etc.), the free circulation of capital at a national and international level and the ability of financial centres to transform companies' real assets into liquid securities for trade on the markets put the places of investment at an ever greater distance. These innovations confer upon the centre a power of spatial arbitrage (Leyshon and Thrift, 1997) between the regional, national and international.

Other spaces and actors do not always manage to make such close connections with the financial markets. Indeed, contemporary financial investment networks work on a preferential, selective and hierarchical basis. They include and exclude certain actors, industries and spaces, even when these boundaries are not static but constantly evolving. In fact, until recently, the relatively closed nature of national economies, combined with certain forms of regulation, enabled decentralised financial systems to fuel various local economies within a nation in a relatively homogenous fashion. And yet the liberalisation of financial systems is driving centralisation and spatial concentration and leads to certain exclusions.

2.3.2 Unequally connected actors and spaces

This process of spatial concentration and centralisation within the financial system brings into question, at the other end of the scale, the development and particularly the autonomy of local banking systems. According to Dow (1999), the preference for liquidity is behind the gradual attraction of financial flows into the financial markets. Moreover, in an increasingly competitive environment, certain regional banks are being bought out by larger banks. This downturn is diminishing regional monetary creation capacity (Dow and Rodriguez-Fuentes, 1997) and reducing local, independent decision-making powers, with local bank branches acting first and foremost as a way of collecting savings (Crevoisier, 2001). Ultimately, these various elements are intensifying the stratification between the Global City and the regions.

This substantial change in the financial channels faces both spaces and companies with very different situations. For some, access to capital is made easier; for others, it becomes more difficult. Broadly speaking, we have on the one hand SMEs unable to access financial industry resources (Dow, 1999; Pollard, 2003; Klagge and Martin, 2005; Torrès, 2011) and unable to finance their growth without losing their independence (Crevoisier, 1997; Corpataux and Crevoisier, 2005). On the other hand we have multi-institutional, multinational and multi-local

groups whose parent companies are well-connected to the financial milieus and who know how to use financial resources to develop their activities and external growth. Moreover, this boundary has shifted considerably as a large number of SMEs have been bought up by the larger, listed groups, a movement which makes them an active part of the financialised accumulation regime (Chabanas, 2002; Crevoisier and Quiquerez, 2005). Other methods, such as IPOs, venture capital and private equity funds, etc. have the same effect.

Thus, although under liberalised finance networks are becoming increasingly complex and interdependent at a global level, and though their nodes and knots are concentrated in a few places, not everyone benefits from this in the same way. The structural and spatial reorganisation of finance both includes and excludes certain players, industries and regions.

3. FINANCE IN SOCIETY: AUTONOMISATION, EXPANSION, OPACIFICATION

Beyond the bounds of the financial industry, what are its effects on the rest of society? To address this question, we re-examine this autonomy from an internal viewpoint, we then identify its impact on the rest of the economy in three stages: a finance-specific way of calculating risks and returns; an extension of these financial criteria to new businesses, industries and nations; finally, a concomitant growth of transparency and opacity. This expansion occurs based on a certain number of continuities, and more crucially, on the tensions and contradictions which characterise the way finance works in society.

On a conceptual level, this section thus enables us to extend the SSF chain well beyond the bounds of the financial industry and to understand its economic and social effects, which seems to be the ultimate point of such research. We will also see that different businesses, industries and nations cannot necessarily be understood in the same way nor at the same speed. Some resist understanding, others require changes to the basic model: to understand the phenomena studied, it is necessary to take account of historical and spatial context.

3.1 The autonomisation of finance

According to standard financial theory, finance is only a reflection of changes in the real economy (Orléan, 1999; 2011) and its activity, in an unfettered world, can be summarised as the efficient allocation of productive capital without disrupting the real economy. Post-Keynsian approaches consider that, on the contrary, banking and financial actors occupy a very specific and, moreover, crucial position because they open up the economic circuit (Bouvet, 1996; Rochon, 1999). They offer certain actors the opportunity to develop by connecting them (or not) to actors in banking and finance and, ultimately, to potential financial resources. Hence the relevance of a circuit-based approach, which shows the hierarchies between different economic actors (Monvoisin, 2000).

For writers of the Regulation School (Aglietta, 1998; Orléan, 1999; Boyer, 2000; Lordon, 2000; Chesnais, 2001), a regime of accumulation based on finance (termed a “financialised regime of accumulation”) has succeeded the Fordist regime based on mass consumption and production.

Under the Fordist regime, finance was subordinate to productive industrial capital and mainly took the form of bank credit. Getting bank credit was, moreover, relatively easy for all businesses. Finance, now the most dominant institutional form, was to set the pace and forms of accumulation.
As with all open systems, a financial system is open to reciprocal influences, interacting with its environment. Orléan (1999) posits that organised financial systems or stock exchanges were invented to make shares in property liquid and instantly tradable with a view to limiting the risks linked to profitable investment. From that point of view, organised financial systems are very much institutional creations invented specifically to suit creditors.

3.2 The space-time of finance-discipline calculations: contradictions with the real economy and its geography.

The finance-discipline imposes particularly specific management criteria on economic actors, based on very particular conceptions of space and time, thus marking a boundary between the financial domain and the real economy. The construction of these forms of equivalence, which are understood in terms of the *risk/return* paradigm, is necessary because they ultimately serve as a basis for the comparisons made in financial operators' calculations. Finance is thus characterised by a very specific conception of the notions of *risk* and *return*, very different from that of the real economy. So the use of these management criteria implies specific temporalities and spatialities, which can contradict those of the real economy.
In the real economy, *return* characterises the accumulation of capital and the control of it over time, i.e. in accordance with economic cycles, whether they be short (production cycles for example) or long (product cycles or technological cycles). This accumulation occurs at various levels (business, region, industry or nation) which correspond to the organisation of real production, consumption and exchanges. As far as the financial economy is concerned, return is modelled on a moment-by-moment comparison basis, monitoring the returns of other financial market investments; the process of financial market evaluation is thus continual and disconnected from production time (Orléan, 1999), and on two levels.
Firstly, the financial industry can require short-term financial performances, thereby dangerously shortening companies' temporal horizons. Indeed, there is a genuine risk of seeing certain businesses pay out dividends to keep shareholders happy rather than making some of the investments needed to maintain their innovative capacity. Financial time and production time can therefore contradict each other.
Secondly, a commitment to a real-estate or industrial project involving its own particular risks and considerations is replaced by a standardised calculation and securities acquisition transaction. Long-term commitment is therefore replaced by the threat of exit, of short-term defection. Accumulation over time is replaced by mobility in space; the stakeholder is superseded by shareholder value.
In the real economy, the entrepreneur's risk is hard to rationalise in the form of a calculation. The entrepreneur is taking a gamble on the future and the future is not perfectly known or knowable. This is what Keynes referred to as "radical uncertainty".

In financial theory, the term “risk” is used to describe situations whose outcome cannot be fully controlled, but for which all the possible exit scenarios are known at the start and for which a probability of each occurring can be assigned, thus enabling the future to be predicted and calculated (Moureau and Rivaud-Danset, 2004). At portfolio asset level, the risk can be reduced by diversifying between asset classes and between nations or regions whose returns are not correlated. Diversifying means investing in different sectors, as well as in countries with economies at varying levels of development. Diversification means taking a pick-and-mix approach to places and territories!

If the “real” entrepreneurial risk is not calculable, share prices represent nothing other than the beliefs of financial opinion. Which brings us back to Keynes’s famous “beauty contest” analogy: actors do not act in accordance with their own beliefs, but rather in accordance with what they think that the others believe. Financial actors can therefore develop increasingly autonomous representations which are increasingly disconnected, and even in stark opposition, to the real economy. From a spatial and sectoral point of view, they will therefore have representations and conventions which *a priori* rule out certain sectors and regions. Moreover, this mixing up of investments takes place within the financialised space. A number of actors, sectors and spaces are therefore immediately excluded, even when the financialised space is expanding (Corpataux and Crevoisier, 2011).

In short, in the real economy, *return* and *risk* are understood in relation to the spaces and temporalities of production and economic cycles. The uncertainty around these processes is radical and its probability cannot be calculated. In financial economics, within the financialised sphere of the economy, the *return/risk* paradigm is like a solution to a problem in a financial engineering exercise which relies upon very specific conceptions of space and time. These finance-discipline conceptions will go on to influence the way in which financiers understand and calculate “reality”, such that where the views of these same financial actors prevail, they will ultimately forge contemporary economies and their geography.

3.3 The expansion of the finance network into the rest of the economy

Over the last twenty-five years, stock-market-led finance has followed its own expansion pattern, moving towards the rest of the economy and society. According to Harvey’s (1982) Marxist perspective, liberalisation and globalisation during this period have enabled the introduction of means able to thwart capitalism’s inherent tendency towards crisis and the continual emergence of new ways of making a profit.

A good example of this process is the way in which, after the stock market crash of early 2000, financial actors turned to new, previously-neglected sectors (e.g. real estate, urban infrastructure, alternative investments, etc.). Faced with the temporary downturn in the equity market, investments acted like communicating vessels, all starting to shift towards traditional products (commodities, gold, oil, etc.) or new sectors of the economy, such as real estate or urban infrastructure, which had, until that point, remained more or less independent of the financial markets. This led to an increase in their stock market value and the gradual financialisation of the

economy. The financial markets have subsequently focused on a succession of specific assets and sectors, even specific regions, e.g. the stock market, real estate, commodities, emerging countries, etc. These assets, their selection driven by speculation, are those which most often benefit from the latest innovations within the financial sphere. In ANT terms, the way that new actors, sectors and spaces are enrolling in the network seems particularly striking.

From a spatial point of view, we are increasingly seeing nodes and knots (Global City) where financial activities (and related activities) are concentrated and which are in a position to "calculate" the geographical distribution of investments. To cite Callon, these global cities are becoming obligatory passage points and the contemporary economic landscape is increasingly being shaped by the decisions taken in these major financial centres. And yet this autonomisation and expansion dynamic in contemporary finance is disrupting its own development pattern. Indeed, although finance requires transparency in order to function -to make its calculations- paradoxically, it is creating opacity.

3.4 Increasingly lengthy and hard-to-control circuits: the concurrent creation of transparency and opacity

Three main characteristics epitomise the dynamic of today's financial industry (Corpataux et al., 2009). Firstly, both the increasing mobility/liquidity of capital and the principle of diversification combine to favour the internationalisation of investments. Yet the new countries in which investments are made are less and less known to investors. Secondly, the emergence of new sectors such as real estate or urban infrastructure require new skills in comparison with those required for traditional industrial investments. Thirdly, in common with most business sectors, finance is also undergoing a process of standardisation of its products/services whilst at the same time these same products/services get more innovative/complex.

Moreover, with the emergence of new actors, the structure of the financial system is getting more complex. Indeed, alongside the banks and institutional investors, numerous businesses are now specialising in financial engineering, expert services, ratings and auditing. The financial markets require public, external and impartial evaluations based on standardised information. The industry therefore generates its own burgeoning process of development and complexification. The fluctuation between inculcating personal responsibility in each actor and also controlling them (through such notions as accountability or the use of third parties to divest oneself of responsibility (Theurillat et al., 2008)) has lead to a proliferation of participants.

Thus today's financial channels are becoming increasingly lengthy, opaque and difficult to manage. In the words of Latour (1987), they are effectively transforming into black boxes. Whilst this is particularly true of "small" investors, the sub-prime crisis has shown that the ratings agencies and the major banking and financial actors have not handled this opacity any better.

Whilst banking and financial crises were almost non-existent in the two or three decades following the Second World War (Reinhardt and Rogoff, 2008), they multiplied during the 1970s, under a financial system in which all safeguards were gradually being cast aside. The financial system is currently therefore suffering from recurrent instability, lurching from bubble to bubble and from

crisis to crisis (Aglietta, 2008). The use of mathematical models in this situation becomes counter-productive. Mackenzie (2004b) talks of “counterperformativity”, the stage at which the adoption of a mathematical model, an equation or other such device by financial players tends to increase the disparity between the expected consequences and the observed reality.
Contemporary finance is increasingly unstable and decreasingly serves the interests of the rest of the economy. The effects of “counterperformativity” as defined by Mackenzie (ibid.) and the effects of what Callon (1999) terms “overflowing”, (i.e. what the financial actors’ calculations fail to take into account, or what the economists define more or less as “externalities”), have become increasingly tangible over the last two decades. It is this finance which is overflowing into the rest of the economy, with largely negative consequences, as set out in chapter 4.

4. A REAL ECONOMY OVERFLOWED BY FINANCE

Finance is now becoming more autonomous and outstripping the rest of the economy. The structural and spatial reorganisation of finance both includes and excludes certain players, industries and regions. Its networks, despite evolving, are still very selective as we have shown in section 2 .3 .2. The instability of the current financial system is also recurrent and there has been an exponential increase in banking and financial crises since the 1970s, along with their associated effects upon the economy. Set against a background of radical transformation, the financial industry has developed an operational geography which enables it to by-pass the spatial constraints of the real economy and to defer the costs of competitiveness onto local and national societies. It overflows in every area, without taking control of the often negative effects of these overflows.
Theoretically speaking, we need to reconnect the finance system with its historical and spatial context and with the rest of society, to show how this boundary and the transition from one context to another account for how successfully the power of finance has increased in contemporary societies over the last thirty years.

4.1 The systematic play of somewhere else

Real capital (machines, buildings, communication and transport infrastructures, as well as skills, brand images etc.) has little or no mobility and consequently subjects its owners to the social constraints of proximity. Conversely, the current structures of finance, based on the development of the financial markets and the growth of financial capital mobility/liquidity, mitigates the risk that capital’s immobility carries by giving capital owners the possibility of exit at any stage. This growth of mobility/liquidity encourages the systematic play of somewhere else and exit strategies. Add to this that contemporary finance exclusively focuses on (or “frames” as Callon puts it) notions of *risk* and *return*, and we gain a better understanding of why the multidimensional links which existed between the financial and real spheres during the Fordist era have since dissolved. The overall situation has thus radically transformed. Financial investors are driven to concern themselves purely with financial profitability and to ignore the social and territorial consequences of their actions (Corpataux and Crevoisier, 2011). In other words, they are encouraged to behave like free

riders.
If we liken the relationship between a business and those who own capital to a social relationship, what is striking is that in the case of the financial markets and portfolio-style management, this relationship is extremely narrow: all that seems to matter now is financial return and risk. By contrast, the social connection between owners of capital and businesses outside of the financial market always involves other issues: dealing with the (often unwanted) environmental and social effects of a company's policy, the more or less willing political involvement in local or national society, etc. These are all aspects (or “overflow effects”) which now tend to be overlooked when operating on the financial markets.
This disconnect between financial investors and entrepreneurs is spatial and territorial in nature. Put simply, one might argue that where there is proximity, there is no possibility of the investor getting away from the various aspects of local or national society. In creating and exploiting the mobility/liquidity of capital, the financial markets make it possible to invest capital over long distances, through complex and opaque circuits, which reduce the identity and the qualities of both investors and actors in the real economy to quantitative notions of *financial risk* and *return*.

4.2 Financial globalisation and short-circuiting the traditional scales of governance

From a spatial point of view, the institutional context of financial globalisation has enabled businesses and financial actors to short-circuit the traditional operational hierarchies of the nation state economy. According to Yeung (2002), globalisation is usually defined specifically as the capacity of certain actors to operate indiscriminately at various spatial levels. This capacity goes beyond the power to relocate certain operations here or there. It is characterised by the gradual emergence of a new operational level, whereby companies take a global approach to business optimisation, which does not follow the traditional local - national - international route. The global approach short-circuits traditional boundaries and hierarchies, and consequently places and states, not simply by having all places and nations compete against each other, but by pitting, say, Kunming against France, the City against the Argentine peso, etc.
According to Yeung (ibid.), it is necessary to understand how this hierarchy was set up throughout various periods of history. Over the last 25 years, it is the financial industry which has, to a previously unseen level, presided over the integration of major groups, their subsidiaries and their investors through the financial markets. We are therefore seeing an overlap between two styles of governance with entirely different spatial characteristics. On the one hand, the real economy, with businesses largely dependent on their manufacturing and market situation, has to make concessions to local and national authorities, trade unions, regulations governing working practices, health and safety and environmental regulations, etc. On the other hand, financial regulation, in a leading position thanks to its exit capability and the distance which it has created between investors and businesses, directly connects subsidiaries to listed groups on distant stock markets and formulates its requirements in line with constantly-forming bubbles. Finance only need concern itself with local conditions governing competition.

4.3 A re-examination of tradition social and territorial compromises

The social and territorial compromises made under the Fordist regime have been fundamentally called into question. The “interessement” processes, to use ANT terms, now unquestionably work in favour of a few actors and territories and to the detriment of the rest.

Effectively, over the last twenty five years the autonomisation of finance, which is linked to the spatial and functional disconnect between financial investors and businesses, has been profitable for owners of capital, the financial industry and the managers of stock-market listed companies. This could be seen as a reversal of the power relationships between these actors and local and national societies, the latter generally feeling obliged to subordinate their public policies in areas such as taxation, training and research, the employment market, the environment, etc. to the criteria of business risk and return. To put it plainly, due to the development of the financial industry, regions and nations are no longer spaces of capital accumulation. The latter are now spaces based on the Global City and which include channels for attracting savings and controlling businesses.

Yet a company’s economic competitiveness can only be partly disassociated from the locations from which it operates. Over the last twenty five years, research into national and regional competitiveness (clusters, innovative milieus, regional production systems, etc.) have largely shown this hypothesis to be accurate. In fact, what determines competitiveness is the local capacity to articulate the various aspects of development as well as to practically reconcile quantitative aspects (e.g. return) and qualitative aspects (e.g. innovation). From this point of view, it is not just firms that are competing but also, crucially, territories. Some survive unscathed, others are put under pressure.

From an economic point of view, it is a matter of (re)producing skills, developing innovation, managing costs, developing infrastructures, etc. From a social point of view, a harmonious employment situation, social security etc. are all down to a local capacity for striking a compromise. Finally, from an environmental point of view, it is local societies that are on the front line with regards the (re)production of resources, or indeed the depletion thereof.

These territorial entities are characterised by unique organisations and specialisations which are qualitatively distinct. At the same time, they are subject to the same quantitative constraint of financial return. How will we henceforth see a form of competitiveness which has a large regional and national component reconcile with businesses which are now mostly stock-market listed companies and which cover dozens if not hundreds of sites in very diverse countries? These overflow effects do not lead to new forms of compromise. The situation seems to be structurally unstable.

5. CONCLUSION

Ultimately, we think that ANT should free itself of two constraints. The first being the absence, from the very outset, of a critical or potentially critical position within this approach by which to oppose mainstream concepts and theories, those which end up being put into practice. The second being the confusion between metaphorical space and concrete space.

ANT is very much responsible for introducing the concept of *performativity* into wider debate. It is a fundamental concept which helps to demonstrate that theories, ideas, models and equations etc. are not the products of a purely contemplative, objective viewpoint, even in the face of an independent, unchangeable reality. This performativity makes it even more vital for social science researchers to adopt a position which does not just involve demonstrating how mainstream economics shapes the world. In attempting, for example, to show that *homo economicus* can exist and in following SSF expositions of the systems and socio-technical mechanisms produced by hegemonic financial theory, are the more or less implicit choices being made not being neglected? The researcher should maintain a potentially critical position towards the fundamental concepts (i.e. towards the basic categories), those which act as the founding principles of that discipline which is being created and enacted. As Sunley (2008) suggests, it is imperative that relational and critical approaches be combined. Moreover, in accordance with the principles of symmetry which ANT proponents hold so dear, one should study both the winners and losers in scientific controversies. By simply following or plotting flows, relationships, associations, etc. in an agnostic fashion, are we not failing to highlight the choices and possible alternatives at the risk of reinforcing the existing networks and order?

There is now a considerable deficit in critical thought when it comes to producing alternative models. The use of critical approaches, as occurs in heterodox schools of economic thought, should not only enable a critical reconceptualisation of the basic categories, but also help pave the way towards alternative economic models not exclusively market-oriented. Currently, ANT and SSF have nothing to contribute in this regard. To be fair, it is worth pointing out that they are not alone. Currently not only actors in the field but also researchers are struggling to find alternative models.

The second constraint is that ANT needs to give more serious consideration to space and time. Social processes always have a locus, and this contextualisation in concrete space and time can not necessarily be summarised as interactions across a network. On the contrary, for each “network”, or for each group of networks, there is a change of context which, moreover, is not ahistorical, and it is this relationship which enables us to understand, to put into perspective and even to evaluate social processes. Metaphorical space is one of disembodied thought, situated not beyond but rather as a precursor to the various social, political and ideological issues and debates.

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