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From Green Fields to Green Felt Tables and Back: The Origins of Index-Based Derivatives

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E·S·R·C ECONOMIC & SOCIAL RESEARCH COUNCIL

LSE THE LONDON SCHOOL OF ECONOMICS AND POLITICAL SCIENCE

DISCUSSION PAPER NO: **44**
DATE: **June 2007**

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The support of the Economic and Social Research Council (ESRC) is gratefully acknowledged. The work was part of the programme of the ESRC Centre for Analysis of Risk and Regulation.

Published by the Centre for Analysis of Risk and Regulation at the
London School of Economics and Political Science
Houghton Street
London WC2A 2AE
UK

ISBN 978 0 8532 8069 9

Printed and bound by Kube, June 2007

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Yuval Millo[1]

Abstract

The introduction of index-based derivatives is one of the most important developments in post-war financial markets; today these contracts are amongst the most commonly traded financial instruments. Yet, no sociological accounts based on empirical material have focused on the creation of index-based derivatives as a social and political institution. This paper offers index-based derivatives as a topic for sociological investigation. Focusing on the creation and regulatory approval of the first exchange-traded index-based futures in the early 1980s, the paper assesses empirical evidence collected through interviews with key figures who took part in the historical events, as well as extensive archival research. The paper makes two central claims. Firstly, that the nature of index-based financial markets is critically dependent on the nature of the qualification process it undergoes – a process through which the particular qualities are negotiated and attached to the products and in particular on the viability of the connections made between the financial contract and the assets on which it is based. Secondly, that qualification of products takes place within a network made up of heterogeneous agents, whose worldviews and motivations are frequently conflicting.

Acknowledgements

I would like to thank Daniel Beunza, Michel Callon, Donald MacKenzie, Fabian Muniesa and Alex Preda for their extremely useful comments. I am also grateful to the three anonymous CARR referees who provided insightful feedback. Special thanks go to Amy Greenwood for her precise and swift editing work.

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Introduction

Contracts that use financial indices as their underlying 'asset' are known collectively as index-based derivatives. They are currently amongst the most widely traded financial products[2]. Furthermore, the introduction of index-based derivatives is considered by many as the single most significant development in the history of contemporary financial markets (Chance, 1995; Arditti, 1996; Kolb 1997a, b). The use of index-based futures has become a standard practice in the financial world. The portfolios of banks, pension funds, insurance companies and governments commonly include index-based derivatives. In fact, index-based contracts have become such an indispensable feature of the global financial system that it would be safe to say that there are millions in the western world who own, either directly or indirectly (even unknowingly), derivatives.

In spite of their central role in today's financial arenas, index-based contracts received little attention within sociological analyses of financial markets. Several sociologists refer to the role that index-based contracts play constructing hedging positions and to the way in which they are used in arbitrage trading (for example, Beunza and Stark, 2004; MacKenzie, 2006). Yet, there exists no published sociological work that traces the social history of that market and analyses the evolution of index-based derivatives and the network of institutions in which this process unfolded. This paper is a first step in recognising the importance of index-based financial instruments as a topic for sociological investigation.

How are we to conceptualize index-based derivative contracts sociologically? The empirical material in this paper suggests that the various actors that took part in shaping index-based contracts developed and practiced different cognitive, ideological and organizational schemes through which they perceived the markets. The network of actors within which index-based derivatives evolved includes several different organizations: the staff of commodity exchanges, commodity traders and financial regulators. Such constellation, with its variety of actors, lends itself to a multifaceted view of the market; a view that suggests that economic action should be understood through the different, and frequently conflicting, worldviews held by the diverse actors who make up markets and by the actions they performed. A good starting point for describing the process of qualification is the work of Zelizer, who offered a model of ‘multiple markets’ aimed at ‘identifying types and patterns of social, structural and cultural variations’ in those markets (Zelizer, 2005). Zelizer applied her model to empirical cases and analyzed the development of different social perceptions about money (Zelizer, 1989). Zelizer’s seminal work about the creation of ‘types of money’ can be seen as a description of a multifaceted process of product qualification. Zelizer showed that, in spite of the fundamental practice through which money is used (ie the transaction) being accepted by all of the actors, through the practice of transaction and its implications, the actors gave different interpretations to the uses and meaning of money. Similarly, actors may agree on a set of basic qualities that a product should acquire, yet, the *practices* in which the product takes part may bring about dramatically different results than the initial qualification attempts.

[2] According to the Bank of International Settlements, the total notional amounts outstanding in 2006 were US$207 trillion for over-the-counter (outside market) interest rate swaps and US$14 trillion for market-traded options, forwards, futures and swaps (Bank of International Settlements, 2006).

A critical component of the qualification process is the attempt (which may be successful or unsuccessful) to sort perceived characteristics into categories. That is, the process of creating a link between certain qualities. In this respect, the conceptual theory in this paper (product qualification) is related to the work done by Bowker and Leigh Star (Bowker & Leigh Star, 1999). Bowker and Leigh Star analyse classificatory systems and trace the ways in which they become embedded into bureaucratic infrastructures to become part of the taken-for-granted reality of organizational structures. Using detailed case studies, Bowker and Leigh Star outline several general historical heuristics along the lines of which classificatory systems come about and how their legitimacy is proposed and contested. This process of institutionalization is a vital part of the organizational implication of the qualification process. That is, it describes how the networks of connections both within organizations and among them create and legitimize rules and practices. This paper, in contrast, focuses on the qualification practices and their performance rather than on the resulting structures of such actions. In fact, by focusing on the action-related dimensions of product qualification, this paper tries to strengthen one of Bowker and Leigh Star's more provocative conclusions, the futility of separating agents from the structure in which they operate.

The notions that qualification – the shaping of products – is performed by heterogeneous agents and that qualities are attached to products through market practices provide a general framework for understanding the process. Such notions can help us to identify the mechanisms of qualification at any given time. Yet, such a snapshot view of the market is not sufficient. If we assume that qualification takes place through the operation of social institutions, and not through the application of universal laws, then we cannot assume that such institutions are static. In fact, by regarding qualification as a dynamic process, this paper refers to a specific theory of action: the Actor-Network theory (ANT), and more specifically to the work about qualification done by French sociologists Callon, Méadel, and Rabeharisoa (Callon et al 2001). As we will see in the discussion below, ANT and the specific form of qualification proposed by Callon et al capture the dynamic nature of the process. That is, qualities of a product are not simply assigned to it, but instead are the outcomes of actions in which the product participates.

However, before we draw a more complete picture regarding qualification, we need to ask how the tools that perform the process – the social institutions of the markets – are held together. One of the influential answers given to this question is that markets are not independent institutions, but are based on the existing social network, or, in other words, are embedded in those networks. In an influential paper, Granovetter argued that economic behaviour is embedded in networks of personal relations (Granovetter, 1985), which in turn are bound by cultural and social frameworks. These sets of social networks encompass the norms and values that are manifested in their infrastructures, the actions of the participants, and the interactions between the two spheres.

If markets are an intractable part of the larger social environment, then what does this tell us about the nature of the qualification process? First, we need to assume that the process does not operate in a linear fashion, but rather in network-like one. That is, the various actors that shape the products do not operate one after the other, but rather interact with each other, and products are shaped through these

interactions. A second assumption that stems from the interactive and networked perspective of product qualification is that the various actors may promote different (and even conflicting) ideas about the desired shape and function of the product. As a result, the qualification process should be regarded less as an orchestrated effort, and more as a competitive one. In this respect, it can be expected that any set of qualities attached to a product through the interaction of actors may be challenged by alternative sets of qualities that other coalitions of actors propose. Lastly, the networked nature of the qualification process places the evolution of markets themselves in a new light. In particular, the relations between the products and the markets in which they are traded may need to be re-examined. If qualification is a process in which different actors take part, and in which conflicting worldviews clash, can we assume that the market itself does not change as a result of such process? In other words, is qualification a process that takes place in the market, or is it, to a similar degree, a qualification *of* the market as a whole?

As mentioned above, when referring to the implicit continuum between the market and its products, the notions of markets as norm-making institutions and as networks can be complemented by the work of Actor-Network theorists. The notion of qualification as developed in this paper is related to a similar concept presented in an influential paper by Callon, Méadel, and Rabeharisoa (Callon et al 2001). The motivation behind the analytical effort in this paper and the one behind Callon et al's paper is similar: an effort to understand where products come from. These similarities, however, are limited to the contours of the theoretical approaches, while the contents are significantly different. Callon suggests that qualification operates through the continual creation and recreation of relations between the evolving products and existing products. The temporary outcomes of these comparative exercises are created each time the qualified product is bought and sold. This schematic framework is a very powerful conceptual tool because it allows us to treat products as a chain composed of connected qualification attempts. Yet, the qualification of financial products includes aspects that call for broadening and reconfiguration of existing concepts in economic sociology as the relationship between the products and their attached practices is different from most markets described so far in the literature. In the cases of products such as wine bottles or cars, for example, there is a visible distinction between the practices of trading, in which the qualities of the products take part in constructing the prices of the products, and between the practices through which the qualities are established and tested. However, in the case of financial products (like index-based derivatives) no such distinction exists; a crucial part in the qualification of financial products is performed on the trading floor. Thus, the way financial products 'behave' in the market is not only a test of their qualities, but the market is also one of the arenas where these qualities are formed and attached to the product. As the empirical material shows, the practices through which the qualities of financial products were established had a dramatic impact on the evolution of the markets.

The construction of deliverability: early history of commodities futures

Derivatives are financial contracts whose market price is derived from the price of an underlying asset. Agricultural commodities, shares and stock indices are just some of the most common underlying entities for which derivative are designed.

The central claim that this paper makes is that, to understand the social dimension of derivatives in general (and index-based ones in particular), it is necessary to trace the development of the links between the underlying entities and the derivative contract. More specifically, it is vital to understand the nature of the qualities of the underlying assets and how these qualities are translated into institutionalized market mechanisms, practices and conventions. The dynamic historical process through which the qualities of the underlying assets are linked to the derivative contract – the qualification of the contract – is central to the analysis of index-based contracts. To analyse the complex historical process of the qualification of index-based derivatives we need to trace the evolution and the influence of two key factors in the commodity futures markets where these financial contracts were first traded: (1) the deliverability of underlying assets and (2) the nexus of connections between the futures exchanges and the regulatory establishment.

The first American market to trade derivative contracts, the Chicago Board of Trade (CBOT), started trading in 1848. The commodities-based contracts (known as 'forwards') traded in the CBOT specified the terms of mutual obligations of the buyer and the seller to, respectively, deliver and pay for a specified amount of product (of a certain quality) on a set date. For example, a typical contract might include the obligation to deliver 20 tons of potatoes of a given variety and of a given quality at a given date in return for a set amount. The terms of each contract had to be negotiated by the buyer and seller: the date in which delivery of the agricultural product was to take place (the contracts' 'expiration date'), the exact nature and quality of the product and the price to be paid on delivery. Since forward contracts were designed for the needs of the two specific parties to the future transaction, they had little use outside the particular setting.

In 1851, three years after its inception, the CBOT took a revolutionary step and standardized the bilateral forwards. The standardized forward contracts, which became to be known as 'futures', were templates that included the terms of the contract and left only the contract’s price to be negotiated between the parties. Any futures contract bearing the same expiration date and underlying asset became interchangeable with any similar contract, regardless of the identity of the traders who bought it initially. By standardizing the contracts, the time-consuming stage of negotiations over the details of the contracts was eliminated and trading became faster and more efficient. However, contracts standardisation had far-reaching implications: standardisation made the contracts *themselves* tradable. With tradable contracts the traders were effectively relieved of the necessity of owning the underlying agricultural products on which the contracts were based. In other words, the traders could buy and sell the contracts among themselves and, when the expiration date was approaching, offset their obligations by acquiring contracts that were the 'other side' of their transactions. For example, a trader holding a contract requiring him to buy 500 pounds of corn at the end of the month would offset his obligations by buying a contract requiring him to sell the same amount of the same type of corn at that date.

After the standardisation of the contracts, the CBOT and futures trading witnessed a long period of growth. The popularity of futures trading gave rise to bets that were taken on the prices that the market would quote. In the late 1880s, that practice of betting on futures' prices gained popularity and by the end of the century, there

were numerous shops that sold contracts that were based on CBOT-traded prices of agricultural futures (Fabian, 1990). CBOT regarded those establishments, commonly known as 'bucket shops', as illegitimate competition. Firstly because the bucket shops were piggybacking on information that originated from the CBOT (where the prices were determined) and offered no compensation for that service. Secondly because betting on futures' prices was taking potential customers from the CBOT and thus denying commissions to CBOT members. In the late 1890s and early 1900s, the CBOT embarked on a fierce legal battle against the bucket shops, at the end of which (and after several landmark court cases (Ferris 1988)) the operation of the shops was declared illegal and terminated.

The main argument used by the CBOT in its legal struggle against the bucket shops was that contracts that did not include a specific obligation for the delivery of goods, and were settle-able only through the payment of cash could not count as legitimate commercial activity but were essentially gambling. CBOT's carefully constructed argument struck a chord with broader anti-gambling emotions in the American society of the time. Following this initial success, the association between cash-settlement and gambling did not remain limited to institutions like the bucket shops, but was extended (at least implicitly) to all other possible cash-settled forward contracts (Fabian, 1990). The construction of a boundary between futures trading and gambling based around product delivery did not stop with the court cases. A lobbying effort by the CBOT also brought about a change in Illinois' gambling laws, forbidding the trading of cash-settled contracts and allowing only contracts that included the option to deliver the goods. The changes in Illinois law were followed by a number of other Midwestern states (Cronon, 1991). Moreover, the notion of similarity between cash-settlement and illegal betting, in its wider form, became a common argument against the trading of financial contracts and even against the immoral nature of financial markets in general. For example, bucket shops were mentioned in the Congressional debates in the early 1930s that led to the establishment of the Securities and Exchange Commission (SEC) (Shapiro, 1984).

Although deliverability was crucial for establishment of the CBOT as an economic and political institution, the actual delivery of products has all but disappeared. The success of standardized futures and the ease with which futures were offset eroded the importance of deliverability. Over the decades since the introduction of standardized futures in the mid 19th century the proportion of traders who actually took part in a delivery of products dwindled constantly. By the 1950s it was clear that the vast majority of futures contracts were not settled in delivery and most estimates were that only in 3%-5% of futures goods actually changed hands (Clark, 1978; Markham, 1987). The rest of the transactions were settled by offsetting the obligations in the contracts through buying or selling 'opposite' ones. This yawning gap between the volumes of futures trading and actual deliveries of the products for which the products were written was not merely an evolving feature of agricultural futures exchanges like the CBOT. In effect, the discrepancy between trading futures and delivery became one of the main growth engines for futures markets. Nominally, each futures contract was backed up by the underlying agricultural product in the amounts and qualities specified in the contract. However, in practice, the volume of futures contracts traded made the actual delivery of the underlying products unrealistic for a considerable proportion of the futures contracts as trading

grew 100-fold in the first century of the CBOT (Tamarkin, 1993). Such phenomenal growth would not have been possible had all the transactions ended up in delivery of the agricultural products.

The fact that most futures transactions ended in offsetting the contracts rather than in delivery had a crucial effect on the institutional evolution of the market. The CBOT, like virtually all other American futures exchanges, was a member's organization and the governance of the organization was dominated by the interests and the ambitions of the members – the traders. Since the traders' financial well-being was dependent on profits made through trading and since virtually all trading was settled in exchanging contracts rather than delivering products, the exact nature of the agricultural commodity underlying the futures was marginal in comparison with the tradability of the contract. Consequently, one of the CBOT's institutionalized goals, expressed in its code of conduct as well as through informal norms, was to generate and maintain large volumes of trading and to search constantly for ways to increase that volume. The institutional motivation to increase the trading volume drove the futures exchanges to expand their repertoire of contracts and over the years, at times of weakening in the commodities markets for 'traditional' products (eg grain and cattle), dozens of other contracts were developed and offered - among them plywood, soy bean, soy meal and frozen concentrated orange juice.

This analysis of the historical path of futures markets shows that the deliverability of the underlying asset was crucial for the legitimacy of futures, and indeed was embedded in the coded norms of gambling laws. However, at the same time the actual practices in the markets rendered the physicality of the assets irrelevant. Moreover, it was crucial for the growth and prosperity of the exchanges that deliverability would be possible in principle, but in the vast majority of the cases would not be performed in practice. As the continuation of the historical narrative shows, the deeply embedded tension regarding deliverability of commodities-based futures contracts will play a significant role in the creation of index-based contracts.

Regulators and exchanges in the network of qualification

From 1969 to 1971, the agricultural commodities markets witnessed a period of low trading volume (Yamey 1985). This period coincided with the gradual demise of the currencies' gold standard; a process that allowed currency exchange rates to float 'freely' (Hutchins 1995) and turned currencies into a much more risky product than they had been beforehand. The futures exchanges, whose members were struggling due to the slow grains market, saw the more volatile currencies markets as a promising business opportunity. Consequently, in 1971, Leo Melamed of the Chicago Mercantile Exchange (the CBOT's arch-rival futures exchange) began to promote a plan for trading futures contracts based on foreign currencies (Melamed 1988). Melamed's initiative, the International Monetary Market (IMM), commenced trading in 1972. Volatile currency markets contributed to high volumes in currency futures and within a short period of time the new type of futures generated large trading volumes. Following this success other agricultural futures markets developed similar contracts and within months the commodities regulator, the Commodity Exchange Authority (CEA) in the Department of Agriculture,

received notices from several other American commodities exchanges about their intentions to apply for permissions to trade futures on non-agricultural products (R* interview).

Currency futures broke the virtually exclusive association that futures markets had held with agricultural products for over a century. Non-agricultural futures signalled that the futures exchanges were aiming to expand their potential customer base by attracting investors from the general business community and, in particular, from the financial sector. These trends created a challenge for the regulatory process related to approving new contracts. Non-agricultural futures were an unknown territory for the Department of Agriculture and, following the success of futures on currencies, concerns were raised among the futures exchanges that the mandatory approval of contracts might be slowed considerably due to lack of knowledge. The severity of the regulatory challenge was manifested in the form requesting information about proposed contracts required by the CME as part of the regulatory approval of currencies futures. The form asked, among other things, about the size, location and condition of the warehouses in which the underlying commodities would be stored (Melamed 1988).

In 1973, growing concerns about the suitability of the existing regulatory regime led the CBOT to initiate an intensive lobbying offensive in Washington to persuade the American Congress to change the commodities regulatory structure. Concerns about the CEA's suitability for regulating the evolving futures world were not the only reason for the lobbying campaign. Since futures contracts were no longer associated exclusively with agricultural products, they were now potential candidates to be transferred to another regulatory authority, one more suitable for the regulation of financial products. The possibility about which the CBOT was particularly concerned was whether the American Congress would define futures on financial products as securities and consequently transfer the regulation of the contracts to the Securities and Exchange Commission.

These concerns were not without basis. The same weak trading period in grain markets that motivated the CME to develop the currencies futures also drove the CBOT to fund research into the possibility of trading options on stocks.[3] Options, being underlined by stocks, were regarded as securities and thus the SEC was given jurisdiction over the contracts. The CBOT's proposal to trade stock options in an organized exchange underwent a long and exhaustive approval process by the SEC. In the CBOT's case, the regulatory process took more than three years and required considerable effort by lawyers and exchange staff. Following these events, when the commodities exchanges' lobbying effort succeeded in bringing about Congressional hearings about the future of futures regulation, it promoted one message above all others: financial futures should not be regulated by the SEC. R*. At the time, a CBOT lawyer heading the lobbying effort in Washington was heard to say:

> 'Damn! We're not gonna go through all that again [referring to the protracted approval process of stock options]. We're gonna make sure that whatever agency comes out of that Congressional process for the futures community has exclusive jurisdiction over everything and nobody else is going to torment us for three years the way these guys [SEC] did. (R* interview)

[3] For a detailed discussion of this historical process see MacKenzie & Millo, 2003

The main argument of the lobbying team was that CME's currencies futures opened the floodgates to a new wave of financial futures, and that futures based on a variety of financial products would soon be proposed. That situation, the argument continued, may lead to an 'administrative hell' in which an exchange that would offer, say, futures on Treasury bills, crude oil and orange juice would have to go through separate approval procedures with the Treasury Department, with the Department of Energy and with the Department of Agriculture. Moreover, whenever a change to the contracts was necessary, each of the agencies that regulated the underlying products would have to be notified. Hence, in a world where futures were no longer limited to agricultural products, regulation according to the underlying products was no longer feasible. Instead, the exchanges' lobbying suggested that a new agency should be created to have exclusive regulative authority over all futures contracts. In other words, a new principle of regulatory taxonomy was presented: regulation based on the type of contract rather than the underlying commodity.

The contract-centric approach was accepted by the American Congress, and in May 1974 the Commodity Exchange Act (CEA) was amended to facilitate the creation of a new regulatory agency - the Commodity Futures Trading Commission (CFTC). Under this legal structure, the CFTC was given exclusive rights over the regulatory aspects of the qualification of futures contracts: since futures could not be traded without such an approval the CFTC became an obligatory point of passage in the topology of the qualification network. In the regulatory landscape that was to follow the law change, the CFTC became an indispensable part of any vector connecting a potential underlying asset, an exchange and a tradable futures contract.

The new regulator created new potential challenges. The broad regulatory definition created a conceptual blur between this new financial product and existing securities products, and created uncertainty regarding the regulatory domains of financial markets. For example, being the exclusive regulator of futures meant the CFTC had jurisdiction over futures on any asset – potentially including securities. However, the SEC already had exclusive jurisdiction over securities and stock options. This led to the following dilemma: if futures on securities were to be proposed, which of the two bodies (CFTC or SEC) would regulate them?

Such a qualification challenge was not merely hypothetical. In October 1975, the CFTC approved an application by the CBOT to trade futures on a financial product - mortgage-backed certificates known as GNMAs (US GAO, 2000:5).[4] At the same time, an application by the CME was pending to trade futures on Treasury Bills (Johnson 1976), and several of the twelve other American commodity exchanges had applications in various stages of completion. It was the common opinion among the SEC's staff that futures on GNMAs would erode the distinction between securities and commodities. This trend was observed by the SEC with much concern, as it threatened its regulatory territory. The potential conflict between the interests of the two regulators had serious implications for the qualification of

[4] Government National Mortgage Association pass-through certificates were known in short as GNMA's. The GNMA certificates gave their owners a proportion of an income generated by a pool of mortgages. The certificates' payments were guaranteed by the Government National Mortgage Association, part of the Department of Housing and Urban Development, which made the GNMA-based futures an attractive contract.

financial futures. Futures could not be traded without regulatory approval and such approval was not likely to be given while the regulatory identity of the contracts was disputed.

The challenge to the qualification of financial futures was embedded in a broader, deeply-rooted rivalry between the two regulators. The immediate issues that troubled the SEC's staff were the possibility of the SEC's jurisdictional turf being limited as a result of the new broad definition that was given to the concept of commodities in the 1974 Act. But, these concerns were underpinned by a more general perception about the nature of commodities markets and their regulation. A senior staff member of the SEC's division of market regulation in the mid 70s described the SEC's staff attitude to the CFTC:

> People who moved from the SEC to the CFTC thought that the CFTC was the end of the world. They were dealing with a bunch of dinosaurs over there. They just could not get them [CFTC] to understand the need for any kind of regulatory oversight. (M* interview)

The view, commonly held by SEC staff, that the SEC was a better regulator than the CFTC and that its staff was more professional than that of the new regulator should not be dismissed merely as a sign of inter-regulatory rivalry. These views belong to a broader perception that contributed to the shaping of the qualification struggle between the two regulators. G*, who was the chief economist of the SEC when the CFTC was established, described the common view about commodities futures at the SEC:

> Commodities were just… they smelled, you know. Commodities were really viewed like gambling. […]. It's like saying: 'when people put those quarters in the slots, that is really an investment' and you [the SEC] got to regulate the casinos. I think it's a cultural thing. (G* interview)

This perspective encapsulates both the nature of qualification and the contours of the qualification conflict that took place in the inter-regulatory sphere. As the history of markets for agricultural commodities indicates, products gain their relative position in the market and their qualities through the practices to which they are attached. If commodity trading is comparable to gambling, and the actual practice of trading is compared to pulling the handle of a slot machine, then the message is clear: futures cannot be used for conducting sound, calculable investment and putting money into them is equal to the luck-determined practice of gambling. This is not the entire message, however. At the time, the SEC and the CFTC were engaged in a struggle over the definition of futures contracts and the struggle was, in many respects, a zero-sum game. Any regulatory 'territory' lost by one regulator would most likely be given to the other. In this light, the quote above (and the general opinion about commodities) should be regarded as an implicit opinion about the SEC as much as it was a direct opinion about the CFTC. If commodities trading is equal to gambling, then securities trading (the other activity in this dichotomy) should be seen as legitimate investment.

Such views underlined the conflict about the qualification of futures. Yet, for the SEC, having a decisive impact on product qualification was not the ultimate goal. Qualification was seen as a step towards the more important goal, to distinguish its regulatory domain from that of the CFTC. The SEC, established in the early 30s, was the more well-established of the two regulators and had better chances to

recruit influential supporters and to impose its definition. However, given that the CFTC had exclusive statutory rights over regulation of all futures and since the definition of commodities included financial products, the separation between the two regulatory fields of securities and commodities no longer existed. In this situation, the SEC's staff knew that in order to avoid the threat of having its regulatory domain taken over by the CFTC, the boundaries between the regulatory areas would need to be reconstructed.

This insight motivated the staff of the SEC to promote the maintainance of a distinction between securities (the exclusive domain of the SEC) and the types of assets that underlay futures trading. Internal discussions at the SEC took place in the months after the amendment to the Commodity Exchange Act. In December 1975, the chairman of the SEC (Roderick Hills) sent a letter to the chairman of CFTC suggesting that:

> Both the CFTC and this Commission should be concerned, not with bare questions of jurisdiction, but with a number of important questions relating to the integration of our capital markets […] Can a meaningful distinction be drawn[…] between securities options […] and futures contracts […] and if so, what is it? (Hills 1975)

The two regulators were not the only agents involved in this political struggle. Due to the dense network of ties between the organizational actors, the debate over the shape of qualification had important implications for the exchanges. The futures exchanges, which were regulated by the CFTC, wished to expand their catalogue of the contracts, and not transfer to the stricter regulatory regime of the SEC. The CBOT, the leading futures market of the time, directed an intensive lobbying effort aiming to persuade the American Congress to incorporate within the law a legislative definition of acceptable underlying assets that was as wide as possible, so as to include as many potential financial assets under the jurisdiction of the CFTC. R*, one of the leading commodities lawyers at the time, coordinated CBOT's lobbying effort:

> I was looking for something that I thought would capture everything that one could think of and did not include securities […] I could not say securities because it would have alerted the SEC. So we used this phrasing – "services, rights and interests"… and crossed our fingers and hoped that the courts will see it as broad enough, which they did. (R* interview)

The regulatory compromise completed the discursive aspect of the qualification process, but the disputes over market practices did not end. Between 1974 and 1980, a long chain of 'border incidents' occurred between the SEC and the CFTC, centred around the regulatory approval processes for futures contracts based on financial assets. In several cases, securities exchanges sued commodities exchanges for trading futures contracts based on financial futures, claiming that the futures contracts were actually securities in disguise and that the futures exchanges were illegally expanding their trading territory at the securities exchanges' expense. The SEC and the CFTC provided advice and support to 'their' exchanges within the cases, but mostly remained out of the courtrooms themselves. One exception was a court case related to the GNMA-based contracts mentioned previously in this paper. Since 1975, CBOT had traded GNMA futures with considerable success. (In 1981, there were approximately 2,293,000 sales of the contract, each representing $100,000 in unpaid mortgage principal (US Court of appeals, 7th circuit, 1982:

25,719)). In early 1981, the Chicago Board Options Exchange (CBOE) submitted an application to its regulator, the SEC, to trade options on GNMAs. The CBOT, fearing that options on GNMAs would compete with its lucrative futures contract, sent a complaint to the SEC and when the SEC approved CBOE's options contract, the CBOT filed an objectionary petition at a Federal court of appeal. The case brought the two regulatory agencies into direct confrontation in court, and resulted in a call by one of the judges for commencement of negotiations between the two parties:

> I did not appreciate seeing two federal agencies expend their time and resources fighting a jurisdictional dispute in court. I believe their efforts would be more wisely spent in utilizing their expertise to reach a solution, which they would jointly recommend to Congress. Campbell (1982)

The case exposed the full extent of the regulatory struggle to the public and forced the SEC and the CFTC to start negotiations over the shape that derivatives contracts would take.

The GNMA case set the stage for the introduction of index-based futures, as the talks between the SEC and the CFTC that followed the statement above ultimately let to the decoupling of the exclusive link between derivative contracts and physical assets[5]. This separation between deliverable goods and derivative contracts placed index-based futures in direct competition with a different type of derivative contract – stock options. Each stock option was written on the basis of a specific stock and as such was dependent on the availability of that stock and a regulatory approval. However, the financial regulaor, the SEC approved only a limited number of stocks to be used as bases for options. Consequently, as option trading became more popular, competition among exchanges for available stocks increased and so did the motivation of futures exchanges (regulated by the CFTC) for the approval of index-based futures.[6]

As promising as indices were, there were some significant obstacles hindering their qualification. A prominent political, cultural and regulatory obstruction stood between the exchanges and the realization of index-based contracts: the deliverability problem. Index-based contracts could not guarantee the delivery of goods – such goods simply did not exist. Because no exchange of goods and funds was possible, index-based contracts could only be settled through the transfer of cash (cash settlement). As discussed earlier in the paper, the evolution of commodities markets shows that notions of deliverability, and its political, social

[5] It may be useful at this point to provide a brief explanation of index-based contracts: Stock indices are mathematical averages of the market prices of set groups of stocks at a given time. For example, a list of 500 stocks complied by Standard and Poor (S&P) is used as a basis for the S&P 500 index. On their own, indices are little more than mathematical representations of the markets' price levels in the markets situations. In contrast, when incorporated into financial contracts, like futures or options, stock indices can serve as a useful market tool. Index-based futures contracts require their owners (buyer) and its seller to pay or receive an amount of money proportional to the difference between the index level at the market on expiry and the index level stated in the contract. These contracts allow market participants to protect their holding against sudden drops in prices. For example, a contract that would grant its owner, say, $25 for each index point below a certain value at a certain date could serve as a safety net for investors. Similarly, a contract that would pay its owner $25 for each index point above a certain value would make a good device for profit-seeking traders who hope to gain from increasing prices.

[6] In 1978, five years after organized options trading began, options were traded in eight other SEC-regulated exchanges.

and cultural implications, were institutionalized and became an inherent component of the institutional and cultural structure of the markets.

The contrasting arguments of the SEC and the CFTC as they evolved in the period leading to the GNMA case framed the range of qualification options in such a way that left the two regulators little choice other than to cooperate. Futures were put under exclusive jurisdiction of the CFTC, yet the products on which the indices were based – the stocks – were regulated by the SEC. This situation led the two regulators to realize that (in spite of the rivalry between the two agencies) the cash-settlement issue should be solved co-operatively. Even the more militant among the SEC staff realized that cooperation was necessary. For example, H*, a senior staff member of the SEC who was involved in the discussions, described the situation:

> [We r]ecognized that our legal positions were less than strong. […] The SEC dealt with a very weak legal hand. (H* interview)

In spring 1981, while the GNMA case was still discussed in court, John Shad and Philip Johnson were appointed as the chairs of, respectively, the SEC and the CFTC. According to Johnson, even before he took up office in Washington he contacted Shad and they both agreed to meet and discuss the overlapping regulatory areas of the two agencies (R* interview). [7]

Although it was essential to solve the deliverability issue, tackling it proved difficult. Delivering the underlying product was the practice through which the distinction between legitimate financial contracts and illegitimate, illegal, gambling was made clear. As such, deliverability formed a crucial part of a contract's quality – its legality. From this legal and social perspective, replacing the contractual obligation to deliver a product with a cash settlement would have amounted to obliterating the distinction between financial markets and casinos. Hence, the dilemma that Shad and Johnson faced was how the heads of the two most important financial regulating agencies in the US would suddenly decide that cash settlement was different from gambling, after their agencies have been condemning the practice since formation?

Shad and Johnson considered an approach that would circumvent the problems rather than tackle them directly. They simulated a scenario in which index-based contracts would include an obligation to deliver. For example, if sellers of index-based futures chose to exercise their contracts and deliver the underlying assets, they would have to buy the stocks that composed the index that underlined the contract. Considering that indices are composed of any number of stocks (ranging from just 30 (Dow Jones) to a few hundred (Standard and Poor's 500)), and also that many series of futures would expire at the same date, deliveries of the underling assets, would result in a sudden demand for stocks - leading to a sharp surge in prices. Shad and Johnson understood that even if a fraction of index-based contracts would be settled by delivery, then the consequential transactions may still cause extreme volatility in the securities markets; a situation that neither party wanted to induce:

[7] Sadly, John Shad passed away in July 1994 so it was not possible to interview him for this research. The material in this paper includes interviews with several high-ranking SEC staff members who took part in the discussions between the SEC and the CFTC, as well as Phillip Johnson and other CFTC staff members.

> We didn't want this great flood of demand for stocks... He [Shad] didn't want it. He had this notion of 'witching hours' in the options markets, triple witching hours. He said: 'I don't need this kind of thing over here in the stock index side and I don't think my guys [SEC staff] care so let's just cash-settle everything. We decided that any index should be cash-settled.' (R* interview)

The 'witching hours' R* referred to were the last trading hours before the expiration of stock options. These contracts were written typically for periods of one month, three months, or six months and usually expired at the end of trading at the third Friday of the month in which the contract expires. Due to these standard time intervals, four times a year (on March, June, September and December) there occurred mutual expiration of the contracts. On those dates, at the hours before expiration, participants in stock markets witnessed huge price movements that seemed to be completely unrelated to the known information about the stocks. Such waves of sale and buy orders, frequently amounting to millions of dollars, did not only leave the traders bewildered, but also caused significant losses to many veteran traders (Stein, 1986). Thus, it was gradually understood that usual patterns of trading did not hold true on these Fridays.

Shad and Johnson's simulation exercise brought to the fore the role that deliverability played in the qualification and realization of index-based contracts. Shad and Johnson showed that the environments of 'real assets' and 'synthetic assets' were incompatible. According to the 'real assets' worldview, the absence of a delivery clause from financial contracts meant that those contracts were no different from betting. Furthermore, in a market where index-based contracts are traded, an obligatory delivery would be equal to calling for a market crash. Therefore, what was a condition of the legal existence of trading in the 'real assets' world became unbearably dangerous in the world of index-based contracts.

This conceptual reconfiguration of the meaning of cash-settlement was a step in the creation of a new legal and practical discourse. The two regulators created a constitutive language act (Barnes et al, 1996) and by so doing they resolved a century old dissonance between a legal definition and the market practices. Namely, by connecting the trading practice of delivering underlying assets with the new index-based contracts, obligatory delivery was denounced as irrelevant and even dangerous. Following this new insight, Shad and Johnson were able to legitimately remove the deliverability obligation from their rules and in effect paved the way to index-based derivatives.

It has to be noted, however, that the qualification process was not unidirectional – the new concepts that the regulators used were created in the new environments in which financial futures and options were traded. Shad and Johnson were able to use the notion of 'witching hours' as a discursive tool in their discussions because such phenomenon had existed in organized options markets for several years before they met. Actors who traded financial futures and options created a new market nexus of practices and norms, constituting a new lingual and communicative medium, which was later used by the regulators.

Discussion

The ability to design derivatives on the basis of market indices is arguably one of the reasons behind the explosive growth of these markets in the last decades, and is an integral part of contemporary market technology. However, unlike other entities that are tradable assets in their own rights, indices are merely the products of mathematical procedures. Therefore, a crucial element in the qualification of index-based derivatives was the construction of the indices as legitimate underlying assets. As we saw, the qualification of index-based derivatives depended on a concentrated effort by a heterogeneous forum of agents (exchanges and regulators) that together transformed the cultural, political and practical aspects of commodities trading into qualities that were assigned to the new financial contract. This analysis serves as a basis for a more general discussion regarding financial markets. In particular, it raises questions regarding the nature of the inter-institutional field in which financial markets operate and about the nature of agency in such fields.

The historical narrative that traces the qualification of index-based derivatives reveals the dense nexus of connections between regulators and exchanges. If a commonly accepted worldview were to be applied to this case then the various actors would probably be classified as belonging to one of two archetypical groups: regulators and regulated. A good example for the application of such a dichotomy to financial markets is the characterization of Miller regarding the constitutive powers of financial regulators (Miller 1986). Miller suggests that many of the sophisticated financial derivative products existing today were developed because financial entrepreneurs were trying to break away from regulation[8]. According to Miller, new and innovative financial products did not fall under the existing regulatory definitions and thus allowed their users to be free from regulatory constrains such as reporting, or compliance with strict risk-mitigation practices. The 'action-reaction' hypothesis makes an implicit assumption about the nature of the financial entrepreneurship process. According to this assumption, regulators and entrepreneurs are locked in an endless symbolic tennis game: the financial entrepreneurs launch a new type of product, which challenges the abilities of the existing regulatory regime, and the regulators react by changing the regulations.

As index-based derivatives show us, such a sequential, bilateral model is not accurate. Instead, regulators and exchanges form and dissolve coalitions that cross the boundaries between regulators and regulated. Ayers and Braithwaite offer an alternative to the mutually excluding division between regulation and deregulation, a dichotomy they regard as arbitrary and contrived (Ayers and Braithwaite 1992). In their analysis, Ayers and Braithwaite predict that in complex fields, such as financial markets, the relations between regulators and regulated would tend to shift from a pattern of command and control, to an interactive pattern they refer to as 'enforced self-regulation'. In the second phase, the regulatory goals are still chosen by the regulator, but the ways in which they are attained are dependent on the expertise of the regulated. The 'enforced self-regulation' scheme implicitly assumes that there is a separation between the 'what' element of regulation (the value-based,

[8] Many of the examples that Miller uses are taken from 'over the counter' derivatives markets, markets that followed a different historical path from the ones described in this paper. However, since Miller's argument is paraphrased in general terms it represents the 'regulators-chase-markets' approach.

normative demands that underline the regulatory practice) and the 'how' (the means through which these demands are tackled). Leyshon and Thrift (1996) follow a different disciplinary path but offer similar conclusions: they suggest that there is a discursive plurality in the interfaces between regulators and corporations, which brings about frequent changes in the content and boundaries of the economic system. If we add this insight to the hypothesis about enforced self-regulation we see that complex regulatory fields, like the one that evolved around derivatives markets, call for very different analytic perspectives from the ones that divide the institutional agents into regulators and regulated. Instead, as the historical description implies, in an environment where it is necessary for the institutional agents to cooperate in order to influence the shape of the regulatory action, the nature of the ties among the various actors is as important as their motivations.

A theoretical perspective that assumes there is a dynamic, multi-focal regulatory environment sets the stage for a concept of a more decentred regulation, such as the one offered by Black (Black 2001, 2002). According to Black, regulation is not a process that the state or its agents activate, but it is rather an outcome (or the multiple outcomes) of interactions among actors. This approach differs radically from command and control approaches not only because it distributes the regulatory action among the agents, but also because it detaches the responsibility for the regulatory process from a single agent, or a group of agents, and transfers it to the *relations* among the different actors. In other words, the question 'who regulates?' is replaced with 'how is regulation performed?' This question, previously seen as a technical derivative of the regulator's worldview, has moved to the fore. No single agent performs the regulation, but instead it is seen as an emerging organizational, political and (more recently) technological phenomenon, which cannot be reduced to a string of pre-determined procedures. Instead, the network of connections through which regulatory activity takes place should be regarded as the organizational infrastructure where rules, practices and procedures evolve and take shape. As the case of index-based derivates shows us, such a network includes the various interfaces between the actors, as well as the material and technological artefacts that they use.

This analysis of the qualification process raises questions about the nature of agency in financial markets. If we use the historical narrative in this paper as a starting point for determining who created index-based contracts, we would find that the answer is far from straightforward. The regulators did not create the market for index-based contracts in isolation. The options traders were responsible for the new conceptual meaning of non-delivery contracts. In particular, it was the notion of 'witching hours' that motivated Shad and Johnson to relinquish the demand for delivery. Similarly, it cannot be argued that the exchanges were responsible for the creation of index-based contracts because, as the data show, critical aspects of the qualification process took place within organizational settings within which the exchanges had relatively little influence.

A possible answer to the question of who created the first index-based derivatives is that the network of connections within the market is responsible for their creation. In other words, qualification provides us with an explanation as to why we should regard markets as a networked, distributed agency. Minsky argued that intelligent action should be conceptualized as a large system of agencies that can be assembled

together in various configurations (Minsky, 1986). Hutchins expanded this concept to include systems that contain both humans and material objects (Hutchins, 1995). Hutchins showed that in a complex techno-social network the attribution of exclusive decision-making capacity to one actor would not be accurate. In such networks no single actor is the ‘commander’, nor the rest ‘subordinates’. Instead, whole networks of humans and machines make the decisions and perform the practices. In accordance, it can be said that the creation of markets for financial derivatives (a process that included a string of interpretations and decisions) could not be reduced to a simple ‘action-reaction’ narrative between the regulators and the exchanges. Indeed, the data shows us that each of the agents had a set of goals that was distinctly different from those of the other. Instead, the connections between the differential actors were responsible for the transformation of index-based contracts from general concepts to tradable products.

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Interviews

All interviews were conducted by the author, recorded and transcribed in full. All interviewees' names and details were kept anonymous.

R*– Chicago, February 2000
M*– Washington, DC., March 2001
G*– Washington, DC., April 2001
H*– Washington, DC., April 2001