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The LIBOR Eclipse: Political Economy of a Benchmark

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Abstract

Up until around 2008 and the subsequent revelation of systematic manipulation, the integrity and ‘facticity’ of the London Interbank Offered Rate (LIBOR) were rarely questioned. Academics treated the LIBOR and the Eurodollar market as if they were synonyms. Central bankers conducted monetary policy as if the LIBOR was an objective reflection of the money market rate. Corporates and households entered into LIBOR-indexed financial contracts as if a money market was the underlying benchmark. This paper investigates how and why the LIBOR managed to maintain its status as a term for the competitive money market colloquially, professionally and in the economic literature for so long. By adopting a theoretical framework drawn from both Political Economy and Sociology, and applying it to the LIBOR-indexed derivatives market, it is shown how the benchmark’s appearance betrays its fundamental nature. This process benefits certain actors within the market: the banks. Importantly, however, it also reveals how the LIBOR became, and remained, such an important benchmark and how it came to be perceived as an ‘objective fact’.

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1 Introduction

Up until the ‘LIBOR-scandal’ erupted, benchmarks in financial markets were seldom mentioned as more than footnotes in academic literature, or for that matter by the financial press or regulators. In many ways this is not surprising, as they are used as standardised indicators for measuring and analysing performance and predictions for the future of *something else*. Just as the consumer price index (CPI) is a measure for inflation in Economics, the FTSE100 and S&P500 are useful benchmarks for studying the U.K. and U.S. stock markets in Finance.

It has become apparent that benchmarks referencing interest rates are of crucial importance for the society, by being deeply rooted in the financial system as a whole. They affect not only central banks, banks and other financial institutions, but also corporates, investors and households. The most widely used interest rate benchmark is the London Interbank Offered Rate (LIBOR)³, or its equivalent elsewhere (such as EURIBOR, TIBOR and so on). According to the BIS (2014), the notional amount of outstanding over-the-counter (OTC) interest rate derivatives contracts amounted to 691 trillion U.S. dollars in June 2014. Of these, it estimated that that between 60% and 90% are linked to the LIBOR, EURIBOR or TIBOR. For the vast exchange-traded futures and options market, the corresponding percentages lie between 90% and 100%, depending on the currency (FEMR, 2014). However, the LIBOR is not only used in derivatives, but also in mortgages, bonds, corporate and student loan contracts - as well as in valuation methods relating to accounting, tax, risk and monetary policy.

The recent discovery that the LIBOR has, at times, been subject to manipulation by banks has put the integrity of the arguably most important benchmark in Economics and Finance into question. LIBOR-indexed derivatives portfolios, and the desire to signal a relatively low funding cost to the rest of the market, appear to have given some banks sufficiently strong incentives to submit deceptive LIBOR quotes in order to reap monetary benefits from having the exclusive privilege to participate in the LIBOR fixing process (see, for instance, Financial Services Agency, 2011; FSA, 2012). Although the investigations, litigation processes and criminal proceedings are still going on, it is already safe to conclude that a vast amount of people and institutions have been affected by the manipulative practises by LIBOR panel banks.

³ Other LIBOR-equivalent benchmarks, such as the Euro Interbank Offered Rate (EURIBOR) and the Tokyo Interbank Offered Rate (TIBOR), have also come under regulatory scrutiny. In this paper, we generally refer to the LIBOR as encompassing all ‘LIBOR-equivalent’ benchmarks.

This paper argues that to understand LIBOR and the LIBOR scandal it is critical to understand the ways in which its appearance creates misconceptions about its fundamental or essential nature. Up until the aftermath of the global financial crisis, the integrity and ‘facticity’ of the LIBOR was hardly questioned. Indeed, as Stenfors (2014a, p. 392) points out, ‘academics treated the terms [LIBOR and money market] *as if* they were synonyms. Policy makers acted *as if* the LIBOR was an objective reflection of the money market rate. Corporates and households entered into LIBOR-indexed financial contracts *as if* the money market was the underlying benchmark’. Consequently, the question remains how and why the LIBOR achieved, and maintained for so long, its status as a term for the competitive Eurodollar market colloquially, professionally and in the economic literature. Or, if seen through the lens of the LIBOR scandal, how and why was deception seen as unthinkable from its inception in the mid 1980s only to change so quickly once the scandal broke.

Marx (1963 [1852]) wrote: ‘Men make their own history, but they do not make it as they please; they do not make it under self-selected circumstances, but under circumstances existing already, given and transmitted from the past’. A study of the emergence and development of the LIBOR clearly shows this pattern of agency within an inherited structure, which, in turn, alters the structure, leading to fresh incentives for agents. The structure within which agents act is, of course, a social construct, established through the widespread adoption of certain practices which once entrenched take on an objective appearance (and which Ilyenkov (2012) labelled an ‘ideal’). This apparently objective structure, such as the existence of the Eurodollar market, or the LIBOR, interacts with the motivations of agents, here above all economic or profit motivations, to establish new practices, and hence structures for further practices.

Given a complex and multi-causal world, it would be impossible to predict how such behaviour could develop in the future. It would, for instance, have been impossible during the 1960s to extrapolate from the development of the Eurodollar market to the almost incomprehensibly large amount of outstanding LIBOR-indexed derivatives half a century later. Nevertheless, with the benefit of hindsight, we can develop a logical path from the emergence of the Eurodollar market to the LIBOR scandal by showing how new practices developed in these financial markets, which shaped future behaviour. This approach is consistent with the notion of *bricolage* in financial markets (Engelen *et al.*, 2008), defined as the ‘creative re-use of those cultural ideas and technical tools that are to hand’ (Dorn, 2015, p. xiv). Outside the narrow confines of neoclassical economics this seems simply a common sense understanding of how agents act and we sympathise with Dorn when he asks: ‘how else could one proceed?’

Importantly in such analysis, the structures that emerge are not trans-historical phenomena. In this study, we see that both markets and benchmarks emerge, shape agents' actions and are in turn dramatically altered by new practices that develop. For example, in the study below we see the Eurodollar markets emerge, give rise to the LIBOR and become eclipsed by it. However, in order to understand what we mean by categories such as 'markets' we need to understand who participates in them, and who took what actions (and with which motivations) to establish them. In the case of the LIBOR, we can trace the motivations for banks to establish the Eurodollar market, why interest rate benchmarks emerged and why banks went on to develop those benchmarks at the centre of the derivatives markets which developed so rapidly from the late 1980s onwards.

To develop such an analysis requires a method which examines the unfolding logic of events, the economic motivations of actors as well as the sociology of market mechanisms. For that reason, we draw upon both Political Economy and the Social Studies of Finance in our theoretical approach and apply it to the LIBOR-indexed derivatives market. We investigate and demonstrate how the appearance of the benchmark differs from its fundamental nature. This process is shown to benefit certain actors within the market: the banks. Importantly, the process also reveals and answers our research question: namely how and why the LIBOR became, and remained such an important benchmark and how it came to be perceived as an 'objective fact'.

The paper is organised as follows. Section 2 outlines the interdisciplinary theoretical approach. Section 3 investigates the role of banks in the emergence of the LIBOR and the underlying Eurodollar market. Section 4 shows how the creation of cash-settled derivatives, and those indexed to the LIBOR benchmark in particular, enables the derivatives market to expand beyond the limits of the underlying market. Section 5 demonstrates how this process allows the LIBOR to *replace* the Eurodollar market as an objective fact far beyond the specialist derivatives market. Finally, Section 6 concludes by a critical reflection upon recent financial benchmark reform proposals by regulatory and supervisory authorities.

2 An Interdisciplinary Theory of Financial Benchmarks

The key empirical fact when investigating the rise of the LIBOR is that its rise to prominence was via derivatives markets. It follows that theory which seeks to explain the rise of benchmarks must also pay attention to derivatives and the extraordinary changes they have undergone since the late 1980s. According to the UK Financial Services and Markets Act 2000, as

amended by the Financial Services Act 2012, a benchmark is defined as an ‘index, rate or price that is determined from time to time by reference to the state of the market; is made available to the public (whether free of charge or on payment); and is used for reference for purposes that include one or more of the following: i) determining the interest payable, or other sums due, under loan agreements or other contracts relating to investments; ii) determining the price at which investments may be bought or sold or the value of investments; iii) measuring the performance of investments’ (FEMR, 2014, p. 4). Although this definition might not be complete it is sufficient to indicate the key elements of the role benchmarks play in derivatives markets. First, the benchmark is related to but separate and distinct from the objects which determine it. Second, it is a measurement and as such cannot be bought or sold, it cannot be delivered in exchange for money; it can however determine sums due in other financial instruments. In derivatives markets therefore it acts as a bridge between the underlying market and the derivative markets, both relating the derivative to the underlying, but critically, and this is the point most often missed by economic theories of derivatives, separating the derivative from the underlying.

When approaching the matter from the perspective of derivatives theory, it must be stressed that all derivatives require a benchmark. The sale of a particular and specific asset (be it a financial asset, a commodity, or other) for future delivery at a pre-determined price is just that – the sale of the asset. It is not, however, a derivative. The development of derivatives markets since the 1980s has shown that derivatives today, whatever they were before or will become, are for repeated buying and selling to profit from price changes and for this require the standardisation which comes with cash-settlement and reference to an underlying benchmark (Lindo, 2013). These critical points are further illustrated in the rest of this section.

Prior to the 1980s the best-known and most-traded derivatives markets were the agricultural commodities markets of North America, which were characterised by exchange-traded and physically-settled derivatives. Textbook accounts of derivatives often look back to these forms as typical and perhaps because of this they treat derivatives as a way of trading an underlying commodity. This approach has its roots in neoclassical economics and the allocational efficiency of complete markets, most famously laid out by Arrow & Debreu (1954). According to this theory, being able to transact in the future reduces uncertainty and thereby increases the utility of risk-averse derivatives users (Copeland & Weston, 1988). Derivatives are explained as a cheaper form of the primitive securities that feature in standard accounts of efficient markets (Ross, 1976). Thus, derivatives are treated as a way to trade an *underlying commodity*. In fact, neoclassical theory starts by assuming that selling commodities and selling via a derivative are synonymous. However, while

the similarities between the two are important, it is the differences that reveal more about the nature of derivatives, and lead to our investigation into why the benchmark is completely ‘left out’.

Neoclassical theory does not explain the phenomenal growth in derivatives during the last decades. Neither does it mention why banks play such a central role in these markets. In this respect, critical and heterodox approaches have fared better. Economists and others have investigated the rise of derivatives in the context of more general developments in capitalism (see, for instance, LiPuma & Lee, 2005; Bryan & Rafferty, 2006; Wigan, 2008, 2009); Otherwise, Marxists have hardly theorised derivatives, and certainly not as a banking activity. Toporowski’s (2000) work in the post-Keynesian and Kaleckian tradition rightly places the growth of derivatives within a process of financial inflation.

Economic sociologists, on the other hand, have undertaken close study of the relations in these markets and have a considerable advantage over the majority of economists in that the researchers have evidently visited trading floors (Beunza & Stark, 2004; Godechot, 2008), interviewed traders and bankers (MacKenzie & Millo, 2003) and base their findings on close study of the markets at work (Knorr-Cetina & Preda, 2005). Although some have paid more attention to the role of benchmarks, the larger political economy context for derivatives trading, above all the place of banks in derivatives markets, tends to be missing.

Leaving the susceptibility to manipulation aside, a fundamental issue has been the discrepancy between what the LIBOR is and what it has been perceived to be. It *is* a benchmark, but has been *perceived to be* the Eurodollar market, the international money market, the short-term interbank money market or an objective reflection thereof. Indeed, derivatives offer an insight into why the benchmark *cannot* be synonymous to the underlying market. By definition, a derivative instrument is not the same as the underlying asset, index or measurement – otherwise it would not warrant a different name. A derivative contract allows counterparties to transact *as if* they have bought or sold an underlying without actually having done so. Standard textbooks in economics or finance generally describe derivatives as contracts to exchange future money for a commodity. For historical reasons, agricultural commodities are often used to illustrate the ‘need’ for derivatives. But as MacKenzie (2006) shows, what is bought and sold, even in agricultural contracts, is not the specific grain of a particular farmer, but rather a standard quantity of a standard quality of commodity. Should a farmer’s product not meet the quantity or quality requirements, (s)he would need to source the relevant product elsewhere for delivery into a derivative. The underlying to a

derivative can therefore be seen as a ‘homogenous abstraction’ (Cronon, 1991, p. 132, quoted in MacKenzie, 2006, p. 14).

Since the expansion of derivatives trading since the 1980s the vast majority of derivatives have come to be cash-settled, either because only cash settlement is permitted under the terms of the derivatives contract, or because contracts permitting physical settlement are overwhelmingly closed out or settled for cash prior to settlement. Theory, therefore, should treat cash-settlement as typical. Cash-settled derivatives proceed *as if* an underlying commodity-like exchange occurs: they appear to represent the net cash payment that would occur *if* an underlying purchase and sale have been completed. As happens so often, though, appearance is the inverse of reality, for cash settlement specifically ensures that *no* underlying exchange occurs. Only cash is delivered and no commodity, security or any other asset is involved.

Arnoldi (2004, p. 24) states, ‘When something comes to exist “in practice”, but not in reality in the strict sense, it can be said to be *virtual*’. In this sense derivatives dealers (i.e. banks) must invest in the ‘the material production of virtuality’ (MacKenzie, 2007); they must bring into being something to trade in practice but not in reality. Economic sociologists have explored the material ways in which the virtual nature of financial markets comes into being in general and how the virtual asset underlying the derivative is ‘made’ in particular. By investigating how the LIBOR was created by banks in order to be able to trade the two most common types of derivatives (Eurodollar futures and interest rate swaps), or variants of these, we can show how the derivative instrument becomes separated from the underlying itself, namely the lending and borrowing of money in the Eurodollar market.

In a Eurodollar futures contract, the *as if* underlying is a 3-month U.S. dollar deposit of one million. This means that the underlying price index is an interest rate corresponding to such a deposit, in other words the 3-month U.S. dollar LIBOR. The counterparties involved exchange the equivalent of the *change* in the rate of interest on a 3-month U.S. dollar deposit of one million. Although no actual deposit is made or required, for each contract they exchange *as if* they had the deposit. On an exchange where futures are traded (such as the CME), margin procedures mean that the exchange steps between the two counterparties and payments are made every day to or from the exchange reflecting the movements in the LIBOR. OTC derivative contracts, such as interest rate swaps and forward rate agreements, escaped exchanges with the claim to be bespoke contracts but have steadily standardised and the large majority are collateralised daily in a manner akin to margin calls at exchanges. An interest rate swap appears *as if* one party pays a fixed interest rate and the

other party pays a floating rate. The underlying price index of the floating interest rate is generally the LIBOR. The original conception of an interest rate swap, however, is of counterparties trading *as if* undertaking a string of forward-starting Eurodollar deposits.

For the lender, extending a loan has two principal disadvantages. First, there is a risk that the principal and interest will not be paid back (credit risk). Second, there is a need to fund such a loan (liquidity risk). These act as a restriction on the amount lent. Trading a derivative on the relevant interest rate *as if* the loan has been made involves funding liquidity risk and credit risk - but greatly diminished compared to the loan itself as it is only on the change in value rather than the full notional amount. Furthermore, the infrastructure of the market, ranging from standardised ISDA agreements to exchange margining, acts to reduce these costs. Derivatives therefore remove an implicit restriction in the underlying market and allow trading for price change on a greatly enlarged scale - both through larger contracts and more frequent transacting. Note, however, that if one wants to borrow or lend money, the derivative is not the logical place to do so. The derivative serves only to capture the price change *as if* lending occurred.

Herein lies the fundamental separation between trading the real underlying asset and trading with a derivative: in the former an asset or commodity is exchanged for money, in the second the underlying is a measurement. It is impossible to actually exchange a measurement, it is only possible to trade derivatives on it. This has two important consequences. First, it makes derivatives useless for those that want to exchange the underlying but perfect for, and restricts users to, those that want to capture price changes in the underlying *benchmark* through buying and selling. Second, the fundamental separation enables a vast expansion of the quantities that can be traded by removing the need to source and deliver the underlying asset. This is true whether the asset is an agricultural commodity or, as explored above, a Eurodollar deposit. The characteristic of derivatives that stems from this examination of the underlying price index is most evident in the most developed forms of derivatives, such as weather derivatives for which delivery of an underlying asset is simply impossible (there is no asset in this case). In other words, neither does the outstanding amount of corn derivatives need to be related to the size of the global harvest, nor the amount of LIBOR-derivatives to the size of total assets in the global banking system. This enables the LIBOR-derivatives market to eclipse the Eurodollar market, and for the LIBOR to *replace* the latter as an objective fact and be put into wider use throughout the economy.

3 Making Markets

Having briefly discussed our method and some theoretical considerations of derivatives and benchmarks, this section begins the more detailed logical and historical investigation into the emergence of the underlying Eurodollar markets, the LIBOR benchmark, and the derivatives markets that made the LIBOR so critical.

3.1 *The Eurodollar Market: Made by Banks for Banks*

The Eurodollar market is often noted for having played a central role for the forthcoming transformation and deregulation of finance (Lapavitsas, 2009). Its actual birth is set in 1957, when banks created a market in Europe where U.S. dollar deposits were re-lent to European institutions instead of re-invested in the United States. Eurodollars hereby came to be defined as deposits denominated in U.S. dollars at banks outside the U.S. As these kinds of deposits later came to be denominated in other currencies, these Eurocurrencies in general (Eurodeutschmarks, Euroyen, Eurosterling and so on) came to represent borrowing and lending outside of the jurisdiction of the central bank issuing the denominated currency.

The Eurocurrency market grew very rapidly, from around 14 billion U.S. dollars in 1964 to over 2,500 billion in 1988 (Sarver, 1990), mirroring increasing international trade and investment after the Second World War. U.S. multinational corporations in Europe in particular sought cheaper, alternative ways to fund their foreign expansion. There was demand for new funding alternatives, and compared to the U.S. domestic interest rate markets, Eurodollars offered tighter bid-offer spreads and generally lower rates as a result of less regulation, lower administrative costs, larger economies of scale and less credit risk. The new market was also boosted by structural economic factors, such as the U.S. balance of payments deficit after the Marshall Plan and a growing pool of U.S. dollars abroad as central banks had accumulated large currency reserves during and after the Bretton Woods framework. Overall, the Eurodollar market proved to be of a special character; it became systematic; had a clear purpose; and also, after some resistance, became approved by the authorities. Fundamentally, it resulted in a growing and lasting organised international money market.

The first Eurodollar trade seems to have been triggered by fears of sovereign and political risk, as the international political climate that existed during the Cold War began to intensify

towards the late 1950s⁴. However, an important driver of the Eurodollar market was *regulation*, or more specifically: the banks' determination to avoid it. Money markets were heavily regulated at the time, particularly in the U.S., making up a strong case for setting up a U.S. dollar money market outside the jurisdiction and scrutiny of the Federal Reserve (*ibid*). This also coincided with the end of the foreign exchange controls that had existed in Western Europe. Hereby, a platform for engaging in regulatory arbitrage was formed, and European banks jumped at the opportunity.

With the Eurocurrency market, a free, competitive and global money market was beginning to take shape for the first time. Through regulatory arbitrage came the realisation by policy makers that this market could not be curbed, but instead had to be embraced and encouraged. This marked the beginning of a decade of competitive deregulation on both sides of the Atlantic. Seen from a different perspective: if the Eurocurrency market was banks' response to regulation, the deregulation phase thereafter was individual states' response to the regulation of other states.

In neo-classical economic theory, the Eurodollar market has generally been seen as an example of how well the market works when free from government regulation (Porter, 2005). In a free, global market economy, which is seen to be more efficient than a regulated one, innovations such as the Eurodollar market that competitively aims to exploit inefficiencies (through, for instance, regulatory arbitrage) are normal developments. It is also economically beneficial, and governments thus have the opportunity to speed up the process through deregulation and thereby further facilitate innovation and the globalisation of finance.

Within International Political Economy (Helleiner, 1994; Strange, 1986, 1996), the Eurodollar market has often been used as an analogy to depict the increasing powers of the self-regulated international financial market vis-à-vis states during the recent decades. Empirical evidence demonstrating the spread of 'Casino Capitalism' is usually found in the seemingly liquid and efficient foreign exchange, money and derivatives markets.

Neo-Gramscians (Cox, 1987; Gill & Law, 1989), on the other hand, tend to focus on internationally mobile financial capital. Financial capital, it is argued, can react to government

⁴ The mounting supply of dollars on the other side of the Iron Curtain needed to be invested, but preferably not in the U.S. The first to exploit this 'market opportunity' was, perhaps paradoxically, the Soviet Union when transferring deposits to its bank in Paris, the Banque pour L'Europe du Nord (more commonly known by their telex address 'Eurobank'). U.S. dollars deposited at Eurobank hence became known as Eurodollars (Higonnet, 1985). Investors in the Middle East also began to place dollars in Europe, quite possibly influenced by the resulting instability after the outbreak of the Suez War in 1956, when the U.S. reacted by freezing some U.S. assets. Later, with the oil shocks of 1973 and 1979, OPEC countries began accumulating large U.S. dollar surpluses that they preferred to invest in Eurodollars in countries with large funding requirements.

policies or expected policies much more rapidly than productive capital, thereby forcing governments to adopt certain policies that are suitable for finance. Within this framework, capital strives for the best conditions to survive and prosper, and nation states compete to attract capital. Consequently, there is a dialectic relationship between the nature and scope of markets on one hand, and the forms of state intervention and regulation on the other. The rapidly growing and globally more integrated capital markets, the birth of the Eurodollar market, along with technology and communications, led to international mobile capital gaining more structural power.

Explanations for the birth and rapid growth of the Eurodollar market can be found in a range of macroeconomic, political and regulatory factors. However, the aforementioned drivers fail to explain the continuing expansion even *after* deregulation had taken place, the U.S. balance-of-payments had begun to reverse, and the international political arena had stabilised. Demand by multinational corporations also played a crucial role in justifying the market, but obvious causality becomes difficult to establish as the growth rate of the Eurodollar market quickly surpassed that of international trade and investment.

Indeed, the role of the Eurodollar market has increasingly tended to become ignored, or at least downplayed. Instead, focus is put on the processes of liberalisation, deregulation, globalisation and financialisation from the 1980s in order to explain the development of the financial derivatives market and the rise of finance more generally. We argue that this approach leads to a false precision, as the Eurodollar market *preceded* the subsequent financialisation process and was pivotal in *prompting* the deregulation process. By emphasising the importance of Eurodollar market as a key historical event, important actors emerge that would otherwise easily be overlooked: the banks. As MacKenzie (2007) states, markets do not simply evolve. Markets are invented and made. The Eurodollar market did not emerge automatically and autonomously within the existing money market. It was *made* by banks.

3.2 *The LIBOR: Made by Banks for Banks*

The rate at which Eurodollars (or Eurocurrencies) were trading became known as the Eurodollar rate. This Eurodollar rate was not ‘official’, but for syndicated loans an average was instead taken from three reference banks at 11 a.m. two days before the rollover date. With time members of large loan syndicates became increasingly insistent that the reference bank chosen be representative in borrowing strength to the various bank syndicate members. Also, the syndicates sometimes tried to retain the right to name substitute reference banks if the requisite majority of

syndicate members felt that the original reference bank had lower borrowing costs than would be representative for the syndicate as a whole (Sarver, 1990). As a result, in 1984, U.K. banks asked the British Bankers Association (BBA) to develop a calculation method (or ‘fixing mechanism’) that could be used as an impartial basis for calculating interest on syndicated loans. This led to the creation of ‘BBAIRS’, the BBA Interest Rate Settlement in 1985, which in 1986 became the LIBOR. Thus, the LIBOR did not evolve automatically from the Eurodollar market. It was made by banks.

Originally designed using the tradable Eurocurrency market as a template, the LIBOR bears a close *resemblance* of a market. The LIBOR panel banks are in effect a list of the largest banks in the world that are competing fiercely against each other. However, the LIBOR was never an outcome of market-determined process. Instead, individual banks are asked, without being able to see each other’s quotes, to submit their rates according to the following criteria: ‘At what rate could you borrow funds, where you do so by asking for and then accepting interbank offers in a reasonable market size just prior to 11 am?’ (IBA, 2014, p. 12). The submitted quotes from the individual panel banks are then collected by an independent calculation agent and ‘trimmed’, whereby a proportion of the highest and lowest quotes is omitted. Finally, the average is calculated and made public (BBA, 2012). Thus, the submitted quotes are not binding, tradable prices. Instead, the LIBOR (and its equivalents elsewhere) can be seen as benchmarks for where the selected panel banks argue the money market is. More specifically, each individually submitted quote is supposed to represent where the LIBOR-bank *claims* to be able to borrow funds (ibid), where the CIBOR⁵-bank *argues* it would be prepared to lend funds (Finansrådet, 2011), or where the EURIBOR-bank *estimates others* to be able to do so (EBF, 2012a).

The LIBOR panel compositions have slowly changed over time, mainly as a result of bank mergers, and now generally include large universal banks that are highly active - and normally market-makers - in the money, foreign exchange and derivatives markets. Likewise, despite the differences in size (ranging from just five members in the STIBOR⁶ panel to 43 in the EURIBOR panel) they have also tended to increasingly include international banks that are not under the direct jurisdiction of the central bank issuing the underlying currency for that particular benchmark. In other words, they are either typical too-big-to-fail banks for the domestic banking system, or ‘global systematically important banks’ – with, for instance, 14 out of the 18 USD LIBOR panel members belonging to the latter group (BBA, 2013; FSB, 2011). Formal ‘membership’ in a LIBOR panel has

⁵ Copenhagen Interbank Offered Rate

⁶ Stockholm Interbank Offered Rate

always been very difficult to obtain, as the formal selection criteria per definition not only exclude non-bank financial institutions, but implicitly also the vast majority of smaller and medium-size banks. Most institutions are already disqualified upon application by requirements such as branch presence, market making ability, sizeable trading activity and reputation (BBA, 2013; EBF, 2012b; FNO, 2011; JBA, 2012).

As discussed in the previous section, the Eurodollar market prompted regulatory arbitrage between different jurisdictions, which resulted in a competitive deregulation process among states. Likewise, the LIBOR (with its roots in the Eurodollar market) managed to escape the confinements of particular regulatory jurisdictions. Thus, up until 2013⁷, the benchmark was unregulated. However, it was not self-regulated by the ‘wider market’ either. Rather, it was governed by the groups of LIBOR panel banks themselves, and generally overseen by a bank lobby organisation (such as the BBA). Therefore, the LIBOR was ‘protected’ by the LIBOR panels themselves, or associations working for these. It should not come as a surprise that the lobby organisations often acted as defendants on behalf of the banks regarding the integrity of the LIBOR fixing mechanism, despite pressure from other market participants (see, for instance, ACI, 2008ab).

The fundamental institutions, such as the definition, the fixing mechanism or the panel bank compositions of the LIBOR benchmarks remained remarkably unchanged, despite far-reaching changes in financial markets more generally from the 1980s. This *status quo* (in other words maintaining control over the underlying benchmark, whilst keeping its integrity intact) undoubtedly suited banks’ interests.

The Eurocurrency market had, by definition, an international component and therefore a natural link to foreign exchange through the covered interest rate parity (CIP)⁸. As the market grew, so did the foreign exchange market closely linked to it. Spin-offs, such as Eurodollar CDs, Eurobonds and syndicated Eurocredit markets enabled the international banking community to extend credits beyond the prudential and legal lending limits of individual banks. In this context, the Eurodollar market played a central role in the transformation of the money and credit markets and the international financial system and as a whole. Syndicated loans, as mentioned previously, *justified* the need for an ‘objective’ reflection of the Eurodollar market. The cash-settled derivatives market, however, *required* a benchmark (in this case the LIBOR). However, it is impossible to actually exchange the LIBOR. It is only possible to trade derivatives on it.

⁷ FSA (2013)

⁸ The CIP states that interest rate differentials between two currencies should be perfectly reflected in the foreign exchange swap price - otherwise arbitrage would be possible. The LIBOR tends to be used for to represent the corresponding interest rates.

4 The LIBOR Takes Centre Stage: the Making of Derivatives Markets and the Eclipse of Eurodollars

As seen above, banks *made* the Eurodollar market and subsequently *made* the LIBOR. Faced with this and the regulatory situation that existed, banks went on to *make* LIBOR-indexed derivatives. They make these markets both by providing liquidity but also the infrastructure of the markets - from legal documentation to payment and settlement systems (Lindo, 2013). One way in which this is made clear is by examining how the Bank for International Settlements (BIS) measures the size of OTC derivative markets: the BIS (central banks and regulators) polls around 250 banks and asks them to whom and how much their OTC derivative exposure is. In other words, they make the strong assumption that all OTC derivatives have a bank as one of the counterparts. OTC derivatives are thus revealed as a banking instrument as much as loans and deposits are (with important differences as well of course). The corresponding figures for exchange traded derivatives (ETD) are not available as the exchange automatically steps between counterparts and novates the derivative such that all derivatives face the exchange. Nevertheless, an examination of the governance, members and major participants on exchanges suggests banks play a similar role with ETDs. This is borne out somewhat with the growth in Central Counterparties (CCPs) since 2008, whereby OTC derivatives between banks and other counterparties have been novated to face CCPs. Here, banks retain their market making (liquidity) role, but subsequently delegate some infrastructure provision to the CCP.

As explained previously, cash-settled derivatives remove the need to source and deliver the underlying. This fundamental separation enables the derivatives market to expand beyond the limits of the underlying market. With regards to the LIBOR, this process can be seen as having taken place through four phases - overlapping, but each strengthening the appearance that the benchmark represents a tradable market.

4.1 *The Growth of the LIBOR-Indexed Derivatives Market*

The Eurodollar future, the world's first cash-settled futures contract, was launched by the Chicago Mercantile Exchange (CME) in 1981. The average daily volume during 1982 was 1,279 contracts, but it quickly became the world's most actively traded short-term interest rate contract (CME, 2006). Up until 1996, the CME used a benchmark based upon a survey where randomly selected banks were willing to lend to 'prime banks' (Mollenkamp, Ablan & Goldstein, 2012). In

January 1997, however, the contract began to be fixed and settled against the LIBOR, although still bearing the name Eurodollar future (reminding us of its link to the Eurodollar market). Between 1981 and 2006, more than 2.7 trillion CME Eurodollar futures contracts had been traded representing 2,700,000,000,000,000 U.S. dollars in notional value, and in 2011, the value of Eurodollar futures contracts traded on the exchange reached 564 trillion U.S dollars. The success of the Eurodollar Future also prompted competing exchanges, such as LIFFE and TIFFE, to offer similar instruments. Euroswiss, Eurodeutschmarks, Euroyen, Short Sterling all came to be more closely associated with futures based on their respective LIBOR than the Eurocurrencies themselves. The name of the benchmark also came to be copied in a range of other international financial centres: MIBOR in Madrid; PIBOR in Paris; TIBOR in Tokyo; STIBOR, NIBOR, CIBOR and so on.

Despite the success story of exchange-traded LIBOR-based derivatives, it was the over-the-counter (OTC) derivatives market that truly changed the market place. This was the largely unregulated market for bespoke interest rate and foreign exchange derivatives that mainly took place between banks: currency swaps, interest rate swaps (IRS), cross-currency basis swaps (CRS), forward rate agreements (FRA), swaptions and so on. Like the futures contracts, they started to appear in the early 1980s and, like exchange-traded futures contracts they too were mostly based on the LIBOR. The BIS estimates the IRS market grew from just 3 billion U.S. dollars in 1982 to around 100-150 billion in 1985. Since then the growth has been phenomenal – with *daily* turnover in 2013 reaching 1,415 billion U.S. dollars (compared to 63 billion in 1995) (BIS, 1986; 1999; 2013).

Thus, although the Eurodollar market could be seen to have achieved deregulation and global market integration by the mid-1980s, it continued to play a crucial role by paving the way for the benchmark by which the vast majority of derivatives were been fixed and settled. As market volumes grew, market participants sought ever-greater legal certainty for existing contracts, citing systemic risk (should the contracts be deemed illegal). Greater legal certainty, however, only served to increase the amount of OTC-derivatives trading. Moreover, as explored above, the very nature of a derivative is as a standardised instrument. The derivative is precisely *not* the specific particular exchange of a commodity or promise to pay for money, but is rather a transaction on the price for a standardised quantity and quality of the underlying. Consequently, as OTC volumes grew, contracts typically became increasingly standardised.

4.2 *The Growth of Banks' LIBOR Exposure*

The second phase began to occur already during the 1980s, when the global economic situation and accompanying financial market regulatory changes transformed the character of the financial markets. Despite the Eurodollar market still growing, these changes led to a reduction in its *relative* importance as a funding source or investment outlet for the banks. Instead, Eurodollars gradually turned into the prime tool to speculate on short-term interest rates in an increasing range of currencies. This was an area where banks, naturally, had a superior competitive, informational and economical advantage. As banks were able to take on more risk, the Eurodollar market was an ideal instrument for taking directional short-term interest rate risk. Further, the abolishment of capital controls made it possible for any bank to be involved in the Eurodollar market by constructing 'synthetic' Eurodollars through the CIP. As FX swaps involved the simultaneous lending of one currency versus the borrowing of another with the same counterparty, they had the benefit of reducing credit risk, ultimately making them considerably more liquid than their underlying Eurocurrencies.

As Camacho & Nieto (2009) note, actual Eurodollars as a proportion of total credit creation began to diminish in the 1980s. However, LIBOR-derivatives, as a proportion of banks' total *exposure* to the LIBOR, increased and began to all but completely replace the Eurocurrency market as a vehicle for hedging, speculating and leveraging. In sum, derivatives enabled banks to expose themselves to the LIBOR in large notional terms without little real or physical exposure to the underlying Eurodollar market.

4.3 *The Disappearance of the Underlying*

The third phase involved a gradual reduction, and even disappearance, of the underlying Eurodollar market. Similar to the development with regards to the FX swap market, the LIBOR derivatives market outgrew the Eurodollar market. The 1988 Basel Accord that was put in place focused on settlement and credit risk as bank assets were classified according to pre-set brackets ranging from zero to 100%, and banks were required to hold capital equal of 8% of the risk-weighted assets. However, whereas the Basel rules put new constraints on banks, they simultaneously opened doors. Excessive on-balance sheet asset usage (such as Eurodollars) was penalised, at the same time as off-balance sheet product trading (e.g. LIBOR-derivatives) was rewarded.

Whereas the more liquid (and less credit intense) foreign exchange market had managed to reduce some of the ‘necessities’ of the Eurocurrency market, the LIBOR derivatives market (which was even less credit intense) and new sources of funding (such as through securitisation) made the term money market all but unnecessary. This transformed the ‘actual’ interbank money market more into a platform of rather ‘boring’ routine bank operations, rather than any ‘casino’. Maturities became, on balance, much shorter, as trading in-and-out was a highly capital intense activity. Trading in very short-term money market maturities (1-day, 1-week, etc.), however, had little to do with interest rate expectations and credit and more to do with daily funding and liquidity requirements to square up the bank balances. The LIBOR, as a reflection of the term money market, therefore became even less linked to a market that was actually trading. For example, a survey by the ECB (2011) shows that the vast majority of unsecured lending is overnight (around 80%) and that transactions up to 1-month maturities account for the most of the remaining part. Rarely any trading takes place in 3-month or 6-month maturities, to which most LIBOR-derivatives are indexed⁹.

4.4 *The Eclipse*

The fourth, and perhaps most abstract, phase took place when the benchmark needed to become anchored to something else, most conveniently to its *own* derivative - rather than the underlying market it is supposed to reflect.

The liquidity of LIBOR-derivatives increased as they became more suitable for trading ‘needs’ than the underlying Eurocurrencies were. Importantly, superior liquidity as reflected in the bid-offer spreads gave them an advantage over the underlying asset (the term money market) in the price determination process. Hence, the LIBOR-rate for longer maturities (such as 6-months and 1-year) became less driven by actual Eurocurrency trading in those maturities, and instead reflected observed prevailing yield curves implied from the prices of a range of LIBOR-based derivatives (such as Eurodollar futures or FRAs). Likewise, the underlying interest rates in the pricing of FX forward premia gradually started to lose their link to the real and physically tradable interest rate differential, and instead increasingly became functions using LIBOR-derivatives for specific currency pairs. Consequently, money market traders began more to look towards the LIBOR-indexed derivatives markets, rather than the money market itself, both in terms of risk-taking as well as for indications of the future direction of the LIBOR. This trend appears to have consistently

⁹ See Table 1 in FSB, 2014 for the maturity concentration of LIBOR, EURIBOR and TIBOR.

followed the growth of the LIBOR-based derivatives market. The separation between LIBOR-based derivatives and Eurodollar markets increased and LIBOR became increasingly self-referential.

Thus, even though the notional amounts of LIBOR-based derivatives have increased dramatically during the recent decades, the relevance of the Eurodollar market moved in completely the opposite direction. Although the underlying (LIBOR) was never a market *per se*, its relative significance gradually increased. The astonishingly large turnover of derivatives referencing the LIBOR sustained the illusion that the underlying index indeed reflected a large, liquid and efficient Eurodollar market. More specifically, it served as ‘evidence’ that the LIBOR was indeed an outcome of a market-determined (and hence objective) process. Perhaps no better illustration of the faith in the LIBOR-equivalent benchmarks can be found than in the EURIBOR, which was first published on 30 December 1998 - 2 days *prior* to the euro *ex nihilo* became legal tender on 1 January 1999. This enabled a EURIBOR derivatives market to emerge before physical transactions possibly could be made, as the currency did not yet exist.

5 LIBOR as an ‘objective fact’

In the previous sections, we demonstrated how the separation leads to a perception that the LIBOR is a market-determined benchmark, even though the mechanism is no such thing. We also showed how, propelled by the sheer volume of derivatives trading, the underlying benchmark gradually takes on an objectivity that enables the derivatives market to eclipse the Eurodollar market. This enables the LIBOR to *replace* the Eurodollar market as an objective fact. Together, these consequences allow the LIBOR to cement itself as an objective fact far beyond the specialist derivatives market.

First, it permits banks to put the benchmark into use in other areas of the economy. The LIBOR becomes not only the benchmark of choice for a variety of derivatives contracts, but the underlying benchmark for seemingly unrelated agreements such as residential mortgages, credit card debt and student loans. The Eurodollar market was never an investment outlet or a place to raise funds for households or university students. However, having become directly exposed to the movement of the LIBOR rate through these agreements, it becomes a focal point that is easily followed in the daily press opting to publish it as any other important number, such as the local weather or the closing level of the stock market index.

Second, given its importance in Finance and Economics, the LIBOR also becomes frequently quoted (and misquoted) in scholarly and professional literature. For instance, a Eurodollar future or interest rate swap cannot be properly explained without mentioning the underlying benchmark. Citing from the widely used academic textbook ‘Introduction to Futures and Options Markets’ by John Hull (1991):

‘The variable underlying contract [...] is the 90-day Eurodollar interest rate. A Eurodollar is a dollar deposited in a U.S. or foreign bank outside the United States.’ (p. 124)

Whereas the definition above is correct, the following quote highlights how the underlying benchmark ‘becomes known’ as the underlying market:

‘The Eurodollar interest rate is the inter-bank interest rate earned on Eurodollars and is also known as the 3-month London Interbank Offer [sic] Rate (LIBOR).’ (p. 124)

Finally, trading in the Eurocurrency market almost becomes synonymous with trading the LIBOR itself – which, of course, is impossible:

‘LIBOR [...] is a floating reference rate of interest. LIBOR is determined by the trading of deposits between banks on the Eurocurrency market.’ (p. 132)

The use of the derivatives benchmark, rather than the actual underlying market, in academic textbooks, journal articles and financial press further cements the facticity which had been developed through banks’ trading practices.

However, the third and arguably most powerful justification for its use occurs when it becomes accepted and adopted by the state. The interbank money market rate is important in central banking as it acts as the ‘symbol’ of the first step of the monetary transmission mechanism, measuring how policy rate changes ultimately impact lending and borrowing in the real economy. The LIBOR has not only increasingly replaced the actual market as this symbol - it has become a policy tool *in itself*. For instance, since January 2000, the Swiss National Bank uses a ‘target band’ for the 3-month Swiss Franc LIBOR as the central bank’s key monetary policy instrument (SNB, 2015). As Stenfors (2014b) points out, the central bank of Norway has gone a step further, by publicly announcing its projected monetary policy rate (the folio rate) and also the future 3-month Norwegian krone risk premia – based upon the 3-month Norwegian Interbank Offered Rate

(NIBOR). This might seem like a paradox, considering that the Eurodollar market was created in order to *avoid* the jurisdiction of the central banks. However, if the central bank, as an annex to the state, accepts the benchmark as ‘objective’, it becomes difficult to argue otherwise.

As has been widely documented, the advent of the global financial crisis caused a complete freeze in the international interbank money markets. This, in itself, did not pose an immediate threat to the usage of the LIBOR. On the contrary, the crisis catapulted the perception of the benchmark from something rather ‘boring’ into an important instrument for the financial system as a whole. The former British Bankers Association (BBA) Chief Executive Angela Knight captured this in a speech on 18 December 2008:

‘Since the credit crunch began, it has become clearer to all of us that LIBOR, not the Bank of England base rate, is what really governs saving and borrowing rates in the high street. It has always been relied on by the market as a reliable benchmark which is also the most transparent. It is appropriate in this global downturn to ensure the continued robustness of this pillar of our financial architecture.’ (BBA, 2008)

As money market risk premia surged in virtually all developed countries, central banks introduced a wide range of extraordinary measures to alleviate the stress in the banking systems. The common expression for this risk premium was the LIBOR-OIS¹⁰ spread, widely perceived to be based upon actual market transactions and thus objective (see, for instance, Bank of England, 2007; McAndrews, Sarkar & Wang, 2008; Sultanaeva & Strömqvist, 2009). Thus, the LIBOR continued to be used not only when the interbank money market ceased to exist; it continued to be used even though ‘everyone knew’ the interbank money market no longer functioned. In fact, the absence of an underlying market did nothing to halt the growth of the derivatives market referring to it. According to BIS (2013), the daily turnover in the global FRA market *increased* from 258 billion U.S. dollars in April 2007 to 754 billion in April 2013.

6 Concluding Discussion

In the analysis above we have stressed how banks make derivatives markets and explored how they make the thing to be traded – namely the underlying price index. We have shown how the construction of the LIBOR, as the pre-eminent derivatives benchmark, allows separation from the Eurodollar market from which it emerged. This separation allows derivatives trading to take place -

¹⁰ The LIBOR-OIS spread has widely been used as a ‘barometer of fears of bank insolvency’ (Thornton, 2009).

trading to capture price changes *as if* trading the underlying but without the necessity of having to do so. The enormous quantity of trading that results has established the LIBOR as an objective fact – not only enabling it to eclipse the Eurodollar market, but to become a ‘price’ in a number of other markets seemingly unrelated to the Eurodollar market.

Our analysis suggests that such a depiction rests upon a fundamental misunderstanding of what the LIBOR is. It has *appeared* as an objective price, which has served to delay the discovery that it has always been susceptible to manipulation (see Stenfors, 2014b). However, as we have shown, the LIBOR emerged to serve a specific purpose for large banks. The practices, which the manipulation scandal has revealed, are consistent with that use. Banks, by nature, are profit maximising and wish to appear good and sound. Seen from this perspective, the structure should not be seen as a self-created and self-governed platform where banks have been able to ‘cheat the system’. Rather, banks could be seen as having taken advantage of having contributed to, and sustained, a great illusion. The LIBOR mechanism has been a fundamentally anti-competitive process that has benefitted from deception and secrecy, but also by appearing *as if* it represents a competitive market.

Consequently, the reaction by regulators and policy makers has been to seek to establish some kind of ‘correctness’ in the LIBOR process – particularly by targeting the behaviour of the LIBOR-banks (and individuals working for these), but also by trying to fine-tune what the LIBOR ought to represent.

The first set of reforms have been aimed at bringing ‘formalisation and professionalism’ into the LIBOR-rate setting process (IBA, 2014, p. 3). In the UK, the regulation and supervision of the benchmark has shifted from the LIBOR-panel banks themselves and the BBA to the Financial Conduct Authority (FCA). Moreover, LIBOR-manipulation has been made a criminal offence, and a specific Code of Conduct (‘the LIBOR Code’) sets out practice standards that LIBOR panel banks are expected to follow. These changes follow a string of fines imposed on banks that have been found having manipulated, or attempted to manipulate, the benchmark. All in all, these set of measures strive to eliminate, or at least greatly reduce, the incentives of LIBOR-manipulation by banks.

The second set of reforms, or reform proposals, has been aimed at making the LIBOR more ‘market-like’. No change has been made with regards to the definition of what the LIBOR *is*. Instead, a large number of currencies and maturities (where the underlying Eurocurrency market is

negligible) have been removed from the LIBOR fixing mechanism altogether (HM Treasury, 2012). Acknowledging that the underlying market for the remaining LIBORs might, at times, be illiquid or even non-existent, provisions have been made allowing LIBOR-banks to use their ‘expert judgement’ when submitting quotes during periods of ‘market turmoil and inactivity when inter-bank offers are absent’ (IBA, 2014, p. 12). In this case, non-Eurocurrency markets are not only allowed, but explicitly recommended, to form the basis for judgement. These other markets include FX swaps and derivatives markets such as overnight index swaps and interest rate futures (e.g. Eurodollar futures) and options (e.g. options on Eurodollar futures) – echoing our previous analysis regarding the ‘eclipse’ (IBA, 2014, pp. 23-24).

It could be argued that the reaction by policy makers and regulators to the LIBOR scandal poses a question of our analysis above. It has namely sought to make the LIBOR fixing ‘official’. This, however, only goes to *confirm* our logic. While separation from the underlying market is essential to allow *as if* trading, the underlying must still be regarded as trustworthy by the users. As MacKenzie (2007) claims, the benchmark must retain an element of *facticity*. Because the only payments are between the derivative counterparties and are based upon the movements in the underlying benchmark, it needs to appear objective to both parties, e.g. it cannot be one over which one party can exert control.¹¹ As long as the use was largely constrained to banks in the interbank interest rate swap market the informal rules of the previous LIBOR arrangements were sufficient. The circle of trust between the relatively few (LIBOR) banks could support such informal arrangements. However, once the use became more widespread these informal rules were insufficient. The global financial crisis came to act as a trigger to reveal the LIBOR scandal, and how the rules had come to lag behind the widespread use of the benchmark.

Making the rules formal and seemingly separate from banks will further establish the ‘thing’ like character of the LIBOR as a price, and encourage its further use. While this is conveyed by regulators and policy makers as making the market ‘safer’, it in no way challenges the use of LIBOR-derivatives or of the LIBOR itself. It will only encourage it. An alternative policy exists than reinforcing the LIBOR’s facticity, LIBOR derivatives markets, and the spread of the LIBOR

¹¹ Lynch (2011) describes derivatives as aleatory contracts. An aleatory contract is a ‘contract in which one party’s duty of performance depends on some uncertain event, e.g. a wagering contract, a contract of insurance’ (Richards & Curzon, 2011) or more simply as ‘a wagering contract’ (Osborn & Woodley, 2005). Lynch stresses that in derivatives and in aleatory contracts, duty of performance depends on an uncertain event external to the counterparts and not on their performance.

throughout the economy. Analysis has shown that markets and benchmarks are made, in this case by banks seeking profits in the circumstances transmitted from the past (and often made by themselves). If they have been made, then they can also be un-made.

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