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THE FOREX PROBE:
AN ANTITRUST PERSPECTIVE ON THE FINANCIAL SCANDAL

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Summary

Introduction

"The Forex Probe" (or "Forex Scandal"), is a financial scandal that took place between 2006 and 2013, in which a number of Forex traders from financial giants such as Barclays, Citigroup, JP Morgan, RBS and others, cooperated in order to manipulate the market and a number of exchange rates for their personal interests. When in 2013 the scandal was uncovered through an article on Bloomberg, investigations from antitrust authorities began at once, and led to fines for more than $10 billion on the whole to the banks being investigated.

The following work deals with said financial scandal, and aims at providing an antitrust perspective on the case. In order to do so, the dissertation will be organised as follows. The first chapter will present the Forex market structure, dynamics and features, along with a most relevant model, as to explain how trading in the Forex market works. The second chapter will then make use of the features presented in the first one, as well as concepts from competition theory, in order to explain, under an antitrust perspective, how the manipulation was executed and why the traders implemented and executed such manipulation. Ultimately, the final chapter presents the Antitrust Regulations in place in the U.S., U.K., Europe, and Switzerland, and consequently analyses the efficiency of the aforementioned fines issued to the banks.

This work aims at looking at the Forex scandal from an antitrust perspective, and at proving that Antitrust Regulation, although the fines were not completely efficient, is rather effective in the countries in question, and provides a strong competition statutory framework.

1. The Forex market

The Foreign Exchange (or Forex) market, is a decentralised, over-the-counter (OTC) market, where agents buy or sell currency in pairs. It is the largest financial market in the world by volume, with an average daily turnover of over $6,5 trillion[1].

Although very liquid, and hence hardly manipulable, over the period extending approximately from January 2006 to December 2013, the Forex has been the scene of a rigging scandal perpetrated by a number of traders from top banks all over the world, who colluded in order to rig and manipulate the exchange rate for their own personal profits at the expense of customers.

Said scheme was possible because of some peculiar structural and institutional features of the Forex that, for the purposes of this dissertation, will be presented here, along with a most relevant model that provides vital micro economic variables that allow us to grasp some key concepts of exchange rate determination, and thus, possible manipulation.

I. The contemporary Forex market: a brief excursus on its history and studies

The contemporary Forex market is recent, as it was born after the dollar convertibility to gold (after a series of deficits in the US balance of payments) was abolished in 1971, de facto ending the Bretton-Woods monetary system, and the pegged exchange rates regime in which all the countries that subscribed to the accords partook.

The abolishment of the dollar convertibility to gold obviously resulted in new economic issues to tackle, for monetary and economic authorities - in that they then had, after almost thirty years of fixed exchange rates[2], highly volatile, floating rates to consider - and for economists, that were then faced with a completely changed macroeconomic and monetary landscape. As a result, many studies were conducted on the structure of the Forex market, and many models were developed as early as the first half of the 1970s, all of which presented a macroeconomic perspective.

The models from the time are commonly known as asset-price (or monetary) approach models[3], macroeconomic equilibrium models, where equilibrium is determined by macroeconomic fundamentals such as the interest rate differential, the inflation differential, the spot forward differential, the price level, and other monetary conditions[4]. Although two different views can be found within the monetary approach, and other doctrinal aspects sub-currents, all the equations for exchange rate determination provided by said models are

[1] (Triennial Central Bank Survey of Foreign Exchange and Over-the-counter Derivatives Markets, BIS, 2019).

[2] The national currencies involved in the Bretton-Woods accords did not need to be perfectly aligned to the standard, but were allowed to fluctuate in a 1% boundary. However, such a convention made all exchange rate considerations negligible in terms of policy.

[3] Another popular, even though less relevant, approach of the time, was the portfolio balance one.

[4] Outstanding contributions to the literature were provided by John Bilson, Jacob Frenkel, Rudiger Dornbusch, Jeffrey Frankel, Peter Hooper and John Morton. For a complete survey on the subject, see papers by Bilson, Frenkel (1976), Dornbusch (1976 a, b, c), Frankel (1979), Hooper and Morton (1982).

linear functions of the aforementioned variables, even though in some cases, some additional determinants can be found.

The recurrence of said determinants in all of the literature's models derives from the fact that the basic theoretical framework of the approach comes from two very popular classic macroeconomic theories, the Purchasing Power Parity (PPP) theory, and the Interest Rate Parity (IRP) doctrine, which, alongside the Efficient Market Hypothesis (EMH), create a perfectly coherent and consistent structure, although very rigid. It is indeed this rigidity one of the causes of the poor performance that this class of models showed in forecasting the rate of exchange, as all of the above theories are based on, and imply, numerous equilibrium, efficiency and rationality conditions, all picturing a stochastic environment that does not resemble at all the reality of the foreign exchange market.

Another -and, perhaps, the most important- limit of these models, is the absolute neglection of micro structure variables. Micro structure variables are important not only because of their compatibility with high-frequency movements in the market (which are fundamental in such a liquid and active market), but also because said variables are responsible for most movements in the price of currencies in the short-term, and convey information as well.

Exactly for this reason, starting from the late 1980s, another literature originated and started to grow, based on a diametrically opposite approach to the former: the micro-structure literature. It is a micro-financial approach to the study not only of the exchange rate, but of the forex market itself, its features, and the interactions between agents. The most important founding of this literature is the role of a micro-structure variable called order-flow. Order-flow is a measure of net-buying pressure, and is important for the two aforementioned reasons: it influences the price, and it conveys information to the broader, uninformed public.

The most relevant model of the literature is the Evans-Lyons model, a stylised interaction model for the determination of the exchange rate. It is this model that will be analysed in this work, as it provides useful intuitions about the economic foundations behind the actions of the forex cartel, and the stylisation of the interaction between players can be a useful starting point for a comparison and more detailed description of the reality of the workings of the Forex market.

II. The Evans-Lyons model

The model was presented in a 2002 paper on the Journal of Political Economy[5], and was a sequential equilibrium model[6], whose protagonist was the variable of order-flow, denoted by x. Order-flow, as said above, is a measure of net buying pressure, and is defined as the sum of buyer-initiated orders net of seller-initiated orders. The economic intuition behind order flow is a quite simple one of demand and supply: as net

[5] Evans, Martin DD, and Lyons, Richard K. "Order flow and exchange rate dynamics." *Journal of political economy* 110.1 (2002): 170-180.

[6] With borrowed features from the sequential equilibrium model by Kyle (1985).

buying pressure rises (demand exceeds supply), the price[7] rises as well. Regarding the other feature of order flow, it can convey two types of information: information regarding the stream of future cash flow, which in the forex market takes the form of future interest differential, and information about market clearing rates. The model is based on the latter.

The model presents a number of structural features that will be further analysed in the following paragraphs, in terms of time, players, interactions and returns.

In the model we have *T* trading periods, which are days, whose end coincides with the 4 p.m. Reuters fix, and all of which are divided into three trading rounds in which different agents interact.

The players are of only two kinds: dealers and non-dealers (i.e., the public). There are *N* dealers, indexed by i, which act as market makers, and are the true protagonist of interaction, as they lead all rounds by providing the quotes for foreign exchange. The public instead consists in a continuum of players $\in [0,1]$, which, in a convergence sense, is large with respect to the number of dealers. They are much more passive agents in the model, especially during the third round of trading, as we will see further in this section.

The last aspect to consider, being this model a financial one, is the expected return of assets. In the model there are only two assets, one risk-less, with gross return equal to one, and one risky, which is the foreign exchange, whose return is *R*, composed by a series of increments representing the flow of macroeconomic news:

$$R = \sum_{t=1}^{T+1} \Delta r_t, \qquad (1)$$

Where all of the Δr_t are independently and identically distributed over $(0, \sigma_r^2)$.

The idea behind the model is quite simple: at the beginning of each trading day, the increments in macroeconomic innovation are observable, and there are uncertain foreign exchange public demands[8].

At the beginning of round one, through the observation of the increments, dealers independently and simultaneously quote a scalar price, P_{it}^1[9] , at which customers realise said demands[10].

Each dealer thus receives a customer order realisation, C_{it}^1, normally distributed on $(0, \sigma_c^2)$. When negative, C_{it}^1 represents customer selling. All customer order realisations are uncorrelated across dealers, uncorrelated with the payoff increments, and not available for public observation. These orders are referred to as portfolio shifts of the non-dealer public.

In round two, once again, each dealer simultaneously and independently quotes a scalar price in order to trade with other dealers.

The net interdealer trade executed during the second round for each dealer is denoted by T_{it}. Hence, at the end of the second round of trading, all agents, including the public, are able to observe the resulting interdealer order flow from that period:

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[7] i.e., the exchange rate. Along the whole paper the exchange rate will be referred to as price, as in price of the currency.

[8] These demands affect the price because, since the market is less than perfectly elastic, in order to absorb them, a price concession is needed.

[9] The price quoted by each dealer within any given round, in order for no arbitrage conditions to hold, must be a common price. See Lyons, Richard K. "A simultaneous trade model of the foreign exchange hot potato." *Journal of international Economics* 42.3-4 (1997): 275-298, Propositions 1 and 2.

[10] Here Evans and Lyons assume no bid-ask spread, considering such an assumption useful in that it avoids distractions from the conceptual workings of the model, even if very unrealistic.

$\Delta x_t = \sum_{i=1}^{N} T_{it}$. (2)

Once the second round is over, there remains the last part of the trading day, in which dealers, after creating inventory imbalances through their trading activities, quote another price, P_{it}^3, in order to make the public absorb them. In other words, they need to quote a price that will make the public willing to absorb their overnight risk.

The public demand in round three will be equal to:

$C_t^3 = \gamma(E[P_{t+1}^3|\Omega_3|] - P_t^3)$, (3)

Where γ captures the public's aggregate risk-bearing capacity, and Ω_3 represents all the available information. Finally, since the price quoted within any given round is common, and the price quoted during the third round must be so that $C_t^1 + C_t^3 = 0$, as the public must be willing to reabsorb dealers' imbalances, we can derive the price change that will happen at the end of each trading day:

$\Delta P_t = \Delta r_t + \lambda \Delta x_t$[11], (4)

Where λ is a positive constant that depends on γ, σ_r^2 and σ_c^2.

Hence, as the above formula states, the daily currency price changes depend positively on a vector of macroeconomic fundamentals[12], and on the order flow.

The model, as previously stated, is quite realistic, even though the stylisation of interactions brings some inconsistencies, especially when looking at the third round of trading, where, fairly unrealistically, customers willingly absorb the dealers' overnight imbalances.

However, the model performed way better in forecasting the exchange rate with respect to its monetary colleagues.

The true and biggest limit of the model is its practical relevance. It was argued, reasonably, that, although it is true that the price-information mechanism works in a close way to the reality dynamics, since order flow is only observable almost at the end of the trading day, it has no use during trading, as the public is clueless as to what order flow could be, and the customer order flow, C_t^1, observed by dealers is normally distributed over $(0, \sigma_c^2)$.

Anyway, the notion of order flow is of great use to us, in that it gives us an idea of how players could influence the price simply by increasing the net buying pressure, as we will see in the following chapters.

III. The forex market institutional features and interactions.

Although an interaction model for exchange rate determination is certainly useful, to some extent, when trying to assess the mechanics and dimensions of a scheme such as the one of the Forex scandal, only a

[11] For estimation purposes, Δr_t is assumed to be equal to the nominal interest rate differential as it is readily available every day and it is the main engine of exchange rate variation (even though the exchange rate could be correlated with other macroeconomic fundamentals), and P_t is substituted with its log rate, so that the model can be compared with standard monetary models.

[12] And indeed, this model (and most micro-structure ones in general) is consistent with, although not based on, the asset-price approach models.

true knowledge of the heterogeneities in information, differences in reaction speeds and diverse market conditions for different players, as well as an understanding of micro characteristics and workings of the market, can make the dynamics of said scheme fully appreciable.

Moreover, a simple snapshot of the market at the end of the relevant period would only be partially meaningful, especially since the period not only was long, extending from 2006 to 2013, but characterised by several radical changes in financial activity, from the financial crisis of 2008/2009, to the e-revolution in finance that started to happen since the beginning of the 2000s and boomed over the period.

Hence, in the following paragraphs, a characterisation of the basic features, players, interactions, and investment styles, will be provided in a dynamic fashion, in order to understand the evolution of the market over the period.

a. Basic Features

As said above, the Forex market is a poorly regulated[13], decentralised one, where players do not usually physically meet, carrying out transactions prevalently via electronic media. This implies to main facts: fragmentation, meaning that transactions can take place at the same time at different prices, and opacity, meaning that the price-information interaction process is difficult to observe.

Another difficulty in the Forex coming from said facts, is the collection of data[14]. The most important operation of data collection is conducted by the Bank for International Settlements (BIS), that then publishes its Triennial Central Bank Survey of Foreign Exchange and Over-the-Counter (OTC) Derivatives Markets (in short, "the Triennial"). The Triennial is the most comprehensive effort in the world for Forex data collection, analysis and provision.

Another important feature of the Forex is its geographical concentration. Indeed, although decentralised, the largest part of Forex turnover is concentrated in a few strategic locations. The undisputed capital of Forex trading is London, where more than one third (and increasing since 2004) of overall trading is executed. This is because of the strategic geographical location of the city, where the trading hours in the morning overlap with the ones of Asian countries and Australia, and its afternoon sessions with the New York ones. Moreover, London has historically been the greatest centre for foreign exchange activity. The close follower is New York, that accounts for almost 20% of global trading. The remaining turnover volume is spread across other important centres such as Tokyo, Hong Kong, Singapore, Auckland, Sydney, Frankfurt and San Francisco.

For what concerns the geographical concentration of the Forex market, no significant changes have happened over the period concerned, as well as after said period, and the same can be said about market fragmentation. However, the rise of electronic and retail trading platforms, as well as the increase in prime brokerage relations,

[13] In the US, there was not a single government agency tasked to supervise the Forex market.

[14] "Due to the decentralised structure of the FX market, where deals take place over the counter (OTC) and where liquidity is fragmented across different venues, the market is rather opaque and quantitative information on market activity quite sparse". (Rime, Dagfinn, and Andreas Schrimpf. "The anatomy of the global FX market through the lens of the 2013 Triennial Survey." *BIS Quarterly Review, December* (2013)).

has slowly, but steadily, made the market less opaque. This does not mean that transparency has become the norm for the vast majority of the market, and only some developing corners of it are still opaque as suggested in King, Osler and Rime (2011). Indeed, at the same time they were writing their paper, the collusive scheme was being perpetrated and has continued to be perpetrated up to the moment in which, finally, traders sounded the alarm. However, it has become less opaque in the sense that it has become more accessible to non-dealer agents and to retail customers, and the once almost "independent", dominant inter-dealer market, has faded into the mix[15].

b. Players in the Forex market

As in the Evans-Lyons model, two broad categories can be distinguished among market participants: dealers and customers. What the Evans-Lyons model omits are the distinct sub-categories of which these two main classes are composed of. In what follows, a specific characterisation of dealers and customers will be made.

Dealers are the more active (in a trading motive sense) counterpart of the Forex market, as, differently from customers[16], they have a profit drive behind their trades. They are the most conspicuous group of agents in the market, although this dominance has been challenged by a number of customer categories since the birth of electronic trading. Indeed, the share of market liquidity provided by dealers has been decreasing from the late 1990s, from 63% in 1998, to 59% in 2004, down to 39% in 2013. However, part of this trend can be attributed to the increasing market concentration in the industry, that allowed dealers to match more customer trades on their own books and net trades internally, and thus decreased their need to offload inventory imbalances on the interdealer market.

The main types of dealers that can be found in the Forex market are market-makers, leverage traders, designated proprietary (or "prop") traders, and senior risk-takers.

Market-makers are those dealers that perform the traditional function of facilitating access to the inter-dealer market liquidity to customers and to execute their orders. However, if this was a significant reality at the beginning of the relevant period, with the steady increase of prime brokerage[17] and the aforementioned electronic trading, this role has lost much of its previous price-discovery value. Another change that started to happened to the category since the early 2000s is that these players stopped dealing in a range of exchange rates, that were substituted by a book exchange rate, and, also, that they started to focus on just one side of the market[18], meaning that they did not try anymore to make excessive profits, but simply facilitate market access.

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[15] However, in 2013, inter-dealer trading accounted for 39% of total turnover, far less than the 63% peak of the late 1990s, still decreasing from the 59% of 2004, but yet, a significant amount.

[16] Although this is true only for the beginning of the examined period.

[17] "Through a prime brokerage relationship with a dealer, non-dealer financials gain access to institutional platforms (such as Reuters Matching, EBS or other electronic communications networks (ECNs)) and can trade anonymously with dealers and other counterparties in the prime broker's name." Rime, Dagfinn, and Andreas Schrimpf. "The anatomy of the global FX market through the lens of the 2013 Triennial Survey." *BIS Quarterly Review, December* (2013).

[18] See Danielsson and Payne (2002).

Leverage (or spot) traders are agents that deal with very short time horizons, with asset holding periods going from minutes to a few days at most. The short-run character of their trades is a significant source of volatility in the exchange rate, and they mostly trade on the basis of order flow executed by banks.

Prop traders (also known as intra-day, or Nintendo, traders) are often erroneously mistaken for leverage traders, pictured as holders of very short-term positions, sometimes as short as those by high-frequency traders. However, in reality, they are often discouraged by senior management from trading too actively, and encouraged instead to hold longer-term positions, typically spanning from days to at most three months.

Senior risk-takers are an additional group of traders, previously often neglected by studies[19] as they are only present at large investment banks, and perform tasks very similar to the ones of prop traders, the only difference being their allocated budget, much higher.

A by-product of some of the aforementioned industry trends, such as the electronic evolution of the market, industry consolidation, and the rise of prime brokerage, is that the once defined borders between these roles have progressively become more blurred, as there is no more a clear distinct inter-dealer-only market.

Another key industry trend that began to grow after the 1998 Long-Term Capital Management Crisis was the sharp decline in risk-appetite by dealers, as they typically wear their losses[20], further incentivising them to try and make the most profit at the lowest possible risk. Moreover, risk-management procedures, after the aforementioned crisis, were brought to a more rigorous standard, meaning stricter controls over the traders' positions, yet no supervision over the transactions, still carried out via phone or electronic media, creating another incentive to try and cheat the system.

Customers are players that interact with dealers[21] in order to access the interdealer market liquidity. This could be an appropriate definition for the first years of the period in question, however, as shown by the 2013 Triennial data, non-dealer transactions increased by 48% from the previous Triennial, with an average daily turnover that rose from $1,9 trillion up to $2,8trillion from 2010 to 2013. This is because, always thanks to the aforementioned industry trends, customers have become much more participative in the market. Indeed, the 2013 Triennial, highlighted that roughly one quarter of Forex volume was provided by lower-tier (or non-reporting) banks[22]. These small banks did not participate in market-making activity, but primarily concentrated in niche business and traded with local clients, since they were clearly unable to provide competitive quotes.

The most important fact about these banks' activities, was that their trading motive was not to simply hedge their positions, and their participation was not passive[23].

At the beginning of the relevant period, this could not be said, as most customer players -which include institutional investors (mutual funds, pension funds and insurance companies), hedge funds, high-frequency

[19] See Sager and Taylor (2006).

[20] i.e., they take responsibility for their eventual losses, that are then deducted off their available budget for the following month. At the same time, were they to make profits, the latter would not be added in full to the following month budget.

[21] i.e., market makers.

[22] These banks traded extensively short-term Forex swaps, commonly used for short-term liquidity management, however, their participation was more active thanks to the aforementioned trends in prime brokerage activities and e-platform trading.

[23] See [22]

trading companies, official sector financial institutions (e.g., central banks) and high net-worth individuals- had a passive approach at Forex trading.

Customers fall under two pairs of categories: passive or active, and informed or uninformed.

Passive customers are players whose Forex exposure comes from the sale or purchase of underlying assets around a strategic portfolio benchmark or from the accrual of international revenues and costs. They deal with such exposure in two manners: either they implement hedges to get the exposure back to a strategic benchmark[24], or they completely neglect and ignore said exposure, believing that in the long-run the average exposure will be equal to zero[25].

Active customers instead, are non-dealers that include foreign exchange exposure into their portfolios as active currency programmes, within which currency managers are tasked by investors to add value to their portfolios by implementing strategic hedges.

Regarding the other classification, informed versus uninformed customers, the category under which each player falls depends on their ability to interpret and behave consistently with macroeconomic information that will influence the exchange rate.

c. Investment Styles

Within these customer categories, heterogeneous investment styles can be found. Among players, we can find technical (or "black box") managers, hedge funds, and risk control currency managers.

Purely technical managers trade within a set of predetermined rules, completely neglecting the role of macroeconomic news. For them, macroeconomic innovations only influence the price indirectly, as a historic price impact. Even though such a strategy is in complete contrast with the EMH, it has proven its effectiveness in the returns it has generated, further proving the non-efficiency of the Forex.

Hedge funds instead, prevalently initiate order flow on the basis of publicly available information, and are indeed amongst the quickest agents to respond to innovations in macroeconomic information. Yet, they combine their macroeconomic analysis with trading rules similar to those of technical managers. The returns coming from their analysis, as it is at least partially qualitative, will depend on the effectiveness of their interpretation.

Finally, risk control currency managers simply make use of option replication strategies inside customers' portfolio in order to minimise the downside risk for exchange rate exposure.

[24] However, such strategic benchmark often neglects considerations about the exchange rate at which they are executed.

[25] This strategy was clearly proven wrong by empirical experience, and for the customers that apply it, it can mean a great embarrassment risk. Were the market to behave differently than expected under this strategy, the players in question would lose conspicuous amounts of money.

d. Interactions, dynamics and the Evans-Lyons model

Now that the specifics of the market and its agents have been presented, along with a model that describes interactions and exchange rate determination, a comprehensive summary can give us an organic view over all of the features analysed.

The Forex is a decentralised and poorly regulated market, in which dealer and non-dealer agents interact. The market is hardly manipulable because of its size, but the shadiness of transactions makes coordination between dealers possible. A number of structural trends within the inter-dealer market have further incentivised dealers to take less trading risks[26].

Within dealers we find market-makers, that are agents that directly interact with customers and execute their orders, and other kinds of dealers which are more active in the inter-dealer market. However, some evolutions in the Forex have made the distinctions between these roles meaningless, as the distinctions between roles are not as precise anymore. Thus, dealers do not trade, as presented in the Evans-Lyons model, all in the same manner.

Customers on the other hand interact with dealers for a number of different purposes, and carry out their strategies based on different theories and rules, and over different time horizons. The reasons why these players enter the market are of the most various kinds, but it is fairly safe to say that not all of them see foreign exchange as a profitable asset. Indeed, only a few of them regard the foreign exchange as such, yet, they have progressively become more active, in the sense presented above.

At the beginning of the period in question the market was "dealer-centric"[27], but the aforementioned trends have questioned this supremacy, although the power of dealers was undoubtedly great throughout all the relevant period. Still, in the case in which they were to continue to perpetrate their scheme, they would have probably had far less influence on the price. Said influence could be exercised through order flow.

The trading activity in the Forex never stops, nor does it proceed in rounds as in the Evans-Lyons model: the trading between customers and inter-dealer trades is continuous throughout the day[28].

This is how the Forex market works, and how players inside it interact. Now that all of this has been reviewed, the exact way in which the manipulation was executed shall be presented.

[26] Without, of course, a decrease in the will to make profits.

[27] The expression can be found in: Rime, Dagfinn, and Andreas Schrimpf. "The anatomy of the global FX market through the lens of the 2013 Triennial Survey." *BIS Quarterly Review, December* (2013).

[28] It is true, though, that, for practical reasons, many customers ask that their orders be executed at the 4 p.m. Reuters fix.

2. How and why traders rigged the market

I. Forex investigations

When on 11th of June 2013 a Bloomberg article exposed the Forex cartel, knowledge of attempts to manipulate the market was not new business. Indeed, the insiders' authorities[29] already knew about the plot, and discussed the matter repeatedly since 2006, without ever taking actions against it.

Indeed, it was this article that triggered the investigations by government authorities that led to fines for more than $10 billion on the whole to a number of financial giants, including JP Morgan, Barclays, Citigroup, the Royal Bank of Scotland and HSBC.

The charges read that the parties, a number of traders that were employed at said banks, engaged in a conspiracy "to fix, maintain, increase or decrease the price of, and rig bids and offers for, the EUR/USD[30] currency pair exchanged in the FX Spot Market, by agreeing to eliminate competition in the purchase and sale of the EUR/USD currency pair"[31].

Given the international nature of the scheme[32], the authorities involved were the Commodities Futures Trading Commission, the New York State Department of Financial Services, the Department of Justice, the US Federal Reserve, the Financial Conduct Authority, the FINMA, and the OCC. Afterwards, the European Commission as well began conducting (late) investigations that led to additional fines in 2019. These investigations were conducted on two other cartels, named, just like the others, after the chatrooms upon which traders exchanged information: the names were "Three Way Banana Split" and "Essex Express". However, the matters, the banks, and the period investigated were the same as the ones of the other cartels, and the case can thus be considered the same.

The investigations did not only lead to the aforementioned enormous fines, but also to the prosecution of individuals. Indeed, on December 2014, Paul Nash, former RBS trader, was the first individual to be arrested. He will be followed by former Barclays trader Jason Katz who will be the first individual to admit criminal wrongdoing. Last, but not least, the former London-based traders Rohan Ramchandani, Richard Usher and Chris Ashton, were indicted by the U.S. DoJ as members of "The Cartel" chatrooms. However, they will be found not guilty of the actions for which they were being prosecuted.

The investigations focused mainly on a number of private chatrooms (one for each currency pair) with names such as "The Cartel" or "The Mafia", that the traders made use of in order to communicate and share clients' private information and consequently coordinate their positions. The findings of said investigations on the

[29] E.g., the meetings of the Bank of England's FX Joint Standing Committee's chief dealers sub-group (or simply chief dealers' meetings). Exactly for the above reason, some of the highest officials of this Committee, such as Martin Mallett, were suspended from their jobs.

[30] The parties did not engage only in the manipulation of this currency pair, but the greatest deal of said manipulations were certainly operated on the EUR/USD change.

[31] Case information, U.S. Department of Justice "U.S v. Citicorp". The same information can be found in the cases against the other conspiration parties.

[32] Most banks and traders involved were British, yet, only the nature of the Forex market per se made the rig an international matter, as currencies from different countries are exchanged.

aforementioned private chatroom unveiled the mechanisms of the collusive scheme, on which light will be shed in the following sections. First, a purely economic view will be provided, so that the features analysed in the previous chapter can be combined together and seen from a "malicious" perspective in order to fully appreciate how the manipulation worked under an economic point of view, then the actual dynamics, strategies and exchanges between traders will be explained.

II. The "How's"

We have seen that the Forex market is rather peculiar, with features that incentivise and allow market manipulations. Hence, for a more detailed inquiry in how effectively traders rigged the market, some of the aforementioned elements will be combined as to explain the techniques that the criminal traders employed. The features that made the collusive operation possible, the "how's", are the price influence, the fixes, and market opacity, and will be combined in the following sub-sections.
The "why's", the incentive structure that led to the Forex scandal, will be presented in the next section.

a. Order flow, the fix, and market power

We have seen that net buying pressure (i.e., order flow) raises the price of the currency. Thus, were a different price beneficial to someone, through buying (or selling, i.e., negative order flow) pressure, said individual could steer the price in their wanted direction. Thus, by trading disproportionately, and in the case that said disproportionate trades were large enough, one could cause a price concession favourable to their position. Simply put, if a sufficiently large agent in the Forex market were to trade disproportionately, he could influence the price as much as to make a personal profit. However, we have seen that, given the characteristics of order flow, no single agent would be large enough. The distribution of customer order flow and its privacy, would make it impossible for a single trader to sufficiently influence the market. However, coordination made traders, that could then be considered as one, large enough.
Now, another feature that we have seen, is that a significant infrastructural trend that has happened in the Forex market in recent years is industry consolidation, meaning that the number of firms that accounted for the majority of transaction volume has been decreasing over time. Indeed, already in 2002, the number of banks that accounted for 75% of daily turnover in London and New York were 17 and 13 respectively, to be compared with the 24 and 20 that made up that 75% in said locations in 1998. This also means that the banks that still accounted for the majority of transactions, then had much more influence over the price, as they contributed in relative terms to a much bigger share of turnover. Moreover, since the institutions were not many, and they all were of significant size, they already had some market power, that, however, once again, was not enough to move the rate as much as was needed. Still, they could exert an influence over the price.

The last element to consider in this perspective is Forex fixings. As Forex trading is continuous, the price of a currency pair is constantly changing, creating problems in the evaluation of market and portfolios' performances. Thus, the fixings are a service supplied by some institutions that were introduced to provide a snapshot of the market that makes possible said evaluations. The most famous and most used one is the WM/Reuters fix, that occurs at 4 p.m. GMT. The fix is calculated over a five minutes window, starting two and a half minutes before 4 p.m., and closing two and a half minutes after then. Over these five minutes, orders and executed trades[33] at valid rates are captured, and an average is computed. That average will be the quote valid for those five minutes. This entails that, if someone were to trade disproportionately over those five minutes, a profit opportunity would arise: if, for instance, a trader should buy a large amount of a currency, the price of that currency would rise over the fixing window. However, they would have purchased the currency at the average price over the window (i.e., the fix), meaning that the price differential between the purchases would have grant them a profit.

Let us make an example: let's suppose that the traders wanted to move the exchange rate up, and used the front-running technique[34]. We further suppose that the traders had enough buy orders to move the market up by 5% by executing their own trades, and then execute customers' ones. If the traders executed together their buy orders (of course, all in the same direction) starting from 15h 57m 30s, and stopped executing them at 16h 2m 30s, at that time the market would have moved up to a 5% higher exchange rate. At the same time, traders would have purchased all their aforementioned orders at the average rate over those five minutes. Supposing that the exchange rate increased in a linear fashion, the average price over those five minutes would be 2,5% higher than the price at 15h 57m 30s, but 2,5% lower than the price at 16h 2m 30s. Therefore, denoting by P the price at 15h 57m 30s, the traders executed their own orders at (1+0,025)P, and could execute the customers' orders at (1+0,05)P. In this way, they could sell the currency to clients at a higher price than theirs, so that on the whole they would have made a profit, or even sell their own currency to customers at a higher price (without taking into account the usual mark-up that traders set on their clients' orders).

Now that all the elements have been analysed with a "malicious" perspective, it is immediate to see how traders rigged the market: given their great potential influence over the price[35], even stronger because of market concentration, they decided to join forces and to coordinate and exploit the fix as to move the market to their will, so that said movements would benefit their personal positions and make them a profit.

Now, what remains to be explained is the material means through which said coordination was implemented, and the answer can be found in the opaqueness feature of the Forex.

[33] Since transactions are executed at the millisecond, not all transactions are captured, but only a sample of them.
[34] See next paragraph.
[35] It is appropriate to stress again that the banks were giants, including the most famous JP Morgan, Citigroup, Barclays and so on.

b. Market Opacity and manipulation techniques

Now, as we have seen the economic mechanisms of the scheme, we shall discuss the material means and the various techniques through which the traders executed it.

We have seen that the Forex is decentralised, and thus transactions take place over electronic media, and they can sometimes be carried out at different prices at the same time. The latter feature once again creates an incentive, as, since transactions are not performed at common prices across the market, it is harder to see if some transactions may be suspicious or unfair. However, it is the former feature which is of great interest to us.

Indeed, this was the liability that effectively enabled traders to operate their scheme, as they would engage "in communications, …, including near daily conversations, some of which were in code, in an exclusive electronic chatroom, which chat room participants, as well as others in the FX Spot Market, referred to as "The Cartel" or "The Mafia""[36]. Said communications were carried out as to coordinate the traders' actions and positions by sharing private client information, in order to manipulate benchmark rates to their favour.

There were more than just two chatrooms on which the scheme was being operated, with names such as "the players", "the three musketeers", "The Bandits' Club" and the aforementioned "The Cartel" and "The Mafia", each of which referred to a different currency pair. The traders would keep all the chatrooms opened around the fix time so as to coordinate their positions, and would write their messages in lingo, and with intentionally poor grammar, as to avoid systematic controls. For example, the following is a conversation between a senior JP Morgan trader and members of the EUR/USD chatroom, in which the JP Morgan trader had net buy orders of €105 million, and wanted the fix rate to go up. He first offers to transfer the order to "Firm A":

Firm A: "maybe", then adds that it is buying €150 million at the fix "for a top (account)", then proposes "i'd prefer we join forces"

JP Morgan trader: "perfick… lets do this… lets double team em"

Firm A: "YESssssss"

JP Morgan: "I got the bookies[37] covered".[38]

By the fix, JP Morgan had amassed orders for €278 million and Firm A for €240 million. JP Morgan bought €57 million two minutes before the fix, and then, during the fix, it bought €134 million while Firm A bought €125 million, accounting on the whole for 41% of the volume in the EUR/USD currency pair. The huge purchases by JP Morgan and Firm A drove the price up, and, given that JP Morgan "covered the bookies" as well, and thus eliminated the competition that could trade in an adverse direction, the price movement was inevitable. The two traders could then execute the buy orders from clients at a higher exchange rate with respect to theirs, de facto making a profit.

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[36] See [4].

[37] i.e., the traders in the interdealer market.

[38] The conversation can be found in: Zhang, Audrey. "Forex Scandal: The Ethics of Exchange Rate Manipulation" (December 8, 2015).

The above case is a classic example of the "Front-running" (or "trading ahead") technique, which consists in executing personal orders before clients' ones, in order to perform the former at a lower price, thus creating a profit through the price differential between the personal orders and the clients' ones. As already mentioned, front-running was not an unlawful practice per se, rather than an unethical one, as regulation did not enter the merits. However, of course, given the sharing of knowledge between agents, front-running became unlawful as well.

Of course, traders did not only employ the aforementioned technique, since the technique to be adopted clearly depended on the traders' positions and their intentions as to what to do with the exchange rate. There were a number of techniques through which the traders influenced the price, among which we find "netting off", "building ammo", "banging the close", "painting the screen" and the aforementioned "front-running".

"Netting off" is a "risk-management" technique, in which, if a trader were to have a net position in an adverse direction with respect to the position of the cartel as a whole, he would try and sell their position in order to realign with the overall position of the group. In this way, the trader would not be hurt, as the other traders' position would not cause an adverse effect relative to his position.

The "Building ammo" technique instead, consists in building up a huge position in a currency just to exit it right before or during the fix. As we have seen, such pressure release would cause a price concession favourable to other players in the case they knew in advance about the strategy, and of the consequent price movement.

Another strategy that the traders employed is the so-called "Banging the close". This strategy is based upon the fact that the fix is not calculated on the basis of trade volume, but rather on the number of transactions executed. This implies that the more the transactions, the higher the price change. Hence, the traders would break up large orders into smaller ones so that the fix could move even more favourably to their advantage.

Finally, "Painting the screen" refers to the practice that cartel traders adopted of placing fake orders to one another, in order to create the illusion of trading activity before the fix. Obviously, said orders were never executed.

c. Final Remarks

To sum up, the traders made use of private electronic chatrooms in order to coordinate their market strategies via a number of different techniques, that, although some were not illegal per se, constituted a grave financial and economic crime.

The coordination, along with market concentration, made their influence over the price much greater than it would have been if they did not collude, enabling them to influence the market and thus make personal profits. The above facts were then ultimately sublimed with the exploitation of the Reuters 4 p.m. fix.

III. The "Why's": Incentive Structure

The dissertation has so far highlighted the features of the Forex market, and has briefly mentioned how some of them could have been incentivising for traders to establish a collusive scheme. As some features were analysed in a different perspective in the above sections in order to explain how the scheme was executed, the following sub-sections will do the same in order to understand why the traders rigged the market. A number of market characteristics that make collusion stronger will be presented, as well as the industry trends that originated after the Long-Term Capital Management Crisis, the already well-known opaqueness, and regulation.

a. What makes collusion stronger?

Many elements can make a collusion agreement between firms[39] more sustainable and thus stronger. However, given that the Forex market substantially differs from any other market in the world, most of the "classic" features that make collusion more sustainable are meaningless in our context. This is mostly because of a key feature of collusion that could not exist at all in the Forex market: punishment for those that deviate from the collusion arrangements. Indeed, given the size of the market, given the characteristics of customer order flow[40], given the fact that prices are not public, that traders positions should be private, and that the market is opaque, there is no possible way in which, were a trader to defect, the other traders could punish him. Not only that, but there is no case in which a deviation from the collusive scheme could be profitable for the defector.

However, if said facts would make the Forex market "unfit" for the establishment of a "classic" collusive agreement, they could also make collusion stronger: given that the collusive profits were higher than those under a regularly competitive market, and there was not a more profitable deviation from the collusive scheme, traders were incentivised to participate and to keep participating in the cartel. Moreover, the fact that no punishment could be enforced, could have made it easier for a cartel participant who wanted to exit the scheme to do so (although it would have been unsensible from their point of view).

It is noteworthy to mention the fact that the collusion profits, and the traders' profits in general, could have not been large enough to justify an interest, and thus a participation, of the banks for which they worked. For instance, let us take the above conversation between the JP Morgan trader and the trader from Firm A. In that case, the traders accounted together for 41% of market turnover over the fix, and their portfolio shift was enormous. Yet, the profit earned by JP Morgan was "only" of $33.000, a substantial amount of money for sure, but definitely minute for a giant such as JP Morgan. Hence, the manipulation was executed only on the basis that said profits would then boost traders' bonuses.

[39] In our case, traders.
[40] See paragraph 1. *II.*

This is an important aspect to consider when looking at fines' efficiency and market potential and actual regulation.

b. Incentive Structure

What could justify, under a strictly economic point of view, the actions of the Forex Scandal traders? Although the answer from the market and customer perspective would clearly be nothing, the traders had a number of incentives that made collusion efficient from their point of view. The features of the Forex that incentivised traders to establish a collusive scheme, were the profits from collusion, the low risk-appetite after the Long-Term Capital Management Crisis, market opacity and regulation. However, as a discussion about regulation is rather relevant and conspicuous under such circumstances, Forex regulation will be analysed in the following sub-section.

Under a regularly functioning market, agents are faced with a prisoners' dilemma. Their best option is thus not to cooperate, even though this would mean that the outcome from their strategies is not efficient on the whole[41]. However, a solution to the prisoners' dilemma is the repetition of the game. In such a way, players could learn and coordinate, and reach a better, more profitable outcome. This coordination is, in real life, the formation of a cartel, and, since - although the outcome for these agents would be profitable - it would lead to an inefficient and uncompetitive market, it is forbidden by antitrust law.

Our case however, does not show a "classic" prisoners' dilemma, as players do not have a proper incentive to cheat the other agents involved. Yet, they had an incentive not to cooperate for ethical and regulatory reasons. As legislation and regulation is poor in the Forex market, and ethics apparently was not a strong enough incentive for traders, they cooperated because the profits from collusion were higher than the ones from competitive interactions, and the risk of being punished for their crime was rather low. Thus, it is evident that profits were a strong motive for the implementation of collusion, which is an important factor when getting to the next point.

Since the Long-Term Capital Management Crisis of 1998, traders had become much more risk-averse. Not only because of the fear of risk and potential graver consequences on the workplace, but also because, as we have seen, risk-management procedures had been improved to general high standards, so that traders were in fact unable to take excessive risks. However, since, in general, the riskier the investment, the higher the associated return to compensate said risk, and thus, the greater the profit, the impossibility and the lack of will to take higher risks, combined with the desire for great profits (as we have seen above), led traders to look for another way to make them, further incentivising them to establish collusion.

Finally, market opaqueness incentivised traders even more to reach the agreement, as, adding to the poor regulation, this feature of the Forex made it quite unlikely that their scheme could be uncovered.

[41] Of course, once again, from their perspective.

These were three out of the four elements that incentivised traders to form a cartel. The fourth and last one, regulation, will now be analysed in detail.

c. Forex regulation

For the vast majority of it, Forex trading is unregulated[42]. Indeed, when asked why it took so long to discover the manipulation that was occurring, the CEO of the Financial Conduct Authority[43] (FCA) answered that the market is not regulated, and thus the FCA did not have market reports to monitor. It was not surprising thus that nobody but insiders noticed that a manipulation was being carried out.

Although in recent years some foreign exchange instruments such as swaps, options, futures and derivatives were put under regulation, spot transactions were deliberately exempted from said regulatory efforts. This is because the lack of legislation was seen as a natural by-product of the Forex market dimensions and liquidity, rather than a gap to be filled.

However, as proved by the case which is being analysed in the foregoing dissertation, regulation could have been an effective "top-down" strategy to prevent such a financial disaster.

Given the international character of the Forex market, different relevant authorities and their respective regulations will be described below in order to understand the legislative context in which the Forex probe happened.

For what concerns the US, some attempts at regulations were made with the establishment by the U.S. Congress of the Commodities Futures Trading Commission (CFTC), a government body tasked with the supervision of futures transactions. Thus, some Forex instruments fell under the CFTC jurisdiction and were consequently regulated, yet, spot transactions were not included in said instruments. This is because, for starters, spot transactions do not belong to the futures category, but, most importantly, because they were deemed non-incentivising for manipulation attempts. However, all this became irrelevant when the Commodities Futures Modernization Act of 2000 stripped the CFTC of all its authority over OTC instruments, de facto deregulating the Forex market. It was the Dodd-Frank Act[44] that definitively brought most Forex instruments under the jurisdiction of the CFTC or of the Securities and Exchange Commission (SEC), stating that all swaps transactions had to be carried out in a central exchange supervised by the two aforementioned authorities. However, spot transactions were not considered to be consistent with swaps instruments.

Anyhow, the CFTC still had some authority in the manipulation area. In fact, the Commodities Exchange Act provides that any person who manipulates, or attempts to manipulate, the price of any commodity, is committing a felony. This was the ground upon which the charges against the aforementioned banks were

[42] Of course, this depends on several factors, such as the country that we are looking at, and the instruments considered, yet, the greatest part of the market is unregulated, especially for what concerns spot transactions.

[43] The FCA is the most important financial regulatory body in the UK, the same that indeed conducted the investigations on the FX probe.

[44] The famous regulatory act that was passed after the Financial Crisis of 2008 highlighted the frailness of the financial systems in order to restore stability and strengthen financial markets' procedures.

brought by the CFTC. Thus, although no financial law could be applied to the case, antitrust legislation came in to "save the day".

On the same grounds - although under a different act, the Sherman Act - were brought the charges by the U.S. DoJ.

Always because of the manipulative scheme, the U.S. monetary authorities, the Fed and the Treasury Department, issued their fines. Yet, in addition, the Fed issued a cease-and-desist order to the banks, and required them to improve their internal controls and audits. This was the first signal that, although no regulatory efforts were made, the Forex market would be more closely watched, and that it would be monitored more scrupulously, abandoning the benign neglection of market practices that authorities had adopted until that moment.

In the U.K. instead, the most relevant authority is the aforementioned FCA, which, since it operates under the Financial Services Act of 2012, other than being unable to punish traders under a financial point of view[45], could not even impose fines because of the market manipulation. Indeed, under the Financial Services Act, spot transactions are not considered as a qualifying investment, meaning that the FCA could not impose fines because no manipulation over the price of an investment asset was performed. However, the Financial Conduct Authority still issued fines for more than $2 billion because of the banks' unsound internal practices, and their failure to control said practices. It is noteworthy that not only were the fines not based upon the fact that the traders manipulated the market, but that spot transactions under the Act legislation are not even considered as investments, once again highlighting the complete lack of regulation in the area. However, the FCA, together with the Bank of England and Her Majesty's Treasury (i.e., the British State Treasury), started conducting research in order to provide recommendations as to how to reform Forex market policy.

The Swiss Financial Market Supervisory Authority (FINMA) is the Swiss financial market authority, where Forex regulation matters are some sort of a hybrid between the U.S. and the U.K. ones. Indeed, the fines issued by the FINMA were quite similar to the US ones in terms of volume (per bank), but similar to the U.K. ones in terms of the grounds upon which they were based.

On an international level instead, there are two authorities that provide and enforce regulation: the European Commission, and the Financial Stability Board. Concerning the former, EU regulation does not provide any specific guideline about Forex regulation, but, given the scale of the case, and the market competition legislation in place in Europe, the EU investigated the scandal and imposed fines on the basis that the banks adopted unfair market practices[46]. The latter on the other hand, is the financial authority instituted by the G20. The Financial Stability Board does not supervise or legislate per se, but coordinates the financial authorities across G20 countries, and provides sets of rules and suggestions for more stable and sound financial markets. Among said suggestions, there were recommendations on how to reform the Forex market, given the "concerns regarding the integrity" of the market.

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[45] As we have seen above, the Forex market is unregulated in the UK as well.

[46] The fines were levied with a substantial delay with respect to other authorities: the EU fines were imposed in 2019, six years after the investigations began, while all the other authorities imposed them around 2014 and 2015, with a much more reasonable timing.

The above description of the authorities' activities and regulations highlights a fact above all: although some steps toward a more regulated Forex have been taken, the market was and remains widely unregulated. Only some instruments, and not the relevant ones, have been regulated, and this only happened in some countries. On the whole, the Forex market still is the "Wild West" described by a trader who spent 12 years in the business[47], and actions against rogue traders can only be brought on the basis of a market manipulation, that, in the case of the Forex may also never be discovered. It is no wonder then that traders found an incentive in the lack of regulation to enact their manipulations, risking very little, as their scheme could have never been dismantled.

On the other hand, however, it is only fair to highlight the effectiveness that antitrust regulation had in tackling this matter. Almost all the fines issued to the banks could be levied only thanks to antitrust regulation, fines that, moreover, were "historic", in the sense that they were the biggest fines ever issued by these authorities, and that it was a step towards "real cultural change… in the industry", as declared by Clive Adamson, FCA's director of supervision[48].

Yet, antitrust regulation could, and should, have only been an additional regulation to apply in order to punish the traders: were the Forex market regulated, the whole scandal probably would not have even happened. Anyhow, a more detailed analysis of Antitrust regulation and fines' efficiency will be provided later on.

IV. Final remarks

This chapter has highlighted the way in which some of the previously discussed characteristics of the Forex, as combined together, created a perilous incentive framework that was then exploited by the traders. What is evident, after viewing and analysing the events that took place between 2006 and 2013 in the Forex market, is that a global Forex regulation reform is needed, and it is needed fast.

[47] Powers, Colleen. "Filling the regulatory void in the FX spot market: How traders rigged the biggest market in the world." *Fordham Urb. LJ* 43 (2016): 139.

[48] "FCA fines five banks £1.1 billion for FX failings and announces industry-wide remediation programme", Press Releases, fca.org.uk

3. Antitrust Law and fines efficiency

The foregoing dissertation has so far presented and analysed the bid rigging case that took place in the Forex market from as early as 2006 up to at least 2013 also known as the Forex Scandal, by presenting the Foreign Exchange market characteristics, the dynamics through which the scheme was executed, and an incentive structure that made participation into the scheme desirable for traders.
We have seen that a great weakness of the Forex market is its lack of regulation. However, being the Forex market a market in the first place, the illicit strategy fell under the competition law jurisdiction.
This chapter aims at presenting the Antitrust Regulations in place in the various countries where the scheme was investigated, and the efficiency of the fines that were issued based on said regulations. For these purposes, the Antitrust regulations in place in the U.S., in the U.K., in Europe and Switzerland will be presented in section I. Section II will then integrate the notions we have seen in the previous chapters with the antitrust regulations that will follow in order to understand whether the fines imposed were efficient or not.

I. Antitrust regulations

As already mentioned in the previous chapters, given that in the Forex market currencies from different countries are exchanged in pairs, the Forex Scandal became necessarily an international matter. The authorities that partook in the investigations and issued fines were listed in the above chapter, and they were the Commodities Futures Trading Commission, the New York State Department of Financial Services, the Department of Justice, the US Federal Reserve, the Financial Conduct Authority, the FINMA, the OCC, and the EU. Therefore, in order to get an overview of the legislative context in which the investigations took place, and see how and why fines were imposed, the following subsections will present the antitrust regulations present in the U.S., in the U.K., in Europe and Switzerland.

a. U.S. Antitrust Law

The first regulatory efforts to create a U.S. Antitrust Regulation date back to the 19th century, when the Sherman Act[49] was first passed in 1890, as a "comprehensive charter of economic liberty aimed at preserving free and unfettered competition as the rule of trade"[50]. Ever since, the Sherman Act has remained the first and most important source of Antitrust Law in the United States at the Federal level. Two other federal acts were then passed by the U.S. Congress in 1914: the Federal Trade Commission Act and the Clayton Act[51]. These

[49] Named after U.S. senator John Sherman from Ohio, a commerce regulation expert.
[50] ftc.gov: "The Antitrust Laws".
[51] The Clayton Act had two most important amendments, with the Robinson-Patman Act of 1936, and the Hart-Scott-Rodino Antitrust Improvements Act. The version discussed here is the final amended one, as only thanks to its amendments did the Act become of, even if little, interest to us.

three Acts constitute the pillars of U.S. federal Antitrust Policy, and, although some other legislative Acts provide Antitrust measures and their enforcement, just like the aforementioned Commodities Exchange Act, they all take from these three sources. The same can be said about states' antitrust laws: indeed, most federal states present antitrust laws, many of which are based upon the federal provisions.

The Sherman Act forbids "every contract, combination, or conspiracy in restraint of trade […] monopolisation, attempted monopolisation, or conspiracy or combination to monopolise".

As may be seen, it prohibits any restraint on trade, so, not only explicit cartels, but also any other kind of agreement that would limit trade or competition. Due to the Act's broad jurisdiction spectrum, almost any antitrust case can be brought under the Act. However, at the beginning, the Sherman Act was not successful at all, as judges applied narrow interpretations as to what constituted trade or commerce among states. This is indeed the main reason why the Clayton and the Federal Trade Commission Acts were created. Notwithstanding all its limits, the Sherman Act has been applied more and more over time, and its interpretation evolved alongside the judicial one.

The Sherman Act does not unlaw any constraint on trade (as any kind of association could be considered as a trade restriction, even if two individuals were to set up a company together), but only unreasonable ones. However, there are some offences that are considered to be in violation of the Act per se, meaning that there is no possible defence or justification. Among said offences we find plain arrangements to fix prices, divide markets and rig bids. Therefore, it is only reasonable that the Sherman Act was applied in this instance by the DoJ, as the actions perpetrated by traders would then be "unjustifiable". Moreover, there are severe consequences for violations of the Sherman Act: it imposes penalties up to $100 million and $1 million for companies and individuals respectively. Furthermore, for companies, said penalties, in the case that the gains from the scheme were over $100 million, can go up to double the profits gained. For individuals instead, being a violation of the Sherman Act a criminal offense, a violation of the Act could mean up to ten years in prison.

The Federal Trade Commission Act is the primary statute of the Federal Trade Commission. It prohibits "unfair methods of competition and unfair or deceptive acts or practices in affecting commerce"[52], that the Commission is in fact empowered to prevent. Moreover, the FTC is able to impose fines, and specify what acts constitute said unfair practices as well as establishing requirements aimed at preventing these acts. Moreover, the Supreme Court provided that all violations of the Sherman Act also violate the Federal Trade Commission one.

Finally, the Clayton Act provides specific regulations for practices which are not included among the offences as stated by the previously mentioned Acts, however, as it deals prevalently with M&A regulation, only one aspect will be considered here: under the Act, a private party is able to sue for triple damages a party that harmed them in violation of either the Sherman or the Clayton Act.

Thus, in the U.S., Antitrust Law is quite strong: the broadness of jurisdiction and strictness of penalties of the Sherman Act, combined with the additions provided by the FTC Act and the Clayton Act, and the violations

[52] ftc.gov: "Federal Trade Commission Act".

per se of the Sherman Act, create a strong regulatory framework, reinforced by the state adoption of these competition laws. Indeed, most bodies that participated in the investigations came from the U.S., and their response was quick and strong.

U.S. Competition policy was one of the most effective by volume, although the traders were not convicted or personally fined, although the Sherman Act provided this possibility. Given that the banks could be considered as innocent parties, we will see better later on, whether, given this, the fines were efficient or not.

b. U.K. Antitrust Law

Competition Law in the U.K. has ancient origins, as the first case which is considered to be a founding precedent is the *Dyer's Case* (1414). However, regarding modern antitrust law, the U.K. has been late with respect to its peers, in that a coherent and strong statutory competition framework has arrived quite recently with the two acts that are now the core of U.K. Antitrust Law: the Competition Act of 1998, and the Enterprise Act of 2002. Hitherto, some regulation had been provided after the end of the Second World War, but was "tentative, partial and under-enforced"[53].

Another source of Antitrust Regulation was received when the U.K. joined the European Community in 1972, and consequently became subject to the latter's Competition Law, constituted, as we will see later on, by Articles 101 and 102 of the Treaty on the Functioning of the European Union (TFEU). However, European Competition Law only applied (as, after Brexit, the U.K. is not subject to EU Regulation anymore) when U.K Antitrust matters "crossed its borders".

The Competition Act of 1998 provided that any agreement, business practice or conduct which has, or could have, a damaging effect on competition in the U.K., is prohibited by law, including the abuses that could be perpetrated by a firm enjoying a dominant market position. The Competition and Markets Authority (CMA) is the principal enforcer of the Act[54], and has provided a number of examples of anti-competitive behaviours, among which we find market division and sharing, bid-rigging, price-fixing, and other unfair practices such as price impositions by suppliers to retailers, market dominance abuse, or the sharing of private information. If a company were to be found guilty of breaching the Competition Act's provisions, it could be fined up to 10% of overall turnover of the company and could be sued for damages.

The Enterprise Act of 2002 instead, is concerned with only some of the aforementioned anti-competitive activities, and makes out of these particular actions a criminal offence. The Act defines a new criminal offence: the entry of an individual into a "hard-core" cartel. A hard-core cartel is a cartel which enters the activities of price fixing, supply limitation, bid-rigging, or the sharing of clients or supply. Moreover, in order for the Act to apply, the individual that entered the hard-core cartel must have done so dishonestly.

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[53] Scott, Andrew. "The evolution of competition law and policy in the United Kingdom." (2009).

[54] Other sector authorities have the power to enforce Antitrust Regulation under the Competition Act in the case that competition distortions are being perpetrated in their respective industry.

Thus, an individual found guilty of dishonestly entering a hard-core cartel, is committing a criminal offence and is personally liable for their actions. Indeed, the Act provides that breach of the provisions can lead up to five years in prison for the offender, and an unlimited fine can be imposed upon them.
The U.K. Antitrust framework thus presents itself as a strong system, in which anti-competitive practices are punished hard. However, as we have seen, the non-regulation of the Forex market has made it impossible to impose fines on Antitrust bases to either the banks or the individual traders, notwithstanding the fact that Antitrust Law in the U.K. is sound and valid. In this case, a Forex reform is clearly needed. It is no surprise thus that, other than for the aforementioned geographical concentration reasons, the traders involved came mainly from the U.K.

c. EU Regulation

As previously mentioned, EU Antitrust policy is provided by Articles 101 and 102 of the Treaty on the Functioning of the European Union. The treaty was first signed in 1957 in Rome[55], and is one of the fundamental treaties of the European Union.
Article 101 of the TFEU states that any anti-competitive agreements between two or more independent market operator constitutes a civil offence. In particular, the Article refers to: direct or indirect price fixings, limitations or controls to production, technical development or investment, market or supply sources sharing, the application of dissimilar treatments to equivalent trading partners to place them at a competitive disadvantage, and making the conclusion of contracts subject to acceptance of other parties which have no connection to said contracts.
Article 102 instead is more market-dominance-oriented, and makes a civil offence out of the abuse of said market dominance, especially, just like Article 101, when it is used to directly or indirectly impose unfair prices, limit production or technical development, apply dissimilar conditions to equivalent transactions with other trading partners to put them at a competitive disadvantage, and make the conclusion of contracts subject to acceptance by other parties of supplementary obligations which have no connection with the contracts[56].
The violation of the provisions of these Articles can be punished with a fine of up to 30% of the relevant sales of a company which is undertaking anti-competitive practices, a fine between 15 and 20% for cartel participants, with an overall limit in all cases of 10% of yearly turnover of the company. The percentage must then be multiplied by the number of years that the violations lasted. Moreover, there is an additional increase in the range of 15-25% on fines for cartel participants, functioning as an entry deterrent.

[55] Indeed, together with the Euratom Treaty, they form the so-called Treaty of Rome.
[56] See: Consolidated version of the Treaty on the Functioning of the European Union - PART THREE: UNION POLICIES AND INTERNAL ACTIONS - TITLE VII: COMMON RULES ON COMPETITION, TAXATION AND APPROXIMATION OF LAWS - Chapter 1: Rules on competition - Section 1: Rules applying to undertakings - Article 101, 102 (ex Article 82 TEC).

Of course, since EU regulation does not have a criminal law apparatus, no criminal penalties can be imposed. Moreover, EU Antitrust Law only applies to companies, and individuals cannot be held personally responsible for anti-competitive behaviours, an important aspect to consider in the sections that will follow.

d. Swiss Antitrust Law

Switzerland's first Antitrust Law was the law on cartels of 1962, a weak regulatory effort which lacked procedural efficiency and granted little decision-making powers to judges. Indeed, until its 1985 revision, a number of arguments could be used to justify collusive agreements and behaviours by showing how the cartels' actions could bring enough benefits to counterweight the damages.

In 1995, a new antitrust (the Cartel Act) and internal market laws laid the foundations for a stronger Competition policy framework, which, as the 1995 law presented some weaknesses as well, was completed with the revised competition law adopted in 2003, which made Swiss Antirust Policy more in line with other OECD countries' ones[57].

The 2003 law prohibited firms and agreements between firms to abuse of a dominant market position, with a particular focus on horizontal price fixings. However, the notion of abuse is limiting to regulation, as the prohibitions are in this way aimed mostly at avoiding M&As that would cause firms to reach a dangerously dominant position.

However, for what regards penalties, it is much more in line with what is prescribed by other countries' policies. The 2003 law provided the possibility to issue fines up to 10% of overall turnover over three years, collaboration with the authorities benefits, the presumption of illegality for vertical price fixings, new investigation procedures, disclosure requirements for the Competition Commission (COMCO)[58] to declare their interests, and a clearer application of the law to all companies.

Given the limits of the Swiss Policy on Antitrust, which is essentially related to M&A regulation, it is not surprising that the fines issued by the FINMA were based on the failure to keep sound risk management practices and controls by banks, and not on Antitrust bases.

e. Final Remarks

The above sub-sections have highlighted the Antitrust Regulations in place in the U.S., the U.K., in the EU, and in Switzerland, showing that, apart from the latter's, Antitrust Policy is sound, strong, and effective in said countries, as, of course, it is also very similar. It is noteworthy, however, that the lack of Forex

[57] We have seen how the U.S., the U.K. and the EU have adopted very similar frameworks, with some differences as to the maximum criminal penalties between the U.S. and U.K., and the fact that the EU could not have criminal sanctions, but the offences, the tools, and the penalties were rather similar.

[58] The COMCO is the main enforcer of Antitrust Policy in Switzerland, acting under the Cartel Act.

regulation in the U.K. brings about some inefficiencies, and it is now even clearer that a Forex reform is needed, also in that it would be a complementary legislation necessary to make Competition Law applicable in cases similar to ours.

II. Fines Efficiency

The imposition of fines, once the law has been broken, is perhaps the most important stage in an Antitrust case. This is because of the threefold effect that an Antitrust fine should have: punishment, retribution, and prevention. In fact, a fine can be considered to be efficient when its size punishes the cartel's participants, compensate the damages suffered by the ones negatively affected by the cartel, and prevents the formation of cartels in the future.

The following sub-sections will deal with each of these three points in order to assess whether the fines imposed by the aforementioned authorities were efficient or not.

a. Punishment

When a cartel restrains competition, such restraint inevitably leads to a welfare loss. In economic theory, this welfare loss is measured by the deadweight loss that a competition restraint entails, and is measured, approximately, as $\frac{1}{2}(\partial P x \partial Q)$, where ∂P is the price difference between the price set by a firm with market power (for instance, a monopoly) and the price set by all firms under perfectly competitive conditions, and $\partial Q$is the quantity differential between the quantity of output sold by a firm with market power, and one in a competitive market. The $\frac{1}{2}$ by which these differentials are multiplied derives from the fact that, graphically, the area that represents the deadweight loss is triangular (of course, this is an approximation). Indeed, it is represented by the triangle inside the supply and demand curves which is lost when there is a restriction on competition, which affects both the market price and quantity demanded (See Fig. 1).

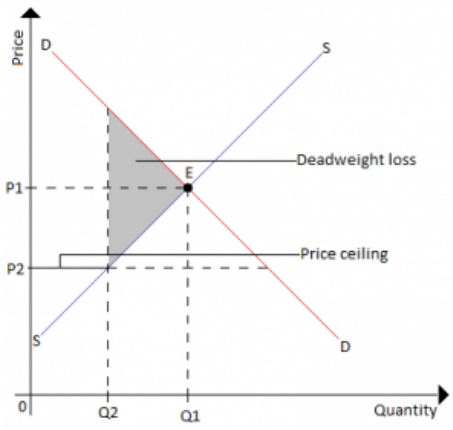

Fig. 1: Monopoly deadweight loss

An efficient fine under a punishment perspective, is a fine whose size is equal to the size of the welfare loss, thus, equal to the deadweight loss caused by the cartel[59]. The fines' ranges provided by the above regulations certainly allow the imposition of fines of such a size, however, in the Forex scandal case, a problem arises.
Given that the movement of the exchange rate caused by the cartel's activities could not be calculated properly because of various factors, namely the fact that the transactions, and their daily character, had an impact which could not be clearly measured, because of the Forex's market size, its opacity, and the fact that different strategies were employed, each of which had a different impact and purpose.
Thus, under this point of view, no truly precise assessment can be made on whether the size of the fines was efficient. However, their enormous volume suggests that the banks they were issued to suffered heavy damages, and thus were punished hard.
An important aspect to consider, however, is that of the recipients of the fines: it was repeatedly stated that it was the traders that had an incentive and a motive to participate in the cartel, and thus, they should have been the right target for the issuance of the fines. Although the banks should have detected the scheme, and the traders were clearly indirectly affected, as many involved traders lost their jobs, the cartel participants were not directly punished, and most of them have carried on with their professional lives almost as if nothing happened.
Thus, although we may say, without precision, that the fines were of an efficient size, they were not directed towards the right recipients.

b. Compensation

Once a punishment has been enforced, compensation to those harmed should be provided. However, for the same reasons why the welfare loss is hardly calculable, the agents that were harmed by the cartel traders are of difficult identification.
Moreover, fines' revenues are seldom delivered to the individuals that suffered a damage or to the institution that carried out the investigations, but are most always included in central governments budgets. For instance, the TFEU provides that the revenues from fines imposed on companies that violated EU Competition Law shall be included in the EU's budget, and most of the revenues from fines in the U.S. are sent to the Treasury Department. Thus, it is not clear how said revenues were employed, but we can be fairly sure when we say that there was no compensation to the victims of the scheme.

c. Deterrence

[59] Although there are various theories and schools regarding what fines should be based upon.

The imposition of a fine should ultimately discourage any other individual to try and replicate the actions of those upon whom the fine was imposed. This objective would be reached in the case that the fines made a possible replication undesirable, hence, non-profitable, under an economic point of view.

The size of the fines was large enough to discourage anyone from even trying to replicate a scheme such as the one of the Forex scandal, however, when we go and see the agents upon which the fines were imposed, the deterrence effect of the fines becomes ambiguous: if, on the one hand, the fines were very large, on the other hand, the traders suffered little or no consequences. Thus, an individual may not perceive the replication of such a scheme as risky, especially since no real developments in Forex regulation have been made. However, on the other hand, the fines were so heavy for the banks, that they would never let anything like this happen ever again, for instance, by improving internal controls and audits.

Thus, in the end, we might say that the fines acted as a deterrent, as the banks would not allow anymore such a conduct from their employees.

d. Final Remarks

The $10 billion fines issued by the aforementioned authorities against the banks in which the cartel traders were employed, had ambiguous effects.

On a compensation perspective, fines probably were not efficient, as the identification of the victims was almost impossible, as well as the damage suffered. Moreover, it is unclear how and where said revenues were spent. On the punishment side we have seen how the recipients of the fines were not the "right" ones, however, on the deterrence one, we have seen that, although the targets of the fines were not the parties at fault, the fines exerted a deterrent effect.

On the whole, taking into account this last consideration, we may say that fines were efficient in that a similar scandal is unlikely to happen again. Therefore, Antitrust Policy has been rather effective on the whole. However, given this ambiguity that characterises fines efficiency, a Forex reform would be the best way to completely, or almost completely, prevent a cartel formation of this kind in the future.

Conclusion

The foregoing dissertation has analysed the Forex Probe by presenting the Forex market's structure, features and interactions, then combining said features with competition theory concepts in order to fully appreciate the antitrust character of the scheme. Then, in order to see whether the Antitrust Regulations present in the countries where the financial scandal occurred were effective, said regulations have been presented, and an analysis of the fines issued was conducted in order to assess whether they were efficient or not.

The above analysis has highlighted the following facts: the structure and features of the Forex market made it a fertile territory for criminal actions to bloom, and, indeed, the Forex Probe happened. Then, we have seen how, being the Scandal a market manipulation, Antitrust Regulation, with the notable exception of Switzerland, was very effective in tackling this issue. In fact, we have seen that the fines, although not efficient under each key point, were efficient on the whole. A last fact that emerged from the foregoing analysis is that, although Antitrust Policy was strong and effective, given the features of the Forex market, a last step to be taken in order for this case to be the last one of its kind, a Forex reform everywhere is necessary.

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