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Abstract

This work aims to study financial regulatory exemptions as a means of enabling structural financial power, which is the power one agent holds in determining the options available to other agents' decision-making in a financial system. To test this perspective, we examine the development of financial derivatives and regulatory conflicts that emerged in the US over-the-counter (OTC) derivatives markets between the 1970s and the 1990s. The results show that the use of derivatives for risk management were fundamental in promoting the expansion of both the American and the international financial system following the end of the Bretton Woods Agreement in 1971. Therefore, after unilaterally putting an end to the stability-inducing mechanisms of Bretton Woods, U.S. public and private agents, by using financial innovations and regulatory exemptions, re-wrote and imposed new rules of operation for the global financial system. This is a clear case of exercise of structural financial power.

Keywords: global financial governance; financial structural power; OTC derivatives markets; regulatory exemptions; post-Bretton Woods System.

Introduction

The Bretton Woods Agreement framed an international system of fixed exchange rates, based on the convertibility of the U.S. dollar into gold and the fixed parity of other national currencies to the U.S. currency. This was a monetary arrangement that reduced exchange rate risk and interest rate volatility and was supposed to help private international flows of trade and investment. However, during the 1960s, the soaring American deficit made it increasingly difficult for the U.S. to sustain the fixed parity to gold. To maintain its macroeconomic autonomy, the U.S. government unilaterally brought to a close the dollar-gold convertibility in 1971. This decision released the U.S. from an international commitment that could have constrained its monetary and fiscal autonomy. Since then, the international financial system has operated on a floating exchange regime, which Serrano has described as "the floating dollar standard" (Serrano, 2003).

The end of the Bretton Woods agreement dramatically increased exchange rate fluctuations, which were intensified by the large flows of speculative capital that followed the end of the American capital controls in 1974 and the subsequent halt in international cooperation (Helleiner, 1994). Interest rate volatility followed as economies opened their capital accounts. According to the Mundell-Fleming impossible trinity, once governments open capital accounts, they are no longer capable of managing the interest and exchange rates simultaneously. As inflation surged in the U.S. throughout the 1970s and basic interest rates were maintained at negative real levels, the confidence in the dollar as an international unit of account eroded. As a result, emerging markets' debts in Latin America and Eastern Europe rapidly mounted, mostly denominated on floating rates. When the Fed increased its interest rates at the beginning of the 1980s, the post-Bretton Woods international financial system faced its first systemic crisis—leading some analysts to demarcate the period between the 1970s and the 1980s as a 'non-system' (McKinnon, 1993; Tavares, 1997).

To cope with the volatility of exchange and interest rates, financial institutions developed new instruments—derivatives—to address these new exacerbated risks. Later, these contracts were extended to an ever-increasing number of assets, including commodities

and debts. In time, derivatives became an integral pillar to the operation of the new global financial system.

According to the technical definition, financial derivatives are contracts that are valued according to the price of other assets, called underlying assets (Hull, 2018). They commit one party to pay to the counterpart, on a future date, an amount determined by the evolution of the price of the underlying asset or exchange a stressed asset for a safe one. In this is way, one party may hedge itself by transferring the risk of the underlying asset's market-value fluctuation to a counterparty willing to take on this risk. However, some investors have speculative purposes and bet on derivatives.

Until the 1970s, the underlying assets of these contracts were limited to a few commodities, such as wheat, oak, beef, etc. However, immediately after the breakdown of the Bretton Woods system, futures exchanges and then banks launched derivatives to manage exchange and interest rates as well as the volatility of other commodities such as oil. Then, in the late 1980s, in the wake of Eastern Europe and Latin America's debt crisis, financial markets introduced derivatives to manage credit risk.

Exchange and interest rate risks, along with credit, are the most fundamental macroeconomic risks and, therefore the first research question from this conundrum is: how did the post-Bretton Woods financial system become operable within high systemic volatility and with inherent financial risks at stake? We raise the hypothesis that derivatives have allowed any asset in the global financial system to be compared and transformed, in terms of risk, into the global standard asset of the system: the U.S. Treasury Bill. That innovation created a mechanism by which investors could address volatility and risk and allowed the post-Bretton Woods system to operate and expand. Derivatives were essential to integrate very different assets into one new globalized system, which are denominated in different currencies, have different maturities and liquidity premiums, and are originated in different countries, as well as follow different legal systems.

Secondly, by studying the developments of the financial regulation of over-the-counter derivatives markets[1] throughout the 1970s and 1990s, this work seeks to understand how the American state was involved in implementing derivatives as instruments to underpin the governance of the global financial system. By analyzing the historical trajectory that leads to the 1998 regulatory turf battle between the CFTC on one side and the SEC, FED, and Treasury department on the other, a second research question emerged: why have high-ranking American officials fought so hard among themselves for two decades to exempt the OTC derivatives markets from regulation? Not excluding lobbying explanations, such as Tsingou (2015), for the behavior of American officials in the realm of OTC derivatives markets regulation, this work comes up with an additional hypothesis for those agents' rationality. We posit that some top American officials must have envisioned the fundamental role financial derivatives and OTC derivatives markets' regulatory exemptions had in helping to structure the post-Bretton Woods system. Therefore, they struggled to influence the status of those markets' regulatory landscape, and thus established the framework that allowed the expansion of the financial system and reinforced the international role of American currency. They had strategic considerations regarding the importance the regulatory exemptions of OTC derivatives markets had for the governance of the global financial system, which is the underlying basis of the American state financial power.

The rest of the article is structured as follows: Section 1 briefly reviews Susan Strange's theory of structural power with a focus on her concept of structural financial power. In Strange's terms, structural financial power is the capacity to alter the rules and norms that guide access to money and credit and organize the operation of exchange rate regimes. Then, in Section 2, we explore Fischer Black and Perry Mehrling's insights on derivatives, which we claim show how these instruments have made the post-Bretton Woods system operable by making it possible to commensurate assets with different risks to U.S. Treasury Bills, the standard global financial asset. Therefore, financial derivatives

[1] Generally, this includes the markets for derivatives managed by banks dealing with other banks and nonbank financial institutions.

are clear examples of how the United States' government writes and rewrites the rules and norms of global financial governance.

Section 3 studies the regulatory struggles among American officials toward the regulation of the American OTC derivatives markets. This section seeks to explore how the OCC, a bureau of the Treasury Department, was essential in freeing American banks to engage in the speculative trading of swaps and other derivatives, and in turn enhancing the liquidity for markets for financial risk. Whereas, at the same time, American officials acted to block CFTC, other American regulatory agencies, and members of Congress to tried to regulate OTC derivatives markets.

Section 4 seeks to use U.S. Congressional hearings to illustrate the strategic considerations those officials had regarding financial derivatives' central role on global financial governance and, therefore, the strong state grip on the construction of the norms of operation of the post-Bretton Woods global financial system. A central concern for American officials was that OTC swaps should not be regulated as futures under the authority of a specific regulator, the CFTC. This allowed American banks to innovate freely in OTC derivatives markets and become global risk managers. The last section presents final remarks and sums up the results of the work.

1 Strange's concept of structural power

Susan Strange did not posit an explicit definition for the word *structure* in her discussions on the concept of *structural power*. However, it is possible to infer that the structure she refers to is the '(…) agenda of discussion or [the] design (…) [of] international regimes of rules and customs that are supposed to govern international economic relations' (Strange, 1988, p. 25). Through this, Strange adapts the concept of *social structure* as the constraints (norms, rules, procedures) that define social behavior in the study of global political economy. It encompasses the underlying assumption that social relations are determined by constraints that force agents to behave in particular ways. Power is then the imposition of limitations from one or some agents over the others, conducting and ruling their behavior (Wendt, 1992).

Story (2001) suggests that for Strange power relations depend on the dialectics between goals and outcomes. If two or more agents have different goals, and outcomes only attend to one agent's goals and not the others, then they who have their goals attended hold power over those without the same privilege. In this context, power relations involve the determination of asymmetric outcomes and not simply whether an agent can make another agent do something he would not otherwise do, in the way traditional political theory understands power (Story, 2001). When an agent holds the capacity to determine asymmetric results within a range of possibilities given to others, this agent holds structural power. In that sense, structural power is not the power that relies on bilateral relations, but on multilateral relations, in which one single agent is more powerful than any other in the set.

Structural power is exercised by the control of the norms that affect the relations between countries, channeling them to attain the goals of the structural power holder. For Strange, there are four structures of power: financial, productive, security, and knowledge. Structural power permeates all of them and each is dependent on the other, their separation being only theoretically possible (Strange, 2002).

Therefore, structural power, for Strange, is the capacity to interfere, control, and determine sets of norms, rules, and procedures over key areas of the global political economy. In her own words: 'Structural power, in short, confers the power to decide how

things shall be done, the power to shape frameworks within which states relate to each other, relate to people, or relate to corporate enterprises' (Strange, 1988, p. 25). Rule determination is in fact about affecting the range of options available to other actors.

The financial structure, for Strange, must be understood by the centrality of the international system of money and credit and how access to both shapes that structure. The spread of the superpower currency in the global financial system is coordinated by the liquidity premium of the dollar to other currencies. Therefore, the stability of the international monetary system is affected whenever the role of the dollar as the reserve currency is jeopardized.

Throughout the 1970s and until the mid-1980s, American dollars were lacking the ability to function as the most important store of value among international currencies. High inflation and low interest rates prompted dissatisfaction by American allies in Europe, Japan, and special U.S. dollar holders in the Gulf. (Helleiner, 1994). However, the political domestic problems the United States was facing in the wake of the Nixon shock were translated into a policy mix that compromised the role of the global currency. More than ever, U.S. power was facing a broader Global Financial Governance crisis, related to how the hegemon would make a newly born system of floating financial prices work in an integrated fashion between different currencies and assets.

The governance issue at stake was one of structural power management: U.S. officials initially had no clue on how the rising floating exchange rate system would work (Volcker, P., Gyohten, T.,1992). As the dollar could not function as an international reserve currency, the U.S. was unable to dictate the norms that other states should follow within the international financial system, harming the basis of its financial power. For if the power holder cannot set the rules, how will he govern?

Yet, American decision-makers were sure to maintain one fundamental motto—preserve greenbacks as the global standard unit of account. Helleiner shows that the U.S. government (Helleiner, 1994) halted any initiative in the international sphere that could harm the hegemonic position of the dollar (Helleiner, 1994).

Meanwhile, domestically, the U.S. was opening doors for new private possibilities of financial governance. As Krippner shows, markets were—through a series of regulatory and policy changes during the 1970s and 1980s—freed to take on the financial prices management responsibility that relied on the American government (Krippner, 2011).

Therefore, the post-Bretton Woods financial landscape established markets as centerpieces of financial power. As Strange elaborates in her definition of structural financial power:

> Thus, the financial structure really has two inseparable aspects. It comprises not just the structures of the political economy through which credit is created but also the monetary system or systems which determine the relative values of the different moneys in which credit is shared by governments and banks (and much will depend therefore on the political and regulatory relation of the one to the other). In the second, the exchange rates between the different moneys, or currencies, are determined by the policies of governments and by markets (and again much will depend on how much freedom governments allow markets). A financial structure, therefore, can be defined as the sum of all the arrangements governing the availability of credit plus all the factors determining the terms on which currencies are exchanged for one another (Strange, 1988, p. 88).

In line with Strange, the structural financial power is not a monolithic capacity that the U.S. government holds because it issues the hegemonic currency. The structural financial power is shared between the private and public relations that surround the hegemonic currency. Recalling Strange in the last passage: 'the monetary system or systems which determine the relative values of the different moneys in which credit is shared by governments and banks (…) depend therefore on the political and regulatory relation of the one to the other' (Strange, 1988). Thus, the way markets manage the price of money and the way governments enforce market actions through regulation is essential in understanding power within the financial structure. However, Strange was unable to identify how derivatives could become a part of American structural financial power, insisting that these instruments destabilize and disrupted the global financial system (Strange, 2015).

2 Black, Mehrling, and the systemic role of derivatives

Fischer Black envisaged in the early 1970s that financial institutions could hedge asset risks, issuing *guarantees.* He argued that 'there was no theoretical reason why a financial institution could not guarantee for a fee, the payment of interest and principal in the bond' or 'a long-term bond against fluctuation in price' (Black, 1970, pp. 4-5). The first operation would convert the bond into one free of default and the second into a short-term bond. Perry Mehrling added that hedging the risk of default is the same as exchanging the risk of a corporate bond for the risk of a sovereign bond, as governments are always able to pay their debt whenever it is denominated in the currency it issues (Mehrling, 2011).

Based on Black and Mehrling's reasoning, a dealer in guarantees could also safeguard bondholders against other risks, such as the losses from exchange rate volatility. This operation for an American investor would be the same as swapping a foreign sovereign bond denominated in local currency for a US Treasury or T-bond. Additionally, whenever parties sign an interest rate derivative, they are exchanging a fixed-rate long-term corporate bond for Treasury Bills. The T-bills are less subject to interest-rate risk because of their short maturity. In an interest rate swap, the party holding long-term bonds makes payments when short-term rates decrease and receives payments from a counterpart, when it increases. Therefore, any variation between the fixed interest rate and the short-term interest rate is offset, rendering the bondholder an asset free of interest rate risk. The guarantees Black assigns and Mehrling exemplifies are, in a general sense, the usage of derivatives to mitigate the three fundamental risks of the post-Bretton Woods global financial system— interest rate, foreign exchange rate, and default.

What are the implications of Fischer Black and Mehrling's approach? From the microeconomic point of view, derivatives reallocate risks among investors. These financial contracts offer a hedge against undesired movements in prices and cash flows for risk-averse agents. Additionally, they create the possibility for risk-prone agents to bet on expected profitable opportunities of future price movements. Lubochinsky (1993) goes further in saying that derivatives have also a broader function: They create a market for financial risk and thus enable investors to price financial assets accordingly. For the author, each class of derivatives performs a fundamental microeconomic function: future

markets helps pricing of spot transactions, options render investment positions cheaper, and swaps allow for the best allocation of resources. Using market derivatives, investors make take positions, that from their point of view, are safer, more liquid, and cost less. They have also increased their leverage capacity, widening market liquidity and creating a booming transaction turnover. As they cover a vast range of underlying assets, they have become one of the fundamental pillars of portfolio diversification, rendering markets more complete and triggering financial globalization (Lubochinsky, 1993; Torres Filho, 2014).[2]

Nevertheless, derivatives have implications beyond the microeconomics of finance. They also have a global macroeconomic and political impact, which the literature on derivatives, both in economics and finance and even from the international political economy perspective, has not been able to grasp. The academic literature has not focused on the implications of the evolution of financial derivatives from the 1970s onward for the governance of the global financial system and its relations with the American financial power.

Black and Merhling did not take into consideration the implications of derivatives for American monetary power. Nevertheless, attentive observation of Mehrling's description of derivatives' risk mitigation shows that by making any asset risk-free, these instruments have systemic implications. They make it possible to commensurate all relevant assets with the American T-bill, which becomes the standard asset of the global financial system. Derivatives allow the pricing of all specific risks of financial assets and create the basis for their trading. According to Brian and Rafferty, risk commensuration is the establishment of 'pricing relationships that readily convert (we use the term "commensurate") different forms of asset' and '(make [them] transmutable) among themselves' (Bryan & Rafferty, 2006, p. 12 and p. 49). Stated more clearly, the risk commensuration by derivatives allows different assets exposed to different kinds of risks

[2] This work is aware of the literature that studies the role of financial derivatives in either prompting or worsening systemic crisis (Kreguel, 2001) and in contributing to systemic volatility (Clapp & Helleiner, 2012). However, the focus of the work, without denying the possible adverse effects these instruments may provoke in the global financial system, is to understand how financial derivatives have enhanced the post-Bretton Woods system's operability.

to be readily comparable and priced to the global standard asset, the T-Bill. For example, assets issued in different currencies are comparable to one another because it is possible to price them against a Treasury bill. Dollar exchanges and derivative markets are more liquid and deeper than any other in the world. Therefore, as a rule, two bonds issued by different companies in different countries and denominated in currencies other than the dollar are priced and traded in the international market because they are subject to derivatives negotiated in dollars. These markets help to mitigate the discontinuities across time, space, and units of accounts regarding the value of the most important assets.

Table 1 [see at the end] illustrates this reasoning. Take, for example, a bond, issued by a Brazilian mining multinational (Vale), in the Brazilian currency (Real), in the local capital market. That might be too risky of an asset for a non-professional American investor to hold in his long-term portfolio, as information regarding corporations of developing countries is not as readily available to him as the American corporations are. Besides, developing economies are more prone to economic and political instability and sharp currency devaluations, which increases risk in emerging capital markets. However, to make Vale´s risk more bearable, the American investor can undertake a Credit Default Swap to mitigate the default risk, buy a foreign exchange derivative (Currency Swap) to lock the future exchange of the Brazilian currency, and preserve his returns in USD against short-term fluctuations with an interest rate swap.

Perfect hedging is rarely seen in the real world. CDS have upfront payment costs and Currency Swaps and Interest Rate Swaps have costs expressed in cash flow payments. However, the example illustrated in Table 1 can be synthesized by the following simplified formula if there were perfect information, no market power, and no transaction costs:

Vale Corporate Bond Yield = T-Bill Yield + CDS Cost + Currency Swap Cost + Interest Rate Swap Cost

In the post-Bretton Woods floating exchange and interest rate regime, the American monetary hegemony was transposed from the monetary pillar of a fixed U.S. gold-dollar standard to a fully fiat, private, flexible, and innovative system based on the dollar as a unit of account and US Treasury Bills as the standard financial asset. The operation of

this system relies on the services offered by the derivative markets. They enable risk management and transactions among different global assets. They support the centrality of U.S. dollars in the international financial system. Those instruments allow investors to easily move capital flows between various classes of assets in developed and emerging countries, and across different capital markets sectors as if they were homogeneous. For, even though many assets in the global financial system are not dollar-denominated and carry different risk natures, derivatives can render them as risk-free as American government assets.

Therefore, financial derivatives are one of the main pillars of global capital integration and thus of financial globalization. Financial derivatives helped to make today's international monetary and financial system sound and manageable. The Bretton Woods arrangement was one with remarkable state control over finance, in which different national monetary and financial systems were tied to the U.S. dollar through a fixed exchange rate. It was a system sustained by the guarantees of the American state, with the convertibility of the dollar to gold and support for cooperation on international capital controls. The current global system, however, is based on a fiat dollar, and privately run financial markets. All public and private agents worldwide are linked to the American financial system, connected by derivatives.

The superpower restructuring of the global financial system started with an abrupt disruption and the breakdown of Bretton Woods. In the aftermath, derivatives emerged as a market response to the increased volatility of interest and exchange rates to become a centrifugal force that holds different monetary systems, capital markets, and assets together in one global flexible financial system based in the dollar through the centrality of U.S. public debt. This innovation aided and reinforced American monetary autonomy and the governance powers of its markets.

By linking derivatives to Strange's structural power ideas, it possible to say that those instruments allowed the United States to manage the structural disorder produced by the abrupt end of the Bretton Woods system and set up the new basis of the American structural power.

3 American officials' strategic considerations on OTC derivatives markets regulation

According to Michael Greenberger, former CTFC director (1997-1999), the regulatory exemptions for OTC derivatives markets prevent a variety of controls, including transparency rules, capital reserve requirements, anti-fraud rules, anti-manipulation rules, and the regulation of intermediaries, all of which enable banks to make riskier investments (Kirk, Gilmore, & Wiser, 2009). These regulatory exemptions are better understood if studied in comparison to mercantile and futures exchanges, organized derivatives markets. CFTC obliges investors to register contracts and follow limits on the daily volume of transactions; apply margin requirements, transparency, and clearing rules; and follow a package of compliance procedures that in a certain way put constraints on financial innovation, leverage levels, and the development of risk management techniques. These impediments are not founded in OTC derivatives markets.

In this regard, it is necessary to observe that the American OTC regulatory exemptions lie in the genesis and subsequent development of the derivative markets. Before the 2008 crisis, they were off-limits. Regulation was absent, and therefore financial institutions had plenty of room to operate and innovate. Carruthers calls attention to the fact that OTC derivative markets regulatory exemptions made the rate of creation of new contracts expand from five launched every year in the 1970s to an average of 48 per year in the 1990s (Gorham & Singh, 2009, as cited in Carruthers, 2013).

The history of OTC derivatives markets regulatory turf battles starts with the Treasury's attitude around the time of the CFTC authorization in 1975. The department feared that off-exchange traded futures were submitted to CFTC regulatory jurisdiction. This decision would enlarge CFTC jurisdiction to include futures and forwards on interbank transactions, which already made up a significant portion of the American over-the-counter derivatives during this time. Helleiner observes the historical influence of the banking lobby over the Treasury due to the latter's responsibility for regulating the banking system. For the author, the Treasury department became, since the end of the 19th century, the central channel of strategic formulation and representation of bankers' interests in the American administration (Helleiner, 1994).

The Treasury's argument against expanding the CFTC jurisdiction to regulate derivatives managed by banks was that it would create uncertainty. Officials then moved to pass an amendment in Congress specifically exempting off-exchange traded derivatives from CFTC regulation. This amendment, named the *Treasury Amendment*, inaugurated the regulatory exemptions[3] for OTC derivatives markets in the United States. The difference in lobbying achievements between exchanges and banks in granting regulatory exemptions for derivatives business sets up the difference in terms of power between one and the other. Banks are a historically very strong lobby sector, as Helleiner (1994) shows, while futures exchanges depended on farmers (a strong lobby sector) to advance their interests and as such were vulnerable to their *quid pro quo* (Helleiner, 1994; Romano, 1997).

The development of swaps and the subsequent boom in the OTC derivatives markets in the 1980s called the attention of regulators once more. In a restricted sense, the OTC swap market and, in a broad sense, the OTC derivatives market generated true regulatory contention between different American financial regulatory agencies and the Treasury. Regulators and monetary policy officials had differing views in their intentions on whether to concede regulatory exemptions or not.

From the 1980s to the 1990s, the OCC, CFTC, SEC, GAO, FED,[4] and the Treasury found themselves entangled in regulatory disputes. The agencies were divided on issues of motivations for competitiveness, systemic importance, regulatory grasp, and fear of

[3] Financial regulation norms, rules, and procedures are agency, instrument, and institution-specific in the United States. This means that if an agency has exempted a financial instrument or financial activity from regulation, that agency will not oversee, supervise, or enforce any regulatory act under financial institutions carrying out financial activities with those specific financial instruments. However, if a financial institution is exempted from regulation over a specific instrument or over a specific market segment, it does not mean that this institution is "free" from all kinds of financial regulation. Other agencies may still claim jurisdictional powers over its activities. In the case of the regulatory exemption for off-exchange derivatives made by the CFTC, it meant that banks would no longer have oversight from this agency within activities carried on with those instruments. Nevertheless, they would still be subjected to an overall regulatory framework that banking institutions are subjected to under the National Bank Act, which is supervised and enforced by the Office of the Comptroller of the Currency, a bureau under the Treasury Department.

[4] Office of the Comptroller of the Currency; Commodities and Futures Trading Commission; Securities and Exchange Commission; General Accounting Office and Federal Reserve System.

systemic risks. In such a strong political struggle, the American Congress had to act as both a contender and an ultimate voice. Those regulatory struggles, as well as the differing motivations of the contending agents, are presented below in sequential order.

The Office of the Comptroller of the Currency (OCC) is the oldest regulatory agency in banking, whose function is to charter and regulate American national commercial banks (active banks in all American states). One of this agency's roles is to authorize new banking activities under the 1862 Bank Act, which states the powers of banks, or, in other words, which activities they are allowed to perform. The allowance of new banking activities is made through the OCC's interpretive letters in which banks submit new activities for analysis and receive comments on whether and how they might be performed, and to what extent.

In 1987, the OCC authorized the Chase Manhattan matched commodity swap index trading. The agency understood that swaps were similar to lending and deposit-taking activities of banks and in general possessed the same risks. As those transactions were matched, meaning end-users like farmers were the counterparty, the OCC interpreted the operation as just like the bank offering a loan to a borrower in exchange for an interest rate.

That decision inaugurated a regulatory battle between the OCC and the CFTC. A few months later, the OCC authorized Chase Manhattan to offer commodity swaps. At the same time, the CFTC started an investigation of the same contracts and launched a note requiring comments for the possible regulation of hybrids[5] and commodities swaps. According to the CFTC, these contracts would be similar to the structure of payments of futures and therefore those instruments would be non-authorized futures that should pass to the agency's jurisdiction. The CFTC, as a recently founded regulatory agency in need

[5] Derivatives contracts that are combinations of different types of derivatives like the swaption, for instance, which is the option of a swap.

of reauthorizations from Congress,[6] held a firm grip on the instruments it could exercise jurisdiction over, to justify its existence and purpose (Romano, 1997; Scalcione, 2011).

The CFTC's intention in regulating the OTC derivatives market was fiercely criticized by the financial industry lobby that was by this time organized around ISDA. Monetary policy officials and agency regulators joined the financial industry lobby revolt. They were: Treasury secretary Nicholas Brady, former Wall Street banker; Richard Breeden, the Securities and Exchange Commission's (SEC) chairman; and Alan Greenspan, the FED's President. From that point, this powerful interest group openly acted to block the CFTC in attaining its goal of regulating hybrids and commodities swaps.

Because of this powerful opposition, in 1989 the CFTC disclosed a policy statement suggesting that some commodities' transactions, according to the agency's jurisdiction, would not be regulated as futures. The exemption for swaps was based on some of their characteristics, such as: individually customized terms, the lack of a clearing system, margin requirements, and business lines that were not sold to the public, as exchange derivatives, which are under the CFTC jurisdiction. Notwithstanding, the CFTC policy statement—while exempting *some* swaps—opened space for non-exempted contracts to be regulated, indicating regulatory uncertainty in the financial industry. As Wattenbarger observes:

> However, the policy statement did not represent a determination by the CFTC that the Commodity Exchange Act is wholly inapplicable to OTC derivatives. Rather, the CFTC expressed its view that 'at this time most swap transactions, although possessing elements of futures or options contracts, are not appropriately regulated as such under the Act and regulations.' The CFTC left

[6] One specific about the CFTC is that it needs periodical reauthorization from Congress to have its regulatory activity considered jurisdictionally valid. Romano (1997) gives a political explanation for this feature: back in 1974 when the creation of independent futures regulation was being discussed in Congress, Democrats wanted to transfer power from the executive branch—in order to weaken the Nixon administration—to the legislative branch. One way they sought to retain control of the new agency was through these periodic reauthorizations.

> open the possibility of future regulation of OTC derivatives (Wattenbarger, 1999, pp. 9-10).

The regulatory uncertainty left by the possibility of the CFTC regulating off-exchange derivatives, especially swaps, drove the financial industry, allied to monetary policy officials, to search for a definitive exemption to that financial market segment. That interest group had been showing increasing discontent to the CFTC's continuous jurisdictional expansion over a growing class of financial derivatives, not only over swaps but also over futures and options on stocks and stock indexes (Romano, 1997).

The officials of the other agencies pressed Congress beginning in 1990 to validate the third agency reauthorization by conditioning two amendments to the CFTC's statute. One would guarantee the transfer of jurisdiction over stock derivatives to the SEC—a more 'sensible' agency to financial industry lobby interests. The other would guarantee absolute jurisdiction for the CFTC to exempt swaps and hybrids traded over the counter.

The first amendment was rejected because both exchanges and farmers feared the CFTC would lose political power and suffer budget constraints if it lost regulatory jurisdiction over stocks and stock index futures, adversely affecting futures markets. The second amendment passed in 1992 when the third agency reauthorization came into effect, and in 1993 the CFTC, following explicitly the amendment's recommendations, exempted hybrids and swaps from regulation, scoring a victory for the banking lobby (Romano, 1997; Wattenbarger, 1999).

In the meantime, from 1990 to 1992, the OCC allowed banks to engage in non-matched or portfolio commodities swaps trading for non-speculative purposes. Trading could happen in exchanges and OTC markets and could also involve underlying assets that were closely related to commodities. In practice, this meant that the OCC was allowing banks to engage in derivatives activities for purposes other than hedging end-users. Despite having prohibited speculative trading, the differences between hedging and speculation were so subtle that regulators could not easily face the difference and punish speculator banks. Henceforth, the agency was authorizing banks to engage in swap transactions for speculative purposes, with the justification that this activity was incidental to bank activities because they should seek financial exposure to underlying assets as part of their

business. As the OCC's tendency was to successively broaden banking powers to authorize a greater range of derivatives trading, foreign exchange, interest rate, commodities, and equities swaps for non-hedging purposes were all authorized by the agency up through 1994 (Omarova, 2009).

It is important to stress this OCC action because allowing speculative activities, even if indirectly, was fundamentally important to improving liquidity in OTC derivatives markets. Speculators taking positions as in the form of bets are the agents granting that hedgers will be able to move in and out of positions quickly, easily, and without harshly affecting returns. This interpretation was key to enlarging the OTC derivatives markets. Besides, as the agency was controlled by the FED, it is important to note that monetary policy officials saw the regulatory exemption as badly needed for the new role of risk management banks were assuming. If this were not the case, they would not have fought so hard for those exemptions.

Contradictorily, the OTC derivatives market's growing turnover in the mid-1990s brought the attention of regulators to the systemic risk it might pose. In 1994, a wing of the Democratic Party led by then-representative Edward Markey put forward a series of hearings in the Subcommittee of Telecommunication and Finance in the House of Representatives. These hearings followed a series of scandals—heavily reported on in the media—involving millions of dollars lost by companies and even by Orange County, California, which traded derivatives over-the-counter with banks.

During the hearings, the Government Accountability Office (GAO), the agency responsible for comptrolling and public auditing in the United States, expressed concerns about the high levels of systemic risk of OTC derivatives markets and explicitly recommended that the American Congress place those markets under consistent regulation by federal agencies. Nevertheless, also during the hearings, financial industry lobbyists affirmed self-regulatory initiatives prompted by ISDA were sufficient for those markets' safe operation. High American officials like the FED's Alan Greenspan and the SEC's Arthur Levitt defended private self-regulation as well. As in the words of Levitt is one of the hearings:

> I am here today to address recommendations made last week by the GAO in its study of the derivatives market. I commend Charles Bowsher and his colleagues at the GAO. The report contains a thoughtful assessment of the derivatives marketplace and accurately identifies a broad range of goals and objectives for the regulatory community. There is obviously a great deal to be done. We need to understand this market better, and we are going to have to go to the industry to do that. The question for all of us here today is not whether this market is going to have more regulatory oversight but how it will get done. From the SEC's perspective, I believe the first step is not legislation but a careful evaluation of the market and an assessment of the level of cooperation we, as regulators, will receive from the industry in designing a sensible regulatory structure (House of Representatives, 1994, p. 188-189).

Subsequent to the hearings, Congress members submitted bills to: i) increase the regulatory supervision by federal regulatory agencies to derivatives transactions in the banking system; ii) increase the international cooperation efforts to regulate OTC derivatives markets; iii) forbid institutions that receive federal deposit insurance to engage in derivatives trading; iv) demand accounting, and transparency requirements from financial institutions that trade derivatives to introduce capital; and v) empower the SEC to regulate OTC derivatives markets. Nevertheless, *none* of the bills proved effective at regulation due to the intense lobby of the ISDA and the opposition from high-ranking monetary policy officials (Pagliari, 2013; Spagna, 2018).

In 1998, the Clinton administration nominated Brooksley Born to be the chair of the CFTC. She was openly in favor of granting the agency enough jurisdictional powers to regulate the OTC derivatives market, as she considered it too opaque. For her, there was no recording keeping or reporting in that market, and regulators had no information as to what was going on. There was no way for the government to know how big the market was and who was taking part, making this segment prone to fraud. Likewise, she was afraid of systemic risk effects from the unregulated market at a time when financial expansion was on its way (Kirk, Gilmore, & Wiser, 2009).

Soon after she took charge, she was personally warned by Greenspan that she should not try to regulate OTC derivatives at risk of triggering an unforeseen financial crisis.

Nevertheless, she moved on with her initial aim and, on May 7th, 1998, the CFTC published an official document called *concept release* in which the agency asked interested parties to comment on the possibility of regulating OTC derivatives markets.

The release was immediately repelled by the *President's Working Group*, an interest group joined on behalf of the American Presidency consisting of the then-Treasury Secretary Robert Rubin, the FED's president Greenspan, and the SEC's Arthur Levitt. The group considered a public communiqué that Mrs. Born's declaration was a misjudgment. Also, the President's Working Group announced that it would call upon Congress to approve a bill blocking the CFTC from regulating the OTC derivatives markets. As an independent agency, only Congress could prevent it from taking action; this mirrors the case involving nearly the same aspects to the 1987's later conflict.

After a series of hearings in the American Congress where the CFTC chairperson, the President's Working Group members, and financial industry lobbyists testified, representatives voted to forbid the CFTC from regulating OTC derivatives markets. Finally, in 2000, Congress passed the Commodity Futures Modernization Act (CFMA) with a clause that removed the CFTC statute authorizing the jurisdiction to regulate OTC derivatives between sophisticated parties or financial institutions specialized in OTC derivatives markets—the derivatives dealer banks. From that point on, the CFTC would only be charged to supervise the self-regulation of financial institutions trading derivatives up to the post-2008 crisis regulatory changes under the Volcker regulation (Kirk, Gilmore & Wiser, 2009).

However, despite clear actions by the OCC and U.S. monetary policy officials to favor the derivatives trading of banks, it is still necessary to investigate the agents' rationality. It is important to check whether they had a strategic plan in mind when they fought for regulatory exemptions or at least if they had any macro or systemic reasoning in those actions. This is discussed in the next section, through a case study of the 1998 congressional hearings on OTC derivatives regulation.

4 American officials' strategic rationality on OTC derivatives regulation: the 1998 case study

On June 10th, 1998, Brooksley Born called upon Congress for a hearing on OTC derivatives markets and defended the power of the CFTC to regulate and even exempt from regulation derivatives instruments traded on these. She endorsed the exemption powers of the Commodities Exchange Act and the Treasury Amendment. She stated that over-the-counter transactions in foreign currencies, government securities, and certain other financial instruments, as well as options on securities and options on securities indexes, were excluded from the act's regulatory range. However, she argued that the CFTC's exemption for swaps and hybrids did not exempt all of those instruments and that even though exemptions meant those instruments should not be regulated, they still had to be subject to some requirements:

> To be eligible for exemptive treatment, the swap must be a swap agreement as defined by the rule: it must be entered into solely between certain defined eligible swap participants; it must not be part of a fungible class of agreements that are standardized in their terms; it must include as a material consideration the credit-worthiness of the parties to the obligation; and it must not be entered into or traded on or through a multilateral transaction execution facility (House of Representatives, 1998a, p. 4)

She argued, then, that the developments in swaps markets 'encompassing new end-users of varying degrees of sophistication, (…) [had raised questions] whether the Commission should broaden the definition of eligible swap participants contained in its current rule and whether record-keeping, sales practice, or other protections may now be appropriate.' (House of Representatives, 1998a, p. 4). She then addressed the motivations for the concept release, which were linked to concerns regarding eligible participants in the market and whether current regulation could sufficiently play anti-fraud and anti-manipulation roles. In her own words:

> The Concept Release seeks public comment on whether the Commission's current exemptions for swaps and hybrid instruments remain appropriate as to the definitions of eligible transactions and eligible participants and the prohibitions against fungible swaps, swaps clearing, and transaction execution facilities. It asks whether the current prohibitions on fraud and manipulation in swaps transactions are sufficient to protect the public, or whether the Commission should consider terms and conditions relating to registration, capital, internal controls, sales practices, record keeping, or reporting (House of Representatives, 1998a, pp. 5–6).

Despite her guarantees, 'the Concept Release does not propose any modification of the Commission's regulations, nor does it presuppose that any modification is needed. The Commission is open to evidence in support of broadening its exemptions, evidence indicating a need for additional safeguards, and evidence for maintaining the status quo' (House of Representatives, 1998a, p. 6). The other members of the President's Working Group understood that the concept release was a broad attempt to regulate OTC derivatives markets. In the words of John Hawke Jr., undersecretary for domestic finance of the Treasury, on July 24th, 1998—the last hearing specifically held on the subject:

> CFTC may be considering overseeing OTC derivatives clearinghouses, regulating multilateral transaction execution facilities for OTC derivatives, requiring registration by OTC derivatives dealers and perhaps other market participants, imposing capital requirements for OTC derivatives dealers, prescribing internal control requirements for OTC derivatives market participants, establishing extensive sales practice rules and disclosure requirements for OTC derivatives dealers, adopting recordkeeping and reporting requirements for OTC derivatives dealers and requiring mandatory membership in a self-regulatory organization for OTC derivatives dealers (House of Representatives, 1998b, p. 76).

Basically, the FED and Treasury's main concern—as evidenced in Hawke's testimony – was that the CFTC would, subsequent to the concept release, launch regulations for swap markets that would reassemble the tighter regulations of futures markets. As expressed in

Larry Summers' own words during the June 30th, 1998 hearing—the second hearing on the subject:

> If swaps are viewed as futures 'the legality of swaps involving nonexempt securities' would be called into question. Consequently, if OTC derivatives based on nonexempt securities are deemed to be futures contracts, there is the possibility that they could be viewed as illegal and unenforceable. Second, the Concept Release causes uncertainty for other types of OTC derivatives, even those that would be clearly covered by the CFTC's exemptive authority, if they were deemed to be futures contracts, since it raises the possibility of increased regulation over this market (House of Representatives, 1999, p. 8).

It is important to observe that what the FED, Treasury, and SEC claimed as a matter of legal uncertainty posed by the concept release interpretations was a fear of the CFTC's intent to regulate OTC derivatives markets in the same way as futures markets. That could be seen in Greenspan's insistent argument that the Commodity Exchanges Act (CEA) [7] does not apply to OTC, rather only to exchanges, and that concerns have persisted on that the CEA could jeopardize the enforceability of certain OTC derivatives transactions. In the hearings, Greenspan argued extensively as to why OTC derivatives markets should not be enforceable under the CEA, emphasizing that those markets had a different infrastructure, business environment, and compliance mechanisms than futures markets. He argued that the regulation of OTC swaps in particular and OTC derivatives, in general, would undermine the competitiveness of U.S. derivatives dealer banks. This would trigger banks to move their derivatives dealing activity abroad, taking out from American regulators' oversight this important market segment when it was American regulatory action, he contends, that was essential for this market to thrive. Still, in his words, without American regulators' supervision, the competitiveness of American banks dealing with OTC would be at risk (House of Representatives, 1998b, p. 30.).

[7] It is important to make clear that the Commodity Exchange Act is the overall regulatory framework to which futures and options are subjected to and the CFTC is the regulatory agency responsible for enforcing it.

Top officials from the FED, Treasury, and SEC then joined Greenspan in arguing for the systemic importance of the OTC derivatives market to the American economy and the proper management of the global financial system. They successively made the point that it was unnecessary to regulate the markets, either pointing to the legal uncertainties it would create if swaps were regulated under the CEA or even highlighting the possibility of the financial crisis posed by this rising "legal threat" (House of Representatives, 1998a, 1998b, and 1999).

It is important to highlight, however, that officials did have a strategic view of what regulatory exemptions in the OTC derivatives market did in terms of opening space for that market to become fundamental for the American and global financial system. Some would back a deeper notion that the regulatory exemptions for OTC derivatives had been essential for the markets' innovative environment. In the words of James Leach, House representative member of the Foreign Exchange Committee:

> (…) though they have become an important risk management tool, over-the-counter swaps and hybrids have only recently come off the drawing boards of our financial engineers, and do not fit legal definitions written long before they were created. So as not to risk standing in the way of innovation, Congress in 1992 ducked the issue of determining whether swaps and hybrids constitutes future contracts under the Commodity Exchange Act. Instead, Congress encouraged the CFTC to exempt swaps and hybrids and possibly all but the fraud manipulation provisions of the CEA. The Commission promptly acted on the exemptions. Although this was—and remains—an imperfect solution, it did provide a measure of legal certainty, allowing OTC derivatives markets to grow at rapid pace (House of Representatives, 1998b, p. 284).

Richard Lindsey, director of the division of market regulation from the SEC, reinforces Leach's view:

> In enacting the Futures Trading Practices Act of 1992, Congress gave the CFTC broad exemptive, not regulatory, authority concerning swaps transactions. The conference report for the CEA verifies that the purpose for giving the CFTC those exemptive powers was to provide certainty and stability

> to existing and emerging markets, thereby fostering financial innovation and market development. The objective was legal certainty for swaps, not expansive regulation of an evolving market (House of Representatives, 1998b, p. 87).

For others, such as Michael Brosnan, deputy comptroller for risk evaluation for the OCC, there was a direct relationship between the condition of American banks as derivatives dealers, their capacity of managing risk, and the regulatory status:

> While we note that the derivatives market, and, in particular, the swaps market, is growing rapidly, we believe that the current regulatory structure for these markets is effective and appropriate. From our perspective as bank regulators, we know that banks' derivative activities include not only their role as dealers to satisfy customer demand, but also the integration of the activity into their asset/liability risk management processes (House of Representatives, 1998b, p. 376).

Kenneth Ryder, the executive director of the Office of Research and Analysis of Thrift supervision, would also argue that regulating OTC derivatives markets would raise the cost of operations, which regulators regarded as a deeply undermining effect, and highlighted the importance of regulatory exemptions for market operations:

> The [Office of Thrift Supervision] would be concerned if the cost of OTC derivatives transactions were to increase significantly as a result of additional regulation. It would be unfortunate, indeed, if—because of additional regulation—the costs of engaging in derivatives transactions to hedge or manage risk were to escalate and become prohibitively high for those seeking to manage and control their interest rate risk exposure (House of Representatives, 1998b, p. 390).

The centrality of OTC derivatives markets for both the American and the global economy was also a topic of discussion. Again, in the words of John Hawke Jr. from the Treasury:

> The OTC derivatives market is a huge, global market, which, when properly used, enables participants, including many businesses, to manage their risk exposures and lower their financing costs. For example, a small U.S. business involved in exporting or importing goods can use derivatives to protect against fluctuations in foreign exchange rates. OTC derivatives also serve as an alternative mechanism for participants to take positions based on their market views, which can increase the liquidity and narrow the bid-ask spreads in the underlying cash markets. These functions of the OTC derivatives market serve to facilitate domestic commerce and international trade, capital formation, and international investment flows and, thus, ultimately, economic growth. Developments that disrupt this market are clearly not desirable. Such disruption can inhibit the use of an important risk management tool. Also, the perceived threat has global implications because of the linkages among markets worldwide. At some point, disruption can increase systemic risk, especially if a fear develops that obligations will not be honored on a large scale (House of Representatives, 1998b, pp. 295 -296).

Greenspan and Lindsey, respectively, reinforce this strategic view:

> The large increase in the volume of OTC transactions reflects the judgments of counterparties that these instruments provide extensive protection against undue asset concentration risk. *They are clearly perceived to add significant value to our financial structure, both here in the United States and internationally* (House of Representatives, 1998b, pp. 308–309, our emphasis).

> OTC derivative instruments are important financial management tools. They reflect the unique strength and innovation of American capital markets, and the securities firms and banks that participate in those markets. The growth of the OTC derivatives market has come in part as a result of the careful approach taken by Congress and U.S. financial regulators. That approach has focused on promoting legal certainty for OTC derivatives transactions and building

> consensus among regulators through the President's Working Group on Financial Markets (House of Representatives, 1998b, p. 86).

Finally, Summers stated that 'the American OTC derivatives market is second to none. In a few short years, it has assumed a major role in our economy and has become a magnet for derivative business from around the world' (House of Representatives, 1999c, p. 8). This is a sign that top American officials had in mind the strategic importance of OTC derivatives. Therefore, by understanding the political struggle over OTC derivatives markets as a historical development, it is clear that top American officials were aware of the coordinated efforts of both the Treasury and FED to keep these markets exempted. They were also mindful of the impacts this policy had in allowing American banks to become dominant and play a fundamental role in global risk management. This specific connection is captured in the words of Levitt:

> It is widely recognized that OTC derivative instruments are important financial management tools that, in many respects, reflect the unique strength and innovation of American capital markets. In fact, U.S. markets and market professionals have been the global leaders in derivatives technology and development (…) The growth in activity involving this market has come, in part, as a result of the careful approach to regulation taken by Congress and by U.S. financial regulators. That approach has focused on promoting legal certainty for OTC derivative transactions and encouraging the development of sound industry practices. That approach has also relied on building consensus among U.S. financial regulators through their participation in the President's Working Group on Financial Markets (House of Representatives, 1998b, p. 118).

Levitt signals that the regulatory status of the time was not a simple, unsupervised development. Instead, it was a deliberately coordinated action between top officials from the FED, Treasury, and SEC to allow private self-regulation of OTC derivatives markets to boost its activity. It means self-regulation was not only achieved through private lobbying, as some parts of the current literature on OTC derivatives market regulation

claim. Nonetheless, self-regulation was favored by public agents who successfully developed a strategy to attract U.S. government support for this market to thrive. They acted under the strategic consideration of the fundamental role of derivatives in the global financial system. This was achieved by using, since the 1970s, a series of normative procedures such as the OCC interpretation letter as well as political instruments such as congressional reauthorizations of the CFTC.

This claim does not deny the possibility that top American officials' actions have also been guided by private lobby incentives. What this hypothesis vindicates is that officials had strategic considerations over derivatives' regulatory exemptions besides private influence on deregulatory moves. Considering Strange's concept of bargaining in enacting structural power, it is possible to observe in this case study that public and private agencies have come together to form one compatible amalgamation of interest that boosted American financial structural power. Without denying the lobby influence hypothesis on OTC derivatives regulation, the work highlights the autonomous creation of interests and considerations by public agents in that realm.

With a strategic set of regulatory exemptions between the 1970s and 1990s, American officials were able to defend the private development of a market that became the central hub for global financial risk governance. This made possible the newly floating system arising from the end of the gold-dollar standard, signaling a reemergence of the American hegemony in a macroeconomic autonomous and financially centered form.

Final remarks

The objective of this work was to understand how financial contracts and financial regulation can be instruments for the reinforcement of financial state power. In this case, we focus on how financial derivatives became one of the fundamental pillars for the operation of the post-Bretton Woods system. The results show that financial derivatives have made the post-Bretton Woods system operable by mitigating the new system's three fundamental macroeconomic risks, related to exchange rates, interest rates, and credit defaults. Thus, it allows any asset in the global financial system to be comparable to a U.S. Treasury Bill—the standard asset in the system—in the same way the U.S. dollar is the basic unit of account. Mitigated by derivatives, all main financial assets issued around the world became comparable in terms of risk to the U.S. Treasury Bill. Therefore, global transaction flows and integration could take place at as fast pace as that of the 1980s, when global markets for risk management started to emerge with the development of swaps in over-the-counter markets. They mitigated, allowed the management of, and thus ordered risk, and in doing so consolidated a new global financial governance under the floating dollar regime.

Financial derivatives were the instrument used by the American state to establish the operational norms of the international financial system in the post-Bretton Woods period. With the Nixon shock, the United States freed itself to sustain the fixed value of the dollar into gold. However, this action created high volatility and instability in the international financial system, leading some authors to call it a non-system. Financial derivatives made it possible to originate a new global financial system more prone to deal with this volatility. Through a learning-by-doing process, agents started to use derivatives as a way to counter, mitigate, and manage risk. It was the start of a new system of guarantees, as highlighted by Black, in which private financial institutions offered guarantees against all sorts of financial risk.

Finally, the present work does not take regulatory processes as merely technical decisions on how to allow financial institutions to carry their business. This work also does not take for granted the assumptions that high-ranking American officials and regulators always reflect the desires of private agents in their overall decisions. For these reasons, this work is able to question whether these officials also had particular and autonomous strategic

considerations on how regulation should be formulated, taking into account states' aims and not only private interests, even if those were interlinked. As a result, the work illustrates how financial officials were able to calibrate their mindset toward what was strategically relevant for the American financial governance.

The history of OTC derivatives markets regulatory struggles revealed how the OCC, through its interpretive letters, was fundamental in allowing American derivatives dealer banks to engage in trading for speculative purposes, which enhanced the liquidity for markets of financial risk. At the same time, American officials were blocking the CFTC and any attempt in Congress to regulate OTC derivatives markets, especially swaps throughout the 1970s and up to the 1990s.

The 1998 turf battle study case among the CFTC, Treasury Department, SEC, and FED revealed, through the analysis of Congressional hearings, important strategic policy consideration from high-ranking American officials such as Summers, Rubin, Levitt, and Greenspan against Brooksley Born's less strategic view on what the OTC derivatives markets meant for global financial governance. For the former, the OTC derivatives markets' regulatory exemptions—exempting them from the similar regulations faced by derivatives exchanges—were strategic in allowing investors and financial institutions to enhance their capacity to manage risk and generate liquidity as new contracts for new kinds of underlying assets were being created at a fast pace throughout the 1980s and 1990s. So, the development of the OTC derivatives markets was one of the main pillars of the expansion of American dollar liquidity in this period and, by extension, of the expansion of the global financial system and American hegemony.

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Annex

Table I

Derivatives mitigation of Vale corporation bond's risks

Asset value	Risk to be mitigated	Derivatives	New Risk-free asset
Vale Corporation bond	Credit Default Risk	Credit Default Swap (CDS)	(As if it was) Sovereign Bond
Sovereign Bond	Exchange Rate Risk	Foreign Exchange Derivative	(As if it was) T-bond
T-bond	Interest rate risk	Interest Rate Derivative	(As if it was) T-bill

Adapted from Mehrling, 2011