

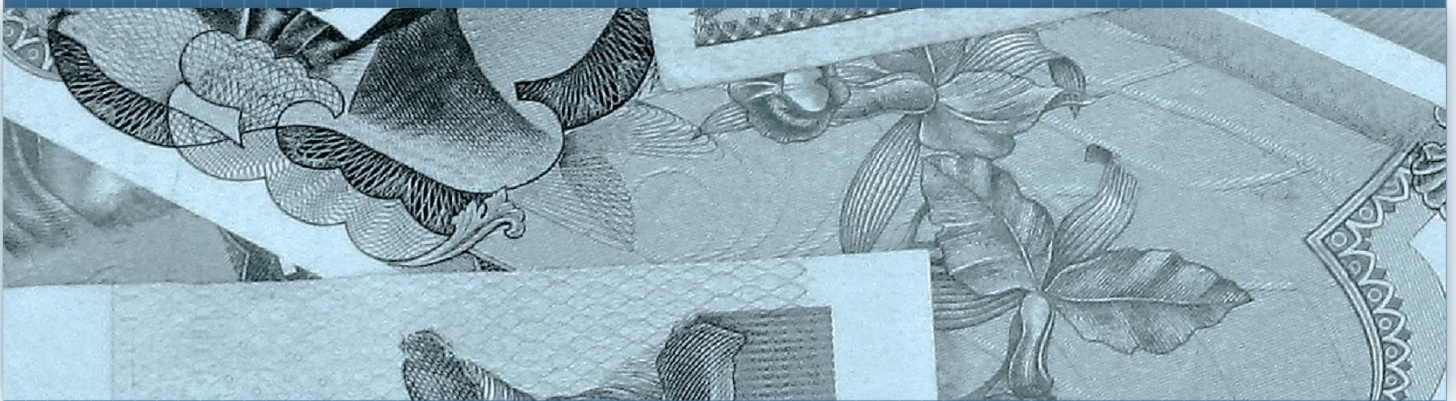
Gemloc

ADVISORY SERVICES

Repo Markets

DRAFT Background Note

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REPO MARKETS

BACKGROUND NOTE 1

This note on repo markets is part of a series of background notes produced under Gemloc Advisory Services Program as a by-product of its strategy to support the development of liquid local currency bond markets. Selected topics have been a key focus in the areas of work of the Advisory Services because of their catalytic impact on debt market development. They include primary market organization through primary dealers and liability management; repo markets; price dissemination and clearing and settlement arrangements².

Repo markets are an essential component of liquid Government debt markets, acting as a transmission belt between money and debt markets, as well as serving to conduct key functions for the efficient operation of debt markets. These include, among others, credit risk management, funding debt portfolios, playing the yield curve, and covering short positions and settlement fails. The hybrid nature of a repo between a collateralized loan and a full transfer of ownership makes it a very versatile instrument for a broad range of market participants with very different business models. However, this is at the same time the reason for its complexity. This note addresses the legal, structural, accounting, tax, regulatory and infrastructure factors that are decisive for repo market development. The legal and infrastructure factors that underpin repo markets functionality are evolving ones and may be different depending on the country. The perspective adopted in this note intends to provide a balanced account of both the conceptual issues in each topic and relevant country cases, with the objective of providing policy makers with analytical tools to address their country specific context.

¹ This background note has been prepared by Jose Ramon Martinez-Resano, Senior Advisor Spanish Treasury and World Bank consultant, to support World Bank Advisory Services programs for the development of local capital markets. **It is a work in progress and as such should not be quoted.** Comments to Email: jrmresano@telefonica.net; martinez@bde.es and asilva3@worldbank.org are welcome. This note will serve as a basis for a forthcoming handbook on the topic.

² Three notes have been produced so far on Primary Dealers, Liability Management and Repo Markets. Other notes will follow on Price Dissemination and Clearing and Settlement.

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REPO MARKETS

1. THE “MAGIC” OF REPOS AND ITS MULTITUDE OF USERS

As highlighted in the WB/IMF Handbook on debt markets, **the money market is the cornerstone of a competitive and efficient system of market-based government debt intermediation**. A properly functioning money market is a precondition for a developed bond market since it paves the way for bearable liquidity risks. Hence, an appropriate money market framework sets one of the first conditions for secondary market activity to emerge.

Repo is a term used with both generic and very specific meanings. For the purpose of these initial introductory remarks, it is worth to retain only that a (generic) repo is a sale of securities coupled with an agreement to repurchase the securities at a specified price on a later date. Typically, the preconditions required for a well functioning money market are also necessary for a repo market to emerge. But they are far from being sufficient. In fact, the development of a repo market often represents a crucial step in the advance of both money markets and capital markets. The nature of this advance can be succinctly summarized by saying **the development of a repo market enables the operation of an efficient bridge between market segments and interests**. It is this markets' completion feature what essentially lies behind the numerous range of agents interested in the development of repo markets.

But the valuable magic of this bridge-like functionality provided by repo markets is also quite demanding in terms of the basic preconditions required for it to work properly. The intent of this chapter is essentially the systematic study of the role played by numerous factors (legal, market structure, tax and clearing and settlement) on repo market development. This is the task of sections 2 to 6.

However, in order to better understand the magnitude of the basic infrastructure challenges posed by repos it will be useful to briefly go first through the functional elements of that “bridge”. In this regard, although imprecise from a legal perspective, **it is useful to initially keep in mind the apparent similarity between repo contracts and collateralized loans of cash**. The proceeds of the initial sale in a repo can be understood to correspond to the principal amount of the loan and the excess of the repurchase price over the sale price corresponds to the amount interest paid on that principal. Moreover, the exchange of title over the underlying security in a repo can be loosely understood to place the buyer on an equal footing with the cash provider in a collateralized loan, as roughly judged in terms of their exposure to counterparty risk.

Certainly, it is absolutely essential that the security bought temporarily under a repo trade effectively mitigates the counterparty risk exposure arising from the funding provided by the buyer. Garbade [2009] describes the importance of risk management concerns of asset managers with temporary excesses of cash as one of the initial drivers of the development of the private US repo market in the US after the World War II, especially once interest rates structurally went up. However, one could hardly speak about repos as a valuable financial innovation if that was all their contribution. Collateralization techniques are probably as old as the mankind itself.

The completion of financial markets brought about by **repo contracts** lies rather in the fact that the **ability to mitigate counterparty risk exposure is fundamentally made compatible with the ability to conduct unrestricted operations with the collateral received**, i.e. the collateral is further tradable.

The outcome of an instrument that provides efficient counterparty risk protection and ensures flexible operations is **a broad range of users**. Almost any kind of investors can securely make the most of their excess cash balances. Typically, a sufficiently broad diffusion of the instrument among non-bank investors sets the basis for a “market pyramid” where inter-bank repo traders sit at the top. Corporate and mutual fund investors stand out in the layer of non-bank users of repo contracts, but also retail investors can be repo users.

Further up in the layers of the “pyramid”, the intense use of repo markets by banks providing intermediation services in debt markets pose demanding requirements on the contractual and operational features of repos. Typically, this is especially the case of primary dealers who have to fund inventory holdings in discharge of their PD obligations. As a general rule, the ability of intermediaries to fund inventory holdings of government debt strongly depends on their capacity to distribute those holdings via repo solutions within the domestic investment base. In this regard, **the development of a domestic repo market has to be understood to mean not just a construct for interbank players, but also a “capillary” and integrated network that reaches domestic investors** seeking counterparty risk free instruments.

Admittedly, this statement has to be qualified as regards repo markets within a monetary union like EMU. Actually, the development of a cross-border repo market poses specific challenges in both infrastructure and legal dimensions. In fact, the statements so far have to be qualified in another dimension. The security underlying a repo needs not to be restricted to government debt. Credit repo has thrived before the crisis both in the US and Europe. But this report concentrates largely on government debt market repos due to its cardinal importance both in good times and bad times.

The operational flexibility predicated of good repo markets cannot be detached from another way of using repos. In the right market circumstances, **the temporary access**

to bonds via repo provides investors a channel to take a short view on market prices.

Importantly, the prospect of this practice has often been the cause of precautionary regulatory measures that inhibit or delay the development of the repo market to start with. On the contrary, some sovereign issuers³ require from their PDs to post short market positions as part of their bid-ask affirmative quoting obligations. It goes without saying that these arrangements require efficient repo markets where primary dealers can cover the risk of settlement fails that would materialize if they are lifted their sale position and have not the bond in their inventory. Interestingly, primary dealers in the US government debt market have traditionally reported systematic short net positions.

A very special sort of participant in repo markets are central banks in the discharge of their monetary policy implementation functions. Liquidity providing loans instrumented as repos decidedly provide central banks the credit risk protection required to safeguard their independence. However, the decisive importance of repos for monetary policy instrumentation acquires strength when that protection join forces with the enhanced effectiveness of monetary policy impulses imparted with an instrument like repo which serves as “bridge” to capital market.

The origin of repo markets in the US can be traced back to the recognition of the especial force of a markets-based implementation framework for monetary policy, i.e. one that leverages on the swift linkages operating between monetary impulses and broad financing conditions in the capital markets. Under the real bills doctrine prevailing in the 20s, this instrumentation philosophy materialized in terms of outright or repo operations on bank acceptances.

But the benchmark nature of government debt in capital markets quickly paved the way in the US to the prominence of repos on government debt as the tool to accommodate temporary adjustments to base money. An institutional feature of the US government debt market that offers testimony of its inextricable links with monetary policy implementation is the fact that traditionally US Treasury PDs are taken to be the counterparts of Federal Reserve monetary operations. To some extent, this amounts to be a recognition of the shared value of secondary market liquidity to both the Federal Reserve and the US Treasury. Consistent with this view, the entire post-trading infrastructure setup for the Fed operations can be said to have essentially hinged around the essentially same legal and tri-party repo infrastructure that serves also private investors in the US market. In a nutshell, the US government debt market provides a case study of symbiotic development of repo for monetary policy and private purposes.

³ A non-exhaustive list of examples is Belgium, France, Italy and Spain.

This case is less clear cut elsewhere, although the catalyzing role played by monetary policy repos for the development of private repo markets is still a valid conclusion. Repos were adopted by OECD central banks much later during an extended period of time. It is safe to summarize the reasons for this late and heterogeneous adoption of repos by saying that it obeyed both policy and implementation considerations.

Two salient policy factors have shaped the particular use of repos adopted by the old Bundesbank and later, to some extent, also by the ECB. The first one is some reluctance to backstop monetary operations exclusively with government bonds, especially as outright operations to accommodate permanent developments in base money, but also as repo operations to deal with its temporary developments. The second one is a reluctance to intervene in the money markets on a daily basis, in order to leave the market to un-distortedly produce the “price” signals that reveal scarcity or abundance of base money.

The bottom line is **some divergence between central bank and market repos**. This departure between nominally similar instruments affects both formal and more material ones. Unlike what happens with the Fed, which essentially has traditionally undertaken repos based on the essentially same legal contract than the used by private operators⁴, the ECB implements open market operations via repos satisfying a proprietary documentation and implementation framework⁵. Two material examples of the divergence between private Eurozone repo markets and central bank repo is the broader range of ECB acceptable collateral or the longer tenors employed in ECB repo refinancing operations.

Based on these notes of divergence one might be tempted to conclude that the Eurozone makes the case of the irrelevance of “official repos” to the development of the repo market on government bonds. But this conclusion fails to grasp the implications of the economics of collateral management in terms of a rich and complex inter-relationship between both segments. As an example of this, the ECB⁶ documents the operation of a Gresham law affecting the collateral supplied in ECB repos, i.e. the substitution of government paper with riskier assets as collateral delivered to the central bank. Viewed from a price perspective, it is immediate that this substitution mechanism finds an expression in terms of some **“natural spread” between official repo rates and market rates for the same tenor**. No matter how difficult it is to ascertain the magnitude of this “natural spread”, both the central bank and market participants have to account for it in their assessment of monetary policy stance and market conditions.

⁴ See Baxter and Toomey (2006)

⁵ The General Documentation on Eurosystem Monetary Policy Instruments and Procedures contains the framework that suits the decentralized and universal implementation of monetary policy of the Eurozone.

⁶ See ECB (2010).

The Switzerland National Bank illustrates the case of the crucial role played by central bank repos in the development of the private repo market, even if it is a latecomer to that sort of operations. The Swiss central bank used to implement monetary policy by means of currency swap transactions. This arrangement proved to be unsatisfactory both from risk management and policy perspectives. The lag between the settlement of the domestic and foreign currency legs of the transaction entailed a principal risk that raised concerns among Swiss authorities after the Asian and Russian crisis. From a policy perspective, a swaps-based implementation framework limited the range of domestic counterparts having direct access to central bank refinancing. Thus, the needs faced by the Swiss central bank in the implementation area required it to promote a repo instrument. The bottom line to retain for our purposes right now is the fact that its initiative in this area not only aimed at serving its own needs but also was instrumental to overcome the impediments (see below) that had hindered the development of a private repo market in Switzerland.

The account of agents that recognize and contribute to the value of repos does not end up with central banks. Although on a less widespread basis than in the central banking world, **sovereign issuers themselves also resort to repos with both policy and management purposes.** From a policy perspective, the temporary provision of bonds by the issuer can provide a cure for transitory imbalances between supply and demand that may arise due to the prospect of settlement fails or even market corners. Some sovereign issuers like UK and Sweden have even stretched further the policy scope of primary market repos to the extent that they can be used as a permanent facility that enhances the liquidity of the secondary market by setting an upper limit to search costs.

From a counterparty risk management perspective, the basic constraints and goals faced by debt offices in the discharge of their cash management duties does not differ substantially from the ones faced by private managers. As a way of example, the Spanish Treasury invests its excess cash balances via one-month rolling overnight repos auctioned among a group of banks.

The account of modalities of repo utilization made so far justifies reiterating the mention made before to the “magic” of repos. Before going into the detailed analysis of the factors that make possible that “magic”, it is important to stress in advance something of relevance with regard to repo market promotion in different stages of development. **The legal and infrastructure factors that underpin repo markets functionality are evolving ones.** Garbade (2009) provides a nice account of the evolution of repo contracts in the US. An important implication of this general observation is the obvious, but often neglected, fact that developed market solutions for repo markets may not be entirely be valid in less developed markets.

An area where advanced economies have innovated, to the extent of altering traditional arrangements in the repo markets area, **is netting of credit risk exposures and collateral management techniques**. The trend in some markets to simultaneously ensure operational flexibility, highest reduction of effective counterparty risk exposure, no matter if it arises from derivatives or repo trades, as well as maximum efficiency in the use of available collateral has required significant legal changes and adaptations that require and attention to transplant to a less developed market.

In a nutshell, the **development of a local repo market entails a sequencing problem**. The rhythm at which development can advance can be just set by the experience gained by local players with regard to the performance of their market. In this regard, the advice and cases contained in this chapter must be taken as a distillation of experiences that cannot be just transplanted but only adapted to the local market.

An advice that summarizes the multiple keys to the success of a repo market is the need of consistency in the deployment of efforts. Consistency here is meant to convey the requirement that the legal underpinnings of repos, its accounting, tax and regulatory treatment as well as market structure and practice are all of them conducive to their magic functionality. The best practices stressed in this chapter must be read jointly with best practices in other connected fields. I turn now to deal with each issue separately.

2. LEGAL ISSUES ON REPOS

The essentially legal content of this section should divert the attention of debt managers and other practitioners to apparently more practical areas. The difficulties met in different jurisdictions to accommodate repos in a way that ensures both their functionality and legality offers important lessons. At this stage, it is worthwhile to stress one of those lessons. Namely, the need of a permanent dialog with legal experts in the matters covered in the following subsections, inter alia property law, bankruptcy law and international private law. Importantly, the communication must be sustained in time because repo contracting conventions have proved in many markets to have an essentially evolving nature.

2.1 REPO FUNCTIONALITY, LEGAL CHALLENGES AND REPO CONTRACT TYPES.

With intentional imprecision, the introductory section assimilated a generic repo to a type of secured loan of cash. The intent of this section is to motivate the precise

definition of alternative repo contracts. Namely, this section paves the way to the definition of classic repo, sell/buy back and repo master agreements.

The comparison of a generic repo with a secured loan of cash was seen to loosely match the remuneration and counterparty risk protection sought by the cash provider under both contracting alternatives. The collateralization dimension is essential for a repo to perform well, but as emphasized in the introductory part, it falls short of capturing the expectations from a repo. Operational flexibility is a second essential ingredient for a repo market to be different from burdensome secured financing techniques.

Typically, secured financing transactions in which the parties agree to secure an obligation with an enforceable security interest in property are governed by legal dispositions that dictate many things. The importance of legal clarity in substantive matters⁷ about generic security financing business traditionally has invited lawmakers to be cautious and adopt strict procedural rules. Thus, in the past the legal procedures applicable to pledges were incompatible with the operational flexibility needed in a money management environment.

The sale and repurchase nature of a generic repo instrument permits to simultaneously achieve operational flexibility and credit risk protection. The full transfer of title over the security underlying the repo transaction is thus a key for the proper working of the market both from an operational and a collateralization perspective.

The contribution of transfer of title to operational flexibility is clear. The buyer can freely on-sell or repo the security received in a reverse repo⁸. As for the counterparty risk protection, a generic repo instrument can be said to provide it only if the law recognizes the right of the buyer to sell the security and appropriate the proceeds from the sale when the seller does not pay back the money lent.

But a generic repo is a challenging legal construct. The diversity of existing concrete repo “documentation” solutions – classic repo, sell/buy back and repo master agreements - highlight the difficulties encountered. The legal challenges associated to generic repo instruments can be said to arise from the crucial fact that a repo is defined as a sale and a repurchase of the underlying security, but it functions as a

⁷ Some of the questions to be answered by secured finance rules are: How to create a security interest in property?, who can create it?, how to make public those security interests?, what is the nature of the property rights over the collateral?, how the property is repossessed in case of default and sold?, how are the proceeds used to pay the party that has a security interest in the property?. See, Fleisig et al (2006).

⁸ A reverse repo is the reverse of a repurchase transaction. A dealer purchases securities from an investor and simultaneously agrees to sell them back at a later date. The dealer provides the investor with cash on which the investor pays a specified rate of interest ("reverse repo rate"). This is a source of financing for investors.

means of borrowing and lending cash. Securities sold in a repo appear to be bought by one counterparty, but only “lent” or better “pledged”, by the other. This combination of buying/selling, on the one hand, and “borrowing/lending” on the other, facilitates the participation in the same exchange of two counterparties with very different requirements. But that also complicates to fit repos within traditional legal constructs. Box 1 illustrates briefly this difficulty from a history of law perspective.

To complicate matters further, securities lending stands as a business practice that replicates similar legal challenges to the one found in repos, although referring now to a different business driver. Namely, the loan driving a securities lending trade is one of securities and the collateral is usually cash⁹, whereas the instrumentation is an exchange of cash and a temporary transfer of title over the security. Fortunately, the securities lending and repo business seldom overlap. Put differently, it is unusual that temporary operations on bonds are called differently depending on the intent of the party that initiates the trade¹⁰, i.e. depending on either her wish being to place/get funds or, alternatively, getting some particular bond. In the government bonds area, temporary trades initiated with such bond driven intent are called repo specials.

Typically, the hybrid nature of generic repo¹¹ clashes with basic legal institutions like bankruptcy arrangements traditionally built upon basic constructs where buying/selling and borrowing/lending are sufficiently differentiated. In this regard, **the essential legal risk to be addressed for the development of a repo market is the risk of re-characterization of repo trades in bankruptcy courts.** The nub of the problem is to ensure that the counterparty acquiring securities under a reverse repo has an unequivocal right to sell them if the other counterparty defaults on the repo and that these rights are unaffected by the controls established by bankruptcy procedures.

An interpretation by courts that a repo trade is nothing but a secured loan typically would negate the funds provider the right to take possession over the bonds received from the defaulting counterparty. In that case, the prohibition of the so called “pacto comisorio”¹² in most civil code traditions would clash with the fundamental condition set above for the development of a repo market.

It is clear that leaving open the ambiguity, as to how courts would interpret the legal nature of repo trade if the cash taker happened to default, is not an acceptable solution. It would be a costly way of settling the nature rights associated to a repo is a crucial enemy of the development of trade in the first place. **The simple solution to**

⁹ Also other securities can be used as collateral.

¹⁰ However, there are exceptions to this general rule, especially in the public policy space. See section (3.1.4) below.

¹¹ For that matter, also securities lending is at odds with ordinary legal conventions in many countries.

¹² The “pacto comisorio” in Spanish, or “pacte comissoire” in French, forbids a party “selling” to itself assets received as collateral. As a way of protection of third parties, it requires the collateralized party to request from the court an order for sale or to undertake a judicial sale.

these ambiguity problems is a statutory clarification of the nature of the property rights associated to securities sold under repo and the rights to set-off. A law reform can decisively contribute to the development of a repo market by offering certainty as to the allocation of rights inherent to the trade. Certainly, market practice and trade often precede the enactment of repo legislation. In this regard, it is relevant Box 2 on the French experience to fit repos in French law in the first 90s.

As it will be made clear shortly, an easy solution to the legal characterization would be to explicitly profile a repo in law as a pair of separate legal transactions, one for current settlement and the other for deferred settlement. This was the route chosen by Spain. But the easy solution may not emerge under some circumstances. It was not adopted when the US repo market developed because of two basic reasons. First, common law legal traditions can accommodate more easily innovative solutions that go beyond simple ones as it ultimately happened with the so called classic repo. Second, the easy solution could not accommodate US repo market practices that reinforce the already strong similitude between a repo and a collateralized loan.

In effect, the recount offered by Garbade (2009) about market practices in the US repo market in the 50s and 60s is consistent with them being a flexible substitute of the ones found in the collateralized lending area via security interests. In particular, it was customary for repo borrowers – primarily non-bank Treasury dealers needing inventory funding – to offer an initial margin or haircut to their creditors, because of their better creditworthiness. Typically, the initial margin provided equaled the amount of accrued interest because the cash exchange was determined on the basis of the clean price of the bond. Crucially, consistent with this convention on accrued interest, the borrower was understood to be entitled to any coupons paid on repo securities during the term of the repo. Furthermore, Garbade (2009) notes that it was also customary to grant the borrower the right to substitute securities from time to time during the life of the repo.

The bottom line of this historical account is the fact that market practices enhanced the re-characterization risk of sale and repurchase agreements in the US. Leaving aside the right of the repo creditor to sell the security, the right of the borrower to the coupons paid and to collateral substitution blurred the difference between repo and secured loans.

The definition of a classic repo as a single legal relationship between borrower and lending was a private contracting attempt to mitigate the enhanced re-characterization risk. The split between sell/buy back and classic repo can be thus traced back to the interplay between market practices and legal background.

This observation is relevant not only because of its historical dimension. It shows to emerging markets in the process of developing their own domestic repo markets that

some of the existing conventions lack an absolute value. This does not imply that local conventions have to be reinvented to cater to local practices. No market is isolated from the rest of the world to dismiss others' lessons and practices. But **blindly mimicking complex foreign legislation from developed markets may make no sense if its accommodation within the domestic legal system is a forced one.**

This has proved repeatedly to be the case in civil code systems. Interestingly, some civil code markets like Spain have evolved to solutions intermediate between sell/buy back and classic repo in a way imperceptible in the day-to-day business once law changes have taken place. Thus, one is inclined to interpret that **the legal dimension of the contract is important to launch the market, but may become relatively immaterial afterwards.**

As a sort of conclusion, **a general recommendation for the development of a repo market in emerging markets is the enactment of sound basic repo statutory law that provides legal certainty. France, Spain and Germany at some point clarified repos by law.** This recommendation does not exclude the adaptation of solutions borrowed from international markets to the local legal system. Admittedly, emerging market countries from common law traditions are in a better position to transplant these solutions.

2.1.1 CLASSIC REPO

The basic structure of classic repo is common to all types of repo-like transactions. It involves a party selling its counterparty securities for cash combined with a simultaneous agreement to buy back equivalent securities at an agreed price in the future. From a counterparty risk protection perspective, classic repo sticks to formal simplicity, since capacity or perfection requirements necessary to create security interests are not needed. In addition, it envisages more easily than other repo-like solutions counterparty risk protection clauses. As it will be clear in section 3.1.3, classic repo is compatible with various forms of delivery, including tri-party repo.

But the legal dimension of classic repo can be tricky. As already pointed out in the previous section, **classic repo arose as an evolutionary form of collateralized loan.** Its contractual design in the US attempted to maintain the practices in the collateralized loan market while avoiding its procedural burdens. In addition, the solution had to ensure the tradability of the security temporarily exchanged. All of that had to come without risk of re-characterization.

The solution adopted by practitioners in the US market on their own was a single contract that entails a transfer to the buyer of the legal title to the underlying security,

although in such a way that the seller still retains the economic benefits derived from the security. The expectation behind such basic proposition was that the explicit transfer of title under a single business relationship would establish without doubts the right to set-off in case of default by a party to the transaction. The buying/selling side of definition had to ensure the tradability side of the set of requirements. We will see that classic repo contracts on their own cannot live up to these expectations. As it will clear in section 2.1.3, **master repo agreements soon emerged as the evolutionary legal technique to overcome the remaining problems offered by classic repos.**

From a practical perspective, the bottom line of the definition given to classic repos above is a set of unique and sometimes counterintuitive features. Consistent with the allocation of property rights in a classic repo, **interim coupon payments to the security during its life correspond to the seller.** If the repo has entailed delivery, the buyer has to transfer those flows back to the seller, a cumbersome practice known as “manufactured coupon”¹³. Moreover, the risk that the value of the underlying security may fall during the life of the repo contract is taken by the seller¹⁴. Similarly, if the issuer of the bond defaults during the life of the repo the loss is borne by the seller. Formally, the return paid on a classic repo is not interest as usually understood, i.e. as cost/remuneration of borrowing/lending which it is not, but a price. Unsurprisingly, given the eclectic rationale behind classic repos, **counterparty risk management techniques like posting initial margin and variation margin, and operational ones aimed at flexibility, like substitution, fit more easily within classic repos.** But the discussion of these issues is more appropriate within the section devoted to master agreements.

The conventions and the eclectic nature of classic repo cannot be understood properly without an evolutionary view of its development. The Drysdale Government Securities bankruptcy in 1982, determined that **repo is done on the basis of the dirty price of the bond.** Drysdale took advantage of the industry’s former and inaccurate practice of pricing US Treasury repo collateral without taking into consideration the accrued interest on the bonds. Drysdale sold US Treasury securities with significant accrued interest and, in turn, borrowed the same securities through reverse repos from entities that owned them. Drysdale used the difference between the reverse repo value of the securities (principal amount only) and the selling price (principal amount plus accrued interest) as capital to finance its operations. Drysdale continued these practices until the coupon payments that they were responsible for passing on to the reverse investors, were due on the bonds. Declining interest rates resulted in significant losses on these transactions and, as a result, Drysdale Government Securities defaulted on

¹³ In the so called hold-in-custody repo, i.e. repos where the seller retains the securities on behalf of the buyer, the transfer is immediate for obvious reasons.

¹⁴ In accordance with this fiduciary transfer interpretation, risk management practices surrounding classic repo belong essentially to its legal nature.

the coupon payments. The regulatory response by the Federal Reserve, in conjunction with the Primary Dealers' Association, was the definition of a pricing mechanism for US Treasury repos which included accrued interest.

As mentioned before, risk management provisions pertain entirely to the essence of classic repo. In every repo transaction, both the lender and the borrower are exposed to risk. The lender can seek to protect itself by asking for margin, that is, by lending less than 100% of the market value of the securities it takes in; but in doing so, it obviously increases risk for the borrower. Alternatively, the borrower might seek to reduce its risk by asking for reverse margin. **Typically, in a repo transaction, it is the lender of money who receives initial margin, because he is receiving as collateral the less liquid asset.** To provide that margin, securities used as repo collateral are priced at market value minus a haircut; the size of the haircut varies depending on the maturity, quality, scarcity value, and price volatility of the underlying collateral, on the term of the repo, and on the creditworthiness of the customer. The exposure to counterparty risk changes throughout the life of the transaction and the initial margin may be found inappropriate. The parties may agree on the transfer of so called variation margin when the net exposure reaches some agreed threshold value.

Appendix 1 contains a series of Bloomberg screens illustrating the pattern of flows and choices in the calculation of a classic repo transaction as well as **a description of the mechanics of repos.** Cash driven transactions require the determination of the number of securities to be bought for the given amount of cash (field: Settlement Money). Instead, in securities driven repos the cash exchanged is determined based on the number of securities sought (field: Face Amount). No matter the nature of driver, the payment made by the borrower in the spot leg of the transaction is based on the gross price of the bond as adjusted for any haircut (field: Settlement Price). To over-collateralize a repo, one typically enters the percentage by which the collateral's value exceeds the loan. A typical value that collateral is 102% of the loan value, leads to adjust down correspondingly the field Settlement Money. In the forward leg, that amount loaned is pay back plus the interest accrued during the period of repo in accordance with the agreed repo rate. Notice that the example contained in the screens has an interim coupon paid during the life of the repo. The assumption in classic repo is that the payment is passed on back to the seller and, therefore, no need to factor in those payments arises at maturity.

2.1.2. SELL/BUY BACK

A sell/buy-back is functionally very similar to classic repo. The main difference lies in the fact that it is **structured as two separate legal contracts.** In other words, a

sell/buy-back can be understood as an outright sale of a bond on the value date and an outright repurchase of the same bond for value on a forward date. The sell/buy-back is entered into for the same reasons as a classic repo, but was developed initially in markets without the proper legal environment to allow for classic repo transactions.

From a different perspective, the fact that two legs of a sell/buy back do not constitute a single contract implies that the **re-characterization risk is lower than the one corresponding to classic repos**. From an evolutionary perspective of contract law, it may be argued that sell/buy-backs are a primitive form of repos. But this cannot be understood as a necessarily functionally inferior repo solution.

Sell/buy backs can be said to have emerged as the purest alternative to contracts requiring costly and sometimes questionable documentation. It is telling that Italy that recognizes “riporti” in its code of commerce, its government debt market operates under the sell/buy back “pronto contro termine”¹⁵. Similarly, the Spanish standard “simultaneas” are contractually nothing else but sell/buy backs. They were explicitly defined in the law of the securities market¹⁶ putting especial emphasis to ensure that the specifics of the two trades matched and were bound by a single business purpose.

Interestingly, **in Spain the contractual duality to the eyes of law is not such from an administrative or regulatory perspective**. The mandatory joint communication of the two (legally separate) legs of a “simultanea” to the clearing and settlement system and an appropriate regulatory setup permits the functional “reconstitution” into a single transaction what legally are two separate trades. Sell/buy backs should never be confused with “wash sales” trades and lightly documented sell/buy back practices should never be taken to be the real meaning of a sell/buy back.

Admittedly, the formal simplicity of sell/buy backs simplicity does not mean that counterparty risk protection can be achieved per se, i.e. without some special support from the law. However, **sell/buy backs typically only require that the buyer is allowed to exercise its unquestionable property rights over the underlying security in case of default by the borrower and to set-off its claims**. In this regard, the precautions contained in civil law jurisdictions that proscribe the “pacto comisorio” (see section 2.1) to exercise collateral typically do not extend to a totally different situation. In effect, the so called “pacto marciano”, whereby the right to set-off is recognized provided that its implicit valuation is fair, is accepted by Spanish and other civil law jurisprudence. In order to reinforce clarity, in Spain the right was explicitly recognized in the Securities Markets Law. In Italy¹⁷, a legislative initiative taken 1988 has extended to sell/buy backs the rights to closing and netting in case of bankruptcy.

¹⁵ For a discussion See Salvatori (2001).

¹⁶ Disposicion Adicional 12, LMV 37/1998.

¹⁷ Article 203, D. Lgs. 24 february 1998, n.58 (Testo Unico della Finanza)

Namely, the surviving party is allowed to keep the collateral up to the market value of its position at closing.

Classic repo had encountered earlier the set-off problem in the US. When Lombard-Wall, an unregulated dealer, failed in 1982, it sought to apply the “stay” bankruptcy rule to its repo customers analogous to the prohibition of “pacto comisorio” mentioned before. In other words, it tried to take advantage of the broadly applied bankruptcy rule that creditors of a bankrupt entity must obtain the permission of the bankruptcy court before they may liquidate the collateral securing the bankrupt entity’s obligations. The market was rising and the court soon granted the necessary permission to liquidate. Therefore, there were no losses. But the case triggered a quick regulatory response because it was clear that “stay” posed a threat to repo market liquidity and raised concern about the adequacy of standard margin practices. In 1984, it was enacted an exemption from the stay rule for repos, with maturities of up to one year, that were collateralized by governments, agencies, CDs and BAs¹⁸.

Sell/buy backs offer the plus of their simplicity. Consistent with it, **in a sell/buy back interim coupons to the underlying bond are typically received by the buyer, i.e. its legal owner, unlike what typically happens in classic repo.** Obviously, this allocation of coupons affects the economics of the deal and must be factored in (or agreed) in the initial pricing. The logic is straightforward

- a) If no interim coupon payment takes places during the life of the sell/buy back the forward price crossed reflects the interest accrued on the sell/buy back.
- b) If a coupon is going to be received by the buyer, the forward price has to be adjusted so that the effective return obtained by the buyer from both the purely sell/buy back return and the receipt of the coupon paid match sell/buy back rates for general collateral. Notice that the adjustment requires also an assumption as to the reinvestment rate applicable to the interim coupon received by the buyer.

Appendix 1 contains also screen print outs from a Sell/buy back transaction in Bloomberg. Its characteristics match the one of the classic repo also portrayed in the same annex. The purpose is to enable a comparison of the flows in the different alternatives. Notice that the sell/buy back has been portrayed under two modalities, one where the interim coupon is paid back to the seller and one where that is not the case.

It is noticeable that practice in some markets does not avoid the cumbersome practice of having to order a transfer of the interim coupon to the buyer, even though one of

¹⁸ See Hagert (1984)

the advantages of repo is simplicity. In a recent survey among made by Felaban (2009) in Latin America, in numerous occasions the coupon is paid to the seller.¹⁹

On the minus side of sell/buy backs as contractual solution for repos stand its natural lack of provisions to apply risk management techniques. But the recognition of the “raison d’être” of sell/buy backs in some jurisdictions has led market practitioners to incorporate sell/buy back annexes to master repo agreement originally designed for classic (see 2.1.3). Obviously, these initiatives aim at ensuring every sort of functionality, i.e. counterparty risk margining, close-out netting and even substitution. In this regard, notice that as the two legs of the transaction are separate, there is no possibility of substituting one security for another. The only possibility for the two parties is to agree to close out the existing sell/buy-back and establish a new deal based on the same sell/buy back rate and maturity, but with different collateral.

2.1.3. MASTER AGREEMENTS

The completion of the first master agreement in the US by the Bond Market Association (TBMA) **was triggered by the default in 1985 of an unregistered securities dealer** “ESM Government Securities” active in the repo market. The collapse of Drysdale and Lombard in 1982 had already caused concern and reforms in the unregulated repo market. But in 1985 the disarray in the investor community was of such magnitude that they entirely avoided repurchase transactions and pressure for legislative action took force.

The operation of forces of demand and supply of regulation resulted in a number of initiatives that would shape the US government debt market²⁰. On the one hand, it accelerated the completion of a long-standing self-regulatory project by the TBMA (PSA) to standardize repo documentation and, hence, to contribute to a more robust repo market. On the other hand, the crisis determined the passing of the Government Securities Act of 1986 that mandated revisions to the initially prototype documentation. The final outcome of this process was a standardized and thoroughly reviewed repo contracting framework that was widely accepted in its general clauses and that was also amenable to customization on some features.

This historical recount of the origin of the first repo master agreement illustrates about **the intrinsic instability of classic repos without a complementing documentation and some supportive legal framework that brings certainty.** The main point is precisely to address legal uncertainties as to the validity of a single business relationship that covers multiple repo agreements reach of which entails a (temporary) transfer of title.

¹⁹ Countries that have sell/buck solutions but still follow this practice are inter alia Peru, Argentina, and Colombia. In Mexico, sell/buy backs are forbidden.

²⁰ See Burnham (1990).

But one also needs to ensure that contingent obligations of classic repo are recognized also by law, i.e. that compensation of obligations under default are legal. In most jurisdictions, netting is perceived both as a sort of payment and as way of collateralization. Consequently, bankruptcy procedures limit the recourse to netting unless it is explicitly recognized. Finally, efficient and secure trading practices require a standardized and comprehensive documentation framework that allow for them. Repo master agreements, together with the legal arrangements that underpin their public efficacy, are the solution to both legal and practical challenges arising in repo markets. In a nutshell, **master repo agreements properly enshrined in law buttress the right to set-off while preserving the tradability and risk management functionalities sought in repos.**

A master agreement sets out the legal relationship between the signing parties and the generic provisions applicable to all repos falling under the umbrella of the master agreement. The specific terms of each repo transaction are documented under a confirmation²¹. Thus, the crucial feature of the “master agreement + confirmation” documentation arrangement is the fact that it transforms all open repo positions between two counterparties into a single legal relationship. This also mitigates the potential risks of facing cherry-picking in a liquidation procedure because of the default of the counterparty. In other words, it protects signing counterparties against the risk that they are obliged to perform on those repos which are profitable to the bankrupt side whilst are rejected their profitable claims.

The need to ensure an appropriate legal coverage for a repo master agreement in the domestic law cannot be overemphasized. A purely technical initiative often fails to dissipate doubts on a complex matter. Hungary provides an example in that regard. On the initiative of the Hungarian Government Debt Management Agency, a wide group of market participants prepared a repo master agreement, customizing an international one to the local markets. However, in practice dealers have ended up not using it because it did not provide an answer to substantive un-clarified legal questions²². Box 2 refers to the interesting French approach to recognize the validity of repo master agreements. Belgium has followed a similar multilateral approach.

It is important to realize the essence of these legal problems. Certainly, master agreements arise as generalized solution that minimize the risk of re-characterization, offer operational flexibility and ensure protections in bankruptcy situations. However, these advantages can be only reached under the form privileges granted to the subsector of professional market players. The rest of market players have to abide to the rules set by bankruptcy courts to deal orderly with situations of default. In other

²¹ The signature of the GMRA master agreement by two counterparties amounts to the adhesion to its general clauses as well as some election of conditions and supplemental terms.

²² See Szakaly and Toth (1999).

words, the envisaged scope of valid signatories of a master agreement under the law is also an important issue to consider when promoting a documentation solution for the first time. For example, the European Collateral Directive restricts its privileged treatment of (financial) collateral-related activity to a restricted list of market participants, although it offers opt-outs for the implementation in different countries.

In order to assess the current situation in terms of accepted repo master agreements, it is useful to succinctly trace the evolution of master repo agreements across time and jurisdictions. The referred experience in the US, already a standard (MRA) in the domestic market by 1990, was adopted soon also by participants in the international bond market. In 1992, the PSA in conjunction with ISMA issued the Global Market Repo Agreement (GMRA) for gross paying securities other than US Treasuries and equities subject to English law²³.

The initial contacts of non-US domestic markets with master repo agreements took place in France in 1994 when the French Bankers Association submitted the so called “Convention Cadre” for its approval by the Governor of Bank of France. The UK domestic market only revised its view about the suitability of an open repo market in 1996. At that time, the UK opted for a documented repo market built upon the GMRA together with a Gilt Repo Annex covering domestic issues.

Actually, the next evolution of GMRA was published in 1995 and took advantage of the preparatory work done in the context of the UK domestic initiative. The revisions included major changes to the margining provisions and the inclusion, for the first time, of provisions dealing with agency transactions as well as fully documented sell/buy back transactions. Although an English law agreement, the PSA/ISMA GMRA, was clearly intended for use in the European cross-border market as well as in domestic markets, without exclusion of those based on sell/buy backs.

The adoption by developed countries of some form or other of GMRA²⁴ supplemented by a national Annex that facilitated the adaptation quickly spread in the second half of the 90s. France granted its approval to GMRA in 1997, the current standard other than for transactions with non-bank investors and French official institutions. In turn, Germany developed its own “Rahmenvertrag für echte Pensionsgeschäfte”. The evolutionary nature of documentation was confirmed in 2000 with a new update to GMRA. Among the early adopters of master repo agreements among in emerging markets stand South Africa and Thailand based on GMRA plus domestic Annex.

In Europe, the evolving landscape of master repo agreements has reached a new stage with the launch of the European Master Agreement (EMA), a multi-jurisdiction and

²³ Being a solution aimed at the Euromarkets, the initial version of GMRA addressed gross paying securities.

²⁴ Already in 1995, Belgium adapted the 1992 GMRA to the domestic market based on an Annex.

multi-instrument master agreement. EMA leverages on the common financial collateral framework deployed by the EU Collateral Directive in 2002 to not only replace the existing diversity of domestic contracts in Europe but also to accommodate integrated collateralization solutions across products and countries.

This brief review of the evolution of the main master repo agreements²⁵ in developed countries can be said to be a proof of the **universal “syntax” underlying repo documentation**. The wording of each solution provides the semantics that suits the domestic legal requirements. Obviously, the “syntax” addresses the functional issues at stake when contracting a repo.

Namely, **the “syntax” is built upon a main body of mandatory or optional provisions dealing with:** (1) the overall logic of the agreement (relationship between Annexes and main body); (2) definitions; (3) initiation, confirmation and termination procedures; (4) margin constitution and maintenance; (5) re-pricing alternatives to margin; (6) “manufactured coupon” procedures; (7) payment and transfer specifications like DvP, netting of cash and securities flows, C&S system; (8) substitution procedures; (9) representations and warranties of signing parties; (10) events of default that trigger close-out and netting of the repos confirmed under the umbrella of the agreement; (11) tax provisions; (12) miscellaneous clauses dealing with communication procedures, governing law etc.

The Annexes have proved to provide a useful degree of modularity to master agreements. In GMRA, an annex containing supplemental terms and conditions typically lists the provisions which require an election to be made by the parties, like their desire to contract under sell/buy back transactions, agency transactions, to make certain choices as to the pricing source for the calculation of market value etc. An additional annex contains the confirmation form that ensures the inclusion of each new trade under the umbrella of master agreement. The annex dealing with sell/buy back contracting specifies the features where they differ from repos so that the general provisions on mark-to-market, netting and close-out need not be repeated again.

From an emerging market perspective, the strategy to adopt a repo master agreement faces two alternatives. The first one is the one followed by, for example, Thailand whose Ministry of Finance appointed a committee to prepare “Supplemental terms and conditions for Thai domestic transactions”. Transactions between nationals are understood to be governed by the local law. The advantage of having an international documentation tool formally adapted to local needs may not be as easily achievable. The Dutch repo market has been facing for years re-characterization

²⁵ In addition to open standards, some market players have developed private label documentation when they consider that industry standard documents do not adequately address their particular operational concerns.

concerns although it operated under GMRA plus Dutch Annex. See Box 3 The other alternative is the preparation of a strictly local master repo agreement. The crucial consideration to decide which route is best is the balance between the degree of cross-border repo business expected and the accuracy of legal opinions on the suitability of international repo masters in the domestic law or international private law.

It is difficult to make a summary or a specific recommendation on a section that deserves an entire book²⁶. Probably, the best summary about the meaning of a repo master agreement is the strong incentives that regulators create to use them (see section 6.2) **Master agreements soundly established in law can be said to operate as “legal capital” on which base new business.** Official investors, like the ECB as reserve assets manager, only takes repo counterparty risk under an accepted master agreement.

3. MARKET STRUCTURE AND CONDUCT

A second crucial element necessary for a repo market to develop and thrive is a balanced functioning of the market that elicits the incentives of both the supply and demand for collateralized funds to be expressed. This general statement has implications in various domains. In other words, having in place the right repo contract does not ensure *per se* the development of the repo market.

From an analytical perspective, the **structure-conduct-performance paradigm of industrial organization provides a consistent frame to account for the significance of a broad range of factors decisive for repo market development.** Repo market structure, i.e. access conditions to it and rivalry among its players, can be said to be determined by a set of relatively stable features like (1) counterparty risk awareness, (2) adequacy of the repo instruments, (3) licensing and regulatory requirements to operate, (4) trading and transparency arrangements, (5) custody rules. In turn, conduct in the repo market refers to the behavioral patterns of market participants to exploit and/or amend the structure of the market in which they operate. More concretely, relevant factors for repo market development that pertain to the market conduct area are not only the (explicit or implicit) code of business practices followed, but also the strategic initiatives that can shape the evolution of the market. Two timely examples of the conduct determinant are the current trend to clear through a CCP and to consolidation of financial collateral operations.

²⁶ See Tyson-Quah (1997), for example.

The space of action of policymakers can be said to oscillate between the action to adopt structural measures and the validation of market conducts. The following sections will attempt to provide an overview of relevant policy issues and case examples in the repo markets. The conclusions reached cannot be said to provide absolutely valid lessons everywhere and there is a good reason for it. Namely, the metrics for market performance changes as the market develops. For the sake of some clarity and concreteness on this, notice that the US tri-party repo market has long made the case of an extremely efficient market. However, its failures during the recent crisis have prompted a deep and ongoing revision²⁷.

From a repo market development perspective, the bottom line of these introductory remarks to the role played by market structure and conduct factors is that **sound judgment of needs and means is the best source advice for countries considering to undertake development initiatives.**

3.1. MARKET STRUCTURE

3.1.1. COUNTERPARTY RISK AWARENESS

Awareness as to the importance of counterparty risk is something that has proved to be influential in how repo markets have developed in various countries. As already mentioned above, various episodes of default in the US in the 80s shaped formal documentation trends. As it will be made clear in section 3.1.3, custodial arrangements were also shaped by those episodes as much as the recent crisis is pushing for a revision of tri-party repo arrangements. In France, an affaire by DG Bank in 1990 in the old “remere” market accelerated reforms towards a full-fledged repo market.

It would be false to conclude based on this and previous examples (US defaults in the 80s) that counterparty risk awareness is necessarily an endogenous outcome of a crisis. The development of the repo markets in the UK and Switzerland provide interesting examples of the contrary. The authorities in those countries benefitted from the perspective gained as latecomers to the repo market and formulated from the outset repo market rules sensitive to counterparty risk²⁸. Box 4 describes big bang initiatives to launch a repo market. Capital adequacy rules have long discriminated between varying counterparty risk sensitive repo solutions (see section 6.2). But lock-in effects often preclude advances in the risk management area in markets that successfully developed early highly functional repo markets, as it happened in Spain.

²⁷ See Payments Risk Committee (2009).

²⁸ The UK code of conduct sponsored by UK prohibited gilt repos being traded until a PSA/ISMA GMRA or TBMA/ISMAGMRA was executed. The Swiss initiatives included tax disincentives for risk insensitive contractual/implementation arrangements (see section 5).

From a market development perspective, **it is important to stress that the importance of the sensitivity to counterparty risk of the repo solution adopted should be assessed jointly with the operational requirements that it poses to back offices that must implement it.** There are not absolute guidelines to find a balance between these objectives because their trade-off depends fundamentally on market liquidity. Recommendations of daily margining for the US and European government debt markets may be inappropriate for an emerging market. Margin practices in a normal market period may also be absolutely inappropriate in a situation of liquidity turmoil, as it happened with the LTCM or Bear Stern crisis.

Importantly, the perverse influence that margining practices may have on credit line policies is too often neglected. The absolute level of leverage would increase if fine-tuned margin policies lead banks to grant larger credit lines to their counterparties than they would do otherwise. The tax on uninsured deposits proposed by the Obama administration is inspired in the evidence that this considerations may have operated in in the US tri-party repo market.

Admittedly, it may be the case that the alternative of inexistent margins and/or infrequent margin adjustments does not lead to an increase in absolute leverage but it may well be the cause of a shortening of repo terms traded in the market. An excessive rate of rollover operations is by itself an undesirable source of risk.

There is no substitute to sound judgement based on relevant information and models to decide on risk management in the repo market. The model is quite simple. Repos and reverse repos are affected by market rate movements that alter the value of the underlying collateral. From a parametric perspective, a risk manager is concerned with the current risk exposure and its probability distribution during the life of the repo.

Market risk practitioners tend to summarize these variables in terms of the so called risk factors that transform risk nominal exposure into risk equivalent exposure²⁹. **Initial margin and variation margin align current exposure to the subsequent realizations of exposure and, therefore, contain counterparty risk to the cost of creating liquidity risk.** The operational costs of margin maintenance are controlled by so called thresholds for risk exposure. Variation margin is only triggered when it exceeds the chosen threshold. Although there are no official statistics on these margin and threshold, the consensus is daily margining with a threshold of 1% of exposure, although it can already start from 1 €.

Importantly, **the determination of required variation margin must be preceded by the valuation of the collateral.** This is an area without standard procedures due to the essentially over-the-counter nature of government debt markets. The ability to undertake faithful valuations based on a really representative market price depend

²⁹ See Banks (1993).

crucially on the ex-spot transparency regimes. Some countries like Spain have long relied on C&S information to provide market transparency, although the Spanish repo does not exploit this advantage for counterparty risk management purposes. In most countries, it is information vendors like Bloomberg or Reuters who provide the information basis to measure current exposure. Few debt managers are involved themselves in post-trading transparency provision. The UK DMO makes daily enquiries among primary dealers following standard procedures to find a fair end-of-day valuation for its bonds.

The alternative to elaborate own estimates of haircut and threshold are off-the-shelve, regulatory or central bank specifications. Delgado et al. (2003) present a model for collateral risk control determination. The General Documentation of the Eurosystem specifies haircuts for the various liquidity categories of eligible assets. Also the banking supervisors have proposed haircuts (see 6.2). In practice, effective haircuts and risk parameters in Europe are being determined by the risk management practices of central counterparties, a trend briefly discussed in section 3.1.3.

3.1.2. INSTRUMENTS, PLAYERS AND TRADING VENUES

The successful expression of demand and supply for collateralized funds requires fitting instruments and market openness to contract them. The fulfillment of these goals should be only constrained by a sound interpretation of what are unbearable risks. For example, some countries, like the UK, understood until mid 90s that the risks of market shorts were sufficient to ban an open repo market. Leaving aside this sort of considerations covered in section 6.1, the only restriction to the expression of the forces of competition in the repo market should be that they fit within sound clearing, settlement and custody arrangements (section 3.1.3).

It is important to stress that **suitability of repo instruments here is not directly related to their contractual form.** Lightly documented markets like the Spanish “simultaneas” have been very successful from a functional perspective. The talk here about fitting repo instruments refers to their ability to satisfy the relevant business models of existing market participants.

Importantly, the market openness condition posed above implies a broad notion of market participant. **The success of a repo market is built upon a balanced coexistence of its wholesale, institutional and retail segments.** Typically, primary dealers and banks need to fund their inventories and mutual funds, corporates or households have to invest their cash. But professional players may on occasions initiate trades not because of their funding grounds, but to get access to the security.

This functional **differentiation between general and special collateral needs determines a natural segmentation in the trading area in some markets**. General collateral repo permits to channel temporary funding with the counterparty risk protection provided by some security from a list of eligible ones, i.e. based on a list of equally acceptable ISIN codes³⁰. A trading solution for general collateral repo needs to specify the market standard procedure applied to determine the actual bond given as collateral. Typically, this is decided by the seller before some cut-off time during the trading session.

A general collateral solution is compatible with both sell/buy back contracts and classic repo ones, although is more typical in the latter case. Provided the contract is a classic repo one, general collateral is also compatible with substitution if the seller expresses that wish when she communicates the bond to be delivered.

Repo markets with segments for general collateral and for special repo simplify trading. The cost to this advantage is to lose a detailed view of the repo rates for each bond separately. Spain maintains the transparency of the individual repo rates. This feature can be especially valuable in the initial stages of development of a government debt market due to the higher scope for distortions and imperfections finding a reflection in different repo rates.

The degree of active management of repo positions determines another avenue of differentiation between different repo products. At one extreme, one finds **overnight repo**, which requires continuous rollover, and **fixed term repo**, which is less demanding in terms of rollover but requires to actively manage interest rate risk. In some markets, more passive repo solutions have been introduced to cater to stable investors. **Floating repo** is a repo solution present in the US and France which updates regularly the remuneration of the funds provided throughout the (open or fixed) term of the loan based on some money market fixing.

Securities lending of government bonds can only become a niche activity when the repo market works properly. Certainly, it cannot be said that a market for repo specials is absolutely equivalent to one where government bonds are loaned out. But typically they are equivalent enough to make securities lending redundant when repo is available. The fact that securities lending deserves its specific master agreements and/or trading venues confirms that repo and securities lending are seldom overlapping instruments. Actually, securities lending is an activity typically belonging to the equity market. In some fixed income markets like the Spanish one, securities

³⁰ The concept of general collateral can change depending on market circumstances. For example, during the crisis a split has taken place between general collateral with a tenor below 5 years and below 10 years. Notice that this splitting makes not much sense if counterparty risk management operates perfectly.

lending has been a de facto inexistent tool for mutual funds and other portfolio managers to generate fee-based income.

However, **securities lending of government bonds by some public authority can become a very important tool to ensure market liquidity**. The US Fed maintains a securities lending program whose purpose is to increase the liquidity in the repo markets by providing a short term flexible supply of issues that are not readily available in the market³¹. As it will mentioned in 3.1.4, this program does not essentially differ from repo programs run elsewhere with similar rationales. However, it is worth highlighting its existence in this section devoted to repo instruments and markets to emphasize the interlinked nature of most repo-like instruments. Interestingly, one of the unique features of the US government debt market until the onset of the crisis has been the fact that primary dealers have systematically been running short positions in US treasuries. Primary dealers distribution of US bonds to customers has moved quicker than the adjustment of their inventories because of the efficiency of the repo market.

The distribution of repo instruments required by the market as a whole typically takes place endogenously if the forces of competition are not unduly constrained. Typically, regular cash flows seeking a collateralized investment solution and bonds inventories that have to be funded define the basis of the business case for wholesale participants in the repo market. The trading technology needed may be different at different stages of development and/or market segments. Typically, the optimal response is best left to be provided by the market participants themselves under the sole restrictions that clearing, settlement and custody are sound. That was the alternative followed in the Spanish government debt market. Policy makers reserved themselves some leading role to influence the way the market was developing within the limits defined by the clearing, settlement and custodial arrangements.

But market openness may not be enforceable if the leading authority is subject to restrictions itself. In an early development stage, established players like exchanges and specialized intermediaries have big incentives to stretch their business model towards the repo market and create barrier for potential entrants. In this regard, it is relevant to notice that the Spanish repo market developed after a reform in the mid 80s that took the government debt market away from the stock exchange. Similarly, the development of the UK repo market was preceded by a thorough reform that included the elimination of a privileged role to the stock exchange intermediaries in securities lending.

³¹ During the recent crisis the Fed enhanced that program by means of the Term Securities Lending Facility (TSLF), a weekly loan facility that promoted liquidity in Treasury and other collateral markets and thus fostered the functioning of financial markets more generally. It was closed in February 2010.

The risk that autonomous market development may derail or take too long should not be neglected either. Possibly that was the reasoning behind the decision of the Swiss national bank to sponsor a domestic repo market based on an exchange-like concession granted by Swiss authorities to the regulated group Eurex. As explained in Box 4, the Swiss market is a case of a careful and integrated planning of every stage of the repo market.

Importantly, no matter if the market does not operate in an integrated way, **the large scale integration of different market segments should never be forgotten.** In this regard, it is relevant to notice that market openness can be impaired by restrictive post-trading arrangements. Section 3.1.3 makes this case for the repo market in Poland where in 2007 effectively only wholesale players could access the repo market.

In early stages of development, it can make sense to offer repo instruments aimed specifically at households and small and medium enterprises. The Spanish government debt market addressed the specific issues raised by the participation of retail agents in the repo market since its reform in 1987. It was clear that restricting the access to the market to retail investors was inconsistent with one of the conceptual drivers, i.e. market openness. Moreover, it was also clear that banks had incentives to provide repo sweep accounts and similar services to their customers. Obviously, these would only benefit from the protection provided by collateral in case of bank default if their repo was properly documented³².

But an ordinary reverse repo entails a risk for the bank that sells the security to a retail investor. If the transfer of title is free of any restrictions, she might decide to sell the security temporarily bought and, hence, cause disarray to the bank's operations once the forward leg had to be settled. The so called "Spanish repo" emerged as a solution that reconciled all these considerations. It works on the basis of a restriction to the rights of the holder to transfer the security bought temporarily. The only transfers authorized are those that, by not affecting the balance of securities holdings on a forward basis, do not require further trades to restore the ability of the investor to deliver the bond in the "Spanish repo". Obviously, the alternative of locking absolutely the transfer rights of the investors would have been less cumbersome. But this instrument was expected to fit also the investment needs of money market mutual funds.

³² This problem has been pointed out by FDIC recently. In a "Final Rule on Processing Deposit Accounts in the Event of an Insured Depository Institution Failure", FDIC notes that in a properly executed repo sweep arrangement the customers should end up owning identified securities (acquired via repo) or obtaining a perfected security interest in those securities. This has been noticed not to be the case for some banks.

Appendix 3 summarizes in a table the features of the main repo solutions and contracts analyzed in the report.

3.1.3. CLEARING, SETTLEMENT AND CUSTODY

The importance of post-trading arrangements in government debt markets extends well beyond considerations valid specifically to repo-like solutions. It is therefore outside the scope of this report to go systematically through the general features of sound clearing and settlement arrangements. However, it is relevant to notice that in some markets, like in the UK, **the introduction of the repo market served to undertake adjustments to the settlement and clearing arrangements** (at that time, Central Gilts Office in the Bank of England) so that repo settlement could take place safely in a book-entry environment.

The focus has to be sharpened to the interaction between post-trading arrangements and repo market structure/performance. The crucial point to notice is that **post-trading arrangements decisively influence the conditions of access to the market, its integrated operation and its safety**. The unfolding of the benefits of competition to market development crucially hinge on licensing requirements to participate in the repo market that are based on settlement and custody account conditions. In the same vein, confidence as to the integrity of the property rights associated with repo custodial arrangements is influential in the growth of the market. Post-trading arrangements can also be supportive to repo market functioning by facilitating transparency and discipline with regard to settlement fails.

In order to be specific about these matters, **it is useful to briefly go through some country cases and extract the corresponding lessons**. In the assessment of the Polish fixed income market, Noel et al. (2006) recommended that the central bank of Poland reconsider the (at that time) existing restrictions on the participation of institutional investors in the repo market. The nub of the problem were the prudential concerns held by the central bank due to the perceived risk from back-to-back transactions with non-bank customers and the lack of oversight powers over that activity due to the disintegrated design of the custodial arrangements.

Actually, the disintegration of Polish custodial arrangements [at that time] had also a cross-product dimension of relevance to repo market development. Typically, a T-bill is a government debt instrument where the engagement of central banks is typically special in many countries due to its quasi-monetary tenor. In early stages of financial development, this policy-motivated engagement has meant that central banks have even provided the depositary and settlement services for T-bills. In some countries like

Poland and Egypt, the subsequent development of the government bond market infrastructure by separate settlement and depository providers has created an undesirable and distortive segmentation. In that regard Noel et al. (2006) noted the unequal use of T-bill- and bond-based repos in Poland could be ascribed to the inadequacy (non-DVP) of the link between the prevailing net settlement system for bonds and the RTGS payment system operated by the central bank. The problem did not affect T-bill repos because the central bank could ensure DVP. **The Polish experience in this area shows the benefits of consolidation of post-trading arrangements across government debt instruments.**

The discussion of the Polish experience has only superficially addressed the **distinction between delivery repo and other forms of repo post-trading arrangements**. Typically, the alternative to delivery repo, a term borrowed from US practice, is often understood to be **tri-party repo**. However, there are other interesting models for the distribution of repo solutions, like the one offered in Spain by “entidades gestoras” as part of a broader palette of services related to government debt. No matter the alternative, the services provided by repo distribution solutions are typically specific instantiations of the basic couple of requests by repo market participants, i.e. safety with regard to their property rights and operational easiness.

The importance of operational easiness should not be underemphasized. Noel et al. (2006) highlight in their analysis of the Polish repo market that the terms of repo transactions effectively entered were designed to circumvent technically demanding features of repo transactions such as mark-to-market valuations and substitution of collateral. Nuñez (2007) makes for Mexico a similar case, in the sense that the technology available to market participants should stand up to the middle- and back-office of the repo instruments distributed.

The integrity of property rights associated to repo positions is also dependent on custodial arrangements. Garbade (2009) makes forcefully this case when he motivates the historical background of tri-party repo in US. Taking possession of repo securities was not inexpensive in the US before the mid 80s. Not unlike what can be the case nowadays in less developed markets, a creditor had to arrange for a bank to hold the securities in a custodial account, it had to give the bank payment and delivery instructions for each transaction, and it had to pay a fee for each transaction. Unsurprisingly, in these circumstances small creditors were ready to accept that the bank that cleared the securities for the borrower would hold the creditor’s securities in a segregated account. In mid 80s, the informal arrangements surrounding these so called “letter repos” culminated with some fraudulent repo dealers’ defaults (see above). The mechanics of the losses to creditors relied essentially on “double dipping” on the securities provided as collateral, i.e. using the same collateral to get funds several times from different investors.

These events accelerated the development of a safe and inexpensive repo in the US, the so called tri-party repo. **In a tri-party repurchase agreement, an “agent bank” stands between the dealer and the creditor.** The three parties sign a contract that specifies their commitments in connection with the repo trades entered between the two principals and falling under the umbrella of the tri-party contract. The bank providing tri-party repo virtually eliminate the operational concerns of the parties with delivery, payment, margin and substitution, while ensuring segregated possession in an account of the creditor. The provision of tri-party repo services could in theory be provided by a bank different to the borrower’s clearing bank. But the economies of scale and scope of both being the same are clear.

This is evidenced by the concentrated activity achieved in the US, where JPM Chase and Bank of New York have ended up being the only players after a gradual process of consolidation. In Europe, where tri-party repo services has been driven less by the need to serve the couple customer-dealer, but to dealer-dealer operations arising in a cross-border environment, the outcome has also been a concentration in the hands of the international central depositories Euroclear and Clearstream.

One of the advantages of concentration is the ability to optimize the collateral provided under repo to extreme limits. The meaning of general collateral repo reaches a new dimension. Borrower and creditor do not need to identify the collateral provided after the trade. The agent bank runs at the end of the day that allocates the securities in the borrower’s securities account to the custodial accounts of individual creditors in accordance with the list of eligible collateral provided in advance³³. However, it is sensible to expect that these advantages can only be reaped in markets that exhibit sufficiently high turnover rates.

The effort of less advanced markets to develop repo distribution solutions can be more productively directed to enhance their safety. Notice that tri-party repo is essentially a contractual arrangement. It is true that the Government Securities Act of 1986 in the US included a series of provisions designed to protect customers doing repos and reverses like segregation³⁴, written confirmations and mandatory notices on substitutions etc. But the supervision of the system was largely left to market participants.

Big investors active in tri-party repo do have to send their auditors around to check whether the clearing bank has in fact segregated their collateral. Moreover, the

³³ A commercial name for that service in Euroclear is Autoselect.

³⁴ Essentially, GSA 1986 revised the exemptions to government debt market contained in the Securities Exchange Act of 1934. Any broker-dealer who deals in regulated securities is required to hold all fully paid-for securities that it safe-keeps for a customer in a denominated, segregated account in which the customer is afforded significant protection. In particular, a broker-dealer holding securities in such an account may neither re-hypothecate nor negotiate such securities unless it is specifically instructed by the customer to do so.

unsupervised nature of these operators has been stressed to extreme limits, as evidence by the crisis. The levels of turnover and operational flexibility achieved in the US tri-party repo market have come at the cost of unacceptable intraday credit.³⁵

The Spanish custodial arrangements for government debt, based on the so called “entidades gestoras”, is an example of special focus on safety through explicit regulation and supervision. “Entidades gestora” is the name for the licensed category of sub-depositaries. Contrary to the approach encountered in other countries, “entidades gestoras” are conceived as agents of the central depository. As a result of this **integrated custodial system in two-tiers**, the provision of services is subject to stringent controls which include on-site supervision by the central bank and **preclude “double dipping” practices**.

Importantly, a license as “entidad gestora” does not imply the creation of a new corporate charter. Banks that deploy the organizational and technological means to comply with the rules can act as “entidad gestora” while being active in the market as principals. From this perspective, the provision of repo distribution services becomes an extension of the credit screening activity by banks and essentially share the costs of resources needed to participate in the market as principal.

The Spanish government debt market has systematically exploited the safety and information delivered by its clearing and settlement arrangements to grant functional integrity to the market. In addition to the custody area, market integrity, transparency and settlement fails management, all of them relevant fields to repo markets, have benefitted from the exploitation of clearing and settlement arrangements for purposes going beyond strictly clearing and settlement.

The legal integrity of Spanish sell/buy back market (“simultaneas”) leverages on the joint communication of each of the legs to the clearing and settlement system. The exceptional treatment that repos deserve in many areas, as we have seen throughout the report, can be specifically targeted. Synthetic sell/buy backs and other undesired transactions cannot benefit from them.

The records of open sell/buy backs contribute to market transparency. A market bulletin containing information on market activity and rates as well as open interest is an easy byproduct of information collected. Notice that the access to “market color” takes place in an open market environment, i.e. one where trading does not take place on a centralized venue. The records of repo rates crossed in the market permit debt managers to track closely on an individual basis the relative demand of each bond.

³⁵ See Dudley (2009)

The records of repos outstanding can serve many other purposes. They enable the so called Spanish repo “pacto de recompra”, a sell/buy back with limited rights for title transfer for the buyer (see 3.1.2). The information on the schedule of Spanish repos outstanding permits to effectively block the ability of buyers to on-sell bonds the forward date of delivery, a common fear to regulators. The records of repos outstanding also have served Spanish authorities to monitor patterns of behavior associated with tax issues (see section 5). And they obviously also facilitate to make provisions regarding securities settlement schedules.

The management of settlement fails in Spain has also benefitted strongly from the integral connection between market and clearing and settlement. An end of day procedure, based on bonds repoed out by market participants willing to contribute to a pool with that purpose, has permitted to achieve minimal rates of settlement fails. It is relevant to notice that the nature of this facility differs from others provided elsewhere by issuers (see 3.1.4) because it is essentially a market discipline solution. Banks that would fail without recourse to the facility are charged a penalty for the temporary access to the bonds through the pool. Thus, the solution does not entail a “transfer” of the problem to the issuer. Admittedly, both types of solutions are compatible.

The potential for the problems coming from an issuer based solution to settlement fails in the repo market have been important in the US market³⁶. The resolution of a long standing problem of settlement fails was discarded to be something for the US Treasury to get involved. Rather, moral suasion by the Fed has determined that bank intermediaries have been ready to self-discipline through a penalty based system that also leverages on the operations of the US clearing and settlement system.

3.1.4. REPO-RELATED DEBT MARKET POLICIES

The operation of repo markets can be structurally affected by various policies undertaken by government debt management offices themselves. The most noticeable ones are: (1) **the use of the repo market by debt managers themselves to manage their excess of cash;** (2) **the provision of repo or securities lending facilities to improve the liquidity of the market and to correct distortions;** (3) **the imposition of repo activity requirements to primary dealers.**

³⁶ See Fleming and Garbade (2004).

Many developed debt managers have ended up using **the repo market as a vehicle to manage their cash management**³⁷. The modalities of intervention can vary a lot. The UK DMO conducts its cash management operations in the sterling money markets by a combination of bilateral trades with counterparties and the issuance of Treasury bills. The Spanish Treasury conducts monthly auctions of rolling overnight reverse repos to place the excess of cash.

The main debt market policy issue that emerges as a result of this type of activity is the degree of distortion caused on the repo market. Typically, the basket of eligible collateral is chosen to be broad enough as to avoid distortions. There is not clear evidence of a distortive impact of this official cash management activity. However, Stigum (2006) notes that an important factor having contributed to the rapid growth of the repo market in the US was the Treasury's decision in 1974 to shift the bulk of its deposits from Treasury tax and loan (TT&L) accounts at commercial banks to accounts at the Fed. This apparently freed huge amounts of governments and agencies bonds that the banks had been holding as collateral against Treasury deposits.

Another widespread modality of official use of repos emerges from the recognition that dislocations in the cash market cannot be on occasions easily smoothed out by a quick reallocation of existing bonds' holdings in the market. Search costs can prevent that from happening temporarily. In these circumstances, temporary additions to the float of debt securities outstanding in the market can alleviate this pressure. A number of debt managers resort to either operate some securities lending or repo facility to provide securities to enhance secondary market liquidity. In this context, the most pressing policy issues relate to access and pricing. The crucial point is that the facility does not cause distortions itself.

The UK DMO operates a non-discretionary standing facility under which the DMO will, if asked by one of its counterparties, create and repo out the requested amount of a specified gilt - usually overnight - at a penal rate of 300 basis points below the prevailing Bank of England Official Bank rate. This facility coexists with a special repo facility which can be used when the DMO considers that there is evidence of severe dislocation in the cash market. The Swedish Debt Office offers a repo-facility in government bonds and treasury bills also at a penal rate based on the central bank repo rate. In Canada and Mexico the facility is provided by the central bank which lend, within certain limits, securities from its portfolio (Canada) or from a balance of non-issued stock (Mexico).

³⁷ Some examples of countries having set up repo arrangements to manage cash are the UK, France, Belgium, Holland, Germany and Spain.

The Mexican experience reveals that pricing is substantive matter. Primary dealers have the exclusive right to borrow government securities against collateral on an overnight basis. The argument that this privilege was preventing the development of the repo market has led authorities to increase the fees charged for using the facility to those primary dealers with a poorer track record in repo market activity.

A close monitoring of repo activity is incorporated in the assessment of primary dealers' performance in some jurisdictions. As a reflection of the importance granted to repo markets, France used to formally evaluate its primary dealers also on the basis of their performance in the repo market. Brazil adopted in 2003 a primary dealer system where both temporary transactions done with the central bank and in the repo market itself belong to the primary dealers' evaluation criteria. As recalled in the introductory section, primary dealers in the US are primarily a Fed institution and hence, presumably, activity in the US repo markets is a crucial piece of the assessment.

3.2. MARKET CONDUCT

3.2.1. CODE OF CONDUCT AND MARKET COMMITTEES

Market conventions are always an important factor for the good functioning of any trading activity. Conventions relating to repo trading have to be understood embedded within broader rules representative of yardsticks of good conduct. In this regard, the general rules contained in the ACI code of conduct³⁸ also apply to repo market participants. However, the specific issues raised by repos deserve appropriate responses.

It is important to realize that a discussion about conventions framed within a code of conduct heading implicitly takes for granted some sort of self-regulatory arrangement. This tends to be a reasonable assumption to make when markets have been up and running for some time. Leading market participants can agree on the useful conventions that facilitate trading without compromising public goods. Market committees led by professional players are typically the forum to fine-tune practices.

However, the broad range of basic infrastructure issues of relevance for a working repo market typically exceeds the capacity of associations of market professionals. Soft law can seldom replace hardwired rules or moral suasion when the matters at stake require significant degrees of coordination and agreement. In this regard, it is worth pointing out that **central banks are typically well positioned to undertake a sponsorship role with regard to both production of rules or to self-regulation by**

³⁸ See ACI (2009).

market players, especially in emerging market environments. Their proximity to market operations and to fiscal authorities provides them with a unique perspective.

The balance between soft and hard rules can change depending on traditions. The reform undertaken by the Bank of England in 1996 to create an open repo market had as a core component a code of conduct agreed by a committee of professionals presided by the Bank of England itself. On the contrary, the reforms undertaken in the late 80s in Spain were hardwired in regulation after consultations with market participants. Certainly, issues requiring disciplinary procedures are difficult to deal with soft techniques. The US repo markets stands as an example of the difficulty for market associations to find a solution to problems that require collective action like settlement fails (see section 3.1.3).

As regards the items addressed by a repo market code of conduct, the examples provided by Bank of England and the Eurepo Council are sufficiently illustrative³⁹. Obviously, the specific content has to be adapted to the alternatives that suit each market. This handbook provides elsewhere guidance to fill the content of the most relevant items: legal alternatives, relevant risk management parameters (margin modalities, remuneration and thresholds), procedural issues to address (allocation of general collateral and substitution), trading conventions and pricing sources.

3.2.2. PRICING AND ARBITRAGE

The determinant of repo pricing is crucial for both market players and policymakers for obvious reasons. It should be clear that the **repo rate for a bond is an alternative reflection of its relative valuation**. In markets with developed interest rate swap markets, the theoretical repo rate for a bond can be defined as the one that aligns its forward price with its fair value as determined by its asset swap spread (possibly, rolled-down the curve).

In less developed markets, **the repo rate differential versus a general collateral bond relates to the prices of the involved bonds through the covered parity law for the two bonds**. Consequently, an expensive bond versus general collateral will translate into a repo rate lower than general collateral repo rate. In turn, the repo rate differential between general collateral bonds will not materially differ since, by assumption, they constitute the set of bonds fairly priced based on the curve.

In practice, it is clear that **repo rates move between the general collateral level determined and the theoretical rate corresponding to each bond**. Analytically, bond

³⁹ See Bank of England (2008) and International Repo Council (2003) and (2005).

specialness amounts to an overshooting of its theoretical level due to market corners caused by diverse events like auctions, lock-in effects in buy-and-hold portfolios etc.

When the special rate is low enough, it provides an incentive to the holders of Treasury securities to borrow money via repo to capitalize on the yield difference between the repo rate and the rate that could be earned by investing any monies borrowed. In this regard, markets which operate both borrowing and repo markets the issue is which route to take to exploit the arbitrage. This is a matter where there are not generally valid principles since the optimal route depends on transaction costs. For the US case, Stigum (2006) makes the case that dealers will go the reverse repo route if the spread on the arbitrage is more than 25 bp, and, otherwise, they would take the securities borrowing route.

The relative pricing of repos versus T-bills, call money swaps or inter-bank deposits is strongly affected by liquidity and counterparty risk considerations as well as by clientele effects. As an example of the latter set of factors, Regulation Q forbids US banks to pay interest on overnight money taken from non-banks, but investors can still invest in repos. Alternatively, some local official investors are prevented from making repos and go for T-bills, instead. The demand for T-bills is further reinforced for their use in collateral arrangements or by buy-and-hold investors. The balance of supply and demand factors thus shapes rate differentials, leaving aside credit and liquidity premia.

3.3.3. FINANCIAL COLLATERAL MANAGEMENT

In developed markets, financial collateral management has become an issue whose importance goes well beyond strictly government debt market issues. The need to collateralize all sort of financial risk exposures, and most notably derivative ones, has created strong incentives for banks to economize on collateral use. The need to rationalize on collateral has been especially pressing in fragmented market settings, like the European one. Hence, the pressure for legal measures that enable a cross-border management of financial collateral has been substantial. In Europe, the outcome of the overall push for a more integrated approach has been the “Collateral Directive”

On the surface, the link between repo market matters and financial collateral management may look weak from a general perspective. However, **the shared legal roots and language confusion can be the cause misconceptions as to the adequate configuration of a developing repo market.**

From a legal perspective, the features required by adequate collateral tools are that they are valid and binding between parties, enforceable against third parties and the

assets so provided must be easily and rapidly realized notwithstanding any insolvency proceedings affecting the collateral provider. The Collateral Directive has created a very liberal legal environment for the provision of collateral aimed at ensuring those features. Namely, the Directive removes collateral formalities and envisages a broad scope of application. In particular, it covers any sort of contractual security interest (especially a pledge) where the collateral provider remains the owner of the pledged assets as well as collateral provided on a transfer of title basis for security purposes (including in particular repurchase transactions), where ownership is temporarily transferred. The only formalities envisaged are delivery of the assets pledged and a written evidence of the collateral agreement.

Importantly, the Collateral Directive also establishes a so called right-of-use of pledged assets that gives the collateral taker the right to re-hypothecate the assets. This revolutionary measure for civil law jurisdictions amounts to functionally replicate some of the features of the repo market, because it permits to mobilize efficiently the collateral portfolio instead of freezing it, as it happens in the framework of “classical” pledges.

The bottom line is that **legal changes can radically alter the operational modalities available in the collateral management area**. Thus, the German market Eurex Repo initiated short after the transposition of the Collateral Directive the so called collateralized funding program. Collateralized funding can be described as a secured funding activity based on re-usable and harmonized collateral baskets. The collateral management system of Clearstream delivers fully-automated allocation out of the harmonized securities pool to collateralize any traded cash amount. This process allows re-use and substitution of the collateral received.

As a result, the Eurex group is in the position to offer all the advantages of blind electronic trading, based on a central clearing counterparty that operates combined with a centralized collateral management system for cash-driven secured money market transactions. The London Clearing House (LCH) launched a similar basket trading product in 2008, although without links to ECB operations.

Collateralized funding has expanded rapidly during the crisis. In addition to its operational advantages, it is worthwhile to also emphasize the liquidity of this trading channel. Whereas tri-party transactions are bilateral transactions, where the buyer and the seller are disclosing their intention to borrow or lend money, collateralized funding does not need that the parties disclose their funding initiatives.

Central bank collateral policy is also an important factor for repo markets. An asset deposited as collateral with the central bank cannot be mobilized further. A selective collateral policy by the central bank could thus determine a relative scarcity of higher quality paper in the repo market. In this regard, the broader collateral policy followed

by the Eurosystem can be said not to distort the level of liquid collateral available in the market.

4. ACCOUNTING ISSUES

The complex nature of repo also bears effects in its accounting treatment, to the point that the development of the market can be jeopardized. As a confirmation of this complexity, it is worthwhile to start this section by saying that **IASB has put forward recently a broadly criticized Exposure Draft on repo accounting that alters profoundly the existing practice regarding repurchase agreement accounting**. The US Financial Accounting Standards Board also recognized the complexity in its Statement nº 125 (FASB 125)⁴⁰. Namely, “Repurchase agreements and securities lending transactions are difficult to characterize because those transactions are ambiguous: they have attributes of both sales and secured borrowings. Repurchase agreements typically are documented as sales with forward purchase contracts and generally are treated as sales in bankruptcy law and receivers procedures, but, as borrowings in tax law, under court decisions that cite numerous economic and other factors.”

FASB 125 recognizes that repurchase agreements are commonly characterized by market participants as secured borrowings, despite the fact that repurchase agreements allows active market participants to fine tune the risk exposure of their portfolios in some dimensions other than just credit risk by means of the buying and selling associated with repos. The idiosyncrasy of repos’ accounting is also confirmed by their treatment under the successor US rule (FASB 140), where repos’ accounting happens to be an exception to the rules of effective control which guide how to account for the transfer of financial assets more generally general. In effect, rules 9a and 9b of FASB 140, dealing respectively with the (lack of) access by the transferor to the transferred assets and with the freedom of the transferee to unconditionally exchange the assets received, would dictate sale accounting for a repurchase transaction. In other words, rules 9a and 9b on their own rule that the repo seller (buyer) should book out (in) the underlying bond and revert later on those entries.

But FASB 140 expanded the applicable considerations with rule 9c, to the effect of excluding repurchase transactions from those that entail a loss of effective control to the seller. Rule 9c negates sale accounting if “the transferor does not maintain effective control over the transferred assets through either (1) an agreement that both entitles and obligates the transferor to repurchase or redeem them before their

⁴⁰ On the “Accounting for Transfers and Servicing of Financial Assets and Extinguishments of Liabilities”. FASB 125 has been replaced by FASB 140.

maturity [...] or (2) the ability to unilaterally cause the holder to return specific assets,..."

Also IFRS has coincided with FASB in the general treatment granted to repos until the referred Exposure Draft⁴¹. Namely, repurchase agreements has been so far understood not to comply with the de-recognition rules that would enable a sale accounting of a repurchase transaction, i.e. the disappearance of the bond repoed-out from the asset side and simultaneous entry of a long position off-balance sheet representing the forward leg. Under IFRS, the first and dominant condition for de-recognition has been a substantial transfer of the risks and rewards of ownership of the financial asset. The dominance of this condition means its prevalence over other (subordinated) conditions for de-recognition under IFRS. In other words, the loss of control over the bonds repoed-out cannot be claimed as a sufficient condition to take them out of the balance sheet. The application guidance AG40 of IFRS makes explicitly the case that repo transactions, where the repurchase price is a fixed price or the sale price plus a lender's return, are examples of situations where an entity has retained substantially all the risks and rewards of ownership.

It is important to realize that market participants may on occasions have incentives to prefer a sale accounting approach to repos. The point to notice is that under that framework the remuneration to the funding provided is recorded by means of entries in revaluation income. **A sale based accounting approach to repos offers the opportunity to manage income recognition across time.** Obviously, this amounts to be an un-faithful recognition of the income generated in a repo transaction, because the commitment to repurchase the bond temporarily sold deeply differentiates it from trading operations that apparently look similar, like selling a security to briefly buy it later at a cheaper price. This can become especially true when market prices for the bond exchanged are formed in a shallow market.

Notice that **the invalidity of a sale based accounting treatment applies under IFRS no matter the legal form of the temporary transaction.** In that regard, even a minimally documented sell/buy-back⁴² must be understood to escape a sale accounting treatment. Spain is an example in that area. The accounting has never been of the sale nature despite the fact that, as pointed out in 3.1.3 repo transactions have been evidenced only by the instruction sent to the C&S.

⁴¹ In order to put in context the scope of this coincidence of views, it is worth recalling that FASB has interpretation statements containing specific guidelines, whereas IFRS has stated just the general principle.

⁴² For instance, a repo evidenced by an instruction to the C&S that proofs from the outset the willingness of both parties to undo the initial sale.

Admittedly, **the legal nature of sell/buy backs has traditionally offered more difficulties for accountants to correctly book for repos.** In Peru, banking regulation still contemplate sale based accounting. Interestingly, this treatment seems to be influenced by the bankruptcy regime. But Mexico also offers an example of the confusion about the proper accounting of “reportos”, the domestic form of classic repo. Namely, until October 2008 “reportos” have been booked according to the apparent legal nature of the transaction (sale/repurchase) and not based on the economic one. In other words, bonds sold out under a “reporto” were derecognized by the seller and recognized. The fact that the right to receive on a forward basis the bonds sold out was booked in the balance sheet together with the funding provided also led to bloated balance sheets before the reform.

The discussion so far has emphasized that even minimally documented repo transactions should not be accounted for following the sale perspective. But no concrete alternative has been proposed yet. In this regard, it is interesting to note that the specific guidelines given by FASB 140 accommodate explicitly the hybrid nature of repos⁴³ and the potential for misuse of general rules.

Drawing on the economic nature of the transaction⁴⁴, **the basic principle put forward by FASB140 is that transfers of financial assets with repurchase commitments, such as repurchase agreements and securities lending transactions, should be accounted for as secured borrowings.** The repoed security has to be retained on the balance sheet of the cash taker while a loan payable (equal to the value of the cash received) is recorded. The cash provider, on the other hand, typically records a loan receivable (as the counter entry to the cash provided to the cash taker), while the security acquired under the reverse repo is recorded off-balance sheet.

The accounting entries described so far do not capture the rich dynamics predicated of repo trading. When the cash provider on-sells the security, it is a “short” (or negative) asset position what reflects his obligation to return it to the original transferor. Unlike what happened with its predecessor, FASB 140 does not envisage that the transferee recognizes in its balance sheet the asset transferred when conditions 9a, 9b and 9c warrant secured borrowing accounting⁴⁵.

⁴³ See FASB 140, paragraphs 200 and ff.

⁴⁴ I.e., the nature of the considerations exchanged in the initial transfer, including the beneficial interests in the transferred assets.

⁴⁵ Under FASB 125, if a repo seller did not have the right to substitute the securities or terminate the transaction on short notice, the repo buyer was required to record both the securities and the obligation to return them back, thereby “grossing up” its balance sheet. In those conditions, debtors had to reclassify the securities in their statements of financial position to avoid double counting the asset. But this re-designation could not solve the grossing up of the overall balance sheets. This accounting rule prompted in US market participants’ fears from altered trading practices and economic expectations in the repo market and, ultimately, triggered an amendment to GMRA. Its aim was to allow repo sellers to

FASB 140 illustrates these general principles with some concrete interpretations. In paragraph 47, it offers specifics as to the conditions indicative of control of the seller over the securities repoed out. Namely, (1) the assets to be repurchased or redeemed are the same or “substantially the same” as those transferred; (2) the transferor is able to repurchase or redeem them on substantially the agreed terms, even in the event of default by the transferee ; (3) the agreement is to repurchase or redeem them before maturity, at a fixed or determinable price; (4) the agreement is entered into concurrently with the transfer, something that wash sales do not fulfill. An important practical matter, as what does it mean “substantially the same”, is given more clarity in paragraph 48⁴⁶.

The secured borrowing treatment of tri-party repos is underlined on the grounds that the transferor has transferred securities to an independent third-party custodian, or to a transferee, under conditions that preclude the transferee from selling or re-pledging the assets during the term of the repurchase agreement (paragraph 101). But transfers entered with the agreement to repurchase at the maturity of the underlying bond must be accounted logically as sales (paragraph 98). The same conclusion applies to transfers with repurchase agreements in which the transferee has not obtained collateral sufficient to fund substantially all of the cost of purchasing replacement assets

The implications of the secured borrowing accounting in terms of income recognition are clear. **Changes in the market value of the securities have no effect on the buyer’s balance sheet.** As regards the seller, their impact must reflect the valuation approach followed in the portfolio on which the repurchase agreement transaction draws, i.e. mark-to-market if the security sold was booked in the trading portfolio or amortized cost if it came from the banking book. The loans payable and receivable representing the cash exchanged will typically accrue interest over the term of the transaction. In some jurisdictions or for internal purposes in banks active in making markets in repos,

protect themselves from the effective application of the accounting rule by simply allowing to change by notice the terms of the original transaction or by terminating it See PSA/ISMA [1995]. This initiative illustrates plainly the creative and protective approach to master agreements drafting highlighted in section 2.1.3.

⁴⁶ To be substantially the same, the asset that was transferred and the asset that is to be repurchased or redeemed need to have all of the following characteristics: (1) the same primary obligor (except for debt guaranteed by a sovereign government, central bank, government-sponsored enterprise or agency thereof, in which case the guarantor and the terms of the guarantee must be the same); (2) Identical form and type so as to provide the same risks and rights; (3) The same maturity (or in the case of mortgage-backed pass-through and pay-through securities, similar remaining weighted-average maturities that result in approximately the same market yield); (4) Identical contractual interest rates (5) Similar assets as collateral; (6) The same aggregate unpaid principal amount or principal amounts within accepted “good delivery” standards for the type of security involved. See FASB 140

that cash balance element can be marked-to-market on their balance sheet. This is one of the main practical applications of repo fixings like Eurepo, for euro repos.

The appendix 2 describes by means of an example the accounting entries to be made when following the collateralized loan approach. The example contemplates the different phases of the accounting cycle of a transaction as well as the relevant set of accounts. The example includes variation margin both in for of cash and securities. Notice that the treatment of variation margin varies according to jurisdictions. In some jurisdiction, the cash may be offset against the amount of the original repo, or added to it, providing that this procedure is described in the relevant legal documentation and that settlement is on a net basis. If securities are transferred, the balance sheet treatment follows that employed for the original securities.

5. TAXATION

The tax treatment of repo trades and positions has revealed repeatedly in many jurisdictions a hindrance for the development of the repo market. As a general rule, it will not come as a surprise the assertion that **repo markets development requires a taxation setting that is not unduly distortive.** The distorting impact of tax rules on repo markets typically is encountered in three main areas. Namely, capital gains taxation, withholding taxes and financial transaction levies. Recently, the Volcker plan aimed at restructuring the US financial system has raised the possibility of taxing uninsured deposits as a recognition of the social costs of liquidity runs. That could potentially also include repos under the new tax base⁴⁷.

Capital gains taxation rules is one of the most damaging distortions. Actually, deficient capital gains rules typically reveal either an inappropriate legal status of repos or a rigid taxation system. Unsurprisingly, the crux of the problem lies in the key feature of these transactions emphasized time and time again in this report that a transfer of legal title occurs which is subsequently reversed on completion. If the taxation of these transactions were to reflect the legal form of what has occurred, a charge to capital gains tax will emerge. This economic impact will emerge despite the fact that market authorities and participants, notwithstanding the legal form of repos, agree on its lending nature. Obviously, the solution to this problem lies in the reconciliation of tax rules with the economic nature of the repos. The corresponding

⁴⁷ As of March 2th, the Volcker plan had not materialized in a bill. However, preliminary information points out that the fee would not be assessed on repos on government bonds. It would be unreasonable otherwise since it cause a significant damage to the liquidity of the US government debt market. The alternative of taxes only repos on private and structured debt seems on the surface more appropriate to address the market failures highlighted in the Volcker assessment.

tax changes have, thus, belonged to each of the major big bang initiatives to launch a repo market⁴⁸. In the US, section 1058 from the Internal Revenue Code clarifies the conditions for an special treatment⁴⁹.

Peru currently provides another interesting example of an undesirable interaction between legal form and tax rules. Repos were introduced by the central bank in 1997 under the sell/buy back modality. However, the repo market has not thrived. One of the reasons is the supposedly loss of tax shield enjoyed by investors in government debt when they repo out a bond. The tax benefit is understood by tax authorities to travel to the new (temporary) legal owner. It could be argued that this distortion is not destructive. The economic impact of this interpretation could in theory be priced in by making cash taking under repo more expensive as a reflection of the shield gained. However, the basic distortions can be easily addressed by tax authorities once they recognize the true economic nature of the transaction, as happened in most other markets.

In Japan, the equivalent of sell/buy backs (*gensaki*) commenced following the postwar reopening of the primary market as a principal means of fund raising. However, *gensaki* transactions on JGS continued to be subject to the securities transaction tax because the trade entailed a form of sale transaction of JGS. As a result, *gensaki* transactions became focused principally on transactions in Treasury Bills and Financing Bills which were not subject to the securities transaction tax. The tax distortions on repos were amended in 1999 with the occasion of the major overhaul of financial regulation in Japan (“Big Bang”) when the transaction tax was abolished.

In Switzerland, stamp duty tax rules and the legal nature of repos exhibited a similar negative interaction to the effect of inhibiting the development of the market until

⁴⁸ France put repos on an equal (neutral) footing to “*remere*”. UK had to undertake also tax changes. Namely, in the UK the stamp duty does not apply to transactions under arrangements for the lending and return, or sale and re-purchase, of securities provided that the securities of the same kind and amount are returned to the lender or seller in accordance with the terms of the arrangement. But similar measures have been taken in Russia, Switzerland, Thailand, Mexico etc.

⁴⁹ In the case of a taxpayer who transfers securities (as defined in section 1236(c)) pursuant to an agreement which meets the requirements of subsection (b), no gain or loss shall be recognized on the exchange of such securities by the taxpayer for an obligation under such agreement, or on the exchange of rights under such agreement by that taxpayer for securities identical to the securities transferred by that taxpayer. (b) Agreement requirements: In order to meet the requirements of this subsection, an agreement shall - (1) provide for the return to the transferor of securities identical to the securities transferred; (2) require that payments shall be made to the transferor of amounts equivalent to all interest, dividends, and other distributions which the owner of the securities is entitled to receive during the period beginning with the transfer of the securities by the transferor and ending with the transfer of identical securities back to the transferor; (3) not reduce the risk of loss or opportunity for gain of the transferor of the securities in the securities transferred; and (4) meet such other requirements as the Secretary may by regulation prescribe. (c) Basis Property acquired by a taxpayer described in subsection (a), in a transaction described in that subsection, shall have the same basis as the property transferred by that taxpayer.

1997. **The interest of the Swiss central bank to develop the market, as pointed out in section above and in Box 4, required the sponsorship of a reinterpretation of repos by Swiss tax administration to the effect of exempt repos from stamp duty turnover levy.** Interestingly, the exemption was granted under three conditions aimed at differentiating repos from secured lending collateralized with cash, which were left subject to the tax⁵⁰. Namely, the cash taker is the beneficiary, an interest payment takes place, and, interestingly, the counterparty risk exposure faced by the cash lender due to market price changes must be managed by means of margin arrangements. Obviously, this latter condition has been influential to the choice of the risk management and the operational arrangements made by participants in the Swiss repo market.

The exemption from stamp duties and the clarification of the capital gains and losses aspects of repo taxation should not be understood to mean that repo should be tax exempted. Income from repo interest should enter corporate and personal income tax bases. The same argument applies to capital and gains resulting from market strategies in which repos play an integral role, like shorting securities borrowed. Typically, **the perverse interactions between income taxes and repos arise as a result of the administrative tools to manage tax collection.**

In particular, **withholding taxes on interest payments arising during the life of a repo can be the reason of important distortions.** An interim coupon during the life of a repo creates clear incentives to undertake coupon washing repo trades whereby the untaxed party acts as buyer and the taxed one as seller. The wedge created by the withholding tax can thus be shared between both parties to the detriment of tax authorities. The problem applies more specifically to those jurisdictions with sell/buy backs where manufactured payments are not a market convention. However, it is clear that tax incentives can be also destabilizing for a classic repo contract. The incentives of coupon washing under differential withholding taxes could erode the incentive to sustain the convention that the buyer pays back the interim coupon received.

The tax arrangements needed to cope with these issues are highly dependent on local administrative issues. Ultimately, the only solution that has proved to prevail in most markets is the establishment of an equal withholding tax rate for all the relevant investors, i.e. for those susceptible of entering in deceptive trades⁵¹. But this is something that typically escapes the direct space of influence of debt managers.

⁵⁰ See Cottier (1998).

⁵¹ The international tax regime is based on the two well known principles that double taxation should be avoided and that tax income must be shared between source and residence countries. But the existing techniques to make compatible both principles have proved to be too imperfect to enable taxing portfolio investment income at source without triggering international tax competition. The evidence that government debt withholding taxes on non-residents might diminish the investor base or that the

In Spain, the information derived from the clearing and settlement system was long used to monitor the extent to which some repo trades were aimed just at circumventing withholding tax rates. At some point during the 90s, this information was used to establish a 30 day limit before each coupon payment as a disincentive against coupon washing. The spot buyer in a repo done during this period would not be entitled to recoup withheld tax. Ultimately the need to treat all relevant investors equally prevailed. The Swiss tax authorities have also dealt with a risk that may be encountered in jurisdictions with the classic repo variant in case of interim coupons. Namely, the risk that both the initial seller (entitled to the coupon) and buyer (coupon recipient) try to recoup the withheld amount from tax authorities. In order to address that potential problem, the Swiss repo master agreement envisages the conservative procedure that the manufactured payment that has to be sent by the buyer is split in two parts. A withholding tax component sent by the buyer to tax authorities and the coupon, net of the withheld amount, to the seller. In addition, the latter has to pay a new withheld amount. The tax authority thus withholds twice but now both lender and borrower are entitled to recoup the withheld amount.

The distorting impact of withholding taxes is wide reaching given that its base is determined on the basis of flows. For example, one needs to ensure that tax rules do not treat cash provided as margin as a taxable base. Also, manufactured coupons should not have a withholding tax treatment different to the one corresponding to the original coupon payment.

6. REGULATORY ISSUES

6.1. RESTRICTIONS TO ACCESS AND FEARS TO MARKET SHORTS

Fears of market shorting activities have been repeatedly an important impediment to repo market development. It is clear that a sell/buy back or a classic repo leave the option open for the buyer to on-sell the security and, thus, to take a short position. The rationale of these concerns lies, essentially, in the systemic consequences that a single failure to deliver in the forward leg of the transaction could end up having. A single failure can make impossible to settle a whole market session when settlement is done on a net basis, as technological reasons determined in the past in most stock exchanges.

incidence of the tax ends up falling on the government itself has led to the abolition of the tax in many jurisdictions.

The perspective of these risks made of repos a forbidden activity in many markets.

The reform that paved the way to a repo market in the **UK** in 1996 had to address inter alia the fact that only the gilt-edged market-makers (GEMMs) were allowed to borrow stocks, and they had to do so via stock exchange money brokers. The repo market had to become entirely open. India had dealt with a similar problem already in 1992.

A rule that went back to 1969, prohibited forward trades in **India** but an inter-bank buy/sell back market developed in the shadows of permitted central bank repo operations. Actually, the Reserve Bank of India got alarmed in 1988 by the large scale growth of repos with nonblank clients, on the grounds of the potential liquidity problems. A committee analyzed the issue in 1992 and certified both the irregular practices taking place and the deficient clearing and settlement arrangements that sustained them. But it became also clear that once the proper system and controls were in place, sell/buy backs were a valuable instrument to the market. As a result, the original prohibition was amended not to apply to banks and securities houses. As regards non-bank customers, they were permitted only limited entry into the repo market as they were allowed to undertake reverse repos only. Another important lesson from that episode was the need to overhaul the clearing and settlement system. RBI evolved the existing clearing and settlement system to make it more secure, efficient and transparent⁵².

Spain revamped its government debt market already in 1987 with a similar guiding idea, namely that clearing and settlement was the key for an open and secure repo market. Not unlike in the other mentioned markets, stock exchange rules had prohibited real repurchase agreements. The only allowed transaction were the so called “reportes” (see Box 1), a transaction with features similar to the Spanish repo mentioned in section 3.1.3. Moreover and similarly to the Indian experience, the central bank had already been operating with the equivalent of sell/buy backs in a money management environment. Thus, the needs of a modern environment for government debt trading and the means to materialize the reform found a natural matching. Sell/buy backs was at that time the technologically and legal efficient solution to adopt⁵³.

An integrated and sound clearing, settlement and custodial arrangement permits dealing with the threats mentioned above. As pointed out in section 3.1.3, adequate

⁵² See RBI Report

⁵³ A totally accurate account of the time sequence of authorized instruments is the following. Market member had available first available restricted repos (Spanish repo). The following year they were authorize to enter forward trades. In 1991, also non-members were allowed to trade forward, although the minimum size of the allowed transaction was quite large, in order to establish a size-base selection of professional players. This paved the way to a broad access to unrestricted sell/buy backs in the whole market.

post-trading arrangements enable to undertake close monitoring of wholesale market positions and to discipline market participants with regard to settlement fails.

As for the activity of non-bank customers to the repo market, it is sensible to impose limitations of either statutory nature or discretionary to their bank counterparties.

Mutual funds are typically statutorily restricted to leverage and, therefore, will be only entitled to enter into reverse repos. In turn, the potential problems caused by corporates or households engaging in the money markets game with banks deserves either bank screening or outright restrictions, as India decided in 1992.

6.2. CAPITAL ADEQUACY REGULATIONS

The general aim of repo-style transactions of reconciling counterparty risk management and operational flexibility brings about specific issues in terms of capital adequacy rules. It could not be otherwise since the (unexpected) risks addressed by these rules are strongly shaped by: (1) the special role played by repo documentation in the mitigation of counterparty risk; (2) the strong interconnection between market and credit risks in repo-style transactions, and; (3) the significance of operational risks in repo-style business.

Capital adequacy rules would be very heterogeneous were it not for the Basel framework. Although evolving in time⁵⁴, regulators subscribing to the accord are expected to implement local rules in line with it. This does not eliminate entirely regulatory and supervisory heterogeneity, but at least it creates a sufficiently common ground which is especially valuable for complex instruments like repos.

It is entirely outside the scope of this brief section to go into the intricate rules put forward by the current Basel framework. But it is worth highlighting its most salient features and its influence on repo market development. Unsurprisingly, **the Basel capital adequacy framework for repo-style transactions treats more favorably repo-**

⁵⁴ The Basel framework goes back to 1988, when the first version of the Accord was signed Basel I. It was amended several times and, most importantly, in 1996, to incorporate for the first time market risks (Market Risk Amendment or MRA). In 2001, The Basel Committee on Banking Regulation presented the first package of consultative documents on the reform of the Basel Accord, Basel II. The final version of Basel II started to be implemented in 2006 and sets out capital rules more sensitive to risk, deals for the first time with operational risk and attempts to align regulatory and economic capital. With these goals in mind, Basel II extends to the banking book the possibility of banks using their own internal models to calculate capital adequacy, something already present for the trading book in the MRA. In 2009, the impact of the crisis has prompted the adoption of new steps towards a new revision of the Basel framework, Basel III.

like transactions entered into within documentation settings that make possible a close scrutiny of counterparty risk and offer legal certainty on netting.

The treatment of repos in the capital adequacy rules is adopted in close connection with general considerations devoted to the recognition of credit risk mitigation techniques. Actually, the fact that repos can be booked either in the trading or in the banking books determines the need of a still broader perspective with regard to repo and economics of capital. Basel II caters to the different needs of simple and advanced repo bank players as much as it suits the different degree of sophistication of banks more generally.

Actually, in order for banks to obtain capital relief for any use of credit risk mitigation techniques, **Basel II establishes minimum standards for legal documentation §117⁵⁵**. Namely, all documentation used in collateralized transactions and for documenting on-balance sheet netting must be binding on all parties and legally enforceable in all relevant jurisdictions. Banks are expected to have conducted sufficient legal review to verify this (§118).

In order for banks to obtain capital relief for any use of credit risk management techniques, Basel II establishes more concrete legal requirements. For example, §123, the legal mechanism by which collateral is pledged or transferred must ensure that the bank has the right to liquidate or take legal possession of it, in a timely manner, in the event of the default, insolvency or bankruptcy. §124 establishes the not innocuous rule that collateral protection is only possible if the credit quality of the counterparty and the value of the collateral must not have a material positive correlation. Notice that domestic banks wishing to fund themselves with foreigners providing government debt as collateral may be constrained of doing so during a systemic crisis like the one that we have been experiencing recently. Another requirement in line with the recommendations contained in this report is §126, i.e. when collateral is held by a custodian, banks must take reasonable steps to ensure that the custodian segregates the collateral from its own assets.

A primary dealer holding a portfolio for market making purposes has to book its repos drawing on that portfolio under the corresponding trading-oriented capital adequacy rules (comprehensive approach). In turn, repo-based credit risk mitigation of banking book positions can be translated in terms of capital needs in **two alternative forms**. Namely, **the simple approach**, similar to the 1988 Accord, or a **comprehensive one** which allows fuller offset of collateral against exposures. Notice

⁵⁵ In what follows, we provide when appropriate the number of the relevant paragraph in the Basel II final document.

that the fact that the risk being dealt with is counterparty risk driven by market risk, (§127) the capital requirement is applied to both repos and reverse repos.

In **the simple approach**, the overall treatment of a risk to a counterparty results from the extent (total or partial) mitigation provided by the collateral. The exposure is split between collateralized and un-collateralized components. The first one is applied a risk weight equal to the one of the collateral, if it improves the risk weight of the counterparty. Obviously, in a repo this substitution always takes place since the risk weight of cash is zero. That does not need to be the case in a reverse repo, depending on the bond received as collateral. The un-collateralized component is applied the risk weight of the counterparty.

The simple approach is not onerous in terms of risk management requirements, because it just requires mark-to-market and revaluation with a minimum frequency of six months. On the contrary, it sets a floor to the risk weight of the collateralized component equal to 20%. Only under some conditions as set out in §170⁵⁶ and for risks held against core market participants the risk weight can become 0%. The set of core market participants is set as sovereigns, central banks, banks, securities houses, regulated mutual funds, pension funds and clearing houses.

The comprehensive approach assumes that initial margin and frequent variation margin calls determine a lower base of exposure for capital requirements⁵⁷. Capital requirements result from the application of the risk weight substitution policy to the adjusted exposure and collateral figures. Banks may calculate their adjusted exposures based on standard supervisory haircuts or own-estimates (Var-models), provided that they fulfill minimum conditions (§133 y §134). The size of the individual haircuts is mandated to depend on the type of instrument, type of transaction and the frequency of marking-to-market and re-margining.

⁵⁶ Conditions contained in §170 can be said to be the features of “normal” repo transactions in domestic government debt markets. Namely, (a) both the exposure and the collateral are cash or a sovereign security security qualifying for a 0% risk weight; (b) both the exposure and the collateral are denominated in the same currency; (c) either the transaction is overnight or both the exposure and the collateral are marked-to-market daily and are subject to daily re-margining; (d) following a counterparty’s failure to re-margin, the time that is required between the last mark-to-market before the failure to re- margin and the liquidation of the collateral is considered to be no more than four business days; (e) the transaction is settled across a settlement system proven for that type of transaction; (f) the documentation covering the agreement is standard market documentation for repo-style transactions in the securities concerned; (g) the transaction is governed by documentation specifying that if the counterparty fails to satisfy an obligation to deliver cash or securities or to deliver margin or otherwise defaults, then the transaction is immediately terminable; and (h) upon any default event, regardless of whether the counterparty is insolvent or bankrupt, the bank has the unfettered, legally enforceable right to immediately seize and liquidate the collateral for its benefit.

⁵⁷ The adjusted exposure is determined in accordance with §147, i.e. $E^* = \max \{0, [E \times (1 + H_e) - C \times (1 - H_c - H_{fx})]\}$, where H_e and H_c are the haircuts applicable to the exposure and collateral respectively. H_{fx} measures the haircut applicable in case of currency mismatch between exposure and collateral.

In the Basel II Accord, a repo style transaction subject to daily marking-to-market and to daily remargining was assumed to receive a haircut based on a 5-business day holding period. These haircut numbers are scaled up using the square root of time formula depending on the frequency of marking-to-market. **The supervisory haircuts for sovereigns** is determined on the basis of three buckets of credit grade (AAA to AA-, A+ to BBB-, BB+ to BB-) and residual life to maturity ($x < 1\text{yr}$, $1 < x < 5$, $x > 5$). The values for the haircut are (0.5,2,4)/(1,3,6)/(15) (§151). Notice that the last bucket is not split up in terms of term. Obviously, based on their rating, the effective collateralization needs are larger in most developing countries than in developed ones.

The rules applying to Var models are not covered in this section. §158 to §169 of Basel II cover the guidelines provided in the Accord for the determination of adequate haircuts. However, notice that the document for discussion that is setting the basis for Basel III is amending some of the parameters contained in the referred paragraphs. The new document draws lessons from the recent crisis. The proposed changes in general require a more stringent margin and collateral regime. There is a clear desire to encourage banks to trade more through central clearing parties (CCPs) by offering 0% risk weightings. It discourages re-hypothecation practices and 'margin period of risk' is planned to be increased from 10 days to 20 days.

Finally, it is relevant to notice that **Basel II not only recognizes risk management on a quantitative basis, but also the validity of netting agreements**. Namely, when there is a well a well-founded legal basis for concluding the netting agreements, that are enforceable in each relevant jurisdiction even if the counterparty falls in bankruptcy, the assets falling under the umbrella of the agreement are identified and there is an ongoing monitoring on a net basis, the exposure can be taken to be the net one and haircuts zero §188.

6.3. LIQUIDITY REGULATIONS

Contrary to other aspects of banking regulation, liquidity regulation is not harmonized on an international level. However, **the crisis has prompted path breaking proposals with potentially deep impact on repo markets**. At the US domestic level, the Volcker plan to tax uninsured bank deposits would have important effect if it was to be applied to government debt market repos. The market failures evidenced in the functioning of the US tri-party repo market have triggered an initiative reform whose final form is still not defined. In the same vein, although backed already by concrete proposals, the

Basel Committee of Banking regulation (BCBR) has issued for consultation a framework for harmonized liquidity bank regulation.

No assessment has yet taken place as to the impact of these new BCBR rules, but their thrust is already clear. Institutions have to implement a liquidity risk management function in order to identify, monitor, measure and analyze the liquidity risk. More specifically the consultation document puts forward two regulatory standards aiming at addressing liquidity risk: (1) a liquidity risk coverage ratio, to ensure that banks hold sufficient high quality liquid assets to withstand a short-term stress scenario lasting one month; (2) a net stable funding ratio, to increase incentives for banks to fund themselves using more stable sources on an structural basis.

The liquidity risk coverage ratio measures if banks hold adequate level of unencumbered, high quality liquid assets to meet net cash outflows under supervisory specified stress scenario for 30-day period. The relevant issue for the purpose of this report is that high quality and liquid assets is assessed on the basis of (1) their low credit and market risk and, importantly, (2) on their market being liquid as measured, inter alia, on the basis of an active repo market. **The new rules thus strengthen the involvement of banking regulators with sound and efficient repo markets.** Actually, the proposal states that a bank should periodically monetize a proportion of the assets in its liquid assets buffer through repo or outright sale to the market in order to test the usability of the assets. Additionally, the standard expects that high quality liquid assets should also ideally be eligible at central banks, something that after this crisis does not prove restrictive. Finally, notice that the condition that the assets are unencumbered should be understood to exclude reverse repos from the portfolio assets backing liquidity outflows⁵⁸.

In the assessment of compliance with the liquidity ratio, the estimate of contractual outflows and inflows are supplemented by a series of contingent outflow liquidity effects, like: (1) 100% of additional collateral that would be required if the bank was to receive a three notch ratings downgrade, (2) any increase in margin calls on derivative transactions if the underlying collateral was to fall in value by 20% or (3) an increase in secured funding haircuts for non-liquid assets, i.e. the repo is assumed to terminate at the maturity date i.e. no roll-over. The conservative tone of the document also leads to restrictions on liquidity inflows. Namely, on repo the conservative assumption to be made is that the bank will continue to repo liquid assets but that it will not renew illiquid repos and will therefore receive 100% cash in.

⁵⁸ This is not a harmonized issue across countries having liquidity ratios. In Malaysia, the Guidance Notes on Repurchase Transactions state that reverse repos are essentially eligible but not securities sold under repo.

Basel III also envisages the so called net stable funding ratio aimed at measuring and encouraging the diversification of funding across time. The medium term nature of this ratio precludes any major interference with repo market considerations.

But in addition to the described two tests, regulators are also required to monitor the funding and liquidity profile of banks. Inter alia, banks would have to report the amount of assets that would be repo eligible in private markets or at central banks. The assets must be broken down by type and location. Haircuts will have to be disclosed also.

A further important element contained in the new Basel III package is a proposal for leverage ratio. Adopted from US banking regulation, the concept is not exempt of significant criticism given the incentives that it creates for off-shore banking, one of the reasons for the recent crisis. The fact is that repos and reverse repos also are planned to contribute to the leverage ratio calculation. Actually, the current proposal establishes that repurchase agreements, reverse repurchase agreements and securities finance will be reflected as per the accounting treatment, but netting will be disallowed. The quantitative importance of this issue has not been ascertained as of now, but voices of caution have already been raised.

6.4. RESERVE REQUIREMENTS AND REPOS

A reserve requirement is an obligation on a deposit taking institution to hold deposits with the central bank in order to better contribute to ensure the prevailing monetary stability goal. In a nutshell, reserve requirements create a forced demand of monetary base which helps central banks to exercise the required control over monetary conditions. The requirement is typically specified as a ratio of a reserve base aggregate whose economic nature correlates closely with measures of inside money, i.e. banking sector liabilities which are close substitutes of currency. More precisely, the requirement is set typically as a function of banking liabilities with non-banks, given the fact that inter-bank deposits and loans tend to cancel each other in the aggregate.

Repos can function as a money-like liability for monetary institutions. In principle, repo sellers acquire full title over the cash transferred to them. In this context, **the issue that motivates this section is whether banks' repos should be part of the reserve base or not.** In order to attempt an answer to this question it is worth noticing two facts. First, the question relates to two different set of policies, i.e. monetary and government debt policies.

Unsurprisingly, then, the precise answer may entail a tradeoff between what would be optimal for each policy separately. For example, it is clear that a non-remunerated reserve requirement entails a tax levied on reverse repos. From a government debt market perspective, tax incidence considerations immediately suggest that reserve requirements should be zero, something improbable as a matter of principle from a monetary policy perspective. Actually, the second thing to notice is that generally speaking the composition of the reserve base aggregate is a problem with a clear statistical component⁵⁹.

The inclusion of repos in the reserve base aggregate is a defined multi-objective fuzzy choice problem. However, the revealed preferred solution across most jurisdictions is to effectively exempt reverse repos from the aggregate. In other words, keeping undistorted the funding market has prevailed over other considerations. The fact that repo weight in the aggregate tends to be zero across jurisdictions, no matter if the remuneration of reserve assets is zero or positive, confirms that countries apply the lessons learned from some episodes when reserve requirements proved to be distortive to the markets affected.

In 1969, the Fed amended Regulation D to make clear that repos done by banks against governments and agencies (banks were already doing them) were borrowings exempt from reserve requirements. The same amendment also specified that repos done by banks against other instruments—CDs, BAs, and loans in particular—were subject to reserve requirements; the amendment thus killed banks' use of the repo market to finance such instruments.

In **Germany**, domestic repo activities in the mid 90s began to expand only following the Bundesbank's decision in December 1996 to exempt all liabilities arising from a genuine repurchase transaction with a maturity of one year or less in marketable securities from minimum reserve requirements. In the space of around 18 months, the balance of repo-related liabilities booked in German banks multiplied by 10. Previously, these repos had been basically booked in banks operating in the Euromarket and thus exempt of costly impact of reserve requirements.

These country cases and the current rejection of reserve requirements on repos with non-banks in most jurisdictions should not discard a local assessment of the need of those same conclusions and/or the conditions for it. Macroeconomic situations of excess of liquidity in which, additionally, repos and deposits with retail investors are treated differently as regards reserve requirements can impair monetary control by inviting to book deposits as repos. **The “genuine repo” condition that convinced the**

⁵⁹ The fact that currency deposits are included in the aggregate in some jurisdictions offers a qualitative confirmation of the statistical component on aggregate composition.

Bundesbank about the appropriateness of lifting its reserve requirement should be analyzed on a case by case. Solid and informative clearing and settlement arrangements can be extremely helpful to disentangle what is genuine repo from other activity.

Finally, it is important to emphasize that **any trade-off between debt market and monetary objectives should not be accommodated by means of forced choices of some repo documentation.** Repos and sell/buy backs are economically equivalent and, consequently, the rules for reserve requirement should not make any differentiation between them. In this regard, it is telling the temptations felt in emerging markets that experience the distortion caused by reserve requirements. Szakaly et al (1999) notes from the perspective of Hungary that “sell/buy back is definitely not a credit deal but two simultaneous purchases, which in some countries involves an advantage for banks in terms of reserve requirements”. It maybe this way of thinking what explains that some markets, like Polish one, have at some point operated with the two contractual forms of repo. Noel et al. (2006) note that In Poland the distortions caused on classic repo transactions by mandatory reserve requirements on transactions with non bank financial institutions led to a classic repo segment much smaller than the Buy/sell back one.

BIBLIOGRAPHY

- ACI, (2009), The International Code of Conduct and Practice for the Financial Markets
- Bank of England (2008), Gilt Repo Code of Guidance.
- Banks, E., (1993), The Credit risk of Financial Instruments, MacMillan publishers.
- Baxter, T., Toomey, R., (2006), Agreements Used by the Federal Reserve Bank of New York in Reserve Asset Investment and Monetary Policy Implementation, Cemla Legal Seminar.
- Burnham, J., (1990), The Government Securities Act of 1986. A Case Study of the Demand for Regulation, Cato Review of Business and Government, November 1990.
- Cottier, P., (1998), Das Repo – ein neues geldpolitisches Instrument, Quartalheft 3/1998, Schweizerisches National Bank.
- Delgado, F., Cossin, D., Huang, Z. and Aunon-Derin, D., (2003), A Framework for Collateral Risk Control Determination, ECB Working Paper nº 209
- Dudley, W., (2009), More Lessons From The Crisis, Remarks at the Center for Economic Policy Studies (CEPS) Symposium, Princeton, New Jersey, November
- ECB, (2009), General Documentation on Eurosystem Monetary Policy Instruments and Procedures
- ECB, (2010), Euro Repo Markets and the Financial Turmoil, Monthly Bulletin February
- Felaban, (2009), Consulta Asociacion Bancos de Peru sobre Repo Interbancario.
- Fleisig, H., Safavian, M., de la Peña, N., (2006), Reforming Collateral Laws to Expand Access to Finance, World Bank
- Fleming, M.J., Garbade, K.D., (2004), Repurchase agreements with negative interest rates. Federal Reserve Bank of New York. Econ. Financ. 10(5) (2004)
- Garbade, K., (2009), “The Evolution of Repo Contracting Conventions in the 1980s”
- Hagerty, W., (1984), Lifting the Cloud of Uncertainty Over the Repo Market: Characterization of Repos as Separate Purchases and Sales of Securities, Vanderbilt Law Review Vol 37 401-431.
- International Repo Council, (2003), Repo Trading Practice Guidelines
- International Repo Council, (2005), Best Practice Guide to Repo Margining

Noel, M., Akamatsu, N., Brzeski, W. J., Segni, C., (2006), The Polish Fixed-income Securities Market, World Bank Working Paper nº 91.

Nuñez, A., (2007), Desarrollar un Mercado Activo de Reporto y de Prestamo de Valores, presentation to LAC Debt meeting.

Payments Risk Committee, (2009), Tri-party Repurchase Agreement (Repo)

Infrastructure Reform Task Force Releases Progress Report.

PSA/ISMA, (1995), "FASB 125 Annex with Guidance Notes"

Reserve Bank of India, (1999), "Development of Repos Market in India: Problems and Present Status", in <http://www.rbi.org.in>.

Salvatori, F., (2001), Orientamenti giurisprudenziali e dottrinali in tema di natura giuridica di pronti contro termine, GERADI.

Szakaly, D., Toth, H., (1999), Repo Markets. Experience and Opportunities in Hungary, NBH Occasional Papers nº 5.

Tyson-Quah, K., (1997), Cross-Border Securities. Repo, Lending and Collateralization, Sweet & Maxwell.

BOX 1 HISTORICAL PERSPECTIVE ON SOME FORMS OF REPO CONTRACTS

An interesting perspective when undertaking a legal analysis of repurchase agreements is an historical one. Legal institutions tend to be rooted in past traditions shared by groups of countries. Taking into account its influence on current legal practices across the world, a good candidate to trace the roots of repos is Roman law. On the surface, there is no shortage of Roman law classical contracts that could have acted as predecessor of repos. The “muto”, the “comodato”, the deposit, the “prenda” and the fiduciary agreement were Roman law contract types that could be claimed as ancestors of repurchase agreements. All of them entailed a delivery of a good and the obligation to return it back. But a closer exam of these contracts by scholars has discarded them as causal predecessors of repos. The closest relative is the “fiducia” contract, although its accessory nature to some principal contract detracts value from the comparison with repos.

Italian legal scholars from the XIX century tracked in depth the legal roots of repo-like trades broadly practiced since the middle ages. It was not a chance that Italian bankers were familiar with these sort of contracts. Usury laws imposed by the church paved the way to repo-like contracts in the middle ages as way to circumvent them. Moreover, Italian traders were in the place to borrow from arab trade practices the Islamic finance “muharaba” contract under the form of the “mohatra” contract, a repurchase that replicates a financing operation. Thus, the oldest and deepest legal analysis of repo-like contracts took place in Italy. The so called “rioperti” were included in the Italian code of commerce of 1872. The Italian civil law tradition exerted strong influence in Spanish, French and Latin American scholars. The latin american “reporto”, Spanish “reporte” and French “report” date back to this tradition.

Interestingly, all these contracts following this XIX century Italian legal tradition have further developed and specialized based on the used given to them in stock exchange environments. This has determined that the legal tradition had no impact on the actual contracts underlying current Italian, French and Spanish repo markets. However, the “reporto” has left its imprint behind in Latin America.

**BOX 2 INTERNALIZATION OF REPO MASTER AGREEMENTS
IN DOMESTIC LAW. THE FRENCH EXPERIENCE.**

Legal uncertainty may derail the launch of domestic classic repo markets due to doubts about the validity of international repo master agreements transplanted to the local market. The case for legal opinions on international repo master agreements is self-evident. However, legal certainty is reinforced when the domestic law explicitly recognizes the chosen repo contract and the master repo agreement is enforceable also in bankruptcy proceedings.

France took early measures in 1993 to define in law n° 93-1444 repos and the right to set-off associated with them even in bankruptcy. Interestingly, the legal initiative took as basic input the work on a repo master done by banks under the auspices of Bank of France since 1988 to substitute inappropriate contracts like “remere” and “aval en pension”. The legal initiative established two important elements. First, it defined a neutral tax treatment for repos, in line with its nature of collateralized loans of cash. Second, it recognized the peculiar sort of property transfer associated with repos, but only if it entailed delivery. Hence, the French name for repos “pension livree”, from deliver “livrer”. The rationale was to avoid the custody risks evidenced in other markets under hold-in-custody solutions.

Finally, the law established a supervisory framework for the legal recognition of valid repo master agreements. Netting of a bunch of contracts was previously understood to be both a form of payment and a form of collateralization. This uncertainty made it useless in bankruptcy situations. The new law granted that netting and close-out of a master repo agreement were acceptable in bankruptcy provided that repos covered entailed delivery and the master approved by Bank of France.

**BOX 3 ENGLISH LAW GMRA AND RE-CHARACTERIZATION
RISKS IN THE NETHERLANDS**

Most repo transactions entered into by Dutch parties are governed by the PSA/ISMA Global Master Repurchase Agreement (GMRA). Until a law initiative was taken in 2000, there has been important debate as to whether transfers of securities on the basis of the GMRA 1995 were consistent with Dutch law. The Netherlands' Civil Code contains a prohibition against fiduciary transfers. This uncertainty created an impediment to the further development of a repo market in The Netherlands. The problem illustrates about the complex issues arising from "borrowing " international documentation solutions. The fact that a Dutch Annex was been available, thus changing the governing law to Dutch law, could not help when the principal provisions of the master envisaged fiduciary transfer. The alternative of contracting under English law did not help either since, no matter the freedom of the parties to choose the law governing the contract of a transaction, the so called "in rem" matters (including transfer and security interests) are still subject to the law of the local custodian. The prohibition of fiduciary guarantees created a significant risk of re- characterization. The absence of "legal cause" behind fiduciary transfers entailed the risk that under Dutch law the seller would still maintain the title over the securities. In a bankruptcy situation the buyer would have to return back them and close-out netting was going to be a fiction. All these problems were finally solved by means of a new section in the Securities Trade Supervision Act 1995 that clarified all these aspects.

**BOX 4 BIG BANG INITIATIVES
TO LAUNCH A REPO MARKET**

The creation of a repo market often requires to adapt multitude laws and regulations, to gather contributions from different infrastructure providers and to promote standards among market participants. Only a strong leadership can direct the whole process and the qualifications required for that are typically held by central banks. However, the material involvement in the operation of the repo market itself may vary.

The Bank of England acted by: (1) lifting existing restrictions to an open repo market and decoupling it from old stock exchange rules; (2) coordinating the appropriate tax changes with the corresponding authorities; (3) catalyzing standards among market participants regarding documentation and risk management issues.

The involvement of the National Bank of Switzerland in the advance of the domestic repo market provides an example of a symbiotic development of two parallel and technologically integrated segments, one devoted to monetary policy repo and the other one for interbank repo purposes. The involvement of the central bank has further assured: (1) vertical integration and STP between the electronic trading environment and the securities settlement system “Swiss chain of value”); (2) the adoption of standard documentation and conventions on the basis of tax disincentives to do otherwise, especially with regard to risk management issues.

The role of Bank of Spain in the late 80s had an integral dimension. Its involvement was part of a major overhaul of the government debt market that entailed breaking apart with stock exchange rules and the creation anew of a central depository system for government bonds. The IT dimension of the project was at that time outside the muscle of private operators. The effort deployed in the post-trading area was smartly capitalized to structure and regulate a market that typically escapes the grasp of market authorities elsewhere. Still, the open structure of the Spanish market is preserved and with it a significant degree of competition. A drawback of the current Spanish repo debt market, which can be traced back to its early development, is an insufficient focus on counterparty risk management features.

APPENDIX 1 REPO MECHANICS

This appendix delineates the mechanics of repo and sell/buy back based on a practical example. The bond underlying the exercises is a Spanish government bond with annual coupon 3.15% maturing in 01/31/2016 and clean price 100.093 (see marker [1] in green in the chart below) . The temporary operation extends from 01/11/2010 to 03/16/2010, i.e. the term is 64 days (marker [T]). The repo rate is 0.65% (marker i) in the Act/360 convention followed in the euro money market. Notice that the bond pays a coupon during the life of the repo. In the following, I present the mechanics of

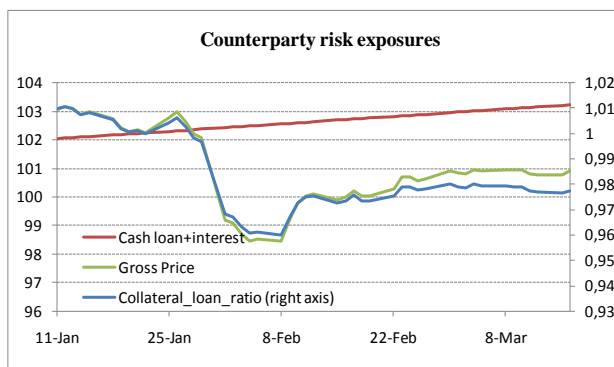
Classic repo schedule

REPO/REVERSE REPO ANALYSIS			
Repo Type	REPO	AS OF:	3/17/10 8:24
SPANISH GOV T	SPGB 3.15 01/16	100.6558/100.7058	(3.02/3.01) BGN @ 3/16
SETTLEMENT DATE	1/11/10	RATE (360)	0.6500%
PRICE	99.0725007	SPREAD	0.0000
YIELD	3.3197187	FIXED TENOR	R
ACCRUED	2.9773973	COLLATERAL	101.0000% OF MONEY
TOTAL	102.0498980	or HAIRCUT	% OF MONEY
FACE AMT	1000	YIELD COLL/HAIRCUT	BUMP DATES
TERMINATION DATE	3/16/10	ROUNDING	1 = NOT ROUNDED 2 = ROUND TO NEAREST 1/8
SETTLEMENT MONEY	1020498.98	OPEN TRADE	N
CALL OPTION	NO		
MONEY AT TERMINATION			
WIRED AMOUNT			1,020,498.98
REPO INTEREST			1,179.24
TERMINATION MONEY			1,021,678.22

repo by means of Bloomberg screens, annotations to them as well as temporal perspective of counterparty risk.

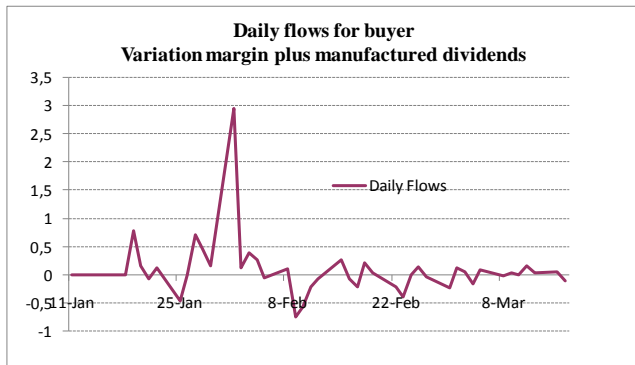
The wired money at settlement (marker [4]) is determined by the condition that the cash provider gets a gross value of collateral (marker [3]) that exceeds its exposure by a certain percentage (marker [R]). The initial margin is [3]-[4]. Notice that, [4]=[3]/[R]. The amount

of repo interest (marker [5]) results from [4]*[i]*[T]/360. The 3.5 coupon paid by the bond during the life of the repo is automatically assumed to be passed on to the seller the 01/31/2010. The following chart display the counterparty risk exposure of the both



the borrower and lender based on gross price of the bond granted as collateral and the loan plus accrued interest. The assumptions underlying the exercise is that the lender wishes to maintain 1% coverage of its exposure subject to adjustments in margin being greater than 0.5%, i.e. the threshold for variation margin is assumed to be 0.5 % . The following

chart depicts the daily flows taking place from the perspective of the buyer, i.e. positive flows amount to inflows for the lender of cash.



Notice that coinciding with payment of the coupon on the 31st of January the temporary lender receives a significant payment that represents both the coupon plus any variation margin. Also notice that initially the operation of the 1% haircut plus the 0.5% threshold preclude any variation margin.

Sell/buy back without manufactured dividend

```

<HELP> for explanation.                               Corp BSR
Enter <1><GO> to send screen via <MESSAGE> System
BUY/SELL BACK REPO ANALYSIS
BB Num EF0843138 ISIN: ES00000120G4 AS OF 3/16/10 15:22 Page 1 of 2
SPANISH GOV'T SPGB 3.15 01/16 100.5500/100.6000 (3.04/3.03) BGN @15:21

SETTLEMENT 1/11/10 Repo Type B/S
PRICE 100.09300000 (ACCRD: 2.97739795) YIELD 3.13111%
REPO % (ACT/360) 0.6500 (ACCRD # DAYS: 345) WORKOUT DATE / PRICE
FACE AMT 1000 W Worst 1/31/16 100
Minimum Piece: 1000 / Minimum Increment: 1000
TERMINATION 3/16/10 TERM (actual # days): 64 T
FORWARD PRICE 99.65732918 (ACCRD: 0.37972603) YIELD 3.21249%
FORWARD POINTS 0.435671 (ACCRD # DAYS: 44) WORKOUT DATE / PRICE
W Worst 1/31/16 100
MARKET COMPARE TO FORWARD PRICE: [N] Pass COLLATERAL 100.0000 % OF MNY
% OF MONEY
REINVESTMENT OF COUPONS
DATE AMOUNT RATE
2/ 1/10 31500 0.6500
COMPOUNDING METHOD: [BX]
P = Proceeds or B = Bullet
* MONEY AT TERMINATION *
SETTLEMENT AMOUNT 1,030,703.97
REPO INTEREST 5 1,191.04
UNADJ TERM. MONEY 1,031,895.01
ADJ FOR CPN & INT. 1,000,370.55
HOLD BOND Price /Face Amount [PX]

.NOTES:
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2577 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2010 Bloomberg Finance L.P.
6907-323-3 16-Mar-10 15:23:29
  
```

The following discussion refers to sell/buy backs. The chart to the left summarizes the mechanics of a sell/buy back without manufactured dividend. The condition under marker [Pass] in N state means that the coupon is not added to the forward payment. Consequently, the lender is remunerated with the coupon paid (3.5) plus its reinvestment

until maturity that is assumed to take place at rate 0.65% (marker [3]). The logic of the flows exchanged is as follows.

```

<HELP> for explanation.                               Corp BSR
<Page Fwd> to return to main screen
BUY/SELL BACK REPO ANALYSIS
BB Number: EF0843138 Page 2 of 2
SPANISH GOV'T SPGB 3.15 01/16 100.5500/100.6000 (3.04/3.03) BGN @15:21

BOND INCOME                                     FUNDING COST
AT SETTLEMENT DATE: 1/11/10
PRINCIPAL 1,000,930.00
ACCRUED INTEREST 29,773.97
TOTAL: 1,030,703.97
---> 1,030,703.97 @ 0.6500
for 64 day(s)

AT TERMINATION DATE: 3/16/10
PRINCIPAL 1,000,930.00
COUPON(S) 31,500.00
ACCRUED INTEREST 3,797.26
INTEREST ON CPNS 24.46
TOTAL: 1,036,251.72

NET INCOME: 5,547.75 COST: 1,191.04

DIFFERENCE 4,356.71 TERMINATION
PER 100 NOM: 0.43567065 AMOUNT 996,573.29
Australia 61 2 9777 8600 Brazil 5511 3048 4500 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2577 6000
Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2010 Bloomberg Finance L.P.
6907-323-3 16-Mar-10 15:24:09
  
```

The flow taking place at maturity, based on accrued coupon and clean forward price (marker [2]), accommodates the expected return (0,65%) over the 64 days over the settlement amount (gross price, i.e. clean price [1] plus accrued coupon at settlement), after adjusting for the interim coupon kept as

well as its return from reinvestment. Notice that the resulting forward price (marker [2]) entails a discount with regard to the clean price at settlement. The forward price maintains no connection with the market price at settlement. The chart above breaks down the described mechanics leading to the discount 0.43567065.

Sell/buy back with manufactured dividend

SPANISH GOV'T SPGB 3.15 01/16 100.5500/100.6000 (3.04/3.03) BGN @15:21

Settlement: 1/11/10
 Price: 100.09300000
 Repo % (ACT/360): 0.6500
 Face Amt: 1000
 Minimum Piece: 1000 / Minimum Increment: 1000

Repo Type: B/S
 Yield: 3.1311%
 Workout: Worst
 Date: 1/31/16
 Price: 100

Termination: 3/16/10
 Forward Price: 102.80977480
 (ACCRD # DAYS: 44)

Term (actual # days): 64
 Yield: 2.6260%
 Workout: Worst
 Date: 1/31/16
 Price: 100

REINVESTMENT OF COUPONS
 DATE AMOUNT RATE
 2/ 1/10 31500 0.650%
 COMPOUNDING METHOD: BX
 P = Proceeds or B = Bullet

REPO COMPARES TO FORWARD PRICE: Pass

COLLATERAL: 100.0000 % OF MNY

*** MONEY AT TERMINATION ***
 SETTLEMENT AMOUNT: 1,030,703.97
 REPO INTEREST: 1,191.04
 UNADJ TERM. MONEY: 1,031,895.01
 ADJ FOR CPN & INT.: 1,031,895.01
 HOLD BOND Price /Face Amount: PX

NOTES:

Australia 61 2 2727 8500 Brazil 511 3049 4900 Europe 44 20 7330 7500 Germany 49 69 9204 1210 Hong Kong 852 2377 6000
 Japan 81 3 3201 8900 Singapore 65 6212 1000 U.S. 1 212 318 2000 Copyright 2010 Bloomberg Finance L.P.
 6907-323-3 16-Mar-10 15:25:21

The next case in the chart to the left represents a sell/buy back with dividend payment (marker [Pass] in Y). The logic is similar to the following case, but now the calculation of the clean forward price (marker [2]) does not need to have an adjustment for coupon payment and/or its reinvestment. Consequently, the forward price does not

exhibit a discount in relation with the spot clean price. Obviously, the repo interest (marker [3]) does not change when compared with a sell/buy back with manufactured payment.

APPENDIX 2 REPO ACCOUNTING

Data for the booking example under a collateralized loan variant.

(D stands for debit entry and C for Credit)

Purchase price	1000	Nominal purchased	950	Market value	1000
Margin ratio	100%	Price differential	2		
Interim reval 1	+50	Interim reval 2	-20		
Cash margin	+5	Securities margin	+25		

Standpoint of the cash taker

	Cash	Trading Portfolio	Loan Payable	Margin	P&L
a)		D 1000			
b)					
c)		D 50			C 50
d)		D 1050			C 50
e)	D 1000		C 1000		
f)		C 20			D 20
g)					
h)	D 1000	D 1030	C 1000		C 30
i)					
j)	D 5			C 5	
k)	C 1002		D 1000		D 2
i1)					
j1)	C 5			D 5	
l)	C 2	D 1030			C 28

Sequence of accounting events

- | | |
|--|--|
| a) Balance before repo execution | h) Reporting during life |
| b) Execution, off-balance sheet reporting | i) Receipt margin securities |
| c) Revaluation during settlement | j) Receipt cash margin |
| d) Reporting during settlement | k) Posting of closing transaction |
| e) Posting opening transaction in value date | i1) Return margin securities |
| f) Revaluation | j1) Repayment of cash margin |
| g) | l) Reporting after settlement of closing |

Standpoint of the cash provider

	Cash	Trading Portfolio	Loan Receivable	Margin	P&L
a)	D 1000				
b)					
c)					
d)	D 1000				
e)	D 1000		D 1000		
f)					
g)					
h)			D 1000		
i)					
j)	C 5			D 5	
k)	D 1002		C 1000		C 2
i1)					
j1)	D 5			C 5	
l)	D 1002				C 2

Sequence of accounting events

- | | |
|--|--|
| a) Balance before repo execution | h) Reporting during life |
| b) Execution. off-balance sheet reporting | i) Receipt margin securities |
| c) Revaluation during settlement | j) Receipt cash margin |
| d) Reporting during settlement | k) Posting of closing transaction |
| e) Posting opening transaction in value date | i1) Return margin securities |
| f) Revaluation | j1) Repayment of cash margin |
| g) | l) Reporting after settlement of closing |

APPENDIX 3 REPO-LIKE TRANSACTIONS SUMMARY

	<u>"Inproper" repo solutions</u>		<u>"Proper" repo solutions</u>		
	Collateralized loan	Securities lending	Classic repo	Buy/sell back	Tri-party repo
Collateral technique	Security interest	Transfer	Transfer	Transfer	Transfer
Collateral	FI and EQ	Cash, FI and EQ	FI	FI	FI
Term	Fixed/open	Fixed/open	Fixed/open	Fixed	Fixed
Remuneration	Fixed/Floating	Fixed/Floating	Fixed/Floating	Fixed	Fixed/Floating
Coupon	Cash borrower	Manufactured dividend to lender	Manufactured dividend to lender	Buyer	Manufactured dividend to lender
Documentation	Single contract	Single contract	Single contract	Two linked contracts	One contract plus agency contract
Master Repo Agreement	Rarely	Yes (GMSL)	Yes: eg. EMA, GMRA, ATBF, MRA...	Yes, per annexes	n.a.
Mobilization	Yes, if right of use	Yes	Yes	Yes	Yes
Market risk from collateral	Owner	Seller	Seller	Seller	Seller
Initial margin	Sometimes	Usually	Usually	Almost never	Usually
Variation margin	Sometimes	Usually	Usually	Almost never	Usually
Initiation	Cash lender	Securities borrower	Mostly cash lender but also sec. Borrow	Mostly cash lender but also sec. Borrow.	Cash lender

GLOSSARY

Book entry securities – A system of tracking ownership of securities based in dematerialized records held by custodians and/or central depository system.

Carry - The spread between the yield on an issue which is owned and the rate at which money is borrowed to finance that issue equals the cost to "carry" an issue. It is positive when the cost to finance is less than the yield on a security and negative otherwise.

Collateral - A general term used to identify the assets granted by borrowers to lenders as protection against default risk. In the repo markets, collateral denotes more restrictively the securities delivered in the repurchase or sell/buy back transaction.

Collateralization - The percentage amount of collateral exchanged in a repo transaction that exceeds the cash dollar amount.

Delivery repo - A repo transaction cleared without the intervention of an agent as it happens under tri-party repo.

European Master Agreement ('EMA') - A repo master agreement developed by the EBF with a multi-product and multi-jurisdiction scope that suits especially European market needs.

Fail - A failure to deliver securities. The originator of the delivery is held liable.

General Collateral - Transactions, normally involving a round amount of cash, the motivation for which lies in investing cash through a repo against some general form of acceptable collateral. The concept opposes to specials.

Global Master Repurchase Agreement ('GMRA') - A repo master agreement developed jointly by SIFMA and ICMA whose acceptance defines it as the market standard in non-dollar markets. The current edition was issued in 2000.

Haircut - The excess either of cash over the value of securities, or of the value of securities over cash in a repo transaction, at the time it is executed and, subsequently, after margin calls. Also called initial margin.

Interim coupon – A coupon which passes its ex-dividend date during the life of the repo.

Manufactured dividend: The payment (of an amount equal to the gross coupon on the securities concerned) which the acquirer of securities in a repo is generally contractually obliged to make to the other party when the acquirer receives a coupon on a security which passes its ex-dividend date during the course of the repo.

Margin call - A request, following the mark-to-market of a repo transaction, for the initial margin to be reinstated, or where no initial margin has been taken, to restore the cash/securities ratio to parity. Margin calls are triggered when the mark-to-market reaches a certain threshold.

Mark-to-Market – A revaluation of the collateralization arrangement of a repo or reverse undertaken to conform to the agreement reaches as to margin requirements. If a party is over

or under collateralized the situation will be rectified by collateral moving free to the appropriate party. Such revaluations should include both coupon accrued on the securities outstanding and interest accrued on the cash; it should also take account of any interim coupon which becomes payable to the holder of collateral. Also known as repricing.

Open Repo - A repurchase transaction which does not have a pre-specified termination date. With an open repo, either the borrower or the investor may terminate the transaction at any time by "pulling" or "returning" the issue.

Off-the-run - A non-current treasury issue. In some markets, these issues are less likely to become a "special".

Master repo agreement - A legally binding contract between a purchaser and a seller to conduct repurchase transactions.

Repo - A transaction which includes both the sale and subsequent repurchase of securities at a specified time and at a specified price. As the "seller" of the securities, the dealer pays a rate of interest ("repo rate") to the purchaser on the cash.

Reverse repo - The reverse of a repurchase transaction. A dealer purchases securities from an investor and simultaneously agrees to sell them back at a later date. The dealer provides the investor with cash on which the investor pays a specified rate of interest ("reverse repo rate"). This is a source of financing for investors.

Sell/Buy back - A dealer sells an issue outright and simultaneously buys it back from the investor on forward basis. The difference between the price paid and the price the issue is sold for is the imputed reverse repo rate.

Set-off – A monetary cross-claim that is also a defense to the claim made in the action by the claimant.

Special issue - An issue which is necessary to borrow in order to cover a short sale. High demand creates a situation where a dealer will reverse in the security at a rate much lower than the regular reverse repo rate.

Substitution - One particular issue is substituted for another in a delivery. On a repo, this can occur either before or after delivery is initiated. The investor is always informed of the substitution.

Term repo - A repurchase transaction with a specified termination date greater than 1 day.

Threshold - The band, agreed between the parties to a repo transaction at the outset, within which the value of collateral may fluctuate before triggering a right to call for cash or securities to reinstate the initial margin or 'haircut' on the repo transaction. Also called maintenance margins.