

A REPORT ON CROSS-BORDER RISKS

**Payments Risk Committee
Securities Settlement Sub-Committee**

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The Securities Settlement Sub-Committee

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I. Introduction

In the past, before the widespread globalization of the securities markets, the impact of any idiosyncrasies of a local market's settlement process was largely confined to decisions on the risks and attractiveness of that market. For an international market participant to avoid the risks associated with specialized or complex settlement practices, a participant had simply to avoid investing or clearing in that market. Given the number of markets an internationally active market participant is likely to be involved in today, local settlement developments in one market can have an increasingly significant impact on other markets. The volume of these cross-border transactions settling daily has created settlement interdependencies between markets that are only fully visible when "what if" distress situations are applied.

In recognition of the growing importance and complexity of cross border risks in increasingly globalized securities markets, the Securities Settlement Sub-Committee (the "Sub-Committee") was formed at the request of the Payments Risk Committee sponsored by the Federal Reserve Bank. The mandate of the group was to identify and analyze the risks associated with cross-border settlement, specifically under the circumstances of cross-border back-to-back transactions. Back-to-back transactions are comprised of a sale of securities in one market and a purchase in another where the settlement timing for both the sale and purchase is to occur on the same day. The proceeds of the sale (cash) are converted into the currency of the intended securities purchase. A same-day turnaround of the same instrument would fall into this category. In addition to developing a description of the risks, the analysis was intended to develop recommendations relating to advantageous settlement practices for settlement systems, participants and the general marketplace.

More specifically, the Sub-Committee was asked to build on the existing base of research, including the BIS report, Delivery versus Payment in Securities Settlement Systems¹. This report pinpoints key settlement attributes as applied by specific settlement systems. It was also apparent early in the analysis process that a proper foundation of terminology is necessary to support the observations in this report. While the Sub-Committee related its analysis to terms and concepts from other reports, the definitions contained within this report are in cases simplified versions over those used in other research efforts.

In an effort to fully describe the efforts and conclusions of the Sub-Committee, the remainder

¹ The Bank for International Settlements, *Delivery versus Payments in Securities Settlement Systems* (Basle, September 1992).

of this report is organized as follows.

- A synopsis of the conclusions of the Sub-Committee is contained in Section II, the Executive Summary.
- Section III defines key concepts used throughout the analysis.
- Section IV defines and describes the Sub-Committee's view of the major risks associated with cross-border back-to-back transactions.
- Section V is a detailed Summary of the analysis. This section, using examples, explains the rationale for the Sub-Committee's view that certain risks are predominant in cross-border activity. A walk-through of the analysis also supports the suppositions and recommendations to be detailed in the following sections.
- Finally, Sections VI, VII and VIII provide a more comprehensive explanation of the recommendations regarding local and cross-border settlement that, in the Sub-Committee's opinion, might reduce risk and increase efficiency.
- Appendix A contains all of the individual country analyses that support the findings of the Sub-Committee. This Appendix may be helpful to market participants for analyzing settlement risk in various markets.

II. Executive Summary

Overview

There are several common themes which appear throughout this report. One such theme is convergence. While the Sub-Committee would like to raise the advantages of convergence, for example of settlement timing or certain legal concepts, it was not the intention of this report to favor any one settlement system or any country's bankruptcy laws. This report simply suggests several practices that, if standardized, would minimize the risks that arise in the course of cross-border activity. Equally, the Sub-Committee recognizes that there are advantages associated with various types of settlement processes: real-time gross settlement, trade by trade gross batch, continuous netting, multilateral and bilateral netting. This report does not intend to support one form over another. Rather, the analysis focuses on the settlement attributes related to specific points in the process, not on the type of process. Another concept which arises frequently in this analysis is that of a settlement system unwind². The Sub-Committee understands that despite several stressful situations in recent years, unwinds have not been required to ensure that any settlement system could complete its process and declare finality. However, in keeping with the spirit of the analysis (i.e. risk identification), it was necessary to consider severe circumstances which might make an unwind necessary and then evaluate the potential spillover implications.

The analysis identifies six risks in cross-border activity (described in detail in Section IV):

- Liquidity Risk - the risk which reflects an institution's inability to meet its obligations (funds or securities) on a short-term basis;
- Credit Risk - the risk of loss arising from an institution being unable to meet its obligations including loss of value and loss of principal;
- Time Gap Risk - risk resulting from timing differences;
- Systemic Risk - the risk of a default triggering other defaults;

² An unwind, as used in this document, is the reversal of transfers that have been processed but are not final. An unwind may be necessary when a participant's default makes it impossible for the settlement system to settle all of its processed transactions.

- Legal Risk - the risk of loss caused by an unexpected application of law, regulation or bankruptcy rules; and
- Sovereign Risk - the risk of a potential restriction of assets imposed by a government.

One risk, Liquidity Risk, arises in virtually every scenario, either precipitating or as the outcome of one of the other risks. In any hypothetical settlement disruption, lack of liquidity always appears to be one of the primary consequences of settlement distress. Settlement distress, in most cases, would result in any combination of these six risks arising in a somewhat cyclical fashion. For example, a liquidity crisis in one market may trigger a systemic reaction causing further liquidity shortages in the original and a second market. This distress could result in a liquidity shortage impacting an institution in a third market, and so on. While the analysis of possible situations can become quite involved, the results are fairly clear. Standardization of procedures and documentation across markets, proactive liquidity management and government, regulatory agency, and financial institution awareness that any one event can have a severe impact on a whole host of interrelated markets and intermediaries is critical. Above all, stress containment appears to be the best remedy for a serious default situation. The more a problem is allowed to spread, the more difficult it would be to regain control.

Recommendations

The synthesis of all the elements of this cross-border risk analysis supports a series of recommendations proposed by the Sub-Committee. It is the feeling of the Sub-Committee that these proposals, if adopted, would certainly minimize the risks described in this report. The recommendations, in addition to identifying settlement practice improvements, suggest changes to universal risk reduction techniques that are not specific to settlement (e.g., collateralizing exposures). These recommendations address the relationships between National Settlement Systems³ and their members as well as relationships between various clearing intermediaries (i.e. local and cross-border entities such as FX Institutions and Global Custodians) and these institutions' clients. Given their specialized nature, linkages between National Settlement Systems or between a National Settlement System and an International Centralized Securities Depository are not discussed in these recommendations.

³ National Settlement Systems are also commonly known as National Central Securities Depositories (NCSDs). A National Settlement System refers to a system that conducts a settlement process in its home market for eligible securities as defined in the system's rules and regulations. Throughout the remainder of this report, these systems called the "local settlement system".

Outlined briefly below (and fully in Sections VI, VII and VIII), the Sub-Committee's recommendations are organized along three lines: those for settlement systems, for market participants and more generally for markets. As a cautionary note, it is important to realize that the Sub-Committee was not in a position to evaluate the costs that may be associated with the adoption of any of these recommendations which, therefore must be viewed as provisional.

Settlement System Recommendations

The Sub-Committee recommends consideration of eliminating local settlement system practices relating to *binding matching* and *early blocking*. Binding Matching, which entails a settlement system obligating a clearing agent to settle a transaction at the point that a trade is matched in the system, was found to increase a local and cross-border clearing agent's exposure to fails and defaults⁴. Clearing agent liquidity risk can result from this practice. Blocking consists of a local settlement system's setting aside assets and essentially making them unavailable for use. Early Blocking is the practice of a local clearing system blocking before the cutoff time or instruction deadline for submission of transactions for settlement. The instruction deadline (defined more fully in the next section) is the last point where the system will accept transactions for the upcoming settlement cycle. Early Blocking results in less market efficiency; assets are unavailable for other favorable settlement practices such as Securities Lending, Repos or Reverse Repos. Both binding matching and early blocking also create a disincentive for early submission of trades for settlement and reduce the effectiveness of matching.

The Sub-Committee recommends that further review be performed on the potential effects of a system unwind, as defined in this report. Although many securities settlement systems where cash and securities transfers are not processed simultaneously have unwind rules, the Sub-Committee recognizes that most systems have other support techniques designed to prevent the use of the unwind rule and an unwind has not been imposed in recent memory. It is the consensus of the Sub-Committee, however, that a local settlement system which is characterized by non-simultaneous transfer processes and has an unwind rule may increase the level of systemic risk in both local and cross-border settlement if the unwind is used. Securities settlement systems rules typically provide for unwinding only when the cash payments associated with non-final securities positions can not be made. The unwind allows the system to achieve DVP by reversing securities movements associated with the cash payments which can not occur. It is the Sub-Committee's opinion that even though the unwind could complicate a severe default situation it would be

⁴ A fail is the non-settlement of a single transaction. A default is an inability of an entity to meet its obligations. A more thorough definition is provided prior to the detail analysis in Section V.

difficult for any system to eliminate an unwind from its rules without either achieving finality after each cycle as recommended in this paper or implementing an extensive additional settlement support structure. A conclusion drawn by the Sub-Committee is that all settlement systems should have sufficient liquidity available as a first line of defense, to ensure that unwinds remain a very remote last resort.

The Sub-Committee also suggests consideration of two modifications to local settlement practices regarding timing. First, local settlement systems should begin to align the timing of instruction deadlines. It is recognized that time zone differences are an obstacle to complete synchronization; however, more alignment than is currently the case is warranted. Discrepancies across markets in the point of irrevocable commitment lengthen the period during which clearing agents and other intermediaries incur liquidity, credit and other risks. As a second timing recommendation, the Sub-Committee feels that local settlement systems which operate multiple settlement processes for one settlement day, should achieve finality at the conclusion of each process. In this way, the risks emanating from an unwind are minimized given that a) the potential for an unwieldy multiple cycle unwind is eliminated; and b) the danger of unwinding assets received through a non-final cycle, which were delivered out of the clearing agent's reach through a subsequent cycle is eliminated.

As a final settlement system recommendation, the Sub-Committee strongly believes that settlement systems must clearly identify the obligations, risks and consequences of participation. The rules, regulations and operating practices of a systems should be clearly articulated and readily available to participants. In addition, the process by which the rules, regulations and operating practices are modified must also be clear.

Participant Best Practices

Best practices regarding cross-border activity are somewhat specific to the types of activity. However, a general principle, fundamental for all participants regardless of role, is that each should "know the market" prior to engaging in any activity. Investors (generally characterized as buy and hold investors) are encouraged to spend the time to understand the legal basis for investing as well as the risks inherent in holding investments in a market. Risk areas to review are those relating to instrument volatility, the rights and obligations of depositories, settlement rules and local market experience of bankruptcy and fraud.

In addition to understanding the risk areas important to an investor, Dealers should also review the applicability of risk reduction techniques such as collateral and netting. Dealers should understand the role of their intermediaries, particularly their clearing agents and settlement

systems, as well as the advantages and disadvantages associated with registration. Most importantly, dealers must be especially aware of liquidity risk as they are often active in large size, multiple currency and sometimes leveraged same-day transactions. It is precisely this type of activity that increases the level of liquidity risk in cross-border activity.

Clearing agents are encouraged to research, document and disseminate market related information pertaining to settlement mechanics and the associated risks. In the past, it has been difficult for cross-border entities to obtain reliable information on local settlement practices. Local agents should be the primary source for disseminating information to the international community. Settlement risk areas which should be reviewed by all clearing agents should include those related to exchange/clearing system membership obligations,⁵ ownership transfer and registration. Both local and cross-border clearing agents are also advised to quantify their own settlement liabilities for both normal and stress situations. Local clearing agents should have contingency plans for acquiring cash and securities liquidity resources in both situations. For cross-border clearing agents cash liquidity requirements must be prepared for in both fail and default situations.⁶ It is especially critical for clearing agents given that as this report contends, clearing agents are the most vulnerable to settlement disruptions and market problems. The capacity to confine liquidity problems largely depends on the ability of clearing agents to withstand the settlement distress.

General Market Considerations

In the opinion of the Sub-Committee, there are two other areas that influence the risk profile of a market. The first area consists of a market's registration practices. The Sub-Committee's suggestions on registration are specific to those markets where registration is a significant event in the transfer of an enforceable interest in a security. In such markets, it is important for the efficiency and safety of the market that the process to re-register securities promote a DVP exchange and be as efficient as possible. These recommendations represent interim measures recognizing the transitional state of the securities market in regards to physical securities. As a long term objective, the Sub-Committee fully endorses the recommendations of other industry efforts that propose settlement activities to be conducted fully on a book-entry basis. To that end, re-registration should not be before settlement, and should be completed as soon as possible after

⁵ Some common membership obligations are Member or Participant Deposit Funds, loss-sharing and unwind rules.

⁶ Securities liquidity risk is at the local clearing agent level since it is the responsibility of the local agent to ensure availability of securities prior to committing to settle.

settlement. Immediate (or very quick) re-registration after settlement would have the following positive effects:

- Earlier asset availability would increase market attractiveness. Investors are sometimes inhibited from reselling securities that are in the process of registration.
- Prompt registration would reduce the incidence of fraud because it is the best protective device for identifying fraudulent certificates. Cumbersome registration procedures may induce market participants to forego reregistration altogether. Any mechanism which promotes registration while not requiring protracted periods of idle assets will prove to be an incentive to register and, as a result reduce the potential for market participant losses due to fraud and theft.

The second general market recommendation concerns taking collateral for the purpose of securing exposures. Overall, the consensus opinion of the Sub-Committee is that collateral is a significant risk reduction technique which should be encouraged and exploited wherever possible. In order to create an atmosphere of confidence regarding the legal enforceability of collateral interests, especially cross-border collateral, standardization and clarity should be high priorities. Recommendations in this area include:

- Simplifying perfection⁷ rules in each market to remove outdated formalities and permit rapid perfection with no time gaps. Ideally, perfection across markets should be consistent and if possible uniform. This would encourage the collateralization of exposures and reduce the complexity of any operational procedures to support the taking of collateral.
- Collateral perfection rules should be adapted to cover multi-tiered custody and assets in transit. At a minimum, allowing clearing agents to have transaction level rights to purchased securities when the purchase was funded using credit from the clearing agent would provide the agent with a source of readily available liquidity.
- A consistent form of documentation which would be respected in any bankruptcy jurisdiction (or at least a large number of primary markets) would eliminate the ambiguity, cost and uncertainty regarding documenting a pledge.

⁷ Perfection refers to any process necessary to allow a pledged interest in collateral to be enforced against third parties, notably bankruptcy receivers.

Conclusion

While the focus of this report is to identify the risks in cross-border transactions, it is not the intention of the Sub-Committee to over-dramatize the risks associated with local or cross-border activities. It has been proven during recent events that the safeguards in cross-border activity are sufficiently robust to sustain the inherent risks not only in normal circumstances but even during periods of some distress. It is the consensus of the Sub-Committee that it is possible and desirable to establish a settlement environment which could not only withstand a serious default⁸ situation, but potentially protect most market participants from the ill effects of a distress situation. Certainly, any large or serious settlement default would be felt by some market participants. However, the Sub-Committee's analysis points to importance of containing any distress in order to keep it from setting off problems in other markets. The Sub-Committee suggests that, given the concerns raised in this paper on unwind rules and finality, that additional research should follow this effort to develop the concepts further and work through to more detailed recommendations. With cross-border volumes increasing steadily, a proactive stance on cross-border risk management will provide a greater level of investor confidence into the future.

There are two areas that arose in discussion which are not addressed in depth in this report. Those areas consist of collateralizing exposures and registration. The Sub-Committee agrees that the absence of an international process for establishing legal rights to securities collateral hinders the efforts of market participants to reduce overall settlement risk. In addition, the complexities of establishing beneficial ownership and registration of securities transfers hampers efficiency in the securities markets. The recommendations provided here on these topics should be viewed as a broad brush effort to raise awareness and not as a comprehensive catalog on these topics.

⁸ A serious default might be the default of a major player or multiple defaults.

III. Local Market Settlement - DVP and Finality

At the heart of all local settlement discussions are the terms finality and DVP. In addition, the Sub-Committee would like to highlight the significance of a third concept, the "Instruction Deadline". As cross-border settlement is a mixture of local settlement practices, it is important to establish a common understanding for concepts routinely associated with local settlement procedures.

Finality is defined in terms of a funds or securities transfer. With respect to a settlement system, finality is achieved when a transfer cannot be reversed or deleted in accordance with the rules or procedures of the settlement system. At that point, the settlement system cannot impede the acquisition of an enforceable interest in the securities by the parties to the original securities transaction.

Delivery versus payment (DVP) occurs when a securities transfer becomes final simultaneously with a final transfer of (related) funds. DVP is a term that invokes many different concepts depending on the context in which it is used. For example, some definitions of DVP preclude certain features as allowing for true DVP such as securities and cash depositories being separate entities. For the purpose of this report, instructions to transfer funds and securities need not be processed simultaneously. In addition, the securities and cash transfer do not have to be performed by the same entity.

An *Instruction Deadline* is the last point in time where a direct clearing member can submit instructions to transfer assets for a specified settlement cycle. Submission of instructions, for the purposes of this paper, includes sending instructions for settlement (first time), confirmation of settlement instructions, instruction cancellation and correction. It is after this point that the direct clearing member is clearly obligated to settle the transactions submitted.

Using these definitions as a foundation, the Sub-Committee agreed that there are several related features of a local system which can play a critical role in minimizing a local market's settlement risk, maximize efficiency and subsequently influence cross-border risk. Specifically:

- Ideally, the transfer process for cash and securities should be simultaneous. While DVP can be achieved without simultaneity, the absolute prerequisite for DVP is that the transfer of cash be completely contingent on the transfer of securities (and vice versa).
- Settlement finality of one cycle, in its clearest form, should occur before the subsequent

settlement process commences. Finality of one cycle that occurs after a subsequent cycle begins, runs the risk of one of the following:

- a. If a settlement cycle begins with provisional positions (positions that are not final) available for subsequent transfers, a transaction fail in the first cycle could result in a multiple-cycle ripple effect. The consequences of a default in this scenario complicate the completion of any of settlement processes that are not final.
 - b. If provisional positions are not available for subsequent transfers (positions that are pending finality are not eligible for retransfer), then periods of inefficiency may exist during which investors and dealers do not have access to assets.
- In the most efficient environment, the settlement instruction deadline should be as close to the initiation of the settlement process as possible. Clearing institutions may incur credit exposure from the deadline until finality. Every additional day in this period may create an accumulation effect on a clearing institution's exposures.
 - As a definitional matter, a transfer can not be reversed by a settlement system after finality.

In addition to these features, the Sub-Committee agreed that there are other significant factors outside of a settlement system's mechanics which influence risk. Notably, the legal framework under which a settlement system operates can materially impact the efficiency and soundness of a settlement system. Even an ideal settlement system can be undermined by a legal system which does not complement the system's rules and regulations. Due to the complexity of multi-jurisdictional legal analysis, the Sub-Committee agreed that a detailed bankruptcy analysis and comprehensive legal recommendations are outside the scope of this review.

IV. Synopsis of Cross-border Risks

The Sub-Committee has identified six significant areas of risk that arise from both local and cross-border activity. The consequences of these risks tend to be more complicated with cross-border activity. There are other risks (e.g., market risk) that may arise during periods of cross-border settlement; however, it was felt that these are the primary risks and should be the focus of the report. To a large degree these risks are interrelated; the occurrence of one risk often gives rise to another. In addition to a definition of each of the risks, the following discussion provides a brief overview of the Sub-Committee's concerns.

Liquidity Risk

In the context of this report, Liquidity Risk reflects the possibility that a party will have insufficient funds to settle an obligation for full value when due, but will have funds to cover settlement obligations on some unspecified date thereafter. In non-bankruptcy situations, the allowable methods to cover short positions are generally driven by local market conventions. As a result, liquidity could be adversely affected by prohibitions on transactions such as Repos, Reverse Repos and Securities Lending.

In a participant default that leads to a significant liquidity shortfall (either cash or securities) in one settlement system, positions of the defaulting institution might be unwound in order to attain a zero or near zero position. In an unwind, both the securities and cash sides of transactions are assumed to be reversed. The result may be that other non-defaulting participants in the market may attempt to withhold movements of transaction assets (either cash or securities) where possible, to minimize their liquidity shortfalls. Settlement systems in other markets might also be forced to unwind positions due to a default of an effected local and/or cross-border intermediary whose default was triggered by the first unwind. The second market's unwind could cause further shortages of cash and securities in settlement accounts potentially continuing the escalation of the problem. The vast concentration of liquidity risk is generally felt to be incurred by the local and cross-border clearing agents and ultimately dealers.

Credit Risk

Credit Risk is the risk that a counterparty will not settle an obligation for full value when due and a loss will result. Credit risk, for the purpose of this report, includes replacement cost risk

and principal risk. Being forced to commit to settlement in one market when there is a chance that the other trade in a back-to-back cross-border transaction could fail requires clearing intermediaries to explicitly or implicitly extend credit to its clients for the intervening period. The period can be either intra or interday. This risk may result from market rules that force settlement on the basis of prior matching of transactions without the opportunity to cancel.

Time Gap Risk

Time Gap Risk, a dimension of credit risk, is defined as the risk of loss that arises from the lack of timing synchronization of key milestones in the settlement process. The lack of synchronization of cut-off times in the settlement processes between markets (instruction deadlines, cash finality, securities finality) increases the risk that a cross-border clearing intermediary may be required to settle one half of a back-to-back transaction when it is known that the second trade will fail. This becomes problematic when the assets of the failing trade were intended to provide cover for the second trade in the back-to-back transaction. For timing related analysis, the best case scenario exists when a cross-border transaction consists of a country pair situated within the same time zone. This at least increases the likelihood that settlement will overlap in terms of time. In this situation the concern is limited to absolute differences in regards to irrevocable commitment and finality. The worst case exists when the countries are situated in different geographic regions as this introduces additional timing differences and may allow for limited processing overlap.

Systemic Risk

Systemic Risk is commonly referred to as the inability of one institution to meet its obligations when due which will cause other institutions to be unable to meet their obligations. A settlement system where the primary means of settling in a default is an unwind⁹ increases the risk of subsequent defaults or fails by other local or cross-border intermediaries. Depending upon the availability of cash and/or securities to complete trades, unwinds could have a liquidity domino effect on otherwise non-defaulting parties.

⁹ It is not uncommon for an unwind rule to be only one of many features, often the last, to be employed in the event of a settlement problem. This statement takes the hypothetical case of a settlement system that relies on an unwind as a first alternative for supporting settlement and achieving finality.

Legal Risk

Legal Risk, in this report, is defined as the risk of loss that arises from an unexpected application of law or regulation or because a governing contract cannot be enforced. While not addressed in any depth in this analysis, the consensus of the Sub-Committee is that the lack of clarity, the outdatedness and discordant nature of various countries' lien and bankruptcy laws may jeopardize the ability to obtain clearly perfected collateral interests. This in turn may lead to reluctance to undertake transactions, failure by intermediaries to protect themselves by taking collateral, or the upsetting of legitimate commercial expectations if arrangements in which collateral is assigned are not respected by a bankruptcy court.

Sovereign Risk

Also known as Political Risk, Sovereign Risk arises when a government takes an action, with or without notice, that affects the market price of assets or restricts movement of assets and funds. Governments can impose restrictions on levels of foreign ownership, foreign exchange availability and rates, or movements of cash and securities. Any of these events, especially when they occur without prior notice, can impede and/or delay settlement in the related market. To the extent that relationships exist between transactions in the restricted market and other markets, liquidity and credit risks can increase, ultimately spreading to other markets.

V. Summary of the Cross-Border Analysis

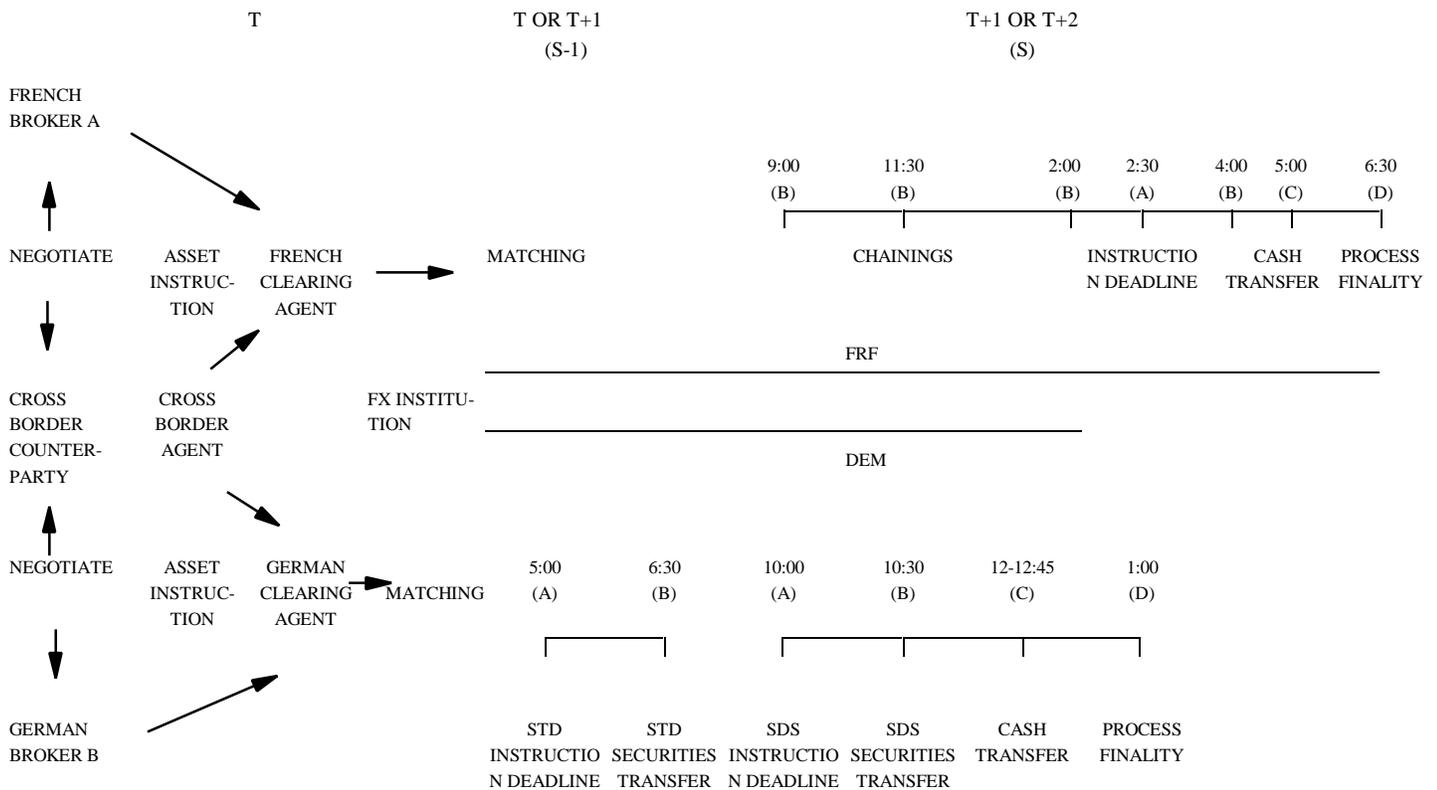
Two events are considered throughout this analysis. The first is an ordinary "fail" of a single or small set of transactions unrelated to the solvency of the initiating parties. Fails can often be caused by operational errors, technology problems or other events unrelated to an institution's financial well-being. The second, referred to in this paper as a "default", is related to an institution's financial status. A failure to perform may be the beginning of a bankruptcy or may be the result of an unforeseeable event which causes severe stress on the institution's ability to meet its obligations. In a simple fail, the shortage of assets is temporary and may be at a level where providing coverage does not represent a problem. A default increases the chance of large credit losses by counterparties or clearing agents given the probability that asset shortages may be of a greater magnitude.

To identify the risks associated with cross-border settlement activity, it is helpful to walk through a specific cross-border transaction flow (Appendix A contains numerous additional examples). Each cross-border transaction is comprised of two trades settling on the same day. By definition, one trade is to settle in one market, while the other trade will settle in another (i.e., the trades taken together reflect a cross-border back-to-back transaction). Each of the trades go through the settlement lifecycle¹⁰ of the respective market. That one trade's successful settlement is contingent on the other trade's settlement from the viewpoint of the cross-border intermediary (without that intermediary supplying added credit and liquidity) is the essence of the market interdependency that is created. The length and level of two markets' overall inter-dependencies can be determined by comparing the relevant pair's settlement mechanics as well as quantifying the volume of cross-border transactions.

¹⁰ The most significant points in the settlement lifecycle are: matching, instruction deadlines, transfer of assets, transfer of cash and finality.

Using the diagram below, consider the following transactions. A cross-border counterparty is selling French BTANs to French Broker A and buying German equities from German Broker B. The transactions have been timed such that both transactions are intended to settle on the same day (cross-border back-to-back trades). The proceeds of the BTAN sale are expected (via a Foreign Exchange contract) to fund the purchase of the German equities.

[Note: While this example implies a market participant with a high degree of focus on cash management efficiency (e.g.. a dealer or leveraged investor), competitive market forces are such that other types of participants will focus more on minimizing idle cash balances.]



The French and German Clearing Agents for the local brokers and the Cross Border Agent may be different local clearing intermediaries. Due to space considerations, the French and German Clearing Agents for both the brokers and cross-border agents are represented here as one entity.

The key settlement processes in this transaction's lifecycle are labeled A, B, C and D.

Points A represent the local market instruction deadlines for submission of transactions. This is one of the primary settlement points in the lifecycle where timing differences across markets can create credit and liquidity risk. In Germany, there are two deadlines: one for the STD or overnight cycle (5:00 pm on S - 1) and one for the SDS or same-day cycle (10:00 am on S). In France there is one deadline: 2:30 on S. The timing difference for irrevocable commitments to settle for cross-border transactions between France and German can be as great as 21 1/2 hours or as close as 4 1/2 hours.

Points B indicate the points in the local market lifecycle where asset transfers take place. Points C identify the timing for cash movements. Points B and C simply illustrate the points in time when transfer processes are operationally executed; the timing of these processes may be different from the point of finality. Multiple cycles of these processes for one settlement day without achieving finality after each cycle could have systemic consequences if an unwind provision were actually used.

Points D depict the point where finality occurs in each market (refer to the definition in Section III). Timing differences in finality during periods of distress may give rise to systemic risk. In Germany, finality is reached at approximately 1:00 pm on S. In France, finality is achieved at roughly 6:30 pm. The timing difference in regards to finality of a cross-border transaction in a France/Germany scenario is four hours.

Timing Analysis

The *instruction deadline* (Points A) is significant as it identifies the point where clearing agents are irrevocably committed to settle the transaction. After that point, a clearing agent is obliged to settle regardless of whether the client being represented has the assets available. When a cross-border clearing agent is committed to settle one half of a back-to-back transaction in one market¹¹ and there is no commitment in the second market, uncertainty exists for that cross-border clearing agent. Periods of commitment uncertainty often signal points in time when any clearing agent may be extending unintended credit; a clearing agent's credit exposure for its clients is commonly felt to be the net purchase amount plus some accommodation for fails. For cross-border clearing, the expectation held by a cross-border clearing agent is that one trade in a back-to-back transaction will generate the resources to settle the other trade. In the event of a fail or default of one trade in a cross-border back-to-back transaction, the resources will not materialize

¹¹ The commitment is considered irrevocable on both the part of the cross-border clearing agent's local agent and local clearing agent of the client's counterparty.

as expected and the cross-border clearing agent will be required to settle. This may be the condition under which a clearing agent will experience stress.

Using the above diagram, consider the following circumstances.¹² In France, the instruction deadline is 2:30 pm on S. In Germany, the deadline for the overnight (STD) cycle is on S-1 at 5:00 pm. The difference in commitment timing in this hypothetical example is 21 1/2 hours (using the STD deadline compared with France's 2:30 deadline). If the German same-day cycle (SDS) were being considered the timing gap would be 4 1/2 (using the SDS deadline) hours. Differences in instruction deadlines add to the possible credit and liquidity risk for the clearing agents and possibly other intermediaries involved in the settlement process. The intermediary affected is determined by the timing and the number of intermediaries involved. Consider the example where a default occurs on S-1 after 5:00 pm. Remember that the German market purchase has already been committed to by the Cross Border Agent and the German Broker's local clearing agent. In this diagram, the Cross Border Agent and the FX Institution¹³ are separate entities. Here are some possibilities:

A Default by:	Potential Results of Default	Risk of/to:	Risk Type
Local French Broker	If not already matched in Saturne, the Cross Border clearing agent's sale may fail. The sale was intended to fund the German purchase. The Cross Border agent may have to extend credit.	Cross Border agent/Cross Border Counter-party	Credit
	It is presumed that the sale proceeds were to go directly to the FX institution. If the FX institution delivers on the DEM, it will incur settlement exposure (short FRF and paid DEM). The Cross Border Agent in this scenario would be paid.	FX Institution/Cross Border C/P	Liquidity & Credit
A Default by:	Potential Results of Default	Risk of/to:	Risk Type

¹² For illustrative purposes, the example given assumes the worst case.

¹³ Very often the FX Institution (if not the cross-border clearing agent or Global Custodian) is a local financial institution in one of the markets associated with the currency.

Local French Broker	If the FX institution does not deliver DEM (knowing that the FRF will not be coming in), the Cross Border agent will be obliged to pay. If it can not, the German Broker's Clearing Agent will be short.	German Broker's clearing agent/ Cross Border Agent	Systemic, Liquidity & Credit
	If the FX institution does not delivers the DEM (knowing that the FRF will not be coming in) the Cross Border Agent will pay and be short DEM.	Cross Border Agent/ Cross Border Counter-party	Liquidity & Credit
Cross Border Counter-Party	Funding for committed settlements (except for funding related to the settlements in process which can not be stopped) will most likely not be forthcoming.	Cross Border Agent/Cross Border Counter-Party	Credit
	The Cross Border Agent needs to cover its short cash position.	German Clearing Agent/Cross Border Agent	Systemic, Liquidity & Credit
Cross Border Agent	As long as the French Agent did not match instructions in Saturne, then it is not bound to settle the sale from the Cross Border Agent.	French Agent/Cross Border Agent	none
	The German Clearing Agent will have delivered securities expecting payment from the Cross Border Agent. If sufficient funds are not available for the Cross Border Agent to settle, the German Agent is committed to settle and extends credit to the Cross Border Agent. If the German Agent is unable to settle, then the settlement support mechanism of the AKV is invoked.	German Agent /Cross Border Agent.	Systemic & Credit

The risks outlined above represent only one timing related situation. By varying the time of default and the agents involved, other risk relationships develop. Although both local and cross-border clearing agents are often not contractually obligated to extent credit to clients, as a

practical matter, credit may be routinely extended in order to provide an efficient and competitive product. It should be noted that Global Custodians often support a cross-border counterparty by offering both services: FX and cross-border clearing. In this dual capacity, the liquidity and credit risks are frequently concentrated in the Global Custodians. International Central Securities Depositories may also incur these risks since, as part of their service, they act as a cross border agent.

In summary, the inability of an intermediary institution to revoke its instructions in one market when other related transactions fail in another market represents the primary risk borne by intermediaries in cross-border activities (i.e. Global Custodians, FX institutions). In one geographic region, timing discrepancies for commitment to settle and finality exacerbate the situation by lengthening the risk interval. Time zone differences further increase the timing discrepancies which contribute to the length of the risk interval. It would appear that a coordinated and consistent approach to commitment and finality across markets in the same region would certainly reduce the complexity and eliminate a portion of the credit, liquidity and systemic risk associated with cross-border settlements.

Systemic - Finality/Unwinds Analysis

Asset and cash transfers (Points B & C) may become significant factors in settlement risk when there are multiple transfer processes occurring for one settlement day. In a multiple cycle environment, it is typical that positions resulting from one process are available for the next cycle. Any disruption of a later cycle may have a systemic effect in that it could cause reversals of transactions processed in previous cycles. In addition to the impact associated with re-processing thousands of transactions, an unwind in a local system with multiple cycles could potentially create liquidity shortages for other local participants and ultimately cross-border intermediaries. Securities of reversed transactions may have been delivered out free, or physically removed from reach.¹⁴ Cash could also have been used elsewhere and could have become irretrievable. Reversing transactions where the assets are no longer available to the clearing institution or its clients would force that institution or client to go to the market to obtain the necessary resources. The net effect of an unwind under these conditions would be that a local participant's failure might impact a large number of local participants in the market, and possibly cross-border intermediaries, which then reduces their ability to settle subsequent trades.

The reversal of one system, which subsequently causes a failure of a cross-border participant

¹⁴ This becomes a factor in markets where physical delivery can be performed quickly.

could then transmit the distress to other, previously unaffected markets. In this way, an unwind could transmit a single entity's default in one market to another market even though the originally defaulting entity did not engage in any activity in the second market. This substantiates the view that in a period of distress, unwinds have the ability to transmit distress to other institutions, possibly to other markets, and therefore have systemic consequences.

Differences in *finality* (Points D) also increase the potential for systemic risk in cross-border settlements. In the above diagram, German finality precedes French finality by four (4) hours. There are two scenarios to analyze:

A default after 1:00 pm

A default in the French market after 1:00 pm (German settlement is final) but before it achieves finality at 6:30 pm generally insulates the German market from any repercussions of a French settlement disruption. Germany has achieved finality and can not be affected. In the case where a German securities purchase (settled) is linked to a French securities sale, an unwind instituted in France could require the cross-border clearing agent and/or the local French clearing agent to extend credit beyond its original intention to do so.

A default before 1:00 pm

Delayed finality in Germany could influence a French market participant's ability to settle. Fails associated with cross-border back-to-back transactions could create a liquidity shortfall for the cross-border clearing agent. This stress on the cross-border clearing agent might in turn, be severe enough to disrupt the normal settlement processes in France. Settlement uncertainty in one market could translate into a reluctance to make payments in other markets¹⁵. While local and cross-border clearing agents are often already committed to certain securities settlements, pure cash movements (unrelated to securities transfers) could certainly be effected. The entities most likely to incur the effects of credit and systemic risk are the local and cross-border intermediaries. While this risk is inherent in the service provided, the level of credit exposure incurred can largely be unanticipated.¹⁶ A cross-border clearing agent may have expected the sale proceeds to essentially net against the purchase amount. A fail of the sale trade may require the cross-border clearing agent to extend credit to its client for potentially the full purchase price of a trade. As mentioned under 'Timing Analysis', a clearing agent (either cross-border or local) often considers its credit exposure to be the net purchase activity for a client with an added credit

¹⁵ The systemic effects which may occur between payment systems and securities settlement systems are a dimension not generally analyzed in this report. It is important though to note that a disruption in one market prior to announcement of finality in others will create a cross-market hesitancy in fulfilling other pending obligations.

¹⁶ The FX Institution would not incur unanticipated credit exposure. The exposure in this case would simply be the risk of not receiving the incoming payment.

accommodation for fails. The fail of a sale in any back-to-back (local or cross-border) could leave a clearing agent exposed for the gross purchase price.

As a result of these two examples, it is obvious that markets which achieve finality earlier may be spared any stress if disruptions occur after its announcement of finality. Any settlement stress occurring in the earlier settling market, will almost certainly cause nervousness across other markets that have not settled. The nervousness may result in liquidity and/or credit stress in cross-border intermediaries or local clearing agents in other markets (see Liquidity Analysis).

In summary, complex relationships of transactions which form settlement "chains", while healthy for the liquidity of a securities market, create an increasingly difficult environment for isolating the distress or default to one institution. Under conditions where there are a) heavy back-to-back transactions; b) multiple settlement cycles without finality; and c) differences in the timing of finality across markets, the use of an unwind could have a serious effect on local and subsequently cross-border settlement. While it has been shown that trading counterparties and clearing agents of the failing institution may experience "stress", an unwind could impact institutions and markets other than those directly involved with the failing institution. Although proper incentives seem to be in place for every institution to manage its exposure, a failure which triggers an unwind may change the complexion of an institution's exposure. In particular, the size of the exposure levels may increase given that the unlinking of transactions may result in credit extensions that exceed the intended amount (refer to Credit Risk definition).

Liquidity and Credit Analysis

As can be seen in the previous two analyses, the first impact of a participant's inability to settle is on liquidity. Settlement distress can result from the two different scenarios defined earlier: a fail and a default. The credit risks associated with a fail are much less severe and are temporary as compared to those of a default. Similarly, liquidity risk in a fail is generally manageable while liquidity risk in a default is a much more difficult issue.

As previously discussed, transactions are frequently part of a series of transactions. It is obvious that without some stopgap measure to meet securities or cash liquidity needs, a single fail might set off a sequence of other fails. In answer to this, in many markets, products such as settlement-related Securities Lending and financing products such as Repurchase/Reverse Repurchase Agreements have been developed to answer these short term liquidity needs. The development of products to bridge short term liquidity needs have had very positive effects in that they provide the means to settle on a timely basis. A side effect of this short term coverage of

positions is that additional credit risk (Repos, Reverses and Lending credit risks) is created and generally absorbed by those institutions with credit capacity. Where products such as Securities Lending are not available or the time window to cover short term liquidity needs using Repos and Reverses is prohibitively short or non-existent, clearing agents incur the credit exposure as well as any penalties.¹⁷

A default creates a greater degree of risk, both liquidity and credit, due to the severity and permanence of the situation. Depending on the system involved, short term measures to cover liquidity needs may enable the system to settle initially. For example, Securities Lending and Reverse Repos may be necessary to allow a system to settle on the day that the bankruptcy is filed. Ultimately, however, as these transactions mature, either a permanent solution to bring debit positions back to zero must be found or other short term transactions will be needed to bridge the time until those assets are found. On the day of the bankruptcy, concentration of liquidity and credit risk occurs primarily in the clearing agents but potentially in the defaulting institution's counterparties (depending on the system). It is these institutions that must have or generate the liquidity resources to cover shortfalls. To the extent that the defaulting institution's activities cross markets, the global clearing agents may also be in the position of a credit and liquidity provider to a greater extent than they anticipated in the normal course of business.

Another factor contributing to liquidity risk is the potential for sudden restrictions on foreign ownership, foreign exchange, or repatriation of assets. The risks resulting from a *force majeure* type of event could have the same net effect of a fail or a failure. Changes in availability of assets might disrupt a "chain" of related transactions, ultimately disrupting, at a minimum, local settlement or in a worst case scenario, could impact other markets.

Other Areas of Consideration

There are two other topics which came up in the course of the Sub-Committee's discussions on the above risks: collateral and registration. Neither topic was specifically included in the scope of this project and both are considered complex topics. The Sub-Committee would like to recognize the significance of these topics by summarizing certain issues.

Collateral

The Sub-Committee identified several issues regarding procedures for taking collateral to secure

¹⁷ Penalties are frequently passed back to the failing party. In a true credit deterioration however, the ability to recoup this loss may be limited.

exposures. The issues point to inefficiencies which dilute the ability of the cross-border intermediaries to use collateral. If collateral is made more effective, it could ultimately reduce the level of credit risk in clearing and settlement activities. Specifically, questions regarding the procedures to perfect collateral taken in association with clearing and settlement complicates the operational process for clearing agents in certain jurisdictions. Convergence across markets on the necessary operational procedures to obtain a legally enforceable claim would increase the confidence of market participants in their ability to secure exposures. Another inefficiency to be considered is the lack of common lien language. Without clear or consistent rules or precedents, there is some level of uncertainty that commonly used pledge language would be respected by the bankruptcy courts in various countries. Ideally, the development of universally accepted pledge language with supporting pledge rules would eliminate any doubt associated with multi-jurisdictional collateral. Again, although collateral issues were not specifically within the scope of this project, the consensus opinion is that cross-jurisdictional collateral issues complicate the preferred risk reduction technique for local and cross-border clearing agents.

Registration and Ownership Issues

Registration and ownership issues have the potential for increasing the risks associated with cross-border activity. As a result, certain features of registration were discussed by the Sub-Committee.

While registration is not necessarily imbedded in the settlement process, it can at times interfere with the orderly exchange of assets. Inconsistencies regarding registration, as well as long periods to accomplish reregistration, can significantly reduce the efficiency of a market. As an example of reduced efficiency, in some markets change of securities ownership occurs on trade date. In this case, without either a) some mandatory cash settlement; or b) legal recognition of settlement system rules which make it clear that the transfer of ownership occurs only when settlement is final according to its rules, it would be difficult to consider the market as being able to achieve DVP. Markets with long registration periods where physical securities are the dominant form create inefficiencies for investors since during registration investors are sometimes inhibited from selling securities. When investors are not encouraged to register, the risk of fraud remains high despite the existence of high printing standards and tight controls by issuers and intermediaries.

Section VIII contains some General Market Considerations developed by the Sub-Committee which include suggestions regarding registration.

VI. Settlement System Recommendations

As described earlier, different settlement practices across local markets have a cross-border systemic effect. It follows then that convergence would reduce the inefficiencies brought by differences across markets, and would minimize the systemic consequences of a distress situation. Some features are thought to create inefficiencies and additional risks in cross-border settlement. The Sub-Committee's observations regarding certain local settlement features are:

Binding Matching

Binding matching consists of a practice where a settlement system requires direct members to settle a transaction once the transaction is successfully matched. *Matching* requires all significant attributes of a trade, as defined by both settlement agents, to exactly match. By enforcing a concept of binding matching, a local settlement system expands the exposure time interval. Binding matching in one market extends the time window during which a cross-border clearing agent is exposed to a cross-border trade. Being forced to settle in one market when the other leg of a cross-border back-to-back trade may fail, can require the cross-border clearing institution to provide unintended intraday or interday credit. Binding Matching may also cause delayed matching. In an effort to reduce the time period during which a participant is committed to settle, participants may delay the introduction of transactions to the system.

Settlement Instruction Deadlines

Settlement instruction deadlines define the last point in time that a direct clearing member can send instructions to the local settlement system for settlement in the upcoming cycle. These deadlines as applied by local settlement systems should be synchronized across markets as closely as possible. Differences in deadlines from market to market create a risk window where only one side (trade) in a cross-border back-to-back is irrevocably committed. Timing discrepancies expose both the trading and clearing institutions to liquidity shortages.

Early Blocking

Blocking consists of a local settlement system's rules which suspend assets from further use for any other transaction. The concept of blocking can be associated with and may be integral to many aspects of securities related products. In this context, however, blocking is associated with freezing a transaction's assets for an upcoming settlement process. Assets, either cash or securities, should not be blocked for settlement purposes prior to the settlement instruction deadline. Blocking of assets should also not be conducted earlier than close of business the day before settlement day. The ability to align blocking with the instruction deadline is contingent on the elimination of Binding Matching as a practice. If matching is binding, then it follows that

assets must be blocked at the point of irrevocable commitment. However, the Sub-Committee believes that blocking too far in advance creates inefficiencies in the market and opportunity costs for investors.

Finality

In the absence of real-time processing and finality, finality should be achieved as frequently as the local system conducts a clearing process. If multiple batch settlement processes occur intraday, correspondingly, finality should be accomplished after each process for both cash and securities. This would minimize the time period during which clearing institutions incur settlement risk, minimize the impact of any unwind should one be called for, while maximizing cross-border settlement efficiency.

Unwinds

Unwinds, if applied, increase the systemic and liquidity risk in a system and across systems. Although the incidence of unwinds is extremely rare, in today's securities markets an unwind could have a liquidity domino effect on otherwise non-defaulting participants. Clearing institutions bear much of the risk associated with unwind rules. The Sub-Committee suggests consideration for additional research to further analyze the risks, costs and protective measures related to unwind provisions in securities settlement systems. Given the apparent disadvantages of using an unwind as raised in this analysis, the Sub-Committee recommends that unwinds continue to be seen as a last resort, and should not be seen as a substitute for other settlement support techniques.

Rules, Regulations and Operational Practices

Settlement systems should clearly articulate and disseminate information regarding its rules, regulations and operational practices. Settlement systems should also outline the risks and obligations associated with membership and its settlement practices to participants. Modifications to rules, regulations and operational practices should be distributed to all participants and clearly identify any changes in participant obligations and risks. In the course of conducting this analysis, the Sub-Committee required detailed and accurate information on specific settlement systems' operational processes in order to assess the risks confidently. In cases, the available information was unclear and incomplete. Without clear and thorough information on procedures and obligations, a market participant's ability to assess settlement risk in a market is hindered and it is unable to make informed decisions regarding participation.

VII. Participant Best Practices

There are no magic "best practices" to eliminate the risks that an investor, clearing agent or dealer can subscribe to. However, it is the view of the Sub-Committee that it is of utmost importance that any participant engaging in cross-border activity must understand the risk inherent in its activity and strengthen its risk controls to ensure its own ability to settle. In this way, the chance of an unwind becomes increasingly more remote. This can only be achieved through understanding the market execution and settlement mechanics as well as the legal framework supporting their activity. Some suggestions might be:

Investor

- Understand the legal basis for investment in each market. The risks of holding investments in a country should be properly understood as the investments are subject to local law.
- Understand the risks of investing in various markets. Ensure that the risks of clearing and settlement are included in the risk/reward equation.
- Choose all depositories carefully. Understand the risks associated with markets where central depositories are mandatory. Understand the rights and obligations of the depository to the end beneficiary.

Dealer

- Understand the legal basis for investment in each market.
- Research and implement risk reduction techniques that are allowed under local law such as collateral, and netting.
- Understand clearing agent instruction deadlines as it relates to an agent's ability to settle and the risks associated with back-to-back transactions.
- Research and understand the advantages and possible limitations concerning registration. A balanced decision to register a transfer or not should be made rather than one that is expedient.

Clearing Agents

- Actively research and keep abreast of exchange and settlement rules as they pertain to clearing. Local clearing agents should be the primary source of current information regarding local clearing practices.
- Clearly understand, document and communicate to investors/clients the risks related to clearance and settlement in various markets.
- Properly measure contingent and actual liabilities that may be created by clearing/settlement related failures. Develop procedures for allocating appropriate resources necessary for settlement. Ensure that compensation strategies account for risk.
- Research and implement procedures to streamline acquiring ownership. Ensure that the advantages and disadvantages of registration are available to investors.

VIII. General Market Recommendations

In addition to the settlement system observations, other more generic market practices could support a more efficient and sound settlement environment for all types of participants. The Sub-Committee would recommend for consideration:

Registration¹⁸

The Sub-Committee recognizes the advantages of and fully endorses industry efforts to move in the direction of book-entry transfers of securities. However, given that physical securities and the associated registration issues will continue to exist for some time, the Sub-Committee recommends the following as interim measures to minimize the risks of physical certificates.

Registration of physical certificates should be performed on settlement day. Registration of securities before settlement day would present a formidable obstacle for achieving DVP. If securities were to be legally and irrevocably transferred in advance of cash finality, then it would appear impossible to develop a DVP system.

There are four significant considerations associated with registration after settlement day:

- Registration beyond settlement day can delay the point of finality. Registration delays may prevent a true DVP exchange if local law does not consider transfers in street name, by endorsement or prior to re-registration as sufficient to pass title.
- Efficiency of the market is materially and negatively impacted in countries where re-registration is necessary to sell securities. In this case, delays in registration result in a "frozen" period where assets are not available for trading. Inefficiencies or uncertainties resulting from long registration practices may create a disincentive for investments in that market.

Subject to nuances from country to country, other risk possibilities include:

- Substantial systemic and credit risk may exist if unregistered securities are resold. A bankruptcy of a previously registered owner of securities (the last registered owner being different from the current owner of the securities) may result in the inclusion of those securities in the assets of the insolvent previous registered owner. Depending on the

¹⁸ These observations should be considered for those markets where registration is a crucial event for a transfer of an enforceable interest in securities.

bankruptcy rules regarding ownership of securities, a subsequent unregistered owner may lose the securities. In a worst case scenario, the unregistered owner may lose the securities but only have limited reimbursement rights from the counterparty from whom the securities were bought.

- Fraud and theft related exposures increase with long registration periods. Registration delays beyond settlement day typically result from a high degree of manual intervention. The longer the registration interval, the less incentives exist for an investor to register. This promotes Street Name holding, which in addition to having different definitions in different countries, may not allow for detection of fraudulent securities. Less frequent screening of securities increase the probability that a fraud situation could occur which may ultimately precipitate a bankruptcy.

Collateral

Currently, there are different procedures from country to country on the process to perfect a lien and different standards for the language to be used contractually to create collateral rights. Operationally, in many countries perfection is difficult and cumbersome to achieve. Various forms of legally acceptable documentation to acquire a lien make it difficult for clearing agents to negotiate with clients. Ideally, a universal standard for contractual lien language as well as for local perfection rules providing for automatic perfection of assets in accounts would simplify a clearing agent's ability to obtain a securities interest in assets. The Sub-Committee recognizes that realization of this goal is unlikely in the near term. Therefore, at a minimum, market participants should work with the relevant agencies to clarify and simplify collateral perfection rules to make them suitable for multi-tiered custody and rapid turnover. Consideration for rapid turnover and assets in transit as being eligible for perfection would enhance an intermediary's ability to collateralize exposures.