GLOBAL Clearing AND Settlement

A Plan of Action

GROUP OF THIRTY

30

All members of the Steering Committee served in their personal capacities. The views expressed in this report do not necessarily reflect the views or policies of their respective institutions, nor does publication of the report by the Group of Thirty imply an endorsement of the views expressed herein.

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Group of Thirty©

Washington, DC

2003

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FOREWORD

The Group of Thirty commissioned this study of global securities clearing and settlement arrangements out of concern that unevenly developed national clearing and settlement infrastructure and inconsistent business practices across markets could be a source of significant systemic risk, and certainly of inefficiency. Given rapid growth of debt, equity, and derivatives trading, both generally and cross-border, the wrong combination of market shocks and financial dislocations might be sufficient to overtax the infrastructure on which the functioning of global markets depends.

With these concerns in mind, the Group of Thirty recruited a senior group of private executives and public officials to serve on the project's Steering Committee, and Andrew Large agreed to serve as its chair. Eleven members of the Group of Thirty itself and a dozen others joined him on the Committee, which undertook the substantial challenge to investigate the complex institutional structures and processes that characterize global clearing and settlement. Their aim was to improve both the safety and efficiency of these global processes.

The Committee began by assembling a formidable array of talent to complete the body of work that is catalogued in this report. Over the course of two years, survey teams and working parties analyzed current industry conditions, evaluated current practice and latest supervisory guidance, and framed proposals for making the system safer and more efficient. If the hours of effort devoted to this venture by its many contributors were fully valued, it would certainly constitute a multi-million dollar enterprise.

The particular focus of the exercise was the set of challenges arising from cross-border trading. Trades are moving across borders without support of common — or even consistent — structures, performance standards, or operational rules. Achieving consistency will require far-reaching change, from purely technical and operational matters to risk management and governance practices. The Steering Committee devised a three-pronged strategy to accomplish this, including:

- Technical and business practice standards intended to strengthen the connections across borders and systems;
- Stronger risk management, including the stronger legal guarantees necessary to provide a solid legal basis for clearing and settlement; and
- Improved governance by private boards, supported by official supervision and fair and open access to systems.

The strategy encompasses 20 recommendations that constitute an action plan for global clearing and settlement. The plan is ambitious but it reflects the aspirations of market participants, gives direction to work that is already under way, and provides specific guidance for tackling new areas. Its fundamental logic is that a globally linked marketplace should be subject to global norms.

Like the Group of Thirty itself, the report seeks to achieve a balance of views and interests, incorporating the best thinking of the private and public sectors. This is important because achieving its objectives will require significant attention from both quarters, along with significant investment by a great many market participants. All of this will take time and it will be important to review progress along the way. To ensure that the issues raised receive the continuing attention they deserve, the Group of Thirty will monitor progress on cross-border reforms going forward.

The Group of Thirty is pleased to have sponsored this project and we commend its analysis and recommendations to all who are concerned about the safety and efficiency of global markets.

Paul A. Volcker
Chairman of the Trustees
Group of Thirty

Jacob A. Frenkel
Chairman
Group of Thirty

CHAIRMAN'S MESSAGE

The global financial system is only as good as the infrastructure that supports it. And the smooth functioning of that system—and the confidence on which it depends—will be threatened if the infrastructure is unreliable. Unfortunately attention to the overall system of global securities clearing and settlement has been in short supply. Meanwhile the process of clearing and settlement has become much more interdependent globally, increasingly linked to the world of payments and foreign exchange as well. Such a network of interdependent systems can improve efficiency, but a network without a sound basis could also create vulnerabilities.

On a domestic basis there is confidence that clearing and settlement systems work. It is the cross-border arena that has been neglected because the architects have tended to stop at their own borders. And although a major failure has so far not struck, recent events—and not least the U.S. tragedy on September 11, 2001—warn us against any complacency.

Against this background, two years ago the Group of Thirty formulated a project on global clearing and settlement. They recruited a Steering Committee, which they asked me to chair, to see whether a pathway could be devised to improve the global system. We took as our basic premise that market-led change should be the key mechanism.

We have avoided prescribing structures, institutional arrangements, or who ought to own what. Instead we have focused on the need for standards—best-practice standards that conform to public policy needs. These standards will in practice define the network: they will outline its features and help form its architecture. In addition, mechanisms to ensure open access to both service providers and users will underwrite competition in clearing and settlement services and functions. In this way institutional arrangements will evolve through market-led change.

We also wanted to ensure a practical outcome, one that conforms to prevailing industry approaches. So we asked market participants themselves what is wrong and what needs to change. We pursued a dialogue with major firms, smaller firms, service providers like control securities depositories (CSDs) and central counterparties, as well as investors and end-users. We reviewed the results against public policy requirements, using as a starting point the CPSS/IOSCO recommendations of November 2001. We were also informed by other studies—by the Giovannini report in Europe, for example—which articulated so clearly many of the barriers to improvement in this area.

The net result of this effort is a series of twenty recommendations, outlined in the Executive Summary that follows. Because the costs of failure in the cross-border area are high, our recommendations go beyond minimum standards. They target best practice in the major mature markets. They may go further than needed in emerging markets, although for the long term we feel that they should be aspirational for such markets as well. The recommendations fall into three groups.

First are those primarily related to efficiency. In a nutshell these are standards of best practice aimed at the private sector. They cover technical features of the clearing and settlement process (messaging, for example), but also market practices such as operating hours. Together they provide for a strengthened network with the potential for interoperability—a concept that we have discussed in some detail on page 14.

Second are recommendations related to mitigating risks—an area of mutual concern to the industry and those who supervise it. Many areas here are familiar and we have focussed on financial and operational integrity of all main participants: users as well as providers. In addition, however, we have taken account of much that has been learned since the September 11 outrage, and addressed some significant areas in the legal arena. Market confidence after all is underpinned by legal certainty in such basic areas as finality and close-out, so we have addressed both these difficult areas.

Third, there is a series of recommendations on improving and strengthening governance, aimed at ensuring implementation of the efficiency and risk mitigation proposals in the report. We have recommended ways to strengthen the resolve and forcefulness of boards of directors as well as ways to ensure fair access and consistent oversight. We have attempted to set out clearly the issues in need of attention, how our recommendations address them, and what needs to change. And we have looked for realistic ways to drive consistent and concerted progress, and to do so on many fronts. We have therefore devised a "pathway" in the form of a statement of who needs to do what for each of the twenty recommendations. Much of the required effort must come from the private sector, but some from public authorities as well.

To add impetus to this process, we intend to put in place machinery to coordinate and to catalyze progress on implementation. The Group of Thirty is forming a Standing Committee to oversee this process. We expect that this Committee will work very closely with all interested parties both public—such as CPSS/IOSCO and individual supervisors and central banks—and private—such as ISSA and the Global Documentation Steering Committee and individuals firms and clearing and settlement organizations. A substantive review of progress will be undertaken two years after publication of this report that will examine progress and make transparent who has been active and whether there are areas in which sufficient progress has not been made.

We have, of course, been mindful of the significant costs involved in implementing our recommendations, but we are confident that our approach is realistic on two grounds. Firstly, while it is the private sector on whom the costs are likely to fall, it is they who can see the potential for lower unit costs by making the necessary investments. Secondly, time helps. The system cannot be changed overnight in any case, and the time horizon for realizing the vision in our proposals is consistent with the cycle for obsolescence of software and systems that requires renewal over a five-to-seven-year period. So we believe that introducing new standards as part of that renewal will be significantly less costly than forcing change faster.

The final point to be made is that the changes we propose will not happen without top-level support. Many of us in the corporate boardroom have shied away from the clearing and settlement area because of its sheer complexity, but this report is aimed at strategic decisionmakers in both public and private sectors. While those with operational responsibility for clearing and settlement will certainly have to understand these matters in detail, top-level support does not require a detailed knowledge of the mechanics. What it does require is that the issues are addressed in an understandable and consistent way, that a sensible course is set, and that the goals are realistically achievable. We hope our study inspires confidence that this is so, and will accordingly enjoy wide support.

If industry leaders and public officials embrace the objectives we have set, the improved infrastructure that results will contribute to enhanced confidence in the markets themselves. We hope that the report proves helpful not only in tackling the specific challenges of global clearing and settlement but in addressing vulnerabilities in global financial networks more generally.

Sir Andrew Large
Chairman, Global Clearing and Settlement Project

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ACKNOWLEDGMENTS

THE GROUP OF THIRTY WOULD LIKE TO PAY TRIBUTE to those whose contribution of time, talent, and energy over the last two years made this project possible. Thanks is due first and foremost to the Chairman of the project Steering Committee, Andrew Large, and the two Vice Chairmen, John Heimann and David Walker, who contributed countless hours guiding the project from inception to completion. Planning the work and bringing it to fruition also relied on the immeasurable support and dedication of the G30 Executive Director, John Walsh, and the Project Director, Marc Hollanders.

They were assisted by an Executive Committee that also included Steering Committee members Jill Considine of the Depository Trust & Clearing Corporation, E. Gerald Corrigan of Goldman Sachs, Gerald Hassell of the Bank of New York, and Andrew Sheng of the Hong Kong Securities and Futures Commission; Michael Patterson of JP Morgan Chase and Stephan Schuster of Deutsche Bank. As discussed in Appendix 2, the Executive Committee chaired working and advisory groups and provided detailed input to the identification and drafting of recommendations. The full 24-member Steering Committee, listed at the front of this report, was responsible for oversight of the work program and for the resulting report and recommendations.

Analysis, drafting, and coordinating the efforts of diverse contributors are key to any successful project and a particular debt of gratitude is owed in this case to PricewaterhouseCoopers for serving as professional services partner for the project. Sam Dibb, Phil Rivett, Chris Thompson, Jack Pullara, and their colleagues conducted the industry survey that lies at the heart of this report, analyzed its findings, and worked with the Executive Committee and industry experts to identify areas of recommendation. Their assistance in all phases of the project, but especially in preparing the report's 20 recommendations, was instrumental to the success of the project. Special thanks is also due to the Bank for International Settlements for permitting Marc Hollanders to serve as Project Director and to the Hong Kong Securities and Futures Commission, JP Morgan Chase, and the European Central Bank for permitting Stella Leung, Ed Neeck, and Elias Kazarian to serve as working group secretaries.

Although the contributions of these individuals were prodigious, the total work effort was dominated by the cumulative contributions of the many private and public institutions that participated in it. The full list of organizations represented on working and advisory groups and those that took part in the industry survey are listed in tables A2-1 and A2-2 of Appendix 2. Of course, any such list is a proxy for the efforts of a great many individuals. Those who made significant personal contributions through their service on working or advisory groups, drafting documents, or offering technical advice are listed at the end of Appendix 2.

We would also like to thank organizations that provided facilities and hospitality for meetings of project committees and working groups. These include Barclays plc, the Bank of England, Citigroup, Goldman Sachs, JP Morgan Chase, Merrill Lynch, Morgan Stanley, and PricewaterhouseCoopers.

The overall project was a complex undertaking and the production, dispatch of drafts, and a very substantial editorial and production process had their logistical center at the G30 offices, and in the office of the project Chairman. Although the work took longer than anyone imagined at the outset, it could never have been completed without the efforts of Dawn Hewitt and Friso van der Oord of the Group of Thirty, Francesca Carter of the Bank of England and Barclays plc, and without the dedicated efforts of our editors Martha Gottron and Nancy Morrison, and our designer Sarah McPhie.

As the number of firms and individuals cited indicates, the G30 global clearing and settlement project was a far-flung enterprise. If there are others who assisted the project in uncharted meetings or unremarked conference calls, we apologize for the oversight and thank them for their contribution.

The final word of recognition is reserved for Gordon Richardson, honorary chairman of the Group of Thirty. Lord Richardson was the driving force behind the 1989 clearing and settlement study as chairman of the Group, and his continuing leadership and interest in this area were manifest in efforts to launch this project. For his support as the Group's senior statesman, we are most grateful.

EXECUTIVE SUMMARY

CLEARING AND SETTLEMENT OF SECURITIES IS A CORE FINANCIAL FUNCTION on which fundamental confidence in the financial markets depends. It is also an area experiencing rapid growth, profound technical and structural change, and infrequent but severe market shocks. Growth has been tremendous. For example, the value of shares traded annually in world markets rose nearly 63 times between 1980 and 2001. Over that same period, U.S. gross activity (both purchases and sales) in foreign securities grew nearly a hundred-fold, while foreign gross activity in U.S. securities also increased more than a hundred-fold.[2] In Europe the institutional setting within which clearing and settlement occurs is changing rapidly, while technology is changing the face of the process worldwide. And the events of September 11, 2001, chillingly demonstrated that global clearing and settlement arrangements are vulnerable to physical disruption and threats previously considered improbable.

Any one of these factors—rapid growth, structural change, or market shocks—would normally be grounds for a thorough reexamination of market function and each has, on occasion, provided justification for significant changes in market practices and supervision. Mindful of the need for reform, the Group of Thirty commissioned this study fully a year before terror struck Wall Street. Subsequent developments have only underscored the importance of the project.

The report recommends wide-ranging reform of the clearing and settlement process, including creation and implementation of global standards in technological and operational areas, improvements in risk management practices, further harmonization of global legal and regulatory environments, and improved governance for providers of clearing and settlement services. These changes are embodied in the following 20 recommendations, which, when implemented, will significantly improve the safety and efficiency of international securities markets. The reforms envisaged are likely to be attainable within five to seven years at modest incremental cost.

THE TWENTY RECOMMENDATIONS

CREATING A STRENGTHENED, INTEROPERABLE GLOBAL NETWORK

1. Eliminate paper and automate communication, data capture, and enrichment.
2. Harmonize messaging standards and communication protocols.
3. Develop and implement reference data standards.
4. Synchronize timing between different clearing and settlement systems and associated payment and foreign-exchange systems.
5. Automate and standardize institutional trade matching.
6. Expand the use of central counterparties.
7. Permit securities lending and borrowing to expedite settlement.
8. Automate and standardize asset servicing processes, including corporate actions, tax relief arrangements, and restrictions on foreign ownership.

1. Standard and Poor's, *Emerging Stock Markets Factbook 2002,* McGraw Hill & Co., New York.
2. See footnote of Figure 1-1. p. 17.

MITIGATING RISK

9. Ensure the financial integrity of providers of clearing and settlement services.
10. Reinforce the risk management practices of users of clearing and settlement service providers.
11. Ensure final, simultaneous transfer and availability of assets.
12. Ensure effective business continuity and disaster recovery planning.
13. Address the possibility of failure of a systemically important institution.
14. Strengthen assessment of the enforceability of contracts.
15. Advance legal certainty over rights to securities, cash, or collateral.
16. Recognize and support improved valuation and closeout netting arrangements.

IMPROVING GOVERNANCE

17. Ensure appointment of appropriately experienced and senior board members.
18. Promote fair access to securities clearing and settlement networks.
19. Ensure equitable and effective attention to stakeholder interests.
20. Encourage consistent regulation and oversight of securities clearing and settlement service providers.

These recommendations are further elaborated at the end of this summary and in the first five chapters of the accompanying report. Chapter 6 provides a fuller discussion of priorities and a plan of action. Appendix 1 presents detailed steps toward implementation. This is an ambitious agenda that will require substantial action by a wide range of market participants, industry associations, and public sector agencies, and it is important to understand why changes of such significance must be made at this time.

RISING STAKES AND RISKS IN THE CLEARING AND SETTLEMENT PROCESS

Clearing and settlement of securities—the process by which the ownership of securities is transferred finally and irrevocably from one investor to another, typically in exchange for a corresponding transfer of funds—is central to all securities market activity and is thus a linchpin of any financial system. Yet few people, even within financial institutions, understand its complex mechanics in detail. The process, including the associated costs and risks, is also largely invisible to end investors. For the most part this is unremarkable, in the same way that users of telephone or Internet services need not understand the intricacies of data transmission or digital switching technology.

The reliable performance this implies owes much to the high level of attention that has been devoted to domestic systems, notably in response to the Group of Thirty's 1989 report, "Clearance and Settlement Systems in the World's Securities Markets." Recommendations published in 2001 by the Committee on Payments and Settlement Systems of the Group of Ten central banks (CPSS) and the International Organization of Securities Commissions (IOSCO) are now one of the key standards used by public authorities to achieve sound financial systems.

At the same time, this is a period of rapid change in technology and market infrastructure, linked to fundamental changes in the marketplace. These changes are associated with growth in trading volumes and technological advances that have been instrumental in opening up access to markets and providing opportunities to automate markets' core processes. Continued consolidation of market players and infrastructure is concentrating both market power and risk. Investors and the financial intermediaries that serve them are increasingly focusing on the costs of trading, and the cleaning and settlement of those trades. With securities trading, especially cross-border trading, expanding rapidly, both the stakes and the risks involved are rising.

THE CHALLENGE OF CROSS-BORDER CLEARING AND SETTLEMENT

Cross-border trading is a particular challenge because, at its heart, clearing and settlement of securities is still an activity that takes place market by market. This "domestic" approach reflects the natural evolution of securities markets in the context of local law, business practice, and regulatory frameworks, and the fact that settlement systems have usually grown up in close alliance with the markets they support. Indeed in several countries, the stock exchange owns the clearing and settlement system. In some countries, members of the exchange are obliged to use these systems.

Any firm that provides investment services to international investors must participate in myriad settlement systems and related legal and regulatory systems. Maintaining the systems and retaining people who understand the intricacies of the conventions and practices that differ from system to system and from market to market is costly. That cost is ultimately borne by investors in internationally traded securities, be they individuals or institutions, mutual funds or pension funds.

NETWORK IMPLICATIONS

As well as adding costs, cross-border trading introduces an increasing element of risk. The lack of implementation of globally recognized technical standards, uniform business processes, and consistent legal and regulatory underpinnings makes the global clearing and settlement network inefficient, unwieldy, and potentially unreliable. Furthermore, this global network links clearing and settlement systems with payments systems and foreign-exchange markets, so that problems in one system and market are increasingly likely to affect markets and firms in other parts of the world.

In addition, this imperfect network is vulnerable to shocks, whether through an unexpected surge in market volatility, a major technical or institutional failure, or a physical disruption. These shocks tend to be of relatively short duration but are sometimes very large in scale. Loss of the clearing and settlement functions even briefly can be costly and disruptive of markets. Loss of function over several days, or simply at a critical time in the daily clearing and settlement process, can have serious systemic implications, especially if accompanied by other financial disruptions.

MARKET DYNAMICS AND THE NEED FOR CHANGE

With risks rising and pressures to reduce costs increasing, it would be reasonable to expect markets to respond to these challenges in ways that reduced both costs and risk. This report proceeds from the premise that market-led change is essential. However, there are two reasons to believe that some external stimulus is needed.

First, the legal and regulatory frameworks on which clearing and settlement systems are founded continue to develop piecemeal and largely on a domestic basis. Thus, the complexities of cross-border clearing and settlement are likely to grow, even if best industry practice and official guidance are strictly followed. Second, incentives within individual clearing and settlement entities tend to support incremental change that strengthens the local franchise, rather than initiatives to facilitate greater competitiveness at the international level that could adversely affect the value of the local franchise. Indeed, segmentation restricts competition because each system is able to set its own standards for membership and for the services it provides. These are not incentives likely to produce global standards of best practice appropriate to the emerging global network.

> Implementing the twenty recommendations in this report would significantly improve the safety and efficiency of international securities markets.

THE GROUP OF THIRTY INITIATIVE

For all these reasons, the Group of Thirty decided to initiate an assessment of cross-border clearing and settlement issues. A Steering Committee was recruited from senior representatives of the private sector and leading figures in the public sector (see page ix). The contribution of the latter, owing to the demands of public office, was in a personal capacity, drawing on their experience but without committing their institutions. The aim of the assessment was to improve efficiency and reduce risk in the system. Its primary focus was major securities markets and the key institutions that form the backbone of the global clearing and settlement framework. In the interest of promoting meaningful change, its objective was to enunciate technical, legal, and process standards where possible, rather than remaining at the level of broad principles. To reflect the realities of the marketplace, Pricewaterhouse Coopers undertook a survey of 40 firms along what this report refers to as the clearing and settlement value chain. Participants ranged from asset managers and broker-dealers to custodians and providers of clearing and settlement services, from small firms to the large "bulge bracket" market participants. It included major trade associations and all major regions of the world (for a complete list of participants, see Appendix 2). To avoid bias in the result, the survey consisted of open-ended questions designed to allow the survey participants to provide their concerns about the current system and expectations regarding this study.

The survey findings constitute a far-reaching agenda for change, aimed at achieving a truly global model for clearing and settlement. The recommendations contained in this report respond directly to this research. If acted upon, the result would be a widely interoperable and accessible system operating to standards of best market practice.

RELATIONSHIP TO OTHER KEY INITIATIVES

To ensure that any new recommendations were anchored in existing standards of best practice and the latest regulatory guidance, a second element of the assessment was an evaluation of existing principles and standards. These included recommendations of the International Securities Services Association (ISSA), work of the Global Documentation Task Force, various reports on integrating clearing and settlement structures in the European Union including the Giovannini report and work of the European Central Securities Depositories Association, and official guidance issued by various supervisory bodies. Most important in this regard were the recommendations issued jointly by CPSS and IOSCO in November 2001, which this report fully endorses as a foundation for the recommendations that follow. It should be noted, however, that this report moves beyond these recommendations in several respects.

- This report promotes "best practice" that clearing and settlement systems in the most advanced economies should aspire to meet within roughly five to seven years, while the CPSS-IOSCO recommendations set forth minimum standards that are expected to be met at the earliest opportunity by settlement systems in all economies.
- Although this report and CPSS-IOSCO share the broad objectives of safety and efficiency, the agenda set out here is considerably more ambitious regarding efficiency, reflecting industry aspirations expressed in the survey.
- This report places greater emphasis than CPSS-IOSCO on cross-border issues, aiming for creation of an integrated global network which goes beyond applying minimum standards in individual jurisdictions.
- Overall, this report's recommendations tend to be more prescriptive than the CPSS-IOSCO recommendations and focus more explicitly on the implementation path to be followed, again reflecting industry aspirations.

Despite these differences in emphasis and intensity, the two sets of recommendations are broadly complementary and entirely consistent. Together, they promote sound infrastructure for global markets.

COSTS AND BENEFITS

The Steering Committee also carefully considered the benefits and costs of the changes being recommended. The available data clearly support the view that the current system is significantly less efficient than it could be. No one disputes that the cost of settling a trade varies significantly from market to market, and cross-border settlement is substantially more expensive than domestic settlement. Yet, when it comes to quantifying this assertion, analysis and opinion differ. For example, the Center for European Policy Studies estimated European Union cross-border costs to be between two and eight times U.S. domestic costs, although the basis and assumptions underlying these calculations have been challenged by other analysis that finds much greater differences, notably by the Depository Trust and Clearing Corporation. Meanwhile, recent estimates of the cross-border premium for trading costs as a whole range from 30 percent for a wholesale trade to 150 percent for retail. While the quantum differs, the cost differences and the potential for savings in all cases are substantial.[3]

Studies to date have focused on the direct costs paid to infrastructure providers for clearing and settlement services. We estimate their operating costs at approximately $2.5 billion annually. A much greater share of overall clearing and settlement costs, however, is attributable to internal expenditure among financial intermediaries, the organizations that facilitate a financial transaction between end-user issuers and investors. These broker-dealers and custodian-agent banks spend on the order of $10 billion a year—and this estimate ignores the cost of working capital tied up in the various systems (for analysis of costs, see chapter 1, pp. 15-16). Cross-border trades also fail far too frequently, and it is estimated that manual intervention to fix these problems can increase trading costs by a factor of nearly four.[4] Significant savings are possible by eliminating the poor data, manual processes, and weak communications that typically cause such failures. An improved infrastructure for clearing and settlement would reduce the unit cost of international transactions, and expanded competition between service providers resulting from a more open and competitive approach to international clearing and settlement services would exert further downward pressure on these costs. Our analysis suggests that these savings will benefit end investors as well as reduce the effective costs to issuers.

The report's conclusion is that significant cost savings can be realized by implementing its recommendations, although the full measure of cost savings and risk mitigation envisaged in the report will be achieved only through comprehensive reform and over an extended period. Accurate quantification of anticipated efficiency gains, however, would require a detailed business-case analysis that is beyond the scope of even the significant resources dedicated to this project.

While substantial cost-savings are to be had over time from adopting these recommendations, there are also significant costs to be borne in implementing them. This will not be a short-term undertaking. Agreement on standards, changes in the organization of local markets, and changes to operating systems at many service providers and market participants will all take time to effect. At the same time, software and systems must be updated and replaced periodically, typically on a replacement cycle of five to seven years. The alignment between the time required to develop standards and the software cycle should permit introduction of new standards in the context of otherwise necessary system replacement or upgrade. Thus, the changes envisaged here are likely to be attainable within five to seven years at modest incremental cost. It is also worth repeating that the impetus for the most ambitious changes comes from the industry itself, suggesting that the changes proposed will be viewed as essential improvements rather than unnecessary expenditures.

The impetus for the most ambitious changes comes from the industry itself, suggesting that the changes proposed will be viewed as essential improvements rather than unnecessary expenditures.

NEW GROUND COVERED BY THE REPORT

Taking account of the full range of analysis, the Steering Committee concluded that fundamental change is needed. The current system of predominantly local provision of clearing and settlement services, based on local or proprietary standards and business practices, must be transformed into a widely accessible global network that is more fully automated and

3. Karel Lannoo and Mattias Levin, "The Securities Settlement Industry in the EU: Structure, Costs and the Way Forward," Center for European Policy Studies, December 2001; and Deutsche Börse Group and Clearstream International, "White Paper on Cross-Border Equity Trading Clearing and Settlement in Europe," April 2002.
4. Based on audits of transcription processing at major financial institutions in Europe and the United States, conducted by SWIFT between 1996 and 1998.

operates to consistently implemented global standards. The report breaks new ground in several important areas, beginning in the cross-border arena where it defines interoperability and the steps necessary to achieve it, including development of specific standards. Next is the area of risk management. The report sheds new light on risk management for users and providers of clearing and settlement infrastructure services. The report also raises important issues of legal risk relating to the enforceability of netting and collateral agreements, and it incorporates lessons learned from September 11 into higher standards for business continuity and disaster recovery planning. An important new area addressed is post-settlement asset servicing, including corporate actions, tax relief arrangements, and foreign-ownership restrictions. And in the other areas touched by the report, it is fair to say that the standards have been pushed higher.

The result, when these recommendations are fully implemented, will be a framework for international settlement and clearing that is quite different from the status quo. In some ways it will resemble the framework that exists in global telecommunications. The global telecommunications carriers compete among themselves but have common standards (both technical and market practice) for interface among one another and with local exchanges and for delivery of transmissions to the end user. The Steering Committee believes that an approach of this type—one that establishes global standards to which all participants in the clearing and settlement process adhere—is essential to facilitate competition and indeed to encourage the providers of international clearing and settlement services to compete as robustly as possible.

The reforms envisaged are likely to be attainable within five to seven years at modest incremental cost.

ACHIEVING REFORM

Reform in these three areas constitutes the Steering Committee's vision for the future of the clearing and settlement system, a vision that will be realized by the 20 recommendations set out in this report. It is worth noting that although the cross-border focus is an important factor in this report, only about one-third of the recommendations are explicitly directed to the cross-border environment. The remainder apply to practices within markets. The reason is simple. Only when the characteristics of performance are consistent will it be possible to create the cross-system linkages ultimately required to produce a seamless global infrastructure.

Together, the recommendations represent a comprehensive plan of action for the future development of global clearing and settlement. Provided that action on these recommendations is systematic, the landscape for clearing and settlement could be very different and much improved within five to seven years. The full improvement in efficiency and safety described in this report will result, however, only from comprehensive adoption of the recommendations set out here.

The critical requirement for change on this scale is the motivation to complete it. Seeing these recommendations through to full implementation will require individual and collective action by providers and users of clearing and settlement services, as well as by supervisors, central banks, and governments. Even though the matters involved are sometimes highly technical, commitment and consensus will be needed not only among technical specialists, but also at the level of boards of directors. Collective action will involve a range of existing industry organizations already active on these issues, while for some, the appropriate venue for action will have to be decided. Neither the Steering Committee nor the Group of Thirty itself can devise or implement these changes.

Although the agenda is ambitious, it is also sensible: responsive to market aspirations for greater safety and efficiency and focused on practical solutions to current problems. It offers an organizing principle for the substantial body of work that is already under way by industry groups, supervisors, and central banks. As new standards and approaches become available, firms will include them in system and software upgrades. The question is whether these efforts will proceed piecemeal or will embrace an approach based on global standards as outlined in this report.

Such an approach can be pursued if those that have the capacity to carry the work forward have confidence that change will come in a reasonable time frame and at reasonable cost compared to the anticipated benefits.

To that end, both the Steering Committee and other participants in the study have supported the monitoring of progress against the reform agenda as motivation for action after the report is published. It has been widely suggested that the Group of Thirty should play a continuing role in this process, in collaboration with appropriate public and private sector entities. Accordingly, the Group has agreed to form a Standing Committee to monitor progress in the period after the report's release.

THE LONGER TERM

The question of how best to carry the full agenda for change through to completion remains to be answered. In other areas such as telecommunications (International Telecommunication Union), postal services (Universal Postal Union), and air transport (International Air Transport Association), an internationally recognized agency has emerged that oversees the creation and maintenance of standards, as well as their adoption and enforcement. In the clearing and settlement area, many organizations are already involved—ISSA, CPSS/IOSCO, the Committee of European Securities Regulators, central banks, supervisors, and various bodies representative of infrastructure providers—but none with both global reach and comprehensive scope. It will ultimately be for the organizations that collectively comprise the global clearing and settlement industry to decide on a long-term approach.

> The current system must be transformed into a widely accessible global network that is more fully automated and operates to global standards.

In the meantime, with the Group's agreement to play a continuing role following release of this report, the Steering Committee makes the following recommendations. These are offered in the firm belief that if implementation of these recommendations begins immediately, then its vision of a safer, more efficient global clearing and settlement system can be brought to fruition in the proposed five- to seven-year time frame.

RECOMMENDATIONS

CREATING A STRENGTHENED, INTEROPERABLE GLOBAL NETWORK

RECOMMENDATION 1. ELIMINATE PAPER AND AUTOMATE COMMUNICATION, DATA CAPTURE, AND ENRICHMENT.

Infrastructure providers and relevant public authorities should work with issuers and securities industry participants to eliminate the issuance, use, transfer, and retention of paper securities certificates without delay. All market participants should seek to automate elements of the process, such as confirmations and trade allocations, that introduce other forms of paper into the securities processing transaction flow as technology safely allows. All market participants should use electronic communication to transmit information for all instruments and transaction types. They should also identify opportunities to streamline processes by avoiding duplicative recording of data and manual addition of supplementary information at each stage of the value chain.

RECOMMENDATION 2. HARMONIZE MESSAGING STANDARDS AND COMMUNICATION PROTOCOLS.

All market participants should adopt ISO15022 (the data field dictionary and message catalogue for securities information flows) as the global standard for straight-through securities messaging across the entire securities life cycle.[5] Over time, XML (extensible mark-up language) should become the language to describe standardized messages.[6] All market participants should support and use communication networks that adopt open, standardized, IP-based protocols for securities transactions. [7]

RECOMMENDATION 3. DEVELOP AND IMPLEMENT REFERENCE DATA STANDARDS.

Market participants should collectively identify, develop and adopt universal securities, counterparty and relevant generic reference data standards that fully meet the needs of all relevant users. Issuers, exchanges, and other originators and distributors of data should make all relevant information available to the market in compliance with these standards for a fair price and on a timely basis.

RECOMMENDATION 4. SYNCHRONIZE TIMING BETWEEN DIFFERENT CLEARING AND SETTLEMENT SYSTEMS AND ASSOCIATED PAYMENT AND FOREIGN EXCHANGE SYSTEMS.

Providers of clearing and settlement services and linked or otherwise associated payment and foreign-exchange systems should collectively ensure that their design, procedures, operational timetables, and funding and cutoff times are such that the operation of one system does not materially reduce the efficiency or increase the risk of settlement in another. Market participants should work together to develop a comprehensive action plan to increase the efficiency and safety of cross-border securities transactions where the foreign-exchange settlement cycle is not synchronized with the securities settlement cycle.

RECOMMENDATION 5. AUTOMATE AND STANDARDIZE INSTITUTIONAL TRADE MATCHING.

Market participants should collectively develop and use fully compatible and industry-accepted technical and market-practice standards for the automated confirmation and agreement of institutional trade details on the day of the trade.

RECOMMENDATION 6. EXPAND THE USE OF CENTRAL COUNTERPARTIES.

Market participants and relevant public institutions should collaborate to assess the potentially substantial risk reduction and efficiency improvements of using a central counterparty. These benefits are expected to outweigh their costs in most markets. Where this is so, market participants should seek

5. ISO, the International Organization for Standardization, is a confederation of national standards institutes that works in partnership with public and private institutions to develop standards to be used consistently as rules, guidelines, or definitions of characteristics and to ensure that materials, products, processes, and services are fit for their purpose.
6. XML (extensible mark-up language) is the universal language for describing structured documents or data on the Internet.
7. IP (Internet protocol) is a suite of protocols developed for and used by the Internet and by private networks as the open, global standard for electronic communication.

either to use the services of an existing central counterparty or to establish one of their own, whichever has the better risk, cost, and benefit profile.

RECOMMENDATION 7. PERMIT SECURITIES LENDING AND BORROWING TO EXPEDITE SETTLEMENT.

Relevant authorities should permit securities lending and borrowing as a method for expediting the settlement of securities transactions.

RECOMMENDATION 8. AUTOMATE AND STANDARDIZE ASSET SERVICING PROCESSES, INCLUDING CORPORATE ACTIONS, TAX RELIEF ARRANGEMENTS, AND RESTRICTIONS ON FOREIGN OWNERSHIP.

Issuers, providers of clearing and settlement services, and other relevant market participants should advise investors of all details of corporate events that they require in an automated, timely manner and in compliance with accepted industry standards, so that each investor can make a timely decision on the action to be taken with full knowledge of the facts. Market participants and public authorities should work together to minimize the administrative costs to each party involved in tax relief arrangements through standardization and automation of procedures and communication of information and through the use and acceptance of electronic data and documentation. Relevant public authorities, infrastructure providers, and market participants should work together to harmonize and make transparent the processes, documentation, and communication of information in connection with foreign-ownership restrictions and reporting requirements.

MITIGATING RISK

RECOMMENDATION 9. ENSURE THE FINANCIAL INTEGRITY OF PROVIDERS OF CLEARING AND SETTLEMENT SERVICES.

Providers of clearing and settlement services should manage their risks and set standards and controls concerning the use of those services that allow them to conduct business in a safe, sound, and prudent manner consistent with their business model and all relevant supervisory and regulatory requirements. The need to operate prudently within the risk boundaries inherent within the business model requires risk management processes and standards, which should be applied objectively and consistently in determining compliance with risk measures, in three broad areas: the counterparty due diligence process; the procedures and techniques used to measure, monitor, and control risk exposure; and the minimum financial and liquidity requirements. Each organization should publish a report, at least annually, that describes the business model, risk framework, and underlying risk management processes, controls, and standards, together with the results of independent testing of those procedures. The report would thereby reassure users that the organization had operated effectively, and also would provide greater transparency to the market.

RECOMMENDATION 10. REINFORCE THE RISK MANAGEMENT PRACTICES OF USERS OF CLEARING AND SETTLEMENT SERVICE PROVIDERS.

Organizations that use, or are considering using, providers of clearing and settlement services should establish robust due diligence and counterparty risk management controls and processes that appropriately evaluate, measure, monitor, and control the risks inherent in such activity and in associated customer-related business.

RECOMMENDATION 11. ENSURE FINAL, SIMULTANEOUS TRANSFER AND AVAILABILITY OF ASSETS.

Providers of securities settlement services should reduce to the lowest possible level the credit risk created if securities or cash are delivered without receipt of corresponding assets, by linking securities transfers to funds transfers in a way that achieves effective delivery versus payment (DvP) and by making transparent the point at which finality of transfer is achieved. Once finality of transfer is fully assured, the rules should enable a receiver to re-use securities and cash without further delay.

RECOMMENDATION 12. ENSURE EFFECTIVE BUSINESS CONTINUITY AND DISASTER RECOVERY PLANNING.

All market participants should, and all systemically important institutions must, regularly review, update, and test their business continuity and disaster recovery plans, including evaluation of reliance on third parties, to ensure with reasonable certainty that critical operations will continue with a high level of integrity and sufficient capacity following a disruption or disaster.

RECOMMENDATION 13. ADDRESS THE POSSIBILITY OF FAILURE OF A SYSTEMICALLY IMPORTANT INSTITUTION.

Market participants in each financial center should work together to identify those institutions, or parts thereof, that are systemically important to the clearing and settlement process. User groups should be established to address how they would react if, despite strengthened business continuity and disaster recovery plans, there were a failure for whatever reason at one of these institutions. Ways of mitigating the risks created should a systemically important institution fail, such as building a real-time data depository, should be evaluated. Where it is determined that effective and feasible solutions may exist, detailed business cases setting out the costs and benefits should be built up, and decisions on future actions and investment decisions should be taken accordingly. As well as enforcing suitably high standards of business continuity and disaster recovery planning in systemically important institutions, regulators and overseers should encourage this process of industry-wide contingency evaluation and planning.

RECOMMENDATION 14. STRENGTHEN ASSESSMENT OF THE ENFORCEABILITY OF CONTRACTS.

Market participants should ensure that due diligence procedures examine contract enforceability, including basic formation and validity, as well as power and authority to contract.

RECOMMENDATION 15. ADVANCE LEGAL CERTAINTY OVER RIGHTS TO SECURITIES, CASH, OR COLLATERAL.

Market participants must be able to determine, with certainty and reasonable cost and effort, what law defines and governs their rights to securities, cash, or collateral in a clearing and settlement system or other intermediary, what those rights are, and how to perfect and enforce them.

RECOMMENDATION 16. RECOGNIZE AND SUPPORT IMPROVED VALUATION METHODOLOGIES AND CLOSEOUT NETTING ARRANGEMENTS.

Market participants should ensure that master agreements provide that upon the early termination of a transaction or group of transactions, the determining party will have the flexibility to value such transactions by the method that is most likely to produce a commercially reasonable valuation at the time of termination. Market participants should include closeout netting provisions in their contract documentation. Relevant authorities in each jurisdiction should ensure that their laws give effect to closeout netting for all central counterparties, brokers, end users, and other market participants, and for all entity, transaction, and asset types.

IMPROVING GOVERNANCE

RECOMMENDATION 17. ENSURE APPOINTMENT OF APPROPRIATELY EXPERIENCED AND SENIOR BOARD MEMBERS.

Members of the boards of securities clearing and settlement infrastructure providers should, individually and collectively, be of a weight in terms of experience and seniority to discharge the enlarged strategic, risk, and operational management oversight responsibilities described in this report.

RECOMMENDATION 18. PROMOTE FAIR ACCESS TO SECURITIES CLEARING AND SETTLEMENT NETWORKS.

Boards of securities clearing and settlement service providers, other organizations providing similar services, and public authorities should ensure that rules and other requirements that control or limit access to securities clearing and settlement services are accepted only where they are necessary and are designed exclusively for the purpose of controlling financial, operational, reputational or regulatory risks; maintaining the safety of the system; or achieving other reasonable public policy objectives. Networks and services should be accessible to all users that pass risk and safety evaluations and enjoy appropriate financial standing, and users should be free to select the mix of functions and services that they wish to use on the basis of straightforward, transparent, and fair tariff policies grounded on the principle of user pays.

RECOMMENDATION 19. ENSURE EQUITABLE AND EFFECTIVE ATTENTION TO STAKEHOLDER INTERESTS.

Board participation should represent different stakeholder interests fairly and equitably. Provision should be made for regular review of, and for changes as necessary in, board composition to ensure continuing balanced representation of varying stakeholder groups, including users.

RECOMMENDATION 20. ENCOURAGE CONSISTENT REGULATION AND OVERSIGHT OF SECURITIES CLEARING AND SETTLEMENT SERVICE PROVIDERS.

Providers of securities clearing and settlement services should be subject to consistent and transparent regulation and oversight, which should focus on the activities undertaken and risks incurred. Standards of regulation and oversight of cross-border activity should be complementary and consistently applied across all relevant jurisdictions. As a long-term goal and where coherent with other public policy objectives, regulatory and oversight standards should be harmonized.

1. CLEARING AND SETTLEMENT: WHAT IS AT STAKE?

THE SAFETY AND EFFICIENCY OF GLOBAL CAPITAL MARKETS DEPEND ON EFFECTIVE CLEARING AND SETTLEMENT of the securities, debt, and derivative transactions that flow through them. Clearing is the process following a trade in which the arrangements for transfer of title and funds are agreed. Settlement is the process by which the ownership interest in securities is transferred from one investor to another, generally in exchange for a corresponding transfer of funds. The goal is to provide the buyer with irrevocable delivery of a security from the seller at or very near the precise moment when the seller receives final and irrevocable payment for it from the buyer. Although largely invisible to the end investor, these processes lie at the core of all securities markets. Indeed, modern securities markets could not function without the systems and infrastructure that facilitate clearing and settlement.

In concept, there is nothing mysterious about this mechanism; yet in practice, it is quite complex. Matching transaction terms, confirming, and settling the many millions of trades taking place every day in major markets is complicated enough in a purely domestic context. But the mechanics have become even more complex with the rapid growth of cross-border trading, which spans many clearing and settlement systems and legal and regulatory jurisdictions. Meanwhile, the underlying legal and regulatory frameworks on which these systems rely continue to develop in a piecemeal fashion and largely on a domestic basis. In short, the trading network is ultimately global in coverage; yet the post-trade clearing and settlement environment is highly segmented and provides only limited integration or reliable connectivity. The causes of this fragmentation include the lack of global technical standards, differing business processes, and inconsistent legal and regulatory underpinnings. The result is excessive delay, failed trades, and substantial duplication of system capabilities. These inefficiencies are costly to users of clearing and settlement services, to investors and issuers active in international markets, and, to the extent that trading activity is discouraged, to the economy as a whole.

In addition to the costs involved, this imperfect network is subject to shocks—an unexpected surge in market activity, a major technical failure, or an external disruption such as the terrorist attack on the World Trade Center in New York on September 11, 2001. Although the system has proven very resilient, the cost and disruption arising from loss of clearing and settlement functions can be profound, especially if accompanied by other financial disruptions.

> Although largely invisible to the end investor, clearing and settlement lie at the core of all securities markets.

Inefficiencies and risks in the clearing and settlement process were a concern well before cross-border trading began its rapid growth. The 1989 Group of Thirty study "Clearance and Settlement Systems in the World's Securities Markets" made nine recommendations for reducing risk and strengthening national systems, now largely adopted. Authoritative guidance in this area was most recently issued in November 2001 by a joint task force of the Committee on Payments and Settlements Systems of the Group of Ten central banks (CPSS) and the International Organization of Securities Commissions (IOSCO).

BOX 1-1. INTEROPERABILITY

As used in this report, *interoperability* refers to the ability of participants along the clearing and settlement value chain to communicate and work with service providers and other participants without special effort on the part of users. Interoperability involves more than technical compatibility of systems, although standardized communication, messaging, data, and timing are clearly essential. The ability of systems to interoperate also requires like or compatible processes, business practices, controls, technologies, products, access arrangements, and fee structures. The recommendations in this report aim at creating the potential for interoperability. Its full realization will require implementation and consistent use of technical, market practice, risk control, system access, and other standards within and between connected entities, enforced though economic, regulatory, or other means.

The benefits of interoperability can be seen in many other industries that have evolved to meet the needs of users operating across borders or systems.

- National standardization of railway track gauges in the United States in the late 19th century eliminated manual switching between systems, making commercial rail transport much faster and cheaper and triggering a major expansion in system use and interstate trade.
- National aviation authorities, through the International Civil Aviation Organization, have adopted standards for automation of air traffic control services, protocols for use of the global navigation satellite system, and controller-pilot data link communications that have significantly reduced the risk of human error and expanded system capacity.
- Through the standard setting of the International Telecommunications Union, almost all telephone calls today require no intervention by anyone other than the caller, whether they are within a particular network or across many networks, and whether they are fixed line or mobile. Combined with expanded competition, which interoperability has promoted, the cost of cross-network calls has fallen dramatically. For example, from 1995 to 2000, the average cost of calls from Switzerland to the United States fell from 74 cents to 7 cents a minute, while the price of Swiss domestic calls dropped only from 5 cents to 4 cents a minute.

Source: International Telecommunications Union, "Interconnection Regulation," *Trends in Telecommunications Reform 2000-2001,* 3rd ed., Geneva. 2000.

Despite the excellent work that has been done in this area, some of the more intractable legal and operational concerns identified more than a decade ago remain unresolved, while new issues continue to arise. The Group of Thirty therefore decided to commission an updated assessment of clearing and settling arrangements to address the new challenges. A Steering Committee was recruited to conduct this assessment. Its starting point was a survey of participants in all phases of the clearing and settlement process to evaluate their level of concern and determine the scope for further work. The survey, undertaken by PricewaterhouseCoopers on behalf of the Group of Thirty, identified five broad areas of concern:

- Access barriers to markets and services that limit effective competition.
- Lack of interoperability and connectivity that prevent the seamless flow of transactions and messages among market participants across different clearing and settlement systems.
- Continuing deficiencies in the basic clearing and settlement model, including traditional concerns over finality of transfer and reliance on paper and manual processes.
- Concerns about risk management, including business continuity and disaster recovery (later underscored by the events of September 11), and the limitations of risk mitigation techniques, such as the effectiveness of collateral in cross-border trades.

- The impact of complex asset servicing requirements on clearing and settlement, including activities such as recording dividends and exercising voting rights (known collectively as corporate actions), tax relief arrangements, and restrictions on foreign ownership.

The survey indicated a high degree of consensus on the need for further work in the five priority areas and the benefits available from the Group of Thirty's renewed attention to these matters.

The areas of recommendation focus on clearing and settlement of debt instruments and equities rather than derivatives, although many of the improvements proposed will benefit derivatives as well. Similarly, the recommendations address the "street" side of clearing and settlement: that is, improvements affecting service providers and intermediaries rather than investor clients. Although the report does not address the "client" side of the securities business, development of comprehensive common standards for electronic processing and messaging in client business would greatly reduce internal costs for market participants by eliminating the use of telephone, fax, and disparate electronic messaging systems for trade comparison and confirmation.

WHAT IS THE COST OF INEFFICIENCY?

The current system for settling cross-border trades is significantly less efficient than it could be. Many comparisons of costs from system to system have been made; although there is much debate over methodology, numerous studies have indicated that the cost of settlement may differ by as much as a factor of eight between trades cross-border in the European Union and the United States, and that cross-border trades are considerably more expensive than domestic ones.[1] In addition, to cope with the range of clearing and settlement entities and their unique operating systems, broker-dealers and other financial intermediaries are installing duplicative systems and implementing more extensive risk management processes, thereby increasing their internal costs. A related cost is the use of local custodians and agents to cope with the specific requirements of local markets, an expensive practice sometimes mandated by local law or regulation. While this variety is unlikely ever to be eliminated, it is usually asserted that the greatest scope for efficiency gains lies in streamlining these areas of duplication at financial intermediaries.

> The lack of global technical standards, differing business processes, and inconsistent legal and regulatory underpinnings are impeding the C&S process.

To test these assertions, a limited number of large, international broker-dealers and custodian banks were asked to provide their "fully loaded" annual costs of clearing and settlement in connection with major markets, including all development and day-to-day running costs, along with relevant market share data.[2] PricewaterhouseCoopers collated and extrapolated from this source data to project a total industry cost. Although such an analysis has many inherent limitations, it yielded reasonable "order of magnitude" estimation of overall clearing and settlement costs that, if anything, are likely to err on the conservative side.[3] The result very plainly supports the view that internal expenditure at the level of intermediaries makes

1. See footnote 3 in the executive summary.
2. Major markets for this purpose were taken to include equity and fixed-income securities markets in the United States, Canada, members of the European Union, Switzerland, Japan, Hong Kong, Singapore, and Australia.
3. By using fully loaded costs, aggregation and averaging of the results should help to smooth out variances caused by organizations at different stages of the system development life cycle. Costs paid to other organizations in the value chain (such as broker-dealer payments to custodians, central securities depositories, and central counterparties) were excluded to reduce the risk of double counting. It is clear that organizations are managed and structured on differing bases, and so measure costs and market share accordingly. Thus, while participants were able to provide estimates of costs and market share, it must be recognized that this survey was not intended to be precise. Surveying the costs of large organizations is likely to underestimate overall industry costs because such firms enjoy economies of scale compared with smaller organizations. Conversely, large organizations typically undertake a disproportionate amount of cross-border trading, which is inherently more expensive and so is likely to offset any distortions caused by scale economies.

up the clear majority of overall clearing and settlement costs—on the order of $10 billion a year, compared with approximately $2.5 billion in costs incurred by the organizations that provide the actual clearing and settlement infrastructure—and this estimate ignores the cost of working capital tied up in the various systems.

Thus, standardization and streamlining of processing could offer considerable savings. An analysis undertaken by Oxford Economic Research Associates (OXERA) for this project examined the level of competition along the clearing and settlement value chain and concluded that the majority of these savings, including reduced back-office processing costs at intermediaries, would likely accrue to end investors in and issuers of securities. Moreover, high transaction costs and complexity in cross-border trading depress the level of trading activity and discourage efficient diversification of portfolio investment (such as pensions) across borders. A more efficient system with lower costs would encourage growth of cross-border transactions and related economic activity, with potentially substantial public benefit.

A more efficient system with lower costs would encourage growth of cross-border transactions and related economic activity, with potentially substantial public benefit.

Of course, it is the overall cost-benefit calculation for any changes proposed that must be considered. Additional costs clearly will be involved in developing and adopting new technical standards and business practices, and these one-time costs could be quite substantial. These costs represent an investment in a global network, the ultimate cost of which will depend importantly on the speed with which new standards are introduced. The report argues for phasing in new standards in line with cycles for obsolescence and replacement of software and systems—perhaps five to seven years—a strategy that should contain additional costs. Once the reforms are in place, the return on investment will be a reduction in the unit cost of transactions for a large range of participants, and an increase in trading activity.

HOW GREAT ARE THE RISKS IN THE SYSTEM?

Risk is a significant concern in any analysis of clearing and settlement systems because of the interrelated credit, market, liquidity, operational, and legal risks that come into play and the fact that, while generally of short duration, the value of transactions involved is almost always very large. Moreover, because of the highly interdependent movement of cash and securities, sometimes including foreign-exchange transactions, a problem in one part of the clearing and settlement process can have a serious adverse effect on other parts of the financial system.

In considering the risk proposals in this report, it is important to recognize that providers of clearing and settlement services, users of those services, and the regulatory community have pursued significant initiatives to strengthen safety and stability over the last decade. These efforts have already produced substantial gains in the major markets and the recommendations should be viewed as an effort to raise the bar still higher in view of the critical nature of the activities being undertaken.

Our research indicates widespread belief that the risks involved in clearing and settlement, including the risk and associated cost of a systemic disruption, are unacceptably high. And the substantial concern about risk revealed by our survey did not factor in the horror of the September 11 terrorist attack and its impact on Wall Street. From long experience, both market practitioners and public officials know that things can go very wrong in markets very quickly, and a scenario in which a major shock could lead to critical failure is not difficult to imagine.

There is also every reason to believe that future developments in international markets will be even more challenging. Risk will rise with the increase of cross-border trading because of the many connections involved, each introducing some level of uncertainty and greatly complicating risk assessment in crisis situations. The contagion risk phenomenon is likely to increase further as the global system becomes more concentrated, with fewer and larger global firms and settlement entities.

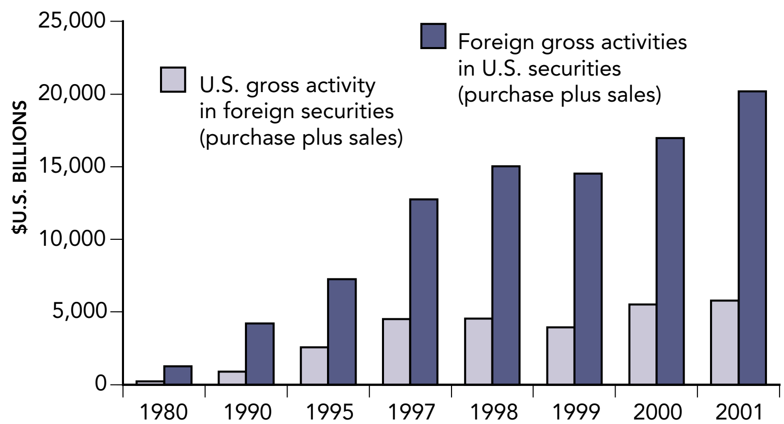
WHY FOCUS ON CROSS-BORDER CLEARING AND SETTLEMENT?

The survey results underscored the sentiment among members of the project Steering Committee that many of the problems so far unaddressed are concentrated in the cross-border arena. Cross-border transactions are a particular challenge because of the complexity of moving from system to system and across legal jurisdictions. The legacy of national systems and the reality of national borders means that this range of interactions tends to be duplicated for each country or market. Settling the cash leg of the transaction brings payment systems and foreign-exchange markets into play, multiplying the range of interactions further. Local agents or custodians are employed to deal with the specific financial, operational, technical, and legal characteristics of the various systems involved. Thus, the clearing and settlement of cross-border trades can be accomplished only through a technically complex process involving links through many and varied institutions and almost certainly featuring different business practices, regulatory approaches, and legal concepts, all of which introduce both cost and risk into the system.

These issues have not been addressed systematically, and there is little authoritative guidance on them. Clearly, no single authority, public or private, can dictate the terms of cross-border transactions or the manner in which they will be cleared and settled. Nor does any global authority, even of a cooperative nature, exist to address them comprehensively. In these circumstances, elaboration of technical standards and best practices appears to be the best, and possibly the only, way to make progress in the cross-border arena.

Alongside questions of cost, risk, and oversight is the issue of scale: cross-border trading has grown dramatically. As an example, figure 1-1 indicates that in 20 years U.S. gross activity (both purchases and sales) in foreign securities grew nearly a hundred-fold, from just $53 billion in 1980 to nearly $5.1 trillion in 2001. Foreign gross activity in U.S. securities increased more than a hundred-fold, from $198 billion in 1980 to $20 trillion in 2001.

FIGURE 1-1. U.S. ACTIVITY IN FOREIGN SECURITIES VERSUS FOREIGN ACTIVITY IN U.S. SECURITIES,1980-2001



SOURCE: Securities Industry Association, "Key Trends in the Securities Industry, 2001" (www.sia.com/publications/html/trends_during_1990s.html).

Data from the International Monetary Fund also indicate a significant increase during the 1990s in holdings of foreign equities as a share of household financial assets in other industrial countries.[4] The share of total household financial assets represented by foreign portfolio equity holdings ranged from under 2 percent in Japan to nearly 12 percent in the United Kingdom at the end of the period, reflecting an increase of more than 40 percent in Japan, 60 percent in France (to 3 percent), and more than 90 percent in Germany (to 7 percent). In the United States, nearly 5 percent of total household financial assets were made up of foreign equities, a 78 percent increase over the period.

This trend is expected to continue, particularly in the Eurozone where securities are now denominated in a single currency, but also in other markets where investors are seeking global diversification for their

4. International Monetary Fund, *World Economic Outlook, 2001,* Washington.

portfolios and issuers are seeking access to wider and larger pools of capital.

HOW CAN THESE CHALLENGES BE ADDRESSED?

In light of this analysis, the Steering Committee set twin goals for reforming the global system: to pursue the maximum attainable level of efficiency in clearance and settlement arrangements, consistent with still higher levels of systemic safety and stability. From these goals flow recommendations for a system quite different from the status quo. The amount of change needed to achieve consistently safe and efficient performance on a global basis is substantial: the problem is extremely complicated, and there are no simple fixes. Because change in one system or market segment will not yield the promised benefits unless all systems and segments change as well, the proposed changes must be pursued comprehensively.

The Steering Committee set twin goals for reforming the global system: to pursue the maximum attainable level of efficiency, consistent with still higher levels of systemic safety and stability.

The result would be a strengthened and widely accessible global network with lower unit-costs of trading and post-trade processing, greater liquidity, and reduced risk to individual institutions and to the overall system. Our proposals for reform include twenty recommendations in three areas of reform.

- ***Building a strengthened, interoperable global network*** by strengthening and streamlining the basic clearing and settlement model, making clearance and settlement systems fully interoperable, and permitting any qualified user access to systems and services on fair and transparent terms (for more on interoperability, see box 1-1). The justification and detail for these recommendations are set out in chapter 3.
- ***Mitigating risk*** by ensuring that clearing and settlement systems and their major users have the financial strength, risk management expertise, operational reliability, and supportive legal and regulatory frameworks to confront the risk management challenges that arise. Given the potential for shocks, heavy emphasis is laid on contingency planning for business continuity and disaster recovery. These recommendations are discussed in chapter 4.
- ***Improving governance*** by strengthening private boards in pursuit of the agenda proposed in this study and by providing consistent regulation and oversight by public authorities. These recommendations are discussed in chapter 5.

Although specific governance recommendations are few in number, it should be recognized that the principal challenges in this report are aimed at the boards and management of service providers and their users in certain cases, and at the public authorities that oversee them. Creating the conditions for interoperability of systems and ensuring access to systems and services for all qualified users—both missing from existing clearing and settlement arrangements—are fundamental to competitiveness and reform and new in this report.

In framing the recommendations in each of these areas, the Steering Committee has borne in mind the aspirations expressed by industry respondents to a survey undertaken by PricewaterhouseCoopers for this study. They called for a report that would offer a clear vision for the future of global clearing and settlement arrangements based on best market practice. Where a sound standard already exists in a critical area, they asked that the report endorse it; but where additional guidance is provided, they asked that it be articulated with sufficient specificity to stipulate best practice without ambiguity. All proposals should be practical, but those that are less than optimal should specify the reasons why, while areas in which longer-term changes in law or regulation are also required should specify the needed changes. Finally, to the extent possible, recommendations should include guidance on how they should be implemented and subsequently enforced. True to this mandate, the recommendations in this report are carefully considered and offer a comprehensive and demanding agenda for change.

The report addresses the challenge first by describing the current state of the system in chapter 2. Chapters 3, 4, and 5 then examine how to build an efficient, interoperable global network for clearing and settlement; how to strengthen the safety and stability of that framework; and how to improve governance as the driver for the changes proposed. The recommendations in each area are distributed throughout the chapters. Given the complexity of implementing the full range of recommendations, the next steps for bringing them to fruition are discussed in chapter 6. Further detail on selected recommendations is provided in appendix 1, while the extensive work program associated with the study is described in the Appendix 2.

2. THE CURRENT STATE OF AFFAIRS

THE CLEARING AND SETTLEMENT PROCESS BEGINS AFTER A TRADE IS EXECUTED; it ends with the final and irrevocable transfer of value between the counterparties to the transaction. Clearing, the first half of the process, encompasses all procedures necessary to determine the obligations of a direct market participant, such as a broker-dealer, to deliver securities or funds once a trade is executed. This part of the process includes recording the key information related to a trade so that the counterparties can agree on its terms, matching and confirming the trade details and the procedures for completing the transaction, and calculating settlement obligations. The settlement part of the process aims to ensure that cash is delivered if and only if securities are delivered and to do so with finality: that is, when the transfer or pledge is irrevocable and unconditional. This overall objective is usually referred to as delivery versus payment, or DvP.

The objective is to complete the overall clearing and settlement process with speed and certainty so as to minimize the credit exposures faced by the counterparties and service providers while trades are still unsettled. Speed and certainty also help maximize the efficiency benefits to be gained from processing large volumes at high speeds, while minimizing the number of expensive failed trades.

A VARIETY OF SERVICE PROVIDERS

To understand the recommendations for changing clearing and settlement arrangements, it is useful first to understand the component parts of the system. The clearance function can be performed by a clearinghouse—usually a central counterparty (CCP), a central securities depository (CSD), or an international central securities depository (ICSD). CCPs can provide not only the clearing function, but they go a step further by legally interposing themselves as counterparty to both buyers and sellers. This process is called novation; buyer and seller interact with the CCP and remain anonymous to one another. CCPs may also provide netting services that reduce risk exposures, thereby also reducing gross margin requirements and liquidity needs of qualifying institutions. A CSD or an ICSD can perform both clearance and settlement functions because it not only can facilitate the coordination and exchange of trade information between counterparties but also can hold securities and process change of ownership by book entry.

> The aim is to complete the overall C&S process with speed and certainty so as to minimize credit exposure for the relevant parties while trades are still unsettled.

In the settlement phase, the movement of securities (such as ownership transfer and bookkeeping) is done at the CSD or ICSD, while the movement of funds is usually accomplished through the banking or payments systems. A number of major securities settlement systems have "embedded" payment or funds-transfer systems that accomplish settlement,

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This chapter benefits from two recent reports on clearing and settlement: M. Guadamilla and R. H. Keppler, "Securities Clearance and Settlement Systems, A Guide to Best Practices," World Bank, Washington, 2001; and The Giovannini Group, "Cross-border Clearing and Settlement, Arrangements in the European Union," European Commission, Brussels, 2001.

whether in central bank or commercial bank money. A CSD or ICSD may hold securities owned by a party other than a member, thus requiring these nonmembers to interact with the CSD through an intermediary such as a custodian or a global custodian.

Custodians hold securities on behalf of their owners and provide asset servicing. Asset services may range from monitoring dividend receipts and interest payments, to filing information and claims with the relevant taxation authorities, to managing corporate actions such as voting and conversion rights relevant to owners of equities, where the provisions of company law in the country concerned may include requirements for trade reporting, disclosure of significant holdings, or foreign-ownership restrictions. Because custodians can deal with the specific financial, operational, technical, and legal characteristics of local systems, foreign investors normally employ local custodian banks as agents in the clearance and settlement process. Although these matters fall outside the time frame of clearing and settlement, they can have important implications for effective transfer and exercise of ownership, and lack of standardization and automation of these services is a serious efficiency concern.

Speed and certainty help maximize the efficiency benefits to be gained from processing large volumes at high speeds, while minimizing the number of expensive failed trades.

An emerging trend arising from cross-border trading is development of global custodians. Global custodians are usually members of many national CSDs or have access to membership through local subcustodian members of the relevant CSD. Because custodians are a vital intermediary in the provision of clearing and settlement services to end users, they must be part of any discussion of functional standards of performance.

BOX 2-1. SYSTEM COMPONENTS

Central counterparty (CCP) — An entity that is the buyer to every seller and seller to every buyer of a specified set of contracts, such as those executed on a particular exchange or trading system. CCPs legally interpose themselves as principal to each side of the transaction; some also offer a netting facility, whereby positions, obligations, or levels of exposure of trade parties are reduced by setting a participant's debits and credits off against each other, leaving a smaller net obligation.

Central securities depository (CSD) — A facility (or an institution) for holding securities, which enables securities transactions to be processed by book entry. Physical securities may be immobilized by the depository, or securities may be dematerialized (so that they exist only as electronic records). In addition to safekeeping, a central securities depository may incorporate comparison, clearing, and settlement functions (without acting as a CCP) and provide services related to corporate actions.

International central securities depository (ICSD) — A central securities depository that clears and settles international securities or cross-border transactions in domestic securities, usually through local agents or direct links to local CSDs. The distinction between ICSDs and local CSDs is blurring as ICSDs merge with local CSDs (for example, Euroclear and Sicovam; Cedel and DKV into Clearstream) and local CSDs offer cross-border settlement.

Custodian — An entity, often a bank, that provides safekeeping and administers securities for its customers and that may provide other services, including clearance and settlement, cash management, foreign exchange, securities lending, corporate actions, and tax relief arrangements.

Global custodian — A custodian that provides its customers with custody services for securities traded and settled not only in the country in which the custodian is located but also in numerous other countries throughout the world.

Based on CPSS-IOSCO definitions.

The final category of players is the members and users of the CCPs and CSDs (a category that generally includes custodians) who influence strategic decisionmaking within these entities, whose own efficiency as users affects overall efficiency, and whose access creates risk exposures in both directions. The level of risk is a function both of the size of these intermediaries and the extent of their access to the entity on behalf of themselves, their customers, and other indirect participants.

THE CHALLENGE OF CROSS-BORDER TRADING

Not surprisingly, the complexity of the clearing and settlement process is directly related to the number of actors involved. Of necessity, therefore, the level of complexity rises substantially as the process extends across borders. Although not every country has a CCP, the typical pattern is a single CCP and a single CSD in each market so any cross-border trade requires interaction with a duplicate set of institutions and actors for each market or country the trade affects.

As securities trading strategies expand on a global basis, the complexities of cross-border clearance and settlement will be further magnified in proportion to the number of (I)CSDs, global custodians, and so forth introduced into the process. More foreign-exchange settlement risk, legal risk, and custody risks will be introduced into the process; operational risk will rise with mismatches in technology, communication methods, and business practices; and there will be more opportunities for exposure to credit risk from participants whose financial standing will be difficult to verify.

Clearing and settlement service providers have had to adapt continuously to the changing demands of the marketplace—growing volumes, new instruments, electronic trading, and improved backup and security arrangements. In all these areas, boards and management of service providers have been very responsive to the needs of users. Yet the response to rapidly expanding cross-border activity has so far been limited. With the exception of Euroclear and Clearstream in Europe (which were established to serve and until recently dealt almost exclusively in debt instruments in the Eurobond market), most clearing and settlement entities were established to deal principally with domestic business, subject to national regulatory and legal arrangements, and the focus of their business models and governance remains domestic. Even in the European Union, where a single economic market is an overriding objective of public policy, the pan-EU investor must contend with highly fragmented infrastructure for equities, including nine CSDs and two ICSDs. A number of factors underlie this inertia regarding the cross-border challenges:

- ***There has been little sensitivity to cost in pursuing cross-border business.*** At least until recently, the appetite for portfolio diversification through growing cross-border business has been such that the high cost of clearing, settlement, and custody services has been absorbed relatively uncritically. Moreover, relatively little attention has been paid to associated internal costs.
- ***International agreement on key operational and technical standards and consistency of regulatory and legal approaches required for building cross-border infrastructure is difficult.*** Pursuing solutions to these challenges is costly and complex and unlikely to be pursued without reasonable assurance of success.
- ***Infrastructure providers have faced limited competitive pressure and have few incentives to support change in the cross-border arena.*** Limited competition, relatively high barriers to entry, and some explicit market protection measures, which may be represented as in the national public interest, have provided little inducement to pursue costly investment in cross-border infrastructure. Because standardization risks loss of franchise value while consolidation to achieve scale economies risks erosion of autonomy, the fiduciary responsibility of board members to shareholders may argue against improved cross-border service for

their customers. In the EU, the public listing of exchanges such as in France (Euronext) and Germany (Deutsche Börse), both of which have substantial ownership interests in the clearing and settlement process, will sharpen attention to shareholder value.

- ***Cross-border clearing has worked well enough, and there has been no crisis to motivate reform.*** Despite rapid growth of cross-border business, market infrastructure has experienced no serious breakdown.

In the chapters that follow, a program for tackling the complex challenges described above is set out. Pursuing it will require that private boards and management, in the first instance, overcome inertia and carry the program forward.

3. BUILDING AN EFFICIENT, INTEROPERABLE NETWORK

EFFICIENT CLEARING AND SETTLEMENT SYSTEMS ARE NEEDED, on the one hand, to reduce risks by achieving finality as quickly as possible and on the other hand, to minimize the costs of using and operating systems. In both cases the beneficiaries are the same: service providers, intermediaries, issuers, investors, and ultimately, the broader economy.

The clearing and settlement infrastructure outlined in chapter 2 has been shaped by three main factors: the needs and demands of users (which have at times changed dramatically and quickly, following stresses or shocks to the financial system); the technology and communications capabilities available; and the innovation of service providers and intermediaries in utilizing those technologies to meet users' needs.

Perhaps the most persistent factor has been the constant evolution of technological capabilities. In the past, most securities markets operated by physically transferring paper securities from one owner to another over a relatively prolonged settlement cycle. In some markets, the paper transfer had to be supplemented by an entry registering the transfer before the new owner could exercise the full rights of ownership. In other markets, a system of bearer securities meant that all the ownership rights were acquired with the physical transfer of the security certificate. As market volumes increased, the limitations of paper-based and manual processing became increasingly clear. User pressure to increase efficiency and reduce risk of securities processing has led the industry to adopt various technological tools as they have become available to create new and more effective services and means of delivery.

The Group of Thirty, in its 1989 report, encouraged movement toward an automated, paperless environment, with settlement on a delivery versus payment basis, so that settlement cycles could be shortened. The result has been DvP settlement effected on a T+3 basis (within three days after the trade), or shorter in some cases, by electronic book entry through CSDs; this has become the standard way in which securities transactions are settled in all developed securities markets. This development has largely eliminated paper stock certificates themselves from the process (although not many other paper-based transaction elements and in many markets retail investors are still able to hold paper stock certificates); it also has unquestionably had a dramatic impact on the efficiency and safety with which securities markets operate. Indeed, given the huge increases in the volume of securities traded, any unautomated alternative to this system of clearing and settlement would be impractical.

> Many groups would benefit from building an efficient C&S system: service providers, intermediaries, issuers, investors, and ultimately, the broader economy.

Although technological and communications progress has been made, the increasing demand for cross-border trading has raised new challenges to efficiency. Clearing and settlement infrastructure has evolved, quite understandably, to meet the needs of users focused mainly on domestic markets. That focus cannot attain the full measure of efficiency and effectiveness for international securities transactions that could be achieved if domestic systems in different countries were effectively linked in a well-functioning global network.

STRENGTHENING THE GLOBAL NETWORK

An essential element in building an efficient global infrastructure is to encourage the emergence of stronger providers of clearing and settlement services, including both CCPs and matching utilities where they do not now exist.[1] These stronger service providers could take a number of forms: providing functionality exclusively for clearing, typically in the form of a central counterparty; providing functionality exclusively for settlement, with or without a supporting custodial capability; or providing functionality that combines clearing and settlement. There is no inherent reason to favor one structure over another or to specify the lines of business in which any entity may engage as long as risk disciplines are calibrated to the risks taken and users have fair access to select the mix of products they want at a fair price. Thus, the report and recommendations focus on strengthened, standardized clearing and settlement functions, and the Steering Committee does not advocate any particular organizational model for CCPs, CSDs, or any other provider of centralized services.

The underlying principle in this report is that market forces should be relied upon to produce the optimal organizational solution.

The underlying principle in this report is that market forces should be relied upon to produce the optimal organizational solution. This is possible, of course, only if market forces are allowed to operate. The recommendations to improve governance in chapter 5 directly address restrictions in national law or regulation that can distort competition, act as barriers to entry, or encourage anticompetitive practices. Users should not be excluded from or tied into services through law, regulation, market practices, or other means, other than through objective and consistently applied processes solely designed to mitigate risk or enhance systemic safety.

The analysis that underlies the recommendations contained in this report is founded on a functional assessment of the current state of clearing and settlement arrangements. Therefore, while the recommendations will be implemented through the actions of specific organizations (private firms and public institutions, either individually or collectively), the recommendations that apply to a particular organization should be determined by what it does and the associated risks rather than by its legal, regulatory, or other status. As a general principle, if two organizations provide comparable services—such as the similar services offered by an (I)CSD and a global custodian—then a recommendation made in connection with those services should generally apply to both.

The recommendations use collective terms to address certain groups of organizations that are invited to take primary responsibility for implementation. It is impractical to define precisely and comprehensively each specific organization included within each particular term, as the activities undertaken by individual organizations and the market structures vary between jurisdictions, but box 3-1 offers some terms as guidance.

THE CASE FOR INTEROPERABILITY

Promoting competition and innovation is not simply a matter of removing specific barriers, but also of creating compatible systems that permit seamless operations on a global basis. Despite significant progress in automating the clearing and settlement process over the past 20 years, it remains operationally and organizationally complex. Arrangements vary significantly from market to market, and cross-border processing is particularly convoluted. In some cases, payment involves a different currency from that in which the underlying security is denominated, a factor that introduces a foreign-exchange dimension into the process.

Moreover, securities are subject to a variety of corporate actions—including payment of dividends or coupons, restructurings, and voting and conversion rights—governed by the provisions of company law in the country concerned. These often require the owner to comply with particular rules that relate to trade reporting.

1. Matching utilities are automated systems through which financial intermediaries and agents for institutional investors match and thereby confirm trade and settlement details.

Such matters can complicate the transfer of ownership rights to the instruments and hence their clearing and settlement. Further, tax treatment for different classes of owners of securities may differ from country to country, requiring the filing of information and claims with the relevant taxation authorities. Likewise, foreign-ownership restrictions may require special filings or limit certain actions involving an instrument. As a result of this complexity, the degree of overhead and cost associated with settling a securities trade is still significantly higher than, for example, the cost of processing a cash payment or a foreign-exchange transaction.

Furthermore, because of the close link between clearing and settlement and the trading of securities, particularly for equities, CSDs and CCPs have typically been established as part of, or closely aligned to, national stock exchanges. Thus, they have been designed to comply with the laws, regulations, and market practices governing securities transactions in the particular jurisdictions with which they are aligned. As a result, clearing and settlement conventions and structures differ materially from country to country. A transaction involving securities that settle in different countries or through more than one CSD or CCP therefore involve an added layer of cost and complexity. By the same token, financial intermediaries that seek to provide international securities clearing and settlement services to their customers either must develop the capability to transact and settle in each of the underlying markets and become members of the local CSDs and CCPs themselves, or they must subcontract the activity to an agent who has that capability and is able to undertake the activity on their behalf. The use of local agents, together with the already large number of global intermediaries, creates an elaborate web of relationships among organizations, with no standards to define how they should connect and interact.

The recommendations offered here to address inefficient and costly market practices and technical and network standards can be divided into two categories. These categories may be broadly defined as measures necessary to build a strengthened and interoperable global network, and measures to enhance services delivered across the network.

As discussed in chapter 1, interoperability refers to the ability of entities along the clearing and settlement processing chain to communicate and work with other entities without special effort on the part of users. Interoperability involves more than technical compatibility of systems, although standardized communication, messaging, data, and timing are clearly essential. The ability of systems to interoperate also requires like or compatible processes, business practices, controls, technologies, products, fee structures, and the like.

With all these elements in place, interoperability offers the potential for processing of transactions without human intervention, for simpler and cheaper back-office operations, for greater competition between providers and systems, and for integration and consolidation of service providers. The market will determine the extent of change that occurs, although creating full compatibility between entities implies a level of cooperation not often seen between competing entities.

Achieving interoperability is a critical issue in securities processing because of the multiple paths along which clearing and settlement systems have developed and the lack of common standards to bridge their differences. The resulting "many to many" relationships are costly, reflecting maintenance of multiple interfaces, duplicate system development, and increased training requirements. There are also indirect costs, for example, in connection with funding (collateral and margin requirements and working capital), with regulatory compliance, and with the investigation and resolution of errors. Interoperability would reduce these costs because users would interact with a number of systems as if they were interacting with only one.

Interoperability is a significant factor in the proposed solution to many issues.

Creating the potential for interoperability requires the development and introduction of a wide-ranging set of standards, covering technical, market practice, risk control, system access, and other commercial and economic features. Establishing full interoperability requires implementation and consistent use of those standards within and between connected entities, enforced through economic, regulatory, or other means.

BOX 3-1. PARTICIPANTS IN THE CLEARING AND SETTLEMENT PROCESS

Several categories of participants figure prominently in the recommendations and are important to their implementation:

- *Financial intermediaries* are those organizations that facilitate a financial transaction between end-user issuers and investors. They can broadly be categorized between broker-dealers (or stockbrokers) and custodian-agent banks. Within these broad categories there is clearly a wide range, from small domestically focused operations to very large global organizations.
- *Infrastructure providers* are the operators of securities clearing and settlement systems or networks. They include (I)CSDs, CCPs, and—where relevant to the particular recommendation—payment, communications network, or other systems that are integral to the clearing and settlement process.
- *Providers of clearing and settlement services* ("service providers") include infrastructure providers as well as those financial intermediaries that provide clearing and/or settlement services to their particular clients, although not to the industry collectively.
- The term *market participants* is used broadly and collectively and embraces infrastructure providers and financial intermediaries, together with end-user issuers, investors, and other organizations that undertake securities-transaction–related processes, such as registrars and transfer agents.
- *Systemically important institutions* are those market participants whose operational or financial failure has the potential to cause other organizations to fail and so to spread contagion through the entire financial system. In any particular market, infrastructure providers and particularly large or strategically important financial intermediaries are likely to be classed as systemically important.

Monitoring and governance of the processes for developing and setting standards are clearly critical and must ensure fair representation for all relevant stakeholders; this will help build consensus around practical and workable standards. These standards should be open and able to evolve, so that they do not inhibit innovation or competition. They should be clear and unambiguous, so that they can be used in a consistent manner. And they should be both enforceable and enforced.

This report argues for implementation of full interoperability across all significant entities over a five-to-seven-year time horizon. Some of the standards that collectively create the potential for interoperability can be implemented in a shorter period. Standardization of individual elements of the process—for example, consistent message standards and communication protocols—will bring definable benefits, even if the overall benefits of full interoperability will eventually be greater than the sum of these parts. On this basis, development and use of each particular standard should be pursued as quickly as prudently possible and should not be delayed by the time frame of any other standard unless critical dependencies exist.

Interoperability is central to meeting the broad areas of concern identified by the PricewaterhouseCoopers survey described in chapter 1. As well as being one of the five key areas identified, interoperability is a significant factor in the proposed solution to many issues. The costs to users of switching between interoperable service providers would be lower, helping to remove a barrier to access and competition. Interoperability would likely facilitate the standardization and automation of additional processes; asset servicing is an important area in this regard. The Steering Committee has found broad consensus among market participants for streamlining their internal processes, in particular, by eliminating manual processing and avoiding duplicative systems and procedures necessary to interact with multiple and incompatible clearing and settlement service providers.

IMPROVING THE EFFECTIVENESS OF ALL SYSTEMS

Efficient clearing and settlement systems require users to be able to communicate and interact seamlessly. In domestic markets, eliminating paper (for example, through the creation of CSDs) and automating communication (for example, through dedicated networks) have been a continuing focus. Major markets have eliminated use of paper securities certificates themselves, either through immobilization of securities certificates in depositories so that transfers can take place in electronic form, or by eliminating certificates all together through dematerialization. Many processes even in these markets still generate paper records, such as those related to voice and fax communications. The Steering Committee recommends that these be eliminated and sees no reasonable grounds for delay.

RECOMMENDATION 1. ELIMINATE PAPER AND AUTOMATE COMMUNICATION, DATA CAPTURE, AND ENRICHMENT.

Infrastructure providers and relevant public authorities should work with issuers and securities industry participants to eliminate the issuance, use, transfer, and retention of paper securities certificates without delay. Such action should be subject to proper investor protection over assets held in electronic form. There is no greater assurance of ownership or control from maintaining paper, and it should be possible to overcome the contrary perceptions of some retail investors through education and by ensuring a sound legal basis for all paperless securities in each jurisdiction. Dematerialization of securities certificates—converting all paper ownership records into electronic format—is the preferred solution. However, in practice immobilization—where ownership is recorded through electronic book entry and the underlying paper certificate is kept in a central security depository—realizes many of the benefits of dematerialization. Therefore, if immobilization can be achieved more quickly and efficiently than dematerialization, it is an acceptable step on the way to full dematerialization.

All market participants should seek to automate elements of the process that introduce other forms of paper, such as confirmations and trade allocations, into the securities processing transaction flow as available technology safely allows, from issuance through to asset servicing. Means of electronic capture, storage, and transmission of documents should be used to their fullest extent to avoid the need for physical documents to serve as evidence of transactional activities and asset ownership.

All market participants should use electronic communication to transmit information for all instruments and transactions types. Market participants should identify opportunities to streamline processes by avoiding duplicative recording of data and manual addition of supplementary information. This recommendation applies to each stage of the value chain, from issuance through to trading, clearing, settlement, and asset servicing, including confirmations, allocations, and rights and decisions related to asset ownership. Electronic communication and avoidance of repetitive or manual recording and enrichment of data among all participants are essential building blocks in achieving a zero-intervention process. Technology to address these two aspects of processing should be fully utilized.

CREATING CONNECTIVITY AND INTEROPERABILITY

Creating an effective network at a global level requires connectivity and interoperability between different markets and systems. Achieving interoperability requires standardization of the technical specifications and market practices that embody the mechanics of systems and networks. These recommendations thus focus on establishing a series of standards in the most critical areas of the clearing and settlement network.

RECOMMENDATION 2. HARMONIZE MESSAGING STANDARDS AND COMMUNICATION PROTOCOLS.

All market participants should adopt ISO 15022 (the data field dictionary and message catalogue for securities information flows) as the global standard for straight-through securities messaging across the entire securities life cycle.[2] Over time, XML (extensible mark-up language) should become the language to describe standardized messages.[3] Market participants should follow the road map set out by the ISO working group established to advance ISO 15022 to a standardized use of XML. This standard should develop to meet the needs of all parties to the investment product life cycle and, in particular, the asset servicing requirements of the industry. All stakeholders in the securities industry should be appropriately represented in the standard development process.

All market participants should support and use communication networks that adopt open, standardized, IP-based protocols for securities transactions.[4] These standard internet protocols must embrace key attributes critical to the sending of messages related to securities transactions. Security, in particular, should be set at a level that satisfies business and regulatory requirements and that meets the needs of all stakeholders in the industry. Each network provider should clearly define and publish its plans to migrate from proprietary communication protocols to the open IP-based protocols.

RECOMMENDATION 3. DEVELOP AND IMPLEMENT REFERENCE DATA STANDARDS.

Market participants should collectively identify, develop, and adopt universal securities, counterparty, and relevant generic reference data standards that fully meet the needs of all relevant users. Such standards should be adopted in connection with:

- Asset identification and associated descriptive data, based upon ISO 6166 (concerning International Securities Identification Number, ISIN).
- Counterparty identification, exact account identification, and standard settlement instructions, based upon ISO 9362 (concerning Bank Identifier Code, BIC).
- Relevant generic data categories, such as fee, tax, and commission rates and other, typically country-specific, data (including currencies, local holidays, and time zones).

Standards should be comprehensive, covering the needs of all users in the securities value chain. They should also be applicable globally. Particular attention is required to address the concerns of jurisdictions where use of such standards is restricted for reasons of data confidentiality, secrecy, or other public policy purposes.

Issuers, exchanges, and other originators and distributors of data should make all relevant information available to the market in compliance with these standards for a fair price and on a timely basis. The development of standards is not in itself sufficient to avoid the very substantial inefficiencies and costs incurred through inaccurate, incomplete, or incompatible data. In addition, it is critical to enhance the substance and content of the data.

Extensive work is needed in connection with all three categories of reference data, and the time frame for ultimate adoption and use of standards will vary. As a first step the industry should set up working groups (or where initiatives are already under way, build upon or combine existing working groups) representative of all parties to the investment product life cycle, to identify the specific areas where standardization is needed. These industry groups should work with the relevant standard-setting bodies and data suppliers to establish a plan designed to achieve identified objectives in connection with these standards.

2. See footnote 5, page 8.
3. See footnote 6, page 8.
4. See footnote 7, page 8.

RECOMMENDATION 4. SYNCHRONIZE TIMING BETWEEN DIFFERENT CLEARING AND SETTLEMENT SYSTEMS AND ASSOCIATED PAYMENT AND FOREIGN-EXCHANGE SYSTEMS.

Providers of clearing and settlement services and linked or otherwise associated payment and foreign-exchange systems should collectively ensure that their design, procedures, operational timetables, and funding and cutoff times are such that the operation of one system does not materially reduce the efficiency or increase the risk of settlement in another. These organizations should collaborate to identify the specific areas where standardization is needed and to develop detailed plans to achieve it. Standardization should be implemented initially on a regional basis (broadly based on the Americas, Europe, and Asia-Pacific). Cross–time zone protocols should be established subsequently. Systems should allow transfers to and from securities settlement systems to be made in a timely manner. Periods of peak cash demand in separate systems should be carefully managed so that they do not clash with one another.

Market participants should work together to develop a comprehensive action plan to increase the efficiency and safety of cross-border securities transactions where the foreign-exchange settlement cycle is not synchronized with the securities settlement cycle. As yet, no fully developed solutions systematically address the costs and risks arising from the mismatch between securities and foreign-exchange settlement cycles in these circumstances. This issue will increase in importance as securities settlement cycles are shortened.

DELIVERING ENHANCED SERVICES OVER THE NETWORK

The recommendations outlined so far aim to help establish an effective international clearing and settlement network that allows infrastructure providers and intermediaries to better provide services that users require. Improvements have already been made at the domestic level to many stages of the securities processing value chain, but considerable scope remains for further automating and streamlining the system in certain areas, particularly (but not exclusively) in connection with cross-border transactions.

One area for improvement is institutional trade matching. Matching is the process whereby the parties to a trade agree on the details of the trade and the related settlement instructions. Much of the cost associated with clearing and settlement arises from the failure of these details to match. Broker-to-broker trades typically already use automated matching systems, and automated matching is unlikely to be practical for trades involving retail investors. Thus the opportunity for improvement lies with trades involving institutional investors. Greater use of matching utilities would help address this problem. With this facility, parties to a transaction could identify and correct problems with transaction details at an early stage in the settlement process, thereby reducing the number and costs associated with unmatched and failed trades.

RECOMMENDATION 5. AUTOMATE AND STANDARDIZE INSTITUTIONAL TRADE MATCHING.

Market participants should collectively develop and use fully compatible and industry-accepted technical and market-practice standards for the automated confirmation and agreement of institutional trade details on the day of the trade. The establishment and use of the matching utilities currently being developed and put into operation is an important part of this process, although many of the potential efficiency gains that they offer will not be realized without interoperability among separate systems. If the number of organizations providing these services grows, the inefficiencies that fragmentation and lack of standardization can create will increase.

> Promoting competition and innovation is not simply a matter of removing specific barriers, but also of creating compatible systems that permit seamless operations on a global basis.

At the clearing level, the key issue that the industry has to tackle is whether to establish CCPs. These have undoubted benefits in terms of reducing both cost and risk, but they are also costly to establish and maintain, and the cost-benefit equation will be different in each market. The Steering Committee expects that in most markets the benefits of using a CCP are likely to outweigh the expense, but does not consider it wise to prejudge the outcome of a full and thorough analysis in specific markets.

RECOMMENDATION 6. EXPAND THE USE OF CENTRAL COUNTERPARTIES.

> Market participants and relevant public institutions should collaborate to assess the potentially substantial risk reduction and efficiency improvements of using a central counterparty. These benefits are expected to outweigh their costs in most markets. Where this is so, market participants should seek either to use the services of an existing central counterparty or establish one of their own, whichever has the better risk, cost, and benefit profile. If more than one organization undertakes this function in a particular market or markets, each should follow harmonized and rigorous operational practices and standards, including those set out elsewhere in this report, so as to be fully interoperable, and each should follow consistent risk management practices as set out in Recommendation 9.

Securities lending and borrowing is a device used in many markets to expedite settlement where stock would otherwise be unavailable to meet settlement obligations. It brings considerable efficiency benefits, yet is not permitted in some markets.

RECOMMENDATION 7. PERMIT SECURITIES LENDING AND BORROWING TO EXPEDITE SETTLEMENT.

> Relevant authorities should permit securities lending and borrowing as a method for expediting the settlement of securities transactions. Each market should provide tax, legal, regulatory, and accounting frameworks to allow the use of stock lending and borrowing to prevent settlement failures. CSDs or other infrastructure providers, while not necessarily acting as principal to the transaction, should seek to develop functionality to allow stock lending and borrowing to be conducted efficiently by intermediaries and other users. This recommendation does not seek to eliminate restrictions in individual jurisdictions that prohibit stock lending and borrowing undertaken for reasons other than expediting settlement, such as transactions that facilitate short-selling.

Asset servicing is an often overlooked but critical part of the transaction value chain. Corporate actions remain an area with significant diversity of practices and widespread use of manual processes and paper, often as a result of legal, regulatory, and taxation requirements governing the ownership and of securities and associated rights.

RECOMMENDATION 8. AUTOMATE AND STANDARDIZE ASSET SERVICING PROCESSES, INCLUDING CORPORATE ACTIONS, TAX RELIEF ARRANGEMENTS, AND RESTRICTIONS ON FOREIGN OWNERSHIP.

> Issuers, providers of clearing and settlement services, and other relevant market participants should advise investors of all details of corporate actions that they require in an automated, timely manner and in compliance with accepted industry standards so that each investor can make a timely decision on the action to be taken with full knowledge of the facts. Each market place should protect the rights of the beneficial owner of a security to all corporate and income events from the point of execution of the purchase transaction in the relevant security. All corporate actions should be able to be executed through book entry transfer and/or payment systems, where such systems operate for the settlement of purchases and sales of securities. All communications through the value chain between issuer and beneficial owner should, as technology allows, be automated as set out in the relevant recommendation.
>
> Market participants and public authorities should work together to minimize the administrative costs to each party involved in tax relief arrangements through standardization and automation

of procedures and communication of information and through the use and acceptance of electronic data and documentation. This recommendation exclusively addresses the process of tax reclamation. It does not in any way seek to address the absolute levels of the taxes themselves.

Relevant public authorities, infrastructure providers, and market participants should work to harmonize and make transparent the processes, documentation, and communication of information in connection with foreign-ownership restrictions and reporting requirements. Full information needed to assess whether restrictions apply should be available to allow investors and intermediaries to make timely and appropriate decisions. For example, investors should be able to determine in advance of trade execution whether the trade will breach any limits. Reporting and disclosure responsibilities should also be transparent and should be able to be discharged through automated electronic communication.

4. ENSURING SAFETY AND STABILITY

CLEARING AND SETTLEMENT SYSTEMS INVOLVE AN INTERRELATED GROUP OF RISKS—credit, market, liquidity, operational, and legal—that are generally of short duration but almost always involve transaction values that are very large in size. Moreover, because of the highly interdependent movement of cash and securities (and other assets and instruments) associated with settlement systems, any event that poses a threat to achieving final settlement in one system is likely to have swift and serious implications for other systems. Contagion risk is likely to increase further as the systems become more concentrated globally, with fewer and larger settlement entities. In short, clearing and settlement systems are akin to the nervous system of the global financial system. As such, they present the classic policy dilemma of how best to manage situations that entail disturbances or shocks of relatively low probability but with the potential to cause serious, perhaps systemic, financial damage.

At one level, the role of clearing and settlement systems is quite straightforward: to ensure that the buyer of a security receives irrevocable delivery of that security from the seller at or near the precise point in time when the seller of the security receives from the buyer final and irrevocable payment for the security. But that apparent simplicity is deceiving, for the process itself is enormously complex and subject to sizable, if often subtle, risks. Achieving finality—and achieving it in the shortest time possible—is partly a matter of the financial, operational, and technical architecture of the particular settlement system.[1] But it is also a matter of the complex legal and regulatory characteristics of both the system and the underlying instruments that are being exchanged. While finality of such transactions is regularly achieved without the slightest hitch, this very regularity can give rise to a false sense of security, even complacency, about the reliability of all elements of such systems to function even under serious stress.

Broadly speaking, there are two modes of securities settlement. The first is the "gross settlement system," in which payment for and delivery of securities occurs transaction by transaction and almost simultaneously. A number of central banks operate real-time gross settlement systems for settling national government securities, with the exchange of cash and securities occurs virtually simultaneously on the books of the central bank. The central bank provides a de facto guarantee to the receiving bank that funds coming from the paying bank will be final—even if the paying bank is found to be insolvent minutes later. This, of course, is finality in purest form.

The second mode of securities settlement is the "net settlement" system. In this system, individual transactions accumulate at the settlement entity for varying periods of time (usually one business day, but sometimes for shorter intervals). At a specified time, the settlement entity nets the gross transactions

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The treatment of risk issues in this report relies heavily on a risk paper drafted by Gerald Corrigan, Managing Director, Goldman Sachs & Co., and further analysis by a working group of technical experts that he chaired.

1. Finality is achieved when a transfer or pledge of securities is irrevocable and unconditional.

among its members, with each member becoming a net deliverer or net recipient of cash and/or securities. The net cash settlement payments are made through preexisting payment facilities at banks or central banks. Although all net settlement systems have these general characteristics, the specific netting procedures may vary. For example, some systems have multiple net settlements during a single day in lieu of larger end-of-day net settlements. In other systems securities are transferred trade by trade while payments are netted, or both securities and cash are netted, with credit risk prior to finality addressed by various risk mitigation mechanisms.

Although the focus of this report is clearing and settlement of securities, the financial and operational integrity of these systems cannot be viewed independently of the financial and operational integrity of settlement systems more broadly. That is, if a major disturbance originates in foreign-exchange, commodity, over-the-counter derivative, or futures markets—especially if that disturbance is credit-related—the presence of essentially the same large counterparties across all such markets would likely mean that cash or securities destined for securities clearing systems might not get there, throwing into question the status of the securities systems settlement. In other words, even the very best of securities clearing and settlement systems are not insulated from problems originating elsewhere in the financial system.

This point takes on a special significance when one considers the specific nature of the risks associated with clearing and settlement systems. At the danger of great oversimplification, those risks can be grouped into four main categories.

- ***Credit and market risk***. The most dangerous risk inherent in all clearing and settlement systems is the risk of default by one or more system participants unable to complete settlement because of liquidity or solvency problems. Such a condition can arise for any number of specific reasons, and it is important to recognize that even the threat of such default will cause other participants and counterparties to take defensive actions that may have the unintended effect of aggravating the very problem that such actions are seeking to mitigate. Credit risk and market risk are grouped together here because one of the more likely and formidable causes of default or the threat of default is the market risks associated with large and rapid declines in financial asset prices, such as occurred in 1987 and 1998.
- ***Liquidity and market-liquidity risks***. Liquidity risk involves several different but related issues. The first and most straightforward is the risk that a key institution facing temporary liquidity problems encounters difficulty in meeting cash or securities obligations to one or more settlement systems. Alternatively, the settlement system itself could have operational problems (see below) that limit or prohibit it from redelivering cash or liquid securities to system participants. Problems along these lines relate to the term "liquidity" in its traditional meaning.

  A different and more troubling aspect of liquidity is the concept of market liquidity of assets. This involves the extent to which various asset markets have sufficient trading liquidity so that financial institutions can readily sell or liquidate positions either to limit losses or to raise cash to satisfy obligations. In the worst of the financial market disturbances of the past 20 years, the de facto evaporation of market liquidity greatly added to credit and market risk. In some instances, the workability of netting systems and closeout procedures that are so central to clearing and settlement systems were also called into question. Among other things, such episodes—as rare as they are—raise questions about the financial and liquidity cushions associated with clearing and settlement systems.
- ***Operational risks.*** Simply stated, the operational risks inherent in clearing and settlement systems are the danger that for whatever reason, one or more such systems incur operational problems that limit or halt normal activities. The cause of such problems can have many specific origins, ranging from protracted software problems to

natural disasters to catastrophic events such as September 11, 2001. Such problems are likely to be most acute when they occur during business hours and extend beyond the close of the normal business day. Ironically, they are also most difficult when they affect only one or a few institutions in a particular locale rather than, for example, a large number of institutions in a particular locale—as might happen in a major natural disaster, such as an earthquake, where there is no question about the cause of the disruption or how to resolve it. In the most severe cases, operational failures can give rise to liquidity, market liquidity, and credit and market risk.

- ***Legal risks.*** The potential legal risks (broadly defined) inherent in clearing and settlement systems are many in number, and some can have serious implications. In essence, legal risks entail the threat that any one factor or a variety of factors will prohibit or limit one or more counterparties from discharging their contractual responsibilities—as they understand such responsibilities—or from protecting themselves from financial harm in the event that another counterparty is unable or unwilling to meet its contractual responsibilities.

  Legal risks can have very simple causes, such as shortcomings in documentation or failure to confirm trade agreement on a timely basis. They can also arise from very complex sources, such as uncertainties about legal interpretations in particular jurisdictions or the practical workability of closeout provisions in times of major market stress.

  Far more often than not, legal issues have been resolved with virtually no so-called "knock-on" effects—even though some of these events have proved quite costly to individual institutions. Legal risks tend not to spread because they rarely carry the direct threat of default that could raise generalized concerns about sizable credit losses to counterparties. In times of very serious market stress, however, the possibility that legal uncertainties—about the ability to close out defaulting counterparties, for example—could add considerable fuel to the fire of market and credit risk shocks.

While the categories of risks inherent in clearing and settlement systems are fairly easy to describe in broad terms, it is impossible to anticipate the precise nature of the future shocks that might move such concerns from the realm of risk to the realm of reality. It is even more difficult to anticipate the exact manner in which an initial shock in one area—operational risk, for example—might work its way into other areas of concern, such as legal and then credit risk, in the progression of a classic chain reaction. One thing is quite clear, however. When any such shock reaches the point where counterparties begin to question seriously whether they will receive payment, delivery of securities, or promised collateral, that is the point when behavior becomes defensive and the seeds of major problems are sown. It is the potential for such problems to disrupt the global financial network that requires practitioners and policymakers alike to devote considerable resources to risk mitigation efforts in the area of clearing and settlement, even if such efforts are admittedly being directed at low-probability contingencies.

> The very regularity of C&S transactions can give rise to a false sense of security, even complacency, about the reliability of such systems to function even under serious stress.

RISK MITIGATION IN CLEARING AND SETTLEMENT SYSTEMS

Risk mitigation in clearing and settlement systems has many dimensions. Moreover, it takes place in a complex institutional framework that must be understood in order to place both risk and risk mitigation in proper perspective. The complexity of some of the processes and linkages involved places a substantial burden on private boards and management to ensure that risks are being effectively monitored, measured, and controlled, and that dedicated and contingent resources are sufficient to address losses arising in the course of business. This burden falls both on providers of securities clearing and settlement services and on their potential users. It applies equally to questions of the financial strength and risk management of individual firms and to their ability to cope with the operational challenges of high-speed, high-volume transactions. Due diligence is required both at the time that decisions are made about accepting new members or about joining a system and during the normal course of business, when risks must be monitored and controlled in real time.

It is safe to assume that every financial institution and service provider devotes substantial time and resources to these matters. The fact that this report includes recommendations on financial integrity and a framework for evaluating current performance is not meant to imply laxity on the part of boards and management or public authorities. The challenge in this area is so great, however, and the cost of failure so high, that the aim of financial management at major service providers must be to ensure continued operation in the face of market shocks and to minimize the potential for default. Thus notwithstanding substantial efforts over a sustained period to strengthen financial stability, the purpose of recommendations in this area is to push the bar a bit higher.

Before turning to specific recommendations, it is worth examining two features of the existing system, neither of which is addressed directly in the recommendations.

- ***Limited liability loss-sharing arrangement.*** Among users of clearing and settlement systems, the legal entity that is the member of a clearing and settlement system may be a limited liability, lightly capitalized entity. Similarly, settlement systems may have limited liability provisions in their loss-sharing agreements for members in the event of a default by another member or members. These limited liability features are accepted methods of risk mitigation. Both providers and users of such facilities must recognize, however, that in rare cases of acute stress, the protections provided by these arrangements may prove illusory; the financial and reputational damage associated with rigid adherence to the legal letter of such protections could be of sizable, if not systemic, consequence.

  In such circumstances, the best risk mitigant might well be for some, or many, institutions to step up to the losses, rather than seek the shelter of an imperfect mitigant. That said, the best way to ensure that such a fateful contingency does not arise relates squarely to the quality and effectiveness of risk mitigation efforts more generally.
- ***Reliance on netting of exposures.*** Many of the tools to monitor counterparty exposures, whether within settlement systems or more broadly, look at "net" exposures rather than at the gross owed-to and due-from exposures. Securing gross transactions on a net basis can entail several steps, most notably accounting for collateral and/or margin and any bilateral or multilateral netting agreements that are legally binding.

  While measures of net exposures are useful and relevant for many purposes, they can be misleading, particularly in times of stress when these underlying presumptions may not hold. Moreover, in times of stress, such measures implicitly assume that counterparties to a defaulting counterparty can successfully close out positions with the defaulting counterparty and do so in a manner that is consistent with the level of net exposure. Unfortunately, both practical and legal factors may stand in the way of such an outcome. If that occurs, it is the gross measure of exposure, not the net, that will be relevant. Accordingly, where the enforceability of netting arrangements is in question, risk management practices and tools must account for gross as well as net exposure both between counterparties and between counterparties and settlement entities.

With these issues in mind, and against the background of earlier official and private studies of this subject, the Steering Committee gave careful consideration to the additional steps needed to reduce the risks associated with clearing and settlement systems. These additional steps are seen as particularly important given the highly likely, perhaps virtually inevitable, consolidation and concentration in the global universe of clearing and settlement. On the basis of these deliberations, three broad sets of recommendations have been developed in the areas of enhanced financial integrity, enhanced operational integrity, and enhanced legal integrity.

ENHANCING FINANCIAL INTEGRITY OF SERVICE PROVIDERS AND USERS

The operations of CCPs and CSDs sit at the heart of the clearing and settlement process. Because a CCP interposes itself between the counterparties to each transaction, acting as the buyer to the original seller and the seller to the original buyer, it is by definition exposed to credit risk of market participants. Theoretically, a CCP assumes no market risk because the market values of the long and short unsettled transactions it holds must be identical at all times. If a market participant fails to fulfill its settlement obligations, however, the CCP is obligated to complete the settlement of the other side of transactions. In that event a CCP is exposed to market risk because it needs to go into the market to buy or sell securities at market prices for settlement purposes. (This risk is often referred to as replacement cost risk.)

In many markets CSDs also have procedures in place to help ensure the timely completion of settlement and maximize settlement of transactions. Otherwise, in extreme cases, the failure of a sizable number of transactions to settle on time could escalate to a gridlock situation whereby a chain of transactions could not be completed on the settlement date, resulting in systemic risk to markets. Banks supporting the operation of CSDs extend intraday or overnight credit to participants by allowing overdrafts in their accounts to facilitate timely settlement. Participants that fail to repay the credit extension create credit losses and put liquidity pressure on those banks. The same applies in those cases where CSDs engage in securities lending (intraday and overnight): if a participant fails to deliver the securities within the agreed period, the CSD or the bank providing the securities lending facility has to replace the missing securities itself. In addition to credit and market risk, CCPs and CSDs face other types of risks, including operational risk and legal risk, in the course of their operations. Although this report addresses these risks specifically in the recommendations on operational and legal integrity, they also need to be considered when determining the suitable level of financial resources.

CCPs and CSDs put in place risk mitigation measures, which can be broadly categorized as:

- ***Measures aimed at controlling the probability of suffering loss through default of a counterparty.*** In essence, these measures are embodied in the due diligence process surrounding the acceptance of new members and review of the continued suitability of existing members.
- ***Measures aimed at minimizing the scale of loss if a counterparty should default.*** These steps include marking to market exposures, imposing collateral requirements and variation margins, setting concentration limits on exposures, and establishing proper internal control and risk management procedures.

No matter how well established and rigorous risk management and mitigation systems and processes are, unexpected losses are inevitable. For example, there could be extreme market moves that are not captured by the risk models; unexpected losses could result from operational failure, disasters, or other external shocks; or losses could arise from legal contingencies. CCPs and CSDs must have financial resources to meet these losses. Although there are many sources of funding, ultimately financial resources will usually come from a combination of the past, present, and future owners, members, and users of the relevant CCP or CSD (the three groups are hereinafter described simply as members).

Because membership in a CCP or CSD creates the risk of having to fund a default, financial intermediaries that are—or are contemplating becoming—members typically adopt procedures to mitigate the risk of loss through default of the CCP, CSD, or other members. Like the risk mitigation processes used in relation to its members by the CCP or CSD itself, these procedures are a combination of due diligence over the CCP or CSD, and day-to-day internal control and risk management processes. Due diligence considerations also evaluate operational risk and could focus on legal risk such as the clarity of the rules describing finality. As discussed earlier, members often join through specially established limited liability entities whose capital is sufficient to meet membership requirements, but little more.

The decision whether to join a CCP or CSD is primarily a commercial decision, often a necessary condition of doing business, particularly where the CCP or CSD is effectively a monopoly in a particular market. That said, it is important that the commercial decision be made with proper appreciation of the risks and balanced accordingly.

> The recommendations are not a fixed standard but an analytical framework against which boards and management can evaluate their operations and seek consistency and quality in risk management.

Intermediaries often transact business with CCPs and CSDs on behalf of their customers. In fact, participation rules may differentiate between members with full execution and clearing rights and non-clearing participants, where "third-party" clearing is considered a risk mitigation technique. Typically, the intermediary has separate contractual arrangements with the CCP or CSD and with the customer, so customer default does not expose the CCP or CSD directly to loss. Instead, the intermediary must bear any loss following customer default, with the CCP or CSD affected only if the loss is sizable enough to threaten the ability of the intermediary to fulfill its obligations to the CCP or CSD. Intermediaries are thus faced with a similar commercial decision to put in place due diligence assessment and risk control processes to minimize the risk of loss from dealings with customers.

Because CCPs and CSDs play such a central role, minimizing the risk of their failure is an important objective. Yet there are several trade-offs in implementing the approach to risk outlined above. Increasing the level of capital required for membership reduces a CCP's or CSD's risk exposure—by attracting intermediaries that are financially robust and well manages—but excludes smaller potential members. At the same time, increasing the hurdle for membership may make a CCP or CSD more attractive to intermediaries that are financially robust and manage risk well. The appropriate balance to be struck will differ from market to market, and indeed within the same market over time, depending on the characteristics of the market, the nature of the products and organizations involved, and the wider commercial environment, including consideration of public policy objectives. The choices made by an individual service provider or user will depend on the mix of activities and supervisory requirements reflected in its business model. Therefore, the recommendations below are not a fixed standard, but an analytical framework for best practice against which boards and management can evaluate their operations and seek consistency and high quality in financial risk management.

RECOMMENDATION 9. ENSURE THE FINANCIAL INTEGRITY OF PROVIDERS OF CLEARING AND SETTLEMENT SERVICES.

Providers of clearing and settlement services should manage their risks and set standards and controls concerning the use of those services that allow them to conduct business in a safe, sound, and prudent manner consistent with their business model and all relevant supervisory and regulatory requirements. Each organization's business model should incorporate a risk framework that addresses all risks connected to its operations. This risk framework should be approved by the board and expressed through a set of limits and other qualitative and quantitative measures and tests. For systemically important organizations, the business model should minimize the probability and impact of default.

The need to operate prudently within the risk boundaries inherent within the business model requires risk management processes and standards, which should be applied objectively and consistently in determining compliance with risk measures, in three broad areas:

- ***The counterparty due diligence process***, whereby service providers make ex ante and ex post assessments of the suitability of their actual or potential users, and the basis upon which users transact, for example distinguishing between those acceptable as clearing and nonclearing members. This process should balance risk control (which inclines toward setting high financial and operational thresholds) with other commercial and competition considerations (which may incline toward lowering barriers to entry of users), while recognizing that there will always be minimum risk thresholds that should not be lowered.
- ***The procedures and techniques used to measure, monitor, and control risk exposure*** arising as a result of the activities of the service provider, its users, and its users' customers. These should seek to avoid moral hazard whereby users can introduce risk to the system without providing proportionate financial protection to the service provider and other users.
- ***The minimum financial and liquidity requirements*** that should be established by infrastructure providers (and enforced by supervisors, as described in the relevant recommendation) in proportion to the risks to which they are exposed, so as to ensure their ability to continue to provide services to markets and minimize the probability and impact of a default on their users and the financial markets.

Each organization should publish a report, at least annually, that describes the business model, risk framework, and underlying risk management processes, controls, and standards, together with the results of independent testing of those procedures. The report would reassure users that the organization had been operating effectively and would also provide greater transparency to the market.

Coverage of this report may overlap with other reporting requirements, such as the so-called SAS 70 reports, assessments pursuant to CPSS-IOSCO standards, and financial sector assessments carried out by the International Monetary Fund and World Bank. This report is intended to be complementary to these other requirements and not to require additional reporting where the purposes of this recommendation are otherwise met.

RECOMMENDATION 10. REINFORCE THE RISK MANAGEMENT PRACTICES OF USERS OF CLEARING AND SETTLEMENT SERVICE PROVIDERS.

Organizations that use, or are considering using, providers of clearing and settlement services should establish robust due diligence and counterparty risk management controls and processes that appropriately evaluate, measure, monitor, and control the risks inherent in such activity and in associated customer-related business. The recommendation does not seek to replace prudential standards and supervision that may already apply to financial intermediaries, including risk-related minimum capital requirements set by prudential supervisors. However, it is clearly important that capital resources and risk management practices appropriately reflect the range of risks inherent in clearing and settlement. Likewise, nonsupervised users of providers' services should be able to demonstrate the risk-based adequacy of their capital resources and risk management processes.

ENSURING FINALITY

Because finality is essential to limiting credit risk in the clearing and settlement process, ensuring simultaneous, final, and irrevocable transfer of assets and payments is critical. Therefore it is incumbent on providers of securities settlement services to link securities transfers to funds transfers in a way that achieves delivery versus payment (DvP). Pursuit of DvP was a recommendation in the 1989 G30 report and has remained on the list of recommended practices ever since, most recently in the 2001 recommendations by CPSS/IOSCO. Despite its vintage and wide endorsement, an industry-wide definition of DvP remains elusive and DvP is still not universal.

RECOMMENDATION 11. ENSURE FINAL, SIMULTANEOUS TRANSFER AND AVAILABILITY OF ASSETS.

Providers of securities settlement services should reduce to the lowest possible level the credit risk created if securities or cash are delivered without receipt of corresponding assets, by linking securities transfers to funds transfers in a way that achieves effective delivery versus payment (DvP) and by making transparent the point at which finality of transfer is achieved. There are different settlement arrangements that can achieve this:

- Real-time (or frequent intraday batch) settlement systems can offer the greatest certainty by providing simultaneous and immediate transfer for securities and cash at multiple points within the working day so long as there is finality of transfer of securities and cash.
- Systems that offer real time (or frequent intraday batch) transfers of securities followed by net cash payments at the end of each working day (or intraday) offer a lower level of certainty, but can substantially reduce costs and demands on liquidity, particularly in high-volume markets. In practice, such systems require additional and enhanced levels of risk management to offset the greater uncertainty but are acceptable provided that intraday securities transfers are final and that risk controls ensure that the end-of-day (or intraday) net settlement of cash payments will be completed, even if one or more participants owing the largest end-of-day cash payments fail to meet their obligations.

Determining the arrangement appropriate to a particular market will depend on a number of factors, including available technology and communication infrastructure, the number and value of transactions, the systemic importance of the market to the world financial system, and the business and operational models of other market participants and related payments systems. Any uncertainties within an individual system are magnified by the complexity and intersystem dependencies of cross-border transactions; this means that the impact of uncertainty on such trades will be greater than on domestic trades. This is another important consideration.

Whichever settlement model is used, each securities settlement system should specify the moment of final transfer in its rules or through binding contracts in plain and simple language, as expounded further in the respective legal risk recommendation.

Systems that settle both securities and cash on a net basis and allow intraday transfers that are conditional or not legally binding, have yet greater uncertainty, as a participant's transfers may be revoked following failure to meet their end-of-day contractual obligations. In these circumstances the complexities of unwinding conditional transfers of securities (and thereby needing to recalculate the delivery obligations of other participants), and the operational difficulties and liquidity pressures that may result, have the potential to create systemic risk. Such arrangements are therefore considered unacceptable, particularly where there is potential cross-border impact.

Once finality of transfer is fully assured, the rules should enable a receiver to re-use securities and cash without further delay, whether arising from settlement, dividend or interest payments, or corporate events.

ENHANCING OPERATIONAL INTEGRITY

As discussed earlier, business continuity and recovery from disaster are concerns for clearing and settlement systems because a technical, terrorist, or natural catastrophe could restrict or halt normal activity. In the worst case, operational as well as, liquidity, market-liquidity, and market and credit risk concerns could affect a wide range of other providers of clearing and settlement services and financial institutions. For this reason, service providers have always devoted considerable resources to planning for business continuity and disaster recovery. Even so, several important lessons were learned from the events of September 11, 2001.

The widespread destruction of the physical infrastructure and telecommunications environment in lower Manhattan caused disruptions in the trading of certain securities and the subsequent clearing and settlement of trades. While the global financial system continued to function in the days following September 11, the level of disruption caused when key institutions were knocked off-line demonstrated the interdependence of the financial system. Recommendation 12 aims to promote immediate action to strengthen business continuity and disaster recovery plans. Given the differing nature of organizations to whom the recommendation is addressed and the varying circumstances in which they operate, the recommendation is not intended to be prescriptive. It is also important to note that elements of business continuity and disaster recovery plans aimed at addressing less catastrophic but nonetheless important scenarios, such as loss of service from telecom or other key suppliers, remain vital. Similarly, effective contingency planning does not in any way diminish the need for strong preventative measures, including physical and IT security.

RECOMMENDATION 12. ENSURE EFFECTIVE BUSINESS CONTINUITY AND DISASTER RECOVERY PLANNING.

All market participants should, and all systemically important institutions must, regularly review, update, and test their business continuity and disaster recovery plans, including evaluation of reliance on third parties, to ensure with reasonable certainty that critical operations will continue with a high level of integrity and sufficient capacity following a disruption or disaster. The review, updating, and testing of plans should build upon the thorough analysis and good practices that have already been established and that are being developed by public and private institutions. The plan should be based upon revisiting planning assumptions, revised risk assessment, and scenario planning that encompasses the key lessons learned from September 11, 2001, and any other relevant incidents that may occur. Organizations should assess whether plans provide satisfactory resilience and evaluate the costs and benefits of developing solutions to the broad range of business continuity and disaster recovery issues. For functions critical to the market as a whole, a split operations model should be considered, whereby one processing site actively backs up another, with each site having the requisite level of key resources, capabilities, and functionality, including appropriately skilled and experienced people. Systemically important institutions should undertake tests with member firms and users as part of their evaluation exercises.

In their review of backup arrangements, organizations should consider whether they have sufficient access to dedicated backup facilities to ensure that operations can be reconstituted within a suitable time frame. When major incidents occur, organizations should be aware that the pressure on shared backup facilities may be such that they are not able to rely on having access to it.

Full disclosure of plans may increase the risk of certain events or attacks, or otherwise compromise plans, and is clearly undesirable. However, contingency plans should be sufficiently transparent and effectively communicated to the other market participants that depend on the institution to allow them to make reasonable judgments about the operational risks to which they in turn are exposed. In addition, the responsible supervisory body should critically assess the contingency plans of the organizations that they supervise, including an evaluation of the adequacy and frequency of testing. The nature of these assessments should reflect the associated risks, and for high-risk organizations should be performed at least annually.

As already noted, the events of September 11 illustrate the vulnerability of financial institutions and the clearing and settlement infrastructure to physical disruption and threats previously thought improbable.

2. "Draft Interagency White Paper on Structural Change in the Settlement of Government Securities: Issues and Options," issued jointly by the Board of Governors of the Federal Reserve System and the Securities and Exchange Commission, May 6, 2002.

The recommendation aimed at ensuring effective business continuity and disaster recovery planning incorporates lessons learned from this catastrophe that individual institutions need to consider in their future plans and operations. But this in itself is not a sufficient response. However robust, thorough, and well-tested they are, it is unrealistic to expect business continuity and disaster recovery plans to anticipate and cater to all possible eventualities. The range of potential scenarios is enormous, yet each individually is unlikely to happen. At the same time the chance of a catastrophic event of some sort is clearly real. It would therefore be imprudent not to consider how the market collectively should address the potential failure of a systemically important institution. Unsurprisingly such considerations are now a high priority for many public and private institutions around the world.

Quite naturally, in the aftermath of September 11, the focus of efforts to further increase the operational integrity of systemically important clearing and settlement entities (and systematically important institutions more generally) has been a matter of particular urgency in the United States. Indeed, in 2002, the U.S. banking and securities regulatory bodies issued for public comment two "white papers" that are relevant to the issue of enhanced operational integrity, although both these papers consider a number of broader issues, as well.

At the risk of considerable oversimplification, one of these papers is directed at structural alternatives that could reduce the vulnerabilities of the overall financial system to a major failure, arising for any reason, at one of the two major clearing banks located in New York.[2] Although the focus of these structural alternatives was not limited to an extended operational failure, it is safe to say that in the post–September 11 environment such a scenario was of particular concern, both in the drafting of the white paper and in the financial community's response to the paper.

The other white paper was much broader, focusing, from a largely supervisory point of view, on a range of "sound practices" aimed at substantially increasing the resilience of key U.S. financial institutions and financial markets in the face of a "wide-scale regional disruption."[3] Among other things, this paper requested public comment on an extremely ambitious timetable for substantial and broad-based enhancements to business and operational recovery capabilities in the event of such a disaster.

Although the two white papers are directed at U.S. markets and U.S.-based institutions, the issues they raise are relevant for all systemically important institutions across all jurisdictions, and they are clearly relevant to the report's goals for enhancing the operational integrity of systematically important clearance and settlement systems. Indeed, regulators, overseers, and market participants in many other jurisdictions have also undertaken considerable effort to evaluate contingency plans in the light of September 11 and to update and strengthen them where necessary.

At this stage, it is not possible to anticipate the specific actions the U.S. regulatory agencies will take in response to the comments they have received from the public on the two white papers. Nevertheless, it seems fairly clear that, under virtually any foreseeable set of circumstances, the system will remain vulnerable to an extended operational failure at systematically important clearance and settlement entities arising for any reason—including reasons less draconian than a wide-scale regional disaster contemplated by the second white paper.

Neither the structural changes nor sound practices contemplated in the two white papers would eliminate this problem, and it would even exist in a global clearance and settlement system having the interoperability and other characteristics contemplated in this report, although the risk and adverse impact would be greatly reduced.

Thus, the very difficult question remains whether there are meaningful steps that can be taken in the relatively short run to further reduce the risks associated with sustained operational failures at systemically important clearing and settlement entities.

3. "Draft Interagency White Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System," issued jointly by the Board of Governors of the Federal Reserve System, Office of the Comptroller of the Currency, and the Securities and Exchange Commission, August 30, 2002.

The nature of the difficulties encountered in seeking to identify such short-run measures is best illustrated by the problems experienced in New York on and for a number of days after September 11. In that time frame, one of the New York clearing banks had protracted operational problems that left a massive volume of transactions (and much of the critical information relating to those transactions) essentially gridlocked in the temporarily impaired clearing bank. Moreover, because there was no interoperability, even new transactions by clients of the clearing bank could not be routed through the second clearing bank. However, and this point is critical, even if interoperability had existed so that new transactions could have been rerouted, market participants believe that it would not have made much difference unless the gridlocked transactions—or at least the information associated with such transactions—could also have been recovered and processed. In other words, interoperability is a necessary condition for materially reducing the risks of certain types of operational failures, but it is not a sufficient condition to achieve that result.

Discussions with prominent private sector experts and the publicly available comments received by the U.S. regulatory authorities on the first of their two white papers have brought forth several ideas for possible solutions to this particular vulnerability that might be achievable in the reasonably short run. Moreover, the steps would be consistent with the longer-term vision for the global network of clearance and settlement systems advocated by this study.

One very promising idea is the concept of a real-time data depository by which each of the two New York clearing banks could back up the other. Obviously any such real-time data depository would require at least some degree of interoperability between the two clearing banks and most, if not all, of their clients and possibly with the U.S. Federal Reserve System as well. Importantly, the real-time data depository would simultaneously capture transactions and information flows to the two clearing banks. Together, the creation of such a depository and the achievement of the degree of interoperability that it would require may be sufficient to ensure that in the event of a major operational failure at one such institution, the other could provide operational backup, including a high level of assurance that all, or virtually all, transactions directed to the troubled bank could be processed and settled in line with normal time schedules.[4]

This example demonstrates how it may be possible to create innovative solutions to the important issue of how the financial market as a whole could deal with the failure of a systemically important institution. The solutions appropriate to systemically important entities other than the two New York clearing banks will differ according to the business model and activities involved, the entity's position in the processing chain, and the way in which the entity interacts with other market participants. Other systemically important entities requiring alternative solutions might include (I)CSDs, CCPs, and providers of secure communications, payment services, and, in a rapidly consolidating market, global custodian services. This report recognizes the remarkable challenge of finding solutions for each of these different types of entity, but it is nonetheless a critical task deserving of sustained effort.

Accordingly, the Steering Committee fully supports initiatives to explore promptly the costs, feasibility, and benefits of approaches that address the failure of systemically important institutions, along the lines of the real-time data depository. Such an approach will not solve all of the problems associated with systematically important operational failures, but it will, among other things, buy the time and the experience to forge more comprehensive longer-run solutions.

RECOMMENDATION 13. ADDRESS THE POSSIBILITY OF FAILURE OF A SYSTEMICALLY IMPORTANT INSTITUTION.

Market participants in each financial center should work together to identify those institutions, or parts thereof, that are systemically important to the clearing and settlement process. User groups should be established to address

4. U.S. regulatory agencies have commissioned a private-sector group to explore solutions to the issues addressed in the first white paper with a mandate to propose feasible plans for addressing them.

how they would react if, despite strengthened business continuity and disaster recovery plans, there were a failure for whatever reason at one of these institutions. Ways of mitigating the risks created should a systemically important institution fail, such as building a real-time data depository, should be evaluated. Where it is determined that effective and feasible solutions may exist, detailed business cases setting out the costs and benefits should be built up, and decisions on future actions and investment decisions should be taken accordingly. As well as enforcing suitably high standards of business continuity and disaster recovery planning in systemically important institutions, regulators and overseers should encourage this process of industry-wide contingency evaluation and planning.

ENHANCING LEGAL INTEGRITY

Essential to the management of risk in the clearing and settlement process is an adequate understanding of key legal considerations and the risks that legal uncertainty can introduce to that process. Among the critical considerations in this regard are contract legality and enforceability; legal certainty over rights to securities, cash, or collateral; and recognition and support of flexible valuation and closeout netting arrangements. These legal considerations are not unique to the clearing and settlement of securities and other instruments but are relevant for all market participants, including counterparties, intermediaries, agents, brokers, and end users.

Ultimately, legal certainty in cross-border transactions will be fully achieved only through enactment of strong, clear, and consistent national and international laws. The Steering Committee recognizes that such legal reform is necessary but will require a long-term effort. Meanwhile, much can and should be done to increase legal certainty and reduce risk through sound management. First of all, it is important that the legal status of transactions and financial relationships be determined in advance of trouble. Once a failure occurs, indeterminate legal positions may make it impossible to determine financial positions with clarity, and it is too late to remedy the underlying legal issues at that point.

Thus, individual entities should further strengthen their internal process of due diligence to ensure that legal risks are identified and effectively managed. Where legal principles can be agreed among practitioners and implemented contractually, standardization of legal approaches by industry participants can yield substantial benefit in advance of broader law reform. In fact, this process can be very effective in laying the groundwork for eventual changes in law. The recommendations below identify interim measures that can be taken and note where the enactment of effective laws is necessary.

While an ongoing business relationship increases the likelihood that parties will perform as agreed, it is the reasonable certainty of legal enforcement that ultimately must underlie all transactions. Legal recognition of the parties' agreement is a precondition for the enforcement of rights under any contract. Fundamental issues include valid formation of the contract, the capacity and authority of all the participants to enter into the contract and to perform their respective obligations, and the compliance of the terms of the contract and the obligations of the parties thereto with applicable law.

RECOMMENDATION 14. STRENGTHEN ASSESSMENT OF THE ENFORCEABILITY OF CONTRACTS.

Market participants should ensure that due diligence procedures examine contract enforceability, including basic formation and validity, as well as power and authority to contract. Where significant uncertainty exists about the reliability of the legal system of relevant jurisdictions, steps should be taken where possible to ensure that such laws do not govern the transactions and that enforcement in such jurisdictions will not be required. Collateral posted and held outside such jurisdictions and letters of credit essentially removing all reliance on enforcement ability in the questionable jurisdiction should be considered. Industry groups should enunciate standards of diligence, and together with appropriate regulators, identify deficiencies in law that could potentially impair contract enforceability, such as those related to gambling and other public policy areas. Industry groups should also propose legislative changes to protect transactions between commercial entities.

While sound contracts are critical, enforceability derives fundamentally from legal certainty embodied in clear operating rules and sound laws. Thus, the pursuit of legal certainty must address operating rules at individual CCPs and CSDs, industry agreements on the formulation of financial contracts, and ultimately reform of national laws. While the exact details of legal reform will depend on national context, achieving the goals of these recommendations may require fundamental changes in law in some jurisdictions.

RECOMMENDATION 15. ADVANCE LEGAL CERTAINTY OVER RIGHTS TO SECURITIES, CASH, OR COLLATERAL.

Market participants must be able to determine, with certainty and reasonable cost and effort, what law defines and governs their rights to securities, cash, or collateral in a clearing and settlement system or other intermediary, what those rights are, and how to perfect and enforce them. The applicable rules of law should be automatically effective, to the extent possible, and should afford the parties to the transaction ex ante certainty and predictability for the largest number of transactions possible. To the extent possible, clearance and settlement systems and other intermediaries should describe to their participants or customers the relevant choice of law that rules in their home countries as they relate to what law governs the effectiveness of transfers and pledges of securities held through an account with an intermediary. Specifically, the following is recommended:

- ***Choice-of-law rules.*** Financial supervisors and legislators should ensure that the Hague Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary, adopted on December 13, 2002, is signed and ratified by their respective nations as soon as is reasonably possible. The Hague Convention, once ratified by all relevant nations, will ensure that there will be a clear and certain answer to the question in an international setting as to which law governs in determining whether a collateral taker has received a perfected interest in pledged securities.
- ***Protection against intermediary insolvency risk.*** Financial supervisors and central banks should confirm that the rights of a person holding securities through an account with an intermediary in their jurisdiction are senior to the claims of the intermediary's creditors to such securities, except where the intermediary affirmatively grants such creditors control over such securities. If the financial supervisor or central bank is unable to provide such confirmation, it should take all appropriate action to ensure that its local commercial and bankruptcy laws are interpreted or amended to achieve such a result.
- ***Pledging and realization procedures.*** Financial supervisors, central banks, and legislators should encourage collateral transactions by simplifying any legal procedures that impose conditions on the effectiveness of pledging arrangements or govern the fairness of realizing on collateral.
- ***Finality.*** The boards of central securities depositories should specify in plain language the moment when a transfer or pledge of securities becomes "final" (that is, irrevocable and unconditional) in its rules or binding contracts with its account holders. Financial supervisors and central banks should require this specification from each central securities depository subject to their jurisdiction.

When a financial failure occurs, the availability of closeout netting and clear valuation rules are the surest way to limit risk. Netting limits overall exposure, and clear, legally recognized valuation procedures permit speedy closeout of complex portfolios and positions.

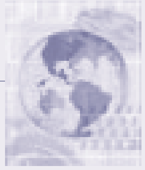
RECOMMENDATION 16. RECOGNIZE AND SUPPORT IMPROVED VALUATION METHODOLOGIES AND CLOSEOUT NETTING ARRANGEMENTS.

Market participants should ensure that all master agreements provide that upon the early termination of a transaction or group of transactions, the determining party will have the flexibility to value such transactions by the method that is most likely to produce a commercially reasonable valuation at the time of termination. Master agreements also should provide that in any exercise of such discretion, the determining party should be guided by principles of good faith and commercial reasonableness.

Market participants should include closeout netting provisions in their contract documentation. Trade associations and other industry bodies should work together to harmonize information on the effectiveness of netting and disseminate it widely and in accessible form.

Relevant authorities in each jurisdiction should ensure that their laws give effect to closeout netting for all central counterparties, brokers, end users, and other market participants, and for all entity, transaction and asset types. Market participants and other interested bodies should encourage legislative reform in those jurisdictions where laws do not meet this standard.

5. GOVERNANCE: THE KEY TO REFORM



GOVERNANCE IS THE FINAL KEY ELEMENT, AND PRIMARY DELIVERY MECHANISM, IN STRENGTHENING CLEARING AND SETTLEMENT SYSTEMS. In fact, the overarching governance challenge in this report is for boards to implement the recommendations for strengthening the clearing and settlement model and strengthening risk management set out in the preceding chapters. Governance refers to the mechanisms and procedures through which the objectives of a company are set, the means to achieve them are identified, and the performance of the company is measured. It also refers to the set of relationships among management, the board, shareholders or owners, users, regulators, and other stakeholders that influence these outcomes.

The specific recommendations under this heading are primarily directed toward the activities and accountability of the boards and management of these systems and, to the extent applicable, their users. The recommendations also touch on the public policy framework for competition and prudential oversight within which these clearance and settlement systems operate. Ensuring the system's openness to competition is a second important challenge and key to success in a number of other areas. The term *competition* refers to the ability both of users to shop around for the best service provision and for qualified would-be service providers to have access to the market. Providers should be judged to be qualified according to objective criteria related to the soundness of their business organization—not their nationality, location, or other factors unrelated to business soundness.

The recommendations outlined below build upon, rather than displace, the substantial governance responsibilities associated with current infrastructure arrangements. The challenge is to raise overall infrastructure capability and performance to a new level. This improvement will take place within a framework of public policy requirements and parameters for both competition and prudential supervision. However, the initiative on substance and timing lies with the boards of entities that are completely or mostly privately owned . (Broadly similar initiatives will be required of clearing and settlement entities owned by central banks or other public bodies.)

The overarching governance challenge in this report is for boards to implement the recommendations set out in the preceding chapters.

The recommendations have implications for governance in three main areas.

- First, boards and management should ensure that new or upgraded systems and software are aligned with the technical and operational standards recommended in this report for achieving interoperability and improving clearing and settlement processes.
- Second, boards and managements should ensure that services and technologies are introduced on an open and competitive basis.

Analysis of the structure and governance of global clearing and settlement arrangements, as well as the report's governance recommendations, are based on a draft paper prepared by David Walker, Senior Advisor, Morgan Stanley International.

- Third, boards and managements should ensure that arrangements for the identification, measurement, and control of risk, including operational risk, fully comprehend the risks inherent in an increasingly linked global network.

The relevant competition authorities and central banks and supervisors responsible for regulation and oversight clearly have important interests in the latter two categories.

GENERAL RESPONSIBILITIES OF BOARDS AND MANAGEMENT

The responsibilities placed on boards of clearing and settlement entities by this report are both wider in scope and more detailed than has been the case to date. These boards are being asked to become the main drivers of change in support of cross-border business, not least because the principal initiatives can be taken only by the boards themselves, with the agreement of users and shareholders. The current state of cross-border clearing and settlement arrangements demonstrates the challenge that this responsibility poses. Cross-border trading has been one of the fastest-growing segments of securities activity around the world over the past decade. Nonetheless, clearing and settlement costs and risks for cross-border trades remain substantially higher than those for domestic clearing and settlement. Despite at least a degree of user involvement in governance and, commonly, a significant element of user ownership, cost and efficiency improvements for cross-border business have lagged behind.

Given this experience, it is clear that board members must enjoy sufficient seniority and experience to provide the strategic vision and authoritative voice necessary to carry through the expanded mandate recommended here.

RECOMMENDATION 17. ENSURE APPOINTMENT OF APPROPRIATELY EXPERIENCED AND SENIOR BOARD MEMBERS.

Members of the boards of securities clearing and settlement infrastructure providers should, individually and collectively, be of a weight in terms of experience and seniority to discharge the enlarged strategic and management oversight responsibilities described in this report. Organizations that are users of such providers, or otherwise have input into the appointment of board members, should be mindful of the broad range of capabilities needed to discharge the diverse, important responsibilities of such a position.

More generally, principles of good corporate governance require directors to adhere to certain standards of conduct in carrying out their responsibilities, including a duty of care. In a user-owned structure where persons appointed to the board are likely to be employees of users, directors need to be especially vigilant. The duty of that director is to exercise his or her authority in the interest of the clearing and settlement entity and all of its users and to disclose conflicts of interest before the board acts. In taking these initiatives forward, boards will need to strike a balance among, for example, the interests of different users of the entity's services or between short-term interest in fee reductions and required investment in capacity and systems enhancement over the longer term.

THE DEMANDS OF PUBLIC POLICY

Good governance must also recognize public policy interests. The capacity to exploit a monopoly position for competitive advantage will necessarily attract interest by relevant competition authorities. Where users have access to alternative infrastructure providers, public policy is likely to focus on harmonization of standards, much as it does with telecommunications. Where there is a sole provider, competition concerns will assume higher priority. Issues include the need to ensure that systems are open, that cross-subsidy between monopoly services and other services is avoided, and that any monopoly rents accrue, one way or another, to users.

Public policy interests also arise in the area of prudential supervision to ensure that clearing and settlement systems are managed so that they can continue to operate in the face of market shocks and so that the risk of default is minimized. To address risk, boards will need to establish and maintain levels of capital, risk management standards, and market transparency consonant with the scale and nature of an entity's operations and potential external shocks. Because such standards could be exploited by incumbent market participants to discourage new entrants and inhibit competition, transparency must extend to application of the standards as well. In the event of consolidation, concentration of risk will only increase the importance of these board responsibilities. The board and management will carry out these responsibilities subject to the oversight of the central bank or prudential supervisor.

INTEROPERABILITY AND COMPETITION

Beyond the general duty of care and the specific demands of public policy, good governance as it is outlined in this report requires boards of clearing and settlement entities to work toward the twin goals of interoperability and openness of systems. The interoperability goal is embodied in specific technical and process recommendations to be implemented as new software and systems are installed. Given the range of actions involved, these recommendations demand early attention and proactivity by boards of major service providers.

Appraisal of the cost involved in implementing international standards and installing new systems that embody them may prove an important influence on consolidation. In particular, boards of smaller entities may find that the more attractive strategic option is consolidation with another entity so that the costs of adopting standards that create the potential for interoperability are shared. Thus, the need to adopt standards associated with interoperability can make the business case for consolidation.

An apparent paradox arises in this report between the stress laid on achieving interoperability and that directed at maintaining or even enhancing competition as a spur to innovation. As discussed above, the drive for interoperability alongside the pursuit of scale economies will tend to promote consolidation, which will reduce competition in numerical terms. But a reduction in the current universe of service providers need not be associated with reduced competition, and it could have the opposite effect.

A major reason for the current array of CSDs is that they often developed, or were granted status, as a form of monopoly within each national jurisdiction. Where such monopoly national systems operate to different technical standards and processing rules—that is, where monopoly national systems are not interoperable—there can be no effective competition between them. The introduction of interoperability would significantly change that situation. The use of common standards would create value for users by increasing the number of potential users of any single clearing and settlement system (creating network externalities). Because products would be less differentiated under common standards, direct price competition would be more important. Common standards would thus produce effective competition on the basis of both price and service, something that is unlikely to be achieved if the current array of partially interconnected service providers operating to different technical and business standards is maintained.

> Ensuring the system's openness to competition is a second important challenge and key to success in a number of other areas.

Standardization could reduce the franchise value of smaller service providers and inevitably in a competitive environment, economies of scale and network externalities would lead to a more concentrated structure. In the extreme case, a monopoly entity offering low tariffs and dependable service quality could emerge. The competitive process could thereby well serve the interest of users—so long as it did not result in anticompetitive behavior, such as creating barriers to new entrants. It is that behavior that would create a concern for competition policy.

The other concern with consolidation is its potential impact on innovation. There seems no particular reason to suppose that boards of entities that have consolidated would be less ready to be effectively innovative in improving efficiency and service quality than the boards of fragmented and noninteroperable entities, except perhaps in the case of a true monopoly. Therefore, an important ingredient for sustaining innovation is open and transparent business models so that even a consolidated entity may be exposed to competitive challenge in one or several of its functions.

Key to addressing the competition concern is ensuring that qualified users have access to systems and are free to select the mix of functions and services that they wish to use.

RECOMMENDATION 18. PROMOTE FAIR ACCESS TO SECURITIES CLEARING AND SETTLEMENT NETWORKS AND SERVICES.

Boards of securities clearing and settlement service providers, other organizations providing similar services, and public authorities should ensure that rules and other requirements that control or limit access to securities clearing and settlement services are accepted only where they are necessary and are designed exclusively for the purpose of controlling financial, operational, reputational, or regulatory risks; maintaining the safety of the system; or achieving other reasonable public policy objectives. Networks and services should be accessible to all users that pass risk and safety evaluations and enjoy appropriate financial standing, and users should be free to select the mix of functions and services that they wish to use on the basis of straightforward, transparent, and fair tariff policies grounded on the principle of user pays. Such risk-based rules should be broadly founded (encompassing the due diligence process set out in the financial integrity recommendation), and fairly and consistently applied. Moreover, the rules and their application should be transparent to the market. Existing barriers that do not meet this test should be removed.

Boards are being asked to become the main drivers of change in support of cross-border business.

OWNERSHIP AND COMPETITION

Competition policy aims to protect the interests of users or consumers of products and services. Therefore, where users own a service provider, public interest concerns are likely to be limited because in such a case any quasi-monopoly rents earned would automatically accrue to users as a group. Where ownership is held substantially by nonuser shareholders, policy interest in the allocation of economic rents is likely to be heightened. The ownership patterns for clearing and settlement entities (there are exceptions, such as those for government bonds in the United States and Japan) are by users, by nonuser shareholders, or by a combination of the two. The last case occurs where a securities exchange (with its own public shareholders) is a nonuser shareholder of an entity that also has shareholders who are direct users.

The landscape of interlinked and interdependent organizations described in chapter 2 demonstrates that the term "user," when applied to clearing and settlement services, could be defined in many different ways. User in this context is taken to refer to an organization that has a direct relationship with a service provider. Most users of this type will be intermediaries who, in turn, provide additional services, typically for an all-in fee, to meet the overall requirements of the end users: investors in, or issuers of, securities. Observation of market practice and the OXERA analysis cited earlier together suggest that competition at the intermediary level is such that a significant proportion of savings accruing to direct users will be passed to end users over time. Thus, addressing competition issues in the interests of intermediaries may be generally expected to bring similar benefit to their clients as end-users.

Where users own the entity, there is likely to be a substantial convergence of interests about improving services. Important choices will still have to be made, however, between short-term and long-term interests—for example, tariff reduction for users versus investment in enhanced systems and capacity, including necessary steps toward interoperability or consolidation. There will also be questions of fairness between large and small market participants. Two areas in which potential differences could arise are the allocation of cost and benefits and setting service priorities among users. In the former case, the incidence of costs and the extent to which savings flow through users to issuers is largely a function of competition. As discussed earlier, the primary beneficiary of savings will be issuers. In any case, all market participants and users share a broad interest in improving efficiency, so the potential for conflict appears small.

As to differing priorities among different user groups, smaller brokers may have a greater interest in short-term tariff reduction than do larger brokers, and custodians may see different investment priorities for the entity than those seen by broker-dealers (for example, custodians may have less interest than broker-dealers in improving the asset-servicing capabilities of CSDs, with which they may be in direct competition). Such differences are likely to be matters of degree, however, and point to the need for an appropriate structuring of the board to ensure a balance among different user interests. A mechanism will be needed to resolve such differences, perhaps through governance arrangements or by-laws. The inclusion on the board of public interest members is a practical means of ensuring that longer-term priorities set by the board are not unduly at risk from short-term user interests.

For entities where nonuser ownership is significant, the board is likely to focus more or less explicitly on shareholder value objectives, which provide a strong spur to efficiency and cost reduction in a competitive environment. As one example, Deutsche Börse has created a vertically integrated structure combining an exchange, clearing and settlement facilities to provide one-stop services from trading to settlement. This offers substantial user convenience. As a publicly traded company, it is also an attractive model from the standpoint of nonuser shareholders. But two potential limitations of the model have to be addressed:

- Can a vertically integrated structure offer the same level of user benefits as an infrastructure model featuring competition on price and service at each level of the value chain and across trading systems?
- Will value-added services, such as credit facilities supplied competitively in the market, be offered or added?

These concerns are all but eliminated if the vertical structure incorporates open access and fair tariff policies that allow users of other stock exchanges or electronic trading platforms into its facility while users of its trading platform can clear and settle trades and pursue ancillary services elsewhere. Of course, the commitment to open access has full effect only if the main clearing and settlement entities are interoperable, allowing competition for services.

The difficulty is that open access and interoperability may not be consistent with profit maximization, at least in the short term. Therefore, an appropriate balance between the interests of users and shareholders may be difficult to achieve in a board consisting of nonuser shareholders. These concerns will be less where there is effective competition than where an infrastructure provider is an effective monopoly. Where a monopoly exists, competition policy interest is likely to arise regarding an array of specific outcomes such as openness of access and fee transparency. A related competition concern is whether additional services that could be competitively supplied are instead tied to core, monopoly services.

If a monopoly or quasi-monopoly exists, but economic rents accrue largely or wholly to market users, competition policy oversight may be confined to ensuring that representation on the board is balanced among different user interests and that board members are committed to interoperable and open systems. However, where nonuser shareholder interest is significant, oversight may be needed to ensure transparency in fee structures and to guarantee that economic rents reach the users of clearing and settlement services. These considerations suggest that for the majority of situations in which clearing and settlement is through private sector entities, the overall balance of advantage probably lies with a user-ownership structure. But the report is not prescriptive in this respect, and other structures may also serve well as long as competition concerns are addressed.

It is also important to recognize that central bank or other public ownership of a clearing and settlement capability does not obviate the need for attention to user interest in monopoly rents. Nor does it remove the need for risk management disciplines similar to those to be applied in privately owned entities. Equally, the boards of publicly owned clearing and settlement entities should pursue international operational and technical standards and be attentive to opportunities for improvements in efficiency, just like boards in the private sector.

RECOMMENDATION 19. ENSURE EQUITABLE AND EFFECTIVE ATTENTION TO STAKEHOLDER INTERESTS.

Board participation should represent different stakeholder interests fairly and equitably. Provision should be made for regular review of, and for changes as necessary in, board composition to ensure continuing balanced representation of varying stakeholder groups, including users. Where a securities clearing and settlement infrastructure provider is user-owned, user-shareholders should make certain that arrangements are in place to provide equitable and effective representation through appropriate by-laws; the appointment of independent, public interest, or end-user investor directors; or other similar measures. Where such a provider is partly or wholly owned by nonuser shareholders and is also a substantially monopoly provider of clearing, settlement, and related services in a particular market, user (and other stakeholder) interests can be adequately protected through appropriate user or other independent, nonshareholder participation in the board. However, these arrangements may have to be supplemented by oversight of tariff and other policies by relevant competition authorities. In either case, the independent directors should be appropriately involved in the audit and remuneration committees.

SAFETY AND SOUNDNESS

Whereas ownership structure will heavily influence the extent of competition policy oversight, that is not the case for prudential oversight. Ensuring safety and soundness is an explicit and core responsibility of the board of any clearing and settlement entity, regardless of ownership structure, and the need for engagement by central banks or supervisors is clear.

Boards of clearing and settlement entities and those who use their services devote considerable effort to risk mitigation, even though the major contingencies they face are of relatively low probability. However, the changes proposed in this report may introduce new configurations of risk that warrant heightened attention. The move to interoperability will in itself neither increase nor attenuate the risk management responsibilities of boards because whether or not the entity is interoperable with other similar entities, the board and management are still responsible for maintaining the risk management process.

These matters are discussed in greater detail in chapter 4, along with specific recommendations in the area of financial, operational, and legal integrity. An important capability in pursuit of these recommendations by infrastructure providers is an effective due diligence process for their boards and management regarding clearing members and major users. Where these members and users are supervised financial institutions, reliable and timely sharing of information between the supervisor and infrastructure provider will be essential. Of particular importance is access to filings made with primary supervisors. Whether such intelligence-sharing arrangements are likely to be adequate will depend partly on the practical working relationships that evolve. But from the standpoint of robust system design and the avoidance of moral hazard, the board of the infrastructure provider (and its prudential supervisor) must be satisfied as to the independence of its capability to evaluate its clearing members and users. In those situations where the mandate of the primary supervisor of a financial entity such as a broker-dealer is to ensure continuing capacity to meet obligations to retail clients, official supervision will offer no assurance that the firm is able to meet its payment or securities transfer obligations to the infrastructure provider. In those cases, the infrastructure provider will have to have an independent appraisal capability with the possibility of on-site inspection, even if such capability is likely to be used only rarely.

Given the reciprocal nature of the assessment of continuing financial health that is recommended between infrastructure providers and their members and users, transparency of the entity is a key ingredient in informing the due diligence of users. Therefore, the board should conduct, at least annually, an independent assessment of the provider's financial position, its risk profile, and its risk management systems, together with its operational reliability including backup and contingency plans. The results of this assessment should be made promptly available to members, users, and the market generally. These assessments will also encourage compliance with the recommendations at large.

There is plainly a substantial and evolving role for official regulation and oversight in the case of all clearing and settlement entities. There may, additionally, be a role for competition policy oversight. Its extent and form will depend in particular on the competitive environment in the marketplace, the ownership and governance structure of a particular clearing and settlement entity, and the extent to which voluntary initiative by the board of the entity mitigates the need for active public policy intervention.

RECOMMENDATION 20. ENCOURAGE CONSISTENT REGULATION AND OVERSIGHT OF SECURITIES CLEARING AND SETTLEMENT SERVICE PROVIDERS.

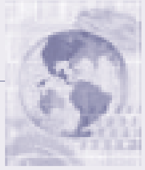
Providers of securities clearing and settlement systems should be subject to consistent and transparent regulation and oversight, which should focus on the activities undertaken and the risks incurred. Standards of regulation and oversight of cross-border activity should be complementary and consistently applied across all relevant jurisdictions. As a long-term goal and where coherent with other public policy objectives, regulatory and oversight standards should be harmonized. While public authorities have developed minimum standards for many aspects of clearing and settlement services, notably as embodied in the CPSS-IOSCO recommendations, the oversight and supervision applied to providers of clearing and settlement services varies across jurisdictions. In addition, organizations undertaking similar activities can be subject to different regulatory regimes and standards based upon their status, such as whether or not they are a bank.

Boards should pursue international operational and technical standards and be attentive to opportunities for improvements in efficiency.

Supervisory, prudential, and oversight standards should recognize the systemic importance of providers of clearing and settlement services with a view to minimizing the risk of default or operational failure of critical organizations. As noted in Recommendation 9, aimed at ensuring consistent financial integrity of service providers, consistent supervision is necessary to create uniform risk standards and ensure consistent minimum financial and liquidity requirements. But consistent supervision is also important to help create a level playing field between competing organizations.

Regulatory and oversight standards that affect cross-border activity must be undertaken consistently and transparently across all relevant countries.

6. FROM RECOMMENDATION TO IMPLEMENTATION



Taken together, the recommendations in this report represent a comprehensive plan of action for the future development of global clearing and settlement. This is an ambitious agenda but a sound one: responsive to market aspirations for greater safety and efficiency, and focused on practical solutions to recognized problems. The report offers an organized approach to the body of work that is needed, a substantial portion of which is already under way by industry groups, supervisors, and central banks. The question is not whether the issues identified need to be addressed, but whether the efforts under way, and the investments that flow from them, will proceed piecemeal or aim toward global consistency.

An approach based on global standards can result if those who have the capacity to motivate change have confidence that it can come in a reasonable time frame and at reasonable cost. The report sets out the general benefits that can be obtained from comprehensive reform, yet the decision to support reform must be made by individual service providers and market participants, whose own cost-benefit calculations are less than certain.

Making all service providers fully interoperable with counterparts in other countries and markets, and with competing firms, will create a more competitive environment, but it could reduce the value of proprietary systems. Open access to systems and services, based only on financial integrity considerations, will enhance price competition and limit cross-subsidy of services. System-wide, the outcome of pursuing these goals will be positive because overall opportunity will increase, but the outcome for individual entities will be uncertain if their former franchise is threatened. At the same time, implementing the recommendations will require substantial investment and change over time and possibly a basic change in business strategy.

There is no certainty that benefits will be proportionate to costs for all organizations, or that either costs or benefits will be spread evenly.

EXISTING INCENTIVES ARE PROPELLING CHANGE

Fortunately, three major influences appear likely to increase strategic attention to strengthening clearing and settlement systems and to produce substantial convergence of private and official interests in favor of reform.

- ***Cost reduction is moving higher on the private sector agenda.*** As margins are squeezed, both during the current market downturn and in the future, broker-dealers, investors, and ultimately issuers will be seeking to reduce external inefficiencies and costs, rather than limiting themselves to internal economies. Users and boards of clearing and settlement entities face new incentives to reduce system development costs, avoid duplicative capital spending, find opportunities for

The report offers an organized approach to the body of work that is needed, a substantial portion of which is already under way by industry groups, supervisors, and central banks.

fee reduction, and pursue consolidation. A sharper focus on external infrastructure costs will underscore the importance of harmonizing technical and operational standards and of reducing the need for multiple linkages to differently configured external providers.

- ***The potential for systemic risk in cross-border activities is more widely recognized.*** The added complexity of cross-border business requires greater awareness of risks. Concentration of the business among a relatively small group of major global players, together with consolidation of infrastructure, mean that a disturbance affecting one counterparty could rapidly spread to other markets and the infrastructure arrangements that support them—however robustly these are structured. This possibility focuses attention on the integrity of payment and settlement arrangements generally, a focus that has been further sharpened by lessons arising from the events of September 11.

This is an ambitious agenda but a sound one: responsive to market aspirations for greater safety and efficiency, and focused on practical solutions to recognized problems.

- ***Market developments call for the attention of competition authorities.*** Consolidation of services and changing ownership structures, in particular where the profit motive has been introduced more strongly into the infrastructure arena through the public offering of shares, raise concern over elements of monopoly in clearing and settlement. There are considerable parallels between the clearing and settlement area and other businesses such as telecommunications and energy supply, where economic deregulation has encouraged the exploitation of scale economies and network externalities, balanced by substantial competition oversight.

REFORM IS A COMPLEX UNDERTAKING

Incentives for change notwithstanding, achieving the objectives set out in this report will be a complex undertaking. The 20 detailed recommendations presented here will require concerted action from multiple parties into the medium-term future. Many of the recommendations cover new ground and entail costs that will have to be carefully considered.

Given the scale of this effort, those asked to adopt the recommendations must feel confident not only that the proposals are of substantive merit, but that they will be implemented systematically. Confidence building requires a realistic framework for action that offers sensible prioritization and ongoing monitoring to ensure sustained attention to performance. Prioritization offers guidance on where work should begin and how it should proceed. Monitoring enables participants to see progress being made and ensure coordination of efforts.

ESTABLISHING PRIORITIES

Because achieving the risk and efficiency benefits described earlier depends on pursuing the program comprehensively, no recommendation can truly be left for later attention. That said, two sets of proposals are of overriding importance.

- The risk recommendations address ongoing safety and stability concerns, stand on their own merits, and warrant speedy action.
- The promised efficiency gains can be achieved only through meeting the conditions for interoperability, which begins with *technical* compatibility, including communication protocols, messaging standards, reference data standards, and synchronized timing.

When these technical capabilities are available, the way will be clear for full implementation of the remaining recommendations relating to business practice and process. Yet given the interdependencies among recommendations, the lead time required for their implementation, and the benefits each offer, there is work to be done in all areas, even if preparatory in nature, within the next year.

Many of the 20 detailed recommendations involve multiple stages: formulation of standards; their wide adoption by providers and users of the clearing and settlement services; and subsequent incorporation, over time, into revised system designs. This process will involve multiple actors: a wide range of trade associations and public bodies to formulate standards, with their implementation becoming the primary responsibility of boards and management of private institutions, with support from prudential supervisors and other regulatory institutions. Furthermore, creating a fully interoperable network will require contemporaneous introduction of standards to achieve the desired result. Finally, a few areas represent new territory for standard setting, reflecting the project's focus on hitherto neglected cross-border activity.

A five-to-seven-year time horizon is proposed, considering the desire for cost minimization and the software obsolescence cycle. That seems quite a long time to address important systemic concerns, but it is a very aggressive time frame for achieving the scope of change contemplated here. Meeting that schedule will require a prompt start on implementation by those responsible for initiating action in each area, so it is important to be clear about the locus of first action.

INITIATING ACTION

Overall, the initiative to build a global network resides in the private sector. The key players here will be boards of securities clearing and settlement service providers, although it is recognized that in a few jurisdictions they are publicly owned, and major users of these services in some instances. They are called upon to take the lead on all recommendations related to strengthening network connections and most of those concerning risk mitigation. There are also several specific recommendations related to the composition and focus of boards, but the overarching governance directive is to put into effect the recommendations set out in this report.

In pursuit of these objectives, private boards should ensure that all new systems development and capital expenditures comply with relevant international operational and technical standards for interoperability. These systems should also be fully capable of identifying, measuring, and controlling the risks faced by the entity, including its counterparty risks. Strategies should be formulated and pursued for avoiding duplicative capital spending and achieving scale economies and network externalities, with due attention to the risks that may arise from consolidation. In keeping with the risk mitigation recommendations in the report, an independently prepared report on the financial and operational condition of the entity should be made available to users and the market more widely on at least an annual basis. Such a report will enable current and potential users to make considered risk and operational performance assessments of their own.

Meeting the five- to seven-year timetable will require a prompt start on implementation by those responsible for initiating action in each area.

Because an overarching objective of the recommendations is to advance current practice toward best practice, private initiatives should be supportive not only of sound management practices, but of sound public policy as well. That said, nothing in the recommendations is intended to limit the public sector's scope of action, and interaction between the private sector and public authorities as standards emerge and evolve will be necessary. Furthermore, there are areas in which action by public authorities is either appropriate or required.

One area is removing legal and regulatory barriers. Although some barriers can be overcome, at least in part, by adopting industry conventions or uniform contractual language, specific legal barriers to entry or access can be overcome only by official action.

There are also a number of areas in which public authorities must act, either in concert with the private sector or actually taking the initiative. One example is providing consistent regulation to provide fair competition and equivalent oversight of different functions. In the area of competition and market access, the degree of involvement of the public authorities is likely to evolve over time, depending on the private sector's response to monopoly concerns and the speed and scope of consolidation that occurs. Where public authorities determine that monopoly conditions exist and governance arrangements make it possible that they will be abused, competition authorities may have to intervene.

The first step required in each area of recommendation and the party best suited to take it are closely interrelated. Where a recommendation calls for adoption of already specified standards (such as messaging standards or communication protocols), primary action will fall to boards and management of infrastructure providers, intermediaries, and custodians, supported as appropriate by relevant industry organizations and public institutions. Where work is ongoing, as is true in many areas of recommendation, existing organizations should be relied upon to the extent possible to continue their work. Where new standards or approaches must be created (such as reference data or corporate actions), impetus is likely to be required first by industry organizations or trade associations in concert with their members. Finally where recommendations call for further study of specific areas (such as systemic operational failure), the impetus for action will have to come from leading private firms, with support and participation as appropriate from the public sector. Table 6-1 identifies first steps to be taken for all 20 areas of recommendations.

> Overall, the initiative to build a global network resides in the private sector. The key players here will be infrastructure providers.

It is also important to remember that the initial focus of attention for the recommendations is limited to a set of advanced economies with significant financial markets. As defined in chapter 1, major markets are taken to include equity and fixed-income securities markets in the United States, Canada, European Union, Switzerland, Japan, Hong Kong, Singapore, and Australia. Thus, in the first instance, the focus is on the CCPs, CSDs, other infrastructure providers, and major intermediaries active in those markets.

MONITORING

Given the complexity and extent of the changes proposed and the time required to effect them, the continuing strong support of boards and senior management will be essential, and external monitoring will be required to name and shame laggards. Following release of its 1989 report, the Group of Thirty sponsored follow-up review of implementation for several years. Then national committees, formed by the private sector, continued monitoring for several more years. There is strong support for a continuing monitoring role for the Group in this case as well. Accordingly, the Steering Committee recommended, and the Group agreed, to a continuing role.

A review is anticipated within two years of this report's release, in consultation with relevant private and public parties, with a report six months thereafter. It will address the extent to which relevant parties are taking each recommended action, the need for further action, and analysis of the time frame for the adoption of emerging standards. Given its missions and resources, the Group of Thirty cannot continue this monitoring role for the long run. Users and providers of various network functions and the organizations associated with those services are in the best position to evaluate the factors that govern their long-term efficiency and safety. It will be for the parties themselves to decide the most appropriate mechanism for pursuing the recommendations in the report over the contemplated five- to seven-year time horizon for implementation—and beyond. Whether an organization should be formed to undertake this role across the global clearing and settlement landscape is a decision that will have to be confronted in the future.

TABLE 6-1. IMPLEMENTATION TARGETS FOR THE PRIVATE AND PUBLIC SECTOR

Recommendations	Initial Goal (NEXT STEPS)	Private Sector (NEXT STEPS)	Public Sector (NEXT STEPS)
Building a Strengthened, Interoperable Global Network			
Recommendation 1 Eliminate paper and automate communication, data capture, and enrichment.	• For each major market, identify and publish: • Steps necessary to eliminate the use of paper securities certificates within a set time frame. • All regulations or laws that lead to a requirement for physical paper, along with proposals for eliminating them.	Collective action by country/market through formation of industry working group in each major market.	Consultation with national regulators and legislators regarding amendments of law and regulation.
	• Enunciate harmonized legal standards for recognition of electronic documents.	Collective action internationally through international legal working group.	
Recommendation 2 Harmonize messaging standards and communication protocols.	• Targets for ISO 15022 implementation and migration to an XML version already in place and coordinated through SWIFT.	Individual action by boards and management.	
	• Any network provider not already operating an IP-based network to publish plans to do so within a defined time frame.	Individual action by boards and management.	
Recommendation 3 Develop and implement reference data standards.	• Establish detailed objectives and terms of reference for coordinated and coherent formulation of asset, counterparty, and generic reference data standards.	Collective action internationally through formation of fully representative, industry-wide working group in each area, drawing on existing initiatives.	
Recommendation 4 Synchronize timing between different clearing and settlement systems and associated payment and foreign-exchange systems.	• Identify all critical timing interdependencies and establish detailed objectives for synchronizing timing, with terms of reference for carrying work forward, on a country, regional, and/or global basis, as appropriate, to address respective interdependencies.	Collective action within markets/ countries and internationally, including representatives of settlement, payment, and foreign-exchange system operators.	Consultation with supervisors, central banks and government-run systems.
Recommendation 5 Automate and standardize institutional trade matching.	• Publish a working paper on globally applicable technical and market practice standards for trade matching and confirmation, building upon work in the U.S. market by the Securities Industry Association.	Collective action internationally through formation of a global working group.	

Recommendations	Initial Goal	NEXT STEPS: Private Sector	NEXT STEPS: Public Sector
Building a Strengthened, Interoperable Global Network (continued)			
Recommendation 6 Expand the use of central counterparties.	• In each market without a CCP, publish a paper for comment setting out the risks, costs, and benefits of using a CCP, with a preliminary conclusion and proposed course of action.	Collective action by country/market through formation of industry working group.	Participation in industry working groups by national supervisors.
Recommendation 7 Permit securities lending and borrowing to expedite settlement.	• In each market where securities lending and borrowing is limited or prohibited: • Identify all regulations, laws, or market practices that serve as impediments. • Propose steps to remove them in a defined time frame, including amendments of law and regulation, as necessary.	Collective action by country/market through formation of industry working group to identify impediments and propose specific changes.	National supervisors and legislators to set out plan to implement proposed changes.
Recommendation 8 Automate and standardize asset servicing processes, including corporate actions, tax relief arrangements, and restrictions on foreign ownership.	• Develop and publish plan to enable standardized, automatic transmission of corporate action information in ISO 15022 format, in each market within a specified time frame.	Collective action internationally—establish industry working group.	Consultation with national supervisors overseers, and legislators.
	• Establish detailed objectives for harmonization of national tax documentation and processes, and set terms of reference and time frame for action.	Collective action internationally—form tax processing working group including industry representatives and tax experts.	Participation of national legislators and tax authorities.
	• In each market, publish clear rules on foreign ownership restrictions and reporting requirements, and make all relevant information freely available to ensure compliance.	Consultation with national supervisors and legislators.	National supervisors overseers, and legislators to clarify law and regulations.
Mitigating Risk			
Recommendation 9 Ensure the financial integrity of providers of clearing and settlement services.	• Each provider to publish outline of business model, risk framework, and underlying risk management processes and standards.	Individual action by boards and management.	Enforcement by supervisors.
Recommendation 10 Reinforce the risk management practices of users of C&S service providers.	• All organizations to establish appropriate due diligence and risk management controls.	Individual action by boards and management.	Enforcement by supervisors.

Recommendations	Initial Goal (NEXT STEPS)	Private Sector (NEXT STEPS)	Public Sector (NEXT STEPS)
Mitigating Risk (continued)			
Recommendation 11 Ensure final, simultaneous transfer and availability of assets.	Each provider to publish report covering: • Nations to sign and ratify the Hague Convention. • How providers will specify the moment of finality specified in rules and contracts in plain language. • Rules for transfer and reuse of cash and securities once finality is achieved.	Individual action by boards and management of clearing and settlement service providers.	Monitoring by national supervisors and overseers.
Recommendation 12 Ensure effective business continuity and disaster recovery planning.	• Each provider to publish outline of business continuity plan, including the scenarios considered, testing performed, and the results of that testing.	Individual action by boards and management of financial intermediaries and clearing and settlement service providers.	Enforcement by supervisors.
Recommendation 13 Address the possibility of failure of a systemically important institution.	• Identify systemically important institutions and evaluate how the risk of their extended failure could be mitigated.	Collective action by country/market—form industry working group.	Cooperation with private sector in evaluating alternative approaches.
Recommendation 14 Strengthen assessment of the enforceability of contracts	• All organizations to establish appropriate legal due diligence and risk management controls.	Individual action by boards and management of financial intermediaries and clearing and settlement service providers.	Monitoring by national supervisors and overseers.
	• Enunciate appropriate standards of legal due diligence and identify deficiencies in law that could potentially impair contract enforceability.	Collective action by country/market – form industry working group.	
Recommendation 15 Advance legal certainty over rights to securities, cash, or collateral.	• Complete agreement on PRIMA in the Hague Convention and embody in national laws.	N/A	Collective action by national supervisors, overseers, and legislators.
	• Confirm seniority of accountholder's rights over creditor's and simplify rules governing pledging and realization of collateral. • Providers to specify moment of finality in rules and contracts.	Individual action by boards and management of financial intermediaries and clearing and settlement service providers.	Collective action by national supervisors, overseers, and legislators.

Recommendations	Initial Goal	NEXT STEPS: Private Sector	NEXT STEPS: Public Sector
Mitigating Risk (continued)			
Recommendation 16 Recognize and support improved valuation and closeout netting arrangements.	• Standard master agreements for all significant transaction types should embody consistent closeout netting and valuation provisions.	Collective action internationally—appropriate industry groups should coordinate action and amend master agreements, as indicated.	Monitoring by national supervisors and overseers.
Improving Governance			
Recommendation 17 Ensure appointment of appropriately experienced and senior board members.	• Develop guidelines by which to evaluate experience and seniority of board members.	Individual action by boards and management of clearing and settlement service providers.	Review by national supervisors, and overseers.
Recommendation 18 Promote fair access to securities clearing and settlement networks.	• Providers to publish report on access rules, detailing inconsistencies with recommendation and specifying plans for remediation within a specified time frame.	Individual action by boards and management of clearing and settlement service providers.	Review by national supervisors, overseers and competition authorities.
Recommendation 19 Ensure equitable and effective attention to stakeholder interests.	• Providers to publish mechanism designed to ensure fair user representation and timetable for implementation of this mechanism if not already in place	Individual action by boards and management of clearing and settlement service providers.	Review by national supervisors, overseers, and competition authorities.
Recommendation 20 Encourage consistent regulation and oversight of securities clearing and settlement service providers.	• Clarify regulatory and oversight responsibilities for each provider. • Establish supervisory principles based on activity and risk-based definitions and analysis.		Collective action by supervisors and overseers.

APPENDIX 1. DETAILED BACKGROUND ON THE RECOMMENDATIONS

APPENDIX 1. CONTENTS

APPENDIX 1. DETAILED BACKGROUND ON THE RECOMMENDATIONS

BUILDING A STRENGTHENED, INTEROPERABLE GLOBAL NETWORK

RECOMMENDATION 1. ELIMINATE PAPER AND AUTOMATE COMMUNICATION, DATA CAPTURE, AND ENRICHMENT.

Infrastructure providers and relevant public authorities should work with issuers and securities industry participants to eliminate the issuance, use, transfer, and retention of paper securities certificates without delay. Such action should be subject to proper investor protection over assets held in electronic form. There is no greater assurance of ownership or control from maintaining paper, and it should be possible to overcome the contrary perceptions of some retail investors through education and by ensuring a sound legal basis for all paperless securities in each jurisdiction. Dematerialization of securities certificates—converting all paper ownership records into electronic format—is the preferred solution. However, in practice immobilization—where ownership is recorded through electronic book entry and the underlying paper certificate is kept in a central security depository—realizes many of the benefits of dematerialization. Therefore, if immobilization can be achieved more quickly and efficiently than dematerialization, it is an acceptable step on the way to full dematerialization.

All market participants should seek to automate elements of the process that introduce other forms of paper, such as confirmations and trade allocations, into the securities processing transaction flow as available technology safely allows, from issuance through to asset servicing.[1] Means of electronic capture, storage, and transmission of documents should be used to their fullest extent to avoid the need for physical documents evidencing transactional activities and asset ownership.

All market participants should use electronic communication to transmit information for all instruments and transactions types. Market participants should identify opportunities to streamline processes by avoiding duplicative recording of data and manual addition of supplementary information. This recommendation applies to each stage of the value chain, from issuance through to trading, clearing, settlement, and asset servicing, including confirmations, allocations, and rights and decisions related to asset ownership. Electronic communication and avoidance of repetitive or manual recording and enrichment of data among all participants are essential building blocks in achieving a zero-intervention process. Technology to address these two aspects of processing should be fully utilized.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation advances aspects of CPSS-IOSCO Recommendations 6 (CSDs), 15 (efficiency),

1. The term "market participants" is used as a collective to include, as relevant, providers of securities clearing and settlement services, financial intermediaries, end-user issuers and investors, and other organizations that undertake processes related to securities transactions

and 2 (trade confirmations). CPSS-IOSCO Recommendation 6 calls for immobilization or dematerialization of securities to the greatest extent possible. The G30 recommendation advocates complete dematerialization or immobilization on the basis of the overwhelming balance of benefits over any respective costs or risks. CPSS-IOSCO Recommendation 2 describes the benefits of automating trade confirmations. G30 Recommendation 1 goes further to explicitly advocate automation of processes, communications, and data processing to the full extent that available technology allows. It is broader in scope, including all aspects of securities processing for which paper can be eliminated or communications and data processing can be automated. CPSS-IOSCO Recommendation 15 sets the broad principle that securities settlement systems should seek to be cost-effective within the constraint of maintaining safe and secure operations and notes examples of places where efficiencies may be sought. G30 Recommendation 1 (and the seven that follow) identify specific areas where efficiency could be improved and set out what should be done to realize cost-saving opportunities.

ISSUE

The use of paper, unautomated communication, and manual recording and use of data in securities processing is time-consuming, expensive, and prone to clerical error. In addition, the use of paper certificates and other physical documents within the settlement and custody environment gives rise to the risk of forgery, theft, or other misappropriation—risks that are lessened in a secure, electronic environment. The use of paper causes greater problems where documents are voluminous, not standardized, or difficult to prepare, interpret, or process.

Completion of an otherwise efficient transaction is often hampered by the need for paper documents to be produced before, after, or alongside execution of an underlying transaction, and exchanged or communicated manually: by fax, for example. Repetitive data capture (such as re-keying of already agreed and matched trade details for clearing and settlement purposes) and manual addition of supplementary information along the process chain (such as the manual addition of standard settlement instructions to a counterparty reference so that securities can be delivered to the correct account), often referred to as data enrichment, also hampers timely, efficient, fault-free, end-to-end completion of a transaction. The ever-increasing focus on the efficiency of processing and avoiding errors challenges the securities industry to work toward the ability to process transactions without the need for manual intervention at any point from trade execution to final settlement (often referred to as zero-intervention processing or, more generically, straight-through processing). With the heightened use of automated trade execution platforms by both private and institutional investors, the pressure for straight-through processing is increased. Electronic documentation, automated communication, and automated transfer and enrichment of data among all participants to a particular transaction are essential building blocks to achieve this goal.

Despite available electronic alternatives, documentation—such as statements, confirmations, allocations, issuer information, notification of registration details, and certifications as to domicile and tax status of the investor—often relies on paper certificates. Communication and information exchange between issuers and investors is rendered less efficient by the use of paper documents. A number of securities markets still transfer funds by check, be it between the (retail) investor and the broker-dealer, between market infrastructure providers, or between dividend/interest disbursing agents and the securities holders of record. The use of checks, like other paper documents, hampers efficient final settlement and exposes the parties to the risk of loss, theft, or other misappropriation as well as the risk of belated receipt and availability of funds. There is also a risk, particularly as settlement cycles are shortened, that insistence on paper for some transactions might lead to differences in settlement periods in markets for paper and paperless settlement. Such differences would harm liquidity and disadvantage the holders of paper certificates or recipients of checks (mainly the retail sector). Yet many markets still require physical documents preceding or accompanying an underlying securities transaction or as part of associated tasks such as dividend or interest income payments. These include:

- Physical documents used to evidence and transfer ownership, be they securities certificates, accompanying transfer and assignment documents, or checks.
- The exchange of physical trade confirmations for the purpose of matching and allocating securities.
- New issues prospectuses, selling memoranda, corporate actions documentation, and subscription agreements (the latter in particular for mutual fund shares and private placement transactions).
- Beneficial ownership declarations, notarized tax authority certifications, and omnibus certifications regarding preferential withholding tax treatments at source.

Centralized securities depositories (CSDs) have been established in many markets to mitigate the need to transfer or use paper securities certificates, a development strongly influenced by the 1989 G30 report. In many countries, however, some investors still hold residual paper certificates. In other areas, some markets have made an effort to facilitate the use and exchange of electronic documents among securities industry intermediaries, but physical documents are often still prevalent. In addition, the insistence by regulators and other authorities on original, paper documents to support and evidence transactions necessitates a flow of paper, even among intermediaries.

The main argument usually advanced in support of maintaining paper is that some, mainly retail, investors like the apparent assurance and tangible evidence of ownership that securities certificates and other physical documents give. However, when secure electronic documentation has a sound legal basis, it can provide similar, if not better, levels of assurance. Public authorities should not underestimate the capacity and flexibility of retail investors to accept and embrace change, as shown, for example, by the acceptance by U.S. investors of electronic records evidencing holdings in mutual funds and the recent smooth transition to the use of the Euro rather than national currencies in many European countries. The latter in many ways was a change far more fundamental than switching from paper to electronic records. Educating investors, responding to their concerns, and clearly explaining the benefits of eliminating paper, many of which should flow through to investors in the form of lower transaction and custody charges, should be able to overcome any apprehension.

Electronic, real-time transmission of data from exchanges or other trading platforms to the subsequent clearing and settlement process must be practiced consistently; otherwise, parties to the trade have to provide secondary duplicative input of the same data. The increase in cross-border investment activities and in investor choice between various combinations of service providers has resulted in a lack of electronic linkage among parties involved in the trading, matching, and settlement of particular trades. In addition, the necessity for various parties at different stages along the value chain to add to transaction data by reference to various information and reference data sources, many of them unautomated, and the heavy use of fax and other manual means of communication in executing, allocating, and settling trade details all contribute to the relatively high failure rates prevailing in the cross-border arena.

Markets operating book-entry transfer systems often require separate, unautomated communication of registration information among custodian-agent banks, CSDs, and the relevant securities transfer agents. Issuers and their agents communicate upcoming entitlements and distributions through the securities industry in an inconsistent manner and through a variety of communication means, such as publication in newspapers, by electronic communication, or through securities data vendor services and stock exchanges. The reclamation of (parts of) withholding taxes levied at source by custodian-agent banks is also a manually intensive process, particularly for cross-border investment activities.

HOW RECOMMENDATION 1 ADDRESSES THE ISSUE

Elimination of the issuance, use, and transfer of paper securities certificates can be achieved through comprehensive use of CSDs for all records of ownership. CSDs operate by one of two main mechanisms: dematerialization, whereby all records evidencing ownership are electronic and paper securities certificates are not issued; and immobilization, whereby ownership is recorded through electronic book entry but with the underlying securities certificates still held by the CSD in physical form. Dematerialization of securities certificates is considered best practice to achieve fast and efficient clearing, settlement, and asset servicing, and to prevent forgery, theft, or other misappropriation. Where local law or regulation requires physical certificates, moving quickly to dematerialization may be impractical. In these circumstances, full immobilization of certificates (preferably accompanied by the ability to issue global notes rather than definitive certificates) achieves many of the benefits of dematerialization and is an acceptable step on the way to full dematerialization. Partial immobilization, whereby most transactions are book entry but investors can still opt to deposit or withdraw paper certificates from CSDs, is not considered sufficiently efficient or safe.

Eliminating the use of paper significantly facilitates automated electronic communication and exchange of information. Technological developments provide an increasingly secure, stable, and efficient means of capturing, storing, and transmitting documents, as well as the ability to exchange information electronically in an automated fashion. This technology presents the opportunity to eliminate paper and manual forms of communication and thereby captures significant improvements in the speed, efficiency, and safety of transaction processing.

WHAT NEEDS TO CHANGE

All paper securities certificates should be dematerialized or, if this is impractical in the short to medium term, immobilized in CSDs as a matter of priority. Over time, the law in jurisdictions where immobilization is established as an interim step should be changed to allow full-fledged dematerialization of securities certificates. For markets where the benefits of immobilization have already been achieved and the barriers to and costs of change are significant, the step to full dematerialization is of lower priority but should still be targeted as a medium- to long-term objective.

Other opportunities to eliminate paper at each stage of the securities processing transaction flow should be taken where the risk and efficiency benefits outweigh the costs, which they are already expected to do in most circumstances and will increasingly do as the capacity and functionality of technology develops. In many cases national law or regulation requires the use of paper, either through an affirmative rule or through not recognizing the legal status or validity of electronic alternatives and equivalents. Again, where law or regulation needs to change to allow paper to be removed from the process, it is recognized that progress may necessarily be slower, but the process should nevertheless begin.

To facilitate harmonized standards for cross-border transactions, the recognition of electronic substitutes for paper documents should be coordinated internationally between the national securities and commercial law legislators so that relevant and consistent changes can be made to their local laws. Although not directly part of the clearing and settlement process, many root causes of processing inefficiencies originate "upstream" at the time securities are issued. Consideration should be given to standardizing primary issue prospectuses and sales memoranda as a precondition for enabling electronic filing, dissemination, and re-use of key data elements for further processes. As discussed further in the recommendation on asset servicing, national tax authorities should accept and provide electronic confirmations of beneficial ownership and taxpayer status as valid substitutes for the relevant paper documents.

Electronic and real-time communication among all parties to trading, clearing, settlement, and asset services activities needs to be established where it does not already exist. Where certain parties (such as end-user investors) are unable to communicate in such a way and it is uneconomic for them to invest in equipment to do so, processes should be designed to minimize the impact of necessary manual processes on other parts of the transaction flow.

RECOMMENDATION 2. HARMONIZE MESSAGING STANDARDS AND COMMUNICATION PROTOCOLS.

All market participants should adopt ISO 15022 (the data field dictionary and message catalogue for securities information flows) as the global standard for straight-through securities messaging across the entire securities life cycle. Over time, XML (extensible mark-up language) should become the language to describe standardized messages.[2] Market participants should follow the road map set out by the ISO working group established to advance ISO 15022 to a standardized use of XML. This standard should develop to meet the needs of all parties to the investment product life cycle and, in particular, the asset servicing requirements of the industry. All stakeholders in the securities industry should be appropriately represented in the standard development process.

All market participants should support and use communication networks that adopt open, standardized, IP-based protocols for securities transactions.[3] These standard Internet protocols must embrace key attributes critical to the sending of messages related to securities transactions. Security, in particular, should be set at a level that satisfies business and regulatory requirements and that meets the needs of all stakeholders in the industry. Each network provider should clearly define and publish its plans to migrate from proprietary communication protocols to the open IP-based protocols.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation endorses CPSS-IOSCO Recommendation 16 (communications procedures and standards), which advocates the use of relevant international communications procedures and standards for the settlement of cross-border transactions. G30 Recommendation 2 is more prescriptive in identifying ISO 15022 and IP (Internet protocol) as the respective current messaging standard and communication protocol that the securities industry should use. It is broader in scope in advocating that these standards be used for all transactions and be developed and used to meet participant requirements throughout the securities life cycle.

ISSUE

Differences in the manner and form by which electronic messages are sent, and in defining and interpreting what elements of messages mean, inhibit the ability of organizations to automate the exchange and use of information, both between organizations and within a particular organization during the processing cycle. Even where paper and manual communication has been eliminated from a transaction flow, lack of messaging standards and communication protocols (broadly speaking, a "dictionary" to harmonize the meaning of the content of the message, and an electronic "envelope" to harmonize its sending) can mean that organizations still need to intervene manually to capture, interpret, or use electronic messages, or at best use middleware to translate between different formats. This issue is significantly magnified for cross-border trading, which require use of multiple local networks and multiple intermediaries, all of which need to communicate with each other in a "many-to-many" web of connections.

Historically, ISO 7775 aimed to address at least part of this issue by defining standardized securities messages; it was endorsed by the 1989 G30 report. Its usefulness was limited, however, because it did not cover all message types used by market participants. In addition, it allowed discretion by incorporating optional fields, and varying interpretations ap-

2. ISO, the International Organization for Standardization, is a confederation of national standards institutes that works in partnership with public and private institutions to develop standards to be used consistently as rules, guidelines, or definitions of characteristics and to ensure that materials, products, processes, and services are fit for their purpose. XML (extensible markup language) is the universal language for describing structured documents or data on the Internet.
3. IP (Internet protocol) is a suite of protocols developed for and used by the Internet and by private networks as the open, global standard for electronic communication.

plied by different users of the standard critically compromised its effectiveness. The market is now moving to adopt ISO 15022, which effectively replaces and builds upon ISO 7775, as the global standard for securities messaging. ISO 15022 uses a set of defined expressions, termed "business elements", which form the building blocks of and collectively describe securities messages. A business element is a unique component of a business process that cannot logically be further subdivided. Each business element must be defined in a consistent fashion on a global basis to maximize the benefit of the new standard. This standard must be developed to meet the needs of all parties to the investment product life cycle, especially the asset servicing requirements of the industry. In addition, data quality and consistent use of standards must enable all parties to receive messages and use the message content through their systems and processes without the need for intervention.

The road map for the migration to ISO 15022 and its further progression to an XML version and beyond also needs to be defined clearly. Consideration should be given to whether all stakeholders in the securities industry have the appropriate representation in the process of developing, setting, and implementing standards. Consideration must also be given to how to balance the need to move and adapt quickly with the need to achieve consensus. Clearly, development of standards should not follow a lowest common denominator approach whereby the whole industry moves at the pace of the slowest to change; neither should a limited number of participants "improve" upon the standard at the expense of broad-based and consistent use.

Protocols are needed to set rules that govern the operation and safety of networks (including those used in the financial services sector), how the various devices connecting the network join up and interact, and the way that dedicated hardware is required to send, transmit, and receive messages securely. To date, communication networks used for transmitting securities messages have generally been based on proprietary protocols and fixed, dedicated hardware. The drawback with this type of network is that it is inefficient, because it requires specific and therefore costly infrastructure and specialized maintenance and support. Users that connect to more than one such network suffer the costs of building customized systems that enable compliance with multiple protocols to connect to multiple networks. Innovation is also inhibited because integration and development of software requires customized tools.

HOW RECOMMENDATION 2 ADDRESSES THE ISSUE

The adoption of a universal messaging standard encompassing the entire securities transaction flow will facilitate zero-intervention processing throughout the securities life cycle. This in turn will enable faster and more accurate confirmation, matching, netting (where used), and settlement, thereby reducing operational and counterparty risk. Greater levels of straight-through processing will also sharply reduce industry costs, given the level of human intervention currently required in executing electronically delivered instructions in forms that are nonstandardized. ISO 15022 aims to enable standardization of all these flows through the following key attributes:

- It is based on a data field dictionary that provides definitions allowing common usage of business elements for all messages.
- It offers flexibility and can thus accommodate in standard form messages that in earlier formats used nonstandard, free-form comment or narrative fields that required receivers to read, interpret, and re-input data.
- It allows any community of users to create its own series of messages, an attribute that has advantages (speed to market without the need to gain universal approval) but also disadvantages (multiple de facto standards for users who may need to participate in several such communities). Market participants can determine the appropriate balance.

The evolution of ISO 15022 to an XML-based standard will further improve message quality, scope, and automation, because the XML-based standard—a cross-industry standard that is not restricted to the securities market—will be wider in scope and usage than that of the first edition of ISO 15022. The ISO 15022 XML toolkit will be freely available to any community of users in the financial industry.

A registration authority appointed by ISO is responsible for maintaining the standard and provides a governance framework. The standards development process is transparent and based on a publicly available business modeling methodology. The migration of programs to XML can be automated, guaranteeing a consistent use of XML and a fast delivery of definitive standards. The migration to XML standards needs to be scheduled against business demand, especially where existing ISO 15022 messages already accommodate the relevant business need. Compensating user advantage (such as a reduction in the amount of intervention needed in processing high-volume or high-risk message types) should always exceed cost of change, and the process needs to ensure continuity and avoid the need for costly changes from one standard to another unless supported by a sound business case.

The development of the Internet presents the opportunity to use a common network based on open, widely used protocols, with consequent improvements to the ease and cost of connectivity and access to the network, and elimination of the need to maintain proprietary, dedicated infrastructure. Historically, however, the level of security offered by communications sent over open networks using standard Internet communication protocols has not been sufficiently secure or confidential to meet the needs of the securities industry.

Internet-based protocols can be used in connection with Public Key Infrastructure (PKI) cryptography and secure communication layer protocols that substantially address these concerns.[4] IP-based networks also offer security benefits that not all existing proprietary networks have. One such benefit is nonrepudiation of messages, which ensures that the message is received from an identifiable and authorized source and effectively replaces the need for bilateral key exchange. Critically, IP-based networks fully support XML-based messaging standards. IP, like ISO 7775 and ISO 15022, is an open standard and, by advocating a move to IP-based networks, the recommendation is not advocating any one particular network. Indeed, the appropriate network may differ between various types of messages. For example, secure Internet messages may be acceptable for lower-value transactions, but the greater security of virtual private networks may be appropriate for higher-value transactions. Where different IP-based networks connect, it is critical to ensure that lower-security users are unable to cause contagion in higher-security networks.

WHAT NEEDS TO CHANGE

The current processes for setting message standards are still fragmented, but key groups of market participants are now working together more closely and have accepted the need to ensure consistency in standards across the market and through the securities value chain. These groups include FIX, the standard most commonly used for securities messages at the pre-trade and trade execution stage of the value chain; SWIFT, the inter-bank communications network and corresponding standard-setter at the settlement and custody stage; and ISO, the overarching global standards body.[5] The successful, wide adoption of standards by the financial community will depend on the willingness of these and other market groups to participate in the process and collaborate to define, implement, and consistently use standards that cover the complete securities value chain. This process is already under way, and the following key stages have been scheduled:

4. PKI is a generic term for a system that uses digital certificates and authorities that verify and authenticate the validity of parties to an electronic message or transaction.
5. The Financial Information eXchange (FIX) protocol is a messaging standard maintained by FIX Protocol Ltd., a membership organization open to all interested firms and developed specifically for the real-time electronic exchange of securities transactions. SWIFT is an industry-owned cooperative organized under Belgian law that supplies secure messaging services to financial institutions active in payments, securities, treasury, and trade services.

- The securities industry and associated application vendors have started developing business applications that take into account and use the business components that are defined in the ISO 15022 data dictionary.
- The official ISO approval process has begun for the ISO 15022 XML standard. This should lead to an officially approved standard in 2003, following which the current and XML versions of the ISO 15022 will coexist for a period, with the non-XML version being discontinued at a point to be determined by its users.
- SWIFT and FIX have agreed in a Memorandum of Understanding to develop and register all future standards in compliance with the ISO 15022 XML standard. This agreement ensures that there will be no further divergence or duplication of effort and investment between the securities message standards supported by FIX and by SWIFT. The reach of the ISO 15022 XML standard needs to be further expanded throughout the financial industry through active cooperation with other organizations in the standards field.

Adoption and use of the standard will be facilitated by the growing industry trend to discount fees for messages that do not require manual intervention, as opposed to those that require further human involvement before they can be processed, so that those not complying will be penalized economically.

Many network providers that have previously used proprietary protocols are moving to develop IP-based communication networks, such as SWIFTNET, on the basis that it provides appropriate security as well as substantial improvements in efficiency, connectivity, and access. These developments should be advanced, with all communication networks significant to the securities industry moving toward common standards so that providers and users of the networks benefit fully from the improvements available. Market participants should work with network providers to ensure that concerns about security and other critical issues are properly and consistently addressed, for example, through the establishment of common security standards. The process of transition will need to be carefully managed, acknowledging the need for users of the networks to develop their own parallel internal infrastructure, applications, systems, and hardware to work effectively with the new standards.

RECOMMENDATION 3. DEVELOP AND IMPLEMENT REFERENCE DATA STANDARDS.

Market participants should collectively identify, develop, and adopt universal securities, counterparty, and relevant generic reference data standards that fully meet the needs of all relevant users. Such standards should be adopted in connection with:

- Asset identification and associated descriptive data, based upon ISO 6166 (concerning International Securities Identification Number, ISIN).
- Counterparty identification, exact account identification, and standard settlement instructions, based upon ISO 9362 (concerning Bank Identifier Code, BIC).
- Relevant generic data categories, such as fee, tax, and commission rates and other, typically country-specific, data (including currencies, local holidays, and time zones).

Standards should be comprehensive, covering the needs of all users in the securities value chain. They should also be applicable globally. Particular attention is required to address the concerns of jurisdictions where use of such standards is restricted for reasons of data confidentiality, secrecy, or other public policy purposes.

Issuers, exchanges, and other originators and distributors of data should make all relevant information available to the market in compliance with these standards for a fair price and on a timely basis. The development of standards is not in itself sufficient to avoid the very substantial inefficiencies and costs incurred through inaccurate, incomplete, or incompatible data. In addition, it is critical to enhance the substance and content of the data.

Extensive work is needed in connection with all three categories of reference data, and the time frame for ultimate adoption and use of these standards will vary. As a first step the industry should set up working groups (or, where initiatives are already under way, build upon or combine existing working groups) representative of all parties to the investment product life cycle to identify the specific areas where standardization is needed. These industry groups should work with the relevant standard-setting bodies and data suppliers to establish a plan designed to achieve identified objectives in connection with these standards.

ISSUE

Reference data plays a critical role in securities clearance and settlement. Poor quality, incomplete, incompatible, or inconsistent data can significantly reduce the efficiency and increase the risk of securities processing. The vital importance of reference data has not always been fully appreciated, and the perhaps surprising complexity of the issues involved, from both a technological and an organizational standpoint, has hindered the ability of the financial services industry to implement fully effective reforms. This is an area where substantial potential for improvement remains. Although some progress was made during the last decade (such as the introduction of ISIN), the continued absence of comprehensive and widely adopted reference data standards that meet the needs of all users creates major costs and risks for industry participants.

There are two main aspects of reference data: the standards that describe how data content should be defined, and the information provided in accordance with those standards. The lack of comprehensive standardization has wide-ranging facets and ramifications, including:

- ***Multiple content standards.*** The existence of multiple standards and sources of data means that the same asset (such as a traded instrument) or entity is often described in many different ways.
- ***Lack of specificity.*** Some data are not specific enough to ensure accurate settlement. For example, the BIC is not detailed enough to ensure that the funds are transferred to the correct branch of a specific bank.
- ***Incomplete scope.*** Many existing standards are incomplete and do not fully solve the underlying problem. For example, ISIN does not accommodate the various representations of securities that can be used for trading purposes (such as the many symbols that may be used for a global equity instrument) so that these can be referenced to the single settlement representation.

Even where standards such as BIC and ISIN exist, data are not always provided consistently or in accordance with these standards. The originators and distributors of data are often inconsistent in how they provide data to the various market participants who use the data in their business processes. It is not always clear who has the responsibility, authority, incentive, or means to provide complete, accurate, and timely data. Typically, it is a combination of securities issuers, exchanges, data vendors, and various other types of organizations that vary from market to market. The form of data provided also varies, from publication in newspapers to automated electronic messages. As a consequence of these issues, industry participants have to employ significant numbers of people to set up, maintain, reconcile, and cleanse reference data. In addition, the lack of quality data creates operational risk and causes significant costs in relation to correction and reworking of transactions, an increased need for manual intervention in trade processing, and increased settlement failure.

While it is generally acknowledged that the lack of common standards adds cost and risk and that all participants spend significant money on "cleaning" the same deficient data, the industry has made only very limited progress in this area over many years. The issues are complex and intractable, and the difficulties with moving forward have many root causes. Historically, the effort to eliminate manual intervention from trade processing has focused on electronic connectivity. It is now becoming recognized that complete, accurate, and up-to-date data are similarly critical. The costs involved in bringing about change in relation to data are perceived to be very high, partly because of the diversity and complexity of any data set that would need to be developed, but also because of the substantial additional costs associated with integrating the standards into each organization's individual systems.

Obtaining funding within organizations to support improvements in reference data is difficult for a number of reasons. Many organizations do not link all the direct and opportunity costs that arise from poor data (such as losses on corporate actions, settlement failure, and the need to rework transactions) back to their underlying cause in a transparent manner, so the business case for change is not clear. Establishing a business case is made even more difficult in many organizations by lack of clarity over ownership of and responsibility for reference data. Given that many issues need to be addressed on an industry-wide basis, the complexities even within individual firms illustrate the difficulties involved in coordinating action across many different parties, including broker-dealers, custodian-agent banks, infrastructure providers, issuers, investors, and data vendors.

HOW RECOMMENDATION 3 ADDRESSES THE ISSUE

Establishing a standardized and comprehensive reference data set across all data classes, one that is adopted by the full range of industry participants, would overcome many of the risks and inefficiencies that currently exist in connection with the need for manual intervention, failure rates, and reworks. For these purposes the term "reference data" is broad and all-encompassing, covering a range of data classes that are diverse in nature and complexity. Three broad classes have been identified:

- ***Asset,*** including asset identification and descriptive data associated with asset identification
- ***Client/counterparty,*** including counterparty identification, account identification, and settlement instructions.
- ***Other,*** including fee, tax, and commission rates, and generic data that is generally country-specific, such as currencies, local holidays, and time zones.

Establishing widely adopted reference data standards covering these broad areas will be complex and challenging. The recommendation therefore seeks to identify and clarify the process required for achieving the proposed change and the need for pragmatic first steps to create initial momentum for moving forward.

WHAT NEEDS TO CHANGE

Delivering effective and substantial change in this complex area requires a significant shift in behavior, both in individual firms and at the industry-wide level:

- Increased industry participation and leadership in the development and definition of reference data standards, including collaboration between, or merging of, the many existing and fragmented initiatives in connection with this subject.
- Harmonization of industry participants' own internal reference data sets and of the interfaces that hand off and receive reference data, both between and within industry participants.
- Changes in the way the industry creates and maintains reference data.
- Willingness of entities, such as stock exchanges, that own data content or proprietary standards to participate in change that may affect their franchise.

In overview, the process for moving forward requires relevant industry participants for each data class or their representative bodies to collaborate with data providers and the relevant standard-setting bodies to define, develop, and implement the appropriate standards. The challenge for the industry is to find the appropriate group for each data class and to establish the necessary leadership and commitment to drive change and complete the process. Each of the three categories of data class, and even the subcategorizations within, will require a different combination of participants and different leadership. However, most will require involvement of representatives of users and providers of data and of standard setters. It is recognized that several initiatives are under way, and this recommendation does not propose to add to that number. Instead, existing initiatives should be combined and coordinated as appropriate to achieve coherent and harmonized progress.

The business case for change should be established and confirmed and should include the nature and scale of the costs and benefits that will flow from standardization and better provision of data. The inclusion of all types of organizations that will be affected will help build consensus and momentum toward realizing change.

Definition, development, and implementation of the standards requires that several issues be addressed, including:

- Identification of the data elements required to populate the standards.
- Analysis and design of the proposed common data content.
- Mechanisms for building consensus and agreement and for resolving disputes.
- Ownership of the standards and the data.
- Implementation plan and timetable.
- Process for updating the standards to accommodate changes and new elements.
- Guidelines for the use of data in a live processing environment (such as timeliness of adding new data elements into production trading systems).
- Enforcement mechanisms.

As noted previously, establishing standards is a necessary condition for eliminating the inefficiencies and risks caused by poor reference data, but it is not in itself sufficient. In addition, the originators and distributors of data will need to provide all relevant data consistently and comprehensively in a form that complies with these standards and in a timely fashion. Such providers of data should also follow the relevant standards set out in other, relevant recommendations, particularly those dealing with messaging standards and communication protocols. Data provision has an associated cost, and users of data should expect to pay an amount that fairly reflects this cost. Ideally, data providers should comply with this recommendation for their own commercial benefit, but in some instances, particularly where there is only one data source, regulation or other forms of enforcement may be needed, for example, to compel issuers to provide data to the market as part of listing requirements.

RECOMMENDATION 4. SYNCHRONIZE TIMING BETWEEN DIFFERENT CLEARING AND SETTLEMENT SYSTEMS AND ASSOCIATED PAYMENT AND FOREIGN-EXCHANGE SYSTEMS.

Providers of clearing and settlement services and linked or otherwise associated payment and foreign-exchange systems should collectively ensure that their design, procedures, operational timetables, and funding and cutoff times are such that the operation of one system does not materially reduce the efficiency or increase the risk of settlement in another. These organizations should collaborate to identify the specific areas where standardization is needed and to develop detailed plans to achieve it. Standardization should be implemented initially on a regional basis (broadly based on the Americas, Europe, and Asia-Pacific). Cross–time zone protocols should be established subsequently. Systems should allow transfers to and from securities settlement systems to be made in a timely manner. Periods of peak cash demand in separate systems should be carefully managed so that they do not clash with one another.

Market participants should work together to develop a comprehensive action plan to increase the efficiency and safety of cross-border securities transactions where the foreign-exchange settlement cycle is not synchronized with the securities settlement cycle. As yet, no fully developed solutions systematically address the costs and risks arising from the mismatch between securities and foreign-exchange settlement cycles in these circumstances. This issue will increase in importance as securities settlement cycles are shortened.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation advances aspects of CPSS-IOSCO Recommendation 3 (settlement cycles), which calls for the benefits, costs, and risks of shorter settlement cycles to be assessed while retaining T+3 settlement as a minimum standard; and Recommendation 19 (risks in cross-border links), which calls for assessment and mitigation of the risks associated with cross-border links between settlement systems. G30 Recommendation 4 is broader in scope in identifying the critical interdependencies between linked settlement, foreign exchange, and payment systems and is more assertive in describing the proactive steps that the industry should take to identify, evaluate, and mitigate associated risks and inefficiencies.

ISSUE

Where connections and interactions exist between clearing and settlement organizations and associated payment and foreign-exchange systems, differences in opening hours and in funding and instruction cut-off times can lead to administrative difficulties and risk for participants.

For transactions involving more than one securities settlement location, the risks to participants result largely from being unable to settle back-to-back trades as a result of failure to receive from or inability to deliver to another settlement organization. The participant is then left with an overnight fail, with the associated funding cost and replacement risk. Where this failure arises from differences in public holidays, this risk may be extended over three days or more. As the market moves toward increased connectivity and interoperability, giving participants a greater choice of clearinghouse and settlement location, timing differences may also create risk management problems for the service providers.

In current market conditions, interaction between providers of clearing and settlement services is generally relatively limited. However, interaction can be a significant issue where liquidity is split between organizations and a sizable transaction flow between them results, for example, across the Euroclear/Clearstream bridge. As such practices as dual listing and competition between trading spaces make split pools of liquidity more commonplace, the need for harmonization between clearing and settlement providers will increase. Even though such organizations may be open at the same time, if funding between them is unavailable, participants will still be unable to settle.

Payment systems are used to facilitate the transfer of money between banks. A payment system consists of the network that links member banks, switches for routing messages, and rules and procedures governing the use of the system. In the context of securities settlement, the exchange of money can be internalized (for example, where a CSD is organized as a limited-purpose bank) or externalized (where multiple settlement banks compete to provide payment services to participants of a CSD and use a separate payment system to effect funds transfers). Because payments are an integral part of the securities settlement process, it follows that a critical interdependence exists between payment and securities settlement systems. This is true even in the case of internalized settlement, because external payment systems are used to fund settlement accounts.

In recent years the number of links between payment and settlement systems (both at the domestic and international level) has increased to facilitate cross-border settlement, delivery versus payment, and payment versus payment. Those initiatives have brought benefits ranging from opening up markets to new investors to reducing settlement risk. However, when these initiatives are coupled with the emergence of time-critical payments and securities settlements, interdependencies are created that need to be investigated further from a systemic viewpoint.

Because central bank money is frequently the settlement asset for payments between commercial banks, demand for cash liquidity that underpins those transfers is increasing. This demand means that settlement banks hold many different pots of cash liquidity around the globe to meet the peak demand in each underlying system at any given time on any given day, and further increases in demand will require settlement banks to hold higher and higher levels of eligible collateral (the assets required to source central bank money, primarily government debt) purely to support and maintain efficient levels of settlement. Fragmentation of cash liquidity between different systems is inefficient.

The operating hours of payment and securities settlement systems need to allow the timely and automated funding of settlement accounts. The design of securities settlement systems will dictate the amount of money needed to effect settlement, which in turn could adversely affect the efficiency of payments markets, and vice versa. As a matter of principle, the design of payment and securities settlement systems should ensure that both are able to operate efficiently.

Cross-currency trades introduce the need for a foreign-exchange transaction to provide the payment leg of the securities transaction in the appropriate currency. This creates one or more additional links in the chain of organizations that need to interact in a coordinated manner. It also requires coherent settlement cycles for securities and foreign-exchange transactions. Further, certain market practices, such as funding several securities transactions with one "block" foreign-exchange trade, often lead to the need for additional manual intervention, such as the subsequent allocation of those block trades across the several underlying securities transactions.

Currently, the typical foreign-exchange transaction settles two days after the trade date (T+2). Where securities settle on a T+3 basis (the normal cycle for most equities and corporate bonds), there is clearly no obvious problem in completing the associated foreign-exchange trade so that the respective settlements coincide. As the securities industry considers further reducing settlement cycles, however, proper coordination with the foreign-exchange markets is imperative. Otherwise, participants in cross-border securities trades will suffer increased cost or risk, or both. In some cases, they may be able to opt for a nonstandard foreign-exchange settlement, but this method is more expensive. Alternatively, the timing difference may result in additional funding costs and/or exposure to market risk on the mismatched currency amounts. These issues already exist in some areas where securities settlement systems operate on a T+1 basis, particularly government bond markets. However, workarounds are available, and although these increase cost and risk and so likely restrict the scale of cross-border activity in these markets, they have not yet done so on a scale sufficient to cause the market to seek and fully evaluate alternatives.

HOW RECOMMENDATION 4 ADDRESSES THE ISSUE

The objectives of the recommendation are to ensure that:

- The opening hours and funding deadlines between organizations providing clearing and settlement and associated services, including connected payment and foreign-exchange systems, are properly sequenced.
- The design of payment and securities settlement systems enables the systems as a whole to operate efficiently.
- Movement toward a shortened securities settlement cycle recognizes the dependency of a contemporaneous reduction in the settlement cycle of the spot foreign-exchange market.

The issues involved are extremely complex from a technical viewpoint, and proper analysis also requires the involvement of a significant number of institutions drawn from both the public and private sectors. A holistic approach is critical to ensure the synchronized and coherent working of payment, securities, and foreign-exchange settlement systems so that all can be effected efficiently from an economically viable supply of cash liquidity.

The recommendation focuses on the need for collaboration between providers of all types of settlement and payment services to ensure that dependencies between such systems are understood and that processes and operations develop to allow synchronization between interdependent activities. This is clearly the right approach at a general level, but beyond setting out principles and high-level guidance, the recommendation does not attempt to prescribe a specific set of answers in an area where highly complex and many-faceted issues are apparent but not yet fully understood and where potential solutions need to be properly tested and thought through. Rather, it advocates that the above-mentioned organizations undertake further research and investigation and remain mindful of the need to consider these factors fully in any future development plans.

WHAT NEEDS TO CHANGE

Significant work and study are required to analyze fully the risks and costs involved. Although many of the principles and issues are common across all jurisdictions, workable solutions in the short to medium term are likely to be much more practical if regionally based. As a subsequent medium- to long-term objective, cross-regional protocols should also be established. As functionality is developed, operators of payment, foreign-exchange, and securities clearing and settlement systems should collaborate to ensure that their design, working practices, and operational timetables are such that:

- The operation of one system does not materially reduce the efficiency of settlement in another.
- Individual funding deadlines recognize the interaction with other settlement and payment systems and banking hours.
- Transfers to and from securities settlement systems can be made in a timely manner.
- Deadlines, timings, and operational cycles are designed to manage periods of peak cash demand in each system in a coordinated manner.
- Effective contingency arrangements are in place, particularly to ensure that an outage of one system has a minimal disruptive effect on the others.
- All systems follow recognized and agreed messaging, communication, and data standards to allow efficient information flow without the need for manual intervention.

Such considerations should encompass the effects of interdependencies on both the service providers and their users.

RECOMMENDATION 5. AUTOMATE AND STANDARDIZE INSTITUTIONAL TRADE MATCHING.

Market participants should collectively develop and use fully compatible and industry-accepted technical and market-practice standards for the automated confirmation and agreement of institutional trade details on the day of the trade. The establishment and use of the matching utilities currently being developed and put into operation is an important part of this process, although many of the potential efficiency gains that they offer will not be realized without interoperability among separate systems. If the number of organizations providing these services grows, the inefficiencies that fragmentation and lack of standardization can create will increase.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation endorses and builds upon CPSS-IOSCO Recommendation 2 (trade confirmation), which describes the benefits of automating trade confirmations. G30 Recommendation 5 goes further to emphasize the need for agreed and commonly used standards, as well as for automation of processes as critical components of an efficient and risk-reducing, industry-wide solution.

ISSUE

Continued expansion of institutional trading combined with an increasing focus on the efficiency of post-trade processing makes it imperative to improve and harmonize the current post-trade confirmation and matching model for institutional trades to make it more robust, efficient, and scalable. Even though some parts of the process are already highly automated, the process as a whole is not seamless, but replete with potential bottlenecks, the need for manual intervention, and opportunities for trade failure. Without improvements, the process will come under increasing strain, with high error rates, increased numbers of exceptions, excessive trade failures, a higher degree of operational risk, and higher operational cost. Nor will it be possible to reach the goal of matching all institutional trades on the day that the trade is executed, which in itself is an important element in reducing risk. These issues are most prevalent in the cross-border environment, but even efficient domestic markets will be increasingly affected. Already, for example, rising volumes have made the daily number of unaffirmed trades unacceptably high in several markets.

Few standards facilitate a consistent and efficient process for institutional trade confirmation and matching. Without standards that are accepted and widely practiced throughout the entire post-trade process, further automation of disparate procedures will not produce the required efficiencies or properly mitigate risk. The current post-trade processing model is characterized by the following features:[6]

- ***Sequential and reactive process.*** Currently, trades are processed sequentially, with only one participant reviewing and enriching trade data at a time. This practice creates a "windshield wiper" effect, where the trade swings back and forth between the investment manager, broker-dealer, and other relevant parties, and data is enriched incrementally with each pass. The process is also reactive, as participants wait for a "trigger" before executing the next step in the process, causing processing delays and redundant flows of nonessential data.
- ***Lack of participant automation.*** Lack of internal automation on behalf of participants is also responsible for inefficiencies in the current process. Specifically, trade data are often manually re-keyed into several systems, custodians' credit and position checks may be manual, and affirmations may be manually reviewed, all leading to an increased chance of error. Manual intervention is necessitated by participants' use of internally developed proprietary systems or vendor systems that fail to adhere to a common standard through the life cycle of a trade. Furthermore, trade information is often passed between parties via phone or fax, again calling for manual input on the receiver's end. For example, approximately one-third of all allocations are manually or verbally transmitted, resulting in delayed affirmation and greater potential for trade failure.
- ***Lack of standards.*** Currently, universal usage of messaging standards or protocols is lacking across the industry, an aspect specifically addressed by the relevant recommendation in connection with the entire processing chain. In addition, no codes of practice for settling transactions have been universally accepted. For example, settlement differences are not currently resolved by agreed-upon tolerance levels, resulting in higher levels of trade "don't knows" and resubmissions.
- ***Inefficient use of data.*** The current process requires the manual enrichment of missing data fields and standing settlement instructions throughout the process, leading to errors and unmatched trades. Where automation is available, the potential for discrepancies between systems exists because data on the systems have not been synchronized, a situation that also often results in unmatched trades and issues requiring resolution.

Additionally, the current process demands that all transaction data be included in each step of the transaction process, as opposed to isolating specific data elements that are required for each particular step. This inclusion requirement slows down trade processing significantly, particularly in those cases where trade data are manually entered along the cycle.

To tackle these issues and so enable efficient and timely trade confirmation and matching, common standards and practices for trade processing must be developed. Many of these issues are addressed, at least

6. As described by the February 2002 white paper on the Institutional Transaction Processing Model put out by the Institutional Trade Processing Committee of the Securities Industry Association. Although written from a U.S. market perspective, the white paper identifies issues common to almost all markets.

in part, by other recommendations in this report. However, the other recommendations do not generally deal with the market practices and ways of working particular to trade confirmation and matching. The securities industry, notably in the United States, but also increasingly in other markets, has recently focused on the establishment and use of matching utilities, as a key mechanism for creating and using standardized and efficient market practices.

Matching utilities are technology platforms that aim to provide an environment of multilateral interconnectivity for post-trade and presettlement activities (including trade matching and trade data enrichment) among investment managers, broker-dealers, custodians, and infrastructure providers. The matching utilities are expected to use and comply with industry-accepted messaging, communication, and data standards as set out elsewhere in this report. By establishing and using common practices, matching utilities should increase efficiency and reduce risk.

Several issues need to be addressed, however. The cost of implementation and use is a barrier, especially for investment managers, in particular those that are not fully automated. Many may not have the resources to build platforms for matching utility usage or recognize the business benefits. Conversely, investment managers that are more technologically sophisticated may have already invested in infrastructure to eliminate the need for manual intervention in most trades and so be reluctant to invest further to gain what may be perceived as only marginal additional benefits.

The presence of multiple matching utility vendors, established either as industry-owned utilities or for-profit organizations, has introduced several issues. Currently, investment managers and smaller broker-dealers are undecided about which to choose, with no organization wanting to choose the matching utility that becomes the one least used. A single matching utility also raises important and adverse consequences, both in terms of the subsequent lack of competition, and the concentration of risk and reliance on one organization that could become a single point of failure for the industry. The industry needs to accept that multiple utilities will be used and turn its attention to mitigating the loss of efficiency that could potentially result.

HOW RECOMMENDATION 5 ADDRESSES THE ISSUE

The recommendation focuses on the need to automate institutional trade matching through establishing fully compatible and industry-accepted technical and market practice standards. The recommendation also recognizes that with more than one matching utility operating, interoperability is required to ensure that the concerns of users about connectivity costs and the choice of which matching utility to use are addressed. Interoperability addresses many of the issues that users face. For example, by connecting to one matching utility, organizations would be able to match trades with users of others. Users of one matching utility would also be able, with only marginal additional cost and effort, to connect to another, interoperable matching utility. Creating interoperability requires standardization of practices in many areas, some of which form part of other G30 recommendations. These areas include:

- Commercial considerations, such as how access or trade match fees, or both, are allocated when more than one matching utility provides services to a trade.
- Consideration of economic or other enforcement mechanisms required to ensure full implementation and use of standards across participants in all key markets.
- Standardization of liability across multiple providers.
- Matching criteria and standards, including tolerance for small differences.
- Communication protocols and messaging standards.
- Reference data standards.
- Operational timetables and timing of processing.
- Operating model, procedural flow, and sequencing of different elements of the process.

While matching utilities in themselves will be key tools in the quest for efficiency and reduced risk, without an environment where the trade matching behavior of all its participants is conducted to specific and agreed standards, they will not be fully effective. The goal is real-time institutional trade matching, and interoperable matching utilities are a necessary, but in themselves an insufficient, part of a solution to achieve this goal.

WHAT NEEDS TO CHANGE

Market participants and infrastructure providers should collaborate to develop relevant technical and market practice standards for trade matching and confirmation, some of which are expanded upon in other recommendations. The Security Industry Association's paper on the Institutional Transactions Processing Model for the U.S. market is an effective base from which to develop a methodology that addresses the needs of other domestic markets and, importantly, cross-border transactions.

Standardization of matching processes, including the use of matching utilities, is a global cross-market and cross-border issue. Indeed, the issue also affects products other than securities; for example, derivatives transactions could achieve greatly enhanced efficiency and reduced risk with better and standardized matching processes. A universally accepted and widely applicable model is clearly desirable, but it will take longer to implement and be more costly to achieve, as harmonization and consensus will be needed across a greater range of existing practices and market participants. If improvements can be made in individual markets more quickly, these should not be delayed, as long as they are compatible with the long-term objective of a consistent and fully compatible global model.

Commitment to participate in matching utility development and use is needed from all market participants and types of organizations. With the adoption of standards for matching, complete interoperability between matching utilities needs to be achieved to maximize the potential efficiency gains and to encourage adoption and use, particularly on the "buy" side where otherwise there will be continued reluctance to use a matching utility whose model may in time become redundant or not provide access to a full range of other market participants. The development of "concentrators" as providers of access to multiple matching utilities through a single interface, either independently or as part of the service offering of global custodians, is an alternative to full matching utility connectivity that may provide an effective and pragmatic interim solution. Adding another intermediary layer may not be as efficient as achieving full interoperability between matching utilities, but the value-added services that concentrators could provide may be an added incentive for broader and faster participation in the use of matching utilities.

Improvements to efficiency and risk will be significantly greater where there is full implementation and use of standards across the industry. Certain types of organization may not perceive benefit for themselves in moving toward standardized practices that benefit efficiency and reduce risk for the market as a whole; incentive structures therefore need to be established to ensure broad participation. Preferably economic incentives will prove sufficient. An example would be differential pricing that reflects the additional costs incurred when standardized, automated practices are not followed. But if by not adhering to particular standards certain market participants create substantial risk or inefficiencies for the market as a whole, then supervisory enforcement of those standards may need to be considered.

RECOMMENDATION 6. EXPAND THE USE OF CENTRAL COUNTERPARTIES.

Market participants and relevant public institutions should collaborate to assess the potentially substantial risk reduction and efficiency improvements of using a central counterparty. These benefits are expected to outweigh their costs in most markets. Where this is so, market participants should seek either to use the services of an existing central counterparty or establish one of their own, whichever has the better risk, cost, and benefit profile. If more than one organization undertakes this function in a particular market or markets, each should follow harmonized and rigorous operational practices and standards, including those set out elsewhere in this report, so as to be fully interoperable, and each should follow consistent risk management practices as set out in Recommendation 9.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation endorses CPSS-IOSCO Recommendation 4 (central counterparties), which promotes the assessment of the benefits and costs of CCPs and asserts the need for CCPs to have rigorous risk control. G30 Recommendation 6 is more emphatic, taking the view that CCPs are strongly expected to bring substantial benefits to most markets. The G30 recommendation also emphasizes the need for harmonized practices and standards and explicitly encourages the evaluation of using the services of an existing CCP as an alternative to building a new system. The need for rigorous control of risk noted in the CSPP-IOSCO recommendation is addressed separately in G30 Recommendation 9: Ensure the financial integrity of providers of clearing and settlement services.

ISSUE

As described in the risk chapter and associated recommendations, organizations undertaking securities transactions are exposed to counterparty risk and, as a consequence, put in place risk mitigation processes and controls. Such risk control practices have associated costs, including the costs of operating the processes and controls and the opportunity cost of collateral and margin that may need to be put up. The higher the risk and the more counterparties that an organization has exposure to, the greater these costs.

The need to perform due diligence over each new counterparty that an organization wishes to do business with may also delay the speed at which trades can be executed, as it is clearly undesirable to enter a contractual arrangement before satisfactory due diligence has been completed, and this can take time. Furthermore, where trading mechanisms are used that provide anonymity to buyers and sellers, it may be impossible to determine in advance whether the counterparty to a trade is one that an organization would wish to do business with, or could have excessive credit exposure to as a result of that trade. In addition, a series of bilateral relationships between different counterparties can result in a very significant number of settlement transactions, even where netting arrangements are applied between each pair.

HOW RECOMMENDATION 6 ADDRESSES THE ISSUE

Central counterparties (CCPs) interpose themselves between the parties to each transaction and thereby become the buyer to every seller and the seller to every buyer.[7] Through this mechanism the number of relationships is greatly reduced, as each participant then has commitments with the CCP, rather than with the many other users of the CCP that it originally dealt with. An organization can therefore deal with any counterparty that it knows is eligible to use a CCP without the need for extensive due diligence because it knows its contractual relationship and risk exposure will be to the CCP. The due diligence of the counterparty will, instead, have been undertaken by the CCP itself, as expanded upon in the recommendation on financial integrity. Similarly, risk mitigation controls such as requesting collateral or margin payments are undertaken between the CCP and each market participant, rather than between each combination of separate market participants. This is plainly more efficient.

Most CCPs use netting, the contractual offsetting of positions or obligations, to further reduce counterparty risk with each user. This multilateral netting between all market participants that use the CCP is far more effective than bilateral netting at reducing both risk exposures and the number of transfers of securities and cash subsequently needed to effect settlement.

CCPs also have a positive role to play in enabling

7. CCPs are generally used only by direct market participants who act as principals to a transaction (such as broker-dealers). Typically, end-user investors are not users of a CCP's services, mainly because they operate on a nonprincipal basis across multiple funds and cannot aggregate their transactions under netting arrangements that are generally core to a CCP's operations.

connectivity through compliance with industry-wide standards. As a critical part of the market infrastructure, CCPs can significantly influence the adoption and consistent use of standards by their users, as each of those users can be more certain that their own processing efficiency will be increased by using standards that the CCP itself uses.

Against these benefits the concentration of risk in a single entity needs to be considered. The concentration of risk is as much operational as it is financial, and indeed the ability to withstand financial shocks through default of one or more users is almost certainly easier to plan for and manage than the risk of a significant operational shock. These issues are discussed more fully in chapter 4 and the risk management recommendations that outline the key techniques and practices that should be used by CCPs to manage and mitigate risk. In addition, the development and maintenance of a CCP clearly has an investment and day-to-day running cost that market participants collectively will need to bear and to weigh in determining the overall net benefits that may accrue.

WHAT NEEDS TO CHANGE

The risk reduction and efficiency improvements of using a CCP are expected to outweigh their costs in most markets, particularly in all high-volume, developed markets. Over time CCPs may come to be viewed as an expected part of the market infrastructure in almost all markets, much as CSDs have become over the past decade.

In markets that currently operate without a CCP, market participants and relevant public authorities should collaborate to assess the benefits and costs of establishing and using such an organization. Where a sound business case is established, there are broadly two alternatives:

- Build and operate a new CCP.
- Use the services of a CCP already established in another center or for another trading market.

Although to date most markets that have decided to use a CCP have opted for the former option, the latter should not be dismissed, particularly for smaller markets or where a CCP is already used for other products, such as exchange-traded or over-the-counter derivatives. Although added concentration of risk may result, it can be appropriately managed and in many cases will be outweighed by the economy of scale benefits that can be gained from use of an existing CCP. The cost of adapting and increasing the capacity of an existing CCP is likely to be considerably lower than the costs of building a new CCP from scratch. In addition, the operating costs of the one CCP can then be spread over a greater volume of transactions, with a consequently lower unit cost. Specific concerns need to be addressed in connection with legal and regulatory jurisdiction, risk management, liquidity and acceptability of collateral, access, and the connection of the CCP to the existing market infrastructure. These concerns are important but in many cases would be substantially mitigated where the other recommendations in this report have been implemented. These are not straightforward issues and should be fully evaluated as part of each market's assessment. Where developing a new CCP is determined to be the best solution, it should be designed to comply fully with all relevant international technical, risk, and market practice standards.

In many markets, the costs and benefits of a CCP may not be equally or proportionately shared between different market participants. Generally, large, active participants will have most to gain from use of a CCP, because they deal with the most counterparties and have a greater volume of trades in each security that can be netted. Business cases should carefully consider how the costs of development and use of a CCP should be allocated to ensure an equitable outcome for all market participants and thereby encourage broad support and participation, for example, through pricing of services based on ad valorem or user-pays principles.

RECOMMENDATION 7. PERMIT SECURITIES LENDING AND BORROWING TO EXPEDITE SETTLEMENT.

Relevant authorities should permit securities lending and borrowing as a method for expediting the settlement of securities transactions. Each market should provide tax, legal, regulatory, and accounting frameworks to allow the use of stock lending and borrowing to prevent settlement failures. CSDs or other infrastructure providers, while not necessarily acting as principal to the transaction, should seek to develop functionality to allow stock lending and borrowing to be conducted efficiently by intermediaries and other users. This recommendation does not seek to eliminate restrictions in individual jurisdictions that prohibit stock lending and borrowing undertaken for reasons other than expediting settlement, such as transactions that facilitate short-selling.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation endorses CPSS-IOSCO Recommendation 5 (securities lending), which encourages the use of securities lending and borrowing as a method for expediting settlement and the removal of barriers that prevent this use. G30 Recommendation 7 reiterates the need to remove such barriers and identifies the actions that public authorities should take to create a framework that permits securities lending. It takes the view that it is then a commercial matter for relevant market participants to encourage broad involvement in such activity.

ISSUE

A significant contributor to the incidence and frequency of failed settlement is the lack of available securities to meet a seller's settlement obligations. In these circumstances, settlement efficiency is greatly increased if the seller is allowed to borrow temporarily the relevant securities from another party to fulfill delivery for settlement. The lender is usually an institutional investor that has securities holdings and, by lending them for a fee, increases the return on those securities; the borrower provides sufficient collateral to mitigate the credit risk of the lender. Such transactions are typically facilitated and processed by the providers of the settlement infrastructure, such as CSDs, and intermediaries such as custodian banks, but these institutions are not necessarily principal to the transaction.

The recommendation that securities lending and borrowing be encouraged to facilitate timely and efficient settlements was first set forth in the 1989 G30 recommendations and has been reiterated and expanded since then, most recently in the report issued in November 2001 by the Committee on Payments and Settlement Systems of the Group of Ten central banks (CPSS) and the International Organization of Securities Commissions (IOSCO).

Over the past decade significant efforts have been made to develop and refine the operational, legal, tax, and accounting aspects of global securities lending, particularly in those markets that had some infrastructure in place before 1990. Indeed, in those countries securities lending has become a substantial factor not only in reducing failed settlements, but in supporting the more complex hedging, trading, and derivative structures that have become elements of mature markets worldwide. However, in several countries little progress has been made in developing viable securities lending structures accessible to both onshore and offshore participants. This lack of progress continues to impede settlement efficiency in both local and cross-border environments.

While a number of countries continue to ban securities lending outright, other countries have only partially developed the requisite legal, tax, and regulatory framework to permit effective lending. The most common impediments include uncertainties about transaction definition and tax, regulatory, or accounting treatment; limitations on the securities eligible for lending; restrictions that limit eligible market participants; and onerous buy-in requirements.

HOW RECOMMENDATION 7 ADDRESSES THE ISSUE

Establishing a supporting framework and environment that permits securities lending and borrowing as a method for expediting the settlement of securities transactions will increase settlement efficiency. G30 Recommendation 7 endorses the 2001 CPSS-IOSCO recommendation encouraging the use of securities lending and borrowing as a method for expediting the settlement of securities transactions. Barriers that inhibit the practice of lending for this purpose should be removed. By providing the minimum tax, legal, regulatory, and accounting elements to support the utilization of stock lending and borrowing, markets can substantially reduce settlement failures. Furthermore, CSDs and other providers of securities clearing and settlement services should seek to develop functionality to allow stock lending and borrowing to be conducted efficiently. In many cases the business model, risk framework, and capital of organizations such as CSDs will make it inappropriate for them to act as principal to securities lending and borrowing transactions, but that should not prevent them from developing functionality that can be used by intermediaries and other users who are able to act as principal.

As noted above, securities lending and borrowing is an integral part of the overall trading environment in most mature markets and supports many complex transactions unrelated to expediting settlement. It is recognized that in some markets such activity is considered undesirable for various public policy reasons, such as discouraging short-selling. This recommendation does not seek to debate whether such public policy objectives are desirable or soundly based but is concerned only with settlement efficiency. Accordingly, it does not in any way advocate that securities lending and borrowing should be permitted for purposes other than expediting settlement of securities transactions.

WHAT NEEDS TO CHANGE

Taxation. Lending transactions are not sales and should not be considered as such. Consequently, lending transactions should not have capital gain or loss implications for taxation purposes. Further, rebates paid to cross-border and domestic borrowers should not be subject to withholding taxes. Tax implications of payments in lieu of dividends made to lenders should be clarified. Stamp and equivalent duties should be waived. The treatment of securities lending transactions should be explicitly stated to eliminate any uncertainty related to their treatment.

Accounting. Lending transactions (both the transfer of the security to the borrower and the receipt of associated collateral) should not be considered sales for accounting purposes. Treating such transactions as sales would be contrary to the underlying economic impact and substance.

Legal/bankruptcy. Law should support the enforceability of the terms of a securities lending agreement, and such agreements should be standardized among market participants. The legal risk recommendations apply to securities lending transactions and discuss further the key legal risks and recommended actions.

Securities lending support by infrastructure providers. CSDs, CCPs, and other infrastructure providers should develop functionality and services that support efficient lending and borrowing, whether it be provided directly by themselves as principal, by intermediaries, custodians, other market participants, or a combination thereof. Such functionality should support both passive transactions (whereby securities are automatically borrowed when a settlement failure would otherwise occur) and borrowing on demand (whereby participants actively manage their securities positions and decide when it is necessary to borrow).

This framework creates the environment for efficient securities lending and borrowing, but holders of securities should not be compelled to participate in such activity. Rather, market participants and infrastructure providers should offer economic incentives and robust risk management practices that encourage broad participation in securities lending and borrowing by those institutions that need to make their portfolios available for the process to succeed fully.

RECOMMENDATION 8. AUTOMATE AND STANDARDIZE ASSET SERVICING PROCESSES, INCLUDING CORPORATE ACTIONS, TAX RELIEF ARRANGEMENTS, AND RESTRICTIONS ON FOREIGN OWNERSHIP.

Issuers, providers of clearing and settlement services, and other relevant market participants should advise investors of all details of corporate actions that they require in an automated, timely manner and in compliance with accepted industry standards so that each investor can make a timely decision on the action to be taken with full knowledge of the facts. Each market place should protect the rights of the beneficial owner of a security to all corporate and income events from the point of execution of the purchase transaction in the relevant security. All corporate actions should be able to be executed through book entry transfer and/or payment systems where such systems operate for the settlement of purchases and sales of securities. All communications through the value chain between issuer and beneficial owner should, as technology allows, be automated as set out in the relevant recommendation.

Market participants and public authorities should work together to minimize the administrative costs to each party involved in tax relief arrangements through standardization and automation of procedures and communication of information and through the use and acceptance of electronic data and documentation. This recommendation exclusively addresses the process of tax reclamation. It does not in any way seek to address the absolute levels of the taxes themselves.

Relevant public authorities, infrastructure providers, and market participants should work together to harmonize and make transparent the processes, documentation, and communication of information in connection with foreign-ownership restrictions and reporting requirements. Full information needed to assess whether restrictions apply should be available to allow investors and intermediaries to make timely and appropriate decisions. For example, investors should be able to determine in advance of a trade execution whether the trade will breach any limits. Reporting and disclosure responsibilities should also be transparent and should be able to be discharged through automated electronic communication.

ISSUE

Corporate actions and associated asset servicing activities present particularly significant opportunities for increased efficiency. Technology developments in this area have not yet been exploited as fully as they have been in other areas of securities processing, such as the communication of information among issuers, intermediaries, and investors. Variations exist in market practice and standards in connection with common definitions of different types of corporate action or elements of complex transactions, in the tax relief arrangements process, and in restrictions over foreign ownership. These variations frequently demand manual intervention, limit the ability to automate processes, and often require market participants to interpret complex documents or rules that may vary from transaction to transaction. Where investor choice is introduced (in connection with rights issues, for example), there is risk as well as inefficiency, as lack of complete, timely, and accurate notifications and other information can lead to losses through inappropriate or ill-informed decisionmaking or through notification of decisions that does not reach issuers by set deadlines.

Many of these concerns are addressed in part by other recommendations that when fully implemented will lead to automated, standardized, and efficient processing and communication and produce accurate and comprehensive reference data. However, the specific nature of many (often arcane) aspects of corporate actions and associated activities demands specific separate recommendations. For the purposes of this recommendation, a "corporate action" is defined broadly. It includes involuntary events (such as a scrip issue), voluntary events (such as a capital increase, share reorganization, takeover event, warrant exercise, conversion, or similar act), and various forms of dividends, including those that are paid with scrip options or that allow dividend reinvestment and similar plans. Corporate actions, across the market, are the major source of financial losses attributable to operational failure. The losses arise for two main reasons:

- The inefficient flow of information between issuer and investor, particularly where there is a long chain of intermediaries and/or paper flow or other nonautomated methods of communication.
- Market failure to protect all the rights of the beneficial owner of a security at all times, including all connected corporate and income events.

Apart from the risk that results from the miscommunication of information, the key risk arises in voluntary corporate actions that require investors to advise the issuer in order to protect their entitlements or elect between different options. Major losses most frequently arise on market transactions that occur close to the issuer's deadline for instructions and on stocks out on loan, especially when these are returned just before the corporate event instruction deadline. Clearly, in these circumstances the inefficient and slow communication of information is put under greatest strain.

Processing tax relief arrangements associated with income on equity or debt securities is also inefficient. It is standard practice for the full rate of withholding tax on income to be deducted at source. However, beneficial owners are entitled to reclaim some portion of the tax withheld if their country of residence has a double-taxation treaty with the country in whose jurisdiction the dividend is paid. This tax reclaim process varies considerably by country and is frequently manually intensive, inefficient, and hence costly to administer. There is no standardization in the type or content of documentation required to support the reclaims; nor are electronic reclaims normally accepted, let alone in standardized message form. The time taken for fiscal authorities to process such reclaims varies greatly and can in some cases take several years. Furthermore the deadlines for making reclaims vary considerably, from as little as 18 months to as much as 20 years.

Rules surrounding ownership restrictions (such as limitations on foreign ownership) and the reporting of material interests vary from country to country. As with tax relief arrangements, the documentation and procedures required to comply with rules is often manually intensive and inefficient. Transparent information is often unavailable, for example on the current level of foreign ownership or the outstanding number of securities in issue against which a limit is measured, making it difficult to determine in advance if an individual trade will cause a limit to be breached. In some markets, restrictions on foreign ownership may lead to other inefficient behavior, such as causing foreign investors to withdraw previously immobilized stocks from securities depositories so that they can instead be registered directly with transfer agents prior to record dates.

HOW RECOMMENDATION 8 ADDRESSES THE ISSUE

Each of the specific issues described above has two specific themes. First is the use of paper and lack of automation, which with improvements in technology, are increasingly unnecessary and avoidable. Second is the industry-wide fragmentation and variation between jurisdictions that require industry participants operating in more than one country to have multiple internal people, systems, and processes to deal with the multiple different requirements and ways of doing things. In many ways, this is a microcosm of several of the issues described in this report that apply to securities processing generally. However, specifically targeted action is required for corporate actions and related asset servicing, and this recommendation addresses these issues through advocating the need for standardization and automation of documentation and processes in three key areas:

- The manner in which corporate actions are described and communicated.
- The documentation and processes for tax relief arrangements connected with securities transactions and income.
- The documentation and processes surrounding restrictions on securities ownership.

Replacing paper with electronic documents and automating communication will greatly reduce many of the inefficiencies described above in each individual market. By doing this in a way that establishes standard market and business practices and ways of operating, further efficiency benefits will be achieved on a global scale.

WHAT NEEDS TO CHANGE

All corporate actions should be able to be executed over book entry transfer and/or payment systems where such systems operate for the settlement of purchases and sales of securities. Issuers should communicate all details relating to corporate actions in electronic form and through the appropriate settlement systems and other relevant information channels.

- The industry should agree on templates for electronic dissemination of information on all commonly used corporate action types using ISO 15022 messages. Guidelines should also be written on the treatment of complex corporate actions that do not completely fit within the ISO 15022 guidelines. If particular types of exception occur frequently, then the ISO 15022 guidelines should be updated to accommodate them.
- Exchanges should require issuers to communicate in a timely fashion all corporate events that arise on their securities to all appropriate parties, including the relevant settlement systems for that security, both in words and in ISO 15022 format, and with no discrepancy between the two. Where issuers release information on a corporate action in several separate announcements, they should also release collectively all the relevant information both in word and ISO 15022 forms.
- Intermediaries should be able to accept, process, and pass on information that conforms with ISO 15022 messages without the need for manual intervention, so that the beneficial owner receives such information without unnecessary delay.

Each market should have rules that minimize the lapsed time between settlement and registration (or equivalent event), and record dates should be as close as possible to the final date for subscription on any corporate event. Markets should link transfer agents to their book entry depository system to enable real-time update of registered records concurrently with the time of settlement of each market transaction. Each market should ensure that investors receive all entitlements due from the point of execution of the purchase transaction in the market, and market rules should require the seller and the seller's broker to protect the buyer's rights where the seller receives an entitlement due to the buyer. Markets rules should also ensure that a lender of a security is able to recall securities out on loan so as to receive entitlements to all corporate actions, including when the security is returned just before the last date for subscription.

There is no expectation that governments will harmonize the various tax regimes that affect securities transactions and income on those securities. However, the processes and documentation underlying the collection of these taxes could be harmonized without affecting the fiscal independence and decisionmaking powers of each jurisdiction. The objective with tax relief arrangements is to move toward a mechanism that minimizes the administrative costs to each party involved in the process: the beneficial owner, the investment manager, the broker-dealer, the custodian, and the fiscal authority. In the medium to long term, it is expected that the most efficient and transparent solution is likely to be a cross-jurisdictional process to self-certify the residency of the beneficial owner to claim any lower treaty rate available, with this lower treaty rate then applied at source. It is recognized, however, that such a fundamental change requires careful and detailed study and that fiscal authorities would have concerns about the loss of cash flow and the potential for false certification. Thus, while this proposal is advocated as a long-term goal worthy of further study, a number of principles and working practices could be established more quickly and would bring more immediate benefit, including:

- Standard deadlines should be set for reclaims to be submitted and for valid claimants to be paid.
- Global custodians or registrars, as appropriate, should substantiate the positions entitled to tax relief.
- The procedures for tax relief arrangements should be clearly, fully, and unambiguously stated and made available electronically on appropriate websites, along with electronic tax reclaim forms.
- Tax forms and supporting documentation, proof of identity, and proof of residency should be standardized and be able to be submitted to fiscal authorities electronically using digital signatures and other appropriate electronic security measures to confirm authenticity.

The process of harmonizing tax practices is a complex and difficult challenge, with many important issues of national jurisdiction and interest that require detailed consideration. As a first step, a global, industry-wide tax harmonization working group should be established that includes representatives of investment managers, broker-dealers, and custodians, together with representatives of fiscal and other relevant public authorities. This working group should design, publish for comment, and update as necessary detailed best practice guidelines for tax relief documentation and processing that adhere to the above principles and working practices. Fiscal authorities should then be invited to determine and announce implementation plans detailing how and by when they will adopt the best practice guidelines.

As with harmonization of the tax relief process, the recommendation does not seek to comment on the merit or otherwise of foreign-ownership restrictions and reporting requirements. Rather, it seeks to minimize both the costs and administrative burden of complying with such restrictions and the incidence with which limits may be inadvertently or unknowingly breached, with losses incurred through consequent remedial actions. To achieve this, relevant rules should be unambiguous and transparent to the market, and the documentation and processes required to comply with such rules should be automated and follow communication, messaging, and data standards as set out in the relevant recommendations in this report. Where compliance with rules depends on knowledge of information for the market as a whole rather than that for an individual organization—for example, where an upper limit is set on the overall level of foreign ownership—that information should be regularly updated and freely available to all relevant market participants so that appropriate and fully informed decisions can be made in advance of trade execution.

MITIGATING RISK

In considering the recommendations relating to risk, it is important to recognize the major initiatives to strengthen safety and stability that have been pursued during at least the last decade by providers of clearing and settlement services, user of those services, and the public agencies charged with regulation and oversight. These efforts, individual and collective, have produced substantial gains in safety and stability in the major markets and these recommendations should be viewed as an effort to raise the bar still higher in view of the critical nature of the activities being undertaken.

RECOMMENDATION 9. ENSURE THE FINANCIAL INTEGRITY OF PROVIDERS OF CLEARING AND SETTLEMENT SERVICES.

Providers of clearing and settlement services should manage their risks and set standards and controls around the use of those services that allow them to conduct business in a safe, sound, and prudent manner consistent with their business model and all relevant supervisory and regulatory requirements. Each organization's business model should incorporate a risk framework that addresses all risks connected to its operations. This risk framework should be approved by the board and expressed through a set of limits and other qualitative and quantitative measures and tests. For systemically important organizations the business model should minimize the probability and impact of default.

The need to operate prudently within the risk boundaries inherent within the business model requires risk management processes and standards, which should be applied objectively and consistently in determining compliance with risk measures, in three broad areas:

- ***The counterparty due diligence process***, whereby service providers make ex ante and ex post assessments of the suitability of their actual or potential users, and the basis upon which users transact, for example distinguishing between those acceptable as clearing and nonclearing members. This process should balance risk control (which inclines toward setting high financial and operational thresholds) with other commercial and competition considerations (which may incline toward lowering barriers to entry of users), while recognizing that there will always be minimum risk thresholds that should not be lowered.

- ***The procedures and techniques used to measure, monitor, and control risk exposure*** arising as a result of the activities of the service provider, its users, and its users' customers. These should seek to avoid moral hazard whereby users can introduce risk to the system without providing proportionate financial protection to the service provider and other users.
- ***The minimum financial and liquidity requirements*** that should be established by infrastructure providers (and enforced by supervisors as described in the relevant recommendation) in proportion to the risks to which they are exposed, so as to ensure their ability to continue to provide services to markets and minimize the probability and impact of a default on their users and the financial markets.

Each organization should publish a report, at least annually, that describes the business model, risk framework, and underlying risk management processes, controls, and standards, together with the results of independent testing of those procedures. The report would reassure users that the organization had been operating effectively, and would also provide greater transparency to the market.

Coverage of this report may overlap with other reporting requirements, such as the so-called SAS 70 reports, assessments pursuant to CPSS-IOSCO standards, and financial sector assessments carried out by the International Monetary Fund and World Bank. This report is intended to be complementary to these other requirements and not to require additional reporting where the purposes of this recommendation are otherwise met.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation builds upon aspects of CPSS-IOSCO Recommendations 4 (CCPs), which asserts the need for CCPs to have rigorous risk control; Recommendation 9 (CSD risk controls), which sets out the controls that CSDs should establish to mitigate settlement risk; and Recommendation 14 (access), which advocates that CSDs and CCPs should have objective and publicly disclosed criteria for participation that permit fair and open access. G30 Recommendation 9 is broader in scope, applying to all providers of clearing and settlement services, and sets out in greater detail elements of the due diligence, risk control, and financial requirements that should form part of consistent, objective, and appropriately high risk-management standards for providers of clearing and settlement services. The recommendation also stresses the need for transparency in the market and sets out a mechanism through which this can be achieved.

RECOMMENDATION 10. REINFORCE THE RISK MANAGEMENT PRACTICES OF USERS OF CLEARING AND SETTLEMENT SERVICE PROVIDERS.

Organizations that use, or are considering using, providers of clearing and settlement services should establish robust due diligence and counterparty risk management controls and processes that appropriately evaluate, measure, monitor, and control the risks inherent in such activity and in associated customer-related business. The recommendation does not seek to replace prudential standards and supervision that may already apply to financial intermediaries, including risk-related minimum capital requirements set by prudential supervisors. However, it is clearly important that capital resources and risk management practices appropriately reflect the range of risks inherent in clearing and settlement. Likewise, nonsupervised users of providers' services should be able to demonstrate the risk-based adequacy of their capital resources and risk management processes.

The primary objective of Recommendations 9 and 10 is to reach strong risk management standards, consistently and comprehensively applied on a global basis. This is a challenging target. The guidance below forms a checklist that aims to assist organizations achieve this goal, and in so doing, it builds on and embeds much of the collective best practice used in the financial services industry today. Although it is recognized that many organizations already have in place several of the practices and procedures outlined, for some organizations implementing these recommendations (and being able to demonstrate this) will require substantial change. Even those organizations considered leaders in the field of risk management are expected to need to improve their practices in certain areas.

The recommendations are directed at two broad groups: the organizations that provide clearing and settlement services, and those that directly use these services. The business models operated by different organizations within these groups are not all the same, and the appropriate risk practices and controls vary accordingly.[8] However, the overall nature of the risk management practices that these recommendations seek to establish is broadly similar across all types of organization and therefore, except where otherwise specified, the guidance below is commonly applicable.

RISK MANAGEMENT FRAMEWORK

Financial risk management techniques should form part of a coherent and integrated risk management framework to help ensure that risks are addressed in a rational and sound manner with appropriate supervision and guidance at the level of the board of directors. This framework should also encompass nonfinancial risks, such as the legal and operational risk matters analyzed in detail as part of separate recommendations. The framework should facilitate the supervision of the organization's activities in line with the business model considered and approved by the board. The specifics of the appropriate framework will vary from organization to organization, but in all cases the framework is expected to include the following features:

- Unambiguous lines of authority and responsibility delegated from the board of directors.
- A comprehensive set of documented risk policies and processes including an assessment program to proactively identify risks (financial and nonfinancial), conducted as frequently as necessary to evaluate changing risks but at a minimum on an annual basis.
- A set of systems, procedures, controls, and management information to facilitate appropriate and timely monitoring, management, and decisionmaking.

It is critical that the particular matters discussed below are implemented within the boundaries of such a framework. The absence of such a framework is prima facie evidence of unsafe and unsound business practice, and one should be established as a matter of priority where it does not exist.

The detailed guidance is grouped consistent with the areas outlined in the summary recommendations:

- The elements of the risk-based counterparty due diligence processes, some of which are common to all due diligence assessments, with important additional factors relevant to users assessing infrastructure providers.
- The procedures and techniques that should be used to measure, monitor, control, and reduce financial risk exposure arising as a result of clearing and settlement activities: practices common to both the infrastructure providers and their users.
- The minimum financial and liquidity requirements that should be established by infrastructure providers. This guidance applies directly to those organizations but will also critically affect the risk management decisions and assessments of their users.

8. For example, taking on and managing financial risk is core to the purpose and operation of a CCP and so forms a fundamental part of its business model. Many CSDs seek to eliminate through their contractual and operational arrangements financial risks to which they may otherwise be exposed. The risk management practices appropriate to each of these models will clearly differ, although they will still encompass due diligence, risk management systems and controls, and the maintenance of adequate financial resources.

1. Counterparty Due Diligence
Initial assessment of counterparties

In the clearing and settlement process, counterparty relationships with other institutions—as users of services, service providers, or customers—are a key source of risk. Therefore, a critical part of risk management is a comprehensive and objective assessment of these institutions before accepting them as financial counterparties. This initial assessment is the primary mechanism by which the probability of suffering a subsequent default from these counterparties can be prevented.

a. All organizations evaluating other counterparties should consider a broad range of factors, including:

Legal structure and financial resources

- Legal status (individual or corporate), nature of organization, and capacity to transact business (see also specific legal risk recommendation)
- Financial resources, capital, and reserves (under both financial accounting and risk-based supervisory rules)
- Availability, transparency, and reliability of audited financial accounts and other publicly available financial and nonfinancial information, which should be received and assessed regularly, such as quarterly financial statements, where available
- Scope and quality of external audit
- Connection to or association with other existing or potential counterparties (for example, where these counterparties are part of same group or subject to common control)
- Guarantees from parent or other group companies
- Bank guarantees, lines of credit, or similar backup arrangements
- Asset and funding liquidity, including assessment of trigger events
- Rating agency evaluation

Risk, operational, and financial control assessments

- Assessment of range and scale of financial and nonfinancial risks
- Appropriate and independent governance, risk framework, and control structure that limits or otherwise controls the organization's activities and ensures compliance with good business practice
- Management structure, competence of people in critical management positions, and extent of reliance on key individuals
- Availability, transparency, reliability, and independence of information on internal control framework, management reports, and other internal financial and nonfinancial information that supports the governance and risk-control structure
- Availability, transparency, and reliability of information on fully documented and regularly tested business continuity and disaster recovery plans, including an assessment of the reliance on third parties and arrangements to deal with industry-wide shocks

Supervisory approval

- Identity and role of supervisor(s)
- Scope of supervised activity
- Penalties, censure, or other sanctions imposed by supervisors

b. Users evaluating providers of clearing and settlement services should also consider:

Market structure

- Sovereign analysis, including assessment of creditworthiness and political and economic stability of country of jurisdiction
- Regulatory framework, including identity and role of supervisor(s) of the service provider and its users, and any regulatory or self-regulatory responsibilities of the infrastructure provider
- Legal framework, including evaluation of how finality is defined by the service provider, and assessment of which law governs transactions where the service provider operates or handles securities issued in more than one country

- Business model and competitive position of the service provider, along with ability to innovate and maintain market position

Organizational structure, governance, and management

- Legal status and structure, ownership, and control
- Governance arrangements, including user representation and mechanisms for balancing conflicting requirements between different categories of user
- Existing user and/or membership profile, considering range of activities, domestic versus international split, size, and number of participants
- Relationships, linkages, or alliances between the service providers and other market participants, including local and international exchanges and other service providers

Operational, risk management, margining, and default arrangements

- Resources in each type of funding (including margin and collateral guarantee fund or loss-sharing arrangements, insurance and guarantees, capital, and reserves) available to meet losses, and the order in which these will be used
- Clarity and transparency of service provider's rules concerning transaction processing, and consistency with definition of when finality of transfer is achieved
- Procedures for recording, matching, and registering transactions
- Transparency and reliability of pricing and calculation of position-related balances
- Position, activity, risk, concentration, and other limits in place and the measures available to the service provider to ensure compliance with those limits
- Margin arrangements, including methodology and basis on which initial and variation margins are set, the frequency and timing of margin calls, and the payment of interest on balances held
- Type of collateral accepted and "haircuts" applied
- Segregation of assets (cash, securities used as margin or collateral) and rules surrounding these in the event of default
- Transparency and clarity of rules concerning default arrangements and the methodology and basis upon which any losses are calculated, allocated, and shared
- History of defaults, settlement failures, or other events that have caused the service provider to draw on funds available to meet losses
- Where multiple products are transacted: whether margin is calculated by product line or across product lines on a portfolio basis; whether collateral is held in separate accounts or aggregated; and the extent of cross-subsidy between products in the event of default

User/membership requirements and basis of participation

- Due diligence assessment of potential or existing users performed by the service provider
- Financial requirements of membership, including minimum capital requirements for different user or membership categories and the need for guarantees or rating agency evaluation
- Operational requirements of use or membership, including the need to have individual business recovery procedures or to participate in collective plans
- Financial, operational, and risk management and reporting requirements
- Regulatory requirements
- User/membership status, representation, and influence on making of key decisions

The results of such an assessment should in the first instance be used in determining whether the organization is one that the institution should do business with and on what basis. For example, the assessment should be used to distinguish between those organizations acceptable as clearing or nonclearing users of certain service providers.

For infrastructure providers, or organizations that act effectively as industry utilities, user/membership criteria and risk hurdles should not be set so high that the detrimental effects of any reduction in competition outweighs the benefits of avoiding risk. Instead they should be set equitably and judged consistently and objectively with the business model, and the process by which organizations are assessed should be clearly disclosed to the market. The membership criteria and risk hurdles also need to be set in consideration of the structure of the market as a whole and the profile of other market participants, reflecting the mutualization of risk and loss-sharing inherent in many institutional arrangements. There should be symmetry of risk and reward, so that a relatively low-risk organization or group of organizations is not obliged by loss-sharing arrangements to act, without equitable compensating benefit, as an effective guarantor of other, higher-risk organizations.

The impact of changing membership criteria can and should be assessed as part of the risk measurement practices to help ensure that the criteria continue to be set at an appropriate level. Raising the thresholds should be considered where the results of stress tests and other risk modeling techniques indicate that an infrastructure provider is exposed to a level of risk incompatible with its business model and level of financial resources.

The due diligence assessment should inform other important processes such as the setting of limits and monitoring of subsequent activity.

Ongoing assessment of counterparties

Organizations should continuously and proactively monitor the key factors evaluated as part of the initial assessment. Processes should be in place to identify, collect, and appraise information relevant to counterparties and their activities, for example, information as reported by news agencies, regulators, exchanges, or other relevant bodies. Periodically, and at least annually, the continued appropriateness of the initial due diligence assessment should be positively reaffirmed using up-to-date data and information.

An organization concerned about the continued suitability of a counterparty should take action to mitigate the risks introduced by that organization. It is not realistic to set out here the full range of actions that might be appropriate in different circumstances, but the sanctions and tools available are likely to include termination of membership or closeout of positions, increased collateral requirements, revision of limits as discussed below, and the seeking of adequate assurances from the relevant organization or its guarantors.

2. Risk Mitigation Techniques

Setting of limits and master agreements

For counterparties accepted as part of the due diligence process, master agreements should be established and limits set prior to the commencement of activity. The legal risk recommendations address specific issues that are pertinent to master agreements. Limits should effectively control the activities of counterparties and restrict the risks that they introduce to a level commensurate with the organization's business model, informed by the due diligence assessment of that counterparty. Limits can be set for a number of factors, including credit exposure, collateral, activity levels, credit standing, concentration, open interest, or any combination thereof. Limits should cover intraday and overnight exposures and, importantly, both net and gross exposures. Setting and monitoring of counterparty gross exposure limits should be informed by the legal risk assessment of the enforceability of netting arrangements discussed in the relevant recommendation. The system of limits established should form part of the risk management framework described above and should include clear delegation of authority for approval of or changes to limits. Limits should be revised consistent with the ongoing assessment cycle outlined above.

Monitoring against limits

Organizations should have a system of controls that allows intraday monitoring of the limits set for their counterparties on a timescale corresponding to significant changes in exposure. Where significant changes in exposure happen in a short period of time, monitoring may need to be on a real-time or very frequent batch basis. Clear procedures should be written for reporting and escalating usage of limits and in particular breaches of limits or the crossing of trigger or warning points that may indicate the increased possibility of a future breach.

Limit excesses should be dealt with on a timely basis. The appropriate action depends on several factors, including the extent or size of the breach, the period over which it has persisted, and the status of the counterparty breaching the limit as assessed by the due diligence process described above.

Margin, collateral, and netting arrangements

Margin, collateral, and netting arrangements are used to restrict the exposure to counterparties. The controls and systems surrounding such functions are fundamental to the ability of an infrastructure provider or financial intermediary to manage risks successfully. These arrangements should be clearly laid out as part of the organization's risk management procedures, and they should encompass factors including:

- Acceptable forms of collateral and the fraction of collateral (haircut) not eligible to cover outstanding exposures, reviewed on a regular basis against market and liquidity risk criteria.
- Margin calculation and methodology, including the process by which margins can be calculated and collected quickly in rapidly changing market conditions.
- Frequency, basis, and transparency of the mark-to-market process.
- Frequency and timing of margin and collateral calls, including intraday and during extreme market conditions.
- Segregation and protection of assets in the event of insolvency.
- Contingency arrangements applicable in abnormal or illiquid markets.

Users of providers of clearing and settlement services who transact business on behalf of customers should ensure consistency between the margining arrangements imposed on them by service providers and the margining arrangements that they in turn impose on customers. However, users should not assume that a simple pass-through of margins is the appropriate action in all cases.

Organizations should be mindful of the risk that they would be exposed to should netting agreements not be enforceable or the ownership of collateral and margin held not be secure; legal risks are discussed in detail in Recommendations 14 to 16. Risk managers should specifically include an assessment of the financial impact of failure of legal arrangements as part of scenario analysis. Except where legal risk is considered insignificant, risk managers should also actively measure and monitor gross exposures.

Multiple products

A number of providers of clearing and settlement services handle multiple products, be they different types of securities or completely different products such as derivatives or commodities. The characteristics of these products vary, and as a result, they affect the risk (and operational) management of the infrastructure provider and its users or counterparties. For example, derivatives give rise to counterparty risk over their lifetime, which is typically much greater than the counterparty risk over the life cycle of a cash securities transaction, which typically follows the settlement period. While the focus of this report is on securities clearing and settlement of debt instruments and equities, it would be disingenuous to ignore this issue. The rules of the service provider and master agreements with counterparties should clearly state how the interaction between different products is handled and address issues including:

- Whether margin is calculated for each product line or by using a methodology assessing portfolio risk across products.
- Whether collateral is held in separate accounts or aggregated across products.
- The extent of cross-subsidy between nondefaulting users operating in different product silos to the defaulting user.

The introduction of new or variant products by service provider can change the risk profile of that organization, either because of the variation in the characteristics of the new products from existing products or because of their interaction with existing products. For this reason, new product procedures should be established and include:

- Risk-focused definition of what constitutes a new product.
- New product application process, business case and risk assessment methodology (including interaction with existing products and associated impact on risk exposures and financial resources), and approval authorities.
- Implementation guidelines and controls.

Financial risk modeling, stress, and scenario analysis

Organizations should identify the key risk factors to which they are exposed, such as market volatility, trading liquidity, the number of simultaneous defaults, and the correlation of defaults, and then estimate their potential losses under different scenarios arising from these risk factors. Scenarios should be derived both by recreating historical events and by forecasting future potential shocks, and they should be constructed to test overnight and intraday real and potential exposures.

Stress tests are inherently subjective and based on individual judgment and experience to determine scenarios. Organizations should therefore also use other quantitative evaluation techniques, such as value at risk (VaR), as a supplement to the stress tests. VaR uses statistical modeling techniques to estimate both scale and probability of loss. It can be seen as a more objective measure than stress testing, but has limitations in dealing with the types of low-probability, high-impact risks that are faced in connection with clearing and settlement and should not therefore be relied upon without a full range of other measures.

Providers of clearing and settlement services should make the methodology, procedures, and results of their risk modeling, stress, and scenario analysis transparent to the market, so that users and potential users can assess the impact on their own risk exposures. This information should include a description of the key risks, the scenarios considered, and a quantitative and qualitative summary of the results of tests sufficient to allow users to understand the organization's risk exposure in the context of its business model and financial resources.

3. Financial Resources

Providers of clearing and settlement services should maintain capital and other financial resources proportionate to the nature and scale of risks inherent in the clearing and settlement process and their own business model, their exposure to these risks, and the systems and controls that they have put in place to mitigate these risks. The adequacy of financial resources should be assessed by service providers regularly, and at least once a day, based on results of stress tests and other quantitative models. Service providers should look at the correlation between participants regarding the nature of their exposures to project the potential impacts of the failure of one participant on others. They should ensure that their financial resources are sufficiently liquid, preferably in same day (T+0) liquidity, to support their continuous operation in market stress conditions. Financial resources should be drawn from sources that fairly distribute and mutualize risk between the infrastructure provider and its users.

Forms of funding

Financial safeguards against such default can take several forms including:

- The initial margin or collateral posted by the counterparty.
- A guarantee fund (or collateral pool) and loss-sharing arrangements among market participants.
- Financial support by third parties (such as insurance facilities, guarantees, and committed lines of credit arranged by infrastructure providers).
- The capital and reserves of infrastructure providers.

Initial margin or collateral posted by the counterparty is generally the first source of funds used in the event of a default. This source reduces the degree to which nondefaulting organizations are required to fund the losses. The desire to have mechanisms to reduce the exposure of industry participants to mutualized risk must be balanced against the competitive arguments for lowering margin or collateral requirements. There is an opportunity cost to users in providing margin or collateral, with the cost in general being proportionately greater for smaller users. This point is particularly important in markets where direct access to or membership in a provider of clearing and settlement services is in practical terms part of an organization's license to do business, and margin requirements should not act as an inequitable barrier to entry. Providers of clearing and settlement services should set margins that fairly and reasonably reflect the risk introduced by each counterparty. The level of initial margin or collateral required should correlate to and be consistent with the due diligence assessment of each counterparty as described above.

Contributions to a guarantee fund are a common entry requirement of services providers. With guarantee funds, participants are required either to deposit sums to form a resource pool to help service providers fulfill their obligations in the case of default or to commit to make such contributions upon demand. Participants in guarantee funds should have the obligations to contribute to the fund on an ongoing basis and to share losses that exceed the fund according to a set of predefined, clear, and unambiguous rules. Contributions and replenishment of the fund by market participants should be calculated commensurate with their risk exposure and activity levels.

Loss-sharing arrangements are widely established to provide funds in the event of low-probability but potentially significant unforeseen losses. However, the details of such arrangements vary materially, most importantly in connection with the extent of liability of individual users. In some cases, users may be exposed to unlimited liability, and even where limited liability arrangements are in place, they may not be preserved in times of acute stress. Service providers should be mindful that users who are exposed to potentially unlimited liability will act to protect their overall capital. Typically, users transact through specially established limited liability entities whose capital meets membership requirements, but frequently with little excess, so that the user's overall exposure is limited to the capital of the transacting entity. To create greater certainty for users, loss-sharing rules should be clearly defined and made transparent, including the methodology by which respective risk exposures and activity levels are calculated, so that users are able to estimate accurately their exposure and potential liability.

Capital and reserves of providers of clearing and settlement services are typically used as a last resort after all other sources of funding have been exhausted. The nature of who supplies this risk capital is clearly different depending on whether the organization is a for-profit enterprise, a user-owned utility, or some in-between hybrid.

In practice, service providers employ a combination of these sources of funding. The characteristics of each type of funding—and in particular who ultimately bears the cost—vary, making the relative proportion and order in which resources are used of critical importance. The recommendation does not seek to stipulate an optimal mix, as that will depend on the business model, circumstances, operation, and risks of the particular organization and its users/members. However, the benefits and drawbacks of each form of funding should be objectively assessed in determining the combination of financial resources. The factors considered, options assessed, and conclusions reached should be clearly and unambiguously set out and made available to users/members.

Amount of financial resources

No matter which form of financial safeguard is adopted by providers of clearing and settlement services, financial resources should be sufficient to ensure, with a high level of certainty, complete and timely settlement in the case of a default by one or more participants. The stress, scenario, and financial modeling analysis described above is a key part of determining the amount of financial resources required. The capital of service providers is crucial not only to cover default on settlements, but also to address other business risks such as legal, operational, and fraud errors that are not measurable reliably by quantitative models. Service providers should set aside part of their capital as a cushion to cover the potential losses arising from business risks other than default risks. As described in the relevant recommendation, prudential supervisors should apply consistent regulatory capital requirements to infrastructure providers (and other organizations that undertake equivalent functions) to ensure they hold financial resources proportionate to the nature and scale of the risks that they pose to participants and the financial system, as well as to promote a level playing field between such organizations.

Liquidity of financial resources

Providers of clearing and settlement services typically invest their financial resources to generate revenues. Noncash investment assets must be liquidated or pledged before they can be used to meet obligations. This process may be lengthy or costly to complete in the event of a default; for example, insurance underwriters usually cannot make all payments within 24 hours, and credit lines may not be able to be drawn down immediately. Service providers should estimate their daily liquidity requirements and ensure that a corresponding proportion of their total assets and resources can be converted into cash within the same day (T+0 liquidity) and the next day (T+1 liquidity) to meet these requirements. In the event of a market-wide problem, service providers would need to use their financial resources to address the problem without delay to restore the confidence in the financial system. Therefore, it is desirable for service providers to maintain the bulk of their assets and resources in T+0 liquidity, so that there is a significant buffer in excess of the calculated liquidity requirement. For this reason, assets should be in highly liquid, short-term securities/bank deposits, and repo-eligible instruments, such as government bonds. Service providers should also establish contingency plans to obtain additional or replacement funding, for example, through assured credit lines.

RECOMMENDATION 11. ENSURE FINAL, SIMULTANEOUS TRANSFER AND AVAILABILITY OF ASSETS.

> Providers of securities settlement services should reduce to the lowest possible level the credit risk created if securities or cash are delivered without receipt of corresponding assets, by linking securities transfers to funds transfers in a way that achieves effective delivery versus payment (DvP) and by making transparent the point at which finality of transfer is achieved. There are different settlement arrangements that can achieve this:

- Real-time (or frequent intraday batch) settlement systems can offer the greatest certainty by providing simultaneous and immediate transfer for securities and cash at multiple points within the working day so long as there is finality of transfer of securities and cash.
- Systems that offer real time (or frequent intraday batch) transfers of securities followed by net cash payments at the end of each working day (or intraday) offer a lower level of certainty, but can substantially reduce costs and demands on liquidity, particularly in high-volume markets. In practice, such systems require additional and enhanced levels of risk management to offset the greater uncertainty but are acceptable provided that intraday securities transfers are final and that risk controls ensure that the end-of-day (or intraday) net settlement of cash payments will be completed, even if one or more participants owing the largest end-of-day cash payments fail to meet their obligations.

Determining the arrangement appropriate to a particular market will depend on a number of factors, including available technology and communication infrastructure, the number and value of transactions, the systemic importance of the market to the world financial system, and the business and operational models of other market participants and related payments systems. Any uncertainties within an individual system are magnified by the complexity and intersystem dependencies of cross-border transactions; that means that the impact of uncertainty on such trades will be greater than on domestic trades. This is another important consideration.

Whichever settlement model is used, each securities settlement system should specify the moment of final transfer in its rules or through binding contracts in plain and simple language, as expounded further in the respective legal risk recommendation.

Systems that settle both securities and cash on a net basis and allow intraday transfers that are conditional or not legally binding, have yet greater uncertainty, as a participant's transfers may be revoked following failure to meet their end-of-day contractual obligations. In these circumstances the complexities of unwinding conditional transfers of securities (and thereby needing to recalculate the delivery obligations of other participants), and the operational difficulties and liquidity pressures that may result, have the potential to create systemic risk. Such arrangements are therefore considered unacceptable, particularly where there is potential cross-border impact.

Once finality of transfer is fully assured, the rules should enable a receiver to re-use securities and cash without further delay, whether arising from settlement, dividend or interest payments, or corporate events.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation broadly endorses CPSS-IOSCO Recommendation 7 (DvP), Recommendation 8 (timing of settlement finality), and Recommendation 9 (CSD risk controls to address participants' failures to settle), which set out minimum standards for mitigating credit risk in settlement systems across all markets. G30 Recommendation 11 aims to build on the CPSS-IOSCO recommendations. Acknowledging the inherent and complex trade-offs that exist between efficiency and risk in this area, it seeks to give guidance on determining the appropriate settlement arrangement and identify approaches that present unacceptable risk, particularly where there is potential cross-border impact.

ISSUE

It is critical that participants in securities markets have confidence that their assets will be properly protected in the settlement process and that they then have freedom to use those assets as they wish once the settlement process has been completed.

To create confidence, the key attribute that the settlement process must have is absolute assurance that a participant will not be obliged to give up ownership of an asset (cash or security) without receiving the corresponding asset that the participant is due as part of the contractual obligations that the settlement process discharges. To achieve this objective for both parties, the exchange of assets must be simultaneous. In addition, both transfers must be final and in no way conditional or capable of being revoked. This final, simultaneous transfer of assets is described by the term delivery (of securities) versus payment (of cash) and is usually abbreviated to DvP.

DvP was first properly recognized as an essential risk-mitigating principle in the mid-1970s, following the collapse of Bank Herstatt. Other banks were left with very significant exposures as they had paid one side of foreign exchange transactions to Bank Herstatt, but had not yet received the corresponding payment from it. Although this case was not directly connected to securities markets, it dramatically emphasized the need for simultaneous exchange of assets in any linked financial transaction.

The primary issue that the financial markets have been grappling with since accepting DvP as an essential characteristic of settlement is that the payment and settlement systems have not generally been able to support DvP in its literal interpretation. There has usually been some dislocation in the timing of delivery and payment; this has created uncertainty. At this point, the questions that need answering are how much of a gap and what level of uncertainty is acceptable, and what mitigating systems, controls, and processes need to be put in place where exchange is not simultaneous. While these basic questions have remained constant, the answers to them have evolved. This evolution results partly from technological advancements that have allowed progress from typically end-of-day batch processing toward real-time or frequent intraday batch processing, but also from pressure applied by regulators, supervisors, and trade groups, and from variability of the acceptable level of uncertainty from market to market.. Factors such as the value and volume of transactions, the systemic importance of the market to the world's financial systems, and the business and operational models of other market participants and related payment systems all need to be evaluated. Broadly speaking, market changes drive the requirement to develop increasingly certain settlement arrangements to meet investor needs, and technological advancements provide the means to get closer to a more literal form of DvP and enhance risk management processes, and so meet such needs. Because technologies and markets are constantly changing, this issue requires frequent review and revision.

A second critical and connected issue is defining the point at which a delivery of a security or payment of funds becomes final. The issue of finality is addressed in the respective legal risk recommendation. A critical concern in this regard is that operators of settlement and payment systems, in their rules, or in binding contracts with their members, should define the moment at which finality is achieved—in plain and unambiguous language. It is central to analysis of the timing of transfers that the terms delivery and payment refer to the point of final transfer and should not be confused with any conditional transfers that may happen beforehand.

In a number of settlement and payment systems, the timing of final transfer or of processing cutoffs is such that receivers of cash or securities are able to reuse the assets outside those systems only after a further delay. This situation applies not only to DvP securities transactions, but also to receipt of cash or securities arising from coupons, dividends, and other corporate actions. In other cases, either the deliverer or the receiver can be obliged to make cash or securities available for processing significantly earlier than the time at which settlement processing commences. Where overnight batch processes are operated, the deliverer or receiver is obliged to immobilize securities before the close of normal settlement activity on the day before the day of settlement. In addition, in some instances, cash arising from sales of securities cannot be applied to the purchase of another security even within the same settlement batch. These timing issues are closely related to the need to synchronize securities settlement, payment, and foreign exchange systems, as discussed more fully in Recommendation 4. It is important that multiple settlement systems dealing with either a single security or a specific denomination of cash operate as a virtual single system, through system linkages or cross-membership arrangements.

HOW RECOMMENDATION 11 ADDRESSES THE ISSUE

The 1989 G30 report reiterated the need for DvP and set as a minimum standard finalization of both delivery and payment by the close of business on the day of settlement, at the latest. In its September 1992 report "Delivery versus Payment in Securities Settlement Systems," the Bank for International Settlements offered a thorough and comprehensive analysis of the issues surrounding DvP, which has been recently re-endorsed by the 2001 CPSS-IOSCO recommendations. The BIS report described and evaluated the various ways that different markets had established arrangements that, while diverse in nature, were commonly described as DvP.

Recommendation 11 does not aim to revisit the level of detailed analysis contained in the 1992 BIS report. Instead the recommendation seeks to augment the BIS analysis by defining the key features that settlement and payment systems should have in the context of today's system functionality and market needs to create a level of certainty that appropriately diminishes the settlement risk of market participants and hence, in practical terms, can be viewed as acceptable forms of DvP. Without such a structure the counterparty, liquidity, and operational risks connected to the settlement of securities transactions are unacceptably high and have the potential to become systemic, in particular where transactions have potential cross-border impact.

The recommendation recognizes that achieving simultaneous and final exchange is not always the most cost-effective solution, given current technology and market practices. Further, the amount of cash and securities needed to enable settlement can be limited through netting and other arrangements, and these can improve further settlement liquidity and efficiency, even though netting can have the potential to conceal or obscure the point at which finality is achieved.

By advocating that each securities settlement system should specify the moment of final transfer in its rules or through binding contracts in plain and simple language, certainty should be increased whichever operational settlement arrangements are followed. This point is expounded further in the discussion of legal risk in Recommendation 15.

Once finality has been achieved, it is important that the proceeds of settlement are available for re-use, both within and across market settlement systems, to optimize settlement liquidity. Therefore:

- Cash or securities should be available for re-use, both within and outside the system in which they settle, following completion of the settlement process.
- Cash or securities required for settlement should not be immobilized for any lengthy period of time, before or after the point of settlement, and especially not during market opening hours.

Adoption of these principles will improve settlement liquidity across markets and thus settlement performance, will reduce risk, and will ensure that investors are given good value on all flows relating to their securities.

WHAT NEEDS TO CHANGE

It is critical that users of settlement systems are able to determine and properly evaluate the settlement arrangements that they are obliged to use. To enable this, infrastructure providers should, as part of the report advocated in Recommendation 9, set out clearly the settlement arrangements they have put in place and all relevant mitigating controls, with an assessment against the criteria outlined in this recommendation. The report should explicitly address identification of the point at which finality of transfer is achieved, the legal status of the rulebook of the securities settlement system, simultaneity of transfer, and protection against insolvency of the intermediary within a country. Settlement systems that do not comply with the criteria set out in this recommendation should be encouraged to develop their processes so as to remove the risks that noncompliant structures present (both to individual investors and other market participants and to the system). In particular, clear rules on finality should be established in each settlement system.

RECOMMENDATION 12. ENSURE EFFECTIVE BUSINESS CONTINUITY AND DISASTER RECOVERY PLANNING.

All market participants should, and all systemically important institutions must, regularly review, update, and test their business continuity and disaster recovery plans, including evaluation of reliance on third parties, to ensure with reasonable certainty that critical operations will continue with a high level of integrity and sufficient capacity following a disruption or disaster.[9] The review, updating, and testing of plans should build upon the thorough analysis and good practices that have already been established and that are being developed by public and private institutions. The plan should be based upon revisiting planning assumptions, revised risk assessment, and scenario planning that encompasses the key lessons learned from September 11, 2001, and any other relevant incidents that may occur. Organizations should assess whether plans provide satisfactory resilience and evaluate the costs and benefits of developing solutions to the broad range of business continuity and disaster recovery issues. For functions critical to the market as a whole, a split operations model should be considered, whereby one processing site actively backs up another, with each site having all key resources, capabilities, and functionality, including appropriately skilled and experienced people. Systemically important institutions should undertake tests with member firms and users as part of their evaluation exercises.

9. Systemically important institutions are those market participants whose operational or financial failure has the potential to, in turn, cause other organizations to fail and so spread contagion through the financial system as a whole. In any particular market, infrastructure providers and particularly large or strategically important financial intermediaries are likely to be classed as systemically important.

In their review of backup arrangements, organizations should consider whether they have sufficient access to dedicated backup facilities to ensure that operations can be reconstituted within a suitable time frame. When major incidents occur, organizations should be aware that the pressure on shared backup facilities may be such that they are not able to rely on having access to it.

Full disclosure of plans may increase the risk of certain events or attacks, or otherwise compromise plans, and is clearly undesirable. However, contingency plans should be sufficiently transparent and effectively communicated to the other market participants that depend on the institution to allow them to make reasonable judgments about the operational risks to which they in turn are exposed. In addition, the responsible supervisory body should critically assess the contingency plans of the organizations that they supervise, including an evaluation of the adequacy and frequency of testing. The nature of these assessments should reflect the associated risks, and for high-risk organizations should be performed at least annually.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation builds upon aspects of CPSS-IOSCO Recommendation 11 (operational reliability), which advocates that contingency plans and backup facilities be established to allow for timely recovery of operations and completion of the settlement process. This recommendation sets out in greater detail the processes and specific factors for consideration that should form part of sound business continuity and disaster recovery plans. This recommendation also stresses the need for transparency so that firms that are operationally dependent on other organizations can make appropriate and considered judgments about the risks to which they are in turn exposed.

ISSUE

Business continuity and disaster recovery planning has for many years been an important part of the operational risk management practices of financial services companies. These plans have focused on matters such as the loss of power or telecommunication facilities, and on the impact of terrorist activities in those countries that have suffered attacks or where such attacks have been perceived as a significant threat. However, market participants learned several lessons from the events of September 11, 2001 regarding business continuity and disaster recovery planning in the context of extreme disruptions. The widespread destruction of the physical infrastructure and telecommunications environment in lower Manhattan caused disruptions in the trading of securities and the subsequent clearing and settlement of trades.

While the global financial system continued to function in the days following September 11, the industry witnessed the interdependencies in the financial system and the need to improve its overall operational resiliency. Because they are systemically important, clearing and settlement organizations, payment systems, and other institutions that undertake functions that provide an actual or effective industry utility need to operate at a high standard of operational resiliency and may therefore need to take further action to strengthen and test their business continuity and disaster recovery plans.

HOW RECOMMENDATION 12 ADDRESSES THE ISSUE

Several new efforts are therefore under way in the financial services industry in both the public and private sector to provide updated business continuity and disaster recovery guidance. For example, in the United States, the Board of Governors of the Federal Reserve System, the Office of the Comptroller of the Currency, and the Securities and Exchange Commission jointly issued a "White Paper on Sound Practices to Strengthen the Resilience of the U.S. Financial System." This consultative paper will become the basis for future regulatory guidance in the United States. Given that these efforts are under way, the differing nature of organizations to which the recommendation is addressed, and the varying circumstances in which they operate, the G30 recommendation is not intended to be prescriptive. Rather, it gives best practice guidance and further points for consideration, with a focus on dealing with extreme events, that may enhance existing policy and practices and can be applied objectively and consistently by market participants to help ensure:

- Timely review, updating, and testing of organizations' business continuity and disaster recovery plans.
- Continuity of processing following events ranging from localized processing disruptions to wide-scale disasters affecting an entire geographic region.
- Effective communication of the organization's planning (without compromising confidentiality) so that market participants that depend on the institution can make reasonable judgments about the operational risks to which they in turn are exposed.

WHAT NEEDS TO CHANGE

Organizations to which the recommendation is addressed should review, update, and test their business continuity and disaster recovery plans to ensure that following a disaster, critical operations will continue with a high level of integrity and sufficient capacity. These bodies should review their planning assumptions, their risk assessment, and scenario planning in the light of the key lessons learned from September 11, 2001.

In the event of a disaster, backup facilities should allow processing to be switched to a second location (located outside the geographical zone impacted) within the same business day. The distance between the primary and secondary location should be determined by taking into account the trade-offs of risk, cost, and efficiency. For functions critical to the market as a whole, organizations should also consider whether developing a split operations model (commonly referred to as "active/active"), whereby one processing site actively backs up another, is appropriate, and evaluate the costs and benefits of such a solution.

Organizations should publish, at least annually, an outline of the business continuity and disaster recovery procedures they have in place and the results of independent testing of those procedures and to give users assurance that the procedures have operated effectively. The level of disclosure provided to the market participants should be sensitive to confidential issues that could increase the risk of compromising plans.

The key lessons learned from September 11, 2001, which should be considered in revising or developing business continuity and disaster recovery plans, are summarized below:

1. Revisit planning assumptions and perform and/or update risk assessments.

Business continuity plans need to consider the range of their planning assumptions. Before September 11 some organizations focused only on the information technology portions of their disaster recovery plans and made certain assumptions that are no longer realistic for all eventualities today (concerning, for example, availability of key people, regional availability of public transportation, and availability of key vendors and business partners).

The first stage in developing a business continuity plan typically consists of developing planning assumptions and assessing the risks of certain events (scenarios) that could occur and therefore should be factored into the plans. This process should be performed on an annual basis at minimum, but it can also be performed throughout the year as change occurs in the organization or as external events occur that affect the organization. As organizations update their business continuity plans, they should factor in several potentially new planning assumptions in the post-September 11 environment, in addition to scenarios that they already consider, such as the potential for:

- Wide-scale regional disruption
- Loss or unavailability of key personal, critical vendors, customers, and other business partners
- Unavailability of public transportation key infrastructure such as bridges and tunnels
- Cyber-threats such as computer hacking
- Unavailability of business locations for periods of up to six months

2. Avoid geographic concentration of primary and alternate facilities.

Just as an investor would diversify the risk in her stock portfolio, the events of September 11 highlighted the need for organizations to diversify geographic locations that support critical business functions. In addition, the advances in information technology may mean that it is no longer essential for employees to be located in one concentrated location.

For business functions critical to the market as a whole, organizations should assess the costs and benefits of developing a split operations model whereby key personnel, business processes, and technology are divided between two or more geographic locations, though it is clear that this will not always be appropriate or desirable. Determining the appropriate geographic separation is a complex and subjective issue that requires careful judgment to balance the trade-offs of risk, cost, and efficiency. This recommendation does not aim to prescribe a particular solution in recognition of the fact that much effort is currently under way to study this issue by both public and private institution. Rather, it gives good practice guidance that can then be applied objectively and consistently.

Where a split operations model has been determined as necessary to give sufficient resilience, best practice would be for personnel at each location to be cross-trained and for each location to have sufficient "people capacity" to absorb the work if one location is unable to process transactions or conduct business. The business operations and technology environment at the backup facility should be able to accommodate sufficient personnel, technology, and provide timeliness of data backup to ensure processing can continue at the second site with sufficient capacity and processing integrity.

3. Develop/review emergency response, incident management procedures, and communication and information flows.

Many organizations have well-developed and tested business continuity and disaster recovery plans but have not developed emergency and incident response plans. The events of September 11 undoubtedly reinforced the need for establishing communications requirements and decision matrixes for the initial hours of a response, including performing rapid but accurate employee head counts, responding to the media and family members, interacting with government officials and law enforcement personnel, and cross-training the chain of command. The dependencies between service providers emphasize the need for inter-organizational planning, particularly on maintaining the inter-organizational communications and flow of information that forms a critical part of a coherent and coordinated response. Having a detailed and fully tested incident response plan has now become just as critical as being able to recover business operations.

Roles and responsibilities for the recovery teams should be clearly documented and communicated. Each team should be trained and ready to deploy in the event of a disruptive event that requires the plan to be activated. The specific teams that should be considered are:

- Senior management team
- Crisis management team
- Damage assessment team
- Alternate site recovery team
- Technical (network/telecommunications/applications/operating systems/server)
- Business recovery teams
- Security team
- Media relations team
- Legal affairs team

4. Review disaster declaration and notification procedures.

Many steps are typically involved during the activation of a disaster recovery plan, many of which occur before the actual declaration of a disaster. An informed decision process should be established in advance to provide an effective framework to allow those "on the ground" to take critical initial steps in a timely manner to best position the organization for a successful recovery. The disaster declaration procedures should clearly identify the initial actions to be taken by damage assessment and/or recovery personnel to implement the recovery plans.

Notification procedures should be documented in the plan for many different scenarios. The procedures should describe the methods to be used to notify recovery personnel during business and nonbusiness hours. Notifications can be accomplished through a variety of methods including telephone, pager, work or personal electronic mail, and cell phone. A common notification method is a call tree. This technique involves assigning notification duties to specific individuals, who are in turn responsible for notifying other recovery personnel. A call tree should be established for primary and alternate methods of notification.

5. Implement appropriate data backup technology.

Many data backup plans focus only on critical computer systems. Consideration should be given to backing up paper-based records, desktop computer systems, and other systems needed to ensure continuity of operations.

Policies and procedures should specify the data that should be backed up and the means for doing so (mirrored/synchronous, replication, tape; daily or weekly; incremental or full) based on data criticality and the frequency that new information is introduced.

6. Focus on vendor and outsourcing dependencies.

In the past, many organizations did not consider the impact on their own operations of a disaster affecting key vendors or outsourcing dependencies. Therefore, a review of vendor and outsourced service providers should be conducted that includes assessing a vendor's criticality, securing multiple vendors for critical processes, understanding a vendor's preparedness to deal with disasters, and understanding vendor capacity thresholds and capacity plans. Organizations need to understand where they are dependent upon key vendors (such as telecommunications) and identify single points of failure that these vendors pose. Vendors and outsourced service arrangements should be included in the business continuity planning process and should provide the organization sufficient evidence as to their operational resiliency.

7. Test all aspects of plans.

Testing of connectivity between all parties (such as participants, exchanges, key vendors) should be performed from primary and backup locations. In addition, plans should consider the loss of key customers and key personnel. Scenarios for technical disaster recovery planning can frequently become routine, ensuring successful tests and the appearance of preparedness. Incorporating "B Team" staff, impacts of degraded critical vendors (especially networks), incomplete data backups, and other realistic problems will ensure that the recovery program is realistically evaluated for its true capabilities.

Besides technical recovery, one of the critical lessons learned from the September 11 attack is the critical need to increase end-user involvement within the testing process. Incomplete procedures and inadequate work area resources can be identified and addressed only through effective and comprehensive tests.

At a minimum, the following areas should be addressed in testing:

- Systems recovery on an alternate platform
- Testing of business process recovery, including coordination among various recovery teams
- Internal and external connectivity
- System performance using alternate equipment
- Restoration of normal operations

Training for recovery personnel should complement testing. Training should be provided at least annually; new hires that have plan responsibilities should receive training shortly after they have been hired. Recovery personnel should be trained in the following:

- Purpose of the plan
- Cross-team coordination and communication
- Reporting procedures
- Security requirements
- Team-specific processes (activation/notification, recovery, and reconstitution phases)
- Individual responsibilities (activation/notification, recovery, and reconstitution phases)

8. Develop a strong maintenance process to keep plans current.

Organizations should have a process in place to ensure that business continuity and disaster recovery plans reflect changes in business, technology, people, and processes. Periodic maintenance is necessary to ensure that the right people can be contacted in the event of a disaster and that a sufficient level of resources is available at alternative processing sites to meet actual needs. Business continuity, disaster recovery, and incident management plans must be continually updated and tested to remain current and ensure organizations are ready. The plan update should be performed at least annually or whenever significant changes occur for:

- Operational requirements
- Security requirements
- Technical procedures and requirements
- Hardware, software, and other equipment
- Names and contact information of team members, business partners, and vendors
- Alternate and offsite facility requirements
- Vital records (hard copy or electronic)
- External events affecting the organization

RECOMMENDATION 13. ADDRESS THE POSSIBILITY OF FAILURE OF A SYSTEMICALLY IMPORTANT INSTITUTION.

Market participants in each financial center should work together to identify those institutions, or parts thereof, that are systemically important to the clearing and settlement process. User groups should be established to address how they would react if, despite strengthened business continuity and disaster recovery plans, there were a failure for whatever reason at one of these institutions. Ways of mitigating the risks created should a systemically important institution fail, such as building a real-time data depository, should be evaluated. Where it is determined that effective and feasible solutions may exist, detailed business cases setting out the costs and benefits should be built up, and decisions on future actions and investment decisions should be taken accordingly. As well as enforcing suitably high standards of business continuity and disaster recovery planning in systemically important institutions, regulators and overseers should encourage this process of industry-wide contingency evaluation and planning.

ISSUE

The recommendation aimed at ensuring effective business continuity and disaster recovery planning is critical to strengthening the resilience of financial markets infrastructure and providers of clearing and settlement services. Yet, however robust, thorough, and well-tested, it is unrealistic to expect business continuity and disaster recovery plans to anticipate and cater to all possible eventualities, as this encompasses an enormous range of potential scenarios, each individually unlikely. At the same time, the likelihood of a catastrophic event of some sort is clearly real.

HOW RECOMMENDATION 13 ADDRESSES THE ISSUE

The recommendation does not seek to prescribe a solution to this issue, which is extremely complex and which, until the events of September 11, attracted limited attention. The recommendation instead outlines the process that the industry should follow to investigate, evaluate, and implement potential solutions.

WHAT NEEDS TO CHANGE

Because the failure of an institution systemically important to clearing and settlement will—by definition—have widespread impact across all users of their services, market participants need to act collectively. As a first step, those institutions, or parts thereof, that are systemically important need to be identified. Users then need to make contingent arrangements as to how they would react should one of these systemically important institutions fail. Ways of mitigating such risks, such as building a real-time data depository, need to be carefully considered and evaluated. The benefits of such solutions may well be substantial, but so will be the costs. For that reason, detailed business cases will be needed for each potential solution to enable considered and appropriate investment decisions to be made.

The recommendation is addressed primarily to market participants, and it is foremost the responsibility of the boards and management of these organizations to act to address the risks described above. However, the systemic nature of the issue has a very substantial public interest. Quite properly, those responsible for the regulation and oversight of market participants have paid significant attention to industry-wide contingency planning, particularly in the United States in the aftermath of September 11, but also elsewhere. They have already encouraged debate and discussion of these matters among the relevant institutions and should ensure that progress continues to be made with sufficient rigor and momentum.

RECOMMENDATION 14. STRENGTHEN ASSESSMENT OF THE ENFORCEABILITY OF CONTRACTS.

Market participants should ensure that due diligence procedures examine contract enforceability, including basic formation and validity, as well as power and authority to contract. Where significant uncertainty exists about the reliability of the legal system of relevant jurisdictions, steps should be taken where possible to ensure that such laws do not govern the transactions and that enforcement in such jurisdictions will not be required. Collateral posted and held outside such jurisdictions and letters of credit essentially removing all reliance on enforcement ability in the questionable jurisdiction should be considered. Industry groups should enunciate standards of diligence and, together with appropriate regulators, identify deficiencies in law that could potentially impair contract enforceability, such as those related to gambling and other public policy areas. Industry groups should also propose legislative changes to protect transactions between commercial entities.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation builds upon aspects of CPSS-IOSCO Recommendation 1 (legal framework), which sets out the need for securities settlement systems to have a well-founded, clear, and transparent legal basis. G30 Recommendation 14 identifies specific issues in connection with legal enforceability and sets out mitigating measures that should be taken where legal uncertainty exists.

ISSUE

While ongoing business relationships offer primary assurance that parties to a financial transaction will perform as agreed, it is the reasonable certainty of legal enforcement that ultimately must underlie all transactions. Contract legality and enforceability are fundamental in this regard, and parties to financial transactions have long focused on these issues as basic elements of due diligence and risk management. But the increasing complexity of transaction structures, as well as the involvement of an ever-growing number of national legal systems, requires reemphasis of this fundamental consideration. In fact, margining and other collateralization, closeout netting, and essentially all other considerations addressed in this report are without significance unless the fundamentals of legal recognition are assured.

In considering how to address these risks, it must be noted that there are many jurisdictions in which legal opinions on fundamental issues have not been obtained, even regarding standard agreements. The issues of concern fall into four categories.

Formation and validity of contract

The law of the jurisdiction or jurisdictions that governs the contract must respect and enforce agreements accomplished and evidenced in the manner utilized by the parties. Typically it is anticipated that oral and electronic agreements will be binding and that confirmations evidencing the terms will be conclusive, absent manifest error. However, the issue of the binding nature of such agreements and the method of proof, while having been addressed in certain key jurisdictions such as New York, has not been the subject of comprehensive evaluation and, where appropriate, legislation. The laws of many jurisdictions, even if not the laws purportedly governing the contract, may have bearing on validity and enforcement, particularly in the context of a multi-jurisdictional bankruptcy or similar event.

Issues of power and authority

The principles of power and authority have often been considered. The commitment of both public and private entities to enter into contracts requires statutory empowerment and formalities that vary by jurisdiction and type of entity. In many cases, authority must be traced to the underlying legal powers of the organization, the approval of the governing board, the delegated authority of the individual expressing the commitment of the entity and, in some cases, the precise formality of execution of documentation. Understanding the applicability of the doctrine of apparent authority, the control exercised by counterparties over their own employees, in the relevant jurisdiction can have far-reaching implications for each party to a transaction.

Issues of public policy

Assuming valid formation and proper exercise of power and authority, enforceability generally depends on whether aspects of the agreement violate law or public policy and on the effect of the violation in the relevant jurisdiction. While violation of law is to be avoided in any event, it may or may not affect contract enforceability. And even if lawful in the jurisdiction whose laws govern the contract, offense to public policy in the jurisdiction in which enforcement is sought may affect enforceability. The typical example is the gambling laws of a jurisdiction.

Integrity and transparency of the legal system

Regardless of the theoretical validity and enforceability of a contractual obligation, access to and the reliability and transparency of the legal system that may be called on to enforce the contractual obligation itself or the judgment of another jurisdiction may be an additional risk to be addressed. These factors may also be affected by the stress to the economy represented by the circumstances under which the contractual obligation is sought to be enforced, the nationality of the parties involved in the litigation, and the possibility of corruption, among other matters.

HOW RECOMMENDATION 14 ADDRESSES THE ISSUE

Addressing legal risks effectively requires due diligence of legal matters in sufficient detail to fully assess the complex of issues involved, as well as a clear understanding of legal rights under relevant legal jurisdictions. The surest ways to control legal risks is to adopt a high standard of due diligence and to ensure, where possible, that deficient laws do not govern transactions and that enforcement in such jurisdictions will not be required. Such steps could include posting and holding collateral outside such jurisdictions and use of letters of credit that essentially remove all reliance on enforcement ability in the questionable jurisdiction.

Formulation of minimum due diligence standards in various legal areas by industry groups would provide a firm basis for risk assessment and management by market participants. Identifying changes in law necessary to remove legal uncertainties and recommending them to governments and legislatures would, to the extent they are implemented over time, provide the ultimate resolution of the problem. Even in that event, however, the need to understand and manage legal risks would remain an essential element of risk management and control.

WHAT NEEDS TO CHANGE

Market participants should ensure that their due diligence procedures examine issues of contract legality and enforceability in sufficient detail to assess fully the complex of issues involved in multi-party cross-border transactions. This must include a clear understanding of legal rights under all relevant legal jurisdictions.

To support these efforts, industry groups should formulate standards of minimum diligence, identify sound legal principles that would minimize legal risk, and recommend changes in national laws that fall short of these sound principles. Beyond strict legal principles, concerns over the reliability of legal systems of relevant jurisdictions should also be enunciated in the interest of promoting reform.

Formation and validity of contract

Industry groups should formulate standards of minimum diligence regarding conclusions about contract enforceability. With respect to purely domestic transactions, where the legal system is well understood, conclusions may be based on a thorough understanding of the legislative and case law affecting the issues.

These conclusions will, of necessity, be subject to varying levels of uncertainty, but nonetheless, reasonable levels of comfort should be obtainable. The complexity of legal opinions relating to the subject matter should also be addressed. Legislation ensure the validity of oral and electronic agreement and dealing with issues of proof should be formulated and pursued if it has not already been enacted.

Issues of power and authority

Industry groups should recommend minimum diligence standards regarding confirmation of authority for each type of transaction and for particular types of counterparties. This may include schedules for standard-form agreements recognizing differing standards applicable to certain types of counterparties. The issue of apparent authority should also be considered since applicable legal principles may affect contract enforceability in ways not fully appreciated. Where principles of apparent authority do not apply, appropriate legislative changes to implement them should be proposed. In jurisdictions where the doctrine does apply, legal considerations that could undermine its application should be identified and legislative changes proposed.

Issues of public policy

Industry groups and appropriate regulators should review issues of public policy concern that could impair contract enforceability, such as gambling statutes that have sometimes restricted the use of certain types of financial contracts, and propose legislative changes to protect transactions between commercial entities.

Integrity and transparency of the legal system

The issue of integrity and transparency of the legal system must be considered as it applies to cross-border transactions, particularly those involving counterparties in nations experiencing political or severe economic instability. This is true regardless of the law apparently governing the contract if ultimate enforcement is dependent on the application of impartial legal principles by a court in a jurisdiction under stress. Industry groups should seek to heighten awareness of these issues and encourage the use of enforceable collateralization outside of such jurisdictions so as to avoid the necessity of resort to courts in such jurisdictions for purposes of enforcement.

RECOMMENDATION 15. ADVANCE LEGAL CERTAINTY OVER RIGHTS TO SECURITIES, CASH, OR COLLATERAL.

Market participants must be able to determine, with certainty and reasonable cost and effort, what law defines and governs their rights to securities, cash, or collateral in a clearing and settlement system or other intermediary, what those rights are, and how to perfect and enforce them. The applicable rules of law should be automatically effective, to the extent possible, and should afford the parties to the transaction ex ante certainty and predictability for the largest number of transactions possible. To the extent possible, clearance and settlement systems and other intermediaries should describe to their participants or customers the relevant choice of law rules in their home countries as they relate to what law governs the effectiveness of transfers and pledges of securities held through an account with an intermediary. Specifically, the following is recommended:

- ***Choice-of-law rules.*** Financial supervisors and legislators should ensure that the Hague Convention on the Law Applicable to Certain Rights in Respect of Securities Held with an Intermediary, adopted on December 13, 2002, is signed and ratified by their respective nations as soon as is reasonably possible. The Hague Convention, once ratified by all relevant nations, will ensure that there will be a clear and certain answer to the question in an international setting as to which law governs in determining whether a collateral taker has received a perfected interest in pledged securities.
- ***Protection against intermediary insolvency risk.*** Financial supervisors and central banks should confirm that the rights of a person holding securities through an account with an intermediary in their jurisdiction are senior to

the claims of the intermediary's creditors to such securities, except where the intermediary affirmatively grants such creditors control over such securities. If the financial supervisor or central bank is unable to provide such confirmation, it should take all appropriate action to ensure that its local commercial and bankruptcy laws are interpreted or amended to achieve such a result.

- ***Pledging and realization procedures.*** Financial supervisors, central banks, and legislators should encourage collateral transactions by simplifying any legal procedures that impose conditions on the effectiveness of pledging arrangements or govern the fairness of realizing on collateral.
- ***Finality.*** The boards of central securities depositories should specify in plain language the moment when a transfer or pledge of securities becomes "final" (that is, irrevocable and unconditional) in its rules or binding contracts with its account holders. Financial supervisors and central banks should require this specification from each central securities depository subject to their jurisdiction.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation develops aspects of CPSS-IOSCCO Recommendations 1 (legal framework), which sets out the need for securities settlement systems to have a well-founded, clear, and transparent legal basis; and Recommendation 12 (protection of consumers' securities), which sets out the need for entities holding customers' securities to protect those assets through appropriate safeguarding procedures. G30 Recommendation 15 builds upon these sound principles to identify specific issues in connection with legal certainty over rights to securities, cash, or collateral, together with how these issues should be resolved and/or the appropriate measures to be put in place to mitigate risk where such legal uncertainty exists.

ISSUE

Most existing choice-of-law rules (private international law) do not allow market participants to determine, in advance of any action, with sufficient certainty and only reasonable effort, what substantive local law governs their rights to securities, cash, or collateral in a cross-border transaction involving a clearing and settlement system or other intermediary. Even when they do, the governing substantive local law may not allow market participants to determine in advance with sufficient certainty and reasonable effort what those rights are or how to enforce them, provide practical answers to those questions, or facilitate risk reduction. Local laws are also far from harmonized in this area.

The problem has arisen because modern developments in systems for holding cash and securities, and the cross-border nature of an increasing volume of transactions, have not been matched by developments in the underlying legal infrastructure. To increase the efficiency of both local and cross-border transfers and collateral transactions, the vast quantity of securities and cash is now held, transferred, and pledged by entries to accounts with clearing and settlement systems and other intermediaries, rather than directly in physical form or directly by issuers. Unfortunately, most choice-of-law rules and local substantive law continue to reflect assumptions of a bygone era when securities and cash were held, transferred, and pledged by physical delivery or directly by issuers and mainly in purely domestic transactions. In fact, most local laws in this area have not changed fundamentally since Roman times. This has created a classic gap between law and practice—a gap that fosters legal uncertainty and undermines the soundness of the legal infrastructure underlying the modern cash- and securities-holding system. The current legal infrastructure can be likened to a rusting bridge that needs to be strengthened or replaced before it collapses under the stress of modern activity.

Many other organizations, including the Basel Committee on Banking Supervision and IOSCO, have recognized that the modern cash- and securities-holding system needs to have a sound legal framework, but they have not defined the standards that should characterize such a framework nor made specific recommendations for bringing local laws into line with commercial practices.

HOW RECOMMENDATION 15 ADDRESSES THE ISSUE

This recommendation aims to ensure that the legal infrastructure underlying the cash- and securities-holding system allows market participants to determine in advance of any action, with certainty, and with only reasonable effort, what local substantive law governs their rights to securities, cash, or collateral in a clearing and settlement system or other intermediary, what those rights are, and how to enforce them. The recommendation requests action by a broad range of market participants including financial supervisors, central banks, intermediaries, end users, financial trade associations, and legislators. There are few circumstances where action by intermediaries and end users alone could achieve this result, but in a number of areas, determinations by the boards of clearing and settlement entities, financial supervisors, and central banks could be effective. In still other cases, and ultimately for the system as a whole, national laws should be harmonized consistent with these objectives and, as a matter of priority, existing choice-of-law rules and national and other local substantive law should be modernized as follows:

- ***Choice-of-law rules.*** For securities held through accounts with an intermediary, the law of the place of the relevant intermediary (commonly referred to as PRIMA) should determine the legal nature of the rights arising out of a credit of securities or cash to such accounts; the steps required for a transfer or pledge of securities or cash credited to such accounts to be enforceable among the parties (including the intermediary) and senior to the rights of third parties; and the steps required to realize a pledge of securities or cash credited to such accounts.
- ***Protection against intermediary insolvency risk.*** Local law should ensure that the rights of a person holding securities through an intermediary are generally senior to the claims to such securities by the intermediary's creditors.
- ***Pledging and realization procedures.*** Local laws that condition the effectiveness of pledging arrangements or govern the fairness of realizing on collateral should be simplified to facilitate and encourage risk reduction by reducing the cost of collateral transactions.
- ***Finality.*** Each clearing and settlement system should specify *in plain and simple language* the moment when a transfer or pledge of securities becomes final in its rules or binding contracts with its account holders, and this specification should be required by financial regulators and embodied in local law.

WHAT NEEDS TO CHANGE

The fundamental requirement is to modernize national and local laws to bring them into line with modern commercial practices, as indicated in the recommendations set forth above. This is a matter of urgency, but there is strong tendency to ignore even well-known defects in the legal infrastructure until after a financial crisis occurs. Nevertheless, because the legal system underpins the entire clearing and settlement framework that this report urges should be reformed, legal reform cannot be left for later, not least because legal reform is often a difficult and slow-moving enterprise.

A broad range of clearing and settlement organizations; market participants including banks, brokers, and other intermediaries; industry groups; banking and securities supervisors and their international bodies; central banks; and national and international bar associations will have to provide persistent support for reforms, taking such opportunities as arise to offer organized support.

One area of recommendation for which united support can be offered is choice of laws. National authorities should be encouraged by all interested parties to sign and ratify the just-adopted Hague Convention as soon as is reasonably possible. It is of course critical to its effectiveness that the Hague Convention be ratified as quickly as possible in as many nations as possible.

As part of the monitoring of performance that will follow this report, national choice-of-law rules and applicable substantive law should be monitored and the extent to which they conform to the specific recommendations set forth above should be specified.

Banking and securities supervisors should consider recognition of sound legal frameworks by calibrating capital treatment of collateral transactions and other risk mitigation measures based on the soundness of the underlying legal framework.

RECOMMENDATION 16. RECOGNIZE AND SUPPORT IMPROVED VALUATION METHODOLOGIES AND CLOSEOUT NETTING ARRANGEMENTS.

Market participants should ensure that all master agreements provide that upon the early termination of a transaction or group of transactions, the determining party will have the flexibility to value such transactions by the method that is most likely to produce a commercially reasonable valuation at the time of termination. Master agreements also should provide that in any exercise of such discretion, the determining party should be guided by principles of good faith and commercial reasonableness.

Market participants should include closeout netting provisions in their contract documentation. Trade associations and other industry bodies should work together to harmonize information on the effectiveness of netting and disseminate it widely and in accessible form.

Relevant authorities in each jurisdiction should ensure that their laws give effect to closeout netting for all central counterparties, brokers, end users, and other market participants, and for all entity, transaction, and asset types. Market participants and other interested bodies should encourage legislative reform in those jurisdictions where laws do not meet this standard.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation builds upon aspects of CPSS-IOSCO Recommendation 1 (legal framework), which sets out the need for securities settlement systems to have a well-founded, clear, and transparent legal basis. G30 Recommendation 16 highlights the measures that need to be taken to mitigate legal risk in connection with closeout netting and valuation arrangements.

ISSUE

Financial agreements, particularly master agreements for derivatives transactions, contain provisions authorizing the closeout or early termination of outstanding transactions under specified circumstances, including payment or delivery defaults or insolvency. In these circumstances, valuation and netting questions become important to the speedy and accurate resolution of claims, and language giving effect to flexible valuation methods and closeout netting should be part of all contract documentation and master agreements and should enjoy the full force of law.

Valuation is an important step in closeout netting, but it is also important in a wider range of financial events. A broad array of master agreements is in use today and many of them require that the value of terminated transactions be determined by reference to market quotations obtained for the elements of the transactions at the time of their termination. Experience with these market quotation–based valuation methodologies has shown that they generally work well for transactions for which there are with liquid markets that are functioning in a normal manner.

Questions arise concerning the use of closeout valuations that are based on market quotations obtained from markets that are illiquid, irregular, or nontransparent. Questions also arise in cases where quotations cannot be obtained and where quotations are obtained but a clear determination cannot be made as to whether they produce a commercially reasonable result. In closeout netting, the real problem with unclear valuations is that the determining party does not know with any certainty whether the right amounts are being set off. A court or trustee may amend the closeout value at some later date and effect a potentially significant change to the netted amount. In addition, some master agreements require that a closeout value be calculated for each transaction that is being terminated. Experience, however, has shown that, in some circumstances, it can be much more efficient to determine closeout valuations for groups of terminated transactions, rather than individual terminated transactions.

Closeout netting is typically triggered in case of closeout or early termination.[10] Effective closeout netting is an important counterparty risk management technique because it ensures that if a counterparty fails, the innocent party is required to pay (or receive) only the net sum owing. This is important for all participants in the markets, whether they are central counterparties, brokers, or end users, and is even protection against systemic risk. For closeout netting to be effective, methods available for valuation of affected transactions must be effective and expeditious. In fact, valuation is a critical issue in case of any early termination of outstanding transactions.

The effectiveness of credit support techniques may depend on the effectiveness of closeout netting, particularly if the underlying collateral is provided by means of outright transfer. Closeout netting itself is often used in conjunction with other risk management techniques, such as the provision of credit support in relation to the net exposure resulting from the application of closeout netting. Through capital rules promulgated by the CPSS, regulatory capital benefits accrue from adopting netting, provided that the netting schemes have "a well-founded legal basis under all relevant jurisdictions." Thus closeout netting must be effective under the laws of the jurisdiction in which the counterparty is organized, the jurisdiction of the law governing the netting agreement and related transactions, and the jurisdiction of branches through which the parties are transacting. Accordingly, much hinges on the effectiveness of closeout netting and that effectiveness must extend to a range of jurisdictions.

The closeout netting process comprises four stages: closeout (or termination) of transactions; valuation of the terminated transactions in the underlying currency of the transactions; conversion of termination values into a single base currency; and netting (or set off) of the individual values to produce a single amount payable by one party to the other. Closeout netting will occur either automatically or upon notice from one party to the other, as previously agreed by the parties. In some jurisdictions where there are doubts as to whether closeout netting will be upheld by a local liquidator, the likelihood of closeout netting being effective may be increased through automatic termination of transactions at a time prior to the appointment of the liquidator.

In the first instance, closeout netting is a technique generally employed in the derivatives markets, between two parties to an over-the-counter derivatives transaction or, in the case of exchange-traded derivatives, between brokers and their customers or clearing brokers and a central counterparty. In addition, the technique is commonly used between parties in the foreign exchange and repo markets and in the interbank deposit markets. Participants in other markets have similar interests in reducing counterparty risk, and the principles of closeout netting can be applied equally within these other markets and, indeed, across all of these markets.

The benefits of closeout netting are particularly obvious in transactions that include a lengthy period

10. Closeout netting is to be distinguished from other netting techniques. Payment (or settlement) netting is a technique allowing parties to settle payment obligations to each other that are payable on the same date, by netting amounts payable in the same currency. Payment netting may apply across all transactions between the parties, or it can be limited to transactions of the same type or even to payments within a single transaction. The obligations remain as gross payment obligations until the time of settlement. Netting by novation is a technique that also allows netting of payments in the same currency that are due on the same date. It differs from payment netting in that the conversion of gross obligations to net obligations occurs when each new transaction is entered into, rather than at the settlement date. Neither technique provides the protections offered by closeout netting, which is intended to apply to all transactions subject to the relevant netting agreement, regardless of when payment or delivery is due and regardless of the currency of the transaction. Although closeout netting does not mitigate settlement risk (which payment netting and novation netting both do), it can be combined with payment netting to gain the combined benefits of both netting techniques.

between contracting and settlement, and a corresponding lengthy period of exposure to the counterparty. In certain markets (such as the cash equities market) where settlement periods are short, the shorter window of possible counterparty default has traditionally meant that the benefits of closeout netting have been less obvious. Entities that participate in more than one market are, however, increasingly seeking to implement cross-product (or cross-market) netting agreements ("master netting agreements"), pursuant to which counterparty exposures arising from a range of transactions (cash market as well as derivatives, for example) will be reduced. Such master netting agreements, if effective, allow counterparties to calculate exposure on a net basis across products and also to calculate their credit limits and margin requirements on the basis of the resulting net figure.

Although acceptance of netting is becoming increasingly widespread, a number of uncertainties still exist. The nature of the uncertainty varies from jurisdiction to jurisdiction and may render closeout netting either partially or entirely ineffective:

- ***Mandatory insolvency rules.*** Closeout netting may offend principles of local insolvency law for several reasons, including the following. It may be regarded as a means of preferring one creditor over another, in breach of principles of equal treatment of creditors; set-off allows the nondefaulting party to "receive" the benefit of one hundred cents in the dollar for each dollar that it owes to the defaulting party. Alternatively a liquidator may be able to "cherry pick" certain transactions that would otherwise be subject to netting by disclaiming onerous property (including transactions that are loss-making for the insolvent estate) and forcing performance of contracts that are profitable to the insolvent estate. A liquidator may additionally be able to challenge arrangements entered into within a certain period before the onset of insolvency (for example, as unlawful preferences, transactions at an undervalue, fraudulent conveyances, or other transactions depriving the estate of assets). Insolvency laws may specifically affect the ability of the parties to terminate transactions before the stated maturity date or to net the resulting termination amounts. Alternatively, mandatory insolvency rules of a particular jurisdiction may require a particular valuation methodology or require calculations and payments to be made in a particular currency, which differs from that agreed between the parties, thereby affecting the net result.
- ***Entity types.*** Certain entity types may be subject to special insolvency procedures, which override netting arrangements and produce a different net result.
- ***Contracting parties.*** Closeout netting is generally not enforceable where there is no mutuality of obligations (for example, between two affiliates and their mutual counterparty). In addition, the application of closeout netting becomes complex in arrangements involving agents acting for underlying principals, especially where the identity of the principal is not disclosed, either at all or until after the transaction has been entered into. Furthermore, netting legislation may be confined to circumstances in which both parties are of a particular type (see, for example, the United States Federal Deposit Insurance Corporation Improvement Act).
- ***Cross-border issues.*** Netting may be effective in some jurisdictions but not in others, where the parties are transacting. A liquidator in a jurisdiction that does not recognize closeout netting may seek to undermine the global effectiveness of closeout netting by suing for amounts owed between a party's offices in different jurisdictions or requiring specific performance of transactions that are profitable to the estate. Alternatively, an insolvency representative in a particular jurisdiction may "ringfence" the assets of the insolvent estate in order to maximize the benefit to local creditors. Recent European Union legislation has promoted certainty in this area (see the discussion in

footnote12 on insolvency proceedings) but more extensive global initiatives are required.

- ***Central counterparties.*** To date, the rules of some central counterparties contemplate the default of the clearing broker but do not provide any mechanism to deal with the default of the central counterparty itself. Clearly this should be of concern to clearing brokers who have an exposure to the central counterparty. Further analysis is required regarding the effect of the potential insolvency of the central counterparty.
- ***Variable application of netting laws.*** The approach to closeout netting varies between jurisdictions. In some jurisdictions closeout netting is mandatory in bankruptcy, while in others it is prohibited. Where general bankruptcy law may otherwise prohibit closeout netting, exceptions to the general rule have been implemented (largely influenced by the Basel capital proposals) but are limited to the particular market circumstances prevailing in each jurisdiction. In particular, closeout netting legislation, if it has been enacted, does not always cover all entity types or all transaction and asset types.

HOW RECOMMENDATION 16 ADDRESSES THE ISSUE

In the first instance, the recommendation focuses on strengthening contract documentation and master agreements within the control of industry. Market participants are charged with including closeout netting provisions in their contract documentation. Trade associations and other industry bodies are charged with harmonizing information on the effectiveness of netting and disseminating it widely and in accessible form.

Market participants are further charged with ensuring that master agreements provide the determining party the flexibility to value such transaction or transactions by reference to the valuation method that best suits the relevant market conditions for such transaction or transactions at the time of termination.

Then there is a legal reform component as authorities in all jurisdictions are charged with ensuring that their laws give effect to closeout netting for all market participants (central counterparties, brokers, end users, and other market participants) and for all entity, transaction, and asset types. Market participants and other interested parties are directed to encourage legislative reform in those jurisdictions where laws do not meet this standard.

WHAT NEEDS TO CHANGE

First, uncertainties surrounding valuation must be addressed. Closeout valuation methodologies should give the determining party discretion to select the valuation method that is best suited to the market for the relevant transaction at the time of its termination and should require the determining party to act in good faith and in a commercially reasonable manner in exercising such discretion. In pursuit of such methodologies, the following actions should be taken by relevant industry associations:

- Associations that issue and maintain master agreements should promptly review their provisions for conformity with this standard and conform them as necessary.
- Associations that issue and maintain master netting agreements that provide closeout valuation methodologies for use with all transactions underlying the master netting agreement, or for use only with underlying transactions that lack such methodologies, should compare their closeout valuation methodologies to the foregoing standards and make any necessary changes.
- Where amendments to an agreement are issued in the form of a new version of the agreement, the relevant industry association should also issue a "stand-alone" version of the amendment for use with previous versions of the relevant agreements.
- Relevant associations should educate the users and potential users of agreements about the benefits of using closeout valuation methodologies that meet the recommended standards.

To give full effect to the recommendation on close-out netting:

- The legal or contractual framework for all central counterparties should include provisions enabling closeout netting in the event of their or a contracting participant's insolvency. Local legislatures should implement any legislative changes required to effect this recommendation.
- Use of closeout netting provisions in contracts by all parties to financial transactions, including central counterparties, and use of master netting agreements are already widespread but should be implemented wherever appropriate.
- Because the legal basis for netting is problematic in many jurisdictions, including the United States, legislation should be adopted to ensure the full effectiveness of closeout netting; supervisors and central banks should support netting for banks through regulatory determinations; and national authorities should pursue global enforceability through an international closeout netting convention or other means, as appropriate.[11]
- Further global harmonization of cross-border bankruptcy legislation is needed, following upon recent European Union initiatives that have resolved a number of uncertainties relating to cross-border aspects of closeout netting for entities located within the EU.[12]

To increase the availability of information to market participants:

- Central counterparties should publish a statement of the legal effectiveness of the closeout netting provisions of their rules.
- In the interest of harmonizing information regarding the effectiveness of netting and making it widely and easily available to participants, trade associations and other appropriate industry bodies should pursue cooperative efforts, possibly including a register of jurisdictions, showing the extent to which closeout netting is effective for different types of entities, transactions, and assets.
- In the interest of promoting legal certainty, initiatives that have been undertaken by various industry bodies (notably the International Swaps and Derivatives Association, the UK Futures and Options Association, the Bond Market Association, and the British Bankers Association) to obtain opinions from counsel regarding netting in a wide range of jurisdictions should be extended to new jurisdictions, entities, transactions, and asset types and should be coordinated among industry bodies and participants in order to centralize efforts and minimize the costs of these initiatives.
- Appropriate industry or official bodies should undertake a study of central counterparty insolvency and the insolvency of clearing systems through which transactions are settled.
- To encourage adoption of the proposed language and supportive legislation and judicial approaches, international databases should be maintained and regularly updated. These databases should list

11. The International Swaps and Derivatives Association Inc. (ISDA) has already made legislative proposals (for example, the 1996 Model Netting Act and the proposed 2002 Model Netting Act). The proposed language includes an extensive definition of "qualified financial contracts," which includes commodity contracts, repurchase agreements, and securities transactions. The proposed act limits the powers of liquidators and any insolvency laws prohibiting set-off.

12. Council Directive 2001/24 on the reorganization and winding up of credit institutions entered into force on May 5, 2001, although EU member states must approve implementing legislation before it becomes effective in those member states. This directive specifies that upon the insolvency of a party to a netting agreement, the only applicable law in relation to that netting agreement is the law of the contract, irrespective of where the insolvency proceedings are being held. Council Regulation 1346/2000 on insolvency proceedings, which applies primarily to corporations and individuals, took effect in all EU member states (other than Denmark) on May 31, 2002. This regulation is directly effective and therefore requires no further implementing legislation. It provides that insolvency proceedings may be opened in the EU member state where the debtor has the center of his main interests. Although it does not deal expressly with netting, the regulation specifically states that insolvency proceedings shall not affect the rights of creditors to demand the set-off of their claims against the claims of the debtor.

master agreements and relevant master netting agreements that contain closeout valuation methodologies that meet the requirements of the recommendation and those that do not. They should also report judicial and legislative developments relating to closeout valuation methodologies, that would be widely publicized and open for use by all interested persons.

IMPROVING GOVERNANCE

RECOMMENDATION 17. ENSURE APPOINTMENT OF APPROPRIATELY EXPERIENCED AND SENIOR BOARD MEMBERS.

Members of the boards of securities clearing and settlement infrastructure providers should, individually and collectively, be of a weight in terms of experience and seniority to discharge the enlarged strategic, risk, and operational management oversight responsibilities described in this report. Organizations that are users of such providers or otherwise have input into the appointment of board members should be mindful of the broad range of capabilities needed to discharge the diverse, important responsibilities of such a position.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation builds upon broad principles articulated in CPSS-IOSCO Recommendation 13 (governance), which advocates that the governance arrangements for securities settlement systems should fulfill public interest requirements and promote the objectives of owners and users. G30 Recommendation 17 gives more detailed guidance on the experience and seniority that board members should have to allow them to effectively meet such objectives, which place great burden on the capability and judgement of board members.

ISSUE

Boards of institutions that form the clearing and settlement infrastructure face complex challenges and demands from many sources: the owners of the institutions, the users of the services the institutions provide, and other important stakeholders, including public authorities. Addressing these challenges and meeting the needs of the varied stakeholders requires board members to have an appropriate level of seniority and a broad range of capabilities to exercise sound judgments over often opaque and occasionally intractable problems.

Many strategic decisions require evaluation and weighing of difficult trade-offs, such as balancing the desire to achieve short-term cost savings with the need to invest to achieve innovation and greater savings in the long term, or maintaining a proper balance between the pursuit of potential cost savings and acceptable constraints of safety and risk management. For most such decisions, each of the different stakeholder groups will have different preferences, further complicating matters. Moreover, the requirement to oversee the commercial, operational, and risk management practices of the organization demands a thorough understanding of the mechanics of the business. In aggregate, these challenges go beyond those typically faced by the boards of similarly sized commercial organizations and underscore the strategic importance of clearing and settlement infrastructure to the securities industry as a whole.

This report focuses on the steps that need to be taken to bring about change that will support safer and more efficient clearing and settlement and in particular bring cross-border costs and risks down to levels closer to those currently associated with domestic systems. This task represents a greater challenge and a broader mandate than now exists for boards. For this vision to be realized, the boards of institutions active in this area will need directors who can lead and drive such change.

HOW RECOMMENDATION 17 ADDRESSES THE ISSUE

Many countries and markets already have well-developed and well-defined governance frameworks and mechanisms for ensuring appropriately qualified and competent boards, and this recommendation (and indeed other governance-related recommendations) is not intended to replace or override such arrangements. Rather, it is intended as supplementary guidance for those organizations that form the infrastructure for securities clearing and settlement to help them address the distinctive and important issues that they face, as described above. Board members of infrastructure providers already have weighty obligations to varied stakeholder groups, and these duties are expanded by the mandate created by this report. To discharge such responsibilities, it is vital that board members enjoy sufficient seniority and experience to provide appropriate authority and strategic vision.

WHAT NEEDS TO CHANGE

Individuals or organizations that are responsible for appointing, electing, or otherwise influencing the selection of board members of clearing and settlement infrastructure providers need to assess carefully the duties associated with such a role and the experience and seniority necessary to fulfill these duties and proceed accordingly.

RECOMMENDATION 18. PROMOTE FAIR ACCESS TO SECURITIES CLEARING AND SETTLEMENT NETWORKS AND SERVICES.

> Boards of securities clearing and settlement service providers, other organizations providing similar services, and public authorities should ensure that rules and other requirements that control or limit access to securities clearing and settlement services are accepted only where they are necessary and are designed exclusively for the purpose of controlling financial, operational, reputational, or regulatory risks; maintaining the safety of the system; or achieving other reasonable public policy objectives. Networks and services should be accessible to all users that pass risk and safety evaluations and enjoy appropriate financial standing, and users should be free to select the mix of functions and services that they wish to use on the basis of straightforward, transparent, and fair tariff policies grounded on the principle of user pays. Such risk-based rules should be broadly founded (encompassing the due diligence process set out in the financial integrity recommendation), and fairly and consistently applied. Moreover, the rules and their application should be transparent to the market. Existing barriers that do not meet this test should be removed.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation broadly endorses CPSS-IOSCO Recommendation 14 (access), which advocates that CSDs and CCPs should have objective and publicly disclosed criteria for participation that permit fair and open access. G30 Recommendation 18 seeks to further clarify the acceptable criteria for participation, by reference to those designed solely for risk, systemic safety, or public policy objectives. All other criteria are thereby deemed unacceptable because they inhibit fair access. This recommendation also explicitly addresses business practices that hamper fair access where an effective monopoly exists, such as tying in or cross-subsidy of other services.

ISSUE

Many infrastructure providers operate as effective monopolies within the markets they serve, either because they have been granted such status through legislation or market convention, or because it would not economically be viable for an alternative organization to attempt to compete within the existing market structure. It is therefore critical that providers that are effective monopolies allow access to users on a fair basis; otherwise some users may be effectively excluded from the market or forced to conduct business through an intermediary that is a direct user of the infrastructure provider. In either case, the level of competition in the market will be reduced overall, disadvantaging both actual and potential participants in the market and ultimately end-user investors and issuers. For this reason, barriers to fair access need to be removed.

HOW RECOMMENDATION 18 ADDRESSES THE ISSUE

The recommendation calls for fair access for all qualified organizations to use or provide clearing and settlement services. This is not a call for full, open access, as restrictions on the grounds of risk, systemic safety, or public policy are clearly for the good of market participants as a whole and in the wider public interest. Rather, the recommendation seeks to clarify the restrictions to access that are acceptable. In this way all other types of restriction are deemed to be unacceptable, a method at the same time simpler and more comprehensive than attempting to define explicitly every unacceptable restriction.

WHAT NEEDS TO CHANGE

The most important barriers to fair access need to be identified and plans put in place to remove them. Where unacceptable barriers have been established through the policies, rules, or operations of providers of clearing and settlement services, there appears no good reason why they cannot be dismantled immediately. Where the barriers result from legislation or regulation, a longer time frame will be needed. The definition of acceptable barriers contained in the recommendation should be sufficient to ensure that in removing barriers to fair access, other public policy objectives are not inadvertently compromised. However, it is recognized that careful attention will be needed to ensure that this is so and that adverse unintended consequences are avoided.

RECOMMENDATION 19. ENSURE EQUITABLE AND EFFECTIVE ATTENTION TO STAKEHOLDER INTERESTS.

Board participation should represent different stakeholder interests fairly and equitably. Provision should be made for regular review of, and for changes as necessary in, board composition to ensure continuing balanced representation of varying stakeholder groups, including users. Where a securities clearing and settlement infrastructure provider is user-owned, user-shareholders should make certain that arrangements are in place to provide equitable and effective representation through appropriate by-laws; the appointment of independent, public interest, or end-user investor directors; or other similar measures. Where such a provider is partly or wholly owned by nonuser shareholders and is also a substantially monopoly provider of clearing, settlement, and related services in a particular market, user (and other stakeholder) interests can be adequately protected through appropriate user or other independent, nonshareholder participation in the board. However, these arrangements may have to be supplemented by oversight of tariff and other policies by relevant competition authorities. In either case, the independent directors should be appropriately involved in the audit and remuneration committees.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation builds upon broad principles articulated in CPSS-IOSCO Recommendation 13 (governance), which advocates that the governance arrangements for securities settlement systems should fulfill public interest requirements and promote the objectives of owners and users, and Recommendation 14 (efficiency), which suggests that securities settlement systems should be cost-effective in meeting the requirements of users. G30 Recommendation 19 builds upon these broad principles to give more detailed guidance on how the varied stakeholder interests should be equitably represented on the boards of clearing and settlement infrastructure providers.

ISSUE

Efficient and safe operation of clearing and settlement infrastructure providers is central to the effective operation of securities markets. Consequently, a variety of stakeholders have a significant and legitimate interest in the operation of these institutions. Important stakeholders include the users of the institution's services and bodies that represent the public interest. Issues in connection with public authorities are addressed primarily through the recommendation aimed at encouraging consistent regulation and supervisory oversight. This recommendation focuses on the need for representation of other stakeholders, particularly users.

Users are not a homogeneous group, and different sets of users are likely to have different objectives. For example, users whose business is primarily focused on domestic markets are less likely to want to invest in developments aimed at improving the efficiency and safety of cross-border activity and would instead prefer rebates or tariff reductions. Alternatively, users who compete with the infrastructure provider for the provision of certain services will have an active interest in restricting the infrastructure provider's development of those services, at a potential cost to other users who may have benefited from the development of the services.

Fair and equitable representation of these varied stakeholder interests on the boards of clearing and settlement infrastructure providers is critical to help ensure that the different interests and needs of disparate groups are considered and addressed, so that strategy and allocation of resources is appropriate and does not act to distort market dynamics or prevent effective competition. In addition, the appointment of directors fully independent of management provides an important level of challenge and oversight and is particularly important in the context of issues connected to audit and remuneration.

HOW RECOMMENDATION 19 ADDRESSES THE ISSUE

Fair and equitable representation of stakeholder interests on the boards of clearing and settlement infrastructure providers will help to ensure that the needs of varied stakeholder groups are properly understood and considered in making key decisions and formulating strategy. Although it is unrealistic to expect a strategy that fully meets the wishes of a diverse set of stakeholders, through proper stakeholder representation a strategy that fairly reflects the assorted expectations can be determined.

The recommendation recognizes that the composition and relative importance of different stakeholders will change over time and therefore calls explicitly for private institutions to have a mechanism to review and, where appropriate, change board composition. This helps to overcome the potential concern that in catering solely to the interests of stakeholders at any point in time, the infrastructure provider could increase the resistance to changing participation in the market as a whole, for example by following policies that acted to prevent new entrants. This issue is also addressed in part through the recommendations on fair access and consistent regulation and oversight.

WHAT NEEDS TO CHANGE

The issue of stakeholder representation needs to be considered in the context of the ownership structure of each institution. Where an institution is user-owned, the interests of shareholders and users are already likely to be substantially aligned, and representation of other important stakeholders such as end-user investors and issuers and the wider public interest can be achieved through appropriate appointments. Where nonusers have an ownership stake in a private institution, then additional, strengthened mechanisms may be needed to ensure users have appropriate representation. This is vital where users have no or very limited choice of institutions from whom they can procure services, and in such circumstances competition authorities or equivalent public bodies may need to oversee policies and operational practices pertaining, for example, to tariffs or bundling of services.

RECOMMENDATION 20. ENCOURAGE CONSISTENT REGULATION AND OVERSIGHT OF SECURITIES CLEARING AND SETTLEMENT SERVICE PROVIDERS.

Providers of securities clearing and settlement services should be subject to consistent and transparent regulation and oversight, which should focus on the activities undertaken and risks incurred. Standards of regulation and oversight of cross-border activity should be complementary and consistently applied across all relevant jurisdictions. As a long-term goal and where coherent with other public policy objectives, regulatory and oversight standards should be harmonized. While public authorities have developed minimum standards for many aspects of clearing and settlement services, notably as embodied in the CPSS-IOSCO recommendations, the oversight and supervision applied to providers of clearing and settlement services varies across jurisdictions. In addition, organizations undertaking similar activities can be subject to different regulatory regimes and standards based upon their status, such as whether or not they are a bank.

Supervisory, prudential, and oversight standards should recognize the systemic importance of providers of clearing and settlement services with a view to minimizing the risk of default or operational failure of critical organizations. As noted in Recommendation 9, aimed at ensuring consistent financial integrity of service providers, consistent supervision is necessary to create uniform risk standards and ensure consistent minimum financial and liquidity requirements. But consistent supervision is also important to help create a level playing field between competing organizations.

Regulatory and oversight standards that affect cross-border activity must be undertaken consistently and transparently across all relevant countries.

COMPARISON WITH CPSS-IOSCO RECOMMENDATIONS

This recommendation recognizes that the bodies responsible for supervising clearing and settlement service providers vary between jurisdictions and often include separate oversight and regulatory authorities. CPSS-IOSCO defines oversight as a "public policy activity principally intended to promote the safety and efficiency of payment and securities settlement systems and in particular to reduce systemic risk," whereas regulation typically focuses more on day-to-day supervision and the setting and enforcing of prudential standards. G30 Recommendation 20 endorses and builds upon CPSS-IOSCO Recommendation 18 (regulation and oversight), which calls for all securities settlement systems to be subject to regulation and oversight, for regulatory responsibilities and objectives to be clearly defined and made transparent, and for cooperation between different regulatory and supervisory bodies. G30 Recommendation 20 expands upon the CPSS-IOSCO work to explicitly advocate building upon cooperation between regulators and overseers to achieve consistent regulation and oversight across jurisdictions, in particular for cross-border activity. In addition, this recommendation encourages supervisory and regulatory assessments based on the functions and activities that supervised or regulated institutions undertake, so that similar operations are subject to similar oversight irrespective of their status.

ISSUE

In a purely domestic context, the existing arrangements for regulation and oversight of securities clearing and settlement are generally sound. In addition, there is cooperation between different regulators and overseers—certainly in most developed markets—and the 2001 CPSS-IOSCO Recommendations for Securities Settlement Systems set out minimum standards that operators of such systems should follow. However, differences in the regulation and oversight of clearing and settlement activities remain, because of differences in regulatory regimes between jurisdictions and because of differences in the status of providers of clearing and settlement services. For example, several of the services offered by CSDs and ICSDs are similar to, and in some cases compete with, services offered by global custodian banks, but the differing nature of these organizations may mean that they are subject to a different regulatory approach. All institutions providing critical clearing and settlement functions must be subject to rigorous and appropriate supervision.

The need for consistent regulation and oversight of clearing and settlement service providers is even more apparent in the context of cross-border activity, where service providers are connected and interdependent. If there are weaknesses in the procedures or systems at one provider of clearing and settlement services, then there is potential for risks introduced at that point to extend through to connected organizations. Although service providers carry the primary responsibility for preventing contagion through robust and consistent due diligence and risk management practices, regulation and oversight provides a vital further layer of protection and must be consistent to be fully effective. In addition, any inconsistencies in regulation and oversight between jurisdictions traversed by a cross-border trade may lead to ambiguity about which standards should apply and therefore to a greater risk of noncompliance. The cost to firms of complying with regulatory standards also needs to be considered: where such standards vary between regimes, the cost of compliance for internationally active firms is necessarily higher, as different standards create the need for duplication in the understanding and application of relevant policies and rules. Variations in regulation and oversight can also affect the ability to move toward full interoperability, because the regulatory and oversight framework in some instances drives market conventions and practices.

It is clearly correct that regulation and oversight authorities should consider the systemic importance of organizations, and so the regime imposed could properly vary depending, for example, on market share or the degree to which alternative service providers are available and on risks involved. However, two organizations that provide similar services and attract similar risks in similar markets should be subject to consistent regulation and oversight. Variation in regulation and oversight approaches can affect the risk management and financial and liquidity requirements of supervised organizations, which can in turn affect the competitive positions of those organizations, as well as the overall safety of connected systems. Creating a competitive playing field is a crucial part of realizing efficiencies and encouraging innovation among service providers, as expanded upon in the recommendation advocating fair access.

HOW RECOMMENDATION 20 ADDRESSES THE ISSUE

Consistent and transparent regulation and oversight across jurisdictions reflecting the activities undertaken (rather than the legal form of the organization) should help ensure that each organization providing clearing and settlement services establishes risk management practices and maintains capital appropriate to its business model, the activities that it undertakes, and the risks to which it is exposed. By focusing on an evaluation of activities undertaken, all services that should be subject to regulation and oversight will be, irrespective of the type of organization that provides those services, facilitating fair competition between service providers and a more consistent and appropriate risk level in the market as a whole. The development of consistent regulatory and supervisory conventions for cross-border transactions will offer greater certainty over the standards that apply to such activity. Consistent and transparent regulation and oversight will address many of the issues set out above, but harmonization of regulation and oversight among jurisdictions could present even greater potential benefits. In particular, it would reduce the costs of compliance for internationally active firms, the benefits of which, as with other efficiency opportunities identified elsewhere in this report, are likely to flow through in large part to end-user investors and issuers.

WHAT NEEDS TO CHANGE

Ensuring consistent approaches to regulation and oversight is a significant challenge, and differing public policy priorities and concerns of individual jurisdictions must be recognized. The challenges in identifying and moving to an approach that takes appropriate account of the activities undertaken and the risks incurred should not be underestimated, and the detailed planning for such a change will need to be carefully considered to avoid unintended consequences and unhelpful inflexibility. In particular, formulating accurate and workable definitions of activities will be critical, as will the linking of these activities to associated risks and understanding of the interrelationships between different activities and risks.

However valid the difficulties of implementation, such barriers should not prevent developments that would help overcome the important issues outlined above. Consistent regulation and oversight should be pursued insistently, and harmonization should be sought as a long-term goal, particularly as the benefits of a step-by-step move to harmonization are likely to accrue incrementally. Significant progress has already been made in this area; in particular the 2001 CPSS-IOSCO recommendations create a set of minimum standards for securities settlement systems and form a sound basis for the further developments called for in this recommendation.

APPENDIX 2. CONDUCT OF THE STUDY

The study on global clearance and settlement arrangements was commissioned by the Group of Thirty in the Fall of 2000. Sir Andrew Large, then Deputy Chairman of Barclays plc, was invited to chair the project and was joined by John Heimann and David Walker from the ranks of the Group of Thirty as vice chairs for the project. A Steering Committee was then recruited, drawn from the senior ranks of the public and private sectors, to oversee progress and approve the final report (Committee members, p. ix).

Serious study of global clearing and settlement arrangements requires examination of a wide range of complex issues, beginning with an analysis of the current state of the system. Since the goal of this study was to develop specific recommendations for improving these arrangements, issues had to be examined at a level of significant detail. Working groups of experts from the public and private sectors were formed, with leadership drawn from the Steering Committee.

The working and advisory groups were led by Steering Committee members Jill Considine, Gerald Corrigan, Gerald Hassell (who replaced Gerd Häusler) and Andrew Sheng; Michael Patterson of JP Morgan Chase and Stephan Schuster of Deutsche Bank. Together with the Chairman, Vice Chairman, Project Director Marc Hollanders, and the G30 Executive Director, this group constituted an Executive Committee for the project that provided ongoing oversight of the work program.

In the analytical phase of work, Gerald Corrigan and Stephan Schuster co-chaired a working group that examined the current state of clearing and settlement systems and practices, based on the industry survey by PricewaterhouseCoopers discussed below, to identify areas in need of reform. Michael Patterson and Andrew Sheng co-chaired a working group that surveyed the current state of industry best practice and official guidance on clearing and settlement issues in order to identify core principles that should be pursued in the study. Gerald Hassell led a working group that examined governance issues, assuming the chair from Gerd Häusler who led the initial investigation. Jill Considine organized and chaired a service-providers advisory group.

Following the analytical phase of work, Gerald Corrigan assumed responsibility for a working group on risk issues and produced the draft chapter and recommendations on that issue. David Walker took the lead in preparing the discussion and recommendations on governance.

The project was able to rely upon the input and participation of a wide range of institutions and individuals. A complete list of institutions that contributed to the project is provided in table A2-1, with participants in the industry survey listed in table A2-2. Individuals who made significant contributions are recognized in Box A2-1. Our purpose in listing these organizations and individuals is to express our gratitude for their contributions to the project, not to suggest their endorsement of the result. Our hope is that the report proves as useful to them as was their input to the project.

ANALYTICAL PHASE OF WORK

The basic research effort proceeded along two tracks: a "bottom up" analysis of the current state of the system based on an industry survey, and a "top down" assessment of existing standards, principles, and other authoritative guidance in this area. The first phase of analysis, the industry survey, was undertaken by PricewaterhouseCoopers, financial services partner for this project.

Interview process

Beginning in early 2001, PricewaterhouseCoopers developed a set of survey questions intended to ascertain the key concerns facing participants in clearing and settlement activities worldwide. It also developed a list of survey targets in North America, Europe, and Asia to whom the questions would be posed. The survey was conducted through face-to-face interviews rather than written questionnaires. Thus, within a common framework and methodology for recording results,

TABLE A2-1. CONTRIBUTING ORGANIZATIONS

ABN Amro NV
Association of Private Client Investments Managers and Stockbrokers
Australian Stock Exchange
Banc of America Securities
Bank One Corporation
Bank of England
Bank for International Settlements
Bank of Japan
The Bank of New York
Banque de France
Barclays
The Bear Stearns Companies
BNP Paribas
Brown Brothers Harriman & Co.
The Canadian Depository for Securities
Chase Manhattan Corporation
Citigroup, Inc.
Clearnet
Clearstream International
Clifford Chance
Companhia Brasileira de Liquidaçâo e Custódia
Council on Foreign Relations
Credit Suisse First Boston Corporation
CRESTCo
David Polk & Wardwell
DBS Group Holdings
Depository Trust & Clearing Corporation
Deutsche Bank
Deutsche Börse
DGZ-Bank Frankfurt
Edward Jones
Eurex
Euroclear
European Brokers Club
European Central Bank
European Securities Forum
Federal Reserve Bank of New York
Fidelity Investments
The Finance Foundation
Financial Services Authority
Financial Stability Institute
FleetBoston Financial Corporation
Global Documentation Steering Committee
Goldman Sachs & Co.
Government of Singapore Investment Corporation
Hong Kong Exchanges and Clearing
Hong Kong Securities and Futures Commission
HSBC Holdings
International Monetary Fund
International Securities Services Association (ISSA)
Invesco Asia
Ivy Funds
Janus Capital Corp.
Japan Securities Dealers Association
JASDEC
JP Morgan Chase & Co.
Legg Mason
The London Clearing House Limited
Merrill Lynch & Co.
The Monetary Authority of Singapore
Morgan Stanley Dean Witter & Co.
National Financial Services
Nomura Securities and Nomura Asset Management
Northern Trust Corporation
Options Clearing Corp.
Oxford Economic Research Associates
PricewaterhouseCoopers
Promethee
Prudential Securities
Reuters Group
Robertson Stephens
Singapore Exchange
SIS Sega Intersettle
Société Générale
Soifer Consulting
Standard Chartered
State Street Corporation
The Stern School, New York University
Tokyo Stock Exchange
Tsubasa Securities
UBS
UniCredito Italiano
U.S. Clearing Corporation
U.S. Securities and Exchange Commission
U.S. Securities Industry Association
Wexford Clearing Services

TABLE A2-2. ORGANIZATIONS INTERVIEWED

ABN Amro NV	Janus Capital Corp.
Association of Private Client Investments Managers and Stockbrokers	Japan Securities Dealers Association
Banc of America Securities	JASDEC
Bank One Corporation	JP Morgan Chase & Co.
The Bank of New York	Legg Mason
Barclays	Merrill Lynch & Co.
The Bear Stearns Companies, Inc.	Morgan Stanley Dean Witter & Co.
Brown Brothers Harriman & Co.	National Financial Services
BNP Paribas	Nomura Securities and Nomura Asset Management
Citigroup, Inc.	Northern Trust Corporation
CRESTCo	Prudential Securities
Depository Trust & Clearing Corporation	Robertson Stephens
Deutsche Bank	SIS Sega Intersettle
Edward Jones	Standard Chartered
Euroclear	State Street Corporation
European Brokers Club	Tsubasa Securities
Fidelity Investments	UBS
Goldman Sachs & Co.	UniCredito Italiano
HSBC Holdings	U.S. Clearing Corporation
Invesco Asia	U.S. Securities and Exchange Commission
Ivy Funds	Wexford Clearing Services

interviewers could readily identify issues of greatest concern to each organization while exploring critical issues in depth. As is usual for surveys of this kind, participating firms were offered assurance of confidentiality to protect proprietary information.

In order to obtain a fair and balanced representation of the issues and concerns facing system participants, PricewaterhouseCoopers conducted interviews with a variety of different stakeholders along the global clearing and settlement value chain, including investors, brokers, infrastructure providers, and agent banks. Organizations whose operations and locations span different regions and countries were represented, including those that offer global products and services and those that are principally focused on domestic business.

Analysis

Following the initial round of interviews, team members from PricewaterhouseCoopers distilled the key problems and concerns into broad categories, taking account of their impact on the various stakeholder groups and on the different phases of the trade life cycle. Follow-up calls were made to pursue points of particular interest or areas of uncertainty. A summary of the key themes and detailed findings was then distributed to the participants and updated based on their additional feedback. Out of this process emerged five priority areas for improvement. These priority areas enjoyed a high degree of consensus as to their subject matter and scope across the range of participants:

- ***Barriers to competition,*** including the lack of open and equal access to separable functions along the value chain and lack of price transparency of separable services.
- ***Interoperability,*** including the need for consistently applied and enforced communications protocols, technology, and data standards and for reliable and comprehensive sources of counterparty and securities reference data.

TABLE A2-3. RELATED STUDIES EXAMINED

1989	Group of Thirty, *Clearance and Settlement Systems in the World's Securities Markets.*
	BIS, *Report on Netting Schemes* (Angell Report).
1990	BIS, *Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries* (Lamfalussy Report).
1992	BIS/CPSS, *Delivery versus Payment in Securities Settlement Systems.*
1995	BIS/CPSS, *Cross-border Securities Settlements.*
1996	FIBV, *Clearing and Settlement Best Practices.**
	IOSCO, Report of the Technical Committee, *Client Asset Protection.*
1997	Joint Report by CPSS and by the Technical Committee of IOSCO, *Disclosure Framework for Securities Settlement Systems.*
1998	IOSCO, *Objectives and Principles of Securities Regulation.*
2000	ISSA, *2000 Recommendations.*
2001	BIS/CPSS, *Core Principles for Systematically Important Payment Systems.*
	CPSS-IOSCO, *Recommendations for Securities Settlement Systems.*
	The Center for European Policy Studies, *The Securities Settlement Industry in the EU, Structure, Costs and the Way Forward.*
	The Giovannini Group, *Cross-Border Clearing and Settlement Arrangements in the European Union.*
	Final Report of the Committee of Wise Men on the Regulation of European Securities Markets.
2002	Communication from the Commission to the Council and the European Parliament, *Clearing and settlement in the European Union — Main policy issues and future challenges.*
	Board of Governors of the Federal Reserve System and Securities and Exchange Commission, *Interagency White Paper on Structural Change in the Settlement of Government Securities: Issues and Options.*

* La Federation International de Bourse Valeur (FIBV) is the World Federation of Stock Exchanges, a global trade association for the exchange industry, representing 56 regulated exchanges from all over the world.

- ***Improvements to the basic clearance and settlement model,*** including information on all processes and communications and elimination of paper from the process.
- ***Optimization of collateral and risk management,*** including a common standard for finality, legal certainty in all securities and collateral transactions, and better management of risk arising in cross-border transactions.
- ***Streamlining asset servicing and corporate actions,*** including electronic communication and information flow to investors and easier compliance with foreign ownership restrictions.

In addition to a broad consensus on substance, the survey indicated clear enthusiasm for a Group of Thirty effort in this area and wide recognition of the benefits that the undertaking could provide. Beyond the obvious evidence of enthusiastic participation in the interview process itself, respondents offered the following suggestions for achieving the study's objectives:

- Set out a clear vision for the global clearing and settlement system toward which all recommendations could be seen as advancing.
- Rather than duplicate the work of other studies in this area, sound recommendations already

enunciated by others should be endorsed. Where recommendations go beyond existing initiatives, arguments and recommendations should be articulated at a level of detail sufficient to describe best practice without ambiguity.

- The focus of the study should be clear statements of best market practice. Necessary changes in law or regulation should be detailed as well, while recognizing their longer implementation horizon.
- In striking a balance between the achievable and the optimal, recommendations that are less than optimal should include the reasons for stopping short of an optimal solution, including an analysis of barriers blocking further progress and benefits forgone by not pursuing the optimal solution.
- To the extent possible, recommendations should include guidance on how and by whom they should be implemented and subsequently enforced.

In recognition of the pledge of confidentiality to survey participants, detailed responses to the survey questions are not being published. However, more information about the content of the survey may be obtained by contacting the Group of Thirty office in Washington, DC.

ASSESSMENT OF EXISTING PRINCIPLES AND STANDARDS

While work proceeded on the industry survey, a working group undertook a detailed inventory of existing standards and principles published by authoritative industry bodies and official agencies with respect to clearing and settlement. The goal of this exercise was to develop a "map" of standards and principles to identify gaps and vulnerabilities that the G30 study should address, whether by expanding upon existing guidance or developing recommendations in areas otherwise unaddressed.

The starting point for the analysis was a bibliography of authoritative studies, many including specific recommendations, that had been undertaken since the 1989 G30 study "Clearance and Settlement in World Securities Markets." Most of these reports were issued under the auspices of the Bank for International Settlements (BIS), the Committee on Payments and Settlements Systems of the Group of Ten central banks (CPSS), the International Organization of Securities Commissions (IOSCO), or the International Securities Services Association (ISSA) or in the context of creating a single capital market in the European Union. These studies are listed in table A2-3

Out of this review emerged an elaborate matrix, organized by major theme, and including specific issues and actions at the level of trade matching, securities lending, communications protocols, and the like. The review encompassed both questions of substance and implementation and went into the voluminous material available in considerable detail. In view of the emphasis among firms interviewed on endorsing and building upon sound recommendations already enunciated by others, the working party focused in particular on the 2000 ISSA recommendations and the recommendations jointly issued by CPSS and IOSCO in late 2001. Where those studies have made recommendations, this report builds upon that foundation, either expanding the reach of the basic recommendation to the global context or exploring the matter addressed in greater detail.

Given the complex and detailed nature of the mapping exercise, the large volume of material generated has not been reproduced in this volume. As with the industry survey, however, more detailed information about the analysis and the resulting matrix itself is available through the office of the Group of Thirty in Washington, DC.

DEFINING RECOMMENDATIONS

The industry survey and analysis of principles produced two "maps" of the system, which were brought together to identify priority areas for further work. Where strong interest from industry intersected with an area identified as needing action in the standards and principles map, the Steering Committee endorsed the development of specific recommendations. Recommendations take one of several forms:

- Endorsement of existing standards, with identification of additional or broader actions than those envisaged under the current standard, where appropriate.
- News standards where none now exist.
- In particularly complex areas, identification of further work that should be pursued, with guidance on the purpose and direction of research.

With the areas and format of recommendation thus identified, several additional rounds of working level meetings were organized to develop specific proposals. The actual drafting of recommendations was undertaken by experts in various phases of the clearing and settlement process, many of them veterans of the earlier working party process, and small off-site meetings of these experts were then organized to discuss and refine the proposals. Draft proposals were vetted more widely and refined before being included in the final report.

BOX A2-1. INDIVIDUAL CONTRIBUTORS

As previously noted, the total work effort devoted to the project was dominated by the cumulative input of many individual contributors. Although there is a danger of oversight in naming individuals, we would like to recognize those who made significant personal contributions to the project, whether by offering their time and expertise in working and advisory groups, drafting and reviewing documents, or offering advice and counsel during the life of the project. Although some have changed jobs during the last two years, they are listed here with their affiliations at the time of their initial participation.

Significant contributions were made by: ABN Amro NV, Hugh Scott-Barret; the Australian Stock Exchange, Angus Richards; from the Bank of England, Alastair Clark, Victoria Cleland, and John Trundle; the Bank of Japan, Iwao Kuroda; from the Bank of New York, Tom Perna and Elizabeth Siano; the Banque de France, Yvon Lucas; from Barclays, Simon Chatterton and Tim Shepheard-Walwyn; Bear Stearns, Michael Alix; BNP Paribas, Jacques-Phillipe Marson; Brown Brothers Harriman & Co., Anthony Enders; the Canadian Depository for Securities, Bruce Butterill and Allan Cooper; Companhia Brasiliera Liquidaçâo e Custódia, Amarilis Sardenberg; from Citigroup, Diana Chan, Ranjit Chatterji, Anne Frascarelli, and Ray Parodi; Clearstream International, Mark Gem, Andre Roelants, and Charles Vuylsteke; and from Clifford Chance, Mark Harding and Dermot Turing.

Also contributing significantly to the project were: from CRESTCo, Iain Saville (now at Computer-share) and Paul Symons; on behalf of the CPSS-IOSCO Task Force, Patrick Parkinson of the U.S. Federal Reserve and Shane Tregillis of the Monetary Authority of Singapore; Davis Polk & Wardwell, Randy Guynn; from Deutsche Bank, Mitchel Lenson, Simon Powell, and Swen Werner; from Deutsche Börse: Orlando Chiesa and Jochen Seitz; DGZ-Bank Frankfurt, Manfred Zass; DTCC, Peter Axilrod, Mary Ann Callahan, Dennis Dirks, Dennis Earle, Ellen Levine, Richard Nesson and Jack Wiener; Eurex, Daniel Gisler; from Euroclear, Pierre Francotte, Martine Dinne, Kristen Geyer and Anso Thire; Euronext, Patrice Renault; from the European Central Bank, Elias Kazarian (working group secretary) and Daniela Russo; from the European Commission, John Berrigan and Elizabeth Wrigley; European Securities Forum, Pen Kent; from the Federal Reserve Bank of New York, Peter Bakstansky and Lawrence Sweet; the Finance Foundation, Michel Gabrysiak; the Financial Services Authority, Gay Huey Evans; the Giovannini Group, Alberto Giovannini; from Goldman Sachs, Paul Deighton, Tim Cole, Robert Mancini, Alberto Pravettoni, and Mike Sammons; Hong Kong Exchanges and Clearing Ltd, Walter Reisch; from the Hong Kong Securities & Futures Commission, Stella Leung (working group secretary); HSBC, John Gubert (subcommittee chair); from the IOSCO Technical Committee, David Brown and David Knott; from JP Morgan Chase, Neil Henderson, Edward Neeck (working group secretary), Gillian Van Schaick, and Susannah Truitt; Lehman Brothers, Thomas Russo; London Clearing House, Rory Cunningham, David Hardy and Andrew Lamb; and from the London Stock Exchange, Donald Cruickshank.

Major contributors also included: the Monetary Authority of Singapore, Yeo Lian Sim; from Morgan Stanley, Jane Carlin, Patrick de Saint-Aignan, Marye Humphery, David Nicol, Judy Smith, and Eileen Murray (now at CSFB); Nomura Securities, Hitoshi Tonomura; Options Clearing Corporation, Wayne Luthringshausen and Michael Walinskas; from Oxford Economic Research Associations, Fod Barnes, Dieter Helm, Gunnar Niels, and Reinder van Dijk; Promethee, Albert Bressand; Reuters, Henry Engler; from the U.S. Securities and Exchange Commission, Larry Bergmann, Robert Colby, Jeff Mooney, and Annette Nazareth; Singapore Exchange, Christina Ang and Peter Chia; Société Générale, Yannick Chagnon; State Street Corporation, Robert Almanas, Mary Fenoglio and Simon Zornoza; from the Stern School at New York University, Roy Smith and Ingo Walter; the Tokyo Stock Exchange, Toshitsugu Shimizu; from UBS, Peter Gnepf, Josef Landolt, and Urs Staehli; and from Unicredito Italiano, Francesco Giordano.

Finally, we are deeply appreciative of the advice and counsel provided in a personal capacity by Wendelin Hartmann, Alexandre Lamfalussy, and by Raphael Soifer. And we appreciate the opportunity afforded to review the project's progress with Roger Ferguson of the Board of Governors of the Federal Reserve System; Cathy Minehan of the Federal Reserve Bank of Boston; and Mario Monti of the European Commission.

GLOSSARY

The following terms and acronyms are used in this report as defined in "A Glossary of Terms Used in Payments and Settlement Systems," Bank for International Settlements, January 2001, revised July 2001.

batch the transmission or processing of a group of payment orders and/or securities transfer instructions as a set at discrete intervals of time.

beneficial ownership/interest the entitlement to receive some or all of the benefits of ownership of a security or other financial instrument (such as income, voting rights, power to transfer). Beneficial ownership is usually distinguished from "legal ownership" of a security or financial instrument.

central counterparty (CCP) an entity that is the buyer to every seller and seller to every buyer of a specified set of contracts, such as those executed on a particular exchange or exchanges.

central securities depository (CSD) a facility (or an institution) for holding securities, which enables securities transactions to be processed by book entry. Physical securities may be immobilized by the depository or securities may be dematerialized (that is, so that they exist only as electronic records). In addition to safekeeping, a central securities depository may incorporate comparison, clearing, and settlement functions.

clearing/clearance the process of transmitting, reconciling, and, in some cases, confirming payment orders or security transfer instructions prior to settlement, possibly including the netting of instructions and the establishment of final positions for settlement.

clearing system a set of procedures whereby financial institutions present and exchange data and/or documents relating to funds or securities transfers to other financial institutions at a single location (clearinghouse). The procedures often also include a mechanism for the calculation of participants' bilateral and/or multilateral net positions with a view to facilitating the settlement of their obligations on a net or net net basis.

confirmation the process in which the terms of a trade are verified either by market participants directly or by some central entity (typically the marketplace). When direct participants execute trades on behalf of indirect market participants, trade confirmation occurs on two separate tracks: verification (generally termed confirmation) of the terms of the trade between direct participants and verification (sometimes termed affirmation) of the intended terms between each direct participant and the indirect participant for whom the direct participant is acting.

cross-border settlement a settlement that takes place in a country other than the country in which one trade counterparty or both are located.

cross-border trade a trade between counterparties located in different countries.

custodian an entity, often a bank, that safekeeps and administers securities for its customers and that may provide various other services, including clearance and settlement, cash management, foreign exchange, and securities lending.

delivery final transfer of a security or financial instrument.

delivery versus payment (DVP) a link between a securities transfer system and a funds transfer system that ensures that delivery occurs if, and only if, payment occurs.

dematerialization the elimination of physical certificates or documents of title that represent ownership of securities so that securities exist only as accounting records.

fail a failure to settle a securities transaction on the contractual settlement date, usually because of technical or temporary difficulties. Fail is usually distinguished from "default." Also called failed transaction.

final (finality) irrevocable and unconditional.

final settlement the discharge of an obligation by a transfer of funds and a transfer of securities that have become irrevocable and unconditional.

global custodian a custodian that provides its customers with custody services in respect of securities traded and settled not only in the country in which the custodian is located but also in numerous other countries throughout the world.

gross settlement system a transfer system in which the settlement of funds or securities transfer instructions occurs individually (on an instruction-by-instruction basis).

immobilization placement of certificated securities and financial instruments in a central securities depository to facilitate book-entry transfers.

international central securities depository (ICSD) a central securities depository that clears and settles international securities or cross-border transactions in domestic securities.

legal ownership recognition in law as the owner of a security or financial instrument. It is usually represented by holding "legal title" and sometimes distinguished from beneficial ownership/interest.

matching the process for comparing the trade or settlement details provided by counterparties to ensure that they agree with respect to the terms of the transaction.

netting an agreed offsetting of positions or obligations by trading partners or participants. The netting reduces a large number of individual positions or obligations to a smaller number of obligations or positions. Netting may take several forms that have varying degrees of legal enforceability in the event of default of one of the parties.

payment the payer's transfer of a monetary claim on a party acceptable to the payee. Typically, claims take the form of banknotes or deposit balances held at a financial institution or at a central bank.

payment system a payment system consists of a set of instruments, banking procedures, and, typically, interbank funds transfer systems that ensure the circulation of money.

real time the processing of instructions on an individual basis at the time they are received rather than at some later time.

real-time gross settlement (RTGS) the continuous (real-time) settlement of funds or securities transfers individually on an order-by-order basis (without netting).

securities settlement system (SSS) the full set of institutional arrangements for confirmation, clearance, and settlement of securities trades and safekeeping of securities.

settlement an act that discharges obligations in respect of funds or securities transfers between two or more parties.

straight-through processing (STP) the completion of presettlement and settlement processes based on trade data that is manually entered only once into an automated system.

systemically important payment system a payment system is systemically important where, if the system were insufficiently protected against risk, disruption within it could trigger or transmit further disruptions among participants or systemic disruptions in the financial area more widely.

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