

# **THE PAYMENTS RISK COMMITTEE**

## **MANAGING PAYMENT LIQUIDITY IN GLOBAL MARKETS: RISK ISSUES AND SOLUTIONS**

**Report by the Cross-border Collateral Pool Task Force**

**New York**

**March 2003**

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The Payments Risk Committee is a private sector group comprising senior managers from several major banks in the US, sponsored by the Federal Reserve Bank of New York. The Committee identifies and analyzes issues of mutual interest related to risk in payment and settlement systems. Where appropriate, it seeks to foster broader industry awareness and discussion, and to develop input on public and private sector initiatives. Current members of the Committee are Bank of America, Bank One, Citibank N.A., Deutsche Bank, Fleet Bank, HSBC USA, JP Morgan Chase, State Street Bank and Trust, The Bank of New York, UBS, Bank of Tokyo-Mitsubishi and Wachovia Bank.

## Foreword

The following document is the result of a study of potential implications for global intraday liquidity arising from recent developments in the global financial markets and global payments environment. It is not meant to be a definitive roadmap to improved payment liquidity risk management, but is intended to stimulate dialogue on the issue, and to suggest some possible identifiable actions by market participants and national authorities. Naturally, each financial institution's response to these market conditions will be governed by its own unique set of circumstances.

Because of the broad nature of the topic of intraday liquidity, the Payments Risk Committee decided to limit the scope of its investigation to three areas:

- Studying the market need for enhanced *cross-border* intraday liquidity services, that is access to intraday liquidity by financial institutions operating in foreign markets. The project attempted to analyze the rationale for such services, giving the greatest considerations to the overall liquidity and systemic risk benefits.
- Evaluating possible private and public sector solutions that would ensure the continued and efficient availability of liquidity in the global markets during times of market crisis.
- Establishing recommendations for preferred solutions that will lead to more effective and efficient global intraday liquidity management.

We hope that you find the following document both interesting and useful. The Payments Risk Committee will continue to pursue its initiatives with the private sector, as well as with the central bank community, in particular:

- Encouraging private sector development of new, well-constructed services that, over time, will enhance market participants' ability to respond effectively to accelerating intraday liquidity demands in global markets; and
- Liaising with the G-10 central banks in the area of extending eligible foreign collateral for intraday RTGS liquidity.

Lori Hricik  
Chair  
The Payments Risk Committee

The present publication is also available on the Payments Risk Committee Web site (<http://www.ny.frb.org/prc/>).

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## **1. PREFACE**

The Federal Reserve Bank of New York established the Payments Risk Committee in 1993 as a means of inviting the input of commercial bankers in formulating recommendations for improving the quality of risk management in payment and securities settlement systems. Senior executives with broad payments systems experience from banks active in the payments business were invited to participate in the Committee. In addition to its primary role of formulating risk reduction recommendations, the Committee's objectives are to promote better understanding of payments risk issues among market participants; to enhance knowledge of the payments systems infrastructure in the U.S. and overseas; to circulate research on payment systems to participants and the public; to promote better communication between private sector institutions, the Federal Reserve Bank and, where appropriate, other bank supervisors within the U.S. and overseas; and to provide a forum for discussion of technical issues in payments systems.

The Committee is sponsored by the Federal Reserve Bank of New York and is composed of representatives of Bank of America N.A., The Bank of New York, Bank One N.A., JP Morgan Chase, HSBC USA, Citibank N.A., Deutsche Bank AG, State Street Bank and Trust Co., UBS AG, Bank of Tokyo-Mitsubishi, Fleet Bank and Wachovia Bank. There is also participation by the Federal Reserve Bank of New York and the staff of the Board of Governors of the Federal Reserve System. The Committee is supported by a Working Group of mid-level executives, which conducts research regarding topics designated by the Committee and drafts reports and studies for Committee approval.

### **1.1. The Working Group and Cross-Border Collateral Pool Task Force**

In September 2001, the Committee requested that the Working Group undertake a study of the market need for enhanced cross-border intraday liquidity management services to support global payment activity. The Working Group was asked to concentrate its study on the rationale for such services, giving specific considerations to the overall liquidity and risk benefits. The Working Group was also asked to evaluate possible solutions (both private sector and public sector) that would ensure the continued and efficient availability of global payment liquidity, particularly in times of market stress. The Working Group was charged with establishing recommendations for preferred services with the following guidance from the Payments Risk Committee: (1) recommendations should not call for the building of new infrastructure; solutions should build upon existing processes, infrastructure and market practices and (2) there should be preferred recommendations for solutions that could be put in place in the near term for use in times of market crisis.

Due to the broad range of issues and their scope, the Working Group assembled a Task Force to examine the issues and draft a report. The Working Group recognized the need to involve additional experts, and individuals representing banks were recruited from outside of the Committee member banks. A full list of the members of the Task Force is presented below.

### **1.2. Task Force Members**

## MEMBERS OF THE TASK FORCE

Chairman	Mr. David Mazza, Citibank
ABN AMRO	Mr. Peter Twilhaar
Bank of New York	Mr. Frank Barnao Ms. Janice Rejas Mr. Phil Scott
Bank of Tokyo-Mitsubishi	Mr. Paul Duddy Mr. Matsahito Tsuchiya
Barclays PLC	Mr. Simon Chatterton Mr. Richard Pattinson Mr. Andrew Whiteley
BNP Paribas	Mr. Jean-Pierre Beck Mr. Francois Diehl
Citibank	Mr. Adrian Gray
Credit Lyonnais	Mr. Dan Koval Mr. Frank Rudisuhli
CSFB	Mr. Gary Gluck Mr. Nick Nicholls
Deutsche Bank	Mr. John Cipriani Mr. Russell Fitzgibbons
HSBC	Mr. Mike Wareham
JP Morgan Chase	Mr. Roy DeCicco Mr. Martin Leboutz Mr. Mel Metherell
State Street	Mr. Larry Atkinson
UBS AG	Mr. Jean-Pierre Doerig Mr. Steve Hottiger Ms. Anneliese Schwyter

### **1.3. Acknowledgements**

The Task Force would like to acknowledge officials from Euroclear, Clearstream International and the Depository Trust & Clearing Company who made additional contributions to the report.

## 2. EXECUTIVE SUMMARY

### 2.1. Background

Over the past decade, there have been a series of developments in the global payments environment that have collectively served to reduce settlement risk in the global financial markets. One development has been the widespread adoption of real-time gross settlement (“RTGS”) systems to support wholesale funds transfers. Another has been the establishment of delivery-versus-payment (“DVP”) settlement systems to support securities transactions in the world’s major markets. In 2002, CLS Bank International (CLS Bank) began providing a payment-versus payment (“PVP”) settlement environment for much of the world’s \$1.2 trillion foreign exchange market. These developments have reduced counterparty settlement exposures as they have eliminated settlement lags or principal risk from many wholesale transactions. As such, these developments have likely served to reduce the potential for systemic risk in the global financial markets.

These same developments, however, have simultaneously served to increase the overall liquidity needs of commercial banks with respect to supporting their payment activities. RTGS systems require relatively large amounts of liquidity as banks need sufficient funds to cover their gross, individual outgoing payments. DVP securities settlement systems that settle funds transfer instructions on a real-time, trade-by-trade basis also require banks to maintain substantial money balances throughout the business day. And while liquidity flows for settling foreign exchange transactions are being significantly reduced by the netting effects within the CLS system, participating banks are now required to make large, timed payments, in non-domestic currencies, during a small time window, and in some cases outside normal domestic banking hours.

Continuing rapid growth in overall financial market activity is further exacerbating commercial banks' payment liquidity needs. Commercial banks active in global markets today face scores of daily funding requirements associated with securities, derivatives and funds transfer clearinghouses, which increases the need to make “time-critical” large-value payments in both domestic and foreign markets. Further, the growing interdependencies between financial market infrastructure, both domestically and internationally, and the continuing integration of capital and currency markets, have increased the potential for any isolated or systemic factor that might affect one system or market to be immediately translated to another. This may be due to a credit event, a liquidity event or, as evidenced by the events of September 11, 2001, an operational event.

As such, there has been heightened commercial bank interest in the related issues of: (1) reliance upon payment liquidity; (2) increased liquidity risk in the global financial markets, (3) and the potential for increasing liquidity risk to give rise to systemic risk. Payment liquidity (also known as intraday liquidity) is critical to a commercial bank because it is at the core of a bank’s capacity to make payments.<sup>1</sup> The recent transformation of the global financial environment has created a heightened reliance upon such liquidity, which in a financial, operational or political crisis, is the first to be affected in the financial markets. As

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<sup>1</sup> *Payment liquidity* and *intraday liquidity* are terms used interchangeably to describe funds that can be accessed (borrowed) during the business day, which are to be repaid within the same business day, usually to enable financial institutions to make payments in real time.

overall financial market activity continues to rise, and transaction volumes continue to increase, the ability for banks to effectively and efficiently source needed payment capacity (i.e., payment liquidity) becomes increasingly important from both a market efficiency and systemic risk standpoint.

The G-10 central banks have responded to the inherent liquidity constraints of an RTGS environment by universally establishing intraday liquidity facilities.<sup>2</sup> Central bank intraday liquidity provisions have become the predominant, and an absolutely critical, source of liquidity supporting wholesale payment activity, and the overall wholesale financial markets. G-10 central bank liquidity provisions are generally viewed to be sufficient to support commercial banks' domestic (i.e., local currency) payment activities. The G-10 central banks generally provide unlimited amounts of intraday liquidity as long as such liquidity advances can be fully collateralized with, in most instances, a variety of local currency assets. These assets are sizable holdings that domestic banks typically maintain on their balance sheets.<sup>3</sup>

A particularly important issue facing the global banking community today, however, is the access to intraday liquidity by commercial banks operating in foreign markets. Commercial banks' demand for payment liquidity in foreign markets (i.e., foreign currencies) has substantially increased in recent years as cross-border payment activity has rapidly grown and many banks have become direct clearers in foreign markets. In certain instances, foreign banks are now among the largest payment banks in many major markets. This trend is expected to continue with the further globalization of markets, the increasing levels of cross-border and multicurrency transactions and the growing demand for global payment and cash management services by wholesale clients.

A prevailing view, however, has been that foreign banks may be constrained in their access to intraday liquidity in foreign markets, particularly in times of market stress. For banks operating in foreign markets, their holdings of collateral assets eligible for sourcing central bank intraday liquidity is inherently limited. In addition, banks are facing more competing uses for these eligible collateral assets with the now widespread use of collateral to support wholesale financial markets and the increasing use of collateral in a range of payment, clearing and settlement systems.

This has raised various important concerns for the global banking community:

- Will there be sufficient intraday liquidity available for commercial banks operating in overseas markets, particularly in times of market stress?
- To what extent does the greater interconnectivity of payment and settlement systems - and the greater demand for timed payments - make it more likely that a local market problem (i.e., credit, liquidity or operational) may quickly become a global liquidity problem?

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<sup>2</sup> The G-10 countries comprise Belgium, Canada, France, Germany, Italy, Japan, the Netherlands, Sweden, Switzerland, the United Kingdom and the United States.

<sup>3</sup> An exception had been the United States, where the Federal Reserve has capped the amount of intraday credit it grants to banks based on a multiple of a bank's risk-based capital. However, intraday credit granted to domestic banks has been considerable as ninety-seven percent of all domestic (U.S.) banks use less than fifty percent of their net debit caps for the average peak overdrafts (Federal Reserve Docket No. R-1107). In addition, in 2001, the Federal Reserve began allowing certain institutions to secure daylight overdraft capacity in excess of their net debit caps by pledging collateral maintained at the Discount Window.

- What will the likely impact be to financial markets stemming from the rapidly increasing demands on commercial banks' collateral holdings, particularly liquid, low risk assets?
- With a commercial bank's global payment capacity largely tied to its ability to source requisite collateral, how can the global marketplace overcome obstacles to moving collateral cross-border to facilitate payment activity? What is the likely impact if solutions are not found for more efficient collateral mobilization for payment and settlement purposes?
- What role should central banks play, as the primary providers of intraday liquidity, in facilitating payment liquidity for banks active in foreign markets? As participation in markets and systems continue to become more global, does the range of collateral accepted by central banks to support RTGS payment activity need to expand to include a wider range of foreign collateral?
- What steps can the private sector take to ensure the continued availability and efficiency of cross-border payment liquidity during times of crisis?

## 2.2. Overview and Scope of Report

With such questions in mind, in September 2001 the Payments Risk Committee established a Task Force to consider the liquidity issues associated with facilitating payment and settlement activity in the global financial markets.<sup>4</sup> Following initial discussions of the subject, the mandate of the Task Force was refined to focus on the intraday liquidity issues associated with conducting payment activity in foreign markets, i.e., "cross-border intraday liquidity." The Task Force was specifically charged with:

- (1) Conducting a study of the need for enhanced cross-border intraday liquidity management services, analyzing the rationale for such services and giving the greatest considerations to the overall liquidity and systemic risk benefits;
- (2) Evaluating possible private sector and public sector solutions that would ensure the continued and efficient availability of liquidity in the global markets during times of market crisis, establishing the rationale for each; and
- (3) Establishing recommendations for preferred solutions.

The Task Force was given further guidance by the Payments Risk Committee, which was that any recommendations for new services should not, if at all possible, call for the building of new infrastructure. Rather, risk reduction solutions should build upon existing processes, infrastructure and market practices. The Payments Risk Committee also requested that the Task Force identify "near-term" solutions for use in times of market stress.

Given the composition of the Task Force, this work has taken a G-10 perspective on intraday liquidity and collateral issues and has not dealt specifically with issues that might

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<sup>4</sup> This can be seen as a broadening of the initiative taken by the Payments Risk Committee in April 2000 which was to sponsor a study of the potential implications for US dollar intraday liquidity risks arising from various planned changes to global payments systems. At that time, the Payments Risk Committee decided to limit the scope of its investigation to the potential implications for the US dollar arising from the implementation of EMU and the supporting Euro payments system, the implementation of CLS Bank and the change to the CHIPS settlement process which was to take place in 2001.

arise in, for example, emerging markets. As such, any recommendations outlined in the report are directed at the G-10 markets. However, the Task Force developed a general framework for analyzing various cross-border intraday liquidity issues such that the report is also likely to be relevant for those concerned with such issues in less well-established markets. Further, the purpose of this report was not to provide an analysis of the general benefits and costs associated with collateralizing financial market transactions. While the Task Force recognizes that there can be limitations and risk associated with collateralizing transactions generally – risk to the collateral transferees, collateral transferors and unsecured creditors - the basic premise underlying the report is that from a risk standpoint, collateralized intraday liquidity markets that support payments and settlement activity are preferable to such markets that are not collateralized.

The report is organized as follows:

- Section I serves as a preface for the Report.
- Section II serves as an executive summary of the Report providing background information, an overview of the scope of the report, a summary of key findings and conclusions and recommendations for preferred market developments.
- Sections 3 and 4 collectively provide an analysis of the market need for enhanced intraday liquidity management services as a means of facilitating payment activity in foreign markets. These sections provide an in-depth survey of recent market developments and trends that are leading to an increasing “dislocation” in cross-border intraday liquidity. This evolving dislocation is one where demands for intraday liquidity in foreign markets are continually accelerating while commercial banks are facing certain constraints in sourcing intraday liquidity in foreign markets. Section 3 presents an analysis of the developments that have contributed to an increased demand for intraday liquidity in foreign markets. Section 4 presents an overview of the constraints. Collectively, these sections provide the rationale for enhancing cross-border intraday liquidity management services from a payments systems risk reduction standpoint.
- Section 5 provides an overview of recent developments by the private sector to improve payment liquidity management both at an institutional level and at an industry level. This section also provides an analysis of possible future private sector solutions that could improve access to intraday liquidity in foreign markets.
- In Section 6, a rationale is provided for a central bank solution to the issues related to cross-border intraday liquidity management. The idea of the G-10 central banks expanding the range of collateral eligible for intraday liquidity to include a broader array of “cross-border” collateral is introduced as an optimal risk-reduction solution.<sup>5</sup> The concept and benefits of “cross-border collateral pool facilities” as an effective and cost-efficient mechanism to facilitate the provision of cross-border collateral to central banks is introduced.

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<sup>5</sup> Cross-border collateral is a term used to describe any collateral asset held abroad, denominated in a foreign currency, issued by a foreign entity, or where the transferor may be incorporated in a foreign country.

- Section 7 presents three potential models for cross-border collateral pool facilities that could be adopted by the central banks (Cash Collateral Pool Model, Securities Collateral Pool Model, Central Bank Guarantee Model). Various options for each model are presented and the operational considerations for each facility type are examined in detail.
- In Section 8, consideration is given to the possible legal, risk and cost issues associated with central banks establishing cross-border collateral pool facilities, as well as possible public policy concerns.
- Section 9 outlines how the establishment of cross-border collateral pool facilities by central banks might benefit institutions that self-clear payments in their home country, and perhaps a limited number of other markets, but rely on correspondent banks for payments in other markets. In fact, the majority of institutions would fall into this category. Implications for the global correspondent banking network are also addressed.
- The Task Force’s conclusions and recommendations for preferred market developments are included in this Executive Summary. The annexes contain a glossary of terms which are used extensively throughout the report and which may not be commonly understood

### **2.3. Summary of Key Findings and Conclusions**

In conducting an analysis of the issues related to managing payment liquidity in foreign markets, the Task Force has had extensive dialog with the thirteen representative banks and with other key players in the financial markets. Conclusions from these discussions and analysis are:

- Recent developments in the global payments environment have significantly increased demand for intraday liquidity by commercial banks, including intraday liquidity in foreign markets. The market trends and developments that have contributed to the increased demands for intraday liquidity in foreign markets include, but are not limited to: (1) the adoption of RTGS systems by central banks; (2) the explosive growth in domestic and cross-border financial transactions; (3) increased funding/margin requirements of new, real time net settlement systems and securities and derivatives clearinghouses; (4) the move to DVP for securities settlements; (5) greater asymmetry in payment flows; and (6) the increased role foreign banks are playing in local markets. The demands for cross-border intraday liquidity are expected to accelerate over time as these market developments and trends continue.
- Recent developments in the global payments environment have also increased the need to make “timed” large-value payments in both domestic and foreign markets. Commercial banks today face multiple large-value daily funding requirements to support payments and settlement systems in each of the markets they participate in. There has also been an increased demand for timed payments by banks’ clients. The advent of CLS Bank will

result in the need to make large-value, timed payments in multiple currencies outside normal market hours in some G-10 countries.

- Commercial banks have become increasingly reliant on central bank intraday liquidity provisions as the main source of liquidity to facilitate payment activity in both domestic and foreign markets. While commercial banks have well-established access to central bank intraday liquidity in domestic markets, access to central bank intraday liquidity in foreign markets is inherently constrained. The G-10 central banks, for the most part, supply intraday liquidity based on a commercial bank's available holdings of certain local currency assets on their balance sheet, which for foreign commercial banks can be limited.<sup>6</sup>
- Commercial bank intraday liquidity is becoming increasingly fragmented. To date, it has been incumbent upon commercial banks to source a sufficient quantity of payment liquidity in each center where they are a direct participant in RTGS systems. This has led to the creation of many "pots" of liquidity across the globe that must meet the peak demand of each underlying system at any given time on any day, with no effective way to "bridge" intraday liquidity.
- Commercial banks are faced with increasing demands on their existing holdings of liquid, low risk collateral. This is due to the rapid growth in the use of collateral in wholesale financial markets and the increasing use of collateral in a range of payment, clearing and settlement systems. This continuing trend will, over time, make it increasingly difficult for commercial banks to source the payment liquidity that is required in foreign markets. As the market is increasingly competing for a narrow range of collateral assets, one concern is that this could ultimately impact the efficient functioning of the underlying bond markets including possibly increasing the relative price of collateral – i.e., a scarcity premium in the cash market for the respective instrument e.g., the government bond market. It also could lead to a re-introduction of credit risk as market participants increasingly borrow and retransfer collateral assets i.e., chaining of exposures, to meet increasing collateral requirements.
- The events of September 11, 2001 demonstrated how demands for cross-border intraday liquidity can be immense in times of market stress and require a public sector, i.e., central bank, response to ensure adequate supply. In the United States, commercial bank borrowings from the Federal Reserve discount window rose from \$200 million to about \$45 billion on September 12. Daylight overdrafts at the Federal Reserve peaked at \$150 billion on September 14, their highest level ever and more than 60 percent higher than usual. This was despite the Federal Reserve injecting billion of dollars of liquidity into the financial system and with opening system-wide reserve balances on September 14 of slightly more than \$120 billion, when such balances normal range between \$30 billion and \$45 billion. While the response taken by central banks on, and shortly after, September 11 clearly served to alleviate liquidity stress in the global markets and helped to avert a systemic meltdown, important issues surfaced relative to the market uncertainty

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<sup>6</sup> The Federal Reserve has a distinct intraday liquidity policy from that of the other G-10 central banks, whereby intraday liquidity provisions are not required to be collateralized and the amounts granted are based on a depository institution's risk-based capital level. This is explained in more detail in this report.

of what the response was going to be, the timing of the response and how information was disseminated.

- Increased interdependencies between financial market infrastructure, both domestically and internationally, and the continuing integration of capital and currency markets generally, have likely increased the potential for any isolated or systemic factor that might affect one system or market to be immediately translated to another. This can have immediate and significant impacts on “normal activity” in other currencies and intraday liquidity in multiple markets. This will make it more difficult for commercial banks to respond to liquidity shortages and will likely make it more difficult for central banks to proactively remediate intraday liquidity problems as the source of these problems are more diverse and may now be from foreign sources.
- The private sector has been very active in recent years in advancing payment liquidity management to support operating in a global environment. Individual institutions have made significant advances in liquidity management, payment sequencing and capabilities and global collateral management. At the industry level, the private sector has enhanced the use of existing payment liquidity through the development of new multilateral net settlement systems; the establishment of central counterparty clearinghouses; the development of repo, securities lending and currency swap markets; the establishment of CLS Bank and the Inside/Outside (I/O) Swap mechanism; and the development of various collateral swap management services provided by central securities depositories.
- While there have been many achievements by the private sector in addressing increasing intraday liquidity needs, it is not certain whether additional private sector services will arise in the near term to address the increasing "dislocation" in cross-border intraday liquidity. This dislocation can be understood as an environment whereby demands for timely cross-border intraday liquidity will continue to accelerate, while commercial banks continue to face inherent constraints in sourcing real-time intraday liquidity in foreign markets. New payment liquidity services are needed to ensure:
  - Commercial banks are able to better mobilize liquidity, in real-time, in foreign markets to meet the increasing demands for timed payments in global markets.
  - There is sufficient overall global liquidity to reduce the likelihood of systemic risk in rapidly evolving markets by mitigating daily imbalances in the supply and demand of liquidity.
  - Central banks have the most effective tools to collaborate in addressing temporal disruptions by intervening to avoid liquidity “stress” escalating into liquidity and ultimately credit/systemic risk.
- The use of central bank money, as the settlement asset in cross-border transaction, means that the G-10 central banks are uniquely positioned to provide the requisite near-term services that will ensure adequate liquidity, reduce settlement risk and ensure the efficiency of the global payment environment.
- By expanding the range of cross-border collateral currently accepted by central banks as part of their existing RTGS intraday liquidity provisions, *and most critically collateral denominated in a foreign currency*, the G-10 central banks could provide the market with

the requisite services to meet future imbalances in the supply and demand of cross-border payment liquidity. This would also be an effective solution to enable central banks to more effectively intervene to prevent liquidity “stress” from escalating into credit and ultimately systemic risk in times of market crisis.

- A few G-10 central banks have recently begun to expand the range of acceptable collateral for intraday liquidity to include foreign (i.e., cross-border) collateral:
  - Through the correspondent central banking model (CCBM) in the Euro system, participants in Target in the European Union (EU) can use collateral held in other countries within the EU to obtain intraday liquidity from the central bank of the country in which they are based. Eligible collateral, however, is limited to euro-denominated assets.
  - With the establishment of the euro, the Bank of England and the Swiss National Bank began accepting certain euro-denominated assets as collateral to support the CHAPS Euro RTGS system in the U.K. and the Swiss Interbank Clearing System (SIC) in Switzerland, respectively.
  - In December 2001, the Federal Reserve began allowing certain depository institutions with self-assessed net debit caps to pledge certain non-U.S. Sovereign Debt and Brady Bonds to secure daylight overdraft capacity in excess of their net debit caps, subject to Reserve Bank approval.
  - In 2003, the central banks of Sweden, Denmark and Norway will jointly establish a facility that will allow banks to use central bank cash deposits in one currency as collateral for raising liquidity in another Scandinavian country (Scandinavian Cash Pool). This will be the first “cross-border cash collateral pool facility” in the OECD markets.

The acceptance of cross-border collateral for intraday liquidity by the G-10 central banks is limited to these instances. Only the Federal Reserve currently accepts collateral denominated in many of the major foreign currencies.

- The Task Force has identified and evaluated various facilities that could effectively and efficiently facilitate broader G-10 central bank acceptance of cross-border collateral for intraday liquidity. These facilities, referred to as *cross-border collateral pool facilities*, would build upon well-understood central bank processes and existing infrastructure (e.g., RTGS systems, central bank accounts) and market practices (e.g. SWIFT<sup>TM</sup> communication network, CSD collateral management services) to minimize costs and implementation time. The Task Force has identified facilities that could accommodate the acceptance of foreign currency i.e., cash as collateral (Cash Collateral Pool Facility) or foreign securities as collateral (Securities Collateral Pool Facility), could be established by central banks on a coordinated basis or on a unilateral basis, and where the custody and management of foreign collateral could be completely outsourced to private sector institutions by central banks.
- While in certain jurisdictions there may need to be changes in local law or regulation to allow central banks to accept foreign assets as collateral for intraday credit, from a legal, risk, and cost standpoint the Task Force did not surface any prohibitory factors in our analysis. From a legal standpoint, cross-border collateralized transactions are

commonplace in today's markets. Any financial risks assumed by central banks could be mitigated through the use of sufficient haircuts on collateral. Such facilities should not result in any material increase in operational or systemic risk. Likewise, it is presumed that central banks would seek "full cost recovery" from the private sector for such services.

- The Task Force gave consideration as to whether the institution of any of the cross-border collateral pool facilities by central banks might raise difficult policy issues for central banks such as: (1) affect on monetary policy implementation; (2) competitive effects in private financial markets; (3) implications for central bank supervision or oversight; (4) implications for the role of central banks as liquidity provider; (5) potential shifts in the concentration of financial activity; and (6) the required degree of coordination in sharing confidential information. The Task Force is aware that there could be monetary policy concerns associated with a Cash Collateral Pool Facility in the event foreign currency collateral is not returned before the close of business – which is not a concern with a Securities Collateral Pool Facility. The Task Force is also aware that a Securities Collateral Pool Facility is more consistent with current G-10 central bank practices, where RTGS intraday liquidity is universally collateralized by securities. It is ultimately up to each central bank to weight these public policy implications against the potential risk reduction benefits.
- It is generally believed that investment by the private sector will be stimulated by the provision of such public sector liquidity services. The continued globalization of the payment and settlement environment will inevitably result in subtle changes in participant behavior and the emergence of business rationales and the financial conditions to support private sector investments.

#### **2.4. Recommendations**

The Task Force has identified actions by market participants and national authorities (i.e., central banks) that would mitigate risk in the global payment systems and enhance the stability of global financial markets:

- **Action by private sector institutions (e.g., individual banks, industry groups)**
  1. Private sector institutions are encouraged to continue to develop new, well-constructed services that, over time, will enhance market participants' ability to respond effectively to the accelerating intraday liquidity demands in foreign markets. Any new private-sector intraday liquidity services should build upon, and be consistent with, existing processes, infrastructure and market practice. New private-sector intraday liquidity services should, wherever possible, be collateralized and optimize banks' use of existing collateral by eliminating obstacles to moving collateral across borders for creating liquidity.
  2. Individual banks and industry groups should give immediate consideration to developing the following new intraday liquidity services: (a) intraday real-time repos, (b) cross-border collateral pool facilities based on the intraday credit provisioning of

one or more private institutions, (c) bilateral intraday currency swaps between banks, and (d) real-time intraday collateral swap services.

3. In order to support near-term private sector development, the Payments Risk Committee should sponsor a Working Group that would, over the next year, liaison with private-sector entities interested in developing new market services.

- **Action by central banks**

1. Each G-10 central bank should, in the immediate term, extend its range of eligible foreign (cross-border) collateral for intraday RTGS liquidity to include a range of high-grade sovereign debt from each of the G-10 countries. G-10 sovereign debt should be accepted as collateral for intraday RTGS liquidity on a daily basis. Recognizing the importance for individual central banks to set their own criteria on acceptable collateral, and where it should be cleared and held in custody, the Task Force sees distinct advantages to each G-10 central bank adopting a “Third Party Agent” Securities Collateral Pool Facility (outlined on page 61), where custody of G-10 sovereign debt, and collateral management, would be outsourced to the international central securities depositories (“ICSDs”), or national central securities depositories or custodians that have account linkages to the ICSDs.
2. Over time, each of the G-10 central banks should determine whether it is necessary to further extend its range of eligible foreign-denominated collateral for RTGS intraday liquidity to beyond that of G-10 sovereign debt.
3. Each G-10 central bank, in cooperation, where appropriate, should chose the most effective steps to foster satisfactory private sector action in the area of enhancing global payment liquidity.

The Task Force believes that the immediate action outlined above - each G-10 central bank accepting sovereign debt from every other G-10 country for RTGS intraday liquidity - would be the most effective and cost-efficient near-term policy tool for central banks to ensure commercial banks are able to mobilize intraday liquidity, on a collateralized real-time basis, to meet the increasing demands for timed payments in global markets. This will ensure sufficient payment capacity can be immediately mobilized by a commercial bank to meet any excessive liquidity demands stemming from an unexpected credit, operational or liquidity event. This could effectively mitigate an initial liquidity stress event from quickly developing into a broader liquidity crisis that could be transmitted across global markets. This would also better enable the G-10 central banks to collaborate in addressing temporal liquidity disruptions in times of market stress, reducing the likelihood of systemic risk in rapidly evolving and increasingly integrated global markets. It would ensure effective uses in times of market crisis, as there would be little or no market uncertainty over its use, capabilities and effects.

The specific advantages associated with each G-10 central bank adopting a “Third Party Agent” Securities Collateral Pool Facility are that:

- Such a facility could be established unilaterally by each central bank.

- Collateral is already centralized at the major international central securities depositories (ICSDs) and can be moved very efficiently through an account entry to central banks.
- The major ICSDs (and CSDs and global custodians which provide full custody and collateral management services) maintain the necessary infrastructure, expertise and capacity for efficient collateral handling and have a proven record in operational execution.
- Market participants could benefit automatically from future developments and investments in the private sector collateral industry.
- The Federal Reserve has already successfully implemented this model as a cross-border collateral pool facility and such a facility can be instituted within six to twelve months.
- A third-party agent managing the collateral could offer a service on a near 24-hour basis to maximize its use.
- The ICSDs have indicated strong support for providing such a service.

### 3. DEMANDS ON GLOBAL PAYMENT LIQUIDITY: MARKET DEVELOPMENTS

#### 3.1. Introduction

Developments in the global financial markets over the past decade have significantly altered the global payments environment. These developments have had a significant impact on how intraday liquidity is managed by commercial banks to support global payment activity. They have also created conditions whereby:

- Commercial banks face an increasing demand for intraday liquidity to facilitate payment activity, and in particular an accelerated demand for intraday liquidity in foreign markets.
- Commercial banks face an increasing need to make “timed” large-value payments in both domestic and foreign markets.
- The ability of commercial banks to efficiently and effectively source intraday liquidity in markets other than an institution’s domestic i.e., “home” market is becoming increasingly strained due to collateral requirements associated with accessing such liquidity.
- There is an inability for banks to effectively “bridge” available global intraday liquidity as it is becoming increasingly fragmented.
- The increased interdependencies between financial market infrastructure, both domestically and internationally, and the continuing integration of capital and currency markets generally have increased the potential for any isolated or systemic factor that might affect one system or market to be immediately translated to another. This is likely to make it more difficult for commercial banks to respond to liquidity shortages and is also likely to make it more difficult for central banks to proactively remediate intraday liquidity problems as the source of these problems are more diverse and may now be from overseas sources.

In this section of the report, an analysis is presented of the various underlying market trends and developments that are significantly altering and increasing the demands for cross-border intraday liquidity and creating the conditions for an increased potential for risk in the global payments environment.<sup>7</sup> It is the view of the Task Force that these trends and developments will continue, and will continue to accelerate the demands for intraday liquidity in foreign markets over time.

#### 3.2. Adoption of RTGS by Central Banks

A significant development during the past decade, as far as increasing the demands for cross-border intraday liquidity, has been the widespread introduction of *real-time gross settlement (RTGS) systems* for large-value interbank funds transfers. In 1990, RTGS systems existed in the United States only. Today, RTGS systems – funds transfer systems where transfers are settled individually, that is without netting debits and credits, with real time final settlement in central bank money – have been established by each of the G-10 central banks and

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<sup>7</sup> Intraday liquidity sourced by commercial banks in foreign markets (i.e., markets other than the institution’s national or “home” market) is referred to throughout this report as *cross-border intraday liquidity*.

many other central banks worldwide. This was done as a response to the growing interbank settlement risk in the financial markets.<sup>8</sup>

Prior to this development, wholesale payments were largely made based on a batch, net settlement processing structure, where all payment instructions were stored and posted to specific accounts during the day, with final settlement of net debit/credit balances deferred until a specified time at the end of the day. Such deferred net settlement systems minimized the intraday liquidity needs of banks operating in foreign markets as all large-value payment activity was netted for funding purposes, mostly on a multilateral net basis. In the past, this also minimized the criticality of the timing of payments as payments could be made throughout the business day, with the resultant funding left to the end of the day.

With the advent of RTGS systems across the G-10 countries - and in many other countries worldwide - the demands for intraday liquidity have increased dramatically. RTGS systems require relatively large amounts of intraday liquidity because participants need sufficient liquidity to cover their gross, individual outgoing payments. Each individual payment needs to be covered by sufficient reserves in a bank's central bank account, or by an incoming payment order or central bank credit.

	<b>1996</b>	<b>2000</b>	<b>1996-2000 (% change)</b>
<b>Belgium: ELLIPS<sup>1</sup></b>	8,376.1	20,954.3	150%
<b>Canada: LVTS<sup>2</sup></b>	9,719.6	16,408.4	69%
<b>France: TBF<sup>3</sup></b>	14,160.7	52,065.4	267%
<b>Germany: ELS</b>	14,480.3	23,665.0	63%
<b>Hong Kong: CHATS<sup>4</sup></b>	7,887.2	11,664.3	48%
<b>Italy: BI-REL<sup>5</sup></b>	17,591.5	27,404.2	56%
<b>Japan: BOJ-NET</b>	327,180.0	328,430.0	.3%
<b>Netherlands: TOP</b>	10,122.1	18,116.1	79%
<b>Singapore: MEPS<sup>6</sup></b>	4,278.0	5,383.8	26%
<b>Sweden: K-RIX</b>	8,441.9	11,576.5	37%
<b>Switzerland: SIC</b>	25,766.9	30,231.0	17%
<b>United Kingdom: CHAPS<sup>7</sup></b>	45,291.2	77,070.8	70%
<b>United States: Fedwire</b>	249,140.0	379,756.4	52%
<b>Total</b>	<b>742,435.5</b>	<b>1,002,726.2</b>	<b>35%</b>

Source: BIS Statistics on Payment and Settlement Systems in Selected Countries (Figures for 2000)  
<sup>1</sup> ELLIPS 2000 figures include cross-border transactions not available in 1996 <sup>2</sup> Canada 1996 figures are for the IIPS systems which was replaced by LVTS in 1999. <sup>3</sup> France 1996 figures are for SAGITTAIRE, which was replaced by TBF in 1998. <sup>4</sup> CHATS figures are for CHATS HKD system. <sup>5</sup> Italy 1996 figures are for SIPS system, which was replaced by BI-REL in 1998. <sup>6</sup> Singapore 1996 figures are for SHIFT system, which was replaced by MEPS in 1998. <sup>7</sup> CHAPS figures are for CHAPS Sterling only.

As Table 1 indicates, there has been tremendous growth in RTGS payment levels in recent years. As RTGS payment levels are expected to continue to rise, demands for intraday liquidity will become particularly acute in future years. At the current growth rate, by the year

<sup>8</sup> The development of RTGS systems has been one response by central banks to the growing awareness of the need for sound risk management in large-value funds transfer systems. RTGS systems offer a powerful mechanism for limiting inter-bank settlement risk because they can effect final settlement of individual funds transfers on a continuous basis during the processing day. In addition, RTGS systems can contribute to the reduction of settlement risk in securities and foreign exchange transactions by providing a basis for delivery-versus-payment (DVP) or payment-versus-payment (PVP) mechanism.

2008, RTGS payments in the G-10 countries alone will surpass USD 1,829 trillion, an increase of over USD 826 trillion from 2000 levels. While RTGS payment activity is not funded on an overall gross basis, i.e., much of RTGS activity is covered by incoming payment activity, this continuing increase in RTGS payment levels will result in increased funding pressures for banks. These funding needs are expected to be particularly acute for payment banks operating as direct clearers in foreign markets (currencies) as access to such intraday liquidity, which is explicitly provided by the G-10 central banks through intraday credit provisions, is inherently constrained due to the collateral requirements of central banks (see Section 4).

### **3.3. Growth in Domestic and Cross-Border Financial Transactions**

Commercial banks' increasing demand for cross-border intraday liquidity is also largely attributable to the tremendous overall growth in both domestic and cross-border financial market activity in recent years. As the tables in Annex 3 indicate, the recent growth in financial market activity related to securities transactions, derivatives transactions, and money market transactions has been enormous.

There has been tremendous growth in domestic securities activity in recent years. The data for eighteen securities trading systems in the G-10 countries alone reflect that for just a four-year period (1996-2000) the aggregate amount of securities traded increased by 47% from USD 23.8 trillion outstanding to USD 35.1 trillion. The data reflecting domestic securities turnover indicates that the instructions handled by selected securities settlement systems increased by 50% over the same four-year period from USD 262.7 trillion to USD 391.1 trillion.

The trading of derivative financial instruments on organized exchanges has grown enormously over the past decade. Many global payment banks also serve as "market makers" for derivatives transactions. The total amounts of derivative financial instruments traded on organized exchanges increased from USD 3.5 trillion notional outstanding in December 1991 to USD 23.9 trillion notional outstanding by December 2001. The total annual turnover in on-exchange derivative financial instruments increased from USD 128 trillion in December 2001 to a level of USD 595 trillion over the same time period. Although on a day-to-day basis the amounts of payments supporting contract deliveries are low relative to the nominal amount of trades, during periods of market volatility, these amounts can increase by an order of magnitude, and banks depend critically on the timely completion of such payments and deliveries in managing their liquidity risks. As the volume of derivative transactions continue to grow, the amount of day-to-day payments on organized exchanges continue to play a larger role in banks management of intraday liquidity.

Likewise, in recent years, there has also been very rapid growth in the level of over-the-counter derivative transactions. While comprehensive figures are not available prior to 1998, as per the Bank of International Settlements, as of December 2001, the total nominal amount of outstanding OTC derivative contracts was reported to be USD 111 trillion. OTC derivatives often require payments periodically throughout the life of the transactions, on maturity, or both. Master agreements provide for the netting of payment obligations in the same currency on the same value date. In practice, however, the extent of payment netting is limited by systems constraints, which make it difficult for banks/dealers to calculate and administer net payments. While for most firms, payments relating to OTC derivatives constitute a relative small share of the total value of their payments, these levels are growing and in some circumstances, OTC

derivatives could give rise to significant liquidity pressures. For example, some OTC contracts provide for early termination in the event of an adverse credit event such as a credit downgrade. Another potential source of liquidity demands associated with OTC derivatives is the fact that OTC transfers are now largely collateralized. As such, a significant decline in the value of an OTC derivatives portfolio could result in substantial demands for collateral and thus substantial liquidity pressures. Furthermore, some collateral agreements provide for collateral requirements to be triggered or increased in the event of an adverse credit event such as a credit downgrade.

In recent years, there has also been considerable growth in short-term money market transactions, particularly collateralized repo and securities lending market transactions. By 1998, the most recent year in which data are available across the G-10 countries, the total value of government securities on repo for the eleven largest markets amounted to USD 2.76 trillion, which represents 30% of the total value of government securities issued.<sup>9</sup>

While domestic financial market activity has continued to grow, so has international (i.e., cross-border) financial market activity. From December 1994 to March 2002 the total amount of eurocurrency liabilities increased 55% from USD 7.2 trillion to USD 11.2 trillion. Of today's eurocurrency liabilities, USD 8.3 trillion represent interbank borrowings and USD 6.4 trillion are in foreign currencies (compared to only USD 3.8 trillion in December 1994). The total level of international debt securities outstanding increased from USD 2.4 trillion of total in December 1994 to USD 8.6 trillion as of June 2002 such that by 2002, international debt securities amounted to 22% of the total (domestic and international) debt securities outstanding, up from only 9% in 1994. A survey of the banks represented on the Task Force indicated that over 50% of their payment activity in the G-10 markets is conducted in foreign markets.<sup>10</sup>

The rapid growth in both domestic and cross-border financial market activity should only continue over the coming years. This will continue to increase the intraday liquidity demands of commercial banks and as international market activity increases, commercial banks' cross-border intraday liquidity demands.

### **3.4. The Move to DVP and Other Elements of Securities Settlement**

Two recent developments related to securities settlements are materially increasing commercial banks demands for intraday liquidity. One is the move to delivery-versus-payment (DVP) settlement environments. The other is the move to central counterparty clearing environments for securities transactions. .

***Delivery Versus Payment.*** Over the past ten years there has been a widespread adoption of delivery-versus-payment (DVP) settlement methods for securities transactions across the G-10, and in many other countries. The move to DVP settlement environments has been viewed as a mechanism to reduce risk and increase efficiency in settlement arrangements. However, the move to DVP settlements continues to have two material affects on the demands for intraday

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<sup>9</sup> Source: BIS Report on Securities Lending Transactions: Market Development and Implications (1999)

<sup>10</sup> For six of the Task Force banks, the average daily value of outgoing payments in their home markets for the month of July 2002 totaled US\$492 billion. The average daily value of outgoing payments in their away markets for the month of July 2002 totaled US\$508 billion.

liquidity: (1) it increases overall demand, and; (2) it increases the need to make large-value payments, i.e., funding, at specified times.

The move to what is commonly referred to as Model 1 DVP environments have the most significant impact on commercial banks' intraday liquidity demands. These are securities settlement systems that settle transfer instructions for both securities and funds on a trade-by-trade (i.e., gross) basis, and at the same time. While such systems have served to eliminate principal risk in securities transactions, participation in such systems requires participants to maintain substantial money balances during the business day. Many of the securities settlement systems in the G-10 countries, in particular the systems that settle government securities, now operate on a Model 1 DVP basis.<sup>11</sup> While this is the case, these systems are often coupled with facilities to provide participants with intraday liquidity in order to minimize "fail" rates. However, access to such intraday liquidity is largely contingent upon the participant bank having the requisite domestic collateral assets.

Most of the other G-10 securities settlement systems have adopted other DVP settlement models that also eliminate principal settlement risk. Such systems may settle cash on a net basis (DVP Model 2), or both securities and cash on a net basis (DVP Model 3). Through payment netting, such systems allow participants to make much more efficiency use of liquidity. However, there are one or more discrete, pre-specified times during the business day when net payments must be made. In addition, in order to ensure the financial stability of the overall system, many of these securities settlement systems impose a combination of daily collateral requirements and limits. The collateral requirements (which are often in cash) have strict funding deadlines, presenting additional liquidity demands on banks serving as clearing members in these systems. Meanwhile credit limits (bilateral or multilateral) imposed by these systems on members can limit banks' expected incoming liquidity. Further some securities settlement systems may prohibit participants from withdrawing funds received during a processing cycle until a later processing cycle. While these developments provide securities settlement systems with extra protection to address credit problems arising from a default, collectively they place increasing liquidity demands and constraints on participating banks.

***Central Counterparty Clearinghouses.*** A recent phenomenon in the G-10 countries which has significantly affected commercial banks' abilities to manage daily payment needs has been the move to central counterparty clearing structures to support securities settlement. In such instances, a clearinghouse becomes the principal counterparty to all securities trades conducted over a given exchange i.e., the buyer to every seller and the seller to every buyer. As the "central counterparty," the clearing house novates and nets all contracts. The move to central counterparty clearinghouses for securities markets has occurred in the United States, the United Kingdom, France, the Netherlands and Belgium. In 2003, this transformation is expected to occur in Germany, Italy, Japan, Portugal and Mexico.

While central counterparty systems provide liquidity efficiencies to trading counterparties by multilaterally netting all transactions, they present new, significant liquidity demands for custodian banks. Under such structures, the custodian bank, as a clearing member of the clearinghouse often becomes irrevocably committed to settle the full set of trades of their clients

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<sup>11</sup> Countries that have adopted Model 1 DVP settlement systems are Belgium (NBB Clearing, CIK, and Euroclear); France (RGV); Japan (BOJ-NET JGB Services); Netherlands (Necigef); Singapore (MEPPS-SGS, DCSS); Sweden (VPC); Switzerland (SECOM); the United Kingdom (CHAPS); and the United States (Fedwire Securities Services).

as soon as they are executed on the exchange on trade date. In these instances, custody banks are not permitted to refuse to settle trades on behalf of their clients (as traditionally has been the case) and commercial banks need to monitor more closely the trading positions of their clients, the credit exposures to their trading clients, and their clients' settlement and funding obligations at the clearinghouse. In addition, as central counterparty systems have universally applied more dynamic risk management techniques to manage the increased financial risks taken on by the clearinghouse, this has increased the level and frequency of cash margin payments required of clearing banks. Central counterparty clearinghouses often run multiple rounds of intraday margining and provide for automatic margin calls if market prices change sufficiently.

### **3.5. Clearing House Funding Obligations**

*Exchange-traded derivatives.* Many commercial banks also serve as clearing members of derivatives exchanges (clearing houses) and as such are required to meet daily margin calls on behalf of clients that are trading members of the exchange. These daily margin payments are made to cover initial margin requirements, that is, requirements to provide collateral to the exchange (clearinghouse) to cover potential future losses on open positions in both futures and options. In addition, in the case of futures contracts, clearing members are also required to meet daily variation margin requirements on behalf of clients, that is, daily payments to the exchange to settle any losses (gains) that have accrued on the clearing member's contracts.<sup>12</sup>

Margins, which are mostly met by providing cash, are typically set at levels intended to cover from 95 to 99% of potential losses from movements in market prices over a one-day time horizon. Traditionally, derivatives clearing houses conducted margin settlement once each day. The clearinghouse would calculate margin deficits and surpluses after the close of each trading day, based on open positions and closing prices. Settlement of the margin obligations would typically occur on the following business day, if possible before the opening of trading. In recent years, however, many clearinghouses have introduced a second round of intraday margin call during the afternoon. Many others that do not, have the authority to make intraday margin calls. In some cases, a margin call occurs automatically if market prices change sufficiently, for example, if a price limit has been reached. As exchange-traded derivative activities continue to grow at a rapid rate, and as markets become increasingly volatile, the level of time-sensitive, intraday liquidity demands on banks serving as clearing members will continue to grow.

Many global payment banks also serve as settlement banks for organized derivatives exchanges. Global payment banks are used to effect money settlements between the exchange (clearing houses) and its members by transfers between their accounts on the books of the bank. Global payment banks are often used because the derivatives clearing house, or many of its members, may lack access to central bank accounts. Or these commercial banks are willing to provide credit (especially intraday credit) to clearing members or to the clearinghouse in large amounts or on certain terms (uncollateralized). Or the commercial banks are able to complete settlements of exchange members earlier in the day than is possible under the operating hours and finality rules of the central bank payment system.

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<sup>12</sup> In the case of options contracts, while a few exchanges impose variation margin requirements, most are covered by a "premium upfront" margining system.

Many settlement banks often are required to extend credit to the clearing members of the exchange, generally on an uncollateralized basis. In such arrangements, without credit from their settlement banks, the exchange members would be forced to incur the opportunity costs and credit risks of holding balances with the banks on the night prior to settlement that were sufficient to cover their obligations to the exchange. Settlement banks also often extend unsecured intraday credit to the exchange (clearinghouse) by allowing it to overdraw its account in anticipation of a subsequent balancing transfer of funds from another settlement bank. As the levels of exchange-traded derivatives transactions continues to grow, the payments activities of many settlement banks continue to grow, as do the levels of intraday credit provided to the market and the banks demands for intraday liquidity to fund this activity.

***Wholesale funds market.*** In the wholesale payments market, a new phenomenon in the G-10 countries is to replace large-value end-of day multilateral net settlement systems with pre-funded, real-time net settlement systems (i.e., “hybrid” systems). Such hybrid systems require all payments to be fully funded by the sender so that irrevocable and unconditional funds transfers can be made during the day rather than only at the end of the day. Hybrid funds transfer systems are commonly considered an improvement in overall payment liquidity management due to their employing centralized queue management processes that can facilitate the settlement of large amounts of payments with relatively minimal funding.<sup>13</sup> Examples of new hybrid, real-time net settlement systems are PNS in France, CHIPS in the United States and RTGS Plus in Germany.

However, the actual amount of daily funding required of banks does not necessarily diminish when a funds transfer system transforms from a traditional multilateral net settlement system to a hybrid system. Rather, the liquidity needs are merely re-distributed during a given day. (For any given set of daily payments activity, the overall funding of the system must be the same under a hybrid systems and a multilateral net settlement system; the net difference between aggregate incoming and outgoing payments needs to be funded each day by system participants under either system. However, hybrid systems do increase the need to make time-sensitive payments during the day. Under multilateral net settlement systems, banks are required to fund daily payment activity once, at the end of the business day. Under hybrid systems, banks are often required to fund payments two or more times per day at specified times. Failure to fund payment activity can result in a delay in the system settling payments and expulsion from the system.

Whether hybrid systems improve payment liquidity over time ultimately will depend on the volume of payments made through these systems and how “balanced” the overall payment activity is. The algorithms that facilitate overall payment activity operate more efficiently with higher volumes and more balance payment flows between participants. One development that may have a materially adverse impact on the liquidity benefits of hybrid systems over time is the likely effect CLS Bank may have on reducing overall payment activity through these systems. Over the next few years, as foreign exchange payments migrate from these hybrid systems to CLS Bank, it is expected that they will lose significant volumes of activity.

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<sup>13</sup> Such systems are often referred to as hybrid systems because they combine features, including risk control measures, of gross and net settlement systems. The centralized queue management processes employ netting algorithms that are highly effective at multilaterally offsetting stored payment instructions based on available funding.

### **3.6. Greater Asymmetry of Payments**

Due to various factors, many of the banks represented on the Task Force find that there is now a greater asymmetry in the flow of their incoming payments. Uniformly across the G-10 markets, commercial banks need intraday liquidity for a greater percentage of their total outflows earlier in each business day, and at the end of each business day. The need for greater funding earlier in the day is due collectively to the widespread adoption of RTGS systems, the increasing margin (collateral) funding requirements of other clearing houses, and the increased cash settlement levels of private sector payment and settlement systems.

A significant factor contributing to greater demand for intraday liquidity at the end of the business day is the common market practice of “delaying payments.” Part of this can be attributed to the fact that cross-border payments have increased significantly in recent years and common market practice has traditionally been for international payment “cover” to come in later in the day. However, under RTGS environments, banks also now have broader incentives to delay outgoing payments whenever possible to economize on liquidity. This results in less liquidity being available from incoming payments earlier in the day in comparison to later in the day. This has two effects. One is to increase the demands for central bank intraday liquidity early in the business day. The other is to simultaneously increase demand for liquidity later in the day, as overall payment volumes are higher.

There are other regular events that cause aberrations in the symmetry of a commercial bank’s daily payment flow. In relation to new securities issues, the lead underwriters are required to pay the issuer prior to receiving compensating funds during the day from the different banks placing the issue. Or commercial paper issuing/paying banks may be required to fund daily commercial paper maturities prior to the receipt of funds from new commercial paper issues. This is generally done through the RTGS systems, absorbing a large part of the lead underwriting firms’ banks intraday liquidity up until the end of the day. The implementation of a syndicated loan presents the same intraday liquidity curve at the underwriter’s bank: a large debit in the morning and numerous medium to small payments during the day to cover. Intraday liquidity pressures are particularly high in specific instances such as the end of month, or end of a reserve period, where global adjustments have to be made before the end of the day, even at “any” rate.

### **3.7. Increased Client Demand for Intraday Payment Services**

As cross-border financial market activity continues to increase, the demand for intraday payment services from commercial banks’ clients continues to grow. This is largely evidenced by the increase in Clearing Risk Limits commercial banks are providing to their wholesale clients. Banks extend Clearing Risk Limits to their clients to manage the intraday credit risks associated with cash clearing activities (“clearing risk”). Clearing risk arises whenever a bank acts as an intermediary on a client’s instruction to transfer, or commit to transfer, cash to a third party before it can confirm that reimbursement from the client has taken place. In theory, banks can manage clearing risk by not making a payment until receipt of reimbursement by the client is confirmed. However, banks may be forced to make a commitment to transfer based on market practice, clearing infrastructure rules, or other factors. The fact that Clearing Risk Limits at commercial banks are increasing, both in aggregate and in foreign currencies, is evidence that

banking clients' demands for intraday payment services, as well as the demand for timed payments in foreign currencies, continues to increase. This growing demand for intraday payments will need to be funded by commercial banks.

### 3.8. CLS Bank

CLS Bank illustrates the influence of new market initiatives on global payment liquidity. Today's practice of making gross payments throughout the day to settle FX transactions is being replaced under the CLS environment by timed net payments. While liquidity flows for settling FX transactions will be significantly reduced by the netting effects within the CLS system, the payment requirements will significantly change both the timing and shape of payment flows among both member and non-member institutions. The key liquidity issue the market faces is the requirement to make large timed payments, in non-domestic currencies, during a small time window and in some cases outside normal domestic banking hours.

The CLS Bank pay-in period is taking place from 1:00 a.m. to 6:00 a.m. Eastern Standard Time (7:00 a.m. to 12:00 p.m. Central European Time). During this period, participants are responsible for sending payments to CLS Bank to cover their net short positions in hourly installments, in accordance with their pay-in schedules. The execution of timed pay-ins, in multiple currencies, will be the greatest hurdle for clearing and nostro banks. Moreover, pay-ins (and pay-outs) in four of the seven currencies (YEN, AUD, USD, CAD) will take place outside the normal operating hours of these local currencies. This concentration of timed payments in several different currencies, in the same time window, creates the biggest challenge to liquidity management and collateral management.

The main concerns, which have been analyzed by both the banking community and central bank community, include the availability of liquidity, the recycling of available liquidity, the liquidity needs of settlement banks that will be serving multiple roles in CLS, and the need for robust contingency plans in the event of abnormal settlements.

***Availability of liquidity.*** While most banks should have ample supply of liquidity in their "home" currency through the intraday liquidity provisions of their home central bank, many CLS banks will have limited, or no availability, of intraday liquidity from their "away" central banks. Participants will need to make arrangements with other banks to provide the needed liquidity for their CLS pay-ins in away currencies. Further, broker-dealer members typically do not have direct access to intraday credit at central banks.<sup>14</sup> Those that are CLS settlement members will need to make arrangements with their nostro banks to make CLS pay-ins. This may result in broker-dealers increasing their existing intraday lines with banks to make their CLS pay-ins. In turn, these commercial banks will need to have sufficient liquidity to support the CLS Bank pay-in obligations of the broker dealers. This liquidity provision must be accommodated within the intraday limits established for the broker-dealer customers, raising the issue of credit risk.

***Recycling of available liquidity.*** In today's environment, FX transactions are largely cleared through large-value multilateral net settlement systems e.g., CHIPS. Therefore the liquidity needed to settle these transactions is only required at the close of the business day. Or

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<sup>14</sup> Broker-dealer members of CLS Bank include Morgan Stanley Dean Witter, Goldman Sachs, Merrill Lynch and Bear Sterns.

FX transactions may be settled directly over RTGS systems where the needed liquidity is provided by central banks throughout the day through their intraday credit facilities. In the CLS Bank environment, however, this liquidity that was previously available to support payment activity throughout the normal payment day will reside with CLS Bank settlement members with long positions during the five-hour settlement period. Simulations run by CLS Bank modeling the potential liquidity positions have indicated that overall long positions in the currencies may amount to tens of billions of dollars and the peak long currency positions of individual banks may reach tens of billions of dollars. The issue the market will be confronted with is how the available liquidity can be recycled among the participants with long positions to those with short positions.<sup>15</sup>

***Multiple roles of settlement members.*** As a result of CLS Bank, large banks serving as settlement members will assume multiple roles in the CLS environment: settlement member, timed payment provider to other settlement members, liquidity provider to CLS, and provider of CLS correspondent services to third parties (“CLS third party services”).

Although both CLS Bank settlement and user members may provide CLS clearing services, only settlement members will be responsible for settlement of all positions generated by CLS Bank clearing. The net settlement positions in CLS Bank of settlement members could therefore arise from their own trades, those of their own third party service customers, those of their user member customers for settlement services, as well as their user member customers’ third party services positions. This will have significant implications for intraday liquidity management.

The development of a market for CLS third party services is also expected to introduce distinctive liquidity demands that the service providers will need to manage.<sup>16</sup> It is believed that a limited number of institutions will possess the requisite financial strength, access to liquidity, and technology platform needed to offer third party services. Although many banks are skilled at managing the current intraday liquidity needs for their own institutions and their customers, the clearing and settlement responsibilities of third party service providers will introduce further complexities to the liquidity management needs in what is expected to be an already complex multicurrency environment under CLS. Additionally, the investment required for developing the infrastructure and technology to offer third party services will be substantial. It is apparent that the CLS settlement banks will be the likely providers of CLS third-party services.

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<sup>15</sup> CLS Bank has developed a solution to address CLS liquidity issues, in particular mechanisms to recycle liquidity. This solution is the creation of US Dollar/FX Liquidity Swaps (“Inside/Outside” (I/O) Swap). CLS Bank provides an automated facility to effect matched inside/outside liquidity swaps for all CLS members. Settlement members provide standing instructions to CLS Bank, including credit availability and potential swap counterparties, and CLS Bank can employ these liquidity swaps to meet liquidity needs during settlement. The Task Force believes that the I/O Swap is something that can work on day one, but that an additional solution is needed which does not result in a reintroduction of credit and settlement risk and that can meet the other liquidity issues presented by CLS other than the recycling of available liquidity.

<sup>16</sup> Third party services in the context of CLS are defined by a number of attributes; the essential one is that the third party will have no direct relationship with, and will in fact be unknown to, CLS Bank. Either a settlement or user member that has agreed to provide services to the third-party client may submit transactions for processing to CLS Bank.

The expected concentration of a large volume of third party services to be offered by a few settlement members may in turn lead to a concentration of liquidity pressures among a relatively small number of market players. Nonetheless, the aggregation of a number of customer positions may result in smaller net pay-ins to CLS Bank, as one customer's long position in a currency offsets the short position of another customer. This netting effect, combined with maximum short position limits for each customer and selectivity in providing service only to credit-worthy institutions, will serve to mitigate the incremental liquidity risk associated with third party services.

***Abnormal settlement.*** The implementation of CLS Bank will effectively link the performance of settlement members with that of nostro agents, central bank RTGS systems, and CLS Bank. It is through these linkages that events such as operational, systems or financial disruptions experienced by any of the parties, double processing days, and unscheduled holidays in one or more of the eligible currencies, may give rise to abnormal settlements and liquidity disruptions in the local markets.

Systems or operating problems experienced by a settlement member in any market may impact settlement and/or liquidity in all other markets. The currency location, in particular the local time zone and respective central bank operating hours, as well as the pay-in schedule of the settlement member experiencing the problems are critical factors which will determine the time available to address the problems.

A settlement member experiencing systems or operating problems would unlikely be able to fulfill some of its obligations to CLS Bank. These include issuing payment instructions to the central bank or to correspondents to meet its pay-in requirements, confirming receipt of funding from user members or third parties, and distributing currencies due to user members and third parties upon request. Implications of systems and operating problems on intraday liquidity management vary by time of day. Specifically, the timing of the problem will affect the member's ability to meet at least its first two pay-in requirements, the ability to pay in prior to the close of central banks in other time zones, and the ability to receive and distribute currency associated with user member and third party settlements. All this will have potentially significant effects on CLS Bank and local market settlements.

If a CLS settlement member is experiencing financial difficulties, either liquidity or credit related, and is unable to meet its settlement obligations, there could be major liquidity impacts to the other CLS members affecting multiple currencies. If a settlement member is unable to meet its settlement obligations, CLS Bank will refuse to settle any of the pending FX transactions of the defaulting member, canceling all these outstanding transactions. CLS Bank will next issue a revised set of settlement obligations to the remaining members which will produce unexpected and potentially large funding obligations to the other members in multiple currencies.<sup>17</sup>

If multiple settlement members were affected by the failure of a major nostro provider, a local market infrastructure outage or other *force majeure* event, the difficulties would be compounded. Another issue of concern would be the case where a settlement member or a user member directly submitting trades is unable to submit trades by the deadline for matching at

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<sup>17</sup> Such revised settlement obligations would consist of unconditional funding obligations (Pay-in Calls for "Settlement") and condition obligations (Pay-In Calls for "Currency Closes").

CLS Bank. Unmatched trades would not be eligible for settlement through CLS Bank, thus requiring gross settlement, which will require significant, unplanned demands for liquidity.

### **3.9. Increased Interdependencies Between Markets and Market Infrastructure**

Over the past decade, global financial markets have been rapidly transformed by the continuing integration of capital and currency markets, and the development of many new direct linkages in financial market infrastructure, both domestically and internationally. These developments have increased the potential for any isolated or systemic factor that might affect one system or market to be immediately translated to another. This can have immediate and significant impacts on “normal activity” in other currencies and intraday liquidity in multiple markets. This is expected to make it more difficult for commercial banks to respond to liquidity shortages. It will also likely make it more difficult for central banks to proactively remediate intraday liquidity problems as the source of these problems is more diverse and can now be from foreign sources.

***Integration of capital and currency markets.*** While the U.S. dollar, euro, sterling or yen capital markets have not been traditionally linked by means of specific systems or mechanisms, either public or private sector, there is growth in use of these markets as close substitutes for one another. Trading liquidity in foreign exchange, money market and equities instruments is such that market operators can quickly and efficiently trade from one market to another. Liquidity linkages between foreign markets are expected to continue growing in the future as capital markets further develop (particularly euro capital markets) and the financial activities of international corporations, financial institutions and governments become increasingly reliant upon the use of multiple currencies.

While euro liquidity positions have not yet yielded material impacts on other currency positions, they do directly contribute to an environment that, given the increasing linkages between the euro and other financial markets, fosters such possibilities. Particularly as euro zone capital and derivatives markets expand, a financial institution’s ability to monitor and control liquidity flows in these markets will become paramount. As the euro increasingly becomes a reserve currency, greater volatility across the euro zone, in turn, may spread to the U.S. dollar and other markets through cross-funding activities. Institutions that fail to monitor, forecast and control liquidity positions in a systemic fashion could find payment flows gridlocked.

***Linkages in financial market infrastructure.*** The financial markets have developed such that banks rely largely on their central bank (RTGS) liquidity not only for individual large-value funds transfers but to book the settlement of most other settlement systems. In the domestic context, there can be many interrelationships. RTGS balances will be used to settle interbank net settlement systems, the cash leg of securities settlement systems, the clearing of exchange-traded derivatives, and ACH overnight batch net systems. In addition, RTGS balances are used to settle the daily (multiple) collateral/margin requirements of derivatives exchanges and securities clearinghouses. In many of the G-10 markets there are multiple securities systems, derivative systems, and payment systems so the number of timed settlements can be large.

In addition, it is only in the last few years that there has been the rise of many direct linkages between financial infrastructures across national boundaries. The global financial market is now experiencing an accelerated pace of developments such as the institution of

transnational equities exchanges (e.g., NASDAQ/NASDAQ Europe), stock exchange alliances/mergers across borders, cross-margining arrangements between futures and options exchanges across different countries and in different currencies, the sharing of trade matching and clearing services by securities clearinghouses in different countries and the institution of dozens of new (often Web-based) global trading platforms for securities, derivative and foreign exchange trading. Many securities exchanges are now allowing for remote trading i.e., direct access to the exchange by firms operating in foreign markets. Further, the international central securities depositories (ICSDs) e.g., Euroclear, Clearstream - which have traditionally provided the only direct infrastructure linkages across foreign markets through their dozen of links to local centrals securities depositories to allow for cross-border securities settlements - are now beginning to perform domestic securities settlement services by becoming the de facto central securities depository in certain markets.

At the international level, RTGS balances are used to settle the multiple daily processing (and settlement) cycles of the international securities clearing depositories (e.g. Euroclear, Clearstream) and cross-border linkages that exist between certain RTGS systems connected by the TARGET system. The implementation of CLS Bank will effectively link the central bank RTGS systems and CLS Bank. Large commercial banks must have the necessary funds available on their accounts, at specific times, to be sure to cover their obligations at the dozens, if not hundreds, of settlement systems which are booked through the RTGS at a specific time. Furthermore, commercial banks are expecting payments from these net systems to cover their net debit position in another settlement system that will be presented for payment later in the day.

On the one hand, linkages between RTGS systems and other systems have improved the intraday distribution of liquidity across settlement systems because RTGS can allow banks to use final funds during the day for the purpose of settlement in other systems and more intraday payment flows between participants can therefore occur. On the other hand, as RTGS systems are involved in the settlement processes of other payment and settlement systems, "exogenous" settlement pressures can be generated by the linked system on the settlement process. Any delay in the payment by one settlement system will have an instant effect on the following payments for several other commercial banks. This is particularly true for payment of cash and securities settlement systems, where the amounts to be paid and received are often in the billions of dollars.<sup>18</sup> This means that banks are expecting funds from one external system to settle another one, and that somewhere in the daily process, one or several banks have to put liquidity in the global payment system to avoid any major gridlock.

The impact on bank liquidity depends largely on the size and timing of the exogenous settlement pressures. As volumes have grown, and more system linkages have developed where the interrelationship occurs only at designated times, the impact on bank liquidity can be significant and widespread. As such, banks typically " earmark" the necessary intraday funds in their central bank account for the settlement of the transactions in the linked systems (in principle on a continuous basis during the day). This has increased the demand for intraday central bank credit. It also gives rise to "competing" uses of balances at the central bank. Since

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<sup>18</sup> The globalization of the securities markets has introduced the capacity to arbitrage securities of different countries. As the settlement of the central securities depositories are done several times during the day, the chaining of these payments in different systems is quite important as the liquidity and the availability of securities in one system is urgently needed to settle the transactions in another central securities depository. On the cash side, these timed payments may total several billion dollars for a given bank.

the payments stemming from the linked settlement systems are time-critical, this can have the effect of increasing the number/value or duration of delayed payments.

Commercial banks have introduced a “code of conduct” for some currencies in order to smooth these cash flows. For example, to reimburse the overnight deals and to settle FX deals in the morning, some banks operating in foreign markets tend to hold their payments until they receive the necessary funds as they have little recourse to intraday liquidity. This “leapfrog” mechanism is increasing until the end of the day when the largest systems settle. This creates intraday liquidity imbalances.

Given these increasing market infrastructure linkages, technical failures in one system can very quickly affect many other systems globally, by transmitting liquidity deficiencies. The overall impact will depend upon the size of the system that has an operational failure, the duration of the technical problem and the time of day when the outage occurs. It is also more likely that isolated liquidity, credit or systemic events that might affect one market can be quickly translated to another. The shift of activity from one market to another can have significant impact on “normal activity” in other currencies.

### **3.10. Market Stress Scenarios: September 11, 2001**

The events of September 11, 2001 demonstrated how the integration of capital and currency markets, and the linkages that are developing across borders, can result in great dislocations in global payment liquidity due to an operational outage in one market. It also demonstrated how demands for cross-border intraday liquidity can be immense in such events.

***The event.*** The terrorist attacks on the World Trade Center in New York on September 11, 2001 caused immense problems with telecommunications and connections among U.S. financial market participants and connectivity to the U.S. payment systems. This hindered many institutions’ ability to initiate or act upon payment instructions, creating market-wide liquidity dislocations in the United States. The U.S. stock exchanges and electronic communication networks (“ECNs”) were closed for four days. Derivative exchanges in New York were closed for two days. Various U.S. dollar clearing banks experienced operational outages that lasted multiple days. Wall Street’s telecommunications network was severely disrupted such that banks and dealers could not communicate. The U.S. dollar repo market and U.S. commercial paper market were significantly disrupted. The event immediately caused major price volatility in overseas financial markets, and U.S. markets when they reopened.

***The response.*** The Federal Reserve took a number of steps to address the liquidity problems of September 11. On September 11, the Federal Reserve released a statement indicating that the Federal Reserve was open and operating and that the discount window was available to meet liquidity needs. From Tuesday, September 11, through Friday, September 14, the Federal Reserve waived daylight overdraft fees and overnight overdraft penalties. To inject funds into the financial system, the Federal Reserve primarily used short-term open market operations and the discount window. Overnight overdrafts increased from an average of \$9 million in August 2001 to more than \$4 billion on September 12. Discount window loans rose from around \$200 million to about \$45 billion on September 12. Later, when markets began to function better, Federal Reserve open market operations increased from \$25 billion to nearly \$100 billion. Federal Reserve staff also contacted banks often during September 11-13,

encouraging them to make payments and to consider use of the discount window to cover unexpected liquidity shortfalls. The Federal Reserve also lowered the fed funds rate by 50 basis points.<sup>19</sup>

The operator of key settlement systems also took steps to alleviate liquidity pressures. The Federal Reserve extended the Fedwire money transfer system and U.S. government securities settlement system operating hours to mitigate the impact of failed trades. The Bond Market Association provided for the extension of the settlement of government bond trading from T+1 to T+3. Other securities system operators e.g., DTCC, Euroclear, extended settlement deadlines to accommodate settlement instructions from the U.S.

To further facilitate the functioning of financial markets and provide liquidity in dollars to foreign institutions, the Federal Reserve entered into swap arrangements with the European Central Bank, the Bank of Canada and the Bank of England. The Federal Reserve and the ECB swap arrangement allowed the ECB to draw upon up to \$50 billion in exchange for an equivalent amount of euro deposits. The Bank of Canada was able to draw upon up to \$10 billion in exchange for Canadian dollars. The terms of the facility with the Bank of England allowed it to draw up to \$30 billion in exchange for sterling. Other central banks indicated their willingness to provide local currency to major constituent banks.

**Liquidity issues.** Although the Federal Reserve provided billions of dollars to depository institutions to alleviate liquidity concerns, connectivity problems, the closure of key markets, and general uncertainty about the clearing capability of U.S. clearing banks made it difficult for institutions to exchange payments and lend or borrow funds in the U.S. There was the further unprecedented drain on US dollar liquidity resulting from the effective closure of the US dollar repo market – and virtually every broker/dealer’s liquidity planning model assumed that the repo market would always represent a stable source of USD liquidity. The settlement problems that arose in the U.S. commercial paper market also required issuers to refinance maturities with drawings under bank lines. As a result, U.S. dollar payments could not flow effectively, and many commercial banks incurred larger-than-usual daylight overdrafts at the Federal Reserve. Between September 11 and September 21, peak daylight overdrafts at the Federal Reserve were approximately 36 percent higher than levels in August 2001. Daylight overdrafts peaked at \$150 billion on September 14, their highest level ever and more than 60% higher than usual. This was despite Federal Reserve opening balances of slightly more than \$120 billion on that day, when such balances typically range between \$30 billion and \$45 billion.<sup>20</sup>

While many U.S. banks faced US dollar liquidity problems, this problem was particularly acute for non-U.S. banks, which were unable to determine either their US dollar cash balances or available collateral due to operational difficulties at some of the U.S. commercial banks. Further, while non-U. S banks were able to post collateral with their domestic central banks in return for additional funding, they were unable to deal directly with the Federal Reserve’s discount window or access additional intraday liquidity facilities for incremental U.S dollar funding. As a result, in the days following September 11, non-U.S. banks had significant

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<sup>19</sup> Much of the information and statistics in this paragraph were obtained from Federal Reserve Bulletin (February 2002), *The Evolution of the Federal Reserve’s Intraday Credit Policies* (Stacy Coleman).

<sup>20</sup> Federal Reserve Bulletin (February 2002), *The Evolution of the Federal Reserve’s Intraday Credit Policies* (Stacy Coleman).

amounts of local currency funding – both on a secured and unsecured basis – but were unable to convert the local currency funding into USD liquidity.

Rates in offshore markets rose dramatically as banks tried to find liquidity to cover obligations, adding further to the stress. European and Asian Banks turned to major U.S. money center banks which were operating in a near normal manner to provide contingency payment execution services as well as straightforward cash advances. However, as the European and Asian banks were unable to divert their incoming traffic from the affected U.S. banks, further liquidity and credit demands were placed on the unaffected U.S. banks. These banks quickly ran up significant short positions with the Federal Reserve, which then provided additional liquidity to them and worked to ensure recycling of liquidity from the banks with operational difficulties.

The liquidity problem was exacerbated by the disfunctioning of the currency swaps market. Many institutions make use of currency swaps as a normal (and sizable) part of their funding and liquidity management needs. However, because the liquidity facilities offered by central banks did not make accommodations for providing funds in other than their base currency, this disconnect meant that the global market had to rely virtually entirely on the U.S. Fed to satisfy the liquidity needs for both straight USD funding and all cross-currency funding which had a leg denominated in USD. Non-U.S. banks were most significantly affected due to a lack of a functioning currency swap market.

In the ensuing days, dealing in global money market products became very difficult. In Asian and European currencies, in principal there were no perceived issues. However, in these times of uncertainty, parties holding a long position tried to keep these positions for as long as possible and parties holding a short position were trying to cover their positions as quickly as possible. This resulted in sharply higher prices in global money markets and made it more difficult to create liquidity to support payment flows. For dealing in the U.S. market there were more complicating factors. Due to the difference in time zones, Asian and European banks tried to finalize their funding much earlier than the domestic U.S. market to meet the cut-off times for making payments via their correspondents. This resulted in very high funding prices and settlement risks for Asian and European banks, where U.S. banks had the possibility to fund themselves through the Federal Reserve's daylight credit program and at the end of their clearing day at lower money market price levels.

***Future adjustments.*** The banks represented on the Task Force believe that the central banks addressed the liquidity issues as effectively as possible given existing policy tools. The response by the Federal Reserve and other central banks clearly served to alleviate some of the liquidity shortages in the global markets, possibly averted large credit defaults, and possibly a systemic meltdown. (There were sizable losses due to the events of September 11, however these were largely associated with meeting insurance claims and the loss of trading revenue due to the closing of U.S. financial markets.)

However, important issues did surface with respect to market uncertainty of what the central bank response was going to be, the timing of the response and how information was disseminated. For example, even though there were no Euro liquidity issues, the ECB offered a quick tender to the market to bring the short-term prices (which had been rising dramatically) down to normal levels. However, Far East and U.S. banks had already closed their overnight positions. With respect to US dollar liquidity, by the time the market was aware of the kind of support the Federal Reserve was giving to the market, Far East European Banks had already

closed their short dated positions. This widely resulted in payments for all major currencies to be executed later in the day than normal as financial institutions looked to keep their liquidity and avoid credit risk as much as possible. This created payment gridlock situations in many markets.

On September 12, the ECB organized a conference call with the Money Markets Contact Group to solicit views on the market and their needed help. The currency swap arrangement between the ECB and the Federal Reserve to create better access to US dollar liquidity was arranged in 24 hours and was a tremendous support to the market. However, the liquidity benefits of this facility were only realized two days after the event. A particular drawback to the facility, which was only recognized afterwards, was that banks lost payment capacity twice. Banks only received dollars after euros were paid, and banks only received euros after dollars were returned.

The Task Force believes that there may be a more effective policy tool for central banks to unilaterally, or collaboratively, address such severe temporal disruptions in liquidity in the future, when there is concern these could escalate into credit and ultimately systemic risks. If central banks have in place the mechanism to accept foreign denominated collateral in exchange for intraday credit, this could be a highly effective and sound way to provide large levels of intraday liquidity to foreign banks without leading to many of the issues related to market uncertainty, timing of the response, and how critical information is disseminated. A concern is that future, potentially systemic crisis could occur in any major market, and could have severe liquidity impacts in multiple regions of the world in different time zones. This will require the existence of a well-understood and efficient mechanism for central banks to collaborate in providing real-time access to cross-border liquidity.

### **3.11. Increased Role of Foreign Banks in Domestic Markets**

Two trends that began in the early-mid 1990s, but that have accelerated over the last few years, are that (1) foreign banks have become more involved in the local clearing of currency (payments) and (2) large global banks, in particular, are playing a much more significant role in the local clearing of payments.

Foreign banks have become more involved in the local clearing of payments as a result of the overall increase in cross-border transactions. Traditionally, the settlement of payments in foreign currencies had been done through local (domestic) banks, the correspondent banks, which routed them through local payment systems. All these transactions are entered through the books of the correspondent bank, leaving the nostro agent (domestic bank) to manage the local currency intraday liquidity needs of the foreign clients. With the increased globalization of markets, over the past decade many banks have established local branches in foreign countries to directly facilitate the cross-border payment activities of their national clients. This has increased the cross-border intraday liquidity needs of many banks.

While many foreign banks have become more involved in the local clearing of payments in foreign markets, it is the largest, most global banks that have most significantly increased their payment activity in foreign markets. This is partially a function of the increase in bank mergers and a general consolidation (rationalization) of financial institutions in many markets. More

importantly, however, it is due to a restructuring of business lines by existing providers to meet client demand for more efficient global payment and liquidity services.

With the rapid globalization of financial markets, many corporate clients began requiring truly global transaction and cash management services. These services include integrated global cash management, FX, securities and trade services; global payment solutions with such services as controlled disbursement and funds transfer and multicurrency payment solutions; global treasury management including inter-company (and intra-company) netting centers, cross-border multi-currency pooling and cross-border sweeping; and global (often Web-based) information management services for reporting on reconciliation, cash management and transactions. A limited number of commercial banks have come to possess the requisite financial strength, access to liquidity, and technology platform needed to offer these truly global payment and cash management services demand by clients. Although many banks are skilled at managing the current domestic and/or regional payments and liquidity needs of their customers, the investment required for developing and maintaining the infrastructure and technology to offer global payment and liquidity services have proven substantial.<sup>21</sup>

Likewise in the securities transaction realm, traditionally non-residents have normally settled their cross-border securities trades through a local agent (a domestic custodian that is a direct participant in the local securities settlement system). Increasingly, however, many institutional investors and internationally active securities dealers now utilize the services of global custodian banks to settle cross-border. Global custodians provide their customers with access to settlement and custody services in multiple markets through a single gateway by integrating services performed by a network of sub-custodians, including the global custodian's own local branches. Market participants place special emphasis on a global custodian's ability to provide lower transaction costs and to provide a variety of global reporting, information, accounting and credit services, settle back-to-back trades, that is, to receive and redeliver the same securities on the same day and to provide various financing.

As a result, a relatively few number of commercial banks have become much more active in settling clearing payments in foreign markets, and are responsible for clearing an increasing number of payments in foreign markets. This has resulted in cross-border intraday liquidity demands of these global banks rising much more significantly than other banks. It has also led to a concentration of liquidity pressures among a relatively small number of market players. It is also expected to lead to larger value payments, requiring stricter deadlines, to be channeled through local payment systems. Moreover, the trend appears to be accelerating, owing to the opportunities for acquisitions and mergers and institutional responses to cross-border opportunities and the need for global economies of scale in the payment and cash management business. Accelerated rationalizing of payment processing banks is expected over the next decade.

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<sup>21</sup> Trends related to the consolidation of financial institutions and the rededication of resources to core competencies have been observed in the market place and referenced by multiple studies. Evidence of this trend is that the number of banks that participated in the BIS Global FX Turnover Survey declined by 20% from 2,415 in 1995 to 1,945 in 2001.

### 3.12. Summary

It is the view of the Task Force that these many developments and trends, which have occurred concurrently, have created conditions whereby:

- Commercial banks, and in particular global commercial banks that are direct clearers in many markets, face a substantially increasing demand for intraday liquidity in foreign markets to facilitate payment activity.
- Commercial banks face an increasing need to make “timed” large-value payments in both domestic and foreign markets.
- The continuing integration of capital and currency markets, and the establishment of an increasing number of financial market linkages, domestically and internationally, have increased the potential for any isolated or systemic factor that might affect one system or market to be immediately translated to another. This is likely to make it more difficult for commercial banks to respond to liquidity shortages and will likely make it more difficult for central banks to proactively remediate intraday liquidity problems as the source of these problems is more diverse and may be cross-border in nature. This was demonstrated by the events of September 11, 2001.

In addition, it is the view the Task Force that these market trends and developments will continue, and will continue to accelerate the demands for intraday liquidity in foreign markets over time.

## 4. CONSTRAINTS TO SOURCING CROSS-BORDER INTRADAY LIQUIDTY

In the previous section, an analysis was provided of the many factors contributing to the increasing demands for intraday liquidity in foreign markets (currencies) by banks to facilitate global settlement activity. In this section of the report, an analysis is given of the inherent constraints banks face in sourcing needed cross-border intraday liquidity.

### 4.1. Reliance on Central Bank Intraday Liquidity

With the advent of RTGS systems, financial institutions have become critically reliant on central bank intraday liquidity as the primary source of funding for their global payment activity. Central banks responded to the inherent liquidity constraints of an RTGS environment by establishing intraday liquidity facilities. This intraday liquidity – which is either in the form of liquidity provision mechanisms such as central bank intraday repos or the allowance of daylight overdrafts in central bank accounts (U.S. only) – allows participating banks to send payments with finality for amounts greater than their reserve balance at the time of the payment request.<sup>22</sup> With the rapid growth in financial market activity, and the widespread adoption of RTGS systems as the primary mechanism for effecting wholesale funds transfers, central bank intraday liquidity has become the primary source of banks’ intraday funding and the primary vehicle for funding intraday liquidity “gaps.”

Banks have other sources of intraday liquidity, however, each of these is subject to various constraints that limit their use. Balances maintained at a central bank are a basic source of liquidity for the purpose of making funds transfers during the day. However, due to the opportunity costs of maintaining balances on account with central banks, which are typically interest-free deposits, such balances are kept at a minimum and are as such not a significant source of intraday liquidity. In addition, banks often use their account balances at central banks as payment liquidity early in the day as payment obligations build.

Incoming payments are the most important source of a bank’s intraday liquidity. However the use of incoming transfers depends upon the patterns and predictability of payment inflows and outflows. Global banks employ sophisticated liquidity management techniques and capabilities which attempt to predict and control these patterns and attempt to minimize intraday liquidity needs. Such techniques include sequencing transfers, that is, controlling intraday payment flows by scheduling the timing of outgoing transfers (through internal queues) according to the supply of liquidity provided by incoming transfers. This generates virtual “offsetting effects” on RTGS payments and contributes to substantially reducing the necessary liquidity. Another technique for sequencing payments involves banks using message codes indicating the time of day that an individual outgoing transfer should be settled. Such time-of-day message codes are used to store transfer orders within banks’ internal systems. Time-of-day message codes allow banks to better forecast liquidity requirements by increasing certainty of the timing of debits and credits associated with transfer orders.

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<sup>22</sup> Because of their interest in the efficient working of financial markets, central banks have a general concern in encouraging developments that can increase efficiency while maintaining and enhancing the integrity of the interbank settlement process. Recognizing the liquidity constraints in a RTGS environment – which has two basic characteristics, namely that it is a continuous constraint for settling funds transfers and that intraday liquidity requirements must be funded by central bank money – the G-10 central banks, as the primary operators of RTGS systems, sought to address the inherent liquidity constraints through the provision of central bank intraday credit.

However, even banks with the most sophisticated liquidity management capabilities still face limitations in minimizing intraday liquidity requirements. First, many wholesale transfers are time-critical and there are limits to the extent to which banks can delay them. Second, individual payment orders are often very large. Breaking down particularly large payment orders into two or smaller amounts can facilitate outgoing payments in some cases. However, this cannot be done in all cases and the resulting transfers can still be quite large. Third, banks do not have complete information about the payments they are due to receive and send on a given day, so they have to sequence payments more or less on the basis of predications.

Banks can also fund intraday payment flows by borrowing through interbank (overnight) money markets. Borrowings in the form of overnight and term loans allow banks to fund intraday payment flows. However, while banks lend and borrow overnight to fund their end-of-day position at central banks, in practice banks very rarely rely on interbank money markets to fund intraday payment activity. Rather, banks will largely rely on the intraday liquidity provisions of central banks that are less costly, do not increase interbank credit exposures and, for banks operating in their domestic market (currency), is generally largely available.<sup>23</sup> Banks may look to interbank money markets as funding for intraday payment flows in times of market stress, however this reintroduces credit risk to the markets.<sup>24</sup>

#### **4.2. Constraints to Accessing Intraday Liquidity at Foreign Central Banks**

For banks operating in their domestic market (currency), there is generally well-established access to central bank intraday liquidity due to the liquidity provision requirements of central banks. Uniformly across the G-10 markets, other than the United States, central banks grant unlimited amounts of intraday liquidity to participants as long as such credit is fully collateralized. The collateral eligibility requirements of these central banks are uniform in that they largely accept a variety of local currency assets as collateral for intraday liquidity (typically marketable securities but also certain less-liquid assets) in which domestic banks maintain considerable holdings on their balance sheets. There are two notable exceptions. First, the Bank of England, which in 1999 began accepting Tier 1 euro-denominated assets as collateral to support the CHAPS Sterling RTGS system in the U.K. Second, the Swiss National Bank, which accepts some euro denominated collateral, namely German Jumbo Pfandbrief GC and German GC, to support the Swiss Interbank Clearing System (SIC). Also, in 2003, the Sveriges Riksbank (central bank of Sweden) will join with the central banks of Denmark and Norway to establish a facility that will allow banks to use central bank cash deposits in one currency as collateral for raising liquidity in another Scandinavian country.<sup>25</sup>

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<sup>23</sup> For various reasons that are examined in Section 3, intraday money markets, which could act as a private-sector liquidity source in an RTGS environment, have not developed to date.

<sup>24</sup> Banks that do not self-clear payments in foreign markets, i.e., “indirect clearers,” largely rely on the “daylight” clearing lines provided by the foreign correspondent banks (nostro agents) as intraday liquidity for their payment activity. The clearing lines provided by correspondent banks in many instances account for 100% of the intraday liquidity needs of indirect clearers. However, there are limitations to clearing lines provided by correspondent banks as such lines will be capped, based on a credit decision of the correspondent bank, and these lines are uncommitted. They are contingent in that they can be lowered or revoked unilaterally by the correspondent bank at any time.

<sup>25</sup> Through the correspondent central banking model (CCBM) in the Euro system, participants in Target in the European Union (EU) can use collateral held in other countries within the EU to obtain intraday liquidity from the central bank of the country in which they are based. Eligible collateral, however, is limited to euro-denominated assets. The European Central Bank has made special arrangements with the central banks of the “out” countries

In the United States, the Federal Reserve grants intraday credit to banks in the form of daylight overdrafts. Federal Reserve intraday credit generally does not need to be collateralized; rather it is priced. There are limits to a bank's access to Federal Reserve intraday credit, in the form of a net debit cap, which are based on the institution's total risk-based capital. For U.S. banks, access to Federal Reserve intraday credit is generally viewed as considerable as the amounts are based on multiple of a U.S. bank's risk-based capital ranging from 0 to 2.25.<sup>26</sup> In addition, as of December 2001, certain depository institutions with self-assessed net debit caps may pledge collateral to their administrative Federal Reserve Banks to secure daylight credit overdraft capacity in excess of their net debit caps, subject to Reserve Bank approval.

For banks operating in foreign markets, however, access to central bank intraday liquidity is inherently constrained. For the G-10 markets, excluding the United States, this is largely due to the collateral eligibility requirements, which generally restrict eligible collateral to domestic assets. Banks uniformly do not maintain large amounts of foreign denominated assets on their balance sheets, therefore banks operating in foreign markets have less of an ability to source liquidity when needed in foreign markets. For example, Euro zone banks can pledge Tier II euro assets as collateral in TARGET to access euro intraday liquidity at any of the European central banks. However U.S. and Far East banks have less ability to source such assets.

For the U.S. market, some foreign (i.e., non-U.S.) banking organizations had recently indicated that their Federal Reserve net debit caps constrain their business activity and place them at a competitive disadvantage to U.S. depository institutions. The view has been that this is because the Federal Reserve does not recognize the foreign banking organization's worldwide financial strength in determining the institution's U.S. capital equivalency measure as a base for its net debit cap. In addition the Federal Reserve has granted intraday credit to foreign banks based on a lower multiple of risk-based capital than domestic banks.

To address the liquidity concerns identified by foreign banks, in December 2001 the Federal Reserve revised its intraday credit policies by raising the percentage of capital used in calculating U.S. capital equivalency measure for foreign (i.e., non-U.S.) banks. Also, as part of its revised policy, the Federal Reserve began accepting non-U.S. Sovereign Debt and Brady Bonds with a rating from AAA to BBB-/Aaa to Baa3 that are held at Euroclear or Clearstream to additional daylight overdraft capacity. The Federal Reserve has thus become to first G-10 central bank to accept a wide range of foreign denominated collateral in exchange for central bank intraday credit.

To date, it has been incumbent on commercial banks to source a sufficient quantity of liquidity in each center where they are a direct participant in RTGS systems, leading to the creation of many "pots" of liquidity across the globe that have to be able to meet the peak demand of each underlying system at any given time on any day. While there are ways to

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(e.g., U.K, Sweden, Denmark) to allow them to raise euro liquidity through the CCBM that may be distributed to local banks by the central banks. For example, the Bank of England is allowed on behalf of U.K. clearing banks to raise intraday up to euro 3 billion in liquidity through the CCBM to support the Chaps Euro RTGS system.

<sup>26</sup> These multiples are applied to an institution's capital measure to determine its single-day daylight credit capacity. The multiples differ somewhat for an institution's two-week average daylight capacity. The Federal Reserve Board indicated in a recent policy announcement that during 2000, less than 5 percent of domestically chartered institutions used more than 50 percent of their net debit caps for their average daily peak overdrafts.

bridge liquidity for overnight funding purposes e.g., currency swaps, in today's markets, where banks are managing their intraday liquidity positions on a global basis, there has largely been no effective "bridge" for intraday liquidity across currencies.<sup>27</sup>

### **4.3. Increased Demands for Collateral in Financial Transactions**

An increasing challenge to commercial banks' capacity to source intraday liquidity in foreign markets is the increasing demand on commercial banks' collateral holdings, particularly liquid, low-risk collateral. Collateral had traditionally been used for purposes such as securing certain overnight and term loans between a bank and a non-bank borrower. However in recent years the use of collateral in wholesale financial markets has been growing rapidly. This is evidenced by rapidly growing repurchase markets, the growing use of collateralized securities lending facilities, the introduction of collateral in many OTC derivatives markets and the increasing use of collateral for a range of payment, clearing and settlement systems.

There are various reasons why these collateral-using activities have expanded rapidly. One is the general expansion of trading, which has increased transaction volumes and risk exposures, and therefore the need for risk mitigating techniques in cash and derivatives markets. Another is the expansion of financial activity globally to include a broader range of participants, thereby introducing new types of counterparties and new or additional credit risks which collateral can manage. In over-the-counter (OTC) derivatives markets, collateralization of exposures with cash and government securities has grown significantly. One factor behind this growth is the range of transactions where collateral is used; that range has broadened beyond "traditional" credit enhancement to a general means of managing counterparty risk.

A further reason is the widespread adoption of techniques to manage and reduce payment and settlement risk. These techniques have increased the use of collateral in payment and settlement significantly. Collateral has been introduced to most net settlement systems in the G-10. Exposures in exchange-traded derivative transactions are typically fully collateralized within short timeframes by margin payments required by clearing houses. Collateral usage in securities settlement systems is becoming universal, particularly in central counterparty clearing houses. Another reason for the increase in collateral-using activities is the greater sensitivity to risks following a series of market disturbances in the 1990s, especially the financial crisis in 1998. This has given further impetus to the use of collateral as a risk mitigation technique.<sup>28</sup>

Banks are therefore facing increasing demands on their existing collateral holdings. These demands are impacting more on banks operating in non-domestic markets where their local currency asset holdings are low relative to in their domestic (currency) assets. While in principle a very broad range of assets may serve as collateral, liquid assets without credit risk or with at most low credit risk are uniformly the preferred collateral in the wholesale financial markets. For example, the range of securities accepted as collateral in derivatives markets is limited to government securities, traditionally mainly US Treasuries, but increasingly European and Japanese government securities. In payment systems, government securities have been the

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<sup>27</sup> CLS "Inside/Outside Swaps" will be the first, but this facility will be limited to the recycling of available liquidity in CLS during the five-hour settlement period only.

<sup>28</sup> "Collateral in Wholesale Financial Markets: Recent Trends, Risk Management and Market Dynamics"; Report Prepared by the Committee on the Global Financial System Working Group on Collateral, Bank for International Settlements (March 2001)

primary form of collateral, followed by mortgage bonds and cash, although the range of assets accepted as collateral is broader in several countries, notably in the European Union. Government securities are the main underlying asset used in repo transactions in all major countries, although mortgage-backed securities are frequently used, and more firms globally are beginning to accept equity as collateral for financing arrangements.

The market therefore is increasingly competing for a narrow range of collateral assets, where in some instances, supply is decreasing.<sup>29</sup> Commercial banks will have to increasingly adjust for this phenomenon and in the future it can make it more challenging to meet the collateral requirements of foreign central banks. A possible concern is that this could ultimately impact the efficient functioning of the underlying bond markets, including, but not limited to relative increase in price of collateral. This price adjustment would be reflected in a scarcity premium in the cash market for the respective instrument – namely the government bond market – as well as in the rate on securities lending transactions. As larger and larger tranches of high quality assets e.g., government bonds, are held for liquidity requirements, instead of supporting the normal workings of the repo and stock borrowing/lending markets, there will be an increasing amount of “specials” in the market. Another possible concern is that market participants might take measures in trying to meet a growing scarcity that might increase risks such as by increasingly borrowing and retransferring collateral assets i.e., the chaining of exposures, to meet their overall collateral requirements.

Whether financial market participants will adjust by increasingly using private sector securities as collateral for financial transactions is unclear. If this were to occur, this would change the overall risk profile of the available collateral pool as credit risk becoming increasingly important. In addition private issues are smaller and more heterogeneous than government securities and there is no liquid derivatives markets for private sector fixed income securities, making these securities less liquid.

#### **4.4. Summary**

Commercial banks have become increasingly reliant on central bank intraday credit as the main source of liquidity to facilitate payment activity in both domestic and foreign markets. While commercial banks have well-established access to central bank intraday credit in domestic markets, access to central bank intraday credit in foreign markets is inherently constrained. In addition, global commercial banks intraday liquidity is becoming increasingly fragmented as it has been incumbent upon commercial banks to source a sufficient quantity of payment liquidity in each center where they are a direct participant in RTGS systems. This has led to the creation of many “pots” of liquidity across the globe that have to be able to meet the peak demand of each underlying system at any given time on any day, with no effective way to “bridge” intraday liquidity.

These constraints to sourcing cross-border intraday liquidity in foreign markets, in conjunction with the increasing demand for such liquidity, are trending towards a growing

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<sup>29</sup> In contrast with the expanding global pool of equity and corporate debt securities, the supply of government bonds, often the preferred type of collateral in wholesale financial market transactions, is increasing slowly, stagnating or even shrinking in major countries, with the notable exception of Japan. By the end-September 2000, US government paper had a share of 29% of all bonds issued by US residents, compared to 44% in 1994. In the same period, the market share of government bonds has also fallen in several European countries.

“dislocation” in cross-border intraday liquidity. This dislocation can be understood as an environment whereby demands for timed, cross-border intraday liquidity will continue to accelerate, while commercial banks continue to face inherent constraints in sourcing real-time intraday liquidity in foreign markets. There may also be future issues with respect to the phenomenon of market participants increasingly competing for a narrow range of collateral assets, where in some instances, supply is decreasing. This may ultimately have an impact on the efficient functioning of the underlying securities markets. Market participants might also take measures in trying to meet a growing scarcity that might increase risks. .

## **5. PRIVATE SECTOR DEVELOPMENTS IN CROSS-BORDER LIQUIDITY MANAGEMENT**

Recent developments in the global financial markets have resulted in banks facing increasing demands for cross-border intraday liquidity, which can be particularly acute in times of market stress, at a time where commercial banks are facing various constraints to their ability to source this liquidity. In this section of the report, the Task Force examines various measures taken within the private sector to address such liquidity issues, both at an institutional level, and at an industry-wide level. An examination is also provided of various possible private-sector solutions to address need for enhanced access to cross-border intraday liquidity. In identifying various possible private-sector solutions, the Task Force has assessed the viability of each from a commercial standpoint.

### **5.1. Developments at Individual Banks**

#### **5.1.1. Global Liquidity Management**

Commercial banks have been very active in recent years in reevaluating and altering their liquidity risk management practices and many large commercial banks have made significant advances in liquidity management to complement operating in a global environment. Banks are now employing sophisticated strategies for liquidity management including enhancements in trigger guidelines, metrics development, and better quantification of funding sources. This has resulted in improved forecasting and banks' daily funding practices cater to a range of specific events including "normal" behavior of cash flows and 'crisis' scenarios. Select commercial banks now employ a "global book" concept to liquidity management such that each region can pass "the book" - in terms of net liquidity position – to the next region for the next business day across time zones.<sup>30</sup> Internal limit and control mechanisms are now much more consistent with banks' strategies for managing liquidity. Banks are also working to improve the communication lines between the treasury function and back-office operational areas (i.e., cash, securities and derivative clearing operations). At present, the treasury area may rely on informal lines of communication to keep updated on operational events that could affect intraday funding such as a wire transfer system failure.

#### **5.1.2. Payment Sequencing Capabilities**

Large commercial banks employ sophisticated liquidity management techniques and capabilities which attempt to predict and control these patterns and attempt to minimize intraday liquidity needs. Such techniques include sequencing transfers, that is, controlling intraday payment flows by scheduling the timing of outgoing transfers (through internal queues) according to the supply of liquidity provided by incoming transfers. This generates virtual "offsetting effects" on RTGS payments and contributes to substantially reducing the necessary liquidity. Another technique for sequencing payments involves banks using message codes indicating the time of day that an individual outgoing transfer should be settled. Such time-of-day message codes are used to store transfer orders within banks' internal systems. Time-of-day message codes allow banks to better forecast liquidity requirements by increasing certainty of the timing of debits and credits associated with transfer orders.

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<sup>30</sup> Such a program requires the implementation of a series of physical and notional concentration practices to achieve a single position for each region that the next geographic time zone can use to finance daily funding needs.

### **5.1.3. Advances in Collateral Management**

A select number of global banks have developed a range of global collateral management capabilities that enable them (and their clients) to efficiently manage a global portfolio of assets to achieve optimal utilization of their global inventory of collateral. These dedicated collateral management services enable banks to review their collateral pool online – primarily securities, but also cash or other assets - and provide the platform for processing a wide array of transaction types including: facilitating the management of collateral pledged or transferred to clearing houses (and other obliges) to fulfill margin/collateral requirements; allocating and sourcing securities through tri-party deal; and effecting portfolio swaps and swap collateralization deals. These services include eligibility testing (based on criteria of a clearing house), daily mark-to-market testing, and substitutions, in the event a party is under-collateralized.

Some banks are contracting directly with exchanges to make it easier for them and their clients to collateralize their positions with an exchange. Links are being established such that banks and their clients will be able to allocate collateral currently residing at the bank to fulfill their margin requirements at the exchange’s own clearinghouse electronically in real-time. In these cases, market participants have more time to move their collateral – instead of being confined to several hours in the morning, they may have all day.

## **5.2. Developments at the Industry Level**

### **5.2.1. The Development of Interbank Net Settlement Systems**

The private sector has made enhanced use of existing payment liquidity through the development of interbank multilateral net settlement systems across the G-10 countries that reduce the overall number and value of payments between financial institutions through netting. In addition, there is also a move to enhance multilateral net settlement systems through the introduction of new centralized queue management facilities and optimization routines that seek to maximize payment efficiency (e.g., CHIPS, PNS). In addition to these domestic developments in the G-10 countries, interbank net settlement systems are now being developed for cross-border payments. EBA Euro1 is a new euro clearing systems that operates across the Euro zone under a continuous net balance calculation with end of day settlement of the netted balances via TARGET. Its annual volumes increased from \$24.7 trillion in 1999 to \$49.6 trillion by 2001. CLS Bank will introduce multilateral netting to a large proportion of the \$3 trillion per day global FX market.

### **5.2.2. Liquidity/Collateral Swap Markets**

The last decade has seen a rapid growth in the development of securities lending, repurchase agreement (“repo”) markets and other liquidity and collateral swap markets that increase overall liquidity in the markets. Securities lending markets, where market participants can gain temporary access to specific securities, increase liquidity in the collateral markets. Repo markets, where firms can, on an overnight or term basis post securities as collateral, increase liquidity in funding market. The global securities lending market has grown into a \$1 trillion market.<sup>31</sup> In the United States, outstanding repos grew by an average 13.5% a year in the second half of the 1990s, amounting to USD 2.5 trillion by mid 2000. In the Euro area countries, the start of the EMU caused a strong expansion of repo transactions, and cross-border activity has

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<sup>31</sup> *Securities Lending Transactions: Market Development and Implications*: BIS/IOSCO (July 1999)

grown significantly. The size of the Japanese repo markets has increased sharply in recent years and the share of international transactions has grown.<sup>32</sup>

Since the introduction of the euro, clearing banks have used liquidity swaps to alleviate imbalances between the EBA net payment system and the various RTGS channels. These swaps have been effective in reducing the risk of gridlock. As CLS Bank diverts flows to RTGS channels, such imbalances may become more pronounced. The capacity of swaps is not limitless and other tools will become necessary.

In 2002, Inside/Outside Swaps (“I/O” Swaps) were developed by CLS Bank to balance a settlement member’s liquidity requirements inside the CLS environment. Primarily, the In/Out Swap is a method whereby a CLS settlement member can reduce the liquidity it requires during the CLS settlement process by conducting equal but opposite trades both inside and outside the CLS Bank system. An In/Out Swap consists of two FX “transactions” which are equal and opposite – both being agreed as the same time as part of a single swap; one leg (the first transaction) is settled inside CLS and the other (the second transaction) is settled outside CLS, with both being settled on the same day.

### **5.2.3. Collateral Management at Clearing Houses**

The advent of many new central counterparty (CCP) clearing house structures for securities markets introduces certain liquidity benefits by allowing market participants to set off their mutual obligations, leaving just a single obligation to the CCP for every netted trade. In markets that were previously collateralized only on a bilateral basis, collateral requirements can also be significantly reduced. To increase still further the netting benefits to members, the netting arrangement may be extended to include a range of financial instruments with the same underlying asset, for example outright and repo transactions. To this end, a number of clearinghouses are in the process of integrating their CCP services for outright and repo trades.

Central counterparty clearing house structures are, in some circumstances, prepared to recognize robust statistical and economic correlations among changes in the value of different financial instruments that reduce the margin needed to protect the clearinghouse when a counterparty has offsetting positions in different instruments. Some clearing houses allow such *margin offsets*, for example between derivatives contracts and related cash and repo instruments, allowing clearing members to economize still further on their collateral requirements. Such efficiencies are also being obtained through margin-offsetting arrangements between clearing houses acting in different countries. More generally, the extension of services to cover a range of—even uncorrelated—instruments allows for efficiencies through cross-margining arrangements. Members are able to pool margin held against different positions, allowing a single net margin call across all the markets cleared.

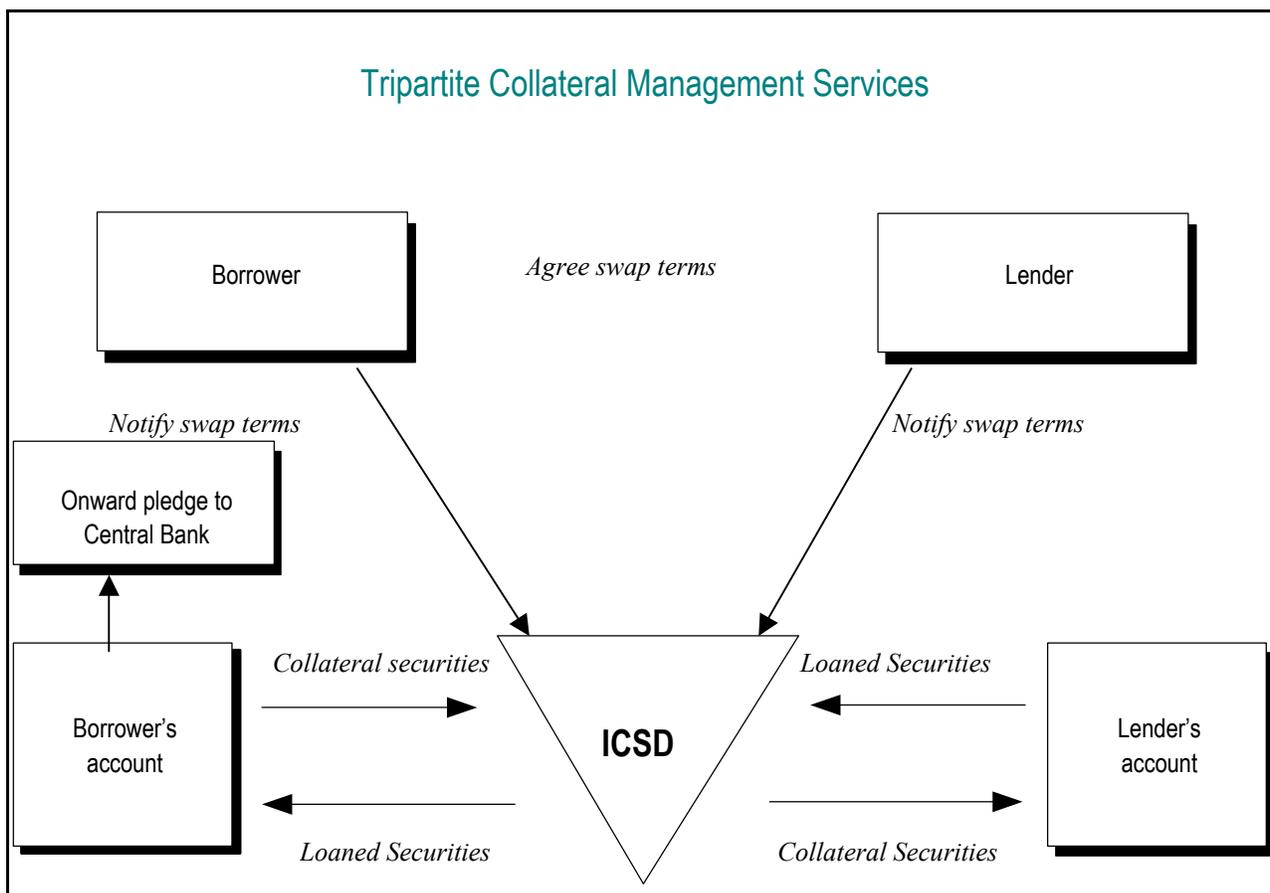
### **5.2.4. ICSD Tripartite Collateral Management**

The international central securities depositories (ICSD) (e.g., Clearstream, Euroclear) as

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<sup>32</sup> *Collateral in Wholesale Financial Markets: Recent Trends, Risk Management and Market Dynamics*; Report Prepared by the Committee on the Global Financial System Working Group on Collateral, Bank for International Settlements (March 2001)

well as certain global custodians, have developed collateral swap management services as an extension of their basic collateral management services. These collateral swap services provide market participants with the opportunity to swap securities holdings, on a delivery-versus-delivery basis, on settlement date. As long as the securities are pre-positioned within a bank's ICSD account, the collateral swaps may take place cross-border, i.e., a security from one country can be swapped for a security from another country. These services provide for a daily mark to market against the swapped assets, with full reporting and automatic margin calls.



Source: Clearstream Banking International

### 5.3. Possible Private-Sector Solutions in Cross-Border Intraday Liquidity Management

There have been significant developments in the private sector in the areas of liquidity and collateral management in recent years. However the specific demands for cross-border intraday liquidity, in the face of constraints on supply, warrant new market solutions which will enable banks to more readily source cross-border intraday liquidity as global demand continues to grow, and particularly in times of market stress. The Task Force has assessed various possible private-sector solutions ranging from the development of intraday money markets, to services provided by individual institutions, to new broader market services. For each, the Task Force makes a determination of the viability of the solution.

#### 5.3.1. The Development of Intraday Money Markets

It was widely believed that the development of RTGS systems could possibly contribute to or stimulate the development of intraday money markets. Intraday money markets could serve as an important private sector source of intraday liquidity. However private intraday money markets, collateralized or uncollateralized, have not materialized to date in any of the G-10 financial markets. The primary reasons for this are: (1) an unfavorable risk-return environment and (2) competitive factors.

The primary reason for intraday money markets failing to develop is due to the *unfavorable risk-return environment*. Commercial banks have determined that for various reasons there has been a low opportunity for intraday dealing gains in either a collateralized, or uncollateralized, market. Banks are unable to price for intraday liquidity in most instances because such credit facilities are typically provided free-of charge as part of banks' basic payment-clearing services provided to customers. In addition much of the market is crowded out by central bank intraday credit facilities, which, in all instances other than the United States, are not priced.

In addition to little opportunity for returns, the costs associated with establishing an intraday money market remain a barrier. Establishing and participating in such a market requires sophisticated operational infrastructure to track and charge for timed intraday borrowings (i.e., need ability to track sources and uses, pricing paradigm, management of credit risk - all in real time and possibly on a cross-border basis). A process for monitoring outstanding against limits would need to be developed. Collateralization adds enormous complexity in mitigating the associated risk. There would also be increased expenses associated with arranging sufficient liquidity facilities to maintain such balances. There are also logistical difficulties such as agreeing to terms, i.e., timing of payments and agreeing to price.

In addition to the lack of opportunity returns, there would be risks associated with participating in an intraday money market. Liquid intraday money markets would entail interbank credit exposure as the market would involve "one-way" deals. Collateralization would add enormous complexity in mitigating the risk. Credit exposures could be large and could spill over into overnight borrowings.

An additional reason why intraday money markets have failed to develop is *competitive factors*. Intraday credit has traditionally been a 'free of charge' service provided by commercial banks to their clients as part of their overall cash management/payment services. Banks' corporate clients, financial or non-financial, receive de facto intraday credit –“free of charge” through their correspondent banks.<sup>33</sup> It will be very difficult for priced intraday money markets to develop in this competitive environment.<sup>34</sup>

### **5.3.2. A Commercial Bank-Run Cross-Border Collateral Pool Facility**

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<sup>33</sup> Except in the case of certain large broker-dealer customers that may be priced for large clearing lines.

<sup>34</sup> Another possible factor is that the intraday credit provisioning of central banks may have a 'crowding-out' effect on the development of private intraday money markets, but this not clear. The intraday credit provisions offered by central banks are highly efficient. The only developed market whereby an intraday money market has developed to date is Sweden, which has a relatively intricate RTGS clearing system and complex intraday credit facility. Banks in Sweden trade central banks funds intraday at an approximate rate of 5bps to help fund the intricate RTGS clearing system.

A possible future cross-border intraday liquidity service is one where one or more global banks offer a cross-border collateral pool service to their customers, or to the broader market. In such a service offering, a global bank would provide intraday funds, in the form of central banks funds, to a participant based on foreign collateral pledged, on an intraday basis, by the borrower. This service would be cross-border in nature because the collateral could be denominated in a currency other than the currency of the intraday funds and held in a foreign jurisdiction. As such it could address both the cross-border payment liquidity and collateral usage issues financial institutions face today.

There was consensus among the Task Force that no one commercial bank has the intraday liquidity resources across the major world currencies to provide a deep, well-functioning service to the market particularly in times of market stress. Even the most well-capitalized and liquid global banks are regularly “short” in liquidity in foreign markets. Clearing and settlement issues would have to be addressed e.g., real-time, cross-border DVP. Market practice would have to be developed for transaction terms i.e., opening of accounts, timing of payments, pricing etc. In order to provide a service collateralized by securities, the commercial bank would need to operate a global custody business that could be integrated with the credit service. There would be barriers to entry as potential users of the service would have to agree to transfer their custody business to the bank. The economic viability of such a service offering to the market is not clear.

Alternatively, there is the possibility that such a service could be provided through a “club” arrangement between the most liquid banks in each currency center (i.e., for USD intraday liquidity the participant goes to a designated U.S. bank, for Swiss franc intraday liquidity, the participant goes to a designated Swiss bank). For a club arrangement to be truly global, services would need to be developed in multiple countries, simultaneously. There is the complex issue of where would collateral be housed and how would it be moved. It would require sophisticated operational infrastructure to track and charge for timed intraday borrowings, manage collateral, manage credit risks etc, which would be costly. The banks collectively offering the service would have to build up adequate liquidity in advance, on a regular basis, or try to arrange special funding facilities to ensure adequate intraday liquidity in the currencies. There would have to be a willingness to deal with a potential significant number of counterparties.<sup>35</sup> It will also involve increased expenses associated with arranging sufficient liquidity facilities to maintain such balances. It is not clear whether such a service would be economically viable. There is no guarantee sufficient liquidity would be available in times of market stress.<sup>36</sup>

### **5.3.3. Bilateral Agreements Between Commercial Banks**

Another, more modest arrangement would be where commercial banks establish bilateral agreements that contract for the provision of intraday funds in a given currency, up to a given amount. These could be committed or uncommitted lines of “intraday” credit. An example would be where a U.S. commercial bank contracts with a U.K. commercial bank to receive an intraday line in sterling of a given amount. If the U.K. bank were to draw on the line, the sterling would be provided by a CHAP transfer (the RTGS system in the United Kingdom) and would have to be repaid by the U.S. bank by the end of the business day in London.

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<sup>35</sup> Many potential users of such a facility may be restricted based on their existing custodian relationships.

<sup>36</sup> This might also raise legal/regulatory issues as such a facility may be seen as building a cartel.

Such an arrangement could increase access to intraday liquidity in foreign markets, and would not be as costly as other private sector alternative solutions. These arrangements would introduce credit risk in the market unless they were collateralized. Market practice would have to be developed for transaction terms, i.e., timing of payments, pricing etc. Banks participating in such agreements would have to build up adequate liquidity in advance, on a regular basis, or try to arrange special funding facilities to ensure adequate intraday liquidity in the currencies. There would have to be a willingness to deal with a potential significant number of counterparties or else the service would be limited to a few select banks. If lines were not committed there would be no guarantee sufficient liquidity would be available in normal market conditions or especially in times of market crisis.

#### **5.3.4. Cross-Border Collateral Swap Facilities**

This would be a service provided by international central securities depositories (or global custodians) that would extend upon their existing collateral swap management services. While the existing tripartite collateral swap services enable commercial banks to borrow needed securities to cover “fails” and short positions, these services have not been used by the market as a mechanism to source collateral for RTGS intraday credit. For this to be done, and used across the G-10 countries, such collateral swaps need to be affected in real-time, on a near 24-hour basis, and all the central banks would have to open accounts with the ICSDs so that these securities could be efficiently pledged to central banks in exchange for intraday credit. Central banks would not have to adjust their collateral eligibility rules or expand their RTGS operating hours. Under this service, commercial banks would be sourcing the eligible collateral through the swap facility.<sup>37</sup>

The Task Force discussed such a service offering with representatives from Clearstream and Euroclear. They agreed that to offer such a service, there would have to be some modifications to their existing collateral swap facilities. This would include offering such a swap service in real-time and expanding the service to near-24 hours. However if there were a clear business case to provide such a service, the ICSD would be willing to further explore offering these services. Issues that the banking community would face are the cost of using such services and whether the ICSD swaps market would be liquid in times of market stress.

#### **5.3.5. Cross-Border Intraday Currency Swap Facility**

This service would be similar to a Cross-Border Collateral Swap facility, however instead of securities, commercial banks would swap foreign currency balances, on an intraday basis, through a common banking (clearing) agent.

The global banking community would have to select a common third-party to provide this service. The third-party would have to have cash accounts with the major central banks and participating banks would have to open cash accounts with the third-party service provider. Intraday foreign coherency swaps could be conducted through a trade matching system provided by the third-party agent. A bank looking to borrow a foreign currency intraday would post the amount of the needed currency, i.e., “buy” order, and the currency available as “collateral” for

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<sup>37</sup> Example: A Japanese bank would swap U.S. securities they hold in their account with Clearstream with euro securities another bank holds with Clearstream through the collateral swap facility. In a second step, the Japanese bank would pledge the euro securities to the ECB for euro intraday credit.

the loan. Banks long in the needed currency would post their ‘sell’ order and the third-party agent would match positions.<sup>38</sup> Trades could be set at a pre-fixed rate to ensure liquidity of the market. Once a trade was matched and confirmed, the parties would transfer the currencies over the RTGS systems, to the account of the third-party agent. Once both currencies are received, the third-party agent would transfer them to the counterparties ensuring a payment-versus-payment basis. It would be intended that the swap would be reversed within the same business day in the market of the borrower.<sup>39</sup>

In order for the market to devolve such a service, a trusted third-party agent would need to be agreed to be the global banking community as banks would be taking deposit risk on the third-party agent. The operations of the third-party would have to run on a near-24 hour basis to account for the time zone differences of the major markets. The service would have to be priced such that it is viable from a user standpoint and economically feasible for the third-part service provider. There would be a question of how liquid such a foreign currency intraday swap market would be in times of market stress.

#### **5.4. Summary**

The private sector has been very active in recent years in advancing payment liquidity management to support operating in a global environment. Individual institutions have made significant advances in liquidity management, payment sequencing techniques and capabilities and global collateral management. At the industry level, the private sector has enhanced the use of existing payment liquidity through the development of new multilateral net settlement systems, the establishment of central counterparty clearinghouses, the development of repo, securities lending and currency swap markets, the establishment of CLS Bank and the development of collateral swap management services provide by central securities depositories and some global custodians.

While there have been achievements by the private sector in addressing increasing intraday liquidity needs, it is not clear whether new private sector services will arise in the near term, with sufficient depth, to address the increasing “dislocation” in cross-border intraday liquidity. This uncertainty is largely due to what is generally perceived to be an unfavorable investment (i.e., cost/return) environment. While commercial banks face various administrative, managerial and portfolio adjustment costs associated with using assets as collateral for sourcing intraday liquidity, to date these costs have not established the financial condition for private-sector investment in such “risk reduction” services. It is also unlikely that any private sector

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<sup>38</sup> The idea here is that this would be somewhat similar to a service associated with the old ECU clearing in London (and EBA position settlement in Europe today). For ECU clearing, at the end of the day ECU banks that needed to cover short or long positions in not a lot of time, would post their interest on the Reuters page – indicating it’s position i.e., ++ very long, + long, - short,-- very short. Deals would then be stuck off-line at a pre-fixed rate (the EBA inside/out swaps are free).

<sup>39</sup> This type of service could function in a similar fashion as the Inside/Outside (I/O) Swaps offered by CLS Bank. I/O Swaps help financial institutions manage their FX-related intraday liquidity by reducing their payment obligations to CLS Bank. I/O Swaps comprises two equal and opposite FX transactions that are agreed as an intraday swap to balance out large long and short positions in CLS while leaving institutions’ overall FX positions unchanged

services will arise at any time with sufficient depth to meet potential cross-border intraday liquidity demands in times of market stress

## 6. CENTRAL BANK SOLUTIONS: RATIONALE/BENEFITS

In this section of the report, the Task Force examines the rationale for a central bank-supported solution to the cross-border intraday liquidity needs of the market and a preferred solution. In the next two sections, the Task Force examines in some detail how a solution could most effectively and efficiently be implemented by central banks.

### 6.1. Rationale

While central banks expect that private sector liquidity resources will meet settlement needs in most situations, central banks also recognize that it is impossible to be certain that there would be sufficient private sector liquidity to support all settlements in all circumstances. Recognition of this risk explains the existence of central bank RTGS intraday lending facilities. It has also led the G-10 central banks over the past decade to “continue to review possible measures that central banks might take – either individually or on a cooperative basis – to improve efficiency and reduce risks in the settlement of cross-border and multi-currency transactions”.<sup>40</sup>

As examined previously, it is unclear whether private-sector solutions will arise in the near term to address the increasing global intraday liquidity demands, and associated global collateral mobilization needs, of the market with sufficient depth, if indeed at all. Only the G-10 central banks, through partnership with depository institutions, are uniquely positioned to provide the requisite services that will ensure adequate liquidity, reduce settlement risk and enhance the efficiency of the global payment and settlement environment.

### 6.2. A Solution

The Task Force recognizes that there could be a range of central bank services that have been identified previously that might address the cross-border intraday liquidity needs of commercial banks and reduce risk in the global payment systems. These include ideas such as expanding operating hours or the joint offering of multicurrency payment and settlement services, that is central banks accepting deposits in multiple currencies and facilitating final transfers between these accounts. However, the consensus among the Task Force is that an optimal solution would be for the G-10 central banks to simply expand the range of collateral currently accepted as part of their existing intraday credit provisioning supporting RTGS payment activity to include certain foreign collateral. “Foreign” collateral can be understood to mean collateral that may be issued in a foreign currency, issued by a foreign entity and/or held in custody in a foreign jurisdiction.

By expanding the range of collateral accepted for intraday credit to certain high-grade, liquid *foreign* assets, the G-10 central banks could provide the market with the requisite services to meet future imbalances in the supply and demand of cross-border payment liquidity, enable central banks to more effectively intervene to ensure future liquidity “stress” events do not escalate into systemic crises, and ensure overall risk reduction in the global financial markets. The Task Force maintained the view that while central banks simply expanding RTGS operating

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<sup>40</sup> This has resulted in the development of certain key central bank payment and settlement services over the past decade to improve liquidity in payment and settlement systems beyond the provision of central bank intraday credit facilities to include queuing mechanisms and the extension of payments systems operating hours.

hours may support additional cross-border payment activity, this alone will not address the cross-border intraday liquidity needs of banks, particularly in times of market stress. It will also not address the global collateral management issues banks face in managing their payment liquidity. Likewise, the Task Force was of the view that the G-10 central banks do not have any interest in offering multicurrency payment and settlement services from a public policy standpoint.

### **6.3. Benefits**

By expanding the range of collateral accepted for intraday credit supporting RTGS activity to include foreign collateral, G-10 central banks would produce the following overall benefits to global financial markets:

- **An enhanced ability of market participants to respond effectively to intraday liquidity demands in foreign markets that will accelerate significantly in the near future.**

By the G-10 central banks accepting certain foreign collateral in exchange for intraday credit, this could ensure that commercial banks will be able to effectively source the needed intraday liquidity as cross-border financial transactions continue to grow and their role in foreign markets increases. It is unclear whether private sector solutions will emerge to meet these demands. This would require new services to develop simultaneously in multiple currencies in a market environment where low opportunity for intraday dealing gains may not exist to compensate the private sector for the required infrastructure investment. In addition, there is no guarantee that many of the other private-sector solutions identified by the Task Force for increasing cross-border intraday liquidity will materialize, and none can assure sufficient liquidity in times of market stress.

- **A decrease in liquidity risk in the interbank payment markets with the associated decrease in settlement risk and credit exposures.**

Commercial banks today have incentives to delay outgoing payments when possible to economize on liquidity. This creates undue liquidity risk in the financial markets as fewer overall payments are settled earlier in the day than would otherwise be. By providing commercial banks with a means to economize on existing collateral holdings by efficiently pledging foreign collateral for intraday credit, this should facilitate greater payment flow earlier in the day, reducing potential liquidity risk - and settlement risk- in the markets. This would be principally true in times where individual banks, and/or a domestic market on the whole, are experiencing abnormal asymmetry in the day's payment flow and large volumes/values of payments are being delayed.

Central banks expanding the range of collateral accepted for intraday credit to include more foreign collateral will decrease liquidity risk, should not materially increase interbank credit exposures, and is likely to lead to a decrease in overall credit exposure in the financial markets. In the absence of new sources of cross-border intraday liquidity, banks will be more likely to source intraday liquidity from overnight money markets, which will introduce credit risk to the markets. Even the new "Inside/Outside" Swap mechanism that is supporting CLS Bank with intraday liquidity will re-introduce a portion of settlement risk to the market. As

explained in Section 7, central banks could ensure a collateralized DVP market for cross-border intraday liquidity that will introduce very little settlement risk to the markets.

- **Increased overall global systemic liquidity and reducing the likelihood of systemic risk in rapidly evolving markets by mitigating imbalances in the supply and demand for liquidity during periods of market stress.**

By each of the G-10 central banks accepting a range of highly liquid, low risk foreign collateral in exchange for intraday credit, an effective mechanism would be in place to limit the potential for systemic risk by providing an efficient liquidity bridge between markets. Large, creditworthy commercial banks have considerable access to intraday liquidity through their national central banks, but less in overseas markets where they may be highly active. In the event of unsettled markets, operational fails or payment system disruptions, use of foreign denominated collateral to obtain liquidity at “away” central banks would provide a margin of safety by mitigating liquidity risk before it is transmitted into credit or systemic risk. Central banks facilities, in place for use on a daily basis, could serve as the primary mechanism for enhancing global systemic liquidity and reducing systemic risk in rapidly evolving markets - mitigating imbalances in the supply and demand for liquidity during periods of market stress.

Such facilities could also allow market participants to more effectively meet unexpected funding demands in private-sector clearing and settlement systems which may be caused by extreme market price volatility, a sizeable credit event or other contingencies such as the operational failure of a settlement system or a key participant of such as system. It would also provide an indirect but important additional layer of protection to private sector clearing and settlement systems as participants' access to real-time liquidity to funds such systems would be improved.

- **A tool for central banks to collaboratively address temporal market disruptions by intervening to avoid liquidity “stress” escalating into liquidity and ultimately credit risk.**

This type of service offering would enhance on-going central bank efforts to identify, and take steps to minimize, risks in the global financial system.

Should they wish, central banks could collaboratively use these services as a tool to address temporal market disruptions by intervening to avoid liquidity “stress” escalating into liquidity and ultimately credit risk. Similar informal arrangements (i.e., euro-U.S. dollar swaps) have already been utilized by central banks to mitigate potential liquidity squeezes during the recent financial market crises e.g., Year 2000 cutover, September 11, 2001 terrorist event. Once in place, the acceptance of foreign collateral for intraday credit would serve as a more robust liquidity mechanism, while providing the added benefit of providing a “business-as-usual” approach for such future crises. This would seem to be a preferred mechanism for such potential crises than previous ad hoc approaches. It would build upon well-understood central bank processes and traditional market practices.

In addition, central banks could have more accurate and timely information flows, especially at times during financial stress. These services would also provide a mechanism for enhanced central bank coordination.

- **Improved competition in correspondent banking by improving banks' access to payment liquidity in foreign markets, allowing for a more level playing field.**

By accepting foreign collateral in exchange for intraday credit, central banks would be taking steps that could improve competition in correspondent banking by allowing foreign banks to more effectively source payment liquidity in the domestic market. This service offering would promote access to markets, payment and clearing systems for which some foreign financial institutions may otherwise be excluded. Better access to intraday liquidity in foreign markets would allow commercial banks to be more competitive in providing corresponding banking services in away markets. Further, such services will facilitate the management of liquidity and improve competition in other fields (e.g., loan syndication, securities custody and clearing) where lead managers and custodian banks have competing demands on their liquidity.

This principle of “counterparties being treated equally” was one of the guiding factors for the European Central Bank’s (ECB) development of the correspondent central banking model (CCBM) for the Euro system. The CCBM facilitates the cross-border use of collateral for monetary policy operations and to obtain payment liquidity in TARGET.<sup>41</sup>

- **Enhanced efficiency of global payment systems.**

Central banks have a shared policy interest in both the efficiency and stability of interbank payment systems and, more generally, in the efficiency of the financial system as a whole. Central banks have a general interest in promoting efficiencies in the payment process through reductions in payment flows, transaction costs and interest expenses on correspondent balances. Central banks are also concerned with the impact that changes in interbank payment and settlement systems may have on the structure and efficiency of the financial markets that these systems support.<sup>42</sup>

Accepting foreign collateral for intraday credit will not only serve to reduce risk in the international financial markets, but also promote efficiency. Allowing banks to better optimize their use of existing collateral should mitigate increasing costs to the market of generating needed payment liquidity capacity and certainly improve settlement efficiency.<sup>43</sup> To date, it has been incumbent on the commercial banks to source a sufficient quantity of liquidity in each center where they are a direct participant in real-time gross settlement

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<sup>41</sup> *Correspondent Central Banking Model (CCBM)*; European Central Bank, November 1999

<sup>42</sup> *Report of the Committee on Interbank Netting Schemes of the Central Banks of the Group of Ten Countries*; Bank for International Settlements, (November 1990)

<sup>43</sup> There are various administrative and management costs involved in using assets as collateral for payments and settlement purposes. These include the cost of transferring collateral, the portfolio adjustment costs of collateral, and the costs of monitoring the use of collateral to ensure holdings are used efficiently and to plan for possible future requirements.

systems, leading to the creation of many “pots” of liquidity across the globe that have to be able to meet the peak demand of each underlying system at any given time on any day. This comes at a time where the size and volatility of such liquidity exposures in payments and settlements are increasing and there is little economic incentive for commercial banks to hold additional collateral in foreign markets for payments and settlement. This service offering by central banks will allow, for the first time, an efficient intraday liquidity bridge across global markets.

This will also allow financial institutions to overcome obstacles of moving collateral across borders while supporting evolution of new market practices without market disruption. There are many obstacles today to moving collateral cross-border for financial transaction generally and in particular for creating liquidity. This would allow commercial banks to overcome such obstacles, supporting evolution of new market practices without market disruption i.e., achieving security and reliability of operations.

This will also provide a solution to potential issues such as whether there will be enough collateral available to meet the growing demand without driving up its cost significantly as demands for high quality collateral increase. If the cost of collateral does rise there is the possibility that market participants take measures in trying to reduce those costs that may increase risk such as reducing excess collateral and instead borrowing to cover peak needs or saving on assets holding by increasingly borrowing and retransferring collateral assets i.e., chaining of exposures. It could also ultimately impact the efficient functioning of the underlying bond markets, including the efficient pricing of high quality assets such as government bonds that may begin to encompass a “scarcity” premium as larger tranches are held for liquidity requirements.

- **Building upon well-understood processes (e.g., central bank intraday credit facilities) and existing infrastructure (e.g., central bank payment systems and accounts).**

Banks operating in the home country have the ability to create intraday liquidity through mechanisms provided by their national central banks. While these mechanisms vary from country-to-country, banks operating in each country are familiar (through daily experience) with the mechanisms to create intraday liquidity. By expanding the range of collateral for intraday credit, a service would build upon existing market infrastructure (e.g., RTGS systems, central bank accounts) and practices (central bank intraday liquidity mechanisms). This should minimize the costs of providing such services to the market.

## 7. CROSS-BORDER COLLATERAL POOL FACILITIES: DESCRIPTIONS

In this section of the report, the Task Force identifies various facilities that could effectively and efficiently facilitate the acceptance of foreign collateral by central banks for intraday credit. These facilities, referred to as *cross-border collateral pool facilities*, would be owned and largely operated by central banks and would be based on the provision of intraday credit by central banks. However, the Task Force has identified certain facility types whereby central banks could outsource the custody and management of foreign collateral to third parties. The Task Force has also identified certain facility types whereby central banks could begin accepting foreign collateral for intraday credit on a unilateral basis. That is, a central bank would not have to coordinate its operations with another central bank in order to accept foreign collateral.

The Task Force has identified three models for a cross-border collateral pool facility. A first model is a *cross-border securities collateral pool facility*, whereby central banks could accept foreign securities as collateral for intraday credit. A second model is a *cross-border cash collateral pool facility* whereby central banks could accept foreign currency as collateral for intraday credit. A third model is a *cross-border central bank guarantee facility* whereby a central bank would provide intraday credit to a commercial bank based on a “credit guarantee” by the commercial bank’s national central bank. Each of these models is analyzed separately. However, this does not mean that the models should be considered as mutually exclusive solutions. Individual central banks could decide to accept both foreign currency and foreign securities as collateral and could adopt multiple models.

In this section of the report, various facility types (“options”) are analyzed under each model and the operational considerations are examined in some detail. In Section 7.1 various options for a securities collateral pool facility are presented. In Section 7.2, various options for a cash collateral pool facility are analyzed. In Section 7.3 the central bank guarantee model is examined. The Task Force’s preferred facility types, from a market efficiency and acceptability standpoint, are indicated in Section 7.4. In the next section of the report (Section 8) the legal, risk and cost issues of cross-border collateral pool facilities are examined, as well as various potential public policy considerations that the Task Force could identify.

### 7.1. Securities Collateral Pool Model

Under this model, market participants would be able to utilize foreign securities as collateral for intraday credit at a central bank. The Task Force identified three options for a securities collateral pool facility that could be viable for the market:

- Home Central Bank Option
- “All Participating” Central Bank Option
- Third-Party Agent Option

Organizationally the general requirements for a securities collateral pool facility are:

- Central banks are allowed to set their own criteria on acceptable securities collateral and, if necessary, where it should be cleared and held in custody. This allows central banks to individually set their own level of comfort. Acceptable collateral would need to be

published (e.g., on Internet, Reuters, Telerate, Bloomberg) along with appropriate haircuts and the settlement mechanism to be used, if necessary.

- Securities can be pledged across time zones but must be returned to the originating commercial bank by the end of the day at the latest. A central bank solution would require central banks to move to a 24-hour operation for the purpose of managing collateral. In a Third-Party Agent Option, it would be up to the third-party i.e., non central bank to provide such a 24-hour service, and possibly an intraday settlement mechanism across multiple third-party collateral management agents.

#### **7.1.1. Home Central Bank Option**

This option makes use of existing home market pledge mechanisms/relationships central banks currently have with their domestic commercial banks for providing intraday credit and accounts central banks have with one another. Home central banks, serving as the custodian and collateral management agent on behalf of all "away" central banks granting intraday liquidity, would accept any type of securities that an away central bank defines as acceptable collateral against which they are willing to provide liquidity.<sup>44</sup>

Participants would have the securities collateral delivered to an account maintained by the home central bank at the designated central securities depository (CSD) in the home market (i.e., the CSD in which the collateral has been issued and deposited).<sup>45</sup> The home central bank would perform a custodian and collateral management function on behalf of all "away" central banks. The commercial bank would instruct the home central bank to pledge unutilized collateral to the account of the away central bank at the home central bank (book entry) for use by its branch in the away location as collateral against payments. The home central bank would apply its knowledge of local law to ensure the required control and possession of the collateral on behalf of the away central bank. Upon taking possession and control of the securities collateral the away central bank would provide intraday credit. The away central bank would be the principal to the transaction and would bear all associated risks e.g., credit, operational, liquidity.

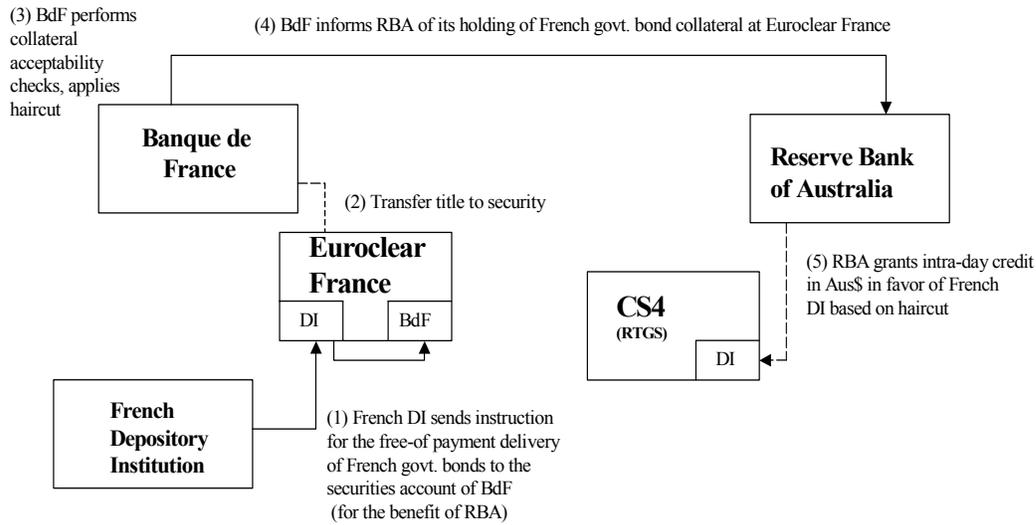
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<sup>44</sup> Some central banks already outsource the custodian and collateral management today, some might want to do this going forward.

<sup>45</sup> In some jurisdictions, central banks operate their own securities depository for government securities. One example is the United States where the Federal Reserve operates the Fedwire Book-Entry System that is the depository and settlement system for U.S. Treasury securities and other U.S. government securities. In other jurisdictions, government securities are maintained in a private-sector national depository with other securities. An example of the latter is the United Kingdom where all securities are held in CHAPS, a private sector depository and settlement system.

Figure 7.4

Securities Facility – Home Central Bank Option



*The unwind would entail a series of sequential reversals of debit and credit entries beginning with: (6) RBA debiting the Aus\$ clearing account of the DI on CS4 at the agreed time; (7) RBA Informing BdF that intraday credit has been repaid and that collateral can be returned; (8) BdF instructing Euroclear France to return French government bonds to the DI through a free-of-payment delivery; (9) Euroclear France returning French government bonds to French DI through book-entry delivery.*

**Example – Home Central Bank Option**

A French bank wishes to obtain credit from the Reserve Bank of Australia on the basis of collateral held in the French central securities depository (Euroclear France). To do so, the French bank must arrange for its assets to be transferred to an account maintained by the Banque de France at Euroclear France. The Banque de France will hold the securities on behalf of the Reserve Bank of Australia, thus in effect acting as its custodian. The collateral will be delivered to the Banque de France according to Euroclear France’s delivery procedures. The Banque de France will inform the Reserve Bank of Australia when it is certain that it has received the eligible collateral in the relevant account. On the basis of this information, the Reserve Bank of Australia will grant intraday credit to the French bank in Australian dollars, based on a haircut. As soon as the French bank has repaid the intraday credit in the Australian market, the Reserve Bank of Australia would instruct the Banque de France to return the French securities to the French bank through a transfer at Euroclear France (see Figure 7.4).

The Home Central Bank option is largely based on the correspondent central bank model (CCBM) used today by the ECB and corresponding Euro-zone central banks.<sup>46</sup> However in the CCBM, the home central bank is always the liquidity provider and collateral management agent whereas the away central banks have a pure custodian function. This approach is possible in Europe because the CCBM does not have to overcome major time-zone differences and operates in a single currency environment. While the Home Central Bank option 1 will increase banks

<sup>46</sup> See Annex 6

access to cross-border intraday liquidity, this approach would limit optimal collateral usage as the available unutilized securities collateral may not always be held in the home market.

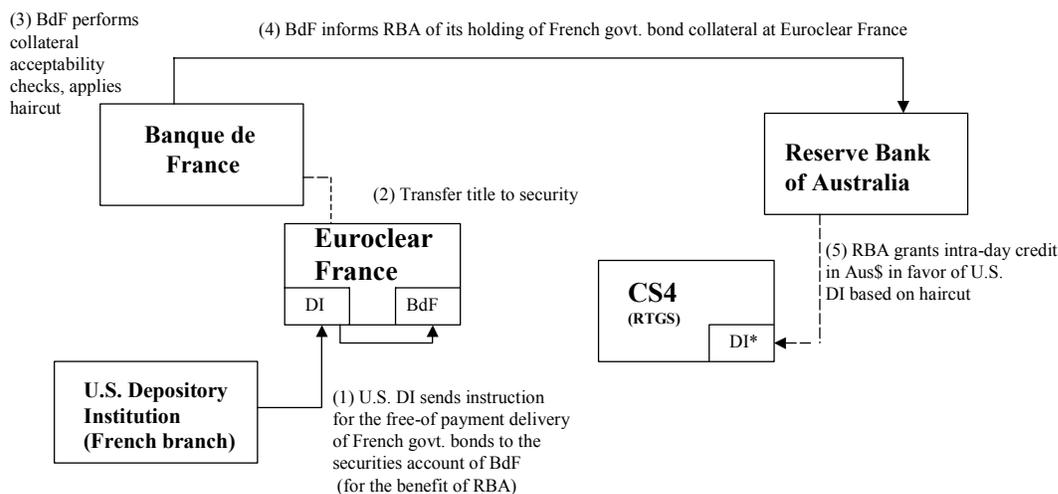
### 7.1.2. “All Participating” Central Bank Option

The “All Participating” Central Bank Option is an extension of the Home Central Bank Option. In this option, all participating central banks would accept securities as collateral for intraday credit not only from the commercial bank’s home jurisdiction, but also from other “participating” central bank jurisdictions e.g., the G-10 countries. All participating central banks would have accounts at each other and accept securities as collateral in return for intraday liquidity provided to the commercial banks branch in their respective jurisdictions. Central banks would be willing to provide custodian and collateral management functions for “away” central banks.

Participants would have the securities collateral delivered to an account maintained by the “local” central bank in favor of the “away central bank” at the designated local depository (central bank or otherwise). The commercial bank would instruct the local central bank to pledge unutilized collateral to the account of the away central bank at the local central bank for use by its branch in the away location as collateral against payments. The local central bank would apply its knowledge of local law to ensure the required control and possession of the collateral on behalf of the away central bank. Upon taking possession and control of the securities collateral the away central bank would provide intraday credit.

Figure 7.5

#### Securities Facility – “All Participating” Central Bank Option



*The unwind would entail a series of sequential reversals of debit and credit entries beginning with: (6) RBA debiting the Aus\$ clearing account of the DI on CS4 at the agreed time; (7) RBA Informing BdF that intraday credit has been repaid and that collateral can be returned; (8) BdF instructing Euroclear France to return French government bonds to the DI through a free-of-payment delivery; (9) Euroclear France returning French government bonds to French U.S. through book-entry delivery.*

### **Example – “All Participating” Central Bank Option**

A U.S. bank wishes to obtain credit from the Reserve Bank of Australia (the Australian central bank) on the basis of collateral held in the French central securities depository (Euroclear France). To do so, the U.S. bank must arrange for its assets to be transferred to an account maintained by the Banque de France (the French central bank) at Euroclear France, the French central securities depository. The Banque de France will hold the securities on behalf of the Reserve Bank of Australia, thus in effect acting as its custodian. The collateral will be delivered to the Banque de France according to Euroclear France’s delivery procedures. The Banque de France will inform the Reserve Bank of Australia when it is certain that it has received the eligible collateral in the relevant account. On the basis of this information, the Reserve Bank of Australia will grant intraday credit to the U.S. bank in Australian dollars, based on a haircut. As soon as the U.S. bank has repaid the intraday credit in the Australian market, the Reserve Bank of Australia would instruct the Banque de France to return the French securities to the U.S. bank through a transfer at Euroclear France (see Figure 7.5).

### **7.1.3. Third-Party Agent Option**

Under this option, the operational burden associated with custody and collateral management would be completely outsourced by central banks to those central securities depositories, or custodians, which have the best securities settlement and collateral management expertise and capabilities.<sup>47</sup> The Task Force believes this can be most effectively and efficiently achieved by central banks outsourcing the securities custody and collateral management to either or both of the international central securities depositories (“ICSDs”) e.g., Euroclear, Clearstream International. Alternatively, central banks could rely on the securities custody and collateral management services of a national central securities depository, or a custodian, that has account linkages to the ICSDs.<sup>48</sup>

An instruction from the commercial bank would transfer unutilized eligible securities from its account at the designated central securities depository to the account of the “away” central bank at the central securities depository. This would serve to collateralize needed intraday liquidity by its branch or cash correspondent in the away central bank location. The central securities depository, acting as custodian and collateral management agent, would apply its knowledge of relevant laws to ensure the required control and possession of the collateral on behalf of the away central bank. The central securities depository would provide confirmation to the respective parties (i.e., away central banks and borrowing bank) that the collateral has been effectively pledged. The central securities depository would, upon instruction from the away central bank, facilitate the return of the collateral to the bank over its books and provide confirmation once collateral is returned.

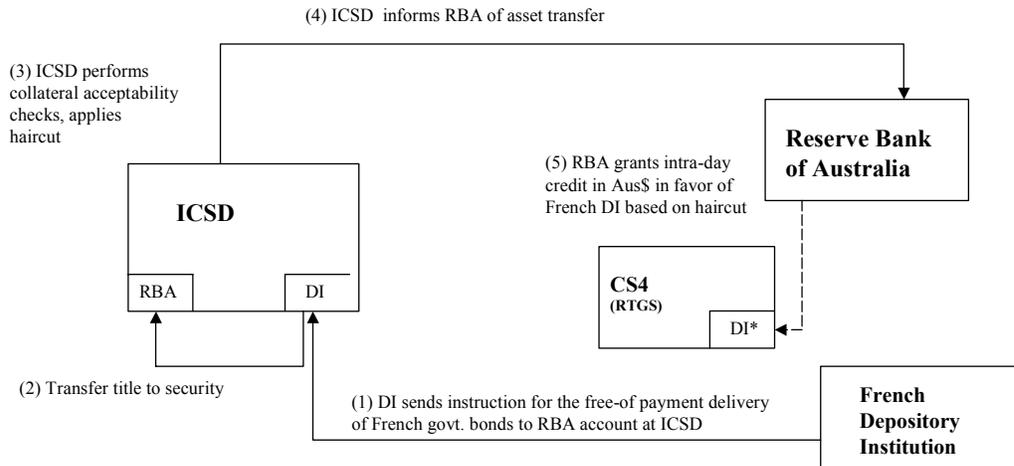
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<sup>47</sup> A global custodian, which is able to provide the required level of service, could also hold a CSD function.

<sup>48</sup> For example, in the United Kingdom, the Bank of England currently grants intraday credit based on a “self collateralization” intraday repo mechanism with certain eligible securities maintained in CrestCo, the U.K. national central securities depository. The Bank of England could likely extend this facility by enabling participants to pre-position certain foreign (i.e., non-U.K. securities) in CrestCo through CrestCo’s account linkage with Euroclear or Clearstream with these foreign securities eligible for use through CrestCo in the automatic “self collateralization” DvP repo mechanism.

Figure 7.6

### Securities Facility – Third Party Agent Option (1)



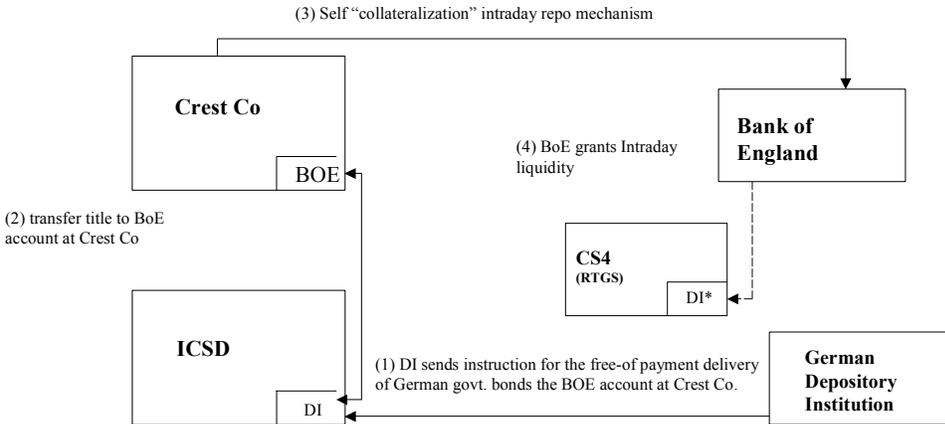
*The unwind would entail a series of sequential reversals of debit and credit entries beginning with: (6) RBA debiting the Aus\$ clearing account of the DI on CS4 at the agreed time; (7) RBA instructing ICSD to return French government bonds to the DI through a free-of-payment delivery; (8) ICSD delivering French government bonds to French DI through book-entry delivery.*

#### **Example – ICSD serving as custodian/collateral management agent**

A French bank wishes to obtain credit from the Reserve Bank of Australia (the Australian central bank) on the basis of collateral held in an international central securities depository. To do so, the French bank must arrange for its assets to be transferred to an account maintained by the Reserve Bank of Australia at the ICSD. Once the Reserve Bank of Australia is certain that it has received the eligible French collateral in the relevant account, it will grant intraday credit to the French bank in Australian dollars, based on a haircut. As soon as the French bank has repaid the intraday credit in the Australian market, the Reserve Bank of Australia would return the French securities to the French bank through a transfer at ICSD (see Figure 7.6).

Figure 7.7

**Securities Facility –  
Third Party Agent Option (2)**



*The unwind would entail a series of sequential reversals of debit and credit entries.*

**Example – Linked Third Party Agents** In the United Kingdom, the Bank of England currently grants intraday liquidity based on a “self-collateralization” intraday repo mechanism with certain eligible securities maintained in Crest Co, the U.K. national central securities depository. The Bank of England could likely extend this facility by enabling participants to pre-position certain foreign (i.e., non-U.K. securities) in Crest Co through Crest Co’s account linkage with Euroclear or Clearstream, with these foreign securities eligible for use through Crest Co in the automatic “self collateralization” DvP repo mechanism. (see Figure 7.7).

The preceding securities collateral pool options (Home Central Bank Option, “All Participating” Central Bank Option, Third Party Agent option) could be understood as “building blocks,” which could be combined in various ways to create preferred solutions for a cross-border securities collateral pool.<sup>49</sup>

**7.1.4. Operational Considerations**

**Custodian/collateral management function.** Operationally all participating central banks (or the designated central securities depositories) would have to have the ability to:

- Define and recognize acceptable collateral.
- Accept collateral via pledge and / or repo mechanism.
- Process timely collateral movements, i.e., prompt delivery, confirmation and return of securities.

<sup>49</sup> This could mean that a participating commercial bank could find an agreement with one central bank to accept collateral via an international central securities depository (ICSD) whereas another central bank might feel more comfortable with an option where other central banks are taking the role of custodian and collateral manager, such as in the Home Central Bank Option or the “All Participating” Central Bank Option. .

- Define mechanism/ medium to affect and communicate a change in collateral criteria.
- Apply a daily valuation to acceptable collateral to ensure sufficient value.
- Preset and monitor haircuts against collateral types that would also mitigate FX risks.
- Define whether the transaction between commercial bank and central bank(s) is structured as a repurchase agreement (“repo”) transaction or in the form of a hypothecation i.e., “pledge” of collateral.

Currently most central banks fulfill the operational requirements outlined above. In addition, central banks act as custodians for one another for government securities. However to extend the custody and collateral management services to foreign government securities, and even non-government collateral, may mean an unacceptable level of work. This function, however, could be outsourced to the central securities depositories and global custodians that have the best custody and collateral management expertise and capabilities. However the central bank providing intraday liquidity is always the principal to the transaction and would bear associated risks such as credit and liquidity.

**Infrastructure.** Central banks currently provide intraday credit to commercial banks in their home markets and have a custodian/safekeeping function for other central banks for government securities. Under the cross-border securities collateral pool model, each participating central bank would likely have to extend their current infrastructure (system and manpower) or make use of central securities depositories or commercial bank custodian services in the respective jurisdictions.

Given the operational requirements, it is assumed that in the Home Central Bank Option and the “All Participating” Central Bank Option Model (collectively the “central bank options”), the operational burden for each central bank would be significant. Central bank securities settlement systems would have to accept new collateral types (as defined by the away central banks), keep records for central banks and commercial banks, and handle updates of acceptable collateral from all involved central banks. Central banks would have to develop timely procedures for confirmation and release of messages to the involved parties. In addition central banks might have to use commercial banks as custodians for certain collateral types (e.g., a US commercial bank would hold DTC eligible collateral for SNB).<sup>50</sup> There may be other, as yet undefined, requirements to support the repo and pledging activity between banks and their cash correspondents.

A Third Party Agent Option could alleviate much of the burden of the central banks mentioned above as the custody and collateral management function would be handled by designated international central securities depositories. International central securities depositories have the necessary infrastructure to provide the requested custodian service such as independent securities valuation, haircuts and communication infrastructure and they guarantee operational execution to the participants.

A key benefit to the Third Party Agent Option would be to concentrate holdings of securities collateral for a cross-border intraday credit in a few locations (i.e., ICSDs and a few other national central securities depositories/global custodians). This would greatly minimize the operational burden for central banks. The central banks would have to maintain far fewer foreign

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<sup>50</sup> In many cases CSDs does not permit overseas entities from establishing direct securities accounts. In these cases, the away central bank would have to rely on a local custodian to maintain custody of the assets.

securities accounts, and custody and collateral management services would be completely outsourced, making it operationally easier to move/accept collateral.

The Task Force would recommend for various reasons, including market competitiveness and continuity of business, more than one third-party collateral management agent be used to support the facility.

***Method of collateralization.*** It is presumed that with the establishment of a cross-border securities collateral pool facility the away central bank (i.e., the lending central bank) would determine the method of collateralization for the intraday credit in its market. The method of collateralization selected most likely would be the one that is normally used by away central bank in the provision of intraday credit. The Task Force sees the options for the G-10 markets being either a repo transaction or a collateral pledge. Whichever facility is used, it would need to be supported by agreements, deeds or the requisite formal documentation in order to establish a pledge in the event the transfer of position or delivery of the currency collateral, with endorsement, is by itself not sufficient. Market participants will have to be aware that different types of transactions and different methods for holding collateral (pooled and earmarked collateral systems) may be used in different jurisdictions and that the facility may use a different procedure from that to which a market participants is accustomed.

The major ICSDs, such as Clearstream and Euroclear, already provide fully-fledged custodian and collateral management services to certain central banks for cross-border pledge agreements. These services include collateral acceptability checks, haircuts, valuation, and position communication/confirmation. For the valuation the ICSDs often use two or more independent pricing services. They also can monitor the liquidity of the pledged collateral and can monitor collateral against specific conditions the central bank may impose.<sup>51</sup> The ICSDs can provide guarantees to central banks on their operational execution. Dividends and interest can be paid directly to the commercial banks.<sup>52</sup>

***Communication protocol.*** Just as in the case of other cross-border collateral pool models, a real-time communication protocol would be required to ensure a safe, reliant and efficient service. While the involvement of central securities depositories, in addition to central banks, may make the communication requirements more complex, the Task Force is of the view that an effective communication protocol could be in place within a practical time period particularly if the Third-Party Agent Option is established. The Third-Party Agent Option would leverage both the communication protocol of RTGS systems and the ICSD. However, central banks would have to evaluate whether they could leverage existing RTGS communication systems, securities settlement system communication networks and central bank/custodian collateral management services to ensure a real-time communication protocol under either of the two “central bank ” options.

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<sup>51</sup> There are certain rules if the quoted prices for a certain security is too old, e.g., older than 5 days, the haircut has to be increased and if older than 10 days, the security has to be replaced by other collateral.

<sup>52</sup> A recent case was in 2001 when the Federal Reserve began using the custodian/collateral management services of both Clearstream and Euroclear for cross-border pledge agreements now in place for commercial banks in the U.S. that need additional liquidity above their domestic collateral holdings. In 2001, the Federal Reserve began accepting non-U.S. Sovereign Debt and Brady Bonds with ratings from AAA to BBB-/Aaa to Baa3 that are held at the two ICSDs.

There would have to be clear information provided to market participants on the cut-off times for effecting cross-border cash collateral pool transactions. The two central bank options are more dependent on local central securities depository cut-off times than the Third-Party Agent Option. Under the Third-Party Agent Option, local cut-off times are only relevant if new collateral has to be deposited with the central securities depository; all other transfers are simple book-entry accounts within the central securities depository. .

***Operating window.*** A cross-border collateral pool facility is meant to function as an intraday credit facility. Therefore securities could be pledged across time zones, but must be returned by the central bank granting intraday liquidity to the commercial bank before the RTGS is closed for the business day.

The assumption is that the local operating hours for cash and securities clearing systems would not have to be changed.<sup>53</sup> However, the collateral pledging/management/control would have to be extended to a 24-hour service, in order to accommodate the movements to and from different time zones. The two central bank options would require central banks to move to a 24-hour operation for the purpose of managing collateral. In the Third-Party Agent Option, it would be incumbent upon the central securities depositories to provide such a 24-hour custody/collateral management service, and possibly an intraday settlement mechanism between multiple ICSDs.

***Unwind facility.*** The “unwind” of the intraday credit could be discretionary, that is left to the discretion/control of the borrowing institution as is protocol for central bank intraday credit provisions generally. Conversely an automatic unwind feature could be developed. An automatic unwind facility could be a timed “kick-back” mechanism, which is automatic but tied to the commercial banks account balance at the ‘away’ central bank, i.e., intraday collateral is automatically returned less any outstanding debit balance at a pre-defined time.

It is the view of the Task Force that the unwind feature should be discretionary to be consistent with market practice. This would also eliminate the need for additional infrastructure to be built to operate the kickback mechanism; however the automatic process would ensure the unwind was undertaken to avoid any possible monetary impact.

***Scalability.*** A cross-border *securities* collateral pool facility offers a wide range of flexibility. For example, the Third Party Agent Option allows a central bank to introduce such a facility unilaterally, without having to coordinate with other central banks. It would allow other central banks to learn and adjust the concept to meet their own requirements and to gradually expand it to a broader basis.

Alternatively, the Home Central Home Central Bank Option could first be offered by a Central Bank on a bilateral basis i.e., involving two participating central banks only, and could be expanded over time to include more central banks. If a facility were implemented first on a bilateral basis only, it would allow a review of legal issues around collateral agreements in just two jurisdictions. Unnecessary adjustments of infrastructure could be avoided and cost could be reduced.

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<sup>53</sup> By not changing the local operating hours of the local securities settlement systems, it is acknowledged that the collateral usage might be limited to a certain extent.

## 7.2. Cash Collateral Pool Model

Under this model, market participants would be able to pledge foreign currency to a central bank for intraday credit.

The Task Force identified three options for a cash collateral pool facility that could be viable for the market:

- Away Central Bank Option
- Home Central Bank Option
- Third-Party Agent Option

### 7.2.1. Away Central Bank Option

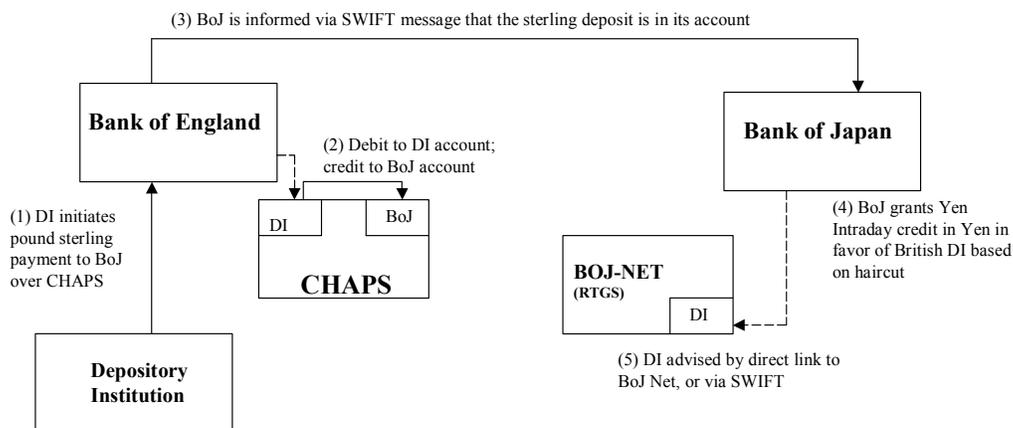
Under this option, participants could use positive cash balances at their home central bank to obtain intraday credit from a foreign (i.e., “away”) central bank.<sup>54</sup> To do so, participants would initiate the transaction by making payment over the home central bank’s real-time gross settlement (RTGS) system to the account of the away central bank. Upon receipt of the cash payment the away central bank would provide intraday credit. The home central bank plays no direct role other than as a correspondent to the away central bank. The away central bank would run the facility and bear all the administrative costs of the facility, although as the facility would be utilizing existing communicating infrastructure such as SWIFT and local RTGS connectivity links, the actual costs above current levels would be minimal. The transaction could be structured as either a collateralized loan or in the form of a currency swap. The away central bank would be the principal to the transaction and would bear all associated risk e.g., credit, operational, liquidity.

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<sup>54</sup> A “home” central bank is the central bank of the country in which the commercial bank’s parent is incorporated i.e., the commercial bank’s national central bank. An “away” central bank is any central bank located in another jurisdiction where the commercial bank is conducting banking activities through a branch, subsidiary or correspondent.

Figure 7.1

### Away Central Bank Option (collateralized loan)



*The unwind would entail a series of sequential reversals of debit and credit entries beginning with: (6) BoJ debiting the Yen clearing account of the DI on BOJ-NET at the agreed time; (7) BoJ initiating payment instruction via SWIFT to return pound sterling to DI; (8) pound sterling automatically returned to the British DI through real-time transfer over CHAPS.*

*Communication via existing SWIFT protocol*

#### **Example – Away Central Bank Option**

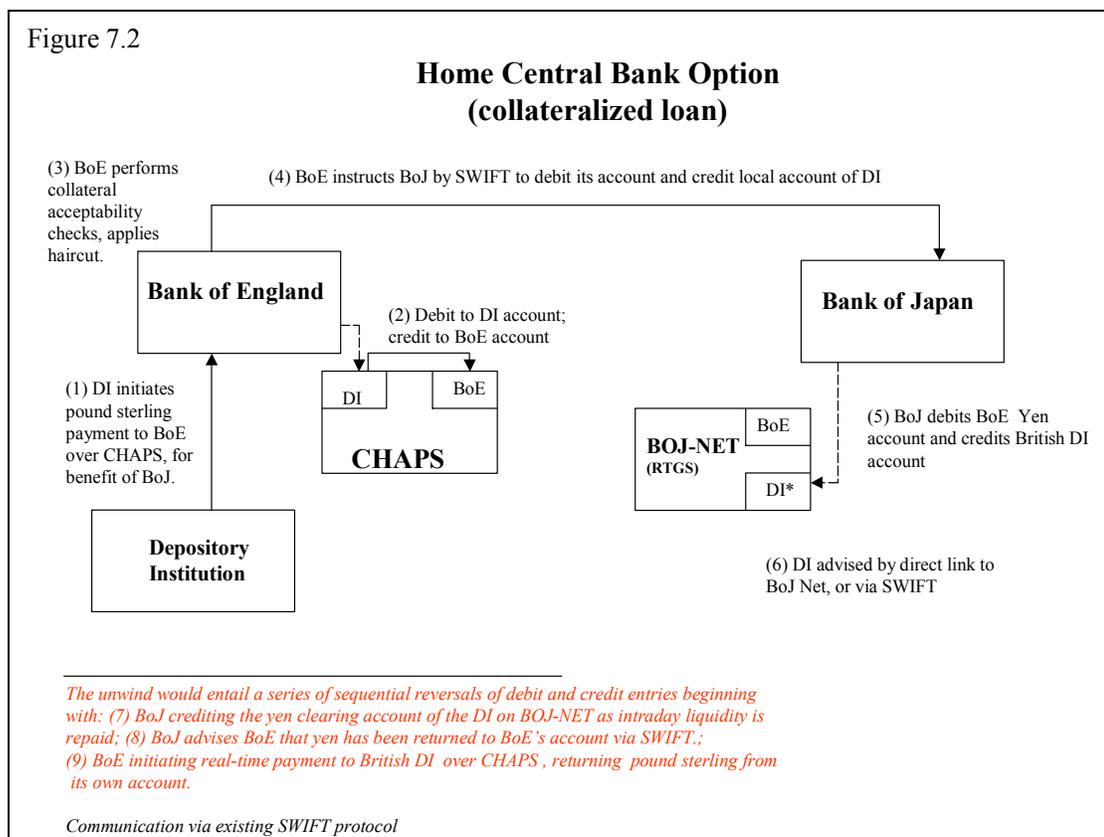
A British bank wishes to obtain credit from the Bank of Japan on the basis of cash balances held in their account at the Bank of England. To do so, the British bank must arrange for its cash balance to be transferred to an account maintained by the Bank of Japan at the Bank of England. (To effect this transfer, a payment would be made over the CHAPS Sterling system i.e., the RTGS system in the U.K. for sterling.) Once the Bank of Japan is advised (via SWIFT) of receipt of the sterling in its Bank of England account, it will grant intraday credit to the British bank in yen, based on a haircut.<sup>55</sup> The intraday credit in the Japanese market will be repaid once the British bank has completed its clearing and settlement activities in the local market. The Bank of Japan would then return the sterling to the British bank through a transfer in the CHAPS Sterling RTGS system (see Figure 7.1).

#### **7.2.2. Home Central Bank Option**

Under this option, participants could use positive cash balances at their home central bank to obtain intraday credit in an away currency owned by the home central bank. However, to do so, participants would initiate the transaction by making a payment over the home central bank's real-time gross settlement (RTGS) system to the account of the home central bank. Upon verifying receipt of funds or establishing adequate credit is available, the home central bank will apply a haircut and authorize the away central bank to release local currency funds from its own account to the designated account of the depository institution in the away central bank. Under this option, the transaction too can be legally structured as a collateralized loan or as a currency

<sup>40</sup> This facility may be structured as a collateralized loan or a currency swap, as agreed between the parties. The mechanics are identical but the accounting and documentation will be determined by the structure chosen.

swap. In either instance the home central bank will bear the risk. However in both cases the home central bank is only authorizing the available headroom of the commercial bank, which will only be granted if sufficient collateral is pledged or credit is available. As in the away central bank option, all payment and information flows would utilize the existing SWIFT network and message standards and local RTGS links to manage the cash collateral. (See Figure 7.2)

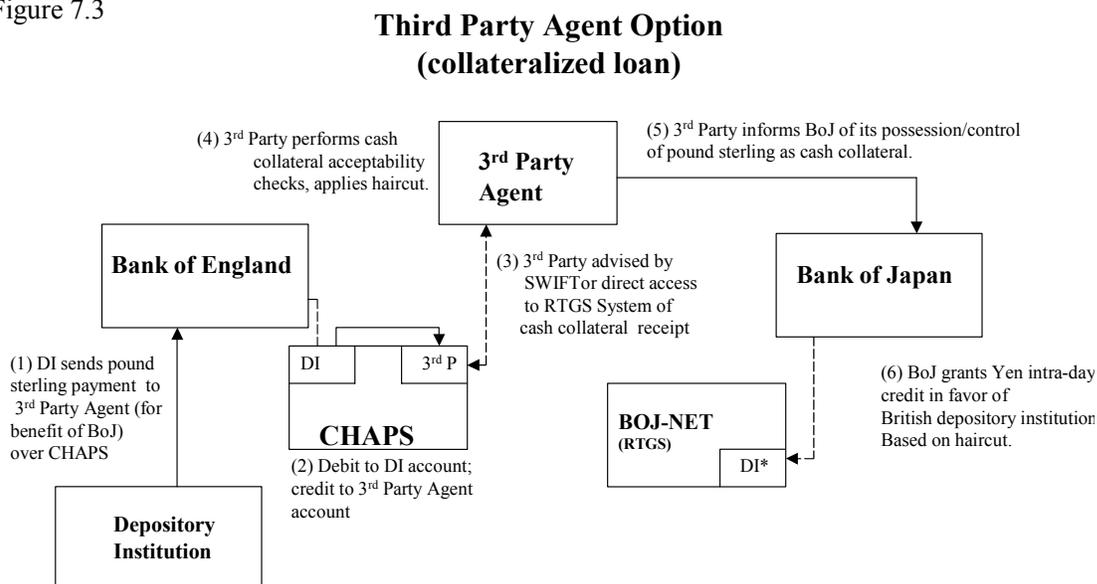


### 7.2.3. Third-Party Agent Option

Under this option, participants could use positive cash balances at their home central banks to obtain intraday credit from a foreign (i.e., “away”) central bank. However, an intermediary would be used by the central banks as an agent for holding the cash collateral. Participants would initiate the transaction by making a payment over the home central bank’s real-time gross settlement (RTGS) system to the account of the third-party agent, for the benefit of the away central bank. The third-party agent would assume the role of cash collateral agent on behalf of the away central bank. The third-party agent would ensure the required control and possession of the cash collateral on behalf of the away central bank and will perform valuation based on preset haircuts established by the away central bank. Upon being notified by the third-party agent of its possession and control of the cash collateral, the away central bank would provide intraday credit based on the haircut. The transaction could be structured as either a collateralized loan or in the form of a currency swap. The home central bank would merely serve as the transfer agent. The away central bank is the principal to the transaction and would bear all associated risk e.g., credit, operational, liquidity. The third-party agent would bear much of the administrative costs of the transactions.

With the introduction of a third party agent links would need to be established between the central banks, RTGS systems and the third party agent. Although this could be achieved through existing SWIFT message types such as MT 200 & MT 900 series, it is envisaged that either a new SWIFT message type for central banks could be developed, or a new real time messaging protocol could be established to create a secure network just for central banks and the chosen third party agent.

Figure 7.3



*The unwind would entail a series of sequential reversals of debit and credit entries beginning with: (7) BoJ crediting the yen clearing account of the DI on BOJ-NET as intraday liquidity is repaid; (8) BoJ instructing 3<sup>rd</sup> party agent to repay pound sterling to British DI; (9) 3<sup>rd</sup> party escrow agent initiating real-time payment to British DI over CHAPS, returning pound sterling from its own account.*

*Communication via existing SWIFT protocol*

### **Example – Third-Party Agent Option**

A British bank wishes to obtain credit from the Bank of Japan on the basis of cash balances held in their account at the Bank of England. To do so, the British bank must arrange for its cash balance to be transferred to an account maintained by the designated third-party agent at the Bank of England. To effect this transfer, a sterling payment would be made over the CHAPS RTGS system. The third-party agent will hold the sterling on behalf of the Bank of Japan. The third-party agent will inform the Bank of Japan that it has received the eligible cash collateral and the amount of intraday credit that should be granted based on the Bank of Japan’s preset haircut. On the basis of this information, the Bank of Japan will grant intraday credit of the advised amount to the British bank in the Japanese market. The intraday credit in the Japanese market will be repaid once the British bank has completed its clearing and settlement activities in the local market. The Bank of Japan would then instruct the third-party agent to return the sterling to the British bank through a transfer in the CHAPS Sterling RTGS system (see Figure 7.3).

### **7.2.4. Operational Considerations**

**Infrastructure.** Under each of the three cash collateral pool options, very little new infrastructure would need to be developed to commence operations. All three options would make use of existing real-time gross settlement (RTGS) systems and correspondent account structures at central banks. Central banks currently provide cash accounts and intraday credit to commercial banks in their home markets and offer cash accounts and custodian/safekeeping and collateral management services for other central banks. Market participants would receive information on their available intraday liquidity in away markets through existing RTGS reporting functions. Market participants could use existing RTGS payment instruction protocols to initiate delivery of cash collateral. No new infrastructure bridges would need to be developed between central bank systems.

The Third-Party Agent Option would also make use of existing RTGS systems and correspondent account structures at central banks. However, a necessary precondition would be for the central bank to select a third-party that would provide the requisite cash collateral management services. From an operational standpoint, this could be any financial institution that is eligible to maintain central bank cash accounts at the central bank and that has the requisite cash collateral management capabilities. From a market competitiveness and credit worthiness standpoint, it is the view of the Task Force that the third-party agent should ideally be a “utility-type” entity, with the creditworthiness acceptable by both market participants and central banks.<sup>56</sup> An instruction protocol may need to be developed between the central bank and the third-party agent for notification of earmarked funds or collateral pledges. This could be achieved through a new SWIFT message type.<sup>57</sup>

**Method of collateralization.** The delivery of the intraday liquidity in any of three options could be structured as either a *collateralized loan transaction* or a *currency swap transaction*. For collateralized loan transactions, there would be a hypothecation of foreign currency as collateral by the market participants to the liquidity provider. Collateralized loans would need to be supported by agreements, deeds or the requisite formal documentation in order to establish a secured pledge in the event the transfer of position or delivery of the currency collateral, with endorsement, is by itself not sufficient. The movement of cash collateral would be affected through book entries on the accounts of the central banks. One advantage to collateralized loan transactions, relative to currency swap transactions, is that there would be fewer account entries on the books of central banks.

For currency swap transactions, the appropriate legal agreement would need to be in place between the liquidity provider and the commercial bank the principals in the transaction. Currency swaps would be effected through the corresponding book entries on the accounts of the home and away central banks. One advantage of currency swap transactions is that their use may eliminate many of the legal complexities associated with cash collateral pledges, including an assurance that the pledge is enforceable against third parties, including a liquidator.<sup>58</sup> Another

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<sup>56</sup> Both market participants and central banks would be exposed to deposit risk associated with their cash balances held by the third-party agent.

<sup>57</sup> The Task Force could also envision a future model whereby the Third-Party Agent provides a more active role in the monitoring the headroom of commercial banks cash balances within the G-10 central banks in order to utilize liquidity effectively. In this future model, an instruction/advice would be sent by the commercial bank to the third party advising the transfer of liquidity from one central bank to another.

<sup>58</sup> However, this should not be barrier toward adopting a facility built around collateral pledges, as cash is one of the most common forms of collateral in the global financial markets.

advantage is that certain central banks may not currently accept cash collateral pledges for intraday credit, but many conduct currency swap transactions.

None of the options would require market participants to adopt new special procedures as each would make use of procedures which already exist in the markets i.e., funds transfers, collateral pledges, and currency swaps. However, participants would have to be aware that different types of collateral transactions (currency swap or collateral pledge) may be used in different jurisdictions and that a central bank may use a different procedure from that which they may be accustomed to.

***Custodian/cash collateral management function.*** A principal difference between the three options is the entity that would serve in the collateral management function. Under the Away Central Bank Option, the away central bank, as the liquidity provider, would maintain the collateral management function. Cash collateral would be delivered directly to the away central bank and the away central bank would be responsible for processing information on the delivery and eligibility of the cash collateral, as well as for conducting the valuation process and for providing liquidity. Under the Home Central Bank Option, the home central bank, as the liquidity provider would provide a collateral management function. Under the Third-Party Agent Option, the cash collateral management function would be provided by the third party intermediary, i.e., a non-central bank, on behalf of the away central bank that is granting intraday credit.

In order for the Away Central Bank or Home Central Bank options to be adopted, a participating central bank would have to:

- Have the ability to define and recognize acceptable cash collateral.
- Have the ability to process timely cash movements, i.e., prompt delivery, notification, confirmation and return of cash.
- Have the mechanism and medium in place to affect and communicate a change in criteria, i.e., haircuts.
- Have the ability to apply a daily valuation to acceptable cash collateral to ensure sufficient value.
- Have the ability to preset and monitor haircuts against cash collateral to mitigate foreign exchange risk.

Currently many of the G-10 central banks fulfill these operational requirements as part of maintaining their existing intraday credit services. The G-10 central banks today also act as correspondents for one another for government securities. However, it is possible that central banks might have to modify their existing capabilities to accommodate a cash collateral service, as cash is typically not accepted by central banks as collateral as part of their intraday liquidity services.

If the Third-Party Agent Option were adopted, the cash collateral management function would be outsourced by central banks. This would alleviate the operational impact to the central banks associated with cash collateral management. The third party entity would have to have the necessary infrastructure to provide the requisite cash service such as independent cash collateral valuation, haircuts and communication infrastructure, plus they would have to guarantee operational execution to the participants.

***Definition of eligible collateral.*** In operating a cash collateral pool facility, individual central banks should be allowed to set their own criteria on acceptable cash collateral, and if necessary, where it should be cleared. This gives central banks the ability to act within their own charters, regulations or practice. This would ensure central banks maintain a necessary comfort level in their credit risk management practices.

However, if the G-10 central banks were to collectively move toward adopting a cash collateral pool facility, some degree of consistency would be desirable. It is the view of the Task Force that to most effectively meet the global intraday liquidity needs of market participants, each of the G-10 central banks should, at a minimum, accept the initial seven CLS-eligible currencies as cash collateral, i.e., US. dollars, euro, yen, sterling, Swiss francs, Canadian dollars and Australian dollars. Acceptable collateral would be published along with appropriate haircuts and the settlement mechanisms to be used.

In order to adopt a cash collateral pool facility, certain G-10 central banks may need to effect some changes in local law or regulations in their jurisdiction. For example, current European Central Bank (ECB) regulations stipulate that in issuing intraday credit, European central banks may only accept collateral denominated in euros, or in one of the other EU currencies e.g., British sterling. A change in ECB regulations would be a prerequisite for European central bank participation in a cash CCP facility.

***Communication protocol.*** Because a cash collateral pool facility would be supporting RTGS credit provisioning, a real-time communication protocol would be required to ensure a safe, reliant and efficient service. There would not need to be new transaction notification/matching services to support such a facility. Existing central bank RTGS instruction protocols could be modified to allow market participants to designate a transaction as a “cross-border” collateral transaction or a SWIFT type message could be developed. There would have to be clear information provided to market participants on the cut-off times for effecting cross-border cash collateral pool transactions. There may have to be changes to cut-off times for international correspondent payments orders.

***Operating window.*** A cash collateral pool facility is meant to function as an intraday credit facility. Credit provided in the away market is to be repaid by the market participant during the same business day (in the away market) that it is granted. Ideally, cash collateral provided from the home market should be returned to the market participant during the same business day. It was envisaged that the cash CCP facility should be available to market participants during the full operating hours of the RTGS system in the away market (as is the case with existing central bank intraday credit facilities). However the time zone differences across the G-10 countries and the current operating hours of the central bank RTGS systems could limit the operational capacity of a cash CCP facility as an intraday credit mechanism across global markets.

As outlined in Annex 5, the current overlapping RTGS clearing cycles of the nineteen countries represented by the seven “CLS-currencies” are somewhat limited. For example, there are only three hours each day (from 01:00 EST to 04:00 EST) where the RTGS systems comprising the CLS currencies are open simultaneously. In addition, there are wide discrepancies in which RTGS systems are open simultaneously on a bilateral basis (the more

critical factor).<sup>59</sup> For example, a Dutch bank operating in the euro market could utilize euros as cash collateral in the Swiss market for the entire business day in Switzerland (i.e., 06:00 CET to 18:00 CET). However, the same Dutch bank operating in the euro market could only utilize euros as cash collateral in the U.S. market from 01:00 EST to 12:00 EST. On an aggregate basis, an Australian bank would be able to utilize Australian dollars as cash collateral in the other eighteen markets for 43 hours. Meanwhile a Swiss bank would have up to 76 hours in aggregate to utilize Swiss francs as collateral for intraday liquidity in the other markets.

While the institution of a cash collateral pool facility operating under the current RTGS operating hours would be able to support commercial banks' CLS funding needs, it would be somewhat limited as a tool to meeting other payment needs across the G-10 jurisdictions. The time zone differences would limit its availability for some markets and result in participants from some jurisdictions being able to make greater use of the facility than others. In order for a cash CCP facility to be of use during significant, and equal, periods of time during the business day in each G-10 market, one of the following must occur:

1. Central banks would have to operate their RTGS systems on a near 24-hour basis;
2. Market participants would have to be willing to pre-position cash collateral on the prior business day in certain markets and possibly not have cash collateral returned until the next business day in other markets; or
3. A third-party agent would have to operate the cash collateral management services on a near 24-hour basis.

Central banks operating RTGS systems on a near 24-hour basis would prevent the need for market participants to pre-position cash collateral the day before and be subject to returns of cash collateral on the following business day. However, moving to a near 24-hour operating capacity for RTGS systems would have significant operational and cost implications for central banks. While some central banks have indicated a willingness to explore the need to expand their RTGS operating hours in response to increased global financial market activity, the move to near-24 hour operating hours is something that will not likely occur in the near-term.<sup>60</sup>

If a cash collateral pool facility were to operate within the constraints of current RTGS operating hours, in certain instances participants in some markets would have to pre-position cash collateral in the home market on the prior day in order to make use of the service. In other markets, participants may have to wait for the return of cash collateral until the next business day as the RTGS in the home market would be closed before the end of the business day in the away market. Unless overnight interest was paid on the cash collateral, in certain instances market participants would face an implicit cost of using the facility equal to the overnight inter-bank lending rate.

A third way to structure a cash collateral facility so there can be full use of the intraday liquidity facility during the business day in all markets is to rely on a third-party agent, to operate its cash collateral management services on a near 24-hour basis. This would alleviate the need

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<sup>59</sup> For a cash CCP facility to operate during the full operating hours of the RTGS systems of these jurisdictions, simultaneous operation of all RTGS systems is not required. Rather, the necessary precondition is that on a bilateral basis each of the RTGS systems overlap with the others for all or most of the business day.

<sup>60</sup> In weighing the costs against the benefits of moving to a 24-hour operating day, central banks should consider not just the benefits of facilitating a CCP facility, but of the other benefits associated with expanded operating hours.

for central banks to have to move to a near 24-hour operating capacity for RTGS systems. This would largely eliminate the need for market participants to pre-position cash collateral and minimize the need to return cash collateral until the following business day.

***Unwind facility.*** Since a cross-border collateral pool facility is meant to be designed as an intraday credit facility, any central bank credit granted in an away market must be repaid to the away central bank before the close of the RTGS operating hours in the away market (or by the conventional time in the local market by which banks are to cover intraday overdrafts at the central bank). The “unwind” of the intraday credit could be discretionary, that is left to the discretion/control of the borrowing institution, as is the protocol for central bank intraday credit provisions generally. Conversely an automatic unwind feature could be developed. An automatic unwind facility could be a timed “kick-back” mechanism, which is automatic but tied to the commercial banks account balance at the “away” central bank; cash collateral is automatically returned less any outstanding debit balance at a pre-defined time.

It is the view of the Task Force that the unwind feature should be discretionary so that it is consistent with market practice. This would also eliminate the need to build additional infrastructure to operate a kickback mechanism, however, the automatic process would ensure that the unwind is undertaken to avoid any possible monetary impact. The Task Force, however, envisions the need to possibly set an earlier repayment time for the intraday credit (i.e., earlier than the normal time in the market), as this would allow for the transaction to fully unwind in both the away and home market, where cash collateral is to be returned to the depository institution. Clearly a contingency operation may be required to offset a possible unwind failure, therefore it was felt that a reverse swap between the two central banks could be a possible answer to avoid domestic monetary impact.

***Scalability.*** Any of the cash collateral pool options could first be offered by a central bank on a bilateral basis i.e., accepting foreign currency from one other jurisdiction only. and could be expanded over time.<sup>61</sup> If a facility were implemented first on a bilateral basis only, it would allow a review of legal issues around cash collateral between two jurisdictions. The advantage would be to learn and adjust the concept before it is introduced on a broader basis. Unnecessary adjustments of infrastructure could be avoided and cost could be reduced. The more countries involved may well mean that the timeframe to implementation would extend dramatically.

The basic assumption underlying all three options is that market participants would only be able to use their home central bank to create cross-border intraday liquidity rather than any central bank where they have an operation. This would ensure that the home central bank has full knowledge (and control) of the global intraday liquidity provided through cross-border collateral pool facilities to national banks.

A cash collateral pool facility could be extended, with no new infrastructure, such that central banks could accept foreign currency as collateral from the account of any other “participating” central bank. This would increase the intraday liquidity capacities of market participants and optimize existing cash collateral usage without any material increase in risk. Such an “all participating” cash collateral pool facility could serve to reduce risk in the event there was an operational outage or liquidity crisis in any particular jurisdiction as liquidity could

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<sup>61</sup> The Away Central Bank Option and Third-Party Agent Option can be implemented on a unilateral basis, with no coordination required among central banks.

be sourced from multiple markets. It would also provide greater flexibility to the service, allowing banks to take better advantage of time-zone constraints that could otherwise limit the availability of the service.<sup>62</sup> One concern might be that commercial banks could possibly arbitrage central bank liquidity facilities, i.e., source cash collateral from the market where it is cheapest to obtain. The management of this liquidity would need a 24-hour coverage by the commercial banks involved, although this was seen as a likely condition due to the linking of the RTGS systems of the seven CLS currencies.

### **7.3. Central Bank Guarantee Model**

A third model for a central bank operated cross-border collateral pool facility would be one where central banks would provide intraday credit to a commercial bank based on a “guarantee” of that credit by the commercial bank’s domestic central bank. The central bank providing the guarantee would be secured based on collateral (cash or securities) provided by the commercial bank

#### **7.3.1. Description**

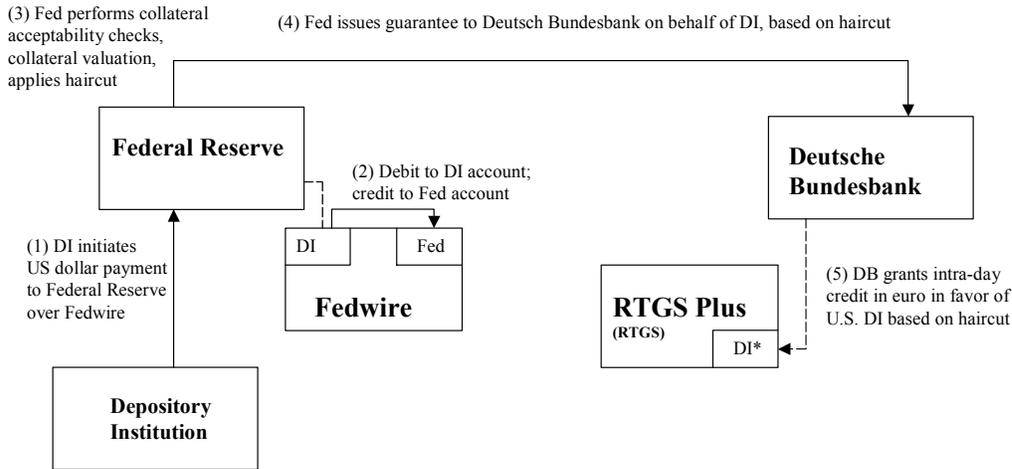
Through this service, participants could use positive cash balances at their home country central bank, or securities holdings, to obtain intraday credit from a foreign (i.e., “away”) central bank. To do so, participants would either transfer cash, or pledge securities, to a guarantee account ( in their name) at the home country central bank, or have a portion of its payment capacity blocked by the home central bank. The transfer of cash could occur as a book transfer at or by a direct debit by the home central bank, or via the real-time gross settlement (RTGS) system. A pledge of securities would be to a designated guarantee account at the home central bank via a book transfer or via the designated central securities depository (CSD). Upon receipt of the collateral, the home country central bank would issue a guarantee to the away country central bank, guaranteeing the intraday liquidity provided by the away central bank to the market participant, for a specific amount, based on a haircut, and specific value date. Upon receiving the guarantee from the home central bank, the away central bank would issue intraday credit, in a domestic format (e.g., intraday credit, intraday repo etc.). In this scheme, the home central bank acts as the custodian and collateral management agent bearing all the administrative costs of the facility. The home central bank also acts as principal in the transaction, guaranteeing the intraday credit provided by the away central bank to the market participant.

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<sup>62</sup> For example, under a facility where banks can only source collateral from their home jurisdiction, a Japanese bank could only attain intraday USD dollar intraday liquidity from the Federal Reserve 12:30 A.M. to 6:30 A.M. EST. However under an "All Participating" model, the Japanese bank could avail itself of euro collateral to attain intraday USD dollar intraday liquidity from the Federal Reserve up until 12:00 .P.M. EST. (see Annex 5).

Figure 7.8

### Central Bank Guarantee Model



The unwind would entail a series of sequential reversals of debit and credit entries beginning with: (6) DB debiting the euro clearing account of the DI on RTGS Plus at the agreed time; (7) DB informing Fed that euro intraday liquidity has been repaid; (8) Fed informing DB that guarantee has been revoked; (9) Fed initiating payment instruction over Fedwire to return U.S. dollars to DI; (10) U.S. dollars automatically returned to the U.S. DI through real-time transfer over Fedwire.

#### Example – Central Bank Guarantee Model

A U.S. bank wishes to obtain euro credit from the Deutsche Bundesbank (the German central bank) on the basis of U.S. dollar cash balances held in its account at the Federal Reserve. To do so, the U.S. bank must arrange for its U.S. dollar cash balance to be transferred to its guarantee account at the Federal Reserve Bank of New York. (To affect this transfer, a book transfer or direct debit could be initiated by the Federal Reserve, or a payment would be made over the Fedwire system i.e., the RTGS system in the U.S.) Upon receipt the Federal Reserve will issue a guarantee to the Deutsche Bundesbank for the given amount, based on a haircut. Upon receiving notification of the Federal Reserve guarantee, the Deutsche Bundesbank would grant intraday credit to the U.S. bank in euro, based on the haircut. As soon as the intraday credit in the German market has been repaid by the U.S. bank, the Deutsche Bundesbank would notify the Federal Reserve and the Federal Reserve would revoke the guarantee and return the U.S. dollars to the U.S. bank main account by a book transfer or through a Fedwire transfer (see Figure 7.8).

#### 7.3.2. Operational Considerations

**Infrastructure.** In a Central Bank Guarantee Model, there would be very little new infrastructure needed to begin operations. Transfers of collateral would occur over preexisting real-time gross settlement systems and/or securities settlement systems in the home country. Intraday credit would be provided in the away market over existing RTGS systems. The day-to-day operations of this scheme would be far simpler for the central banks as there would be no movement of assets across borders. However, central banks would have to have a communication mechanism in place for notification of the issuance and revocation of guarantees,

and for the notification by the away central bank to the home central bank that the participant has repaid any credit.

***Method of collateralization.*** The method of cross-border collateralization would be in the form of a guarantee, i.e., a contractual obligation by which the home central bank assumes responsibility for performance of the obligations of the market participant if it defaults on its intraday credit obligations. Such guarantees are not uncommon in cross-border financial transactions or clearinghouse arrangements. Bank letters of credit have been an integral part of international finance for many years. Likewise, many clearinghouses rely on bank guarantees from participants for collateral/margin and/or loss-sharing requirements.

A key consideration would be how to structure guarantees with regards to nominal amounts per participant, and the frequency and tenure with which guarantees would be issued. It is presumed that the away central bank would have full discretion as to how much liquidity it is willing to provide based on a guarantee from a home central bank. Likewise, home central banks should not be obliged to provide guarantees more than they are willing to and unless they are able to ensure they are fully collateralized. Guarantees could be issued on a daily basis for a specific value date, or when the guarantee is needed for a longer period. Acceptable terms would have to be established in contractual arrangements between the home central bank and the away central bank and the home central bank and the participants.

***Custodian/collateral management function.*** Under this scheme, the home central bank would provide the custodian and collateral management function. The G-10 central banks should currently be able to meet the general operational requirements of the facility, as the home central bank would presumably only be willing to accept the collateral that it already uses in its domestic operations. However, it is possible that central banks would have to modify their collateral management capabilities if cash were accepted as collateral for the guarantee, as cash is not typically accepted by central banks as collateral for their intraday liquidity provisioning.

***Definition of eligible collateral.*** The away central bank, supplying the liquidity, would only have to rely on the guarantee provided by the home central bank. It is presumed that that home central bank would rely on the same collateral relied upon in its domestic intraday credit operations. However, home central banks may want to expand acceptable collateral to include cash balances at the home central bank.

***Communication protocol.*** A real-time communication protocol would be required to ensure a safe, reliant and efficient service. Market participants could initiate collateral movements in the home market by sending real-time delivery instructions to the home central bank through existing RTGS or CSD systems. Market participants would receive information on the status of the intraday credit in the away market over the away central bank's RTGS reporting system. However, the requisite communication protocol would need to be established for: (1) the away central bank notifying the home central bank of its willingness to accept a guarantee from the home central bank for a given participant for a given amount; (2) the home central bank notifying the away central bank of its willingness to provide guarantees up to a specified amount; (3) the home central bank notifying the away central bank that collateral is in place and that guarantee is effective; or that it is revoking guarantee; and (5) the away central bank notifying the home central banks once intraday credit has been repaid.

A Central Bank Guarantee Model could make use of existing S.W.I.F.T communication lines and working communication methods at national central banks. There would have to be clear information provided to market participants on the cut-off times for affecting transactions. Based on these, changes to cut-off times for international correspondent payments orders may or may not have to change. Over time, it could be determined whether a fully integrated straight-through processing (STP) model should be developed to support a Central Bank Guarantee Facility.

**Operating window.** Market participants' use of a Central Bank Guarantee facility could be limited by the time zone differences across the G-10 markets. Since this is meant to operate as an intraday facility, its use could be limited to the overlapping operating hours of the home and away central banks RTGS systems (see Annex 5 which outlines the current overlapping hours of the CLS currency RTGS systems). However, to enable greater and more comparable use across markets, the facility could be established such that a requested guarantee by market participants could be for a specific future value date in the away market e.g., the next business day. The guarantee would therefore become effective at the opening of the RTGS system of the away central bank on the requested value date, after acceptance of the notification of the home central bank. This would not have monetary implications for either market as liquidity in the away market would be repaid intraday and the guarantee in the home market would be fully collateralized, most likely by domestic securities.

**Unwind facility.** Just as in the case as the other models, a Central Bank Guarantee Facility is meant to operate as an intraday credit facility. The "unwind" of the intraday credit could be discretionary, that is left to the discretion/control of the borrowing institution as is the protocol for central bank intraday credit provisions generally. Conversely the automatic unwind feature could be developed. An automatic unwind facility could be a timed "kick-back" mechanism, which is automatic but tied to the commercial banks account balance at the "away" central bank, i.e., intraday collateral is automatically returned less any outstanding debit balance at a pre-defined time. It is the view of the Task Force that the unwind feature should be discretionary as that is consistent with market practice and would limit additional infrastructure from being needed to manage the kickback mechanism. The Task Force, however, could see the need to set an earlier repayment time for the intraday credit than the normal time as this would allow for the transaction to fully unwind in the away market, without causing monetary implications.

**Scalability.** A Central Bank Guarantee Facility could be offered first on a bilateral basis i.e., involving two participating central banks only, and could be expanded over time. If a facility were implemented first on a bilateral basis only, it would allow a review of legal issues around collateral agreements in just two jurisdictions. The advantage would be to learn and adjust the concept before it is introduced on a broader basis. Unnecessary adjustments of infrastructure could be avoided and cost could be reduced. The more countries involved may well mean that the timeframe to implementation would extend dramatically.

The basic assumption underlying the Central Bank Guarantee Facility is that market participants would only be able to rely upon guarantees provided by their home central bank. However, in principle a facility could be established whereby a market participant could rely on guarantees from any central bank where they are a direct participant in the RTGS system. This would enhance optimal collateral usage, as the available unutilized collateral may not always be held in the home market. It would also provide greater flexibility to the service, allowing banks

to take better advantage of time-zone constraints that could limit the liquidity benefits of the service. One concern with this model might be that commercial banks could possibly arbitrage central bank liquidity facilities, i.e., source collateral from the market where it is cheapest to obtain.

#### **7.4. Summary**

The Task Force identified three basic models for central banks to facilitate the acceptance of foreign collateral in exchange for intraday credit. Each would be acceptable from a market standpoint and there are no prohibitory factors, which from an operational standpoint would require significant infrastructure development. Each model offers fully collateralized intraday liquidity options for the global market participants.

The intent of the Task Force is to offer a comprehensive view of the models and options that we believe will provide for the extended use of collateral in the global markets. The characteristics of the models and options vary. Decisions may be made on the merits of cash, securities, or both, serving as acceptable collateral. An additional factor in any decision may be based on the interest or willingness of the central banks to establish unilateral, bilateral or multilateral facilities. A third factor may include an assessment of the pros and cons in outsourcing the operational component of collateral management.

The range of options is meant to provide maximum flexibility to the central banks' community. The Task Force acknowledges the fact that the central banks may not universally support any one model or option. There are policies and local market practices that will influence individual central banks' assessment of the proposed models. The Task Force is confident that the range presented is sufficiently broad so that the central banks can focus on and work with the model/option that is best for their market.

With respect to a cash collateral pool, the Task Force has identified possible advantages for central banks of the "Away Central Bank" option over the "Home Central Bank." The former could be established unilaterally by central banks, not relying on any operational coordination between central banks. It also would not be reliant upon a commercial bank's domestic central bank maintaining large levels of foreign currency reserves on account with the foreign central bank to facilitate the activity. An advantage of the "Third-Party Agent" option is that in addition to being able to be established on unilateral basis, central banks could fully outsource the collateral management/custody activities, minimizing the operational impact and associated costs. A third-party collateral management agent could also possibly offer this service on a near 24-hour basis to maximize use across time zones. The Scandinavian Cash Pool being instituted by the central banks of Denmark, Norway and Sweden in 2003 will be the first cross-border cash collateral pool instituted in the OECD markets (see Annex 7). It will follow the "Away Central Bank" model outlined in this report. It may be looked to as a model for other central banks to adopt.

With respect to the securities collateral pool model, there was universal agreement by the Task Force that if central banks were to begin accepting foreign securities as collateral for intraday credit, the "Third Party Agent" option would be the preferred solution from a market standpoint as:

- This type of facility could be established unilaterally by a central bank.
- Collateral is already centralized at the major international central securities depositories (ICSDs) and can be moved very efficiently, by account entry only, to central banks.
- The central banks could outsource the operational handling of collateral, which would minimize the operational impact for central banks and present greater operational efficiencies to market participants
- The major ICSDs and global custodians have the necessary infrastructure, expertise and capacity for efficient collateral handling in place and have a proven record in operational execution. The ICSDs have indicated strong support for providing such a service.
- Market participants could benefit automatically from future developments and investments in the private sector collateral industry.
- The Federal Reserve has already successfully implemented this model as a cross-border collateral pool facility.
- A third-party collateral management agent could offer a service on a near 24-hour basis to maximize its use.

The Task Force acknowledges that individual G-10 central banks should be allowed to set their own criteria on acceptable foreign denominated collateral, and if necessary, where it should be cleared and held in custody. However, if the G-10 central banks were to collectively move toward accepting or expanding the use of foreign denominated collateral, some degree of consistency would be beneficial. The Task Force believes that in order to most effectively meet the global intraday liquidity needs of market participants in the shortest possible timeframe, for both normal market conditions and times of market stress, the G-10 central banks should accept a broad range of sovereign debt from each of the G-10 countries.

The Task Force also believes that central banks having a mechanism in place to accept certain foreign collateral in exchange for intraday credit would be a most effective policy tool to address temporal (and potentially systemic) disruptions in liquidity in times of market stress. The Task Force is of the view that many of the cross-border collateral pool facility options outlined in the report could be instituted by central banks within six to twelve months, thus serving as an enhanced “near term” tool for collaborating in times of market stress. Each central bank should determine which cross-border collateral pool facility it would find most effective and suitable for use in times of market stress and which could be instituted most promptly.

The Task Force has established a table (see Annex 4), which compares each of the seven cross-border collateral pool facilities against each of these issues.

## **8. CROSS-BORDER COLLATERAL POOL FACILITIES: LEGAL & RISK ISSUES, COST IMPLICATIONS AND PUBLIC POLICY CONSIDERATIONS**

In the section of the report, an analysis is provided of the legal issues, non-legal risk issues, and cost implications associated with central bank cross-border collateral pool facilities. The Task Force also provides a view of any possible public policy considerations. It is not believed that the risk issues, cost implications or public policy concerns should present barriers to central banks establishing such facilities.

### **8.1. Legal Issues**

The Task Force recognizes that collateral transactions that have a “cross-border” element that can be complex from a legal standpoint. The Task Force also recognizes that at the moment most collateral transactions involving central banks are domestic rather than cross-border. The collateral transactions associated with the cross-border collateral pool facilities would be foreign in nature because:

1. The collateral would be denominated in a foreign currency.
2. The transferor would be incorporated in a foreign country.
3. The collateral would be issued by a foreign entity i.e., foreign governments; and
4. The collateral would be held abroad (e.g., in a foreign depository/bank).

In order for any of the cross-border collateral pool facilities to be viable, central banks, as the collateral takers (“transferees”), must be assured that they can perfect a secured interest in the collateral in each jurisdiction where collateral is taken. Participating central banks would need to ensure that in the event of default not only would they have the right to maintain possession of the collateral, but also that they would have a secured ownership interest in the foreign currency with an immediate right of set-off. Prior to the institution of a cross-border collateral pool facility, each participating central bank would have to consider collateral law, insolvency law and contract law in the relevant jurisdictions to ensure an enforceability of claims in the event of a default and that there would be no “conflict of law.” (For the unique legal aspects of a Central Bank Guarantee Facility, see the text box below.)

#### **8.1.1. Collateral law**

It must be clear to the participating central banks which country’s collateral law will be applicable to a cross-border collateral pool transaction. In most cases, neither the currency nor the issue of the asset would be relevant when determining the applicable collateral law. Rather, the relevant law will in most legal systems be determined by the location of the collateral. For example, the law applicable to collateral will typically be the law of the country where the collateral is held. For a cross-border collateral pool facility where market participants are only able to generate collateral from their home market the location should be clear, as the collateral will be held in the “home” country central bank account. It should therefore be relatively easy for a central bank to determine the applicable collateral law and how it relates to collateral law in its own market.<sup>63</sup>

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<sup>63</sup> For a cash collateral pool facility, one of the advantages of structuring transactions as a currency swap is that collateral law may not be relevant as the transaction would be not structured as a collateralized borrowing. Rather, the transactions would be structured as two “linked,” but separate, outright buys and sells of foreign currency.

### **Insolvency law**

For a cross-border collateral pool facility where commercial banks can only source collateral from their home country, there should not be any complications in determining which insolvency law would apply. The applicable insolvency law would be that of the nationality of the transferor, which would be the same as the location of the transferor. Participating central banks would need to ensure the validity of the cross-border collateral pool transaction under the transferor's insolvency law and that there is sufficient recognition to the collateralized transaction as a foreign creditor. In addition, if the central bank providing intraday liquidity based on foreign currency as collateral operates in a country that applies a "territoriality" principle to insolvencies - applying separate insolvency proceedings to the local branch of the foreign transferor - there would be a potential conflict about the applicable insolvency law, with the possibility that there will be inconsistency with the collateral law.

#### **8.1.2. Contract law**

In general, legal systems prescribe which collateral and insolvency law would apply to a CCP transaction. Thus central banks could not likely contract to have a particular collateral and insolvency law of their choice apply to a cross-border collateral pool transaction in order to avoid any ambiguity or conflict about what country's laws will be relevant. However the contracts could add some further conditions that have to be met in order for a cross-border collateral pool transaction to be valid; particularly in the case of cash cross-border collateral pool facility structured as a "currency swap" where new agreements may have to be drawn up to govern these intraday foreign exchange swap transactions.

#### **8.1.3. Multiple jurisdictions**

The legal analysis above has been based on the assumption that (a) market participants would only be able to position collateral from their home market and that (b) a third-party e.g., ICSD, commercial bank is not used to manage the collateral. This means that at most only two jurisdictions would normally be applicable, these jurisdictions being those of the "home" country, where the collateral is issued, held and where the participant is incorporated and the "away" country of the central bank issuing intraday credit based on the foreign collateral.

However, if a third party collateral management agent was used, a third jurisdiction could be relevant, the jurisdiction of the third-party custodian/collateral management agent, increasing the scope for complexity and conflict. Further, if market participants were able to utilize collateral from markets other than their home country, this would result in the laws of three or more jurisdictions being relevant. In such cases, even the identity of the transferor may be unclear, as this will depend upon the principles underlying a country's insolvency law. Some countries apply the principle of "universality", whereby winding-up an insolvent institution is conducted globally, covering all assets and branches, according to the law of the country of incorporation. Others apply the principle of territoriality, whereby separate proceedings take place in each location where there are assets or branches.

Despite the legal complexities, cross-border collateral transactions are far from being uncommon in the market. A number of central banks already have some collateral transactions with foreign transferors. Central banks within the euro-zone accept foreign collateral for intraday credit from non-euro countries within the European Union (e.g., United Kingdom) and this is reciprocal. The Federal Reserve accepts certain foreign-denominated collateral, held in foreign depositories, for overnight borrowing purposes and beginning in 2001 for additional

daylight overdraft capacity.<sup>64</sup> Certain central banks take collateral in the form of foreign assets in those cases where the investment of foreign exchange reserves is collateralized. And the ICSDs, among others, have been facilitating cross-border collateral transactions for years.

In general terms there is no reason to conclude the cross-border collateral pool facility arrangements cannot be made to ensure their enforceability, even if market participants were able to utilize collateral from markets other than their home country or if a third party collateral management agent was used. The Task Force is of the view that instituting a cross-border collateral pool whereby participants would be limited to generating collateral from their home market would simply minimize the legal complexities that would need to be analyzed and overcome to initiate a facility in the short-term.

**Central Bank Guarantee Facility:  
Collateral law/insolvency law/multiple jurisdictions**

The legal benefits of the Central Bank Guarantee Facility depend on its being able to simplify the legal position of the away central bank without creating legal complications for the home central bank in terms of collateral law and insolvency law.

In principle, the simplification derives from the fact that, for the home central bank, domestic collateral would be used in a transaction that was purely between it and the domestic participant and in which only domestic collateral and insolvency law should be applicable, with no conflict between these laws. These are laws the home central bank would be familiar with due to its normal operations. At the same time, the away central bank, supplying the liquidity, would only have to rely on the guarantee provided by the home central bank and thus should not be affected by foreign collateral law or foreign insolvency law. Moreover, the central banks would in principle be able to choose which law applied to the guarantee itself.

In practice, there may be some legal difficulties with a Central Bank Guarantee Facility. First, the home central bank would have to have the power to issue guarantees and the away central bank to authority to accept them. Discussions the Task Force has had with the Board of Governors, the Bank of Japan and the European Central Bank indicate that there is nothing in these institution's charters that prohibits a guarantee mechanism. In the event this was not the case, obtaining the necessary powers by central banks may not be straightforward.

Even in the event central banks do have the power to issue and accept guarantees, an in-depth legal analysis would be required by each participating central bank, especially of jurisdictional claims. However, much less legal analysis would likely be required than the other CCP models as this model largely works off of existing arrangements between credit institutions and local central banks, and each central bank will only have to reach comfortable legal arrangements between itself and the other central banks. It would clearly be important that the guarantee itself was legally robust, although in principle this ought not to be a major difficulty (given the ability of central banks to choose the applicable law). In some countries the home central bank may also need to establish that if the market participant went into liquidation, the legal position in its country would enable it (as the provider of the collateralized guarantee) to have the right and necessary priority to realize the collateral.

**Contract Law.** It is presumed that central banks would need to have contracts in place governing the facility and in particular the terms of the guarantees to ensure that they are valid.

<sup>64</sup> An individual banking institution must be specially approved by the Federal Reserve to hold collateral for additional daylight overdraft capacity.

## 8.2. Non-Legal Risks

### 8.2.1. Credit risks

In the cross-border collateral pool facilities, the central bank would be incurring a credit exposure to the market participant providing foreign currency as collateral. However this credit risk would be no different than the credit exposures central banks currently incur through the provision of intraday liquidity. The credit exposure would be fully collateralized, with an appropriate haircut. The facility would be structured such that the central bank is never exposed to a full principal risk because collateral will always be delivered ahead of the granting credit and will always be returned after credit has been repaid. As long as the legal underpinnings of the facility were sound, the central bank would have a secured interest in the foreign currency collateral. If intraday credit granted through the CCP facility was priced the same as other central bank intraday credit, there would be nothing inherent to the operational design of the facility to make it more likely that a market participant would fail to repay intraday credit collateralized by foreign currency as opposed to intraday credit collateralized by domestic collateral. Intraday credit will be repaid in the same market it is generated and in the same currency.

In the cross-border facilities, the home central bank would simply be acting as an agent (i.e., transferor, safekeeping, custodian) and would assume no direct credit risk in the CCP transactions (except in the case of the Home Central Bank Option of the Cash Collateral Pool Model where the home central bank will be serving as the principal, credit provider). However, the amount of intraday credit granted by the central bank to in the home market might increase as market participants may look to increasingly utilize intraday credit in the home market to fund intraday liquidity needs in away markets. This could be controlled if limits were imposed on the use of a cross-border collateral pool facility.

An additional form of credit risk would be the deposit risk assumed by both the market participant (collateral transferor) and the away central banks (collateral transferee) against the institution acting as the custodian for the collateral. Unless a third-party was used to manage the collateral, this credit exposure would be to a home central bank. This credit risk should be acceptable to both market participants participating central bank (central banks currently act as custodians to foreign central banks for government securities). If a non-central bank third-party is used to hold and manage collateral, this commercial intermediary must be of a creditworthiness acceptable by central banks and market participants due to the potential deposit/custody risk.

***Central Bank Guarantee Facility.*** How the facility would ultimately affect the credit exposures assumed by the central banks would ultimately depend on its design. It is likely that a guarantee provided by the home central bank would take the form of full compensation, meaning that all financial risks (i.e., credit risk, market risk of collateral and legal risk) would be assumed by the home central bank.

However, the away central bank might still bear the foreign exchange and or/liquidity risks if the guarantee was expressed in the currency of the home central bank and/or the home central bank had a period in which to realize and liquidate the collateral before having to provide funds under the guarantee. Alternatively, these risks could be transferred to the home central bank if the guarantee was expressed in the currency of the away central bank and the obligation

was to provide funds immediately upon the guarantee being called. It would also need to be clear under precisely what terms the guarantee could be called.<sup>65</sup>

From the point of view of the away central bank, any credit exposure would be to the home central bank. For the home central bank, there would be exposure to the market participants but this should be limited to a market price exposure i.e., margin provided by the haircut is not sufficient.<sup>66</sup> For the home central bank, there could be some exposure to full principal risk if the participant defaults and the collateral transaction turns out to be defective. Providing that as a guarantor it is not put in a less favorable position than a securities creditor, this would be the same sort of residual credit risk it faces in its normal domestic collateral transactions.

If intraday credit was priced the same as all other central bank intraday credit, there would be nothing inherent to the operational design of the facility to make it more likely that a market participant would fail to repay intraday credit collateralized by foreign currency as opposed to intraday credit collateralized by domestic collateral. Intraday credit will be repaid in the same market it is generated and in the same currency. Any deposit risk inherent to the facility would be taken by the away central bank vis-à-vis the home central bank serving as custodian.

### **8.2.2. Operational risks**

There should not be a material increase in operational risk relative to existing central bank intraday liquidity facilities and relative to how cross-border collateral transactions currently take place without the benefit of a cross-border collateral pool facility. In all three models, intraday liquidity provisions would make use of existing RTGS systems and corresponding account structures and reporting systems. In the Cash Collateral Model, collateral would also move and be held on central bank accounts. If a third-party were used to manage the cash collateral, the overall operational soundness of the facility would be largely contingent upon the operational reliability of the third-party collateral management agent, i.e., technical, managerial. However, there are many commercial institutions that have sound and sophisticated cash collateral managements services and the facility should be fully automated, operate on a real-time basis, with no limited intervention with transactions.

A Securities Collateral Pool Model could be somewhat more operationally complex, as there would be linkages to securities depositories. However these linkages should be to established central securities depositories and be fully automated, with no manual intervention. Further, the operational complexities would be minimal under a Third-Party Agent Facility as very few new linkages would have to be established (only central banks opening accounts at a handful of ICSDs).<sup>67</sup> In the event there was an operational outage at an third-party custodian or

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<sup>65</sup> For example, the guarantee may only be able to be called in the event of participant bankruptcy. Conversely, the facility could be structured such that a guarantee could be called in the event of any liquidity difficulties of the participant i.e., the participant not being able to repay the intraday liquidity by the end of the business day.

<sup>66</sup> Under the guarantee scheme the home central bank would have to supply the funds to the away central bank whether or not it could realize the collateral.

<sup>67</sup> Since the overall operational soundness of the service would be contingent upon the operational reliability of the ICSD (i.e. technical, managerial), it may be prudent for central banks to establish links with at least two ICSDs. Likewise, if a commercial bank is chosen as a third-party collateral management agent, a trusted third party with sophisticated and proven cash collateral management services should be relied upon and it may be prudent to use the service of two entities..

collateral management agent, this would not prevent a participant from being able to cover its intraday overdraft in the away market. The only material impact should be to delay the return of collateral to the market participant.

The operational risks associated with a Central Bank Guarantee Model would be minimal as the operational complexities are far less than the other CCP facility types. A Central Bank Guarantee Model would fully leverage existing RTGS and corresponding account relationships as there would be no movements of collateral cross-border. In the event there was an operational outage at the home central bank, this would not prevent a participant from being able to cover its intraday overdraft in the away market.

### **8.2.3. Systemic risks**

While the scope of this report was not to assess the overall social benefits of cross-border collateral transactions versus their social costs, a key question that market authorities face in connection with a cross-border collateral pool facility is assessing the potential for such a facility to affect market stability or contribute to systemic risk. Several points can be made in this regard. First, a cash collateral pool facility or central bank guarantee facility could play a role in facilitating the ability of market participants to take on leverage although the facility would not be unique in this respect. A bank could overdraw its home central bank account in order to generate cash collateral for borrow intraday at the away central bank.<sup>68</sup> A cross-border collateral pool facility could also create channels through which market shock may flow from one country's money market to another. However for this to occur, there would have to be significant intraday volatility between G-10 foreign currencies to warrant additional margin calls by the away central bank to possibly create liquidity pressures for market participants. In general, a cross-border collateral pool facility should not be likely to contribute to distortions that collateral practices have introduced during past market disturbances such as collateral takers tightening collateral standards, massive margin calls and widespread liquidation of collateral, where systemic pressures are likely to intensify.<sup>69</sup>

On the other hand, to the extent that cross-border collateral pool facility increases the overall liquidity in the market, it can reduce the change for any given liquidity shock to be systemic in nature. A cross-border collateral pool facility can lower systemic risk by reducing the time lag and uncertainty that currently accompanies the settlement of obligations in many currencies through increased intraday liquidity. Market participants regularly hold back on payments during the day until sufficient liquidity is available through incoming payments. In the event of unsettled markets, or a major operational outage in the marketplace, a cross-border collateral pool facility would provide an efficient liquidity bridge across markets and provide a margin of safety by reducing liquidity risk. Should they wish, central banks could efficiently use the CCP as a tool to address temporal market disruptions by intervening to avoid liquidity stress escalating into liquidity and ultimately credit risk. Finally, because a cash collateral pool facility and central bank guarantee facility would simply link cash markets, such a facility would not create direct channels through which market shocks may flow from securities markets to

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<sup>68</sup> A securities CCP facility could play no role in facilitating leverage as only securities would be used as collateral, never overdrawn central bank accounts. Central banks could prevent such leverage in cash CCP facilities or central bank guarantee facilities by prohibiting banks from using overdrawn central bank cash balances as collateral.

<sup>69</sup> Such events have generally been attributable to cases where there were risk management failures in collateral arrangements in normal times which market participants rushed to correct when facing severe market disturbances and high degrees of leverage by financial institutions.

money markets to derivatives markets and vice versa as many other financial transactions have the potential to do.

From a practical standpoint central banks would have to develop their own view of the potential for cross-border collateral pool facility to contribute to systemic risk. The view of the banks represented on the Task Force is that unique nature of a cross-border collateral pool facility run by central banks, and the likely size of the flow of funds through the facility, relative to the size of the money markets in the G-7 countries, would not seem to generate systemic concerns.

### **8.3. Cost Implications**

#### **8.3.1. Operating costs and pricing of service**

Since a cross-border collateral pool facility would be owned and operated by the central banks, central banks would bear most of the direct costs of set up and ongoing operations. However, it is presumed that central banks would seek “full cost recovery” of the facility from commercial banks, as is consistent with payment and settlement services central banks provide to the private sector. The pricing of the service in each market could be set unilaterally by the central bank. This could be either on a transaction basis, through a general usage charge, or some combination of both. Decisions would have to be made as to whether all depository institutions would bear the costs, or only those that use the service.

It is presumed the costs of set up and operation would not be prohibitive since a cross-border collateral pool facility would make use of much existing infrastructure. The costs to central banks of setting up and operating a facility would be greater if a third party was not employed as a collateral management as central banks would have to bear the operational costs associated with collateral management.<sup>70</sup> In some of the facility types the Task Force considered there would be have to be a “cost allocation” arrangement between central banks as the home central bank would be providing custodian/collateral management services on behalf of away central bank i.e., the liquidity provider. On other facility types all of the cost would be incurred by the central bank providing liquidity. If central banks extend RTGS operating hours solely to support a cross-border collateral pool facility, the operating costs associated with the facility would be higher.

If a non-central bank third-party was used to manage collateral, the direct operating costs to central banks would be lower. However the commercial entity serving as the custodian/collateral management agent would have to be compensated for its operating costs. These costs would need to be accounted for in the pricing of the service.

#### **8.3.2. Pricing of intraday credit**

In a cross-border collateral pool facility, the away central bank i.e., liquidity provider, would have full discretion with respect to pricing of the intraday liquidity. The pricing could be consistent with the pricing of existing intraday credit services. Conversely, individual central banks could price cross-border intraday liquidity differently if a central bank wanted to affect its use.

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<sup>70</sup> The estimated costs vary by central banks depending on the necessary changes of systems and manpower involved.

### **8.3.3. Economic viability of service**

In order for a cross-border collateral pool facility to be economically viable, it would have to be priced such that market participants would have a financial incentive to make use of the facility. Financial institutions would ultimately perform a cost/efficiency calculation that would determine its overall use.

If the central banks were to outsource the custodian/collateral management services to a private-sector institution, the service should be structured to ensure the institution is duly compensated.

## **8.4. Public Policy Considerations**

### **8.4.1. Affect on monetary policy implementation**

The supply of intraday credit is generally believed to have no implications for monetary policy since such credit has to be repaid before the end of the day and thus intraday liquidity conditions have no bearing on the overnight (or longer-term) interest rate. Central banks, by charging above market rates and/or penalty fees for overnight borrowings, have made it uneconomical for borrowers to turn intraday credit into overnight credit simply as a result of a failure to repay the intraday credit at the end of the day. If however there is a spillover into overnight credit, there could be an affect on the monetary aggregates.

The potential risk for an intraday borrowing to spill over into an overnight borrowing at the central banks should not be higher than it is today. Overnight (discount window) credits may be extended only at the central banks discretion and are therefore limited. The central banks can request information regarding the reason for the spillover from the respective commercial bank as they would do today if a bank approaches the central bank for overnight credit. The central banks role as monetary authority and lender of last resort would remain unchanged.

It is possible that a Cash Collateral Pool Model or a Central Bank Guarantee Model could shift responsibility for providing domestic liquidity away from the domestic central bank and onto a foreign central bank providing the guarantee. However, such a shift in responsibility should not occur as long as the away central bank retained full discretion as to how much liquidity it provided to participants with a guarantee from a home central bank. Likewise, home central banks should not be obliged to provide liquidity up to the full amount of the guarantee, or even provide any guarantee, so that market participants do not become reliant upon the guarantees and that some of the responsibility for providing intraday liquidity shifts between central banks.

### **8.4.2. Competitive effects in private financial markets**

An important area of policy interest is the impact of a cross-border collateral pool facility on competition in the private financial markets. One of the reasons for interest in cross-border collateral pool facilities is the fact that they could help to level the playing field between domestic and foreign participants by reducing the cost to foreign participants of providing collateral for intraday liquidity.<sup>71</sup> Another advantage to many banks is that it will make

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<sup>71</sup> One of the guiding principles behind the development of the Eurosystem correspondent central banking model (CCBM) was that counterparties should be treated equally with regards to the use of collateral to obtain central bank liquidity

available collateral on their balance sheet work more efficiently and lead to higher safety as many banks could more easily create liquidity in a specific market.

One of the concerns could be that a cross-border collateral pool facility could most benefit the largest global financial institutions, which are self-clearing in many currencies and maintain large amounts of home currency collateral (cash or securities) to leverage in away markets for liquidity. This concern could be mitigated if limits were imposed on its overall use – perhaps in time other than market stress- or if banks that self-clear in the own market only, or limited markets, could make indirect use of the facility (see Section 9 ). However a cross-border collateral pool facility could remove a barrier to smaller banks being able to self-clear in foreign markets, where today that may have limited access to intraday liquidity. This could increase competition in domestic payments markets with smaller banks serving as new entrants. Further, a cross-border collateral pool facility would facilitate the management of liquidity and improve competition in other fields (e.g., loan syndication, securities clearing) where lead managers and custodian banks have competing demands on their liquidity.

A possible concern with the Third-Party Agent option under a Securities Collateral Pool Model is that it might serve to give an individual ICSD an unacceptable degree of monopoly power or competitive advantage in the market. This concern could be eliminated by central banks relying on the services of more than one ICSD. There could also be competition policy consequences if participants from some countries were able to make greater use of a CCP facility due to the time zone differences.

#### **8.4.3. Acceptability of service from individual central bank perspective**

The Task Force recognizes that individual central banks would be concerned with the way the various cross-border collateral pool facility service options might alter their roles of monetary authority, financial system supervisor or overseer and provider of liquidity. As such the Task Force gave consideration to whether any of the models might raise difficult policy issues for individual central banks such as: required legislative and policy changes; implications for central bank supervision or oversight; implications for the role of the central bank as liquidity provider; likely shifts in the loci of financial activity; and the required degree of coordination and sharing of confidential information.

- *Required legislative and policy changes.* In most instances, individual central banks should not be required to seek legislative and/or policy changes as a cross-border collateral pool facility service would be consistent with current central bank credit provisioning. However, in certain jurisdictions there may need to be changes in local law or regulation to allow central banks to accept foreign currency as collateral as part of its payment systems liquidity policies or changes in local law or regulation to allow central banks to issue and/or accept “guarantees” from other central banks. This may be the case in Europe where current ECB regulations stipulate that European central banks may only accept euro-denominated collateral or collateral in other European currencies as part of their credit provisions. In some countries, e.g., Japan, there may need to be changes to withholding tax laws so that collateral may be used effectively cross-border.
- *Implications for central bank supervision or oversight.* A cross-border collateral pool facility is fairly straightforward as far as a supervisor policy is concerned – none of the three CCP facility models would have a fundamental difference compared with the situation where

cross-border collateral transactions take place without the benefit of these services. The existing supervisory relationships between central bank and local market participants would remain the same. The away central bank i.e., the liquidity provider, should always be able to control/limit the amount of intraday credit it will provide and the acceptable terms for the cross-border collateral pool arrangement.<sup>72</sup> A possible concern could arise over the role of a common third-party agent i.e., which central banks would have oversight of these entities. However this would be no different that situations today where a utility is providing global services to market participants e.g., CLS Bank, Euroclear, Clearstream under the current supervisory regime.

- *Implications for the role of central bank as liquidity provider.* The fundamental role of central banks as liquidity providers should not change with the institution of a cross-border collateral pool facility.<sup>73</sup> Except in the case of the Federal Reserve, it is policy for all the G-10 central banks to provide unlimited amounts of intraday liquidity as long as such credit is secured by acceptable collateral assets. However, the Federal Reserve maintains a policy whereby intraday credit is generally not collateralized and has maintained a policy preference of seeking to reduce/contain the levels of overall intraday credit it provides to market participants. Therefore the adoption a cross-border collateral pool facility by the Federal Reserve may require the U.S. central bank to alter its procedures to allow for more general use of collateral for intraday overdrafts.<sup>74</sup> In addition, it is possible that a cash CCP facility could result in an increase in daylight overdrafts in Fed accounts as commercial banks in the U.S. replaced foreign (i.e., non-U.S.) securities on their balance sheet with Fed daylight credit to collateralize intraday liquidity needed at central banks outside the U.S.
- *Likely shifts in the loci of financial activity.* One possible shift in the location of financial activity that could result from cross-border collateral pool facilities is that certain participants might reduce their holdings of securities in certain jurisdictions as they look to reduce the portfolio costs of maintaining collateral. This may raise concerns for certain government authorities over a possible sell-off of sovereign debt, resulting in a material reduction in the price of these assets. However any such action should not occur in mass or simultaneously and the net effect would be enhancing the overall efficiency of global payments systems. In the event market participants could utilize foreign currency from other than their home jurisdiction as collateral, one concern might be that commercial banks could possibly arbitrage central bank liquidity facilities. Likewise the use of a common third-party agent should not shift financial activity away from other correspondent banks.
- *Required degree of coordination.* A cross-border collateral pool facility may or may not require coordination between central banks, depending on the model adopted. There are some facility types proposed where central banks could unilaterally establish a facility with no coordination among central banks. Other facility types would require greater levels of coordination as the away central bank would rely on the home central bank to serve as

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<sup>72</sup> And in a Central Bank Guarantee Facility, the home central bank should always have the authority to limit or revoke any guarantees.

<sup>73</sup> However, under a Central Bank Guarantee Facility, bearing credit risk in connection with an bank's payment activity in other countries would be a new development for central banks.

<sup>74</sup> This is something the Federal Reserve recently did as the U.S. central bank now allows collateral held for discount window purposes to be used to increase a bank's intraday facility on an individual agreement basis.

custodian, collateral management agent or provider of a “guarantee.”<sup>75</sup> Enhanced central bank coordination would have potential advantages and disadvantages. On the one hand, the operational and information links that might be created in conjunction with a cross-border collateral pool facility, as well as the formalized relationships, could provide central banks with more accurate and timely information flows, especially at times of financial stress. On the other hand, the policy and structural interdependencies that would be required with facilities needing significant central bank coordination could delay the institution of any facility. To the extent that the G-10 central banks would want to adopt a common facility across their markets, a greater level of coordination would be required to harmonize practices.

While it was not possible for the Task Force to consider every possible policy implications for each individual central bank, is the overall view of the Task Force that the introduction of cross-border collateral pool facilities should not fundamentally affect the roles of individual central banks. It will ultimately be important for each central bank - in analyzing all the possible side-effects of each service option – to weigh them carefully against the potential risk reduction and efficiency benefits.

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<sup>75</sup> Under a Central Bank Guarantee Facility, central banks, on at least a bilateral basis, would have to develop the framework for the issuance and acceptance of guarantees. Issues such as how would they be structured, what would be their tenure, what precisely would they cover, would have to be coordinated.

## 9. CROSS-BORDER COLLATERAL POOL FACILITIES: USE/IMPACT FOR INDIRECT CLEARING BANKS

One of the Payment Risk Committee's guiding principles for the Task Force was that any market solutions should take into account the requirements of *indirect clearing banks*. Indirect clearing banks are commercial banks that may self-clear payments in their home country (i.e., currency), but rely on correspondent banks to clear payments in foreign jurisdictions. In practice, most commercial banks are indirect clearing banks as there are very few “multicurrency” clearing banks that have a direct clearing relationships with all G-10 central banks. As such, the Payments Risk Committee felt it imperative that the Task Force (1) identify how the institution of any cross-border collateral pool facilities might impact correspondent banking relationships, (2) examine how indirect clearing banks may make use of a cross-border collateral pool facility and how they would benefit from such a service offering, and (3) assess whether the benefits of a cross-border collateral pool facility would largely be limited to a handful of global commercial banks.

### 9.1. Use of Facilities by Indirect Clearing Banks

Since indirect clearing banks would not have a direct relationship with all foreign central banks (i.e., no formal account relationship and no direct access to the RTGS system), they would have to use their correspondents i.e., nostro banks, in some locations, to make use of cross border collateral pool facilities. The following is an illustration of how indirect clearing banks could make use of cross-border collateral pool facilities in a given market.

1. **Example – Cash CCP: Collateralized Loan Transaction.** A Japanese commercial bank self-clears Japanese yen but relies on a correspondent bank (i.e., nostro agent) to clear U.S. dollar payments.
2. The Japanese bank’s U.S. dollar nostro agent is unwilling to make U.S. dollar payments for the Japanese bank in a timely manner because the Japanese bank lacks sufficient liquidity or daylight credit.
3. The Japanese bank, wishing to ensure its USD payments are met, provides JPY as cash collateral - to support its payments in USD - by moving unencumbered JPY balances from its cash account with the Bank of Japan to its nostro agent's cash account at Bank of Japan.
4. The nostro agent then transfers an equivalent amount of the JPY cash balances from its cash account at the Bank of Japan to the Federal Reserve’s cash account at the Bank of Japan.
5. Upon notification that it has received the eligible yen cash collateral, the Federal Reserve will grant intraday USD liquidity (i.e., room under the cap) to the Japanese bank’s USD nostro agent.
6. The USD nostro agent then makes payments on behalf of its Japanese customer up to the amount of the collateral, plus any cash received and any credit line. Immediately upon the USD nostro agent identifying sufficient receipt of USD cash in the Japanese bank’s account, the nostro agent would notify the Federal Reserve to instruct the Bank of Japan to return the JPY cash collateral from its account at the Bank of Japan to the account of the USD nostro agent.
7. The USD nostro agent then transfers an equivalent amount of the JPY cash balances from its cash account at the Bank of Japan to the Japanese commercial bank’s JPY cash account at the Bank of Japan. In turn, JPY liquidity is returned to the indirect clearing bank’s account.

In these circumstances, there would be no formal relationship between the away central

bank i.e., the liquidity provider, and the indirect clearing bank. The legal relationship would remain between the away central bank and the nostro bank, a direct participant in the national RTGS and an entity supervised by the central bank and/or local bank regulators. The foreign currency collateral e.g., JPY cash would be pledged to the away central bank by the nostro agent and the away central bank would have a secured interest in the cash collateral if the nostro bank were to default on its intraday credit allocation. Similar arrangements could be made between indirect clearing banks and their nostro banks to make use of a securities facility or a facility built upon central banks guarantees.

It is the view of the Task Force that it is likely in the near-term that indirect clearing banks' use of a central bank-run cross-border collateral pool facility would be limited to: (a) times of market crises; (b) times at which a bank's correspondent (i.e., nostro agent) may be concerned over its credit quality and looking to lower clearing limits; and (c) times at which the bank's correspondent (i.e., nostro agent) itself may be having difficulty making payments on its behalf in a local market due to the nostro agent's own liquidity constraints. The economics and service offerings of the correspondent clearing market do not provide for indirect clearing banks making direct use of a cross-border collateral pool facility on a daily basis.

The primary reason that indirect clearing banks would not make use of a CCP facility on a daily basis is that in most cases the payment clearing services currently provided by correspondent banks include intraday credit lines to facilitate clearing. Correspondent services are marginally priced, or not priced at all. Payment clearing services have generally evolved into a "value added" service correspondent banks provide to their clients. Intraday clearing lines granted to clients are generally not priced.<sup>76</sup> Any associated costs to the indirect clearer may be limited to payment transaction fees, which would still exist in using a cross-border collateral pool facility. As such, there is currently little apparent economic incentive for an indirect clearing bank to make use of a cross-border collateral pool facility on a daily basis to fund daily payment activities in foreign markets.

## **9.2. Benefits to Indirect Clearing Banks**

The benefits of a cross-border collateral pool facility are that it would be a way to facilitate liquidity and outgoing payments in times of market crisis, in the event the indirect clearing bank is running up against any clearing caps established by the nostro agent, or when the nostro agent itself is having difficulties sourcing liquidity for payments in the market.

In times of market crisis, liquidity can be scarce and this can result in the delay of payments in a market, which may further exacerbate a liquidity shortage. In such instances, a nostro bank may have difficulty in meeting the payment needs of all its clients in a timely fashion. Through the use of a cross-border collateral pool facility, indirect clearing banks would have an efficient and effective mechanism to fund their payment needs in the away market, using existing collateral assets.

There may be other instances where an indirect clearing bank has no capacity under its clearing line at its correspondent bank merely due to an unexpected asynchronous payment flow

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<sup>76</sup> The revenues obtained by banks from their correspondent banking services are largely attributable to interest income received on cash balances held overnight by clients.

vis-à-vis its counterparties (i.e., outgoing payments made on behalf of the indirect clearing bank by the nostro bank have exceeded incoming payment for the indirect clearing bank). In these circumstances, the nostro bank may refrain from making outgoing payments on behalf of the indirect clearing bank due to internal credit management procedures. A cross-border collateral pool facility would enable indirect clearing banks to efficiently collateralize additional payment capacity at the nostro bank in a given away market.

Further, there may be instances where a nostro bank agent is having difficulties sourcing liquidity for payments in a market and this is delaying the payment needs of the indirect clearing bank, which is a client. A cross-border collateral pool facility would provide the indirect clearing banks with an effective mechanism to fund those payment needs in the away market, thus circumventing the liquidity problems facing the nostro bank.

### 9.3. Issues

The primary issue for most indirect clearing banks is that it would be unacceptable for its collateral to be used freely by the nostro bank to support another institution's payments. It would therefore be necessary for a mechanism to be in place that effectively ensures that the nostro bank is only using the indirect clearing bank's collateral for its respective payment activity, and that the indirect clearing bank's collateral is returned almost immediately following the payment activity being funded by the indirect clearing bank.

The mechanisms that would need to be put in place to control this activity would have to be done at the nostro bank/indirect clearing bank (client) level.<sup>77</sup> Such solutions may include:

- Assurance from nostro agents that client's collateral will support their respective payment activity only. This assurance would have to be documented in the correspondent clearing agreement between the nostro bank and its client.
- Provisions in the correspondent clearing agreement whereby the nostro bank will be obligated to make payments and return a client's collateral within a pre-agreed time span or else the nostro bank would be required to compensate the client.
- The most effective, but perhaps most difficult to implement solution to this issue would be to establish a repo arrangement between the nostro bank and the indirect clearing bank (client). The client would repo the collateral to the nostro bank and receive cash /liquidity proceeds in their cash account to support activity at the nostro. The nostro bank in turn could use the collateral to re-pledge to the appropriate central bank. The reverse would take place once the intraday liquidity is not needed. e.g., the central bank would return the collateral and the nostro bank would clear the repo by returning the collateral to the client and charging the client's cash account for the value. In this manner, the client's collateral would be directly associated with liquidity support for their activity.. This would require no central bank involvement. Acceptable collateral type would be agreed between nostro bank agent and client.

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<sup>77</sup> The Task Force did consider other options such as the away central bank i.e., liquidity provider, implementing procedures to monitor the nostro bank's use of the client's collateral. However this was viewed as being beyond the scope of normal central bank activities i.e., setting up protections for foreign entities that have no direct operations in the jurisdiction or monitoring/limiting RTGS payment activity based on an underlying beneficiary. However, the Task Force did recognize that in the longer-term, under a Third Party Agent model, the intermediary may be able to establish some procedures/tools to monitor the use of a clients' collateral by a nostro bank).

Delivery could be via ICSDs, using similar arrangements to those mentioned in the securities model. In the case of cash collateral, a Swap type arrangement might also be appropriate.

#### **9.4. Impact to Correspondent Banking Relationships**

There should be no material impact to existing correspondent banking relationships. Commercial banks would still rely on their nostro banks to effect payments in markets where they do not self-clear. There should be no impact to the pricing of correspondent bank services. The quality of these services should only improve as correspondent banks would now have an efficient mechanism for allowing clients to cost-effectively collateralize clearing lines, something that today is generally not market practice. A cross-border collateral pool facility should also allow correspondent banks to offer greater levels of payment capacity i.e., clearing lines, without a subsequent material increase in risk. In addition, a cross-border collateral pool facility would allow for greater competition in correspondent banking, as foreign banks would have great ability to compete in a given jurisdiction.

Further, in the future as RTGS, derivatives and securities volumes rise - and with the institution of CLS Bank – there will be increasing demands on correspondent banks to provide collateral in the clearing systems. As such, as correspondent banks become under increased pressure they may look to their clients to assist in meeting these increased collateral needs. A cross-border collateral pool facility would effectively and efficiently facilitate this market development.

## **10. CONCLUSIONS**

The Task Force's conclusions and recommendations are included in the Executive Summary.

## ANNEX 1

### Glossary

<b>agent</b>	An entity, such as a fund manager or a custodian, acts on behalf of another party, the principal. Under a contractual agreement, the agent may execute the transaction for the principal but is not responsible for performance by the principal.
<b>away central bank</b>	For purposes of this report, an away central bank is any central bank located in a jurisdiction other than the one in which the commercial bank's parent is incorporated.
<b>away market</b>	For purposes of this report, an away market is any jurisdiction other than the one in which the commercial bank's parent is incorporated.
<b>caps</b>	Quantitative limits on the funds transfer activity of individual participants in a system; limits may be set by each individual participant or may be imposed by the body managing the system; limits can be placed on the net debit position or net credit position of participants in the system.
<b>cash deposit risk</b>	The credit risk associated with the holding of cash balances with an intermediary for the purpose of settling transactions.
<b>central bank credit (liquidity) facility</b>	A standing credit facility that can be drawn upon by certain designated account holders (e.g., banks) at the central bank. In some cases, the facility can be used automatically at the initiative of the account holder, while in other cases the central bank may retain some degree of discretion. The loans typically take the form either of advances or overdrafts on an account holder's current account which may be secured by a pledge of securities (also known as Lombard loans in some European countries), or of traditional rediscounting of bills.
<b>clearing/ clearance</b>	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.
<b>central securities depository</b>	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 (i.e., so that they exist only as electronic records). In addition to safekeeping, a central securities depository may incorporate comparison, clearing and settlement functions.

<b>central counterparty</b>	An entity that is the buyer to every seller and seller to every buyer of a specified set of contracts, e.g. those executed on a particular exchange or exchanges.
<b>clearing house</b>	A central location or central processing mechanism through which financial institutions agree to exchange payment instructions or other financial obligations (e.g., securities). The institutions settle for items exchanged at a designated time based on the rules and procedures of the clearing house. In some cases, the clearing house may assume significant counterparty, financial or risk management responsibilities for the clearing system.
<b>collateral</b>	An asset that is delivered by the collateral provider to secure an obligation to the collateral taker. Collateral arrangements may take different legal forms; collateral may be obtained using the method of title transfer or pledge.
<b>correspondent banking</b>	An arrangement under which one bank (correspondent) holds deposits owned by other banks (respondents) and provides payment and other services to those respondent banks. Such arrangements may also be known as agency relationships in some domestic contexts. In international banking, balances held for a foreign respondent bank may be used to settle foreign exchange transactions. Reciprocal correspondent banking relationships may involve the use of so-called nostro and vostro accounts to settle foreign exchange transactions.
<b>CSD</b>	See central securities depository.
<b>cross-border cash collateral pool facility</b>	Facilities (services) that could effectively and efficiently facilitate the acceptance of foreign currency as collateral by central banks for intraday liquidity.
<b>cross-border collateral</b>	Any asset delivered to secure an obligation where the asset is either held abroad, denominated in a foreign currency, issued by a foreign entity or the transferor is incorporated in a foreign country.
<b>cross-border collateral pool facility</b>	Facilities (services) that could effectively and efficiently facilitate the acceptance of foreign i.e., cross-border, collateral by central banks for intraday liquidity.
<b>cross-border intraday liquidity</b>	Intraday liquidity an institution requires to support payment activity in foreign (i.e., non-domestic) markets (currencies). See intraday liquidity.
<b>cross-border securities collateral pool facility</b>	Facilities (services) that could effectively and efficiently facilitate the acceptance of foreign (i.e., cross-border) securities as collateral by central banks for intraday liquidity.

<b>collateral pool</b>	Assets owned by the members or owner of a payment system that are available to the system as collateral to enable it to obtain funds in circumstances specified in its rules.
<b>daylight overdraft</b>	Credit extended for a period of less than one business day. In a credit transfer system with end-of-day final settlement, daylight credit is tacitly extended by a receiving institution if it accepts and acts on a payment order even though it will not receive final funds until the end of the business day. Also called daylight credit, daylight exposure and intraday credit.
<b>deferred net settlement system</b>	A system that effects the settlement of obligations or transfers between or among counterparties on a net basis at some later time.
<b>delivery versus payment</b>	A link between a securities transfer system and a funds transfer system that ensures that delivery occurs if, and only if, payment occurs.
<b>DVP</b>	See delivery versus payment.
<b>home central bank</b>	For purposes of this report, the central bank of the country in which the commercial bank's parent is incorporated.
<b>home market</b>	For purposes of this report, the jurisdiction in which the commercial bank's parent is incorporated.
<b>ICSD</b>	See international central securities depository.
<b>international central securities depository</b>	A central securities depository which clears and settles international securities or cross-border transactions in domestic securities. At the moment there are two ICSDs located in EU countries, Clearstream and Euroclear.
<b>intraday credit</b>	Borrowed funds in the form of an overdraft in a deposit account that is to be repaid within the same business day. See daylight overdraft.
<b>intraday liquidity</b>	Funds that can be accessed (borrowed) during the business day, usually to enable financial institutions to make payments in real time. Also called payment liquidity. See also intraday credit.
<b>multilateral net settlement system</b>	A settlement system in which each settling participant settles (typically by means of a single payment or receipt) the multilateral net settlement position which results from the transfers made and received by it, for its own account and on behalf of its customers or non-settling participants for which it is acting.

<b>net credit (or debit) position</b>	A participant's net credit or net debit position in a netting system is the sum of the value of all the transfers it has received up to a particular point in time less the value of all transfers it has sent. If the difference is positive, the participant is in a net credit position; if the difference is negative, the participant is in a net debit position. The net credit or net debit position at settlement time is called the net settlement position. These net positions may be calculated on a bilateral or multilateral basis. See caps.
<b>optimization routine</b>	Routine processes in a payment system to determine the order in which payments are accepted for settlement. Optimization routines are used to improve system liquidity and increase settlement efficiency. See also queuing, scheduling.
<b>payment liquidity</b>	Funds that can be accessed (borrowed) during the business day, usually to enable financial institutions to make payments in real time. Also called intraday liquidity.
<b>payment versus payment</b>	A mechanism in a foreign exchange settlement system which ensures that a final transfer of one currency occurs if and only if a final transfer of the other currency or currencies takes place.
<b>PVP</b>	See payment versus payment.
<b>real-time gross settlement</b>	The continuous (real-time) settlement of funds or securities transfers individually on an order-by-order basis (without netting).
<b>S.W.I.F.T.</b>	Society for Worldwide Interbank Financial Telecommunication: a cooperative organization created and owned by banks that operates a network which facilitates the exchange of payment and other financial messages between financial institutions (including broker-dealers and securities companies) throughout the world. A S.W.I.F.T. payment message is an instruction to transfer funds; the exchange of funds (settlement) subsequently takes place over a payment system or through correspondent banking relationships.

## ANNEX 2

### Comparative tables of select central bank RTGS credit facilities

<b>Swiss National Bank Credit Facilities (All times in CET)</b>		
	<b>Intraday</b>	<b>ON facility (Lombard)</b>
Credit Terms (e.g. collateralized, priced)	- All intraday credit facilities must be fully collateralized	- All overnight credit facilities must be fully collateralized
Eligible Collateral	SNB eligible Collateral baskets (3): 1. German Jumbo Pfandbrief GC (approx CHF 370bn), Definition: -Issued by a bank -Moody's or S&P min rating of AA -min. issue amount euro 1bn 2. German GC (approx. CHF 1,220bn) 3. SNB GC (approx. CHF230bn), Definition of SNB Basket: - CHF bonds and TB - listed or traded on organized market - issue amount >CHF100m - min.rating for foreign securities (generally AA)	- Swiss Government bonds - Swiss Canton (State) bonds - Swiss Municipals, Pfandbriefinstitute and bank bonds - Other bonds of Swiss debtors
Collateral Facility Type (i.e., pledge, repo)	- Repo	- Money Market Trades
Initial Margins on Collateral	- No, see below valuation haircuts	- No, see below valuation haircuts
Valuation Haircuts on Collateral	- Haircuts for all 3 baskets are 10%	- Swiss Government bonds (haircut 10%) - Swiss Canton (State) bonds (haircut 15%) - Swiss Municipals, Pfandbriefinstitute and bank bonds (haircut 20%) - Other bonds of Swiss debtors (haircut 25%)
Valuation Margins (marking to market)	- None (as intraday)	- None (most trx are ON-loans)
Limits on Credit Extensions	- No explicit limit - SNB offers on a daily basis, bidding process	- Explicit limit (Lombard) - Banks can determine how much collateral they are willing to hold on a permanent basis with SNB
Limits in Relation	- None	- None

to Collateral Type		
Business Hours of Credit Facilities	<ul style="list-style-type: none"> <li>- 4.00-4.10pm for next value day (is credited at 6pm and debited next day at 3pm)</li> <li>- 8.00am - 2.45pm ongoing same day value facility</li> </ul>	<ul style="list-style-type: none"> <li>- Lombard facility is available after Clearing Stop II and start of End of Day Processing by SNB (4pm until 4.15pm), repayment takes place next day no specific time</li> </ul>
Time of Day Credit Must be Repaid	<ul style="list-style-type: none"> <li>- Between 3-4pm, but earlier repayment possible.</li> </ul>	<ul style="list-style-type: none"> <li>- 4pm (repayment has to be initiated by the bank)</li> </ul>
Fee for Service	<ul style="list-style-type: none"> <li>- SNB none</li> <li>- Transaction costs SEGA have to be borne by borrowing bank (approx. CHF50 p/ticket of CHF100m)</li> <li>- Cost of collateral</li> </ul>	<ul style="list-style-type: none"> <li>- None</li> <li>- Cost of Collateral</li> </ul>
Loan Interest Rates	<ul style="list-style-type: none"> <li>- 0%</li> </ul>	<ul style="list-style-type: none"> <li>- Daily average money rate of the last two days +2% (floating Lombard)</li> <li>- Interest rate is published daily at SNB21 (Reuters)</li> </ul>
Penalty (e.g., interest rate, charges)	<ul style="list-style-type: none"> <li>- If banks would not be able to pay back the intraday facility in time SNB charges Lombard rate +2%</li> </ul>	<ul style="list-style-type: none"> <li>- No penalty, if not repaid Lombard credit renews automatically</li> </ul>
Collateral Held At	<ul style="list-style-type: none"> <li>- SIS SegainterSettle AG</li> <li>- Collateral is transferred from banks acct at SIS SegainterSettle AG to SNB acct at SIS SegainterSettle AG</li> </ul>	<ul style="list-style-type: none"> <li>- Collateral held at SNB acct Zurich</li> </ul>
Collateral Settlement Procedures/ Systems	<ul style="list-style-type: none"> <li>- EurexRepo (for intraday repo trading), SECOM (for securities settlement), SIC (for cash settlement)</li> </ul>	<ul style="list-style-type: none"> <li>- By phone, SNB credits bank acct in SIC</li> <li>- Collateral is delivered via SEGA and remains permanently at the acct with SNB</li> </ul>
Eligible Participants	<ul style="list-style-type: none"> <li>- Only members of SIC, SECOM and Eurex Repo</li> </ul>	<ul style="list-style-type: none"> <li>- All banks which have a SIC account (SIC member)</li> </ul>
Different Rules for Foreign Entities	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- No</li> </ul>
Additional Guarantees	<ul style="list-style-type: none"> <li>- No</li> </ul>	<ul style="list-style-type: none"> <li>- no</li> </ul>
Cross Border Use of Eligible Collateral Assets	<ul style="list-style-type: none"> <li>- Currently no cross boarder use possible</li> </ul>	<ul style="list-style-type: none"> <li>- currently no cross boarder use possible</li> </ul>
Law Governing Central Bank Credit Facility	<ul style="list-style-type: none"> <li>- Central bank law (Notenbankgesetz) Art14 Abs2and3</li> </ul>	<ul style="list-style-type: none"> <li>- Central bank law (Notenbankgesetz) Art14 Abs4</li> </ul>
Legal	<ul style="list-style-type: none"> <li>- 3<sup>rd</sup> party repo agreement</li> </ul>	<ul style="list-style-type: none"> <li>- none</li> </ul>

documentation		
Remarks	- Regular SNB open market activities 9am normal term fund bidding <sup>i</sup>	

<b>Bank of England Credit Facilities (All times in London Time)</b>		
	<b>Intraday</b>	<b>ON facility (Lombard)</b>
Credit Terms (e.g., collateralized, priced)	- All intraday credit facilities must be fully collateralized by repo. - Payments liquidity is by pre-positioning of instruments - Securities (in DvP) generate funds by automatic “self collateralization” in the settlement process	- Overnight facilities are extended through overnight repos with the Bank of England - Repo transactions are conducted through a 3:30 p.m. facility and a 4:20 p.m. facility.
Eligible Collateral	<p><b>Sterling:</b></p> <p>The following securities are eligible for intraday liquidity in CHAPS:</p> <ul style="list-style-type: none"> <li>• Gilts (UK Government Bonds), including gilt strips</li> <li>• Sterling Treasury bills</li> <li>• Bank of England euro bills and euro notes</li> <li>• Eligible local authority bills</li> <li>• HM Government non-sterling marketable debt</li> <li>• Sterling-denominated securities issued by (EEA) governments and <u>major international institutions</u></li> <li>• All securities on the ECB’s Tier One Asset List</li> </ul> <p><b>Euro:</b></p> <p>The following securities are eligible for intraday liquidity in CHAPS</p> <ul style="list-style-type: none"> <li>• Gilts (including gilt strips)</li> <li>• Sterling Treasury bills</li> <li>• Bank of England euro bills and euro notes</li> <li>• HM Government euro Treasury notes</li> </ul> <p>All securities on the ECB’s Tier One Asset List</p>	
Collateral Facility	- Repo	- Repo

<sup>i</sup> Reuters: SNB10, SNB11, SNB12; Telerate: 3488, 3489, 3490; Bloomberg

Type (i.e., pledge, repo)		
Initial Margins on Collateral	- Varies according to instrument	-
Valuation Haircuts on Collateral	- Repos initiated / repaid on same day at same value.	-
Valuation Margins (marking to market)	- Repos initiated / repaid on same day at same value	-
Limits on Credit Extensions	- No explicit limit	-
Limits in Relation to Collateral Type	- No explicit limit	-
Business Hours of Credit Facilities	- 06:00 to 18:00*  * A limited number of clearing banks are subject to central bank debits before the start of the payment timetable in respect of bank note holdings.	-
Time of Day Credit Must be Repaid	- Between 17:00 and 18:00 <i>or</i> - In the case of self collateralization, on the sale of the asset	-
Fee for Service	- Standard entry cost in securities settlement system. Subject to appropriate volume discounts.	
Loan Interest Rates	- Sliding scale of charges applied by Bank of England dependent upon culpability and frequency over a rolling 3 month period.	- For overnight repos conducted at the 3:30 p.m. facility, rates are at 1% over the normal intervention rate; - For overnight repos transacted in the 4:20 p.m. facility, rates are at 1.5% over the normal intervention rate.
Penalty (e.g., interest rate, charges)	- If banks were not able to pay back the intraday facility in time overnight assistance would apply - A (unlikely) consequence of Sequential Duty could be that free assets may not be adequate to satisfy normal Balance Sheet requirements	
Collateral Held At	- Bank of England - Depositories (see below)	-
Collateral Settlement Procedures/ Systems	- CREST - CMO - Clearstream / Euroclear	-
Eligible	- Settlement Banks only	-

Participants		
Different Rules for Foreign Entities	- No	-
Additional Guarantees	- No	-
Cross Border Use of Eligible Collateral Assets	- CCBM for Euro and Sterling	-
Law Governing Central Bank Credit Facility	- England	-
Legal documentation	- Repo agreement	-
Remarks	-	- The Bank of England does not pay interest on residual sterling credit balances.

<b>Federal Reserve Credit Facilities (All times in New York Time)</b>		
	<b>Intraday</b>	<b>ON facility (Discount Window)</b>
Credit Terms (e.g. collateralized, priced)	- Intraday credit is generally uncollateralized up to a limit, referred to as a net debit cap, however, as of 12/2001, the Federal Reserve began allowing certain depository institutions to obtain additional daylight credit above their net debit caps by pledging collateral. All intraday credit is priced; however, the charge calculation includes a deductible equal to 10% of an institution's capital measure.	- All overnight credit facilities must be fully collateralized
Eligible Collateral	- U.S. Treasuries and Fully Guaranteed Agencies - Government Sponsored Enterprises - International Agencies - Brady Bonds- US Dollar Denominated - Brady Bonds - Foreign Denominated - Foreign Governments - US Dollar Denominated - Foreign Governments - Foreign Denominated - Municipal Bonds	- U.S. Treasuries and Fully Guaranteed Agencies - Government Sponsored Enterprises: - International Agencies: - Brady Bonds- US Dollar Denominated - Brady Bonds - Foreign Denominated - Foreign Governments - US Dollar Denominated - Foreign Governments - Foreign Denominated - Municipal Bonds

	<ul style="list-style-type: none"> <li>- Corporate Bonds</li> <li>- Asset-Backed Securities - AAA (including Collateralized Loan and Bond Obligations)</li> <li>- Asset-Backed Securities - non AAA (not including Collateralized Loan and Bond Obligations)</li> <li>- Commercial Mortgage-Backed Securities - AAA</li> <li>- Mortgage Backed Securities</li> <li>- Collateralized Mortgage Obligations - AAA</li> <li>- Trust Preferred Securities</li> <li>- Mutual Funds</li> <li>- Government Sponsored Enterprise Stock (FNMA, SLMA, FHLM)</li> <li>- Bankers Acceptances, Certificates of Deposit, and Commercial Paper</li> <li>- Commercial and Agricultural Loans</li> <li>- Agency Guaranteed Loans</li> <li>- Commercial Real Estate Loans</li> <li>- Construction Real Estate Loans</li> <li>- 1-4 Family Residential Mortgages</li> <li>- Home Equity</li> <li>- Consumer Loans- Autos, Private Banking, Installment, Credit Card Receivables, Student Loans Etc.</li> <li>- Raw Land</li> </ul>	<ul style="list-style-type: none"> <li>- Corporate Bonds</li> <li>- Asset-Backed Securities - AAA (including Collateralized Loan and Bond Obligations)</li> <li>- Asset-Backed Securities - non AAA (not including Collateralized Loan and Bond Obligations)</li> <li>- Commercial Mortgage-Backed Securities - AAA</li> <li>- Mortgage Backed Securities</li> <li>- Collateralized Mortgage Obligations - AAA</li> <li>- Trust Preferred Securities</li> <li>- Mutual Funds</li> <li>- Government Sponsored Enterprise Stock (FNMA, SLMA, FHLM)</li> <li>- Bankers Acceptances, Certificates of Deposit, and Commercial Paper</li> <li>- Commercial and Agricultural Loans</li> <li>- Agency Guaranteed Loans</li> <li>- Commercial Real Estate Loans:</li> <li>- Construction Real Estate Loans</li> <li>- 1-4 Family Residential Mortgages</li> <li>- Home Equity</li> <li>- Consumer Loans- Autos, Private Banking, Installment, Credit Card Receivables, Student Loans Etc.</li> <li>- Raw Land</li> </ul>
Collateral Facility Type (i.e., pledge, repo)	- Pledge	- Pledge
Initial Margins on Collateral	- No, see below valuation haircuts	- No, see below valuation haircuts
Valuation Haircuts on Collateral	- Haircuts on assets range from 40% (Raw Land) to 2% (Short Maturity U.S. Treasuries, Guaranteed Agencies and Government Sponsored Enterprises))	- Haircuts on assets range from 40% (Raw Land) to 2% (Short Maturity U.S. Treasuries, Guaranteed Agencies and Government Sponsored Enterprises)
Valuation Margins (marking to market)	- Collateral pledged for intraday credit purposes is marked-to-market and subject to appropriate haircuts in accordance with the valuation methods used for discount window	- Market prices are used as the basis for collateral valuation whenever active and reliable markets exist. Market prices are obtained from one or more vendors and are updated at least

	with the valuation methods used for discount window collateral (see the adjacent column). <sup>78</sup>	weekly, or more frequently if market conditions warrant. If the Reserve Bank is unable to obtain a market price for pledged assets (e.g., customer loans) from its vendor(s), a standard calculation is used to establish a margin. A margin is based on an assessment of various characteristics of the specific collateral, including credit quality, interest rate, maturity, and the current interest rate environment. Margins for both priced and nonpriced assets are periodically reassessed to ensure that the margins reflect market conditions.
Limits on Credit Extensions	- Yes, limits, or net debit caps, are based on a multiple of an institution's capital measure and its financial condition as determined by factors including supervisory rating, capitalization data, or other supplementary information. In certain instances, where an institution has been approved for collateralized credit above its net debit cap, the credit extension limit is based on the institution's net debit cap and the amount of Reserve Bank-approved pledged collateral.	- No
Limits in Relation to Collateral Type	- None	- None
Business Hours of Credit Facilities	- Federal Reserve intraday credit is accessible during the operating hours of the Fedwire <sup>®</sup> Funds Service (regularly scheduled from 12.30 a.m. Eastern Time to 6:30 p.m. Eastern Time)	- 9am - 7pm
Time of Day Credit Must be Repaid	- Depository institutions are expected to settle intraday overdrafts before the end of the Fedwire <sup>®</sup> Funds Service operating day (regularly scheduled to close at 6:30 p.m. Eastern Time).	- 24 hours from the time it was granted. Typically 6:30pm.
Fee for Use of Credit?	- Annual rate of 36 basis points, quoted on the basis of a 24-hour day. Certain institutions are subject to a daylight-overdraft penalty fee equal to the annual rate applicable to the daylight overdrafts of other depository institutions (36 basis points) plus 100 basis points.	-

<sup>78</sup> For more information on the types and valuation of assets accepted for collateral purposes please refer to [www.frbdiscountwindow.org/](http://www.frbdiscountwindow.org/).

	- Cost of collateral	
Loan Interest Rates	- 0%	- Published discount window rates (includes rate for primary, secondary, and seasonal credit)
Penalty (e.g., interest rate, charges)	- Certain institutions are subject to a daylight-overdraft penalty fee equal to the annual rate applicable to the daylight overdrafts of other depository institutions (36 basis points) plus 100 basis points. Institutions that do not settle intraday overdrafts before the end of the Fedwire® Funds Service operating day, are subject to a monetary charge for the overnight overdraft based on the effective federal funds rate on the day of the overdraft plus 400 basis points.	- None
Collateral Held At	- Federal Reserve (book-entry and definitive collateral); Reserve Bank pledge accounts at the Depository Trust Company (DTC); other third party custodian arrangements; borrower-in-custody arrangements	- Federal Reserve (book-entry and definitive collateral); Reserve Bank pledge accounts at the Depository Trust Company (DTC); other third party custodian arrangements; borrower-in-custody arrangements
Collateral Settlement Procedures/ Systems	- Varies by arrangement – e.g., for collateral held at the Federal Reserve in book-entry form, settlement occurs over the Fedwire® Securities Service’s National Book-Entry System (NBES) <sup>79</sup> ; the Reserve Banks’ Collateral Management System (CMS) records collateral held outside of NBES, either in Reserve Bank vaults or through the other arrangements listed above; acceptance of collateral through these other arrangements involves issuance of an acknowledgement of deposit by a Reserve Bank	- Varies by arrangement – e.g., for collateral held at the Federal Reserve in book-entry form, settlement occurs over the Fedwire® Securities Service’s National Book-Entry System (NBES); the Reserve Banks’ Collateral Management System (CMS) records collateral held outside of NBES, either in Reserve Bank vaults or through the other arrangements listed above; acceptance of collateral through these other arrangements involves issuance of an acknowledgement of deposit by a Reserve Bank -
Eligible Participants	- Institutions must be financially healthy and have regular access to the discount window in order to adopt a net debit cap other than zero. <sup>80</sup>	- The Federal Reserve Board’s Regulation A governs borrowing by depository institutions at the Federal Reserve discount window (12 CFR 201). It is linked to a depository institution’s requirement to hold reserves and its eligibility for federal deposit insurance.

<sup>79</sup> The National Book-Entry System (NBES) is the central securities application of the Federal Reserve System. See <http://www.frbservices.org/Book-Entry/frBook-Entry.cfm> for additional information.

<sup>80</sup> For more information on the provision of Federal Reserve intraday credit, please refer to the Federal Reserve’s Policy Statement on Payments System Risk at <http://www.federalreserve.gov/paymentsystems/psr/policy.pdf>.

Different Rules for Foreign Entities	- Yes. Different procedures for calculating net debit cap.	- Only available to U.S. braches and agencies of foreign banks.
Additional Guarantees	- None	- None
Cross Border Use of Eligible Collateral Assets	- Yes. Foreign Governments and Brady Bonds pledged through Clearstream/Euroclear	- Yes. Foreign Governments and Brady Bonds pledged through Euroclear/Clearstream
Law Governing Central Bank Credit Facility	- Payments System Risk (PSR) policy of the Board of Governors of the Federal Reserve System (Board). - Federal Reserve Operating Circulars - Contract law	- Federal Reserve Act - Federal Reserve Board Regulation A - Federal Reserve Operating Circulars - Contract law
Legal documentation	- Includes Federal Reserve Operating Circular 1 <sup>81</sup> ; may include a signed resolution by a depository institution's board of directors	- Includes Federal Reserve Operating Circular 10 (Lending) <sup>82??</sup>
Remarks		

<sup>81</sup> See <http://www.frbservices.org/Industry/OperatingCirculars.cfm> for additional information.

<sup>82</sup> See <http://www.frbservices.org/Industry/OperatingCirculars.cfm> for additional information.

### ANNEX 3 Statistical Tables

Table 2a Outstanding securities at selected securities trading systems: end of year (USD billions)			
	1996	2000	1996-2000 (% change)
<b>Belgium</b>			
Regulated off exchange market (equities)	169.0	200.3	31.%
BXS (equities)	93.1	180.7	94.%
<b>Canada</b>			
CDS (debt and equities)	695.9	1,178.5	69%
<b>France</b>			
Euronext Paris (equities)	1,141	2,290.3	101%
Euroclear France (debt and equities)	1,539	3,449.2	124%
<b>Germany</b>			
Clearstream Banking Frankfurt (debt and equities)	na	5,265.2	na
<b>Hong Kong</b>			
HK Stock Exchange (equities)	445.7	614.8	38%
CMU (debt securities)	29.1	42.1	45%
<b>Italy</b>			
Borsa Italiana (equities)	985.5	1,128.2	15%
<b>Japan</b>			
TSE and other equity exchanges	2,922.0	2,972.5	2%
<b>Netherlands</b>			
Euronext Amsterdam (equities)	352.5	769.9	118%
<b>Singapore</b>			
SGX (equities)	276.8	301.4	9%
<b>Sweden</b>			
SAXES (equities)	182.4	387.5	112%
<b>Switzerland</b>			
SIS SegalIntersettle	745.1	1438.3	93%
<b>United Kingdom</b>			
LSE	5,343.4	8,381.2	57%
<b>United States</b>			
NYSE	10,145.4	14,497.1	43%
Nasdaq	1517.1	3,597.1	137%
Fedwire (federal debt)	5,259.8	5,701.9	8%
<b>Total</b>	23,822.5	35,074.4	47%
Source: BIS Statistics on Payment and Settlement Systems in Selected Countries (Figures for 2000)			

<b>Table 2b</b>			
<b>Instructions handled by selected securities clearinghouses and securities settlement systems: value of transactions</b>			
(USD billions)			
	<b>1996</b>	<b>2000</b>	<b>1996-2000 (% change)</b>
<b>Belgium</b>			
NBD (CSD)	2,269.5	2,336.7	3%
<b>Canada</b>			
CSD/BBS	24,831.0	15,062.0	-39%
<b>France</b>			
Clearnet SA	217.7	1,188.1	445%
Euroclear France	19,247.7	36,319.3	89%
<b>Germany</b>			
Eurex	11,470.9	35,948.8	213%
Clearstream Banking Frankfurt	8,086.3	14,198.4	76%
<b>Hong Kong</b>			
CCAS (settlement system)	704.5	1,395.7	98%
CMU (debt securities settlement system)	529.9	760.3	43%
<b>Italy</b>			
CCG (clearinghouse)	247.5	1,363.9	451%
LDT	15,210.7	26,199	72%
<b>Japan</b>			
BOJ-NET JGB System	38,200.0	88,559.1	132%
<b>Netherlands</b>			
Clearnet SA	439.6	885.1	101%
Necigef (CSD)	135.0	919.6	581%
<b>Singapore</b>			
SGX/CDP	49.3	96.3	95%
<b>Sweden</b>			
VPC (CSD)	7,359.7	8,209.7	12%
<b>Switzerland</b>			
SIS Segalntersettle	225.8	259.0	15%
<b>United Kingdom</b>			
CREST/CMU	43,656.4	80,192.1	84%
<b>United States</b>			
Fedwire (Book-Entry Securities)	160,600.0	188,100.0	17%
DTC <sup>1</sup>	50,200.0	116,400.0	131%
<b>Total</b>	262,665.8	391,065.8	50.4%
Source: BIS Statistics on Payment and Settlement Systems in Selected Countries (Figures for 2000)			
<sup>1</sup> DTC data reflects corporate and municipal securities only.			

Table 2c						
Derivative financial instruments traded on organized exchanges						
(Notional principal in USD billions)						
Instrument	Amounts outstanding			Turnover		
	Dec 1991	Dec 1995	Dec 2001	Year 1991	Year 1995	Year 2001
Interest rate futures	2,156.0	6,073.5	9,415.2	99,560.0	258,907.1	420,934.2
Currency futures	18.3	37.9	65.6	2,683.0	3,193.4	2,499.3
Equity index futures	76.0	172.2	341.4	7,780.0	11,413.3	22,912.3
Interest rate options	1072.6	2,741.7	12,492.8	17,320.3	42,983.4	122,765.9
Currency options	62.9	43.2	30.0	1,505.0	986.2	355.9
Equity index options	132.8	326.9	1,605.2	6,359.3	10,081.2	25,423.1
Source: BIS Quarterly Review: International Banking and Financial Market Developments						

Table 3b				
Amounts outstanding of over-the-counter (OTC) derivatives: end of year				
(USD billions)				
Instrument	Notional amounts			Gross market values
	Dec 1990	Dec 1995	Dec 2001	Dec 2001
Interest rate swaps	2,311.5	12,810.7	58,897.0	1,969.0
Currency swaps	1,155.1	2,394.8	3,942.0	335.0
Outright FX forwards and forex swaps	na	na	10,336.0	374.0
FX options	na	na	2,470.0	70.0
Forward rate agreements	na	na	7,737.0	19.0
Interest rate options	na	na	10,879.0	222
Equity linked forwards and swaps	na	na	320.0	58
Equity linked options	na	na	1,561.0	147
Commodity contracts	na	na	598.0	75
Other	na	na	14,375.0	519
Source: BIS Quarterly Review: International Banking and Financial Market Developments				

## ANNEX 4

### Comparative table of cross-border collateral pool (CCP) facilities

	<b>Cash Collateral Pool Model</b>					
	<b>Away Central Bank Option (Collateralized Loan)</b>	<b>Away Central Bank Option (Currency Swap)</b>	<b>Home Central Bank Option (Collateralized Loan)</b>	<b>Home Central Bank Option (Currency Swap)</b>	<b>Third-Party Agent Option (Collateralized Loan)</b>	<b>Third Party Agent Option (Currency Swap)</b>
<b>Entity serving as liquidity provider (principal counterparty)</b>	Away central bank	Away central bank	Home central bank	Home central bank	Away central bank	Away central bank
<b>Entity serving as collateral agent</b>	Home central bank	Home central bank	Home central bank	Home central bank	Home central bank	Home central bank
<b>Entity bearing operational impact and direct administrative costs</b>	Away central bank	Away central bank	Home central bank	Home central bank	Third party	Third party
<b>Infrastructure changes required</b>	Instruction protocol can be achieved through SWIFT  Collateral movements and intraday liquidity provisions leverages off of existing RTGS systems and central bank account structures.	Instruction protocol can be achieved through SWIFT.  Collateral movements and intraday liquidity provisions leverages off of existing RTGS systems and central bank account structures.	Communication bridge required between central banks Can be achieved through SWIFT.  Instruction protocol can be achieved through SWIFT.  Collateral movements and intraday liquidity provisions leverages off of existing RTGS systems.	Communication bridge required between central banks. Can be achieved through SWIFT.  Instruction protocol can be achieved through SWIFT.  Collateral movements and intraday liquidity provisions leverages off of existing RTGS systems.	Instruction protocol can be achieved through SWIFT.  Collateral movements and intraday liquidity provisions leverages off of existing RTGS systems and central bank account structures.	Instruction protocol can be achieved through SWIFT.  Collateral movements and intraday liquidity provisions leverages off of existing RTGS systems and central bank account structures.
	<b>Away Central Bank Option (Collateralized Loan)</b>	<b>Away Central Bank Option (Currency Swap)</b>	<b>Home Central Bank Option (Collateralized Loan)</b>	<b>Home Central Bank Option (Currency Swap)</b>	<b>Third-Party Agent Option (Collateralized Loan)</b>	<b>Third Party Agent Option (Currency Swap)</b>
<b>Perfection of claim in event of default</b>	Due diligence on confirmation of perfection of claim of cash deposit is required.	Intraday credit secured based on collateral swap legal agreement	Due diligence on confirmation of perfection of claim of cash deposit is required.	Intraday credit secured based on collateral swap legal agreement	Due diligence on confirmation of perfection of claim of cash deposit is required.	Intraday credit secured based on collateral swap legal agreement

<b>Settlement risk</b>	Assumed by market participant.  Deliver of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Deliver of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Deliver of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Deliver of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Deliver of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Deliver of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.
<b>Harmonization of central bank practice</b>	Not required, but may be desirable.	Yes, to effect the currency swaps. Need agreement of collateral swap as instrument of liquidity generation.	Not required, but may be desirable.	Yes, to effect the currency swaps. Need agreement of collateral swap as instrument of liquidity generation.	Yes in adopting common third party collateral management agent.	Yes in adopting common third party collateral management agent.
<b>Coordination of central bank procedures.</b>	None required. Can be operated on a unilateral basis.	Some required. Away central bank would require home central bank to effect currency swap.	Considerable required. Away central bank will require home central bank to perform custodial/collateral management operations on its behalf. Cannot be operated unilaterally.	Considerable required. Away central bank will require home central bank to perform custodial/collateral management operations on its behalf.	None required. Can be operated on a unilateral basis if each central bank wants to choose its own commercial bank collateral management agent. However some coordination is desirable so central banks chose common 3 <sup>rd</sup> party agent.	None required. Can be operated on a unilateral basis if each central bank wants to choose its own commercial bank collateral management agent. However some coordination is desirable so central banks chose common 3 <sup>rd</sup> party agent.
<b>Development of collateral management services</b>	Away central banks should be able to leverage existing collateral management capabilities. May need to develop new procedures for managing "cash collateral."	Away central banks should be able to leverage existing collateral management capabilities. May need to develop new procedures for managing "cash collateral."	Home central banks should be able to leverage existing collateral management capabilities. May need to develop new procedures for managing "cash collateral."	Home central banks should be able to leverage existing collateral management capabilities. May need to develop new procedures for managing "cash collateral."	Third-party commercial bank leverages off existing market services.	Third-party commercial bank leverages off existing market services.
	<b>Away Central Bank Option (Collateralized Loan)</b>	<b>Away Central Bank Option (Currency Swap)</b>	<b>Home Central Bank Option (Collateralized Loan)</b>	<b>Home Central Bank Option (Currency Swap)</b>	<b>Third-Party Agent Option (Collateralized Loan)</b>	<b>Third Party Agent Option (Currency Swap)</b>
<b>Definition of eligible collateral</b>	Set by away central banks i.e., liquidity provider. Should encompass CLS currencies.	Set by away central banks i.e., liquidity provider. Should encompass CLS currencies.	Set by away central banks i.e., liquidity provider. Should encompass CLS currencies.	Set by away central banks i.e., liquidity provider. Should encompass CLS currencies.	Set by away central banks i.e., liquidity provider. Should encompass CLS currencies.	Set by away central banks i.e., liquidity provider. Should encompass CLS currencies.

	Some countries may require changes in local law/regulation to accept foreign collateral.	Some countries may require changes in local law/regulation to accept foreign collateral.	Some countries may require changes in local law/regulation to accept foreign collateral.	Some countries may require changes in local law/regulation to accept foreign collateral.	Some countries may require changes in local law/regulation to accept foreign collateral.	Some countries may require changes in local law/regulation to accept foreign collateral.
<b>Straight--through processing (STP)</b>	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS systems. A fully integrated notification/confirmation system could be developed by away central bank over time, but not required.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS systems. A fully integrated notification/confirmation system could be developed by away central bank over time, but not required.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS systems. A fully integrated notification/confirmation system may be difficult to develop as key roles will be shared by home and away central banks.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS systems. A fully integrated notification/confirmation system may be difficult to develop as key roles will be shared by home and away central banks.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS systems and 3 <sup>rd</sup> party bank systems. A fully integrated notification/confirmation systems could be developed by 3rd party bank over time, but not required.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS systems and 3 <sup>rd</sup> party bank systems. A fully integrated notification/confirmation systems could be developed by 3rd party bank over time, but not required.
<b>Operational window</b>	Will be limited and uneven across G-10 central banks unless settlement-timing cycles of RTGS are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.	Will be limited and uneven across G-10 central banks unless settlement-timing cycles of RTGS are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.	Will be limited and uneven across G-10 central banks unless settlement-timing cycles of RTGS are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.	Will be limited and uneven across G-10 central banks unless settlement-timing cycles of RTGS are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.	Will be limited and uneven across G-10 central banks unless 3 <sup>rd</sup> party agent operates on near 24hr basis.	Will be limited and uneven across G-10 central banks unless 3 <sup>rd</sup> party agent operates on near 24hr basis.
<b>Flexible unwind facility</b>	Can be set unilaterally by away central bank subject to RTGS cut-off time limitations.	Can be agreed unilaterally by away central banks subject to RTGS cut-off time limitations.	Can be agreed bilaterally between home and away central banks subject to RTGS cut-off time limitations.	Can be agreed bilaterally between home and away central banks subject to RTGS cut-off time limitations.	Can be set unilaterally by away central bank subject to RTGS cut-off time limitations.	Can be set unilaterally by away central bank subject to RTGS cut-off time limitations.
	<b>Away Central Bank Option (Collateralized Loan)</b>	<b>Away Central Bank Option (Currency Swap)</b>	<b>Home Central Bank Option (Collateralized Loan)</b>	<b>Home Central Bank Option (Currency Swap)</b>	<b>Third-Party Agent Option (Collateralized Loan)</b>	<b>Third Party Agent Option (Currency Swap)</b>
<b>Scalability</b>	Can first be offered with only one other foreign currency as collateral, other	Can first be offered with only one other foreign currency as collateral, other currencies could be	Can first be offered with only one other foreign currency as collateral, other	Can first be offered with only one other foreign currency as collateral, other	Can first be offered with only one other foreign currency as collateral, other	Can first be offered with only one other foreign currency as collateral, other

	currencies could be added over time.  Could be extended to accept cash collateral from any participating central bank, not just home country central bank.	added over time.  Could be extended to accept cash collateral from any participating central bank, not just home country central bank.	currencies could be added over time.  Could be extended to accept cash collateral from any participating central bank, not just home country central bank.	currencies could be added over time.  Could be extended to accept cash collateral from any participating central bank, not just home country central bank.	currencies could be added over time.  Could be extended to accept cash collateral from any participating central bank, not just home country central bank.	currencies could be added over time.  Could be extended to accept cash collateral from any participating central bank, not just home country central bank.
<b>Credit risks</b>	Assumed by away central bank. Limited to FX price risk; protected by haircut.	Assumed by away central bank. Limited to FX price risk; protected by haircut.	Assumed by away central bank. Limited to FX price risk; protected by haircut.	Assumed by away central bank. Limited to FX price risk; protected by haircut.	Assumed by away central bank. Limited to FX price risk; protected by haircut.  Market participants and away central bank incur deposit risk on 3 <sup>rd</sup> party agent.	Assumed by away central bank. Limited to FX price risk; protected by haircut.  Market participants and away central bank incur deposit risk on 3 <sup>rd</sup> party agent.

	<b>Securities Collateral Pool Model</b>			<b>Central Bank Guarantee Model</b>	
	<b>Home Central Bank Option (Pledge/Repo)</b>	<b>“All Participating” Central Bank Option (Pledge/Repo)</b>	<b>Third-Party Agent Option (Pledge/Repo)</b>	<b>Central Bank Guarantee Facility</b>	
<b>Entity serving as liquidity provider (principal counterparty)</b>	Away central bank	Away central bank	Away central bank	Away central bank	
<b>Entity serving as collateral transfer agent</b>	Home country CSD	Any country ICSD	ICSD (with pre-positioning through any country CSD)	Home central bank	
<b>Entity serving as custodian</b>	Home central bank	Any central bank	ICSD	Home central bank	
<b>Entity serving as collateral management agent</b>	Home central bank	Any central bank	ICSD	Home central bank	

<b>Entity bearing operational impact and direct administrative costs</b>	Home central bank	Any central bank	ICSD	Home central bank
<b>Infrastructure changes required</b>	<p>Communication bridge required between central banks. Can be achieved through SWIFT message type</p> <p>Instruction protocol can be achieved through new SWIFT message type.</p> <p>Collateral movements and intraday liquidity provisions leverage off of existing CSDs and RTGS systems and central bank account structures.</p>	<p>Communication bridge required between central banks. Can be achieved through SWIFT message type</p> <p>Instruction protocol can be achieved through new SWIFT message type.</p> <p>Collateral movements and intraday liquidity provisions leverages off of existing CSDs and RTGS systems central bank account structures.</p>	<p>Instruction protocol can be achieved through new SWIFT message type.</p> <p>Collateral movements and intraday liquidity provisions leverages off of existing CSD/ICSD infrastructure and RTGS systems and central bank account structures.</p>	<p>No cross-border movements of collateral</p> <p>Communication bridge required between central banks. Can be achieved through SWIFT message type.</p> <p>Instruction protocol can be achieved through new SWIFT message type.</p> <p>Intraday liquidity provisions leverage off of existing RTGS systems</p>
	<b>Home Central Bank Option (Pledge/Repo)</b>	<b>“All Participating” Central Bank Option (Pledge/Repo)</b>	<b>Third-Party Agent Option (Pledge/Repo)</b>	<b>Central Bank Guarantee Facility</b>
<b>Perfection of claim in event of default</b>	Due diligence on confirmation of perfection of claim with title transfer on a cross-border process is required. CCBM experience in Euroland shows that this can be a drawn out process.	Due diligence on confirmation of perfection of claim with title transfer on a cross-border process is required. CCBM experience in Euroland shows that this can be a drawn out process.	Due diligence on confirmation of perfection of claim with title transfer on a cross-border process is required. ICSDs willing to facilitate analysis. Fed experience for discount window borrows shows that ICSD can speed up the process.	<p>Simplification of legal issues. No cross border pledges of collateral.</p> <p>Due diligence on confirmation of whether central banks have power to issue and accept guarantees. If not, may be unviable.</p>

<b>Settlement risk</b>	Assumed by market participant.  Delivery of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Delivery of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Delivery of collateral prior to delivery of credit at initiation. Repayment of credit prior to return of collateral on unwind.	Assumed by market participant.  Delivery of collateral prior to issuance of credit at initiation. Repayment of credit prior to return of collateral on unwind.	
<b>Harmonization of central bank practice</b>	Not required, but may be desirable.	Not required, but may be desirable.	Required to a certain extent in adopting common ICSDs.	Yes, to issue/accept guarantees. Need agreement on how guarantees would be structured.	
<b>Coordination of central bank procedures.</b>	None required. Can be operated on a unilateral basis.	None required. Can be operated on a unilateral basis.	None required. Can be operated on a unilateral basis as each central bank sets up relationships with ICSDs. However some coordination is desirable.	Considerable required in the structure of central bank guarantees and in the communication between central banks. Home central bank will have to perform custodial/collateral management operations.	
	<b>Home Central Bank Option (Pledge/Repo)</b>	<b>'All Participating' Central Bank Option (Pledge/Repo)</b>	<b>Third-Party Agent Option (Pledge/Repo)</b>	<b>Central Bank Guarantee Facility</b>	
<b>Development of collateral management services</b>	Central banks should be able to leverage existing collateral management capabilities. May need to develop new procedures for managing "foreign-issued" collateral.	Central banks should be able to leverage existing collateral management capabilities. May need to develop new procedures for managing "foreign-issued" collateral.	ICSDs leverage off existing market services.	None required.  Home central banks should be able to fully leverage existing collateral management capabilities as collateral will be in local currency only.	
<b>Definition of eligible collateral</b>	Set by away central banks i.e., liquidity provider. Some countries may require changes in local regulation to accept foreign collateral. Harmonization across G-10 central banks desirable.	Set by away central banks i.e., liquidity provider. Some countries may require changes in local regulation to accept foreign collateral. Harmonization across G-10 central banks desirable.	Set by away central banks i.e., liquidity provider. Some countries may require changes in local regulation to accept foreign collateral. Harmonization across G-10 central banks desirable.	Set by home central banks.  No countries would require changes in local law/regulation to accept foreign collateral. Some justifications may need changes in law/regulation to accept/issue central bank guarantees.	

<b>Straight-through processing (STP)</b>	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS/CSD systems. A fully integrated notification/confirmation system could be developed by central bank over time, but not required.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS/CSD systems. A fully integrated notification/confirmation system could be developed by central bank over time, but not required.	No manual processing at outset. Transaction notification/confirmation to occur over existing RTGS/CSD/ICSD systems. A fully integrated notification/confirmation system could be developed by ICSDs over time, but not required.	No manual processing at outset. Communication between central banks regarding issuance/revocations of guarantees can be achieved through new SWIFT messaging. A fully integrated notification/confirmation system could be developed over time by central banks.
	<b>Home Central Bank Option (Pledge/Repo)</b>	<b>“All Participating” Central Bank Option (Pledge/Repo)</b>	<b>Third-Party Agent Option (Pledge/Repo)</b>	<b>Central Bank Guarantee Facility</b>
<b>Operational window</b>	Will be limited and uneven across G-10 central banks unless settlement-timing cycles of RTGS/CSD are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.	Will be limited and uneven across G-10 central banks unless settlement-timing cycles of RTGS/CSD are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.	Will be limited to the different CSD cutoff times the ICSDs have with the different regional markets to the extent that new collateral has to be delivered into the ICH. ICH will have to offer a 24hr custody/collateral management service.	If central bank guarantees are “standing” there would be no limitations in the operational window. Use of the CCP as a intraday liquidity tool in the away market could extend the full business day.  If central bank guarantees are issued on a transactional or daily basis unless settlement-timing cycles of RTGS/CSD are aligned or market participants are willing to pre-position collateral and experience delays in collateral returns.
<b>Flexible unwind facility</b>	Unwinds could be at the discretion of the market participant or an automatic “kickback” mechanism could be employed subject to RTGS/CSD cut-off time limitations. The latter would require additional infrastructure by central banks	Unwinds could be at the discretion of the market participant or an automatic “kickback” mechanism could be employed subject to RTGS/CSD cut-off time limitations. The latter would require additional infrastructure by central banks	Unwinds could be at the discretion of the market participant or an automatic “kickback” mechanism. As long as the securities remain within the ICSD not subject to RTGS/CSD cut-off time limitations.	Unwinds could be at the discretion of market participant or an automatic “kickback” mechanism could be employed subject to RTGS/CSD cut-off time limitations. The latter would require additional infrastructure by central banks.

<b>Scalability from a collateral point of view</b>	Can be first offered on a limited basis i.e., sovereign debt from one foreign county. Over time additional sovereign debt could be added and additional marketable securities.	Can be first offered on a limited basis i.e., sovereign debt from one foreign county. Over time additional sovereign debt could be added and additional marketable securities.	Can be first offered on a limited basis i.e., sovereign debt from one foreign county. Over time additional sovereign debt could be added and additional marketable securities.	Could first be offered such that guarantees would only be accepted from the participant's home country central bank.  Could be extended over time such that guarantees would be accepted from any participating jurisdiction, not just home jurisdiction.
<b>Scalability from a model point of view</b>	Possible on a bilateral basis, i.e. min. 2 central banks	Possible on a bilateral basis, i.e. min. 2 central banks	Possible on a bilateral basis, i.e. min. a central bank, 1 ICSD	
<b>Credit risks</b>	Assumed by away central bank. Limited to market price risk; protected by haircut.	Assumed by away central bank. Limited to market price risk; protected by haircut.	Assumed by away central bank. Limited to market price risk; protected by haircut.  Market participants and away central bank incur custody risk on ICSDs.	Credit risk of market participant is assumed by the home central bank. The home central bank guarantee would stand even if the participant defaults. This is the same residual credit risk central banks face in their normal domestic collateral transactions. This credit risk is limited to a market price risk on domestic collateral, protected by haircut, unless collateral turns out to be defective.

## ANNEX 5

### Table A

#### Clearing Cycles of RTGS Systems for CLS Currencies

<b>Sydney</b>	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00
<b>Tokyo</b>	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	02:00	04:00
<b>CET</b>	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
<b>Switzerland</b>	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00	21:00
<b>London</b>	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00	16:00	17:00	18:00	19:00	20:00
<b>Toronto</b>	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00
<b>New York</b>	16:00	17:00	18:00	19:00	20:00	21:00	22:00	23:00	00:00	01:00	02:00	03:00	04:00	05:00	06:00	07:00	08:00	09:00	10:00	11:00	12:00	13:00	14:00	15:00
	(a)	(b)	(c)	(d)	(e)	(f)	(g)	(h)	(i)															

(a) 2 hour RTGS window for the following CLS currencies: - *CAN\$, CHF & US\$*

(b) 1 hour RTGS window for the following CLS currencies: - *AU\$, CAN\$, CHF, US\$ & YEN*

(c) 5 hour RTGS window for the following CLS currencies: - *AU\$, CHF, US\$ & YEN*

(d) 1 hour RTGS window for the following CLS currencies: - *AU\$, CHF, EUR & YEN*

(e) 6 hour RTGS window for the following CLS currencies: - *AU\$, CAN\$, CHF, EUR, GBP, US\$ & YEN*

(f) 1 hour RTGS window for the following CLS currencies: - *CAN\$, CHF, EUR, GBP US\$ & YEN*

(g) 4 hour RTGS window for the following CLS currencies: - *CAN\$, CHF, EUR, GBP & US\$*

(h) 1 hour RTGS window for the following CLS currencies: - *CAN\$, CHF, EUR & US\$*

(i) 3 hour RTGS window for the following CLS currencies: - *CAN\$, CHF, & US\$*

There are nineteen countries whose RTGS systems are comprised by the CLS currencies: the thirteen countries in Europe who operate in the euro and Australia, Canada, Japan, Switzerland, the United States and the United Kingdom.

## ANNEX 6

### **Securities Collateral Pool Model: Comparison of the Home Central Bank Option to the Correspondent Central Banking Model (CCBM)**

The only cross-border securities pool facility in existence today is the correspondent central banking model (CCBM) used in the Eurosystem.

Through the CCBM, participants in TARGET in the European Union (EU) can use collateral held in other countries within the EU to obtain intraday credit from the central bank of the country in which they are based. To do so, they must arrange with the issuing CSD (i.e., the CSD in which the collateral has been issued and deposited) for the collateral to be delivered to an account maintained by the local national central bank. The local national central bank then holds the collateral on behalf of the central bank granting the intraday credit and thus acts as a correspondent central bank. The correspondent central bank is responsible for providing the necessary information on the delivery and eligibility of the securities, while the home country central bank is responsible for processing that information, as well as for conducting the valuation processing and providing liquidity.

The CCBM was established by the European Central Bank as an interim solution - to facilitate the cross-border use of collateral across the entire euro area from the start of Stage Three – until adequate alternative market solutions are available. One of the guiding principles of Monetary Union is that counterparties should be treated equally. In seeking to apply this principle to the use of collateral, the Eurosystem established the CCBM to ensure that all collateral eligible for use either in monetary policy operations or to obtain liquidity in TARGET is available to all market participants, regardless of where in the European Union the collateral or the participant is located.

While there are similarities between the proposed Home Central Bank Option of the Securities Collateral Pool Model and the CCBM, there are two fundamental differences:

- Under the CCBM, the home central bank is always the liquidity provider whereas under the proposed Home Central Bank Option the away central bank would be the liquidity provider. This approach is possible under a CCBM because it operates under a single currency and does not have to overcome major time-zone difference across central banks.
- While the CCBM operates as a “cross-border” collateral facility, it only operates under a single currency, i.e., euro.

The CCBM is most similar to the Home Central Bank Options where the home central bank performs a custodial and collateral management role on behalf of the away central bank. This approach eliminates the need for the central banks acting as the liquidity provider to establish any direct links to foreign CSDs. However since beginning operations in 1999, there have been certain operating difficulties around timelines regarding same-day pledges and returns of collateral intraday, which have occurred in the CCBM.

## ANNEX 7

### Scandinavian Cash Pool - SCP<sup>83</sup>

#### **Background**

The second wave of CLS currencies is planned to go live second quarter 2003 and will include the Scandinavian currencies. As two-three Liquidity Providers are required in each currency, some of the Scandinavian CLS banks have agreed to act as Liquidity Providers in more than one currency. In that respect, concerns were raised with the manually based model currently available for handling cross-border collateral via the central banks. The concerns primarily related to the speed of which liquidity could be raised and also to the size of the pool of assets eligible for collateralization in a foreign central bank.

As a consequence, the Scandinavian CLS shareholders have asked for one uniform and fast working automated procedure for the administration of cross-border collateral in Scandinavia. The Scandinavian shareholders and the central banks of Denmark, Norway and Sweden have agreed to develop a common Scandinavian Cash Pool (SCP).

#### **The overall framework of the Scandinavian Cash Pool**

The basic principle of the model is that the participants first use collateral located in one Scandinavian country to raise liquidity according to that country's normal procedures. The resulting liquidity is then used as collateral for raising liquidity in another Scandinavian country. A participant can thus have one central pool of collateral in one country and use SCP to raise liquidity in other countries. Hence, liquidity will be able to flow cross-border without cross-border transfer of collateral.

The model implies that a domestic CB can give credit based on cross-border collateral pledged at another CB without concerns about the quality of foreign assets.<sup>84</sup> The foreign CB assumes the credit risk, and the domestic CB assumes the exchange rate risk. The individual CBs are responsible for determining the appropriate haircuts and/or margins, ensuring that these risks are hedged appropriately.

To comply with the monetary policy regimes in all three Scandinavian countries it has been decided by the CBs to restrict the model to intraday credit only. If a participant tries to use the SCP for interday credit, i.e., non-compliance with the rules set out, the CBs can impose sanctions on the participant. The CB affected is responsible for deciding appropriate sanctions. Sanctions could be fines or – as the ultimate measure – a decision to exclude the participant from the national RTGS system.

SCP will be run on a full cost recovery basis. i.e., the participants will share the development costs in the CBs. To ensure a level playing field, access to the system is open for all participants in the RTGS system. New participants will be charged a fair part of the development costs.

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<sup>83</sup> This descriptive note of the Scandinavian Cash Pool was provided by the Danmarks Nationalbank (the central bank of Denmark).

<sup>84</sup> Domestic CB refers to the central bank in the bank's home country and foreign CB refers to a participating Scandinavian central bank.

### **Scandinavian Cash Pool based on SWIFT communication**

The overall SCP procedure, including a common SWIFT communication standard, has been agreed by the CBs. However, the technical implementation is managed nationally to ensure compliance with local systems.

The fundamental principle of the SCP is that liquidity deposited to a pledged SCP account in one CB can be used as collateral for intraday credit in another CB. It has been decided that each participant must have one SCP account for each foreign participant in each foreign currency. The accounts must be pledged to the relevant participating CB.

The participants will access SCP via their national RTGS system interface using existing transfer and book entry facilities to debit their current account and credit the pledged SCP account.

The described framework implies that each CB has to develop a new application that can handle the communication between the CBs. These applications will send/receive information relating to the balance of the pledged SCP account and the release of pledge. It has been agreed that the message type will be SWIFT MT 298.

The examples below illustrate the SCP. Since a particular CB basically has to handle two situations – guaranteeing collateral for credit in foreign CBs and giving loan based on collateral in foreign CBs - there are two examples, although the examples are similar and just viewed from different perspectives:

#### *Example A: Domestic borrower wants intraday credit in a foreign CB*

1. Via the domestic RTGS system, the borrower makes a transfer from his current account to his SCP account pledged in favour of the foreign CB. This transfer takes place according to national rules and the liquidity used for the transfer is raised according to national procedures.
2. The new SCP application generates an MT 298 with information on the balance of the pledged account and sends the message to the relevant foreign CB.
3. The foreign CB gives credit to the participant taking into account haircuts and margins in its discretion.
4. When the loan in the foreign CB has been repaid, or the additional cash collateral no longer is needed, the foreign CB informs the domestic CB that collateral can be released. For this purpose an automatically generated MT 298 is used.
5. The domestic SCP application registers the message and initiates a transfer of the released amount of cash from the borrowers SCP account to his/her current account.

#### *Example B: Foreign borrower wants intraday credit in a domestic CB*

1. Via the foreign RTGS system, the foreign borrower transfers a given amount to a SCP account in the foreign CB pledged in favour of the domestic CB. Based on this, the foreign CB sends an MT 298 with information about the balance of the pledged account to the domestic CB.
2. The SCP application in the domestic CB registers the MT 298, calculates the value in domestic currency and applies domestic haircuts and margins in determining the maximum loan which can be given on the basis of the posed collateral.

3. When the loan in the domestic CB has been repaid, the domestic CB informs the foreign CB that collateral can be released. For this purpose an automatically generated MT 298 is used.
4. The foreign SCP's application receives the message and releases the pledge.