Payments Risk Committee
Wholesale Customer Advisory Group

Report of the Joint Task Force on the PSR Policy Consultation Paper

February 2007

New York

The Payments Risk Committee identifies and analyzes issues of mutual interest related to risk in payments and settlement systems. Where appropriate, it seeks to foster broader industry awareness and discussion, and to develop input on public and private sector initiatives. The institutions represented on the Committee include Bank of America, Bank of New York, Bank of Tokyo-Mitsubishi UFJ, Citibank, Deutsche Bank, HSBC, JPMorgan Chase, State Street, UBS, Wachovia, and Wells Fargo.

The Wholesale Customer Advisory Group is represented by depository institutions that are major users of the Federal Reserve's Fedwire Funds Transfer Service. Advisory Group members alert the Federal Reserve when they have business suggestions related to their use of the Fedwire Funds Transfer Service, and advise the Federal Reserve on how various initiatives and service/policy changes to the Fedwire services will impact banks' operations and customers. Institutions represented on this group are ABN AMRO, Bank of America, Bank of New York, Citibank, Deutsche Bank, HSBC, JPMorgan Chase, Key Bank, Mellon Financial, State Street, Sun Trust, UBS, US Bank, US Central Credit Union, Wachovia, and Wells Fargo.

Report of the Task Force of the Payments Risk Committee & Wholesale Customer Advisory Group on the PSR Policy Consultation Paper
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1. Executive Summary

In response to the June 2006 *Consultation Paper on Intraday Liquidity Management and Payment System Risk Policy*, the Payments Risk Committee (PRC) together with the Wholesale Customer Advisory Group (WCAG) formed a task force to gather data on contributing factors to late day payments on the Fedwire funds transfer system. The initial emphasis was on collecting data at the depository institution level, specifically the products, clients and process flows that drive payment activity between the hours of 3 pm and 6 pm.

Thirteen of the 16 banks represented on the PRC and WCAG participated in the data gathering exercise, which used the last 10 business days of September 2006 as its timeframe. The dates chosen included a month/quarter end as well as a Government Sponsored Entities (GSE) principal and interest settlement date. This data was analyzed by the Task Force. The results were presented to both the PRC and WCAG with noteworthy observations about activity surrounding:

1) CHIPS final funding
2) Broker/dealer activity
3) DTC funding and settlement activities
4) The value of tri-party repo activity as a percentage of total activity measured

The presentation of the data collected, as well as the noteworthy observations generated additional interest in these four areas. The Task Force was asked to pursue these work streams further and obtain additional detail on the underlying activities and processes that contributed to late day payment activity. The objective was to provide greater detail on these points providing information that would be beneficial to all members of the PRC and WCAG as data to support their individual responses to the consultation paper, or their general education about payment practices and processes.

The Task Force reconvened and four work streams focusing on the noteworthy observations were created. Each group, with representatives from various banks of the PRC and/or WCAG, met with the principal participants in each of its work streams. This included other depository institutions, settlement organizations and clients. The discussions surrounded the processes and market practices that contributed to late day payment activity, with an emphasis on the consultation paper and the questions posed within that document. Potential opportunities for change and process enhancements were also discussed.

The cooperation and collaboration between the depository institutions have resulted in a better understanding of the practices and processes surrounding large value, late day funds transfers. The discussions with the related settlement organizations and participants have raised the awareness of the issues raised in the consultation paper and the potential opportunities presented here reflect that.

The research confirms that late day payment activity is driven by a number of factors within the work streams analyzed. While tri-party repo does stand out due to the nature and timing of its processes, as well as transaction values, the other work streams contribute to varying degrees. Daylight overdraft fees are a factor that influences behavior, but fees do not seem to be the driving cause of late day payment activity. The broker/dealer work stream provided insight into the client perspective and involvement in this activity but potential opportunities from this group are captured in the other work streams. Our ability to impact the late day payment activity will likely be the cumulative result of process and behavior change, either as a result of pursuing some of the potential opportunities mentioned in this document, or by additional efforts by the depository institutions.

2. Background

In June 2006, the Board of Governors of the Federal Reserve System issued the *Consultation Paper on Intraday Liquidity Management and Payment System Risk Policy*. The consultation paper requests comment on the possibility of changes in its Payment Systems Risk Policy to address what is commonly termed “late day compression” in the funds transfer system. Before issuing the consultation paper, the Fed solicited input from the financial community as to the causes of the shift in payments to significantly later in the day. From this preliminary analysis, the Fed pointed to a number of possible causes, including the late day settlement of some private systems, the increasing late-in-the-day reconciliation of funding positions, and the use of general liquidity management strategies by depository institutions. As this preliminary analysis was largely based on anecdotal information, the Fed sought information from the industry to substantiate the possible causes and to understand better the underlying drivers of late day compression.

The PRC and the WCAG reviewed the consultation paper in the summer with the Fed and determined that the issue warranted further review. As a result, it formed a task force comprised of members of both the PRC and the WCAG to develop a survey to understand the magnitude of the perceived problem. A survey was developed and data for the two week period ending September 29, 2006 was collected by 13 banks. The banks that participated in the survey collected information on Fedwire funds transfers they initiated between 3 pm and 6 pm that were greater than $10 million in value. The banks further segmented this data by breaking out the funds transfers that were initiated for two business activities (tri-party repo and corporate trust) and by the originator of the transaction. The banks also collected and reported information on funds transfers that were being held in queues for credit purposes and liquidity management. Finally, the banks collected data on funds transfers related to the settlement of CLS, CHIPS and DTC.

An initial review of the aggregate data by the Task Force in early November provided insight into large value payments activity. The 13 banks generated 56% of total Fedwire funds transfer value (40% of volume) during the two week sample period. Fedwire funds transfer activity of the 13 banks peaked between 5 and 5:15 pm; on average, almost 775 transfers totaling $178 billion were made during this 15 minute interval. Activity on September 29, 2006 during this 15 minute interval, which represented both a month and quarter end, was particularly high: close to 1,160 transfers totaling $277 billion. The data revealed that Fedwire funds transfers related to tri-party repo transactions represented 39% of total value transferred by the 13 banks between 3 pm and 6 pm. This was followed by funds transfers originated on behalf of broker/dealer clients (15% of total value). The data also showed that funds transfers executed in the latter half of the afternoon was not merely an issue of banks holding funds transfers for credit or throttling purposes, but that settlement of DTC and CHIPS around 4:30 and 5:15 pm respectively is likely to have some impact on late day funds transfers.

The Task Force decided that more work was needed to obtain better context for observed patterns and a better appreciation for the driving factors. As a result, four areas were identified for further analysis:

1) Cause and effect of CHIPS settlements
2) Drivers of late day broker/dealer activity
3) Cause and effect of DTC settlements
4) Mechanics and dependencies of tri-party repo activity

This paper summarizes the work of the four subgroups that further analyzed the data collected and observed behaviors of the industry and raises some ideas and suggestions for action that may alleviate the concentration of Fedwire funds transfers late in the day.

3. Key Findings

CHIPS Subgroup

- Approximately $100 billion is in the CHIPS balance release queue throughout the day[1]
    - Approximately $23 billion (35 payments) are deleted at the end of the day before CHIPS closes; these are then most likely paid via Fedwire, potentially after 5 pm
    - Approximately $70 billion is settled at the end of the day (as a result of $35 billion final pay in/out)
- There are large value payments that remain unresolved for an extended period of time
- Knock-on effect to credit queues unclear; difficult to quantify the overall impact of a change that would release payments from the queue earlier in the day
- Very few banks use the intraday supplemental funding feature to help facilitate payments sitting in the CHIPS queue
- Lifting of the credit cap at 5 pm finalizes approximately $5 billion of additional payments

Broker/Dealer Subgroup

- Broker/dealers have not fundamentally changed their liquidity management practices over the past several years; however, during this time, the volume and in particular value of business activity of the broker/dealers has grown significantly
- Intraday credit/liquidity from banks is generally not a factor related to funds transfer activity
    - Broker/dealers do not throttle payments, rather they send instructions to banks as soon as available
    - Broker/dealers have their own concentration limits of how much money they hold at each bank
- Late day customer payments are largely tied to end of day position management, i.e., securities settlement (e.g., DTC settlement at 4:30 pm) and those overnight investment activities which typically occur after 4 pm
- Cash management strategies do differ across broker/dealers resulting in different impacts to timing of funds transfers at the end of the day; different legal entities are often involved
- Different business models impact the make up of a broker/dealer's late day funds transfers (e.g., proprietary vs. client driven)
    - Proprietary inter-company transfers reflect broker-dealer use of multiple payments banks (for own investments or inter-company transfers)
    - Customer driven, e.g., hedge fund customers
    - Or a combination of the above
- Operations at broker/dealers may be more challenged on peak days due to sheer volume of transactions and related payments, but we do not know if this results impacts timing

DTC Subgroup

- 62% of DTC daily settlement value ($896 billion total) is related to the settlement of money market instruments (MMI)[2]
- Market constraints appear to make it difficult to move MMI settlement earlier than the existing 3 pm timeframe
- P&I allocations and progress payments can be withdrawn by participants until 3 pm (progress payments can only be withdrawn in increments paid in)
- The settlement process which begins at 3 pm occurs over a 90-minute window; based on historical data, the settling bank acknowledgement process does not appear to take as much time as currently allotted

[1] Source: The following three bullets reflect systemwide CHIPS information (provided by CHIPS).
[2] Source: DTC provided this data.

Tri-Party Repo Subgroup

- The $367 billion tri-party repo funds transfers between 3 pm and 6 pm is a small portion of the tri-party repo market, which has been growing over time[3]
  - The cash movements are the large sums of investor money moving into (via the custodian) and out of (via the dealer, investor, or agent) tri-party repos; this flow is often referred to as the ‘cash leg’ of the tri-party repo
  - This represents a small number of transactions averaging 1,600 per day with a high average value of $225 million; these settlement amounts have already been netted down to some extent
- The late day settlement of tri-party repos are closely linked to the late day investment and the end of day position management process
  - Tri-party repo transactions are generally agreed upon early in the day (before noon) but processed later in the day (after 3 pm)
  - The close of Fedwire securities at 3:30 pm triggers a late day sequence of events (confirmation, netting of trades, payment initiation, etc.)
  - Finalizing tri-party repo amounts also coincides with end of day position management by dealers and investors; this process is accelerated with DTC close at 4:30 pm
  - The “loan” from the investor is generally considered 24 hour money; therefore, the funds are not returned to the investor until late in the day
    - There are provisions for early returns reflected in the tri-party repo rates
- There is no common infrastructure that supports the tri-party repo market
  - Procedures may be similar among the participants but the timing of different steps can vary
- While Fed daylight overdrafts (DOD) on the cash leg of tri-party settlements is a cost factor for the dealers (charged by agent) and banks, particularly custodians (managing their liquidity), the impact of removing DOD charges on the timing of funds transfer activity beyond liquidity queue reduction is not certain
  - Reducing or removing Fed DOD would likely reduce or eliminate related liquidity queues and accelerate some new investor funds, but would not necessarily move up the residual tri-party settlements which are tied to end of day process

4. Potential Opportunities

CHIPS Subgroup

- Release credit cap earlier than 5 pm; this may need to be tested in production as modeling may be difficult
- Increase credit cap limits in the system; this may need to be tested in production as modeling may be difficult
- Increase initial pre-funding amount; this may need to be tested in production as modeling may be difficult
  - Assess cost implications
- CHIPS and its participants should form a task force for the purpose of thinking of ways to release payments from queue within a specified timeframe, e.g., 15 minutes
- Have participants long in Fedwire but short in CHIPS settle CHIPS deficit before 5 pm

[3] Source: This data is from the survey of PRC and WCAG members during September 18 and 29, 2006.

Broker/Dealer Subgroup

- Broker/dealers support and echo many of the suggestions surfaced by other subgroups (these were not discussed in detail with the broker/dealers)
    - Changes to DTC: earlier or intra-day settlement, more automation around DTC postings
    - Enhance netting arrangement for tri-party repo

    In addition
    - A market to trade intraday liquidity / Fed daylight overdraft
    - Expanding the market for early return of Fed funds sold
    - Adjusting the Fed daylight overdraft rate

DTC Subgroup

- Move end of day credits to NSS to shave off a few minutes from settlement times; DTC is already working on this
- Form a working group of DTC settling banks to identify any impediments to expediting the acknowledgement process; if determined feasible to compress schedule, re-visit the issue with DTC
- Ask DTC to review periodically participant net debit caps for potential increases
- Explore with DTC and other industry participants the feasibility of a second settlement cycle for non-money market activity to settle late morning or early afternoon
- Consider the impact of DTC operating as a RTGS rather than a net settlement system – a study group?

Tri-Party Subgroup

- Removal of DOD charges will accelerate cash settlements related to tri-party repos to the extent it reduces liquidity queues
- Improve/standardize processes related to settlement of tri-party repos
- Expand netting (of trades) arrangements among investors and dealers
- Create a payment netting arrangement for the banks on Fedwire, specifically for tri-party related settlements.
    - May not reduce operational risk
    - Cost considerations given the small number of participants and transactions
    - Possible expansion to other products, if successful

5. Conclusions

There is no single solution to the concentration in late day payment activity. An increase in the volume and value of transactions across the work streams contributes to the later execution of transactions during the business day. The practices and processes of each work stream were reviewed for potential efficiencies. The cumulative effect of these efficiencies may create opportunities to reduce the flow of payments that occur late in the day. The Task Force recommends that the PRC follow up on a number of the potential opportunities identified. In particular, areas of interest include netting arrangements for tri-party repo settlements, feasibility studies on potential changes to DTC, and collaboration with CHIPS to identify ways to release payments from the CHIPS queue earlier.

Appendix 1: Work of the Subgroup on CHIPS

Objectives

- Determine the impact of CHIPS settlement activities on late day Fedwire funds transfers.
- Determine the impact of CHIPS final pre-funding on Fedwire funds transfers after 5 pm.
    - o Review the impact of late day payments on those banks who receive funds from CHIPS as well as those who send funds to CHIPS at CHIPS closing.
    - o Assess the receipt of CHIPS final funding amounts: a) receipt of resolved individual transactions and/or b) the actual final settlement amount which allow a bank to release pending Fedwire funds transfers.
- Determine if banks see any potential for a change in behavior by releasing certain Fedwire payments prior to 5 pm, if certain changes to the CHIPS algorithm were implemented.

Project Tasks

- Analyze survey data, in particular, internal customer credit review queue and liquidity queue data to identify key elements.
- Share survey data between 4:30 pm and 5:30 pm with CHIPS and discuss observations and industry issues. Obtain additional information from CHIPS if needed.
- Develop a questionnaire to be answered by the largest CHIPS participants.
- Summarize findings.

Observations from Survey Data

- On average, prior to 5 pm, over two thirds of payments held in internal customer credit review queues are for CHIPS or internal book transfers and the remainder is for Fedwire transfers.
- Between 3 pm and 5 pm, Fedwire funds transfers held in internal customer credit review queues remain about the same but decline thereafter.
- After 5:15 pm, Fedwire funds transfers held in internal Fedwire liquidity queues decline dramatically.

Summary of Meeting with CHIPS

The subgroup met with the following representatives of CHIPS: Hank Farrar, Joe Alexander and Vinnie DeSantis. The subgroup provided a brief introduction of the survey results and shared some of the data collected. CHIPS shared with the subgroup, the monthly release data report for September 2006 and additional detailed information regarding payments processed and deleted after 4 pm during the last two weeks of September 2006.

<u>Daily CHIPS Activity</u>

CHIPS provided hour-by-hour data on funds transfers executed on its system. The data reflect funds transfers at the time they are final (not when instructions are received) and show that CHIPS funds transfers (measured in value and volume) peak rather sharply between 10 am and 11 am. In addition, hourly volume and value are steady from noon until the end of the day at 5 pm. Therefore, there is no surge or rise in CHIPS funds transfers that occurs contemporaneously with the peak of Fedwire funds traffic after 3 pm.

CHIPS stated that the number of payments held in queue is fairly steady from 10:15 am onwards at about 900 to 1,000 transfers worth about $100 billion. It was CHIPS' impression that there was considerable turnover in the 1,000 transfers in the queue over the course of the day.

About 95% of CHIPS funds transfers are executed and become final during CHIPS' main processing cycle, which ends at 5 pm. At that time, there are on average about 850 funds transfers for about $70 billion of value, or about 5% of CHIPS' daily average value pending to be settled. The lifting of the cap on a bank's "balance" at 5 pm allows about half of these payments to be executed (that is, become final). But these funds transfers are rather small, and on average, amount to about $5 billion. The remaining funds transfers are executed and become final through the final pre-funding.

The volume and value of the CHIPS funds transfers that are in the queue as of 4 pm are reduced by banks deleting some funds transfers. About 35 funds transfers, amounting to about $23 billion, are deleted in the last hour.[4] Banks may delete payments to reduce final pre-funding requirements.

Only three banks - not among the large CHIPS participants - currently use the CHIPS intraday supplemental funding facility to push through CHIPS payments.

<u>Relating CHIPS Activity to Peak in Fedwire Funds Activity</u>

What goes on at CHIPS after 4 pm could contribute to the peak in Fedwire funds activity between 5 pm and 5:15 pm in the following ways:

- Deleted CHIPS funds transfers (about 35 per day, for a value of $23 billion) would be executed over Fedwire, unless they are cancelled per customers' request. This may occur immediately after deletion unless the transfer is held in the bank's liquidity queue. The reason for deleting payments from CHIPS may vary depending on whether the funds transfer was initiated by a large U.S. bank or small foreign bank.
- The final payouts by CHIPS at the end of the day inject about $35 billion into the FRB accounts of the CHIPS banks. This should allow banks that are receivers to release payments that are held in their liquidity queues.
- The accounts of the customers of the CHIPS banks are credited about $70 billion when the queued funds transfers become final around 5:10 pm. (If some of the transfers are for the benefit of the receiving bank instead of one of its customers, the total amount is less.) The crediting of customer accounts should reduce the volume and value of Fedwire funds transfers that are held in credit queues at the CHIPS banks, and result in a rush of Fedwire traffic or should fund customer overdrafts which are created by the CHIPS banks earlier in the day.

<u>Opportunities for Changes</u>

CHIPS has considered changes to its processing cycle but the potential effects of any incremental changes are not clear. For example, CHIPS is considering the impact and implications of releasing the credit cap earlier than the current 5 pm time, but this is difficult for CHIPS to model. Another idea is to move up the final settlement time from 5 pm to earlier in the day, for example by an hour to 4 pm, but CHIPS expects that the payments currently made during that one hour (12 thousand payments for $90 billion) would only move from CHIPS to Fedwire. Moreover, a shift in CHIPS settlement may only serve to shift the time of the congestion on Fedwire rather than better distributing the payments over the course of the day. The other changes CHIPS has considered include multiple settlements which CHIPS sees significant problems with and increased interim pre-funding that could reduce final pre-funding.

Summary of Responses to Questionnaire

Eight banks responded to the questionnaire.

- All payments that are CHIPS eligible are sent via CHIPS throughout the day, unless specifically directed by customers or unless payments are more than a specified dollar threshold amount. Generally, the dollar size, the customer segments or banks' CHIPS position are not determining factors to route a payment via CHIPS or Fedwire.
- Most banks also route time sensitive CHIPS eligible payments via CHIPS. If these payments are not resolved within a reasonable timeframe via CHIPS, they may be rerouted to Fedwire.

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[4] There is a relatively modest discrepancy in the figures quoted. Some figures are estimates provided by CHIPS and others are daily averages based on data for the two week period beginning September 18, 2006.

- Most banks do not selectively release CHIPS payments before Fedwire payments from their credit queue, but a few do.
- All payments in the credit and liquidity queues are reviewed in the same manner whether payments are sent by international financial institutions (IFI) or non-IFI.
- Banks do receive payment instructions close to or after 5 pm that are CHIPS eligible; however, most banks do not think their customers could send these payment instructions earlier in the day due to various business/funding reasons. Additionally, the number of those payments may be small.
- Banks do not generally utilize the intraday pre-funding capability.
- Most banks do not delete payments from CHIPS or re-evaluate payments in the CHIPS queue; however, when they do delete payments, they are urgent payments which are then sent via Fedwire immediately. A bank may re-evaluate its CHIPS position shortly before the initial CHIPS cut off and may delete payments to stabilize their final CHIPS position. The deleted payments are sent via Fedwire after CHIPS closes.
- When CHIPS closes, only a small volume of CHIPS eligible payments due to lack of funding appears to still be held in the banks' internal queues.
- Most banks would like to see an improvement in the CHIPS algorithm which would improve the end of day position and may increase the number of time sensitive payments as well as more non time sensitive payments to be shifted from Fedwire to CHIPS.

Summary of Findings

- All banks appear to send almost all CHIPS eligible payments via CHIPS throughout the day irregardless of the dollar size, time sensitivity, customer segments, and time of the day when payment instructions are received.
- Approximately 850 funds transfers for about $70 billion of value are pending to settle via CHIPS at 5 pm. The $70 billion are credited into customers' accounts and push out pending payments that are held in the customer credit queues at banks, resulting in Fedwire payments. Or, part of the $70 billion funds customer overdrafts created at the CHIPS banks earlier in the day. Unfortunately, due to time constraints, the subgroup was not able to assess how much of the final CHIPS settlement actually reduces existing overdrafts versus facilitating new payments to be released over Fedwire.
- Approximately 35 funds transfers per day for value of about $23 billion are deleted from CHIPS before 5 pm. Most of those payments are made via Fedwire after CHIPS closes.
- The final payout by CHIPS at the end of the day injects about $35 billion in Fedwire liquidity. The $35 billion may be used to release pending payments in the bank liquidity queues where the receiving banks were in a negative position at the Fed.

Suggestions

The CHIPS balance release engine is efficient in recycling liquidity throughout the processing day. However, the rules and algorithm that are used to release payments from the balance release engine have the unintended consequence of delaying approximately $100 billion in payments through most of the processing day with many large value payments held in queue for several hours. The subgroup believes that an improvement in the CHIPS algorithm to enable more payments to be released within 15 minutes of receipt would relieve some of the late day compression. It is a formidable task to gauge the impact of an improved CHIPS algorithm on the late day compression as modeling is quite challenging. However, given the understanding by the subgroup members of how CHIPS and Fedwire payments are made, the subgroup expects that more payments released earlier in the day would fund customers' accounts and release additional payments from the credit queues at banks, recycling the available liquidity in the system. This would most likely have a multiplier effect on the Fedwire system. Specifically, the subgroup would like CHIPS to consider the following suggestions to further improve the algorithm or reduce the end of day position in CHIPS:

- Increase the allowable credit position a bank can be in during the day
- Allow for the earmarking of time sensitive payments for immediate release
- Build in a preference flag to look for and to settle the largest number of transactions

- Consider allowing banks with a significant positive balance in their Fed account and a short position on CHIPS to fund their CHIPS position earlier than 5 pm

Two potential changes that CHIPS has considered in the past are increasing the initial pre-funding amount or lifting the credit cap earlier than 5 pm. The subgroup acknowledges the difficulty that CHIPS has in modeling the impact of such changes. CHIPS may want to consider instituting such changes for a trial period, for example, one month to review the effects on payments going through the CHIPS system.

Finally, the subgroup suggests that the CHIPS Funds Transfer Business Committee and CHIPS management take a fresh look at CHIPS efficiency with an objective of all payments to be released within 15 minutes of receipt and come up with a process improvement which would have a broader positive impact on both CHIPS and the Fedwire system.

Appendix 2: Work of the Subgroup on Broker/Dealer Clients

Objectives

- Understand what is driving late day payment instructions from the broker/dealer clients of banks. Determine the nature of these payments and what causes them to be sent late in the day.
- Determine what may be main obstacles to broker/dealers executing payments earlier in the day (e.g., the late day settlement of DTC, the late day settlement of tri-party repo transactions).
- Determine if broker/dealer clients see any potential for changes in market practices, bank practices, and operational changes at securities settlement systems (DTC/Fedwire Book-Entry), or in Fed policy, that could lead to them execute payment instructions to their banks earlier in the day.
- Clarify the impact of banks holding broker/dealer payments in their liquidity queues on late day broker/dealer payment activity.

Project Tasks

- Analyze survey data on broker/dealer clients to identify important elements.
- Discuss issues with broker/dealer relationship managers within the banks.
- Hold one-one-one meetings with key broker/dealer clients to discuss issues. Use a common template of questions and common data points (i.e., data from September 20, 25 and 29).
- Compare findings from discussions with broker/dealer clients.
- Summarize findings.

Observations from Survey Data

- Late day broker/dealer payments are almost as high on September 20 as they are on the peak quarter-end date (September 29).
- GSE funding does not appear to cause broker/dealer payments to be made later in the day. Late day broker/dealer payments on September 25 (peak GSE funding day) are the same in nominal volumes and value as other days.
- The late day broker/dealer payments are relatively small in number, but large in value. Even on the peak day (September 29) there were only 913 broker/dealer payments, in aggregate, made after 3 pm. However this totaled $170 billion or an average size of $187 million.
- Banks may be holding in internal liquidity queues a large proportion of late day broker/dealer payments, primarily due to their size.

Summary of Findings

- Several sources/drivers contribute to late day Fedwire funds transfers across broker/dealer clients. Some broker/dealers are mostly sending proprietary payments; some are sending mostly customer payments. One broker/dealer’s late day payments are almost equally comprised of proprietary and customer activities.
- A large portion of a broker/dealer’s late day proprietary payments can comprise inter-company funding/settlements in addition to payments reflecting proprietary overnight investing activities.
- The broker/dealers’ customer-driven late day payments primarily reflect securities settlement (mainly tied to DTC settlement) and the overnight investment of funds (primarily by hedge fund/prime brokerage clients), in addition to tri-party repo transactions.
- All the broker/dealers indicated to some degree or another that DTC, with its late-in-the-day funds settlement has the greatest residual effect on their late day payments. Most mentioned that the mechanics of tri-party repo can also contribute to late day payment flows. These, particularly DTC settlement, were seen as the greatest obstacles to initiating Fedwire funds transfers earlier in the day.

- Broker/dealer access to intraday credit/liquidity is not a contributing factor toward broker/dealers sending Fedwire funds transfer instructions to banks late in the day. Broker/dealers largely look to send Fedwire payment instructions to their banks as soon as customer instructions (cover funds) come in. Intraday credit/liquidity in respect of non-tri-party repo related settlements is provided free to broker/dealers from their banks so there is no cost incentive to hold/queue payments internally, which is something that is generally not done by the broker/dealers.
- While heavier volume days can be challenging from an operational standpoint it was not necessarily evident to the broker/dealers (or to the banks) that the broker/dealers were initiating a greater percentage of Fedwire funds transfers later in the day on those peak days.
- The broker/dealers have not fundamentally changed their liquidity/payment management practices in recent years. There does not appear to be anything intentionally done by the broker/dealer community to have contributed to there being a shift toward a greater percentage of overall Fedwire funds transfers being made late in the day.
- It seems reasonable to assert that broker/dealers have unintentionally contributed toward the shifting of a greater percentage of Fedwire funds transfers later in the day simply because broker/dealers' business have gown so tremendously over the past five years in volume, and in particular, value. This would mean that inter-company funding/settlements, proprietary overnight investing activities and client (prime brokerage) overnight investment of funds would increase, as a percentage, relative to the broker/dealer payment activity that is made earlier in the day.
- The broker/dealers provided a number of suggestions for changes that may lead them to initiate funds transfers earlier in the day including certain changes to market or bank practices, changes to securities settlement, and changes to Federal Reserve policy. These include:
    - A market to trade intraday liquidity / Fed daylight overdraft.
    - Expanding the market for early return of Fed funds sold.
    - A bilateral netting arrangement for the tri-party repo market.
    - Changes to DTC: earlier or intra-day settlement, more automation around DTC postings.
    - Adjusting the Fed daylight overdraft rate.

Summary of Interviews with Broker/Dealers

<u>Characteristics of Broker/Dealer Initiated Fedwire Funds Transfers Late in the Day</u>

- Two broker/dealers said their late day fund transfers are mostly due to proprietary activity and two broker/dealers said their late day funds transfers are mostly customer driven. One broker/dealer noted that both proprietary and customer activities contribute to late day funds transfers.
- Broker/dealers noted that Fedwire funds transfers supporting <u>proprietary</u> activities are for:
    - Inter-company funding/settlement - end of day balancing of accounts across firm entities
    - DTC settlement
    - Fed funds transactions - selling off excess or purchasing funds to cover funding gaps
    - Other proprietary overnight investment activity
- One broker/dealer said that over half of its Fedwire funds transfers for proprietary business were for inter-company settlements.
- <u>Customer</u> driven Fedwire funds transfers are primarily for:
    - Securities settlements - many tied to DTC settlement
    - Investments of funds, e.g., tri-party repo
- One broker/dealer said that DTC settlement payments have the greatest residual effect on the firm's late day payments, particularly inter-company settlements. Others also noted that not receiving funds from DTC until 4:30 pm delays the initiation of payments until after this time.
- Some of the broker/dealers mentioned that the mechanics of tri-party repo can lead to late day payment flows. One broker/dealer said it generally issues payment instructions for tri-

party repos to its agent and custodians in the 12 pm to 12:30 pm timeframe but that the agent or custodian may be holding the payments, which then has a knock-on effect delaying the return of other funds.

Intraday Liquidity Management Practices at Broker/Dealers

- Three broker/dealers noted that intraday liquidity is not a factor in initiating payment instructions. One of these broker/dealers said that it initiates payments as quickly as possible and has an internal service benchmark where it expects its banks to execute the funds transfers within 10 minutes. Another broker/dealer explicitly stated that it does not queue any payment orders that it submits to its clearing banks.
- One broker/dealer has a policy to only initiate a customer payment when the customer has provided the covering funds. This broker/dealer also manages its intraday liquidity and will only issue payment instructions on demand. Consequently, this firm does not generate much payment activity before noon.
- One broker/dealer noted that two to three times a year, one of the broker/dealer's clearing banks may delay executing the broker/dealer's payments due to the bank's net debit cap constraints.

Challenging/Large Volume Days

- The broker/dealers consistently noted that the first and last day of each month (particularly quarter end) are challenging. This is due to the volume of Street activity that occurs on these dates, resulting in customers moving funds between their broker/dealers and broker/dealers moving money between their clearing banks.
- Broker/dealers also noted that days on which certain products settle could also be challenging. These include:
    - FX IMM settlement days
    - Futures contract settlement days
    - Freddie Mac settlement days (15^{th} of month)
    - Fannie Mae settlement days (25^{th} of month)
    - Quarterly credit derivative settlement days

Obstacles for Broker/Dealers to Initiate Fedwire Funds Transfers Earlier in the Day

- A few of the broker/dealers noted that the late settlement of DTC is an obstacle to initiating funds transfers earlier in the day
- Other obstacles noted by the broker/dealers include:
    - Late settlement of tri-party repo trades
    - Bank funding issues
    - Waiting for the receipt of funds prior to closing

Changes that may Lead to Earlier in the Day Funds Transfers

The broker/dealers provided a number of different suggestions for changes that may lead them to initiate funds transfers earlier in the day. The suggestions have been organized below by the type of change.

- Changes to market or bank practices:
    - A market to trade intraday liquidity / Fed daylight overdraft. One respondent noted that at least one bank in the market has made a business out of trading intraday liquidity.
    - Improved clarity on the overall market sources and uses of intraday credit and understanding of participants that hold excess credit balances.
    - Creating a market for early return of Fed funds sold.
    - A bilateral netting arrangement for tri-party repo market.
- Changes to securities settlement systems:
    - Moving DTC settlement to earlier in the day could lead to the broker/dealer clients sending payment instructions to their banks earlier in the day. This is evidenced on

    days when the securities market/DTC closes earlier in the day (i.e. the day before holidays etc).
  - Intraday settlement of DTC.
  - Automated way by banks of posting DTC credits quicker, similar to commodity exchanges.
  - DTC should be more proactive in managing positions whereas no broker/dealer should be allowed to have excessive debit/credit position at DTC.
- Changes to Federal Reserve policy:
  - Changing Regulation Q to allow banks to pay interest on demand deposits, which may lead to less broker/dealer initiated payments being made late in the day because there would be a lot less moving of proprietary broker/dealer money late in the day seeking overnight investments.
  - Adjusting the Fed daylight overdraft rate although this admittedly is difficult given the totally different impact this rate has on the behaviors affecting settlement of securities (settle early) versus cash (settle late) transactions.

Appendix 3: Work of the Subgroup on DTC

Objectives

- Determine the impact of DTC activities on late day payments.
- Understand DTC processing and settlement deadlines.
- Determine impediments in current processes.
- Determine if there are opportunities for improvements which would allow for Fedwire payments to be released earlier than 5 pm.

Project Tasks

- Analyze survey data to identify key elements.
- Develop set of questions to discuss with DTC.
- Share relevant survey data between 4:30 pm and 5:30 pm with DTC and discuss observations and industry issues.
- Summarize findings.

Observations from Survey Data

- Intraday progress payments to DTC drain liquidity from system.
- Upon completion of DTC settlement, large numbers of new instructions received by banks.
- Between 5 pm and 5:15 pm, largest value of Fedwire funds transfers executed.

Anecdotal discussion prior to the survey findings speculated that considerable liquidity was tied up in DTC throughout the day in the form of progress payments and that this liquidity did not become available to the participants until DTC settled and released same at around 4:30 pm. Survey data indicated that on average $35.8 billion was funneled to DTC in the form of progress payments throughout the day and that a net of $46.5 billion was released back into the system once the various DTC settlement activities occurred.

Summary of Meeting with DTC

The subgroup determined the most effective way to move forward given the time constraints was to meet with DTC and engage them directly. The group formulated an agenda and brief presentation to share with DTC prior to an on-site meeting. The objectives of the meeting were as follows:

1. understand DTC's settlement schedule and processes;
2. determine opportunities for returning funds to participants earlier than the final payout; and
3. discuss opportunities for enhancements to help alleviate the concentration of funds transfers that occur late in the day.

The subgroup met with the following representatives from DTC: Joe Brennan, Director, DTC and NSCC Settlement; David Cosgrove, VP, DTC and NSCC Settlement;
Diana Downward, Managing Director, Operational Risk Management; Bill Hodash, Managing Director, DTC and NSCC Settlement; John Kiechle, VP, Product Management Clearing and Settlement; and Richard Nesson, Executive Managing Director, Legal, Regulatory and Compliance.

The subgroup provided a brief introduction and some context regarding the project but the DTC participants were well versed in the Fed's consultation paper and the majority of the time was spent discussing settlement activities and market practices.

DTC Background Information

DTC has 407 participants (109 banks and 298 brokers) and 86 settling banks. On average, DTC settles 800 thousand transactions valued at $896 billion each day. The settling banks have an average end of day credit balance of $40 billion, which reaches $92 billion on peak days.

Money market instruments (MMI), primarily commercial paper activity, represent 62% of DTC transaction value but only 5% of DTC transaction volume.

DTC Settlement Schedule

The end-of-date settlement schedule begins at 3:00 pm with the cutoff of the issuing and paying agent's (IPA) ability to refuse to pay for the redemption of maturing commercial paper, and ends at 4:40 pm with DTC paying out money to settlement banks for the accountholders that end the day in a credit position. The DTC processing schedule is outlined below:

2:30 pm -	MMI issuance reclaim cutoff
3:00 pm -	MMI refusal to pay cutoff - This is critically important to IPAs as they allow MMI issuances and redemptions to post to their account as long as they have until 2:59 pm to refuse to pay for a particular issuer. In the event that the IPA refuses to pay, all the maturities and new issuances posted during the day for that issuer will be reversed. DTC indicated that this happens a few times each year.
3:00 pm -	Principal and income (P&I) withdrawal and settlement progress payment (SPP) return cutoff - See P&I section below.
3:05 pm -	Largest provisional net credit (LPNC) control is released - To manage the risk of a potential reversal on MMI transactions, DTC holds back the largest net credit due to an issuer program (for purposes of calculating balances used in system controls) until after the 3 pm refusal to pay cutoff. Release of this control injects additional liquidity into the system, allowing for additional settlements.
3:10 pm -	Last P&I allocations initiated - See P&I section below.
3:10 pm -	Recycle cutoff for valued transactions
3:20 pm -	Cutoff for the entry of valued original transactions - Instructions for DVP transactions are no longer accepted (instructions for free of payment transactions can be entered until 6 pm).
3:30 pm -	Reclamation/receiver authorized deliver (RAD) approval cutoff - Participants that have received securities earlier in the day can no longer “DK” valued deliveries after this time.
3:45 pm -	DTC/NSCC cross endorsement balances are calculated and applied to participants' accounts
4:00 pm -	Settlement begins - DTC notifies settlement banks of the final figures.
4:30 pm -	Cutoff for settling banks to acknowledge/refuse to settle for a specific participant
4:35 pm -	Process NSS for all settling banks with net debits
4:40 pm -	DTC sends out net-net credits via Fedwire

Settlement Progress Payments (SPP)

Participants make progress payments to DTC by transferring funds into DTC’s Fedwire account usually to reduce debit cap constraints. Progress payments may begin in the morning, generally in order to permit the processing of MMI maturities, although the bulk of SPPs are made between 1 pm and 3 pm. MMI securities that are maturing are staged for delivery to the paying agent first thing in the morning and a paying agent’s ability to accept the securities deliveries will be limited by the paying agent’s net debit cap. Concurrently, instructions for new securities issuances are received by the paying agent (with the volume of these instructions normally peaking between noon and 2 pm). Settlement of the new issuances generate credits to the paying agent’s settlement balance, thereby reducing the paying agent’s debit cap restraints, allowing maturities previously subject to the agent’s debit cap to be processed. Progress payments can also be made to establish credits in the settlement balance to reduce the debit cap restraints. While these progress payments can begin first thing in the morning, paying agents often do not submit them until later in the day after they have received issuers' new issuance instructions and shortages are determined. DTC estimates that 75% of all SPPs are related to MMI activity. DTC estimates that approximately 60% of the progress payments made by participants are clearly and unequivocally necessary to process incoming MMI maturity deliveries, while the remaining 40% may not be as clearly necessary.

Progress payments are accepted through 3:30 pm and participants are also able to withdraw SPP funds until 3 pm as long as the debit cap and collateral controls are not overridden. It should be noted that SPP funds may only be withdrawn in the same increments in which they were paid in during the day.

Principal and Income (P&I)

P&I payments on corporate bonds, municipal securities, and structured notes, as well as equity dividends, are sent to DTC's "concentration accounts" at JPMorgan Chase during the day by paying Agent banks. These payments are moved into DTC's account at the Federal Reserve periodically (every 30 minutes) and DTC credits the accounts of participants that are due the P&I payments. This process is called P&I allocation whereby DTC matches the funds to the associated securities CUSIP, books the transaction into the accounting system and credits the receiving party's account. The 25th, 15th and 1st of every month are the largest P&I days.

3:10 pm is an important cutoff time for P&I processing as it is when the DTC staff begins making the final P&I allocations. In this last allocation procedure, if a paying Agent bank that has sent P&I funds to DTC's accounts at JPMC has not also provided DTC information on the associated securities, DTC will conduct a process under which gross amounts received from an agent are matched against the gross amounts due from the agent, with additional allocations made to pay out all agent funds received (bookkeeping entries closing out receivables on specific CUSIPs are not made, however, until the actual payment detail is subsequently received). Paying agents are required to send in P&I payments for that day by 3 pm but these banks typically delay sending in the P&I payments until the issuers have paid them. In addition, paying agents are managing their own account liquidity at this time and prefer to pay-in as late as possible (i.e., right before the 3 pm cutoff).

DTC participants are able to withdraw P&I funds credited to their account until 3 pm. DTC notes that 15% to 20% of P&I funds are withdrawn during the day but most participants choose to keep the funds in their accounts at DTC in lieu of making progress payments or for other reasons.

Potential DTC Action

There was some discussion of the potential of compressing the end-of-day schedule so that payouts to settlement banks could occur 25 minutes earlier at 4:15 pm. One component would be to move the settlement of end-of-day credits via NSS rather than Fedwire transfers (debits already occur via NSS). This may save five to ten minutes. DTC is in the process of working with the Federal Reserve Bank of New York to do this.

Another area where the timeframe could potentially be compressed is in the settlement bank acknowledgement process, which currently begins around 4 pm after DTC has calculated the final settlement figures. On an average day, DTC completes the finalizing of figures around 3:40 pm (much earlier than the 4 pm noted on the schedule). Settling banks have the greater of 30 minutes or until 4:30 pm to acknowledge the final settlement amounts for each of their participants. Historical data show that banks do not require a 30 minute acknowledgement period, although some banks will wait until the last minute to send in their acknowledgement. Consequently, DTC believes that there is potential to save 10 to 25 minutes from this process. If DTC were to pursue this, it would need to begin by discussing such a change with its 86 settlement banks (most of the final settlement value is processed by about a dozen settlement banks). DTC does not have concrete plans at this time to pursue this incremental change.

DTC and members of the study group heavily discounted the possibility of starting the end-of-day settlement process earlier in the day, even by one hour. The argument is that the 3 pm deadline for IPA refusal to pay on MMI maturities is already tight due to the widely fragmented corporate money market and the temporal nature of corporations' funding requirements as well as some practical considerations including the fact that some issuers are firms located in the Pacific time zone. Any discussion of moving this cut-off earlier would necessarily involve treasury officials from many corporate sectors. Moreover, many of the settlement processes that occur between 3 pm and 3:40 pm are sequential and necessary; therefore changing or compressing the time for these processes would be difficult.

There was also a brief discussion of DTC "educating" its participants on the potential for transferring their funds (i.e., SPP and P&I) from DTC to their settlement bank before 3 pm. DTC was open to the idea but a bit skeptical – several past efforts to publicize these capabilities have had little impact. DTC noted that it had recently tried to help out one particular participant in this way, but after transferring funds out every day for a couple of weeks, the participant eventually stopped doing so because too often it had to return funds to DTC later in the day. It was also noted that the DTC system uses $30 billion to $40 billion to facilitate the settlement of $600 billion in commercial paper settlements, which is considered quite efficient.

There was not enough time at this meeting to discuss potential long term fundamental changes at DTC and in the industry, for example, adding a mid-day cash settlement cycle or having DTC move to a real-time gross settlement system. Although DTC questioned whether the benefits of such changes would outweigh the costs to the industry, it was open to future discussions with the PRC on such longer term ideas. Any mid-day cash settlement cycle that would include MMIs would necessarily require opening up discussion of moving up the MMI IPA refusal to pay cutoff.

DTC does not intend to submit a comment letter to the consultation paper on the PSR Policy. However, it would be interested in hearing back from the PRC about its findings and recommendations that come out of its efforts.

Suggestions

The information provided by DTC was extremely valuable in gaining insight as to how effectively DTC processes and the impact it has on reducing overall risk in the financial community. It was also evident that changes could not be arbitrarily undertaken to alleviate late day compression without having some adverse impact on the DTC and the industry. However, the subgroup feels that there are opportunities which require further exploration with DTC which would allow for some incremental improvements in the flow of funds without introducing additional risk into a smoothly functioning process. These are as follows:

- Encourage DTC to settle credits via NSS which would allow funds to be credited to participants 5 to 10 minutes earlier. This is already in progress and should be implemented in the 1st quarter of 2007.
- DTC indicated that there is a possibility to compress the settlement bank acknowledgment process. Based on historical data, DTC believes 10 to 25 minutes could be saved in this way but they have no firm plans to discuss this change with settling banks. While this seems to be an opportunity to infuse some liquidity back into the system a bit earlier, it also means participants in a debit position would be charged sooner. Further, it is not clear what, if any, operational impact this change would have on the settling banks and if there are impediments to an earlier acknowledgment. The subgroup suggests that the PRC and WCAG banks put together a small working group to determine if this is a feasible option and if it would be worth further discussion with DTC to recommend such a change.
- Encourage DTC to review on a periodic basis the debit cap methodology to determine if there are opportunities to increase same at the participant level. DTC already does this, but perhaps could do so more frequently.
- Although DTC indicates that a majority of its daily transaction value is attributable to settlement of MMI instruments, the introduction of a mid-day cash settlement for bonds and

equities could be useful. If deliveries of bonds and equities were final at, say noon, and DTC participants' cash positions as a result of those deliveries were known with certainty, it could facilitate the flow of payments. Broker/dealers and others could start their daily process for cash management, overnight financing and overnight investments much earlier in the day. The PRC should engage DTC and other industry participants in discussions relative to the establishment of a second settlement cycle for non-MMI issues to determine how beneficial this might be. The subgroup recognizes that this is a fundamental change in how DTC and the industry operates today and would require thoughtful analysis including possible changes in the current risk management structure formulated to address participant failure. DTC advises that some participants have in the past pressed to delay some cut-offs later in the day, to align more closely to market closing times (e.g., if there is an active tender offer for a security); this may not be in conflict with the above proposal, but is an example of the many issues requiring further analysis.

- Engage DTC and other industry participants in discussions about the feasibility of DTC becoming an RTGS system rather than a net settlement system. Again, this is a fundamental change in how DTC operates and its impact cannot be understood without significant study. Given the efficiency with which DTC operates today requiring liquidity equivalent to approximately 5% of total settled value, it is unclear whether a true RTGS system would improve the financial community risk profile or create additional issues that may be more difficult to address than the current late day compression.

Appendix 4: Work of the Subgroup on Tri-Party Repo

Objectives

- The subgroup addressing tri-party repo included participants from the two Agent banks and three Custodian banks. The subgroup discussed and documented information to (a) provide definition around the tri-party repo process, (b) examine the drivers impacting the process and participant behavior driving late day settlements, and (c) offer potential solutions.

Observations from Survey Data

- 40% or $367 billion of the $933 billion funds transfers executed between 3 pm and 6 pm was cash movement related to the tri-party repo market.
- The $367 billion represents a closed loop of cash movements between the Agent banks and Custodian banks on behalf of Dealers (returning funds to Investors) and Investors (advancing funds to dealers).
- The average Fedwire funds transfer related to a tri-party repo transaction was large - $225 million over the survey period.
- An undisclosed percentage of the total flow is also held in liquidity queues before or during the 3 pm to 6 pm period.
- This $367 billion loop of funds transfers represents a small percentage of the total tri-party repo market. On any given day, most of the funds invested in tri-party repos are not sent back to the Custodians for the benefit of the Investor.

Summary of Findings

- The cash movements addressed in this subgroup's paper are the large sums of Investor money moving into (via the Custodian) and out of (via the Dealer, Investor, or Agent) tri-party repos. This flow is often referred to as the 'cash leg' of the tri-party repo.
- The tri-party repo market is an extraordinarily large market. Even with the current level of netting (30% to 80% range of daily value ear-marked for settlement), the total average daily net settlements for the product were nearly $367 billion or 40% of value of end of day (EOD) settlements in the PRC/WCAG survey.
- There are multiple factors which come together and explain why tri-party settlements tend to be late in the day. These fall within <u>Workflow</u>, <u>Position</u>, <u>Credit</u>, and <u>Liquidity</u> management.
    - A factor influencing the evolution of the Tri-party repo market has been Fed DOD. DOD charges on funds returned by the Dealer to the Investor are borne directly by the Dealer. The Dealer sometimes passes on this charge by factoring the cost of an 'earlier return' into the rate fixed with the Investor. DOD charges on funds sent to the Dealer on behalf of the Investor are born by the Custodian. Fed DOD thus has a direct impact on the Dealer and the Custodian and encourages later day settlement as all parties have an interest in avoiding DOD. DOD has clearly provided a strong incentive for <u>Liquidity</u> management.
    - The steps in the tri-party <u>Workflow</u> process may also encourage a drift to later in the day. The end to end tri-party repo process is largely manual and can take hours to complete. Final payment is the last of a sequence of steps. This drift puts additional pressure on EOD.
    - Lastly, Tri-party settlements appear closely linked with the EOD <u>Position</u> management process which only begins after Fedwire Securities close at 3:30 pm. This results in late day sequence of events; confirmation and netting of trades; initiation of payment wires, credit check / management and release process. DTC kicks off the EOD process – 90 minutes before Fedwire funds close generating an incremental $25 billion increase tri-party settlements in the 4:30 pm to 5 pm timeframe.

Suggestions

- Reduce or eliminate Fed DOD charges on Fedwire activity. It, however, is not certain that a reduction or removal of DOD charges alone would result in a large shift to earlier payments. Much of the current <u>Process</u> management appears tied to milestones in EOD <u>Position</u> management, the latter remaining relatively unchanged. Likely result is uncertain.
- Improve, standardize <u>Process</u> management; create best practices. Is this practical? Create a common industry-wide communications and settlement platform a la DTC. Expensive.
- Netting:
    a) <u>of trades</u> – Already takes place to some large or small degree at the following levels: Investor – Investor, Investor – Dealer, Agent – Agent. Can this be expanded?
    b) <u>of payments</u> – A new paradigm, bi- or multi-lateral within Fedwire, by product message type (possibly), for Tri-party. Collateral impacts?

  Netting of payments potentially cuts across other drivers and might significantly reduce absolute settlement amounts.

- The subgroup recommends that the institutions in this subgroup participate in a phase 2 project to further analyze and develop a specific recommendation on:
    - Whether key steps in the tri-party repo process could be accelerated and / or netting of trades expanded.
    - Feasibility of systemic offsetting of tri-party payments, e.g., via bi- or multi-lateral real time netting.

Tri-Party Repo Subgroup Position Paper

<u>What is a Tri-Party Repo?</u>

The distinguishing feature of a tri-party repo is that an Agent bank acts as an intermediary between the two parties to the repo, i.e., the Dealer and the Investor. The Agent is responsible for the administration of the transaction including collateral allocation, marking to market and substitution of collateral. Both the Investor (lender of cash) and Dealer (borrower of cash) enter into these transactions to avoid the administrative burden of bi-lateral repos.

<u>Characteristics of Tri-Party Repo Market</u>

- Provides liquidity and depth to the U.S. government securities repo market.
- Is a highly concentrated market with a small number of participants relative to its size.
- Has grown appreciably over the last several years. The size of the market is now very large in both volume and, in particular, value. Specific data regarding size is confidential.
- Is a complex product involving coordinated actions between multiple parties. Movement of Investor funds, or the 'cash leg' of a tri-party repo, is accomplished via Fedwire funds transfer.
- There is no industry owned infrastructure which supports the tri-party repo market and related settlements.
- The above said, the tri-party repo market is 'efficient', accommodating a large volume and value of related settlements everyday.

<u>Participants</u>

There are four groups of participants with different roles in the tri-party repo market:

- Agents – Agents handle U.S. government securities transactions (purchase and liquidation) on behalf of the Dealer; movement of loan proceeds; accounting; and safe-keeping of the securities for the Custodian – the collateral for the loan. The unit in the Agent bank managing Dealer's Clearance business also handles tri-party repo.
- Dealers – Work with Agents. Dealers implement investment strategies and invest in various securities. They must put up 2% of their own capital to finance their securities portfolio. Dealers borrow the balance from Investors.
- Custodians – Custodians are the bankers to the Investors.

- Investors – Lend to Dealers who use the proceeds to finance their purchase of securities. Securities become the collateral securing the loan. These loans can be defined as short term maturities or on-demand paper callable at any time.

Current Tri-party Repo Market Situation

While there is a large concentration of funds transfers at the end of day related to tri-party repo, this concentration may represent an equilibrium. All participants are engaged in the business in some proportion. Both Agents and Custodians are sensitive to the business requirements of their Dealer and Investor clients. These needs drive the Agent and Custodian's business process. This process takes into consideration current Fed DOD pricing / charges and resultant / other client funds management behaviors. As there are no apparent generic issues regarding process from either the Dealer or Investor community, one assumes that their, as well as the tri-party repo market's, requirements are currently being met.

Typical Day 1 / Day 2 Participant Activities

Day 1

- A Dealer pre arranges a loan from an Investor under a tri-party repo agreement. The majority of these transactions are agreed upon early in the day.
- The Dealer purchases and sells securities throughout the day while keeping in mind the volume of tri-party repos that it is arranging with Investors over the course of the day.
- The Agent receives and sends securities for the Dealer throughout the day and the Agent's cash account at the Fed is automatically debited and credited by Fedwire Securities. These securities movements take place between 8:30 am and 3:30 pm (operating hours of Fedwire Securities). The Agent also safe-keeps the securities for the Dealer, which are then used as the collateral for the loan from the Investor.
- The Investor sends the Agent the loan proceeds under the tri-party repo agreement via Fedwire (a funds transfer from the Investor's Custodian bank to the Agent). The Dealer funds its 2% equity in the securities investment. These funds transfers supporting Dealer securities portfolios all completed by 6 pm.
- The Agent charges the Dealer for Fed DOD charges on its net cash positions resulting from securities settlement and cash movements on a minute by minute basis throughout the day.

Day 2

- The tri-party agreement can expire, be unwound for the day, or rebooked.[5]
    1. If expired, the Dealer returns the loan amount to the Investor by sending a Fedwire funds transfer from the Agent to the Investor's Custodian.
    2. If unwound, the Dealer asks the Agent to return its securities to support its trading activity that day. The cash is held by the Agent for the Investor, unless it is transferred back to the Custodian.
    3. If rebooked, there will be no Fedwire funds transfers.[6]
- The majority of tri-party transactions are unwound on a daily basis. The Agent:
    1. Credits cash to the Investor account on the books of the Agent.
    2. Releases the securities / collateral to the Dealer's account on the books of the Agent. The Agent then places a lien on the collateral. The substitution of cash for collateral is, in effect, a secured extension of credit by the Agent to the Dealer. Because of this process, there should be no intra-day need or credit issue related to the Dealer that would delay the return of funds to an Investor.
- On any given day, a percentage of funds are returned to Investors (i.e., transferred from the Agent to the Investor's Custodian bank) that want intra-day use of these funds. These funds are then returned to the Dealer (i.e., sent from the Investor's Custodian bank to the Agent) by

[5] For purposes of this paper, an *expired* or *returned* trade is one that has *matured*. An overnight trade that does not actually terminate the next day is *rebooked* or *rolled over* or *renewed*.

[6] The amount of rebooked tri-party agreement will not change. The sub-amounts of underlying types of security investments can go up or down. A new rate and maturity date will also be applied.

close of business. Investors asking for 'early return' of funds carry the related Fed DOD charge which is factored into the terms of the tri-party repo trade between the Investor and the Dealer.

Considerations Impacting Participant Behavior – Drivers of Late Day Settlements

The tri-party market opens along with the opening of Fedwire Securities at 8:30 am. The best tri-party repo rates are available early in the day. As a result most resulting tri-party repo trades are agreed to by the Dealers and Investors early. However the timing of Fedwire funds transfers related to tri-party repo between Dealers and Investors has completely separate drivers.

- Agents only initiate tri-party repo related funds transfers on behalf of the Dealers after receiving an instruction from the Dealer as well as a related confirmation of the trade from both the Dealer and the Investor. Most of these funds transfer initiations take place after Fedwire Securities closes at 3:30 pm. Most Investors are not sensitive about the timing of receiving the return of their investments from the Dealers.
- Custodians only initiate tri-party repo related funds transfers on behalf of the Investor after receiving an instruction from the Investor.

The confluence of the management of four different processes by tri-party repo participants explains why tri-party settlements take place late in the day. These processes include Work Flow, Position, Credit, and Intra-day Liquidity management.

Workflow / Process Management – Structural

1. Highly Manual Process – All Participants
   A successful tri-party repo requires proper communication and coordination between the Agent or Custodian's internal business process and the Dealer or Investor. These processes (outside of monitoring and bookkeeping) remain largely un-automated or manual, not straight through. Communications between the Dealers and the Investors is also manual.

2. Late Day Confirmation of Trades – Dealers and Investors
   A large percentage of tri-party trades are only confirmed between Dealers and Investors *after 3 pm*.[7] The Agent is typically waiting for a confirmation from both the Dealer and Investor of the current day's repo trades, before the Agent moves funds on behalf of the Dealer. The Custodian is also waiting for confirmation of the trade from the Investor before releasing funds for credit approval, authorization, and processing.

Position Management – Money doesn't move until trades are done

3. Netting of Trades – Investors
   An estimated 30-80% of Investors net their trades against the Dealers.[8] This means that the tri-party repo related funds transfers are net of the current and previous day's tri-party repo amounts. This netting can only take place *after all trades are confirmed for the day*. As a large percentage of Investors net their trades, the subgroup surmises that an associated value of tri-party repo settlements is already being netted. Netting reduces the number and size of related Fedwire funds transfers. Trades that are not netted require that the principal for all expiring trades be returned and the funds for any new trades be wired to the Dealer's Agent bank later in the day.

4. Positions are Open Longer – Dealers and Investors
   Dealers do not finalize their positions until *after* Fedwire Securities closes and DTC (used for non-U.S. government tri-party repos) and other treasury (e.g., Fed Funds) settlements take place late in the day. Only then are Dealers completely certain of their funding position and borrowing requirement for the day. This contributes to late

[7] The consensus view of all subgroup participant banks.
[8] The consensus view of all subgroup participant banks.

confirmation of trades with Investors, which then results in the late day transfer of funds.

DTC settlement is particularly important. During the PRC/WCAG survey period the average DTC Settlement was $47 billion, generating a $25 billion and $15 billion increase in the level of tri-party and broker/dealer settlements between 4:30-5 pm. Nearly all Investors also leave their position open until late in the day. This allows them to vet late day offers and confirm related prices with the Dealers. They only finalize their position after 5 pm, and initiate instructions to transfer funds after this time. Though most Investors still finalize their positions from a bookkeeping vantage point early in the afternoon, they do not necessarily send funds transfer instructions to their Custodian until later in the day.

5. Late Day Mutual Funds – Investors
   Some Investors make late day investments in mutual funds which remain open for purchases and redemptions of shares that day until 5 pm. The closing time on many of these funds has been moving back later in the day. Most money market and some bond and equity funds now close at 5 pm; at least one fund is open until 5:30 pm. The volume of tri-party repo transactions initiated by Investor as a result of this late day mutual fund activity is deemed to be miniscule, though related value can be large.

   These investments are not finalized until fund positions are closed which impacts final trade confirmation and money movement by the Custodian. These investments also bump up against the FRB funds deadline.

Credit Management

6. Intra-day Credit Availability – Custodians and Investors
   This is a function of the individual Agent and Custodian bank's approach to intra-day credit. This is generally not an issue for Agent settlements on behalf of Dealers which are essentially secured. Size of intra-day credit lines available from the Custodian to the Investor can be a constraint with respect to the timing of funds transfers initiated by the Custodian on behalf of the Investor. In these cases the Custodian will await receipt of funds from the Dealer's Agent bank, i.e., there is a built-in credit lag.

Intraday Liquidity Management

7. Fed DOD Charges – Dealers
   Agents charge Dealers for DOD on their net cash positions resulting from securities settlement and cash movements. This includes DOD charges from when the cash leg of the tri-party repo is returned to Investors. DOD charges encourage late day Fedwire funds transfer instructions in order to avoid same.[9] Fed DOD charges give Dealers the incentive to work with Investors to shift or manage down their DOD charges. Different Tri-party repo rates apply to transactions that require the 'early return' (i.e., in the morning) of funds to the Investor – a lower rate – versus the return of funds to the Investor later in the day – a higher rate.

8. Fed DOD Charges – Agents and Custodians
   Not all delays are due to the behavior of the Dealers and Investors. As most banks manage their DOD position at the Fed, large (e.g., tri-party repo) funds transfers are likely to be managed through the liquidity management queue at Agent and Custodian banks.

[9] DOD charges provide opposite incentives to the Dealers: DOD charges delay funds transfers out of the Agent banks but charges on overdrafts encourage early return of securities for cash.

<u>Options to Alleviate the Late Day Concentration of Value in Tri-Party Settlements</u>

Process Management	**Possible Action:**	**Additional Comments**
Highly Manual Process	• Participants streamline and accelerate internal processes • Create common industry-wide communications and settlement platform	• Last steps of process appear closely inter-linked with EOD settlement and positioning process. Why is such a high percentage tied to EOD? Could the settlement of some meaningful percentage of trades be accelerated? • Would be expensive and might undermine the commercial efficiencies associated with the tri-party business
Late Day Confirmation of Trades	• Accelerate	• Appears to be largely tied to Fedwire Securities close and final DTC settlement. See prior box. Is there a best practice?
Position Management		
Netting of Trades	• Could take place at 3 levels: 1. Investor – Investor 2. Investor – Dealer 3. Agent – Agent All 3 already take place to some large or small degree	• Need to verify how much trade volume and value is currently netted down. • What is workable; makes most sense?
Positions are Open Longer	None	• This has been the trend; accelerated by better intra-day cash reporting • Flexibility provides options / creates value
DTC	• Move up DTC	• Being addressed by DTC Sub-group
Late Day Mutual Funds	• Move up redemptions	• Moving up late day Mutual Funds reduces later day investment options. Is that good?
Credit Management		
Intra-day Credit Availability	None	

Liquidity Management		
Fed DOD Charges	• A lower charge or no DOD charge might benefit all participants, particularly the Dealers and Custodians	• A lower charge is still a charge and likely to have little impact. No charge should eliminate Liquidity management and related queues, but might not necessarily result in a large shift to earlier payments because much of the process around Tri-party does not begin until Fedwire Securities closes. Tri-party confirmation and settlement is also closely aligned with final DTC settlement and final EOD positioning and funding. Refer to comments in Process management above • Fed DOD usage associated with cash Fedwire settlements changed very little as a result of the introduction of Fed DOD charges in 1994. Subsequent growth in DOD usage has been driven by increases in Fedwire activity.
Netting of Payments	• New Paradigm – Systemic netting at Fed	• Need to examine: o specific transaction (message type) driven i.e., tri-party only or broader application o bi-lateral versus multi (algorithm) netting; are there sufficient flows between all participants to make it work? o all day versus EOD say with 3 pm start time o Whether it would bring forward the underlying confirmation and netting of trades process thereby accelerating the EOD payment settlement process o The potential continued impact of fixed intra-day credit availability and /or Fed cap on Process management

Of all of the above netting could have the most immediate and significant impact on the value of tri-party payments.

Netting of tri-party repo trades

- Investor to Investor/Dealer
  Informal netting arrangements driven by certain Investors already exist. These Investors net their position in specific funds across Dealers at an Agent bank. For example, a client (one or multiple funds) can net its new investments against maturing investments with participating Dealers at an Agent bank so that it is in a single cash position (pay in to the Agent if the new investments were greater or receive funds if the maturities were greater).

There appears to be interest on the part of the Investors and Dealers for expanding this netting arrangement, but there are capacity/resource constraints to expanding – primarily technical/financial. For example, all transaction details still require manual entry by the Agent bank (and Investor?) to calculate the netted figures; subsequent calculations are then done automatically. Also certain Investors and Custodians have their own peculiar constraints which impede facilitating expansion.

Netting of tri-party repo payments

- New Paradigm
    - o General – Multi-lateral net settlement for more efficient use of liquidity
    - o Specific – New type code in Fedwire for netting tri-party repo and / or other large funds transfers

Appendix A

Tri-Party Repo (TP) and Broker/Dealer (BD) Share of Total Value of Payments

	Value of Payments			% of Total Payments		
USD' Millions	**Total**	**TP**	**BD**	**TP**	**BD**	**TP + BD**
3:00 - 3:30 pm	$67,608	$22,361	$5,092	33%	8%	41%
3:30 - 4:00 pm	$93,144	$30,121	$7,440	32%	8%	40%
4:00 - 4:30 pm	$131,367	$48,350	$14,801	37%	11%	48%
4:30 - 5:00 pm	$177,191	$73,186	$29,314	41%	17%	58%
5:00 - 5:15 pm	$178,198	$70,473	$25,332	40%	14%	54%
5:15 - 5:30 pm	$130,914	$63,819	$18,798	49%	14%	63%
5:30 - 5:45 pm	$99,743	$43,652	$16,595	44%	17%	60%
5:45 - 6:00 pm	$55,506	$15,155	$19,157	27%	35%	62%
Total	$933,671	$367,118	$136,529	39%	15%	54%
5:00 - 6:00 pm	$464,361	$193,099	$79,882	42%	17%	59%

Timing of Settlement of TP, BD, and all Other Payments

	Value of Payment			% Time Segment Total		
USD' Millions	All-TP-BD	TP	BD	All-TP-BD	TP	BD
3:00 - 3:30 pm	$40,155	$22,361	$5,092	9%	6%	4%
3:30 - 4:00 pm	$55,583	$30,121	$7,440	13%	8%	5%
4:00 - 4:30 pm	$68,215	$48,350	$14,801	16%	13%	11%
4:30 - 5:00 pm	$74,691	$73,186	$29,314	17%	20%	21%
5:00 - 5:15 pm	$82,394	$70,473	$25,332	19%	19%	19%
5:15 - 5:30 pm	$48,297	$63,819	$18,798	11%	17%	14%
5:30 - 5:45 pm	$39,496	$43,652	$16,595	9%	12%	12%
5:45 - 6:00 pm	$21,194	$15,155	$19,157	5%	4%	14%
Total	$430,024	$367,118	$136,529	100%	100%	100%
5:00 - 6:00 pm	$191,380	$193,099	$79,882	45%	53%	59%

Source: PRC/WCAG survey

Appendix B

Tri-party repo day time line – all quantitative data is from the PRC/WCAG survey.

8:30 Fedwire Securities opens

- The majority of tri-party transactions are "unwound" on a daily basis in order to support settlement of prior day and same day Dealer's securities trading. Cash is credited to the Investor's account at the Agent bank, and the collateral or securities are returned to the Dealer's account at the Agent bank.
- Cash is only returned to those Investors (by funds transfer from the Agent bank to the Custodian) wanting the intra-day use of these funds. On any given day, most of the funds invested in tri-party repos are not sent back to the Custodian for the benefit of the Investor. Only the incremental change in the amount an Investor devotes to tri-party repos or shifts in the Dealer with whom the Investor contracts trigger a Fedwire funds transfer between an Agent bank and Custodian.

12:00 The majority of the value and volume of new tri-party repo trades are booked by noon.

3:00 A large percentage of the new tri-party repo trades are confirmed between the Dealers and Investors by this time.

3:00-3:15 Fedwire Securities closes for DVP deliveries and Dealers settle their securities positions with their customers.

3:15-3:30 Any rescinds / final settlement take place and Fedwire Securities closes.

4:30-6:00 80% of the volume and value of the Fedwire funds transfers related to tri-Party repos or BD are executed.

4:30-5:00

- ➢ DTC settles at 4:30 – average $47 billion settlement
  - Fedwire funds transfers executed for tri-party repos or initiated by and BDs account for $103 billion or 58% of total transfers between 4:30-5:00
  - average $25 billion increase in funds transfers for tri-party repos
  - average $15 billion increase in funds transfers initiated by BDs
- ➢ Process of late day confirmation and netting of trades between Dealers and Investors begins
- ➢ Investors begin returning cash which they have taken for the day
- ➢ Same day purchases / redemptions in mutual fund shares must be finalized by 5:00

5:00-5:15

- ➢ CHIPS finalizes settlement between 5:10-5:15; CHIPS typically receives $35 billion and finalizes $70 billion of payments that had been queued in the system
  - Fedwire funds transfers executed for tri-party repos or initiated by BDs account for $96 billion or 54% of total transfers made between 5:00-5:15
  - Average Fedwire credit and liquidity queues drop by $36 billion ($13 and $23 respectively)
- ➢ Dealers and Investors begin finalizing their own position for the day

5:15-5:30 Fedwire funds transfers executed for tri-party repos or initiated by BDs account for $83 billion or 63% of total transfers made between 5:15-5:30

Appendix 5: Participants of the Task Force

Russell Fitzgibbons (Chair)	Deutsche Bank
<u>Subgroup on Broker/Dealer Clients</u>	
David Mazza (Subgroup Chair)	Citibank
Kevin Caffrey	Bank of New York
Steve Fullenkamp	JPMorgan Chase
Diane Leslie	JPMorgan Chase
Larry Pryor	Deutsche Bank
<u>Subgroup on CHIPS</u>	
Yoko Horio (Subgroup Chair)	Wachovia
Thomas Amato	Bank of Tokyo-Mitsubishi UFJ
Roy DeCicco	JPMorgan Chase
Nancy Hedges	HSBC
Bob Shetty	HSBC
<u>Subgroup on DTC</u>	
Kathleen Voigt (Subgroup Chair)	State Street
Brent Blake	State Street
Paul Christakos	UBS
Lauren Dustin	JPMorgan Chase
Tom Ferlazzo	UBS
Russell Fitzgibbons	Deutsche Bank
Yoko Horio	Wachovia
David Weisbrod	JPMorgan Chase
<u>Subgroup on Tri-Party Repo</u>	
Steve Fullenkamp (Subgroup Chair)	JPMorgan Chase
Francis Behlmer	Bank of New York
Kevin Caffrey	Bank of New York
Kathy Hagany	JPMorgan Chase
Kathleen Voigt	State Street
Rena Walsh	State Street
David Weisbrod	JPMorgan Chase
<u>Observers from the Federal Reserve</u>	
Susan Foley	Federal Reserve Board of Governors
Lucinda Brickler	Federal Reserve Bank of New York
Sandy Krieger	Federal Reserve Bank of New York
Lawrence Radecki	Federal Reserve Bank of New York
Marsha Takagi	Federal Reserve Bank of New York