Liquidity Complements to RTGS

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RTGS systems, while offering many advantages, have drawbacks. Two drawbacks, in particular, are worrisome:

BIS RTGS report (1997) discusses the high demand for liquidity in RTGS systems caused by the asynchronous timing of payments.

Kahn, McAndrews, and Roberds *(JMCB* 2003*)* show that RTGS systems give rise to settlement risk--a risk that is not present in netting systems.

There are many possibilities for liquidity-saving features to be "added" to RTGS systems.

-time-sensitive pricing

-intraday repo market

-deferred settlement system:

various options for settlement from deferred settlement queue

Deferred settlement systems: What might they accomplish?

Deferred settlement systems reorder the settlement of a set of payment submissions.

For example, a netting system cumulates and "pends" the settlement of a set of payments until a designated time, and then settles them by transferring the net amounts.

Alternative deferred settlement systems might release gross payments from the pending queue when a bank's balance is sufficient to cover the payment.

Why would one wish to reorder the settlement of a set of payment submissions?

The reordering is intended to make payments settle with greater synchronicity. Synchronous settlement is liquidity-saving.

Synchronizing payments occurs in two ways:

1. Exogenous: System's mechanical operation.

2. Endogenous: Participants reacting to system's incentives for payment submission.

Consider a deferred netting settlement system as a complement to an RTGS system..

One issue: who is responsible for the settlement risk of a system provided by the central bank?

Another issue: endogenous use of the system and impact of historical norms.

Desirability of the system is dependent on the number of users. Network risk.

Possible outcomes: few banks use it with limited liquidity savings, or many banks use it.

Consider a "Balance Reactive Gross Settlement queue" (BRGS) system. Similar to some European systems. *Balance-centric.*

Queue and Release criterion: place a payment order in a queue if a bank's balance is at or below its credit limit. Release queued payments if the release of the payment results in the bank's balance being greater than or equal to its credit limit.

We argue that this is only partially useful (at least in the U.S. context), because a bank can't target it's balance at a level other than its credit limit. Can slow submission of RTGS-express payments.

Alternative System: Receipt Reactive Gross Settlement queue (RRGS) system. Based on the *flow* of payments

Queue and Release criterion: Banks place lower priority payments in queue.

Payments are released from the queue if, within a specified time period (*e.g.* one calendar minute), a bank's *receipts* are sufficient to allow the queued payment to be settled so that, after settlement, the bank's balance is not lower than it was at the beginning of the minute.

(Unless a bank makes RTGS payments during the minute.)

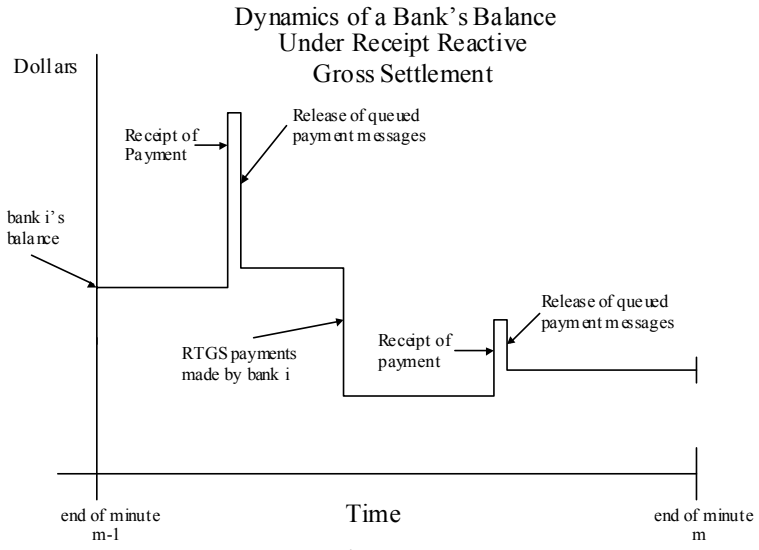


Figure 1

RRGS offers banks several advantages--in the context of a complement to an RTGS system.

1. No network risk. It is useful to a single bank in isolation. Therefore, it is truly a ***complement*** to RTGS.

2. Unlike BRGS, the settlement of an RTGS payment does not slow the settlement of queued payments. No incentive to delay RTGS payments.

3. Potentially, allows banks to signal intentions to pay--counteracts problem of settlement risk in RTGS, depending on level of queue-transparency.

Potential problems of RRGS:

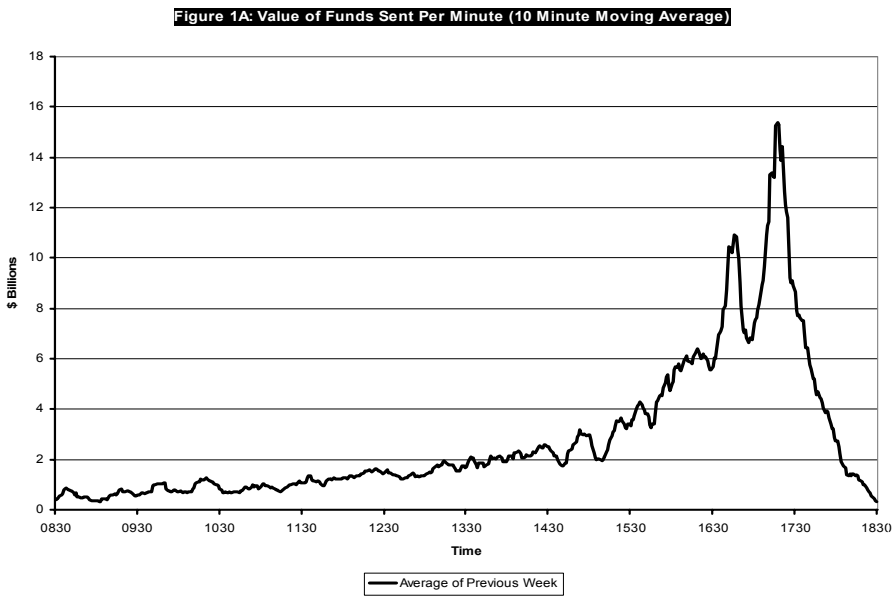
1. Gridlock.

Add bilateral matching feature--at cost of increasing network risk.

2. Credit risk inherent in signal of willingness to pay--a conundrum. In our simulations, queues are opaque.

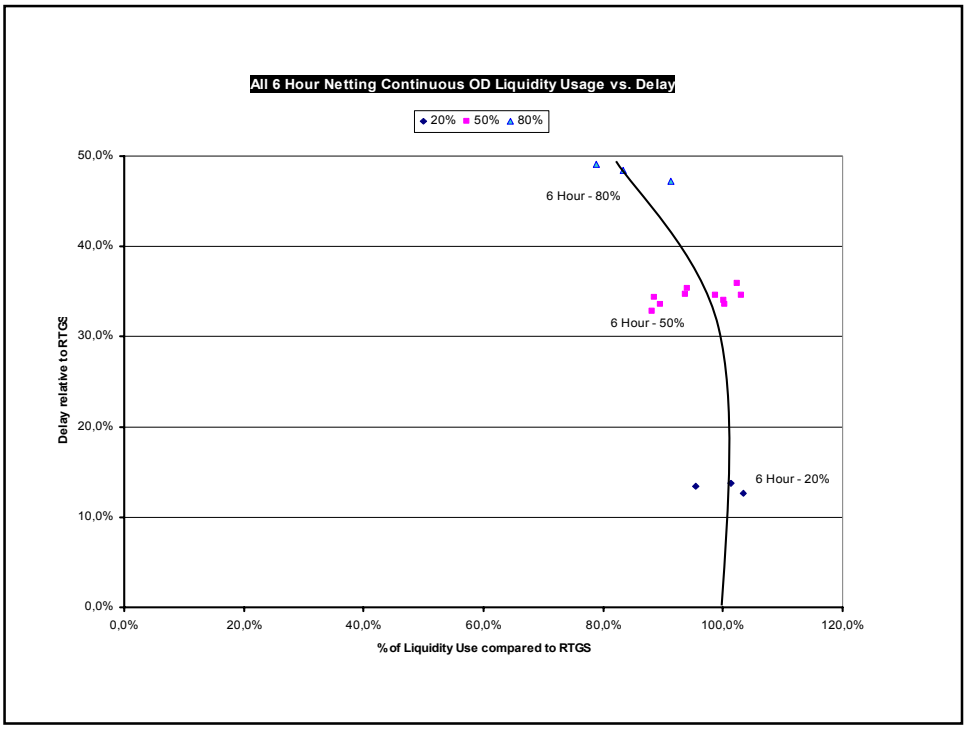
How do these systems perform? Let's simulate their performance on 10 days of randomly selected days of Fedwire Funds Transfer Service experience, in 1999 and early 2000.

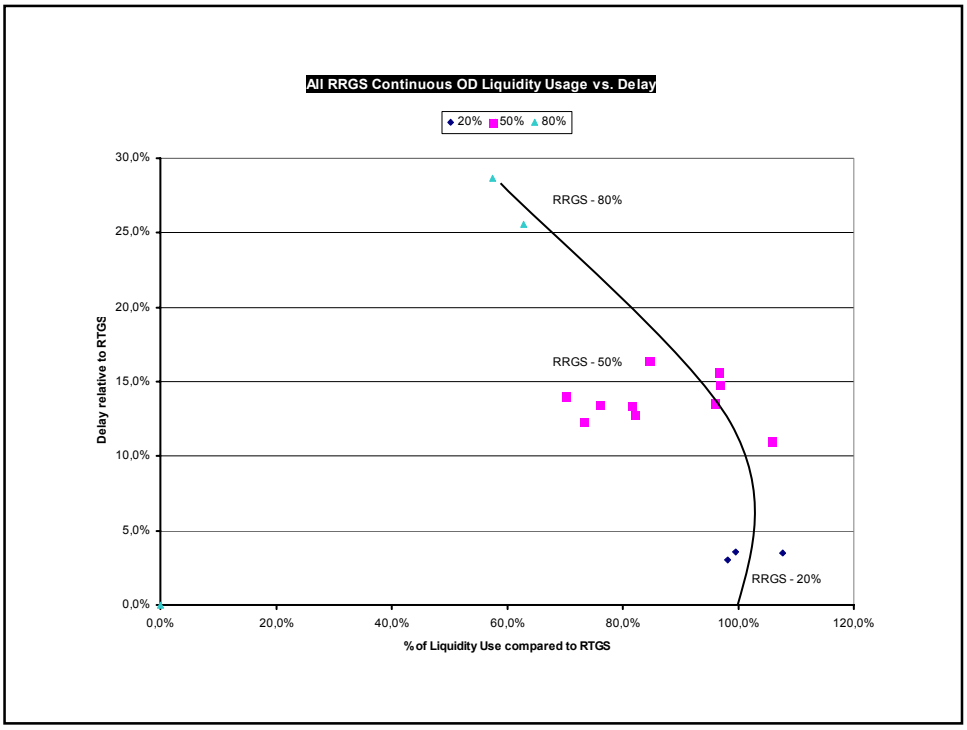
50 percent of payments are randomly selected to be placed in queues, 50 percent to be settled via RTGS.

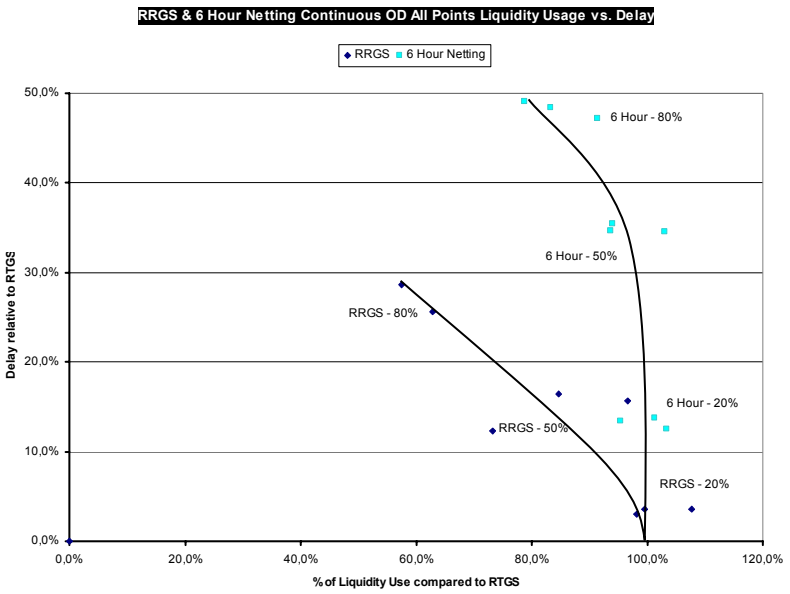


Overview: Simulation Results

Treatment	Avg. Overdraft ($ Billions)	% Change from RTGS	Avg. Time of Settlement	Delay Statistic
Real-Time Gross Settlement	20,29	-	14:37	0
One-Hour Netting	20,41	0,6%	15:06	7,51 %
Six-Hour Netting	19,45	-4,1%	16:57	34,35 %
Receipt-Reactive Gross Settlement	17,52	-13,6%	15:15	13,74 %


All 6 Hour Netting Continuous OD Liquidity Usage vs. Delay
20%
50%
80%
50,0%
40,0%
30,0%
20,0%
10,0%
0,0%
Delay relative to RTGS
6 Hour - 80%
6 Hour - 50%
6 Hour - 20%
0,0%
20,0%
40,0%
60,0%
80,0%
100,0%
120,0%
% of Liquidity Use compared to RTGS


All RRGS Continuous OD Liquidity Usage vs. Delay
20%
50%
80%
30,0%
25,0%
20,0%
15,0%
10,0%
5,0%
0,0%
Delay relative to RTGS
RRGS - 80%
RRGS - 50%
RRGS - 20%
0,0%
20,0%
40,0%
60,0%
80,0%
100,0%
120,0%
% of Liquidity Use compared to RTGS



Discussion: Why does RRGS outperform netting?

Netting is somewhat *static.*

RRGS has the potential to settle many more payments by triggering better circulation of liquidity, which can cause a *cascade* of payments to settle.

Conclusions:

1. Deferred settlement systems can improve the use of liquidity relative to the existing patterns of payment submission in RTGS systems *by reordering payment timing* at the expense of some delay in payments.

2. Whether such systems would be widely used by participants is unknown.

3. The Receipt-Reactive Gross Settlement system performs well mechanically, and is likely to have fewer disincentives for its use by banks.