

The Impact of System Design on Tiering Incentives

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Overview

1. Australia's RTGS system
2. Methodology
3. Benefits
4. Costs
5. Central Bank Utility Function
6. Conclusions

Australia's RTGS system

- ❑ Reserve Bank Information and Transfer System (RITS)
- ❑ All banks must hold accounts
- ❑ Only small account-holders (less than 0.25%) can settle indirectly
 - But, only six of the 34 eligible do so
- ❑ Four largest banks account for almost 60% of payments and receipts

Methodology

- ❑ Data
 - January 2008
- ❑ Tiering
 - Smallest to largest, by value
 - Tiered to 'largest payment partner'
- ❑ Measures
 - Maximum intraday liquidity used
 - Share of payments and receipts
 - Client-settlement bank credit exposures

System Designs

	Central queue	Bilateral offset	Sub-limits
Pure RTGS			
Central queue only	X		
Bilateral offset only	X	X	
Sub-limits only	X		X
RITS replica	x	X	x

Assumptions

□ Liquidity

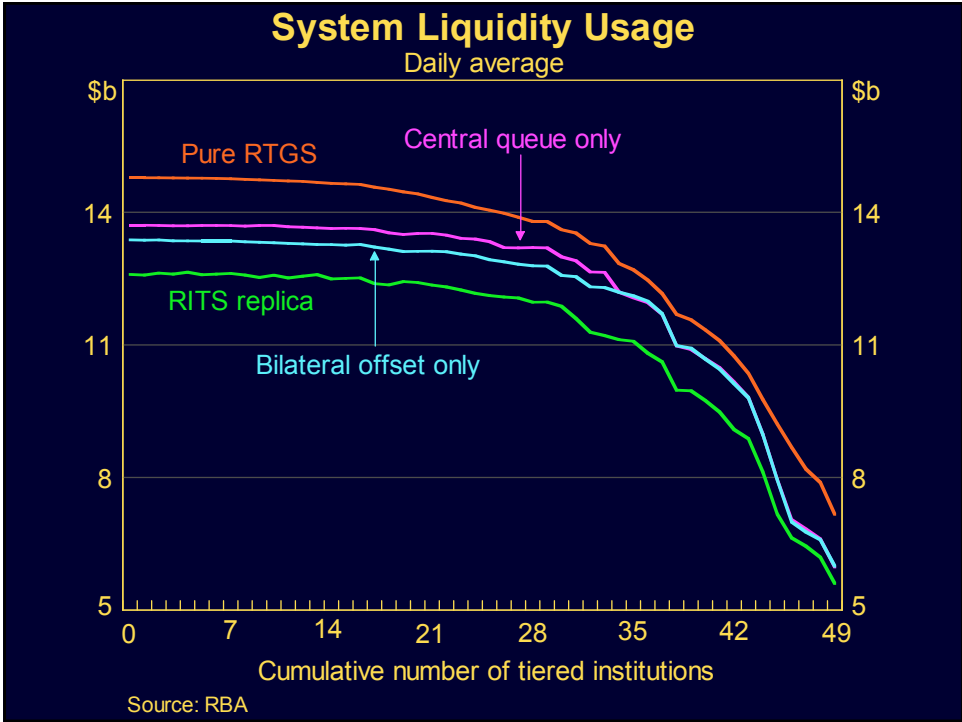
- Actual for central queue systems
 - Non-additive
 - Unlimited liquidity at end-of day
- Pure RTGS: unlimited liquidity

□ Sub-limits

- Actual

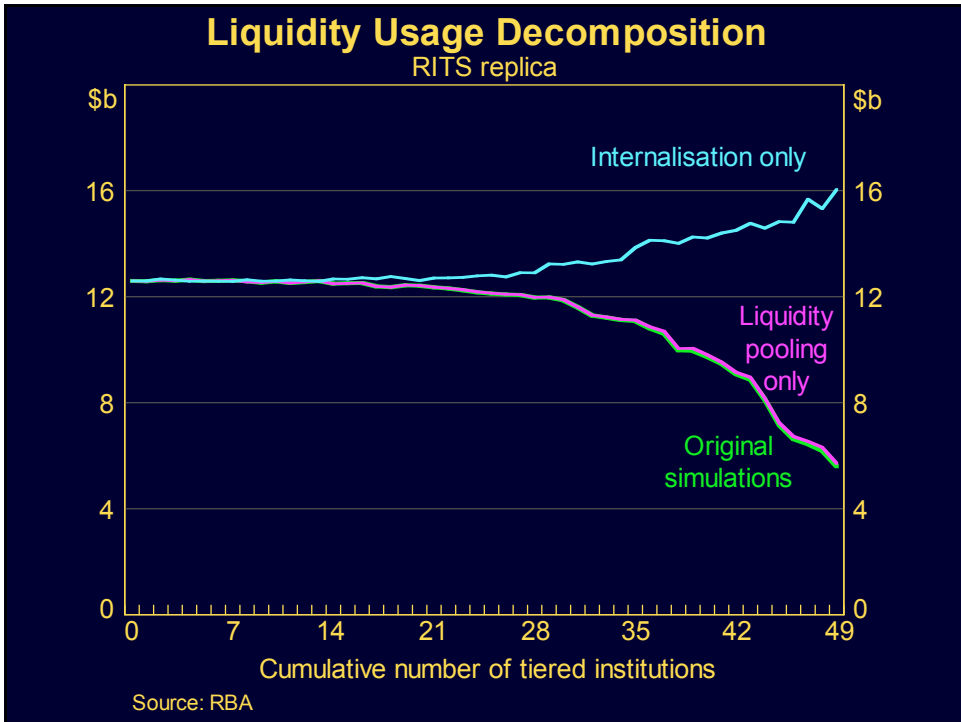
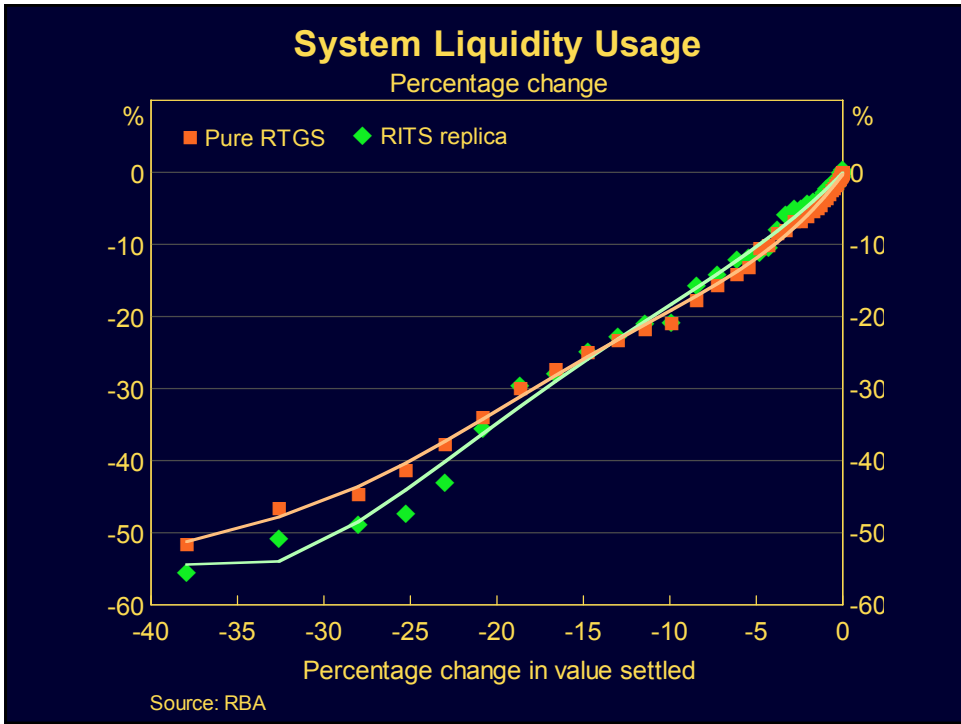
□ Submission times

- Actual for central queue systems
- Pure RTGS: adjust to model coordination



Marginal Changes

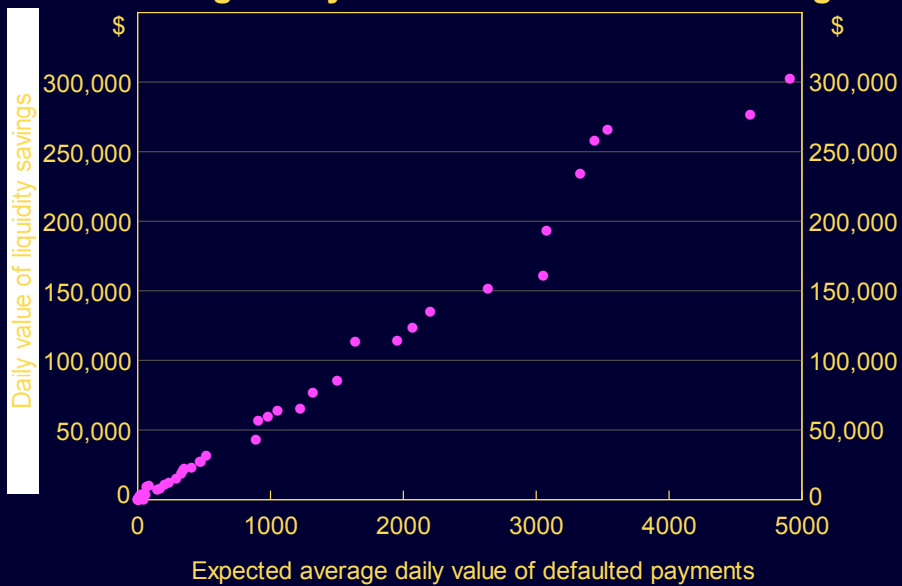
	Overall	Decreases		Increases	
	Av	#	Av	#	Av
Pure RTGS	-155.4	49	-155.4	0	n/a
Central queue only	-157.8	43	-181.4	6	11.0
Bilateral offset only	-150.7	44	-168.4	5	5.4
RITS replica	-142.7	38	-193.2	11	32.0



Costs

- ❑ System design has minimal effect
- ❑ Concentration risk
 - Four largest banks share up 10 percentage points
 - Largest bank's share up 3 percentage points
- ❑ Credit exposures
 - Settlement bank
 - Maximum around \$2 billion
 - Highly correlated with client size
 - Clients
 - Individual: maximum \$3.5 billion
 - Total: maximum around \$5 billion

Liquidity Savings and Average Daily Default Values Under Tiering



Central Bank Utility Function

□ Cobb-Douglas utility function

$$U = (kX)^a (iY)^{(1-a)}$$

- Reduction in credit risk: kX
- Liquidity savings: iY

□ Budget constraint

- Linear relationship: $iY = \alpha - \beta kX$
- Estimate: $iY = 312627.00 - 64.01(kX)$

□ Optimal tiering

- $Y^* = \frac{(1-a)\alpha}{i}$
- $Y^* \rightarrow 0$ implies $a \rightarrow 1$

Conclusions

- Some evidence RITS design lowers tiering benefits
 - Majority of liquidity savings come from liquidity pooling
- System design doesn't have a significant impact on tiering costs
 - Tiering only slightly increases concentration
 - Credit exposures significantly lower than participant's capital
- Framework for thinking about trade-off between liquidity savings and credit risk

