
Liquidity Management in Connection with Settlement of Retail Payments

Majbrit Nygaard Christensen, Tommy Meng Gladov and Lars Egeberg Jensen, Payment Systems

INTRODUCTION

Every day, citizens and firms make numerous payments using the Dankort, Betalingsservice (direct debit) and online banking transfers. These types of payment are known as retail payments. To execute a retail payment, an amount must be transferred between the payer's and the payee's banks via the underlying payments infrastructure.

The Danish banks are in the process of modernising the payments infrastructure, cf. Box 1, with the purpose of reducing the time from a payment is executed until it is received by the payee. This requires extensive changes to the payments infrastructure. A new system, the Intradagclearing, enabling intraday payment settlement, will be introduced in the autumn. This requires the banks to manage their intraday

MODERNISATION OF THE PAYMENTS INFRASTRUCTURE

Box 1

The modernisation consists of four elements:

- Since May 2012, Dankort transactions made during the weekend have been settled during the night between Sunday and Monday – previously they were settled between Monday and Tuesday. In consequence, payments made during the weekend are credited to the retailers' accounts on Monday morning.
- In November 2012, improved opportunities for the banks to offer their customers and firms fast settlement of large payments via Danmarks Nationalbank's payment system, Kronos, were introduced. The banks have introduced a lower limit of kr. 1 million for transfers.
- As of November 2013, customers will be able to execute intraday credit transfers. The system designed to handle this, the Intradagclearing, was put into operation on 6 September in order to gain experience with the system.
- In the autumn of 2014, a new system, the Straksclearing, will be introduced for fast settlement of payments up to kr. 500,000 for 24 hours, seven days a week all year round. Such immediate transfers will be credited to the recipient's account a moment after they have been submitted.

¹ The modernisation is described in detail in *Danmarks Nationalbank* (2012).

liquidity more actively. The banks' liquidity management will be facilitated by the introduction of a number of new automated tools. It is essential that the banks carefully consider which liquidity management tools are the most appropriate. Used properly, liquidity management becomes safe and efficient and retail payments are settled on time. This article describes the new tools and how they can improve the liquidity management.

From the autumn of 2014 it will be possible to make immediate transfers around the clock with credit transfers of up to kr. 500,000 being received immediately by the payee. This will place additional requirements on the banks' liquidity management as their liquidity will no longer only be affected at predetermined settlement times but around the clock.

SETTLEMENT OF RETAIL PAYMENTS

In connection with the settlement of retail payments, payments are compiled on an ongoing basis, and the net position of each bank is calculated at predetermined settlement times. Based on this, the individual bank receives or pays an amount equal to the sum of payments to and from the bank's customers. Prior to the settlement the banks must reserve liquidity for this purpose. This is done by transferring liquidity to a settlement account at Danmarks Nationalbank on the basis of which net positions are exchanged. Once a settlement has been executed, the balance of the settlement account will automatically be released and be at the disposal of the bank.

The reserved liquidity must cover the value of the net position. If a bank fails to reserve sufficient liquidity for the settlement, its payments will not be executed until a later settlement cycle. The payments in question are postponed and new net positions are calculated for the other banks. This means that the net positions of the other banks will be affected. There is a risk that the liquidity reserved by the banks does not cover the new net positions, entailing that their payments are not executed in due time.

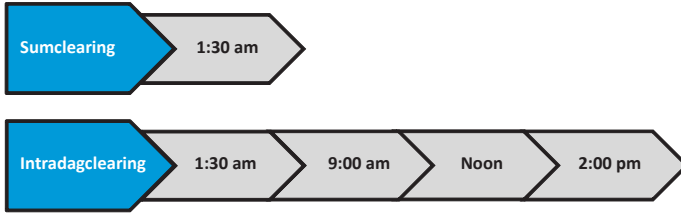
Sumclearing and Intradagclearing

The system that previously handled all retail payments is called the Sumclearing. The banks' net positions are exchanged during the night in the Sumclearing.

Since 6 September 2013, retail payments have been settled using two systems: the Sumclearing and a new system, the Intradagclearing. Under the new system, payments are settled in three daytime settlement cycles and one night-time cycle simultaneously with the Sumclearing, cf. Chart

SETTLEMENT CYCLES

Chart 1



Note: Dankort payments made during the weekend are settled separately on Monday morning at 6:00 a.m.

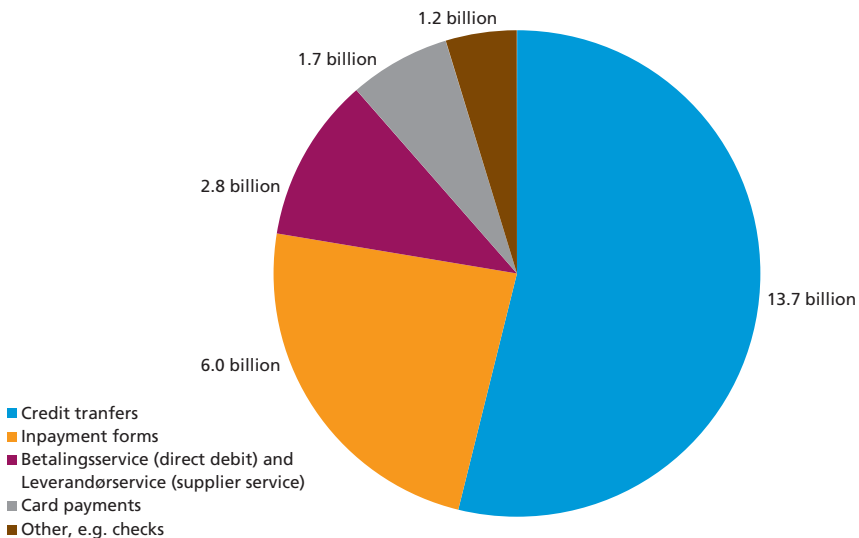
1. The Intradagclearing is based on international standards of payment messages, which contribute to preparing the infrastructure for the future.

The Intradagclearing makes it possible to make credit transfers that are received by the payee on the same banking day. Until now, the amount has typically been deposited to the payee's account the next banking day.

Only credit transfers have been transferred from the Sumclearing to the Intradagclearing, cf. Danmarks Nationalbank (2012). The daily value of these transfers totals approximately kr. 13.7 billion, cf. Chart 2, entailing that more than half the total value of retail payments has been transferred.

PAYMENTS IN THE SUMCLEARING BROKEN DOWN BY TYPE, AVERAGE DAILY VALUE, 1ST QUARTER 2013

Chart 2



Source: Nets and Danish Bankers Association.

In principle, the infrastructure makes it possible to transfer all types of retail payments from the Sumclearing to the Intradagclearing.

LIQUIDITY MANAGEMENT

The banks hold liquidity in their primary accounts, also called current accounts, at Danmarks Nationalbank. The current account balance is impacted by e.g. deposit and lending transactions, foreign-exchange and securities transactions as well as retail payments. The banks must ensure that they always have sufficient liquidity to execute their payments and consider how to allocate their liquidity during the day. To facilitate the settlement of payments Danmarks Nationalbank grants credits to the banks within the monetary-policy day, which runs from 4:00 p.m. to 3:30 p.m. on the next banking day. Credit is granted in the form of an overdraft on the bank's current account against securities or certificates of deposit as collateral. The current account balance plus the bank's maximum overdraft facility equals the liquidity available to the bank. At the end of the monetary-policy day, i.e. at 3.30 p.m., the banks may not have current account overdrafts. If they have insufficient liquidity, they have to borrow in the money market.

Previous liquidity management tools

As a general rule, the banks only reserved liquidity once a day prior to the night-time settlement of retail payments in the Sumclearing. At the time of reservation they did not know the size of their net positions and, consequently, reserved considerably more liquidity than needed. Until 6 September 2013, it was possible to reserve liquidity for the settlement in three ways: *standing order*, *manual transfer* and *reservation under the automatic collateralisation arrangement*. The reserved liquidity is transferred to the banks' settlement accounts at Danmarks Nationalbank.

- *Standing order*. A fixed amount is automatically transferred from the current account to the settlement account, enabling the bank to transfer liquidity without using manual procedures. The size of the *standing order* can be adjusted and is typically sufficiently large to cover the liquidity needed for the settlement. The order must not exceed the bank's available liquidity. In the case of insufficient available liquidity, the *standing order* is not executed.
- *Manual transfer*. Amounts are transferred manually from the current account to the settlement account. *Manual transfer* is typically used in connection with the transfer of additional liquidity during peak periods when the banks expect large negative net positions. In principle, *manual*

AUTOMATIC COLLATERALISATION ARRANGEMENT

Box 2

The automatic collateralisation arrangement is used to pledge collateral for loans from Danmarks Nationalbank. The loans can be used to settle payments in connection with securities transactions and periodic payments in the VP settlement, foreign-exchange transactions in the CLS settlement and retail payments in the Sumclearing and the Intradagclearing. A bank wishing to use the automatic collateralisation arrangement must have an automatic collateralisation agreement with Danmarks Nationalbank and open an automatic collateralisation account in Danish kroner.

The bank pledges securities in one or several designated securities accounts with VP Securities, typically trading accounts, as collateral. Unlike traditional pledging of collateral to Danmarks Nationalbank, the automatic collateralisation arrangement does not bind specific assets in a collateral custody account. Under the automatic collateralisation arrangement a share of the value of the bank's securities corresponding to the credit amount is pledged as collateral to Danmarks Nationalbank. Basically, Danmarks Nationalbank accepts the same securities as in the case of traditional collateral. The securities in the collateral custody account are at the disposal of the bank as long as the value of the account exceeds the total credit under the automatic collateralisation arrangement.

Credit under the automatic collateralisation arrangement must be covered by 3:00 p.m. at the latest. Where possible, any outstanding credit at 3:00 p.m. will automatically be covered via the current account balance. In the event of insufficient cover in the bank's current account, securities with a total collateral value matching the value of the outstanding credit with Danmarks National will be transferred.

A bill to expand the possible use of the automatic collateralisation arrangement has been prepared. The legislative change will enable the banks to use the automatic collateralisation arrangement to pledge collateral for all types of credit within the monetary-policy day. This will enable the banks to use the automatic collateralisation arrangement for all their daily payments.

transfer may be used for the daily reservation, but the manual procedure increases the risk of errors.

- *Reservation under the automatic collateralisation arrangement.* A fixed amount is transferred to the settlement account under the automatic collateralisation arrangement, which is described in detail in Box 2. Typically, the automatic collateralisation arrangement makes it possible to reserve large amounts of liquidity, reducing the risk of insufficient liquidity for the settlement. The reservation is made automatically, which minimises the risk of manual errors.

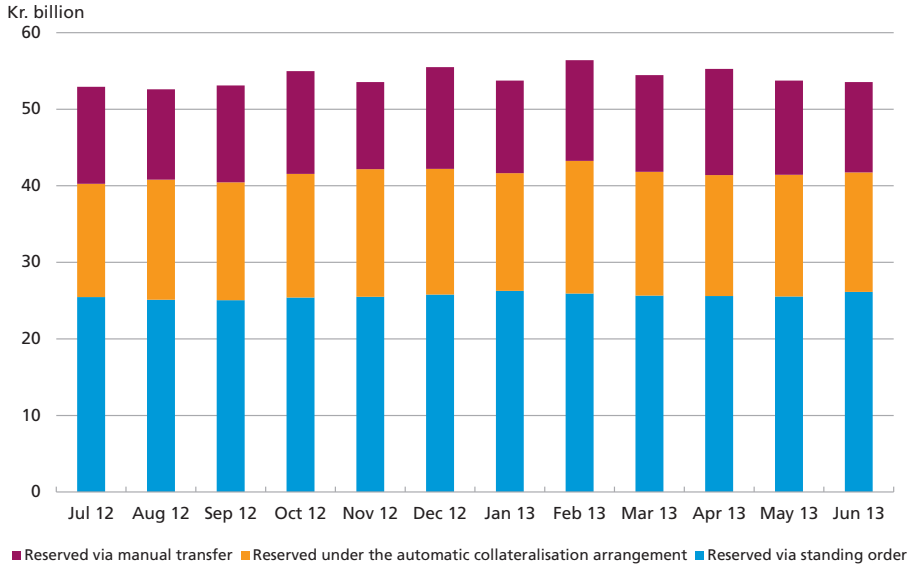
Use of previous liquidity management tools

In August 2013, 55 banks were direct participants in the Sumclearing. Moreover, a number of banks were indirect participants via other banks.

Until 6 September 2013, the majority of the banks reserved liquidity via *standing order*. Some either used the *reservation under the automatic*

THE BANKS' RESERVATIONS FOR THE SUMCLEARING, AVERAGE DAILY VALUE

Chart 3



Source: Danmarks Nationalbank.

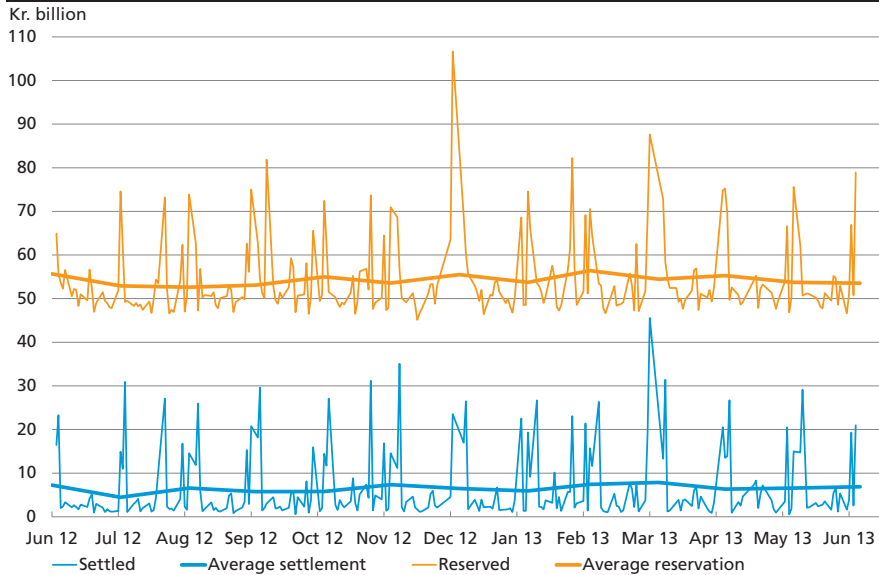
collateralisation arrangement or the manual transfer options, while only few used a combination of the three options. On an average day, 48 banks used standing order, 10 used reservation under the automatic collateralisation arrangement and 5 used manual transfer.

Measured by value, *standing order* accounted for the majority of reservations, cf. Chart 3. The value of reservations via *standing order* was stable at kr. 25.6 billion on a daily basis, corresponding to slightly less than 50 per cent of total reservations. On average, the value of *reservation under the automatic collateralisation arrangement* totalled kr. 15.9 billion on a daily basis, corresponding to approximately 30 per cent of total reservations. Accounting for an average of kr. 12.6 billion of daily reservations, the value of *manual transfer* made up the smallest share. The value of *manual transfer* varies on a daily basis due to day-to-day fluctuations in the liquidity need.

Typically, the banks reserved ample liquidity for the settlements, cf. Chart 4. The amounts settled vary strongly. On days with major government payments, such as municipal block grants, or corporate tax and VAT payments, large amounts are settled in the Sumclearing. Reservations for settlements vary accordingly because the banks take known payments into account. Daily settlements have averaged kr. 6.5 billion in the past year, while daily reservations have averaged kr. 54.1 billion.

RESERVATION AND SETTLEMENT IN THE SUMCLEARING, DAILY OBSERVATIONS AND AVERAGE DAILY VALUE

Chart 4



Source: Danmarks Nationalbank.

Although the banks in total have reserved sufficient liquidity for the settlements, payments were delayed on nine days in 2012 due to insufficient reservations by some banks.

New liquidity management tools

A number of new liquidity management tools have been introduced in the modernised payments infrastructure. If applied appropriately, they will mitigate the risk of delayed execution of retail payments.

Under the new setup, the banks receive a forecast of their expected net positions in the next settlement cycle. The forecast is calculated by the operator of the system, Nets, and makes it easier to predict the liquidity requirement. Moreover, the banks can include a buffer in the liquidity reservation, also called *coverage*, which can be used to meet unexpected liquidity requirements.

In addition, several new liquidity reservation options for the settlement cycles have been introduced. These are automated methods aimed to ease the banks' work procedures and are called *direct debit automatic collateralisation*, *direct debit current account* and *mest muligt (maximum liquidity)*. The banks may still use *standing order* and *manual transfer*. Reservation under the automatic collateralisation arrangement is replaced by *direct debit automatic collateralisation*.

The new tools and their possible applications and advantages are described below.

- *Direct debit automatic collateralisation.* The banks can raise liquidity automatically by obtaining credit under the automatic collateralisation arrangement. The borrowed amount matches the received forecast plus the selected coverage. In consequence, the automatic collateralisation arrangement has become more efficient than previously when the banks themselves determined the size of the reservation.
- *Direct debit current account.* Danmarks Nationalbank can automatically transfer an amount matching the received forecast plus the selected coverage from a bank's current account to its settlement account. The banks' total available liquidity may be used. This is mandatory for all banks and is solely used for daytime settlements during the opening hours of Danmarks Nationalbank's payment system, Kronos.
- *Mest muligt (maximum liquidity).* The banks can make their available liquidity disposable for night-time settlement. The liquidity is transferred from a bank's current account to its settlement account. As the banks cannot use any excess liquidity for other purposes during the night-time they will benefit from using *mest muligt (maximum liquidity)*.
- *Coverage.* The banks may fix a buffer beforehand, which is automatically added to the forecast in connection with reservation via *direct debit automatic collateralisation* or *direct debit current account*. The banks themselves choose the size of the buffer, which is the same for all settlements around the clock. Banks with a payment obligation according to the forecast reserve liquidity corresponding to the forecast plus the selected *coverage*. Banks set to receive liquidity according to the forecast reserve liquidity corresponding to the difference between the *coverage* and the forecast to ensure that the bank has the desired buffer for the settlement.

The liquidity management tools make it possible to cover various banks' needs, e.g. the automatic collateralisation arrangement is mainly relevant to banks with a certain holding of securities. Moreover, the tools are adjusted to the banks' need for liquidity management during the daytime and night-time. During the night-time, the banks can only use liquidity for settlements while during the daytime they need liquidity for other purposes.

Use of new liquidity management tools

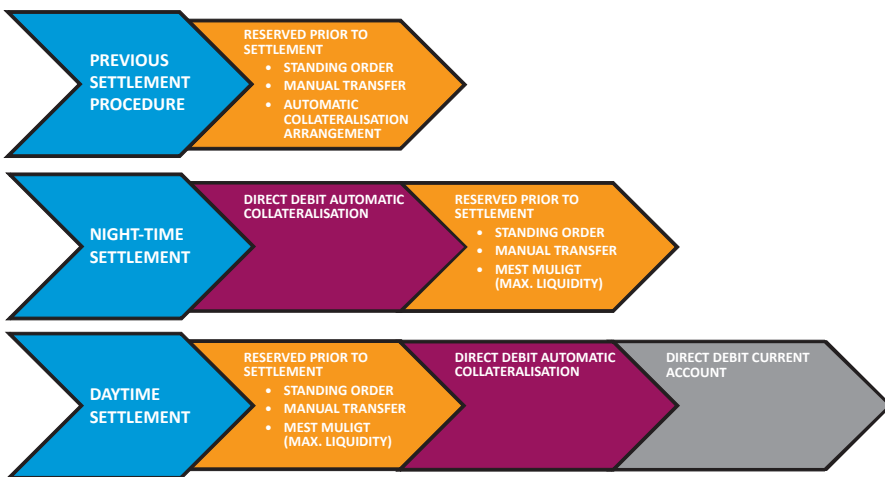
The liquidity management tools may be applied differently during the night-time and daytime. Chart 5 shows an overview of the liquidity reservation options and their sequence.

During the daytime, the banks can transfer liquidity to their settlement accounts using *standing order* and *manual transfer*. In the case of banks using the automatic collateralisation arrangement, liquidity is automatically transferred for the settlement via *direct debit automatic collateralisation* if the liquidity in the settlement account does not match the forecast plus the selected *coverage*. By using the automatic collateralisation arrangement the banks can avoid the manual procedures of *standing order* and *manual transfer*.

Direct debit current account is only used during the daytime when liquidity can be transferred from the banks' current accounts. This is mandatory for all banks and is used if the deposit in the settlement account and the drawings under the automatic collateralisation arrangement are lower than the forecast plus the selected *coverage*. If the missing liquidity is not obtained in this way, the bank does not have the sufficient liquidity.

For night-time settlements, the banks can transfer liquidity to their settlement accounts using *standing order*, *manual transfer* and *mest muligt (maximum liquidity)*. *Mest muligt (maximum liquidity)* is only an option for night-time settlement because it will bind the banks' total available liquidity to the settlement.

SEQUENCE OF RESERVATIONS Chart 5



Note: The chart shows previous and present opportunities for liquidity reservation for retail payment settlements and their sequence in the various settlement cycles.

Source: Danmarks Nationalbank.

During night-time settlement, *direct debit automatic collateralisation* is used before the liquidity reserved in advance. The selected sequence ensures maximum liquidity for the night-time settlement.

NEW CHALLENGES

The changed payments infrastructure will entail new challenges for the banks in their liquidity management due mainly to a higher number of daily settlements and a settlement cycle close to the end of the monetary-policy day. In consequence, the banks will have to manage and monitor their liquidity more actively and tackle the challenges by making use of the new liquidity management tools.

More daily settlements

Daytime settlements require continuous liquidity management. Until November 2013, retail payments are settled during the night-time or, in rare cases, during extra daytime settlements. Until then, the liquidity required for retail payments will be limited during the daytime.

Under the modernised infrastructure, the banks must have sufficient liquidity during the daytime for the settlement of retail payments, foreign-exchange and securities transactions and other interbank transactions. Therefore, the banks have to decide actively which liquidity management tools are the most appropriate and ensure sufficient liquidity on an ongoing basis.

Banks using the automatic collateralisation arrangement should use *direct debit automatic collateralisation* for the settlement of retail payments because this option typically enables reservation of considerable liquidity for the settlement.

During the daytime, the mandatory *direct debit current account* contributes to minimising the risk of delayed retail payment settlements. The banks must be aware that if the current account liquidity is automatically used for the settlement of retail payments, it is not available for other purposes. For banks that do not wish to impact their current account liquidity, the automatic collateralisation arrangement presents an advantage, as *direct debit automatic collateralisation* is used before *direct debit current account*.

The end of the monetary-policy day

The last daytime settlement cycle in the Intradagclearing is at 2:00 p.m., which is fairly close to the end of the monetary-policy day at 3:30 p.m. This entails a substantially shorter interval between the last daytime settlement cycle and the end of the monetary-policy day. The banks

receive forecasts of the liquidity required for the settlement and can prepare for the ending of the day. However, they do not know their final liquidity requirement until after the settlement and consequently may experience time constraints when raising liquidity in the market to cover any credit obtained from Danmarks Nationalbank prior to the end of the monetary-policy day.

The banks can affect the liquidity requirement for the settlements by limiting the value of customer transactions. Moreover, the banks may encourage corporate customers to make transfers via Danmarks Nationalbank to ensure that the amounts are entered promptly and do not have to wait for the next settlement of retail payments.

Unexpected liquidity requirement

Forecasts of the expected liquidity requirement are only correct if all banks have reserved sufficient liquidity. If one or more banks fail to do so, their payments will be postponed to a later settlement cycle and new net positions will be calculated for the other banks. Since the new net positions will not match the forecast, there is a risk that more banks have reserved insufficient liquidity.

Several of the new liquidity management tools can be used to minimise the risk of payment delay resulting from an unexpected liquidity requirement. The tools enable the reservation of liquidity in excess of the forecast.

Coverage is used to cover any gaps between the forecast and the actual liquidity requirement. The size of the *coverage* determines how well protected the bank is, cf. Box 3. Omission to use *coverage* may entail that one bank's insufficient reservation delays the majority of the other banks' payments. The greater the banks' *coverage*, the lower the risk of the banks being impacted by the insufficient reservation of one bank. However, a large *coverage* does not guarantee that payments are executed in due time in a situation where the bank with the largest payment obligation has not reserved sufficient liquidity. This emphasises the importance of all banks monitoring their reservation of liquidity for the settlement of retail payments on an ongoing basis.

Using the *mest muligt (maximum liquidity)* option will typically enable the banks to ensure considerable liquidity for the night-time settlement in the Sumclearing and the Intradagclearing, where the major share of the settlement is expected to be executed. As in the case of *coverage*, the risk of payments being delayed due to unexpected liquidity requirements is minimised.

All banks should use *mest muligt (maximum liquidity)* combined with adequate *coverage*, which can be determined with due respect to the average and maximum payment obligation of the bank.

COVERAGE

Box 3

The significance of coverage to the settlement of retail payments has been analysed based on 246 days' settlements in the Sumclearing in the period 1 July 2012 to 30 June 2013.

It is assumed that the banks reserve amounts matching their negative net positions plus coverage. If the net position is positive, kr. 0 is reserved. It is also assumed that one bank has not reserved sufficient liquidity.

The table shows the effects if the bank with the largest, median and smallest payment obligation does not reserve sufficient liquidity and the number of days by which execution of the other banks' payments is delayed due to the insufficient reservation. The table also shows how many of the 55 participating banks that, in the worst case, are impacted on the relevant days. The effects are calculated for various levels of coverage

No coverage

If coverage is not used, execution of the other banks' payments will be delayed on almost all days. Irrespective of whether the removed bank has the largest or the smallest payment obligation, the majority of the banks will, in the worst case, be affected by the insufficient reservation.

Coverage

If the bank with the smallest payment obligation fails to reserve sufficient liquidity, coverage of 5 per cent will, on most days, ensure that settlement is executed for the other banks. With coverage of 25 per cent, settlement will be executed as planned on most days, even in a situation where the bank with the median obligation is removed from the settlement.

It is also seen that the maximum number of banks affected by insufficient reservation declines as coverage increases. Coverage of 25 per cent has a positive impact on the settlement but it will still have major implications if the bank with the largest payment obligation fails to reserve sufficient liquidity.

EFFECT OF COVERAGE

	No. of days			Largest no. of banks		
	Largest payer	Median payer	Smallest payer	Largest payer	Median payer	Smallest payer
Coverage						
0 per cent	246	243	235	46	46	45
5 per cent	246	154	7	42	30	17
25 per cent	244	67	0	33	14	0

Source: Danmarks Nationalbank, own calculations.

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