# EXPRESS TRANSFERS IN DENMARK

Morten Fremmich Andresen, Banking and Markets
and Lars Egeberg Jensen, Payment Systems.

## INTRODUCTION

Starting November 2014, it will be possible for citizens and firms in Denmark to make express transfers 24/7/365, changing the current situation where it may take one or more days for a payment to reach the payee.

*Express transfers* are facilitated by the modernisation of the Danish payments infrastructure undertaken by the Danish financial sector and Danmarks Nationalbank.

The modernisation is based on a report prepared by the working group on domestic payment transfers.[1] The report identified a number of initiatives, all of which are designed to reduce the period of time from a payment is initiated until it is received. Faster execution of payments provides a number of benefits to citizens and firms. At the same time, the infrastructure is being prepared for new mobile payment solutions that are entering the market and already feeding user expectations of express transfer of payments.

Earlier, credit transfers between two banks took at least one day. The autumn of 2013 saw the introduction of the *Intradagclearing* system, enabling *intraday transfers*, i.e. transfers within the same day.

The last initiative of the report is to introduce the *Straksclearing* system, enabling express transfers. Express transfers are credit transfers of up to kr. 500,000 which can be made immediately 24/7/365.

This article describes the Straksclearing. Firstly, the new express transfer option available to citizens and firms is described, followed by a description of the extensive changes to the Danish payments infrastructure resulting from the launch of express transfers. Finally, the article reviews the experience gained with intraday transfers.

## EXPRESS TRANSFERS

Daily retail payments made by citizens and firms, for instance using the Dankort, online banking facilities or Betalingsservice (direct debit), are executed in an infrastructure ensuring that amounts are transferred between the banks of the payer and the payee. The Straksclearing is a new system which, along with the existing Intradagclearing and Sumclearing systems, will be at the core of the Danish retail payments infrastructure, see Box 1.

The Straksclearing will be launched in November 2014, enabling bank customers to make instant credit transfers, e.g. online banking transactions. These transfers are called express transfers, they can be made 24/7/365 and their upper limit is kr. 500,000.[2] This is an improvement for customers, since credit transfers currently take from a few hours up to several days on weekends and bank holidays. The same applies to existing payment solutions, such as MobilePay and Swipp; however,

1 See Danmarks Nationalbank (2012).

2 It has been agreed between Danish banks that the upper limit of an express transfer will be kr. 500,000. Each bank may set a lower limit though.

## Retail payment systems

Box 1

The launch of the Straksclearing in November 2014, which marks the completion of the modernisation project, will improve the retail payments infrastructure. Instead of one system, the Sumclearing, for the settlement of retail payments, there will be three systems: the Sumclearing, the Intradagclearing and the Straksclearing. The systems are owned by the Danish Bankers Association, while operations are outsourced to Nets. The systems differ by having different settlement times and by handling different payment solutions. The three systems are outlined below.

**The Sumclearing**

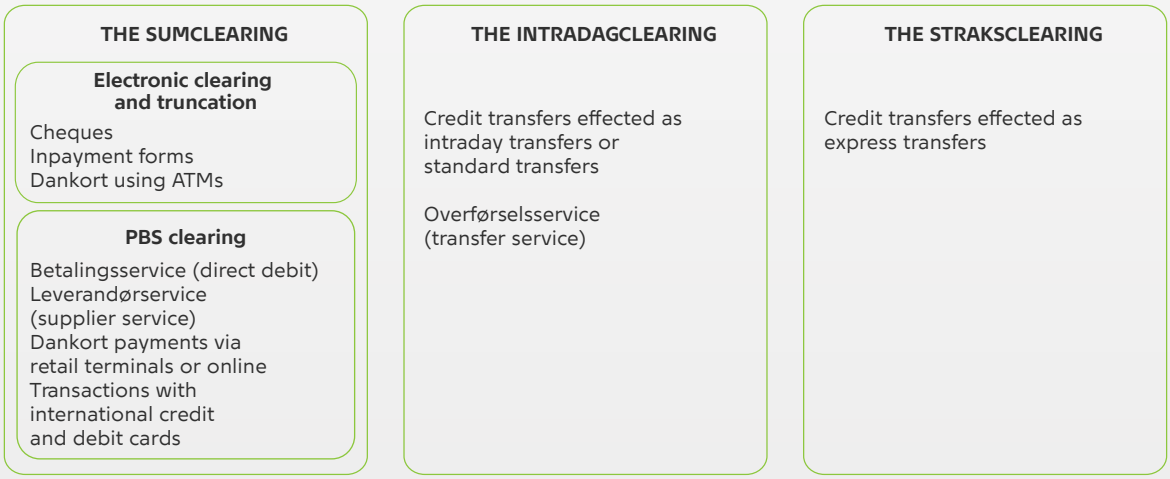
The Sumclearing settles many of the payment solutions available in Denmark. The Sumclearing is a net settlement system, and interbank settlement takes place at night after banking days. The banks' net positions in the Sumclearing are calculated based on two separate clearing cycles, known as subclearings. In the one subclearing – the electronic clearing and truncation – the calculation is made on a decentralised basis at the banks' data processing centres. This subclearing includes payments made by the banks' own customers, e.g. payment of inpayment forms, settlement of cheques and transactions made in the individual bank by the customers of other banks, e.g. ATM cash withdrawals. Credit transfers used to be included in the electronic clearing and truncation. In the other subclearing, the PBS clearing, payments are compiled centrally at Nets, the former PBS. Payments in this subclearing include Betalingsservice and Dankort payments made via terminals and online. It typically takes one banking day for amounts settled in the Sumclearing to be available in the payee's bank account.

**The Intradagclearing**

The Intradagclearing is used for the settlement of credit transfers, such as online banking transfers. The Intradagclearing is a net settlement system, and there are several daily settlement cycles between the banks on banking days, as well as a night-time settlement cycle after banking days. It typically takes a few hours for amounts settled in the Intradagclearing to be available in the payee's bank account.

**The Straksclearing**

Like in the Intradagclearing, the Straksclearing settles credit transfers. The banks have agreed on an upper limit of kr. 500,000 for each transaction. As the system is pre-funded, instant settlement takes place between the banks. Amounts settled in the Straksclearing are instantly available in the payee's bank account.




Source: Danmarks Nationalbank.

in these solutions the payee receives a receipt confirming that the payment has been made. The Straksclearing also provides an improvement for firms, for instance in relation to sales of large consumer goods, because the firm can instantly verify whether an express transfer has been received. Since the payment is final, there is no risk of the amount being subsequently reversed. This is unlike e.g. Dankort payments where only the first kr. 4,000 of a payment is guaranteed.

With the introduction of the Straksclearing, the options for fast settlement of payments in the Danish infrastructure will fully match those in comparable countries, cf. Danmarks Nationalbank (2012). The infrastructure will be much more aligned with customer expectations and it will be prepared for many of the new payment solutions entering the market, such as mobile payments. The Payments Council (2013) maps developments in the range of payment solutions.

## SETTLEMENT IN THE STRAKSCLEARING

An account holder's deposit with a bank represents a receivable. When an account holder makes a transfer to an account holder at another bank, the receivable must be redeemed and replaced by a similar receivable for the payee at its bank. Therefore, the payer's bank must transfer liquidity to the payee's bank. Thus, to execute a payment, not only must the payer have sufficient funds in its account, but also its bank must have sufficient liquidity to exchange the payment with the payee's bank. The exchange of the payment between the banks takes place in *settlement systems*.

Changes to the infrastructure and at banks are required to enable banks to offer express transfers. So far, all retail payments have been settled in net settlement systems in which customer payments are compiled on an ongoing basis. At fixed times, banks settle payments among each other via accounts at Danmarks Nationalbank based on the sum of customer payments. Only then is the payment available to the payee. With this concept, it takes anything from a couple of hours to several days from a payment is sent until it is received, depending on when the payment is initiated.

The introduction of the Straksclearing will change this. Because express transfers are completed immediately, payments cannot be compiled prior to processing. Instead, banks provide liquidity at Danmarks Nationalbank in advance. This liquidity is used as the bank's customers receive or make payments in the Straksclearing.

If a bank has failed to reserve sufficient liquidity for a customer to make a given payment, the payment is instantly rejected at initiation, i.e. the customer cannot make the transfer. The bank can obtain further liquidity in the Straksclearing either by providing more liquidity or by receiving express transfers. Given that banks do not know the extent of their customers' payments in the Straksclearing in advance, banks need to compare their Straksclearing consumption with the size of their reserved liquidity on an ongoing basis. Box 2 illustrates the process from an express transfer is made until the amount is available to the payee. The execution time for an express transfer is just a few seconds.

### PARTICIPATION IN THE STRAKSCLEARING

The Danish Bankers Association is the system owner of the Straksclearing. Banks can participate as direct or indirect participants. An indirect participant enters into an agreement with a direct participant and holds an account with this participant. In order to be a direct participant, the bank must hold a current account at Danmarks Nationalbank and a settlement account for retail payments in Danish kroner (subsequently referred to as the *settlement account*).

Most banks in Denmark hold current accounts at Danmarks Nationalbank. The current account is the participant's primary account, while the settlement account is a sub-account[3] of the current account. The participant has access to its accounts in Danmarks Nationalbank's real-time gross settlement system[4] *Kronos*. In the settlement account, the participant may reserve liquidity from the current account for a given settlement. When a participant transfers liquidity from its current account to its settlement account, notification about the participant's balance in the settlement account is immediately sent to Nets. This notification is called a *credit line*, and Danmarks Nationalbank guarantees each participant's current credit line. Each participant always has one outstanding credit line with Nets, 24/7/365. When participants have settlement accounts designated for specific purposes rather than just a current account, they can make their own liquidity dispositions for various settlements.

Nets is responsible for operating the Sumclearing, Intradagclearing and Straksclearing systems as well as the *Liquidity Module*. At Nets, credit lines for the participants are received in the Liquidity Module. Here, individual credit lines are allocated between the Sumclearing, Intradagclearing and Straksclearing systems, respectively, using an allocation algorithm. This enables Nets to validate entries in the Straksclearing against the credit line allocated to the Straksclearing at any time.

3 Settlement accounts are also available for securities settlement, VP and settlement of foreign exchange transactions, CLS.

4 A *real-time gross settlement system*, or RTGS system, is a payment system in which each payment is settled individually in real time. RTGS systems are used by financial institutions for settlement of large-value and/or time-critical payments, e.g. money market transactions, foreign exchange transactions and the cash leg of securities transactions. These systems are also used for the settlement of net positions from net settlement systems, such as the Sumclearing and the Intradagclearing.

## Description of an express transfer

Box 2

Below, the technical flow of a credit transfer via the Straksclearing is illustrated. The illustration shows a completed transfer. Below the illustration, the corresponding Straksclearing entries at Nets are shown. In this example, at the time of the transfer, the payer's bank has made kr. 10 million available for its customers' express transfers, known as a credit line, while the payee's bank has a credit line of kr. 42 million. The total time of the flow is limited to a few seconds.

1. *The transfer is made*. A citizen or firm initiates an express transfer of kr. 9,000 via its online banking facility.
2. *The transfer is transmitted.* The payer's bank[1] transmits the transfer to Nets.
3. *Nets validates the transfer*. At Nets, the transfer is validated against the size of the credit line of the payer's bank. Since the size of the transfer does not exceed the credit line, the amount is reserved in the credit line of the payer's bank. Nets transmits the transfer to the payee's bank.
4. *Receipt*. The payee's bank accepts the transfer and sends a receipt to Nets.
5. *Final approval by Nets*. Nets sends a final receipt to the payer's and the payee's bank. In the Straksclearing, the credit line of the payer's bank is finally reduced, and the reservation is removed. The credit line of the payee's bank is increased correspondingly.
6. *The transfer is received*. The amount is available in the payee's account.


**THE STRAKSCLEARING**

| | Payer's bank | Payee's bank |
|---|---|---|
| Credit line | 10,000,000 | 42,000,000 |
| Transfer | -9,000(3) | 9,000(5) |
| New credit line | 9,991,000(5) | 42,009,000(5) |

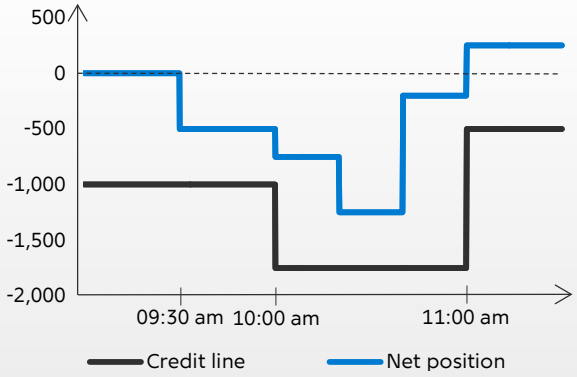
1. In practice, the data processing centre of the individual bank communicates with Nets on behalf of the bank.

Because Nets validates and executes transfers, it is essential for the Straksclearing that dedicated liquidity from Danmarks Nationalbank remains available for the transfer at Nets. This ensures settlement finality of express transfers. Therefore, a participant can increase its credit line in Kronos by transferring further liquidity from the current account to the settlement account but not the other way around. The reason is that, in principle, the participant may already have spent its liquidity at Nets in the Straksclearing. Instead, the participant may reduce its credit line via Nets' Liquidity Module. As Nets notifies Danmarks Nationalbank about the change, a credit line reduction will have a "releasing" impact on the participant's settlement account. Subsequently Kronos automatically releases liquidity from the settlement account to the current account.

The participant can access Nets' Liquidity Module through an online user interface. Here, the participant can adjust its liquidity rules in the Liquidity Module and reduce its credit line. The participant can also track all incoming and outgoing payments in the Straksclearing and monitor the total consumption in the Straksclearing, i.e. the net position.

Chart 1 illustrates the interaction between the Liquidity Module and Kronos. The two systems are designed to provide a high degree of liquidity management automation though. As described

**Example of monitoring of the Straksclearing using the Liquidity Module and Kronos** Chart 1




The participant has 1,000 in its settlement account in Kronos, which has been sent as a credit line to Straksclearing (black curve). At 10:00 am, the participant notices that its net position (blue curve) is -750, leaving just 250 for the Straksclearing. Therefore, the participant transfers an additional 750 from its current account to its settlement account in Kronos, bringing the credit line with Nets to 1,750. At 11:00 am, the participant notices that the net position is now positive at 250, causing the participant to reduce its credit line in the Liquidity Module to 500. This releases 1,250 in Kronos, which is transferred from the settlement account to the current account.

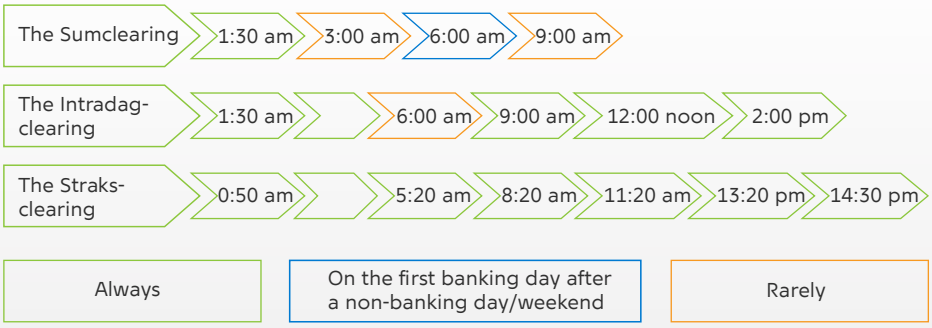
in Jensen et al. (2013), Kronos has a number of procedures for automated liquidity provision, and the Liquidity Module allows individual adjustment of the size of required credit lines for the Straksclearing for different times of the day.

## EXCHANGE OF LIQUIDITY AT DANMARKS NATIONALBANK

At fixed times of each banking day, the participants' net positions in the Straksclearing are posted at Danmarks Nationalbank. The net position of each participant is the sum of all incoming and outgoing express transfers since the latest settlement in the Straksclearing, whereby one amount is entered in the settlement account of each participant. Settlement in the Straksclearing takes place in connection with the settlement of the Sumclearing and Intradagclearing, enabling participants who receive liquidity in the Straksclearing to use this liquidity in the Sumclearing and Intradagclearing. In addition, one settlement cycle is run exclusively for the Straksclearing at 2:30 pm. Chart 2 shows all settlement cycles in the Sumclearing, Intradagclearing and Straksclearing.

Box 3 illustrates a settlement cycle in the Straksclearing and Intradagclearing.

**Times of exchange of liquidity in the Sumclearing, Intradagclearing and Straksclearing** Chart 2



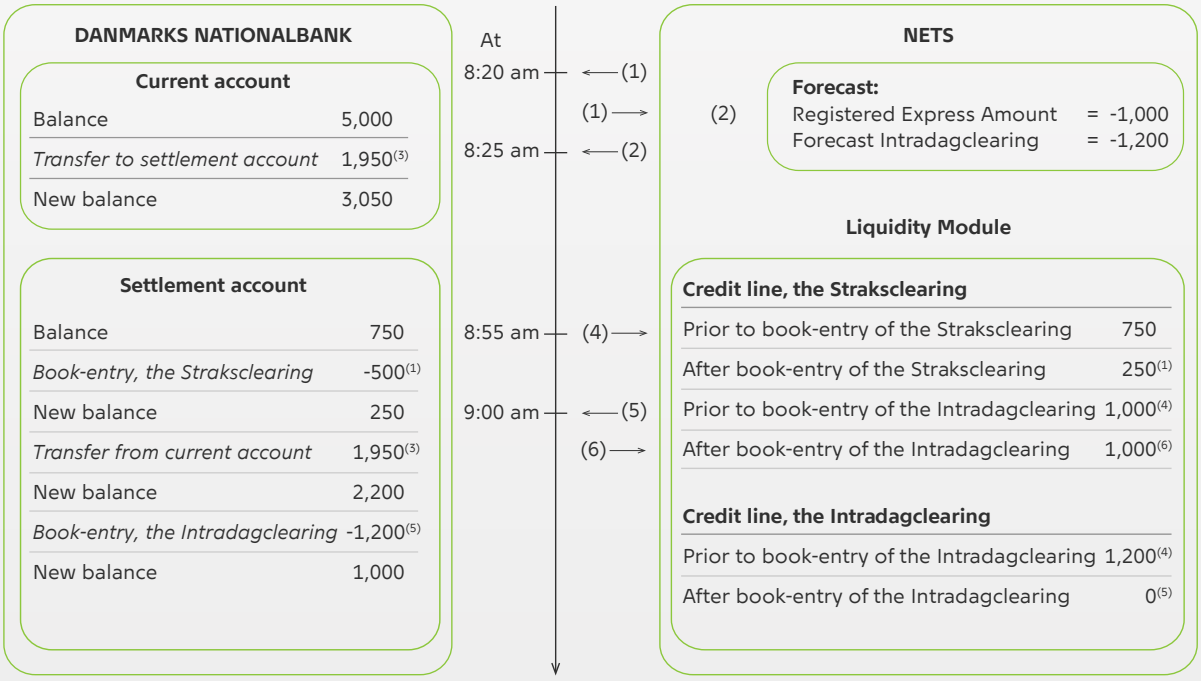

Note: The first initiative of the modernisation project was to move the settlement cycle of weekend Dankort payments from the night between Monday and Tuesday to Monday morning at 6:00 am. Similarly, settlement is now effected on the first banking day after national holidays and other non-banking days. The orange settlement times in the chart are used only if the preceding settlement cycle was not completed correctly.

## Example of settlement in the Straksclearing and Intradagclearing

Box 3

Settlement in the Straksclearing and Intradagclearing at 9:00 am is illustrated below. The participant uses only the deposit in its current account for the settlement of payments.[1] Prior to the settlement, the balance in the participant's current account is 5,000, while the balance in the settlement account is 750; therefore, the credit line for the Straksclearing is 750.

1. *Book-entry of the Straksclearing.* At 8:20 am, Nets sends book-entry items to Danmarks Nationalbank for all participants in the Straksclearing. The participant has used 500 in the Straksclearing in the example, which amount is debited to the participant's settlement account. Danmarks Nationalbank sends a new credit line of 250, equivalent to the new balance of the settlement account. In the Liquidity Module, the credit line for the Straksclearing is updated to the new credit line.
2. *Forecast at 8:25 am*. The Liquidity Module generates a forecast, which is sent to Danmarks Nationalbank. This forecast contains the expected net position of each participant in the Intradagclearing at 9:00 am, along with a Registered Express Amount for each participant. In advance, each participant has individually entered a Registered Express Amount in the Liquidity Module at Nets; this is the amount the participant wishes to reserve for the Straksclearing when the settlement of the Intradagclearing has been completed. The total liquidity requirement of the forecast is calculated at 2,200.
3. *Liquidity provision at Danmarks Nationalbank*. Since the balance in the settlement account is 250, the remaining liquidity requirement of 1,950 is automatically transferred from the current account.
4. *Credit lines for the Intradagclearing*. At 8:55 am, Danmarks Nationalbank sends credit lines to Nets in response to the forecast. These credit lines enable Nets to initiate settlement of the Intradagclearing. The Liquidity Module allocates the credit line between the two clearing cycles, the Intradagclearing receiving a credit line of 1,200 and the Straksclearing receiving 1,000.
5. *Book-entry of the Intradagclearing*. Nets forwards book-entry items for the Intradagclearing at 9:00 am. The participant in the example must deliver 1,200, which is debited to the settlement account.
6. *New credit line for the Straksclearing*. After the book-entry of the Intradagclearing, Danmarks Nationalbank sends a new credit line to the Straksclearing to be used by the participant until the next settlement cycle. This credit line corresponds to the participant's Registered Express Amount of 1,000 and the new balance of the settlement account. In the Liquidity Module, the credit line for the Straksclearing is updated to the new credit line. Had the participant's liquidity in the settlement account exceeded the Registered Express Amount after the book-entry of the Intradagclearing, the excess liquidity would automatically have been transferred to the current account.




1. Jensen et al. (2013) provide a detailed description of the new liquidity management tools made available to the banks by Danmarks Nationalbank in connection with the infrastructure modernisation.

## SECURITY OF EXPRESS TRANSFERS AND RETURN ON CURRENT ACCOUNT DEPOSITS

### SECURITY OF RETAIL PAYMENTS

An inherent concern with faster payment transfers is whether these have any implications for security in terms of money laundering or terrorist financing. Do express transfers allow time to ensure that the funds do not end up in the wrong hands?

Payment transfers between citizens and firms involve a number of security measures. These measures are implemented before, during and after the transactions are completed to ensure that the funds are not to be used for unlawful purposes. One of these measures is that banks are responsible for knowing their customers. This entails that banks must know the identity of their account-holding private individuals or owners of firms. In Denmark, it is thus not possible to open an anonymous account or an account under a false name.

When a customer initiates a credit transfer, a number of automatic controls are executed before the transaction is completed. For instance, the payee's bank must verify that it will accept the payment on behalf of the payee. Before giving its acceptance, the bank checks that the customer holds an account to which the payment can be credited. Moreover, banks typically have filters in place to capture potentially suspicious transactions or block specific payees. If the filters capture a transaction, the bank rejects the payment, which is thus not completed. These controls are extremely fast and apply to both standard transfers, intraday transfers and express transfers.

Both the receiving and remitting banks are responsible for double-checking customer transactions. To this end, banks for instance keep an eye on unusual transaction patterns and excessive customer transactions. Banks are obliged to follow up and investigate potentially suspicious transactions and to document, retain and possibly disclose the results of these investigations.

The measures to prevent or identify money laundering and terrorist financing are in place no matter how fast a payment transfer is completed. In other words, higher transaction speed for credit transfers does not alter the security level. Moreover, the Danish infrastructure enables only credit transfers in Denmark. Thus, it is not possible to make transnational express transfers.

### RETURN ON CURRENT ACCOUNT DEPOSITS

The introduction of the Straksclearing, requiring banks to hold liquidity in their settlement accounts at all times, has resulted in changes in connection with the closing of the monetary policy day, see Box 4.

## EXPERIENCE GAINED WITH INTRADAY TRANSFERS

The autumn of 2013 saw the introduction of the Intradagclearing, a new system in the retail payments infrastructure. Since then, all credit transfers have been completed via this system. As a new feature, the Intradagclearing runs four settlement cycles each banking day day: at 1:30 am, 9:00 am, 12:00 noon and 2:00 pm. The system enables intraday transfers, i.e. citizens and firms can transfer funds that are available to the payee on the same day. Moreover, after the introduction of the Intradagclearing, intraday transfers made late at night or on weekends are received one day earlier.

This new option has been well received, and 10 per cent of all credit transfers are now settled during the daytime.

In Denmark, credit transfers totalling an average of kr. 17.4 billion are made every day, representing about 60 per cent of the value of all retail payments. In the three new daytime settlement cycles, the daily settlement totals an average of kr. 2 billion, corresponding to 11 per cent of the value of daily credit transfers. Thus most credit transfers, in value terms, are still settled during the night-time settlement cycle at 1:30 am, along with the remaining retail payments in the Sumclearing.

The value of daytime transfers is distributed more or less evenly across the three settlement cycles, cf. Chart 3. As regards the number of transactions, a different picture emerges. Most transactions are still settled during the night-time settlement cycle, but the number of daytime settlements differs between cycles. At 9:00 am, an average of 64,100 transactions are settled, while 16,100 and 15,600 transactions are settled at 12:00 noon and 2:00 pm, respectively. In other

## Calculation and return on current account deposit

Box 4

The participants' current account deposits are calculated at the end of the monetary policy day each banking day at 3:30 pm as part of Danmarks Nationalbank's pursuance of monetary policy. Following the implementation of the Straksclearing, the calculation will be changed to include the deposit in the participant's settlement account. Thus, the participant's current account deposit will be calculated as the net balance in its current account and settlement account, respectively. Since the net balance is calculated, it is possible to have a negative balance in the current account against collateral (cf. Danmarks Nationalbank's terms and conditions for pledging of collateral in force at any time) and a positive balance in the settlement account. It is not possible for the participant to have a negative balance in the settlement account. It remains the responsibility of each monetary policy counterparty to ensure that its current account balance, net, is not negative at the end of the monetary policy day.

Following the implementation of the Straksclearing, the current account deposit will earn interest at the current account rate, based on the net deposit in the current account and the settlement account each day at 3.30 pm, cf. the description above. The return will be independent of the participant's net position in the Straksclearing at the same time.

In the following, Danmarks Nationalbank's calculation of the participant's current account deposit at 3:30 pm and the return on this deposit are illustrated. In the example "Bank 1", the participant's current account deposit is calculated at 600, equivalent to the sum of a deposit of 150 in the current account and 450 in the settlement account. The participant's deposit will earn interest, at the current account rate, on 600. In the example "Bank 2", the participant's current account deposit is calculated at 375, equivalent to the settlement account deposit of 500 less the negative current account balance of -125. The participant's deposit will earn interest, at the current account rate, on 375.

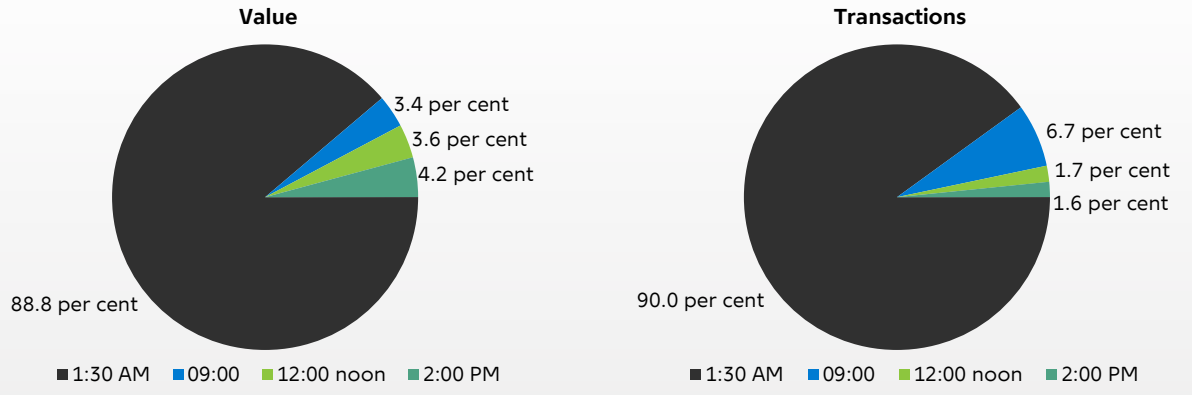
| | Bank 1 | Bank 2 |
|---|---|---|
| Balance in the current account at 3:30 pm | 150 | -125 |
| Balance in the settlement account for retail payments in Danish kroner at 3:30 pm | 450 | 500 |
| **Calculation of current account deposit at 3:30 pm** | **600** | **375** |

words, there tends to be more small transactions at 9:00 am than at 12:00 noon and 2:00 pm. One explanation could be that private individuals tend to make online banking transactions in the afternoon and at night, which are settled at 1:30 am or 9:00 am, while firms usually make their, larger, transactions in the morning, which are settled at 12:00 noon or 2:00 pm.

The way in which citizens and firms use intraday transfers reflects the way banks offer this option to their customers. Banks have opted for different solutions, and, moreover, developments have pro-

## Credit transfers, value and number

Chart 3




Note: The chart covers the period from 1 February 2014 to 30 June 2014.
Source: Danmarks Nationalbank.

gressed since banks became able to offer intraday transfers to their customers.

Some banks opted from the start to settle all credit transfers as quickly as possible, i.e. in the next settlement cycle. As a result, the typical transfer was received faster by the payee without requiring any different actions on the part of the payer, being a customer of these banks. Other banks gave their customers a choice between intraday transfers and standard transfers, the latter usually reaching the payee on the following banking day. The faster type of transfer was typically subject to a fee. The fees have changed since the introduction. When intraday transfers were launched, some banks charged a fee, but the trend has subsequently been towards lower or no fees for this service.

In addition to fees and a choice between intraday transfers and standard transfers, banks have also set different *cut-off* times for when a transfer is to be initiated to be settled on the same day, typically between 11:30 am and 12:30 pm. If the transfer is initiated after the cut-off time, it will not be settled until the night-time settlement cycle and will not be available to the payee until the following banking day.

## CONCLUSION

The Straksclearing, to be introduced in November 2014, will facilitate interbank express transfers. The system represents an improvement for citizens and firms, as they will be able to receive payments much faster than today, and it underpins the development of new payment solutions such as mobile payments. Danmarks Nationalbank expects banks to actively support customers' use and knowledge of the express transfer option.

The implementation of the Straksclearing also marks the completion of the modernisation of the retail payments infrastructure. Citizens and firms may benefit from further initiatives however, for instance whether other payment solutions than credit transfers can be completed faster than is currently possible. Therefore, banks are encouraged to assess the possibilities of infrastructure improvements on an ongoing basis.

## LITERATURE


Bakkegaard, Jesper, Tommy Meng Gladov and Anders Mølgaard Pedersen (2011), Settlement times for payments in Denmark, *Monetary Review*, 2nd Quarter, Part 1.

Danish Payments Council (2013), Report on new payment solutions.

Danmarks Nationalbank (2012), Report on domestic payment transfers in Denmark (in Danish with an English summary).

Jensen, Lars Egeberg, Tommy Meng Gladov and Majbrit Nygaard Christensen (2013), Liquidity management in connection with settlement of retail payments, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter, Part 1.

Korsby, Jakob Mygind and Peter Toubro-Christensen (2012), Faster payments in Denmark, Danmarks Nationalbank, *Monetary Review*, 3rd Quarter, Part 1.