



NORGES BANK

**FINANCIAL  
INFRASTRUCTURE  
REPORT  
2015**



FINANCIAL  
INFRASTRUCTURE  
REPORT  
**2015**



NORGES BANK

**Norges Bank  
Oslo 2015**

Address: Bankplassen 2  
Postal address: Postboks 1179 Sentrum, 0107 Oslo  
Phone: +47 22 31 60 00  
Fax: +47 22 41 31 05  
Reg. no.: 0629/7  
E-mail: [central.bank@norges-bank.no](mailto:central.bank@norges-bank.no)  
Website: <http://www.norges-bank.no>

Editor: Øystein Olsen  
Design: Brandlab  
Layout: 07 Media AS

The text is set in 9 pt Azo Sans

ISSN 1894-xxxx (Online)

# CONTENTS

---

<b>EXECUTIVE BOARD'S ASSESSMENT</b>	<b>4</b>
<b>NORGES BANK'S RESPONSIBILITY</b>	<b>6</b>
<b>1 CHALLENGES TO THE FINANCIAL INFRASTRUCTURE</b>	<b>8</b>
<b>1.1 Contingency planning</b>	<b>8</b>
<b>1.2 Outsourcing</b>	<b>10</b>
<b>1.3 Central counterparties – risk management</b>	<b>11</b>
<b>1.4 The efficiency of retail payment services</b>	<b>15</b>
<b>2 SYSTEM DEVELOPMENT – SUPERVISION AND OVERSIGHT</b>	<b>20</b>
<b>2.1 Norwegian interbank systems</b>	<b>20</b>
2.1.1 Norges Bank's settlement system	20
2.1.2 Norwegian Interbank Clearing System	22
2.1.3 Private settlement bank systems	25
2.1.4 Continuous Linked Settlement	26
<b>2.2 Securities settlement</b>	<b>30</b>
2.2.1 VPS settlement system	30
2.2.2 CCP systems	31
<b>2.3 Follow-up of the assessment of Norwegian systems against international principles</b>	<b>36</b>
<b>REFERENCES</b>	<b>40</b>
<b>DEFINITIONS AND ABBREVIATIONS</b>	<b>41</b>
<b>ANNEX</b>	<b>43</b>

---

# EXECUTIVE BOARD'S ASSESSMENT

The *Financial Infrastructure Report* is part of Norges Bank's work to promote financial stability and an efficient payment system in Norway. Norges Bank's Executive Board discussed the *Report* at its meeting on 6 May 2015.

The Executive Board considers the financial infrastructure in Norway to be robust and efficient. There have been few disruptions in interbank systems and in the securities settlement system in recent years.

Because the payment and securities settlement systems perform key public functions, they must comply with strict requirements for system availability and sound crisis management. Banks and Norges Bank must be able to deal with full or partial failure of the payment system. Technological advances may in time lead to the development of new contingency solutions. So far, however, no viable alternatives have been documented to permit the elimination of cash as part of the overall arrangements. Banks' obligation to accept deposits and make deposits available to customers in the form of cash has been explicitly included in a new Financial Institutions Act. Finanstilsynet (Financial Supervisory Authority of Norway) and Norges Bank are now examining contingency arrangements for electronic payments and banks' contingency arrangements in relation to cash distribution.

The financial infrastructure is dependent on technologically advanced systems. The technical operation of the payment system has been largely outsourced. Risk management can be more demanding when systems are operated by entities other than owners and can be further complicated by having a chain of service providers. Since system owners are also responsible for outsourced operations, they must have sufficient resources and expertise to undertake effective control of these operations, perform risk analyses and implement measures to mitigate risk.

Within the financial infrastructure, many system owners use the same service provider. This makes the financial infrastructure vulnerable, since a fault in the operations of one provider can affect several systems simultaneously. System owners must have a real possibility of switching service provider. This will make the system less vulnerable if the system owner is not satisfied with the services provided. Alternatively, the system owner should be prepared to perform the outsourced services internally. Norges Bank will follow this up as part of its supervisory and oversight tasks.

One feature of the securities settlement system is that risk is to a great extent concentrated in central counterparties (CCPs). CCPs are subject to strict requirements to ensure that CCP participants provide sufficient collateral and to have sufficient financial

resources to meet their obligations. CCPs are also required to have sound risk management systems. A number of foreign CCPs have cross-border operations in Norway. Norges Bank gives considerable weight to effective cooperation on oversight with the authorities in CCPs' home countries.

In 2014, Norges Bank assessed financial infrastructure systems against international principles. The systems complied with most of these principles. The framework for following up and managing risk, including operational risk, was inadequate for some of the systems. The Executive Board is of the opinion that the measures implemented by system owners represent a clear improvement. Further measures are still necessary, including measures to strengthen contingency arrangements in the event of systems failure.

The total social costs associated with payment services are estimated at just under NOK 15bn annually, equivalent to 0.6% of mainland GDP. Compared with other countries, costs in the Norwegian payment system are low. Norway is among the world leaders in payment card use. Eight out of ten card transactions are made using the BankAxept card. According to Norges Bank estimates, the social costs associated with using BankAxept are much lower than with payments using international cards. Norges Bank will continue to provide information about costs, prices and market conditions in the period ahead.

Banks make a loss on all main categories of payment instrument except international cards. This may weaken the ability and willingness of banks to promote efficient solutions and invest in new infrastructure. The use of international cards is increasing. The cost of using these cards is covered by the point of sale – typically a shop – and not by the cardholder. Merchants are free to pass this cost on to card users, but this rarely happens in Norway. Thus, customers are not being presented with the right prices when choosing a payment solution. As a result, an inexpensive solution – BankAxept – may be crowded out by more expensive solutions.

The methods of payment used by households and enterprises are changing. Three new services are contactless payments, electronic wallets and instant payments. Adopting faster and simpler solutions will, in isolation, be profitable to society. Whether these solutions contribute to lower costs will depend on fee structures. In addition to costs and speed of payment, the security of the new services should also be assessed. Norges Bank will monitor developments and, if necessary, recommend measures to ensure that the new services promote payment efficiency.

Øystein Olsen  
13 May 2015

# NORGES BANK'S RESPONSIBILITY

Norges Bank oversees the financial infrastructure. The financial infrastructure comprises the payment system and the securities settlement system. Norges Bank supervises systems for clearing and settlement of interbank money transfers (interbank systems). This is part of the Bank's work to promote financial stability.

Under Section 1 of the Norges Bank Act, Norges Bank is responsible for promoting an efficient payment system in Norway and vis-à-vis other countries. An efficient payment system completes payment transactions quickly, reliably and at low cost.

Norges Bank promotes an efficient payment system by:

- providing secure and efficient settlement of interbank payments in banks' accounts with Norges Bank,
- supplying banknotes and coins and ensuring that they function efficiently as payment instruments, and
- overseeing important developments in the payment system and assessing ways to improve the system's resilience and efficiency.

**The payment system** comprises interbank systems and systems for payment services (cf. the Payment Systems Act). **Interbank systems** are systems for interbank money transfers, with common rules for clearing and settlement. **Systems for payment services** are systems for the transfer of funds between customer accounts in banks or other undertakings authorised to provide payment services (cf. Section 1-1 of the Payment Systems Act). Cash payment is not defined as a payment service.

**The securities settlement system** (VPO) is a system for the settlement of financial instruments, with common rules for clearing and settlement.

## SUPERVISION

Norges Bank is responsible for supervising interbank systems pursuant to Chapter 2 of the Payment Systems Act. Norges Bank issues licences, sets requirements for interbank systems and supervises the systems to ensure that they comply with the requirements and with the Payment Systems Act.

DNB ASA (DNB) and the Operations Office of the Norwegian Interbank Clearing System (NICS) are licensed by Norges Bank to operate interbank systems. In its supervision of NICS and the DNB settlement system, Norges Bank also attaches weight to relevant international principles for financial infrastructure systems. If Norges Bank considers some of these principles to be especially relevant, Norges Bank may require that NICS and the DNB settlement system comply with the standards.

If Norges Bank identifies a violation of the Payment Systems Act or the terms of the licence, the Bank can instruct the interbank systems that are subject to supervision to rectify the violation. Norges Bank can grant exemption from the licensing requirement for interbank systems that are considered too small to have an effect on financial stability. In Norges Bank's assessment, the SpareBank 1 SMN settlement system is not subject to licensing, but it is nevertheless subject to oversight. The licensing requirement for interbank systems in the Payment Systems Act does not apply to Norges Bank's settlement system.

## OVERSIGHT

Norges Bank's oversight responsibilities are based on Section 1 of the Norges Bank Act and international principles drawn up by the Committee on Payments and Market Infrastructures (CPMI) and the International Organization of Securities Commissions (IOSCO). Norges Bank is not a member of the CPMI. Finanstilsynet (Financial Supervisory Authority of Norway) is a member of IOSCO.

Norges Bank oversees its own settlement system (NBO) and the SpareBank 1 SMN settlement system. Norges Bank also oversees securities settlement, including the systems of central counterparties (CCPs)<sup>1</sup>.

Norges Bank is a member of the committee of central banks that oversees Continuous Linked Settlement (CLS) Bank, an international bank for the settlement of foreign exchange transactions. The Federal Reserve chairs the oversight committee.

<sup>1</sup> The role of the CCP is to enter the trade as a party or otherwise guarantee that contracts involving trade in financial instruments or obligations relating to borrowing of financial instruments are fulfilled.

TABLE 1.1: FINANCIAL MARKET INFRASTRUCTURES SUBJECT TO SUPERVISION OR OVERSIGHT<sup>1</sup>

System	Instrument	Operator	Supervision/oversight	Administrative body
Norwegian securities settlement system (VPO)	Securities	Verdipapirsentralen ASA (VPS)	Supervision and oversight	Supervision of VPS and VPO: Finanstilsynet Oversight of VPO: Norges Bank
VPS's central securities depository (CSD) function	Securities	VPS	Supervision and oversight	Supervision of CSD function: Finanstilsynet Oversight of CSD function: Norges Bank
SIX x-clear's central counterparty system	Financial instruments	SIX x-clear AG (SIX)	Supervision and oversight	Supervision of SIX: The Swiss and Norwegian financial supervisory authorities. Oversight of SIX: The Swiss National Bank and Norges Bank. <sup>2</sup>
Norwegian Interbank Clearing System (NICS)	Payments	NICS Operations Office	Supervision	Norges Bank
Norges Bank's settlement system (NBO)	Payments	Norges Bank	Oversight	Norges Bank
DNB Bank ASA settlement system	Payments	DNB Bank ASA	Supervision	Norges Bank
SpareBank 1 SMN settlement system	Payments	SpareBank 1 SMN	Oversight	Norges Bank
Continuous Linked Settlement (CLS)	Foreign exchange	CLS Bank	Supervision and oversight	Supervision of CLS: Federal Reserve Oversight of CLS: Central banks with currencies settled in CLS, including Norges Bank

<sup>1</sup> Efforts are in progress to establish cooperation between the UK and the Norwegian authorities on oversight and supervision of LCH.

<sup>2</sup> A cooperation agreement has been concluded between the Swiss and the Norwegian authorities on oversight and supervision of SIX x-clear.

Robust and efficient settlement is important for maintaining confidence that transactions in money and financial instruments will be completed in a sound manner. If Norges Bank through its oversight of the systems identifies shortcomings that could compromise security or efficiency, Norges Bank will request system owners to rectify the shortcomings. Norges Bank's assessments are published in this Report.

## COOPERATION WITH FINANSTILSYNET

As Finanstilsynet's supervisory tasks and Norges Bank's supervisory and oversight responsibilities related to the financial infrastructure overlap, Norges Bank works in collaboration with Finanstilsynet.

Finanstilsynet's tasks include supervising the technical operation of the systems in the financial infrastructure. Norges Bank is responsible for promoting an efficient payment system in Norway and vis-à-vis other countries. This means that Norges Bank also assesses the efficiency of retail payment services.

Norges Bank is responsible for supervising interbank systems, while Finanstilsynet sets requirements related to the systems' technical operation. Finanstilsynet's assessment of technical systems forms part of the basis for Norges Bank's supervision of interbank systems and Finanstilsynet may take part in supervisory meetings as an observer.

Verdipapirsentralen (VPS) is licensed by the Ministry of Finance. Finanstilsynet has supervisory responsibility for VPS and takes part as an observer in the oversight meetings conducted by Norges Bank. Table 1.1 provides an overview of responsibility for supervision and oversight of the various systems in the financial infrastructure.

Finanstilsynet and Norges Bank are in regular contact, and the two institutions exchange information and consult each other before important decisions affecting the payment system or the settlement system are made. The collaboration between Finanstilsynet and Norges Bank is described in more detail in Norges Bank (2012a)

# 1 CHALLENGES TO THE FINANCIAL INFRASTRUCTURE

The financial infrastructure comprises systems for the clearing, settlement, and registration of monetary and other financial transactions. The payment system and securities settlement system, including central counterparty systems, are key components of the financial infrastructure in Norway. A detailed account of financial infrastructure systems and Norges Bank's supervision and oversight of these systems is provided in Section 2.

The financial infrastructure in Norway is on the whole robust and efficient. Fast, cost-efficient and reliable payments save time and provide security for households and enterprises. At the same time, developments are raising new challenges. This section discusses some of them.

## 1.1 CONTINGENCY PLANNING

A disruption in the payment system can have serious economic consequences, including preventing households and enterprises from settling transactions. The authorities are therefore focused on ensuring that systems have reliable backups to ensure business continuity. It is also important for systems to have disaster recovery arrangements that ensure resumption of operations within a reasonable time if business continuity arrangements fail. Financial market infrastructures (FMIs) are required to have contingency plans for dealing with both operational disruptions and financial problems.

### **Business continuity plans for dealing with operational disruptions**

The extent of a disruption depends on several factors: the duration of the disruption, the number of customers affected, the types of transaction dealt with by the FMI, whether alternative solutions are available to customers and whether the problem in the FMI can lead to problems in other FMIs. The economic costs of a disruption can be far higher than the FMI's private costs.

In its supervision and oversight of FMIs, Norges Bank focuses on defence mechanisms, business continuity arrangements and disaster recovery arrangements.

- Defence mechanisms must protect the FMI from physical attacks and keep information secure.

- Business continuity arrangements must enable the FMI to maintain operations even in the event of a disruption. Duplication of hardware is an example of a business continuity arrangement. Operations can then continue even if one component should fail at one of the operating sites.
- Disaster recovery arrangements must ensure that operations can be resumed after an event that puts operating sites and business continuity arrangements out of action. Having a third, independent operating site, which can be started up if business continuity arrangements fail, is an example of a disaster recovery arrangement.

The requirements for such arrangements are specified in licence terms and the recommendations for such arrangements follow from international principles. Moreover, FMIs subject to supervision must also comply with the requirements in the Regulation on the use of information and communication technology (ICT Regulation). Under the Regulation, training in and exercises and testing of business continuity solutions and disaster recovery solutions must be conducted at least once a year to ensure that they function as intended. Verifiable documentation of the test results must be provided. These requirements also cover outsourced operations.

In collaboration with Finanstilsynet, Norges Bank ensures that Norwegian FMIs comply with these requirements.

In a worst case scenario, banks and Norges Bank must cope with full or partial failure of the payment system. While new technology may eventually make new contingency arrangements possible, no viable alternatives to cash have been documented to permit the elimination of cash as part of the overall solution. Banks' obligation to accept deposits and make deposits available to customers in the form of cash has been made explicit in a new Financial Institutions Act. Finanstilsynet and Norges Bank are now examining contingency arrangements for electronic payments and banks' contingency arrangements in relation to cash distribution.

### **Recovery plans for dealing with financial problems**

According to the CPMI-IOSCO principles for financial market infrastructures, FMIs must have recovery plans for dealing with financial problems (see CPMI-IOSCO (2012)). When Norwegian FMIs were assessed against

# RECOVERY PLANS IN THE EVENT OF FINANCIAL PROBLEMS – INTERNATIONAL RECOMMENDATIONS

On 15 October 2014, CPMI and IOSCO published a report to provide guidance to financial market infrastructures (FMIs) on the development of plans to recover financial strength in the event of significant losses and liquidity shortfalls (see CPMI-IOSCO (2014)). The report is consistent with the Key attributes of effective resolution regimes for financial institutions of the Financial Stability Board (FSB) (see FSB (2010)).

CPMI-IOSCO (2014) provides guidance on the design of recovery plans. Plans should ensure that the interests of all relevant stakeholders are considered. Furthermore, an FMI should identify possible stress scenarios, the triggers for implementing the recovery tools and the need to test plans.

Most of the report deals with tools that an FMI can implement in the event of financial problems. Examples of such tools are cash calls, recapitalisation, use of collateral by the FMI to cover losses, obtaining liquidity support from participants or third-party institutions and taking out insurance against operational losses. These tools are relevant for all types of FMI.

Some of the tools discussed in the report are relevant for central counterparties (CCPs) only. A CCP may experience financial difficulties if a participant defaults. If a CCP has uncovered losses caused by participant default, the losses must be allocated among non-defaulting participants. The CCP can do this through variation margin haircutting or by forced allocation of contracts or by terminating contracts with participants.

An FMI may have to implement recovery tools if the FMI i) must allocate uncovered losses caused by participant default, ii) experiences an uncovered liquidity shortfall, iii) must raise additional equity capital or replenish other financial resources iv) must allocate losses not caused by participant default.

While the report does not provide specific guidance on which tools should be used by FMIs, it indicates that recovery tools should have the following characteristics:

- 1 **Comprehensive:** The set of tools should comprehensively address how the FMI would continue to provide critical services in all relevant scenarios.
- 2 **Effective:** Each tool should be reliable, timely, and have a strong legal basis.
- 3 **Transparent, measurable, manageable and controllable:** Tools should be transparent and designed to allow those who would bear losses and liquidity shortfalls to measure, manage and control their potential losses and liquidity shortfalls.
- 4 **Create appropriate incentives:** The tools should create appropriate incentives for the FMI's owners, direct and indirect participants, and other relevant stakeholders.
- 5 **Minimise negative impact: The tools should be designed to minimise the negative impact on direct and indirect participants and on the financial system.**

The report also emphasises that financial shortfalls should be best dealt with using tools with voluntary mechanisms for participants.

The development of a recovery plan is the responsibility of the FMI itself, but the authorities responsible for oversight must ensure that recovery plans have been developed as set out in CPMI-IOSCO (2014). Where an FMI is systemically important to multiple jurisdictions, cooperation among the authorities is needed to ensure that recovery plans are in line with the guidance from CPMI-IOSCO.

these principles in 2014, Norges Bank and Finanstilsynet gave weight to the fact that the final guidelines for recovery planning had not been published. The FMIs were therefore not criticised for not having such plans, as long as the boards approved the preparation of these plans when the final guidelines were published. Norges Bank will ensure that the FMIs follow up on these commitments.

Recovery plans must ensure that an FMI is able to continue to provide critical services in periods of substantial losses or liquidity shortfalls without support from government authorities. These situations can arise if a participant in an FMI is unable to meet its financial obligations or if the FMI incurs general operating losses.

The authorities have a role if a crisis becomes so severe that an FMI is unable to continue to operate. Even though the FMI will no longer be responsible for its own operations in such a situation, some of the tools the FMI has listed in its recovery plan may be used by the authorities in the event the FMI is wound up.

## 1.2 OUTSOURCING

Outsourcing means that system owners transfer the performance of a task to another operator rather than performing the task internally. The owners of interbank systems have largely outsourced the technical operation of support systems for clearing and settlement:

- Norges Bank has to some extent outsourced the operation of Norges Bank's own settlement system to EVRY ASA.
- The NICS Operations Office has fully outsourced the technical operation of NICS to Nets Norge Infrastruktur AS, which in turn purchases services from Nets Norway AS.
- DNB and SpareBank 1 SMN have to a large extent outsourced the technical operation of their settlement bank systems to external service providers, including EVRY ASA.

A distinction has emerged in the financial infrastructure in that payment system operations have largely been outsourced by system owners, while VPS has not outsourced operation of the securities settlement system.

Outsourcing has both advantages and disadvantages. The financial infrastructure is dependent on advanced technical solutions, which require considerable specialist expertise. Such expertise is expensive and may be difficult to obtain. Outsourcing can provide access to increased expertise and capacity.

The costs associated with system operation and development in the financial infrastructure are substantial. Economies of scale can be gained from outsourcing, as several system owners use the same provider, reducing costs.

On the other hand, increased concentration may weaken competition, and the consequences of a serious incident may be more severe. A shortage of service providers makes it more difficult for system owners to switch provider if they are dissatisfied with the service, while it can also reduce the bargaining power of the system owner vis-à-vis providers. Norges Bank is of the opinion that system owners should make preparations contractually and in terms of resources and expertise for a possible change of provider. It is important that switching service provider is a realistic alternative. The system owner should be prepared to perform the outsourced service internally, if the need should arise.

If a fault occurs in the operations of a service provider within the financial infrastructure, the consequences will likely be more severe if several system owners use the same provider. A fault in the operations of one service provider could then affect several of the systems within the infrastructure simultaneously.

System owners' responsibility also extends to the part of the system operated by other entities. With a chain of providers, risk can increase and become more difficult to identify. Owners must ensure that they also have sufficient expertise and capacity to undertake effective control of outsourced operations.

For both system owners and the authorities, it is more challenging to undertake control of operations at distant locations and when a chain of service providers is involved. In the opinion of Norges Bank, system owners have a particular responsibility to implement effective measures to follow up offshored operations and services involving a chain of service providers. It is not certain that Norwegian needs, considerations and priorities in a given situation will coincide with

priorities set by the authorities of the country operations have been outsourced to. Experience shows that in a crisis, national interests are often given priority.

Insourcing, i.e. restoring internal operation of a service that has long been performed externally, can put a strain on resources. Insourcing must be prepared for, and system owners must have access to the necessary expertise and resources. In Norges Bank's view, it may be useful for system owners to assess on a regular basis whether some services currently outsourced should be performed internally.

In the period ahead, Norges Bank will continue to focus on outsourced operations to ensure that system owners maintain the necessary level of control. Norges Bank has requested that system owners in the financial infrastructure assess critical service providers in 2015. On the basis of system owners' assessments, Norges Bank will conduct an assessment, which will be based on international CPMI-IOSCO principles.

In 2015, Finanstilsynet will head a working group tasked with assessing outsourcing of critical operations by parties engaged in payment services and financial infrastructure. The group comprises representatives from Finanstilsynet, the Ministry of Finance and Norges Bank. The working group will assess the challenges outsourcing can pose for financial stability, supervision and oversight. In addition, the group will consider whether changes should be made to operators' current scope for outsourcing. In its assessment, the group will take into consideration the entities performing the outsourced operations, including offshored operations. The group will also assess whether some types of task should be performed from Norway.

### 1.3 CENTRAL COUNTERPARTIES - RISK MANAGEMENT

The use of central counterparties (CCPs) has increased in recent years, primarily as a result of regulatory requirements. In the light of experience gained during the financial crisis, the G20 leaders decided in 2009 to require central clearing of standardised OTC<sup>2</sup> derivative

contracts. This was followed up in the US by the Dodd-Frank Act and in Europe by EMIR.<sup>3</sup> At the same time, it is now common practice that CCPs are the contractual counterparties to equity trades on exchanges. On Oslo Børs, all equity trades have been subject to a clearing obligation since 2010.

Central clearing will normally promote financial stability. The counterparty risk between the two original parties to a trade is removed when the CCP becomes the buyer to the seller and the seller to the buyer. The CCP guarantees settlement of trades it has become a party to. Moreover, together with trade repositories<sup>4</sup>, CCPs will increase transparency regarding the various types of contracts being traded in financial markets. Thus, markets will function more efficiently in periods of financial stress, and bankruptcies of large financial institutions will be easier to manage for the authorities and for other financial institutions.

But the increased use of CCPs also creates new challenges. Counterparty risk, rather than being spread across a number of financial market participants, is concentrated in CCPs. In certain situations, this could result in a more serious crisis.<sup>5</sup> CCPs therefore have a responsibility to organise their operations in such a way that they can meet their obligations in periods of severe market stress, and the authorities must follow this up through supervision and oversight.

To mitigate this risk, EMIR requires that a CCP maintains sufficient financial resources to cover substantial losses. This includes margins from clearing members, contributions to default funds and the CCP's capital (see box on page 13). CCPs must also establish recovery plans to address situations where their financial resources are insufficient. EMIR also sets out requirements for testing margin models and the CCP's financial resources (see box on page 14).

CCPs often operate in more than one jurisdiction. Thus, a failure of a CCP can affect the financial sector of several countries at the same time. EMIR therefore requires the establishment of colleges in which the authorities in various EEA countries collaborate in the oversight and supervision of CCPs. The primary

2 "Over the counter" (OTC) means that the derivatives are not traded on an exchange.

3 For a detailed discussion of EMIR (European Market Infrastructure Regulation), see page 33.

4 Registry of derivatives trades.

5 For a detailed list of the advantages and disadvantages of CCPs, see Murphy (2013).

responsibility for supervision and oversight rests with the authorities in the country where the CCP is established.

### **Risks associated with CCPs**

Because the CCP acts as the seller to the buyer and the buyer to the seller in the original transaction, it has, in principle, a balanced position. Thus, any fluctuations in the price of equities or other assets do not entail a risk of losses.

However, when one of the parties to a trade defaults, the CCP's book is no longer balanced. It thus bears a contingent market risk.

In such a situation, the CCP is obliged to honour the trade with the non-defaulting counterparty and must thus replace the contract that was defaulted on. A CCP that clears equities can do this by entering into contracts with a new counterparty to buy or sell the corresponding position (close out the position). To limit any losses from changes in market prices, the CCP will try to close out the position relatively quickly after the default of a participant.

A CCP that trades in equities or listed derivatives will normally find a counterparty on a regulated trading venue (e.g. an exchange). OTC derivatives, however, are not traded on regulated trading venues. Therefore, if a clearing member defaults on its obligations to a CCP that clears OTC derivatives, the CCP will arrange a separate auction that the other clearing members are obliged, or have strong incentives, to participate in.

CCPs' potential exposures arising from clearing OTC derivatives are often greater than from clearing equities. The reason is that settlement of an equity trade normally takes two days from the trade date, while a derivative can have a maturity of up to several years. Important OTC derivatives that are cleared for Norwegian banks are interest rate swaps (IRSs) and forward rate agreements (FRAs). According to the Bank for International Settlements (BIS) and Norges Bank, there was approximately NOK 4 100bn in interest rate derivatives outstanding in June 2010 (Norges Bank (2013)).

Financial market participants are often clearing members of different CCPs. To enable clearing members of different CCPs to clear a trade, these

CCPs must be linked. The CCPs will have a position against each clearing member and against one another if clearing members each use separate CCPs. CCPs often have larger exposures to other CCPs than to ordinary clearing members, since the positions between CCPs involve the trades of a number of clearing members.

As CCPs receive margins and hold capital that must be deposited with one or more banks, they have a risk vis-à-vis these banks. If a bank becomes insolvent, the CCP could incur a loss. The risk of losses is limited because EMIR requires that CCPs hedge their deposits with repurchase agreements collateralised by high-quality, highly liquid bonds.

Any problems in a CCP can quickly spread among clearing members. For instance, a clearing member can for instance incur a loss from having to share in a loss from the default of another clearing member. Moreover, an increase in market volatility may trigger margin calls that must be paid within a few hours. To raise enough liquidity to cover the margin call, clearing members may be forced to sell financial instruments. This can result in higher price volatility, which in turn triggers additional margin calls (negative feedback loop). Because such margin calls will normally be made in periods of market stress and affect all clearing members of the CCP simultaneously, the consequences could be serious.

### **Supervision and oversight**

As there are no longer CCPs with a head office in Norway, the Norwegian authorities do not have primary responsibility for supervision and oversight of any CCPs. At the same time, Norwegian market participants may be vulnerable to the failure of a foreign CCP. Norges Bank therefore gives weight to participation in colleges that oversee and supervise the CCPs that operate in several countries. Moreover, Norges Bank also works to gather information on and analyse CCPs that could affect financial stability in Norway. This pertains to:

- the margin models used by the CCPs
- the structure of default funds
- the instruments cleared by the CCPs
- links with other CCPs and FMIs (e.g. liquidity providers)
- whether Norwegian market participants have adequate alternatives if one CCP fails
- data showing Norwegian banks' exposures to CCPs

## MEASURES TO MITIGATE AND MANAGE RISK

Central counterparties (CCPs) are required to hold adequate collateral as well as have sufficient financial resources and liquidity to meet their obligations. Such resources are to be used in a pre-specified sequence ("default waterfall") to ensure appropriate allocation of losses and create the proper incentives. A typical default waterfall is structured as follows:

- 1 **Margins:** Margins are used first to cover losses. Clearing members of a CCP pay margins that must be sufficient to cover potential exposures in 99% of cases. Margin requirements are calculated by the CCP using a model and depend on potential changes in the value of the clearing members' portfolio.
- 2 **Defaulting clearing member's default fund contribution:** If margins are insufficient to cover a loss, the defaulting clearing member's contribution to the default fund will be used.
- 3 **Equity:** Then, a portion of the CCP's equity will be used. The fact that the CCP loses a portion of its equity before other clearing members incur losses is intended to create effective incentives for sound risk management.
- 4 **Mutualised default fund tranche:** Losses in excess of the defaulting clearing member's portion of the default fund are covered by the default fund contributions of non-defaulting clearing members.
- 5 **Rights of assessment:** Most CCPs can call for extraordinary default fund contributions. Such extraordinary contributions normally have an upper limit defined in proportion to the original contributions of clearing members.
- 6 **Remaining equity:** If the default fund is not sufficient to cover the losses, the CCP's remaining equity will be used.
- 7 After the equity has been used up, the CCP's recovery and resolution plans will enter into force.

To ensure that resources are sufficient to cover losses, the authorities set requirements for the amount of margins, the size of the default fund and the amount of CCP equity. There are also requirements for procedures for CCPs to test whether their financial resources are sufficient.

# TESTING OF CENTRAL COUNTERPARTIES

Participant default may result in direct losses and/or liquidity shortfalls for the central counterparty (CCP). Testing of a CCP's margin model and financial resources is intended to ensure that the CCP has sufficient capital to handle a default.

The requirements for testing of CCPs are regulated in EMIR. These requirements are in accordance with CPMI-IOSCO principles concerning testing of CCPs. Even though EMIR and CPMI-IOSCO have detailed provisions and principles for such tests, CCPs must still exercise appropriate discretion to ensure that tests capture all relevant risks. The Ministry of Finance may issue regulations on verification and approval by supervisory bodies of models used by CCPs to meet their obligations.<sup>1</sup>

## Testing of margin models

Under EMIR, clearing members' margins shall cover losses incurred by a CCP in 99% of cases if a clearing member defaults. Different CCPs use different models to calculate the margin rate required to meet this requirement. Two standard tests are conducted to ensure that CCPs collect sufficient margins:

- **Backtesting:** In a backtest, the estimates in the model are compared with historical data to verify that the margins would have covered losses in 99% of cases.
- **Sensitivity analysis:** The sensitivity analysis checks the robustness of the calculation of margins when the parameters in the model are changed. Examples of such parameters are magnitude of price movements, how much the price may be affected if the CCP is forced to take a large position in the market, option volatility and correlations between various instruments.

Even if these tests are conducted rigorously, they only show whether margins are sufficient on 99% of days.

The tests do not show the magnitude of price movements on the remaining 1% of days. If a large clearing member defaults, it will likely be on a day with large price movements. This can inflict substantial losses on the CCP.

## Testing of the CCP's financial resources ("default waterfall")

- **Stress testing:** EMIR requires that a CCP has sufficient resources in the event its two largest clearing members default under extreme but plausible market conditions. One challenge is that it is difficult to identify the scenarios with extreme impact potential in advance. One reason for this is that large clearing members of a CCP may have very complex positions, e.g. equities in sectors with differing market performance. Another reason is that some CCPs clear derivatives that can change considerably in value, even in cases where the price of the underlying security does not change. CPMI-IOSCO therefore requires that CCPs conduct stress tests for a broad spectrum of scenarios to document compliance with the requirement.
- **Liquidity testing:** A liquidity test can be conducted simultaneously with the stress test or as a separate test. While the stress test focuses on whether the CCP has sufficient resources, the liquidity tests focuses on whether the resources can be realised in a sufficiently timely manner to enable to CCP to meet its obligations.
- **Reverse stress testing:** While an ordinary stress test is used to examine whether a CCP has sufficient resources to handle extreme scenarios, a reverse stress test is intended to identify scenarios that the CCP will not be capable of handling. Because scenarios can always be created that will result in the insolvency of a CCP, sound judgement must be exercised when assessing the plausibility of such scenarios.

<sup>1</sup> Section 13-2, fourth paragraph, of the Securities Trading Act.

## 1.4 THE EFFICIENCY OF RETAIL PAYMENT SERVICES

According to the Norges Bank Act, Norges Bank has a responsibility for promoting an efficient payment system domestically and vis-à-vis other countries. In an efficient payment system, payment transactions are completed quickly, reliably and at low cost. When the prices and characteristics of various payment instruments are known, users will choose the solutions that best meet their needs overall. If the prices users are presented with reflect the differences in the costs of producing the services, users will be motivated to choose the payment instruments that entail low costs for society.

In Norway, most payments at points of sale are made using payment cards. Most card payments are made using the domestic BankAxept debit card system, while payments using international payment cards are increasing from a low level. Nearly all invoices are paid electronically via online banking, either as ordinary bank transfers or as direct debits (e.g. Avtale-Giro).

### Payment costs and incentives

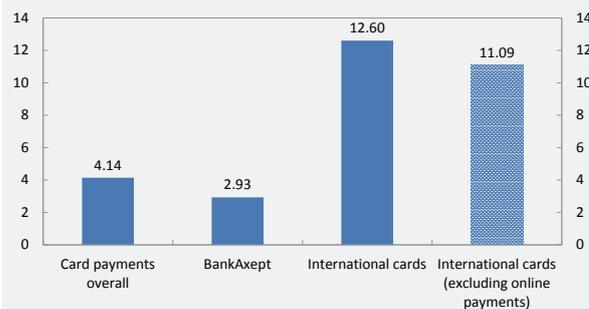
In autumn 2014, Norges Bank published a new survey of payment costs on the basis of data from 2013.<sup>6</sup> The total social costs related to use of cash, payment cards and giro payments are estimated at NOK 14.5bn, or 0.6% of mainland GDP. This estimate includes costs for both providers and users of payment services. Costs have fallen since they were first estimated in 2007. The costs in the Norwegian payment system are low compared with the costs in Sweden and Denmark.

### Cost of using various payment cards

The social costs associated with various types of card payment vary widely. While each payment using BankAxept costs society just under NOK 3, each payment using an international card costs between NOK 12 and NOK 13 (see Chart 1.1).

There are two main reasons for the wide differences in costs between card systems. First, payments using international cards are more resource-intensive for both banks and international card companies. International credit card payments entail costs for credit

CHART 1.1 Unit social costs associated with various payment methods. In NOK



Source: Norges Bank

checks, borrowing and billing. Second, the cost differences reflect somewhat different areas of use for the two types of card. For example, BankAxept cards cannot be used for online payments. If online payments are excluded, the unit cost of international cards falls by NOK 1.50. Use of international cards at physical points of sale may represent an excess cost to society of between NOK 1.2bn and NOK 1.3bn annually.<sup>7</sup>

In principle, the cost of using of international cards is financed by merchants. For each card payment, merchants pay a fee to their bank (acquirer). For payments using BankAxept, there is a fixed fee per payment, often around NOK 0.10, in addition to any fixed monthly amount. For payments using international cards, a percentage of the purchase amount is usually charged, ordinarily between 1% and 2%. Merchants can cover these fees by reducing their profit margin or by passing them on to customers, either by adding the fee directly to the payment or by raising their overall price level. In Denmark, the use of international payment cards has declined markedly after merchants began to charge customers fees for payments using such cards.

Customers usually pay only an annual fee for international cards and can obtain benefits such as deferred payment, travel insurance, discounts and

<sup>6</sup> See Norges Bank (2014a).

<sup>7</sup> This amount is arrived at by taking the number of payments using international cards at physical points of sale (154m) and multiplying it by the difference in unit cost between international cards and BankAxept (NOK 11.09 minus NOK 2.93). It is assumed that unit costs do not change with changes in the number of transactions.

fraud protection insurance. As long as no explicit fee is charged for using international cards, it may be profitable for individual customers to pay using such cards. Yet ultimately, customers as a group bear the cost of using these cards if merchants' payment costs are passed on to the prices of goods and services.

When the price is lower than production costs, customers have an incentive to use a card more extensively than the level of usage that would benefit the economy. This is especially true for international cards.

Payments using BankAxept are also usually free of charge to the customer, but then the marginal cost of such payments is also very low. Bank transaction processing is largely automated and one extra payment does not result in any appreciable increase in costs. For international cards, variable costs make up a larger portion of total costs.

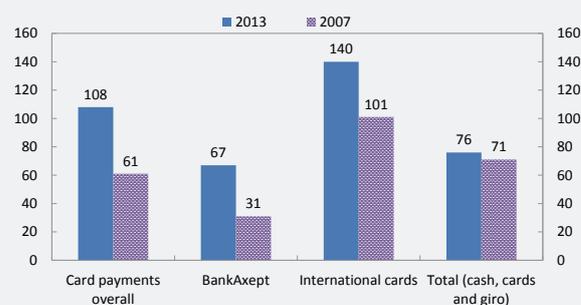
### Banks' cost coverage

Banks' payment services overall operate at a loss. Only 76% of the costs of payment services were covered by revenues from payments in 2013 (see Chart 1.2). Banks' payment card business overall operates at a profit; revenues amounted to 108% of costs. Banks operated at a loss on BankAxept payments, but at a profit on payments using international cards. Since 2007, banks have reduced their losses associated with BankAxept and increased their profits on international cards.

Banks have posted a profit on their overall card business primarily by reducing costs, and not by increasing revenues. Merchant fees for payments using BankAxept are far lower than the fees for payments using international cards. The fees for using BankAxept go in their entirety to the merchant's bank (the card acquirer), while the fees for payments using international cards are shared by all participants involved in processing payments - the card acquirer, the card issuer and the relevant card company.

Since the annual fee is the only revenue the card issuer or the customer's bank receives from payments using BankAxept, banks have nothing to gain from increasing the number of BankAxept payments. On the other hand, for each payment using international cards, the card issuer charges the card acquirer what is called an interchange fee. The rates for this fee are

CHART 1.2 Banks' cost coverage in 2007 and 2013. Revenues as a percentage of costs



Source: Norges Bank

set by card companies. Data from the cost survey show that interchange fees averaged 0.4%-0.8 of the turnover amount. If the interchange fee is higher than the marginal cost, banks will have an interest in increasing the volume of payments using international cards. The EU has adopted new rules for interchange fees, which will also be introduced in Norway. Under these rules, debit card and credit card interchange fees must not exceed 0.2% and 0.3% of the purchase price, respectively. Such a cap will likely reduce banks' revenues from the use of international cards.

Banks have incurred losses on payments using BankAxept and payment instruments other than international cards for a long time.<sup>8</sup> Pricing that does not cover costs may be a deliberate choice on the part of banks, since some customers may think that they should not have to pay to use their own money. At the same time, losses on most payment solutions have weakened banks' capacity and willingness to promote efficient solutions and invest in new infrastructure. Even so, there are now signs of increased willingness to invest in common systems. Examples of this are the recent spin-offs of BankAxept and BankID into separate limited companies.

### New methods of payment

For a long time, the most common form of payment for goods and services was cash. From just after the turn of the millennium, payment cards took over as the most used payment instrument, owing in part to an increase in online shopping. Physical payment

<sup>8</sup> The fact that banks offer low interest rates on transaction accounts is disregarded here.

cards are still the most common means of payment at points of sale and online, even though payment by mobile phone is increasing.

There are primarily three *means of payment*: cash, bank deposits (deposit money) and electronic money (e-money)<sup>9</sup>. Use of a means of payment requires a *payment instrument*. Cash may be used without other instruments and is therefore both a means of payment and a payment instrument. Chart 1.3 pro-

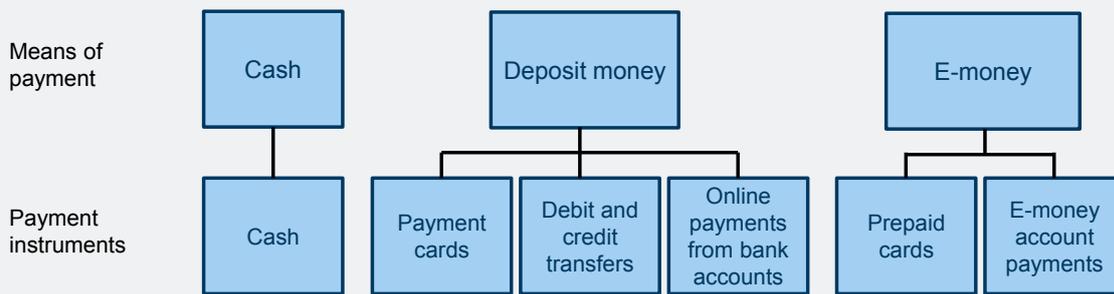
9 E-money is monetary value in the form of a claim on an issuer that is stored on an electronic medium, issued after receipt of funds and accepted as a means of payment by enterprises other than the issuer. Pre-paid cards and e-money accounts are two forms of e-money.

vides an overview of the various means of payment and payment instruments.<sup>10</sup> Most payment instruments can be used in several different ways.

Chart 1.4 provides a brief overview of three new solutions in the area of payments. These solutions and whether they make payments more efficient are discussed in detail below.

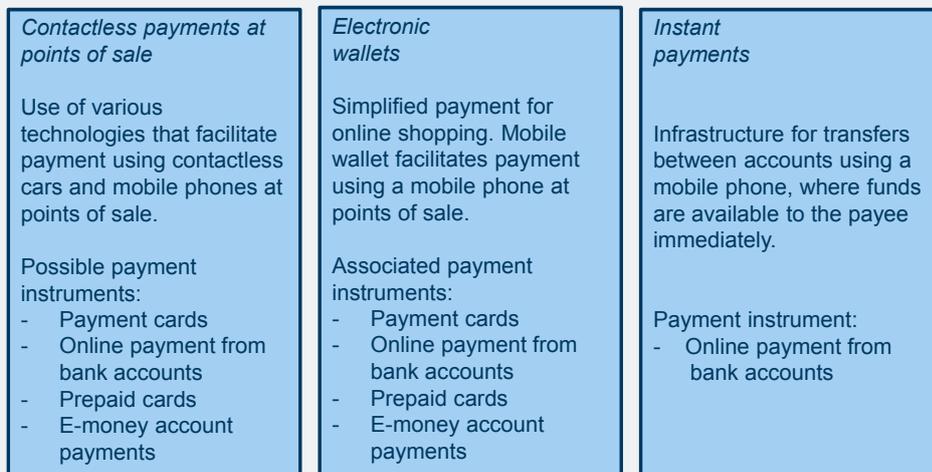
10 Two distinctive forms of payment are payments using a credit card and payments billed to a mobile phone subscription. The credit card purchase is counted as a card payment at the moment of purchase, but the actual transfer of funds takes place afterwards as a bank transfer. Payments via a mobile phone bill could possibly be referred to as a payment instrument.

CHART 1.3 Means of payment and payment instruments



Source: Norges Bank

CHART 1.4 New solutions in the area of payments



Source: Norges Bank

### Contactless payments at points of sale

Physical payment methods (cash or use of a card with a PIN) are still the most common at points of sale, but the number of contactless payments using cards or mobile phones is growing rapidly. In many cases, contactless payments will be simpler and faster to complete than traditional payments. Most contactless solutions are based on the use of a payment card, but other instruments, such as payments from bank accounts or e-money accounts, may be used in some solutions.

Contactless payments may be made using a number of different technologies, but near field communication (NFC)<sup>11</sup> is one of the most important technologies. A user simply holds the payment tool (plastic card or mobile phone) close to an NFC payment terminal. In practice, the terminals are often configured to request a PIN code from the customer if the payment sum exceeds a certain amount.

Most of today's payment terminals are equipped with contactless technology, but the terminals must be activated to accept contactless payments. Currently, few points of sale in Norway accept contactless payments.

Several Norwegian banks have distributed payment cards with contactless technology to their customers. One solution in particular that will probably be employed soon has been jointly developed by MasterCard and the Norwegian company Zwipe. The card combines contactless technology with biometric identification (fingerprint).

For contactless payment using a mobile phone, an electronic version of the payment card is used. So far, two mobile payment services have been launched in Norway based on NFC technology. DNB and Telenor launched ValYou in October 2014, while the Eika Group will offer Eika Safe to some of its customers as from June 2015. Apple Pay and Samsung Pay are international payment solutions based on NFC technology.

Samsung Pay makes it possible to use both NFC technology and a new technology called *Magnetic Secure Transmission* (MST). When MST is used, the mobile phone transmits a magnetic signal that is read by the

payment terminal in the same way as a magnetic strip on a payment card. In this way, the technology can be used at all existing point-of-sale (POS) terminals.

Another technological solution facilitating payment using a mobile phone is scanning so-called QR codes.<sup>12</sup> These codes can be read by QR code readers or by the camera of a mobile phone using a mobile app and may be used to identify a product, the payer or the point of sale. For example, payment is initiated when the customer scans the QR code for the product or point of sale. This action establishes contact between the customer's mobile phone and the POS terminal and the payment transaction can be completed. The Norwegian payment provider mCASH offers a mobile phone payment service based on QR codes.

There are also other solutions for payment using a mobile phone at the POS terminal. Some are based on Bluetooth technology, while others are based on establishing contact between the customer and the point of sale using the payment service's mobile app (PayPal Mobile offers the latter solution in some countries).

### Electronic wallets

Paying by mobile phone at a POS terminal usually requires a mobile wallet. A mobile wallet is an application that is downloaded onto the mobile phone and contains one or more payment instruments: various payment cards and prepaid<sup>13</sup> cards, a solution for online payments<sup>14</sup> and e-money account payments<sup>15</sup>. Payments are made via the mobile wallet, regardless of the form of contactless technology used (NFC, QR code or Bluetooth).

11 NFC is a wireless transmission method that enables units with NFC technology to communicate with one another. NFC works only over very short distances.

12 A QR (quick response) code is a two-dimensional bar code that can store a large number of characters and be read quickly.

13 A prepaid card is a payment card that contains a monetary value that has been transferred onto it in advance and that can be used for payments. The monetary value can be stored in a chip on the card or be registered in an account on a server or the Internet. Only cards that may be used at points of sale other than the issuer are considered e-money.

14 Payments with direct withdrawals from bank accounts are primarily used in connection with online purchases. The website's payment solution forwards customers to the login window of their own online banking service.

15 Payment from an e-money account. An e-money account holds e-money primarily used for payment of online purchases. The user has transferred funds to the account or has linked a payment card or ordinary bank account to this account. The account can be used to pay at merchants that accept the solution.

An electronic (mobile or digital) wallet can also be used to complete payments when making online purchases. The customer then does not need to enter card details such as the cardholder's name, card number, expiry date and card verification code. In principle, a digital wallet is the same as a mobile wallet, only located on a server rather than stored on the mobile phone. The details of one or more payment cards can be stored in the wallet. Other payment instruments, such as direct withdrawals from bank accounts and e-money accounts, can also be set up. To pay, the user simply needs to log in to the wallet with user name and password and choose the payment instrument to be used. Norwegian examples of electronic wallets are ValYou, mCASH and Eika Safe. PayPal and Google are among the best known international providers of electronic wallets. The card companies Visa and MasterCard have also developed their own wallets, called V.me and MasterPass. Both are planned to be launched in Norway in 2015.

### Instant payments

When cash is used for person-to-person (P2P) transfers of funds, the transaction is settled immediately. There are several schemes for P2P electronic funds transfer, of both deposit money and e-money. Currently no electronic solutions exist in which settlement is instantaneous.<sup>16</sup> In 2012, the banking industry decided to develop instant payments<sup>17</sup>, and the infrastructure is now in the process of being put into operation. Snapcash from the Eika Group is the first Norwegian solution for instant payment from account to account using a mobile phone. The user does not need the payee's account number, only the mobile number. The link between mobile number and account number is retrieved from the banks' joint account and address registry (KAR).

### Innovations and efficiency

The new methods of payment can increase the efficiency of the payment system. To the extent payments can be made faster and more easily, it will, in

isolation, be profitable for society to adopt them. The time required to complete the actual payment accounts for a large share of the total social costs. Payments using contactless cards without entering a PIN code will be faster and simpler than payments using cards in the traditional manner.

There are a number of different solutions for payment using a mobile phone, and it is difficult to assess whether these solutions will lead to faster, simpler and cheaper payments overall. The use of digital/mobile wallets for online purchases is making the payment process faster and simpler. Instant payments do not speed up or simplify the actual initiation of payments, but give payees access to funds much faster (immediately).

Contactless payment and electronic wallets are configured for use with international cards, but currently not for BankAxept. BankAxept has announced that its cards will be adapted to contactless mobile use by the end of 2015.

Most people consider entering a PIN code when paying using a card to be an important security element. Removing this element without replacing it in any way will weaken this security. At the same time, this only applies to small-value payments, which means that the consequences of misuse for the individual or the banking industry will be limited. In other cases, the traditional method of payment using a card may be replaced by payments using a mobile phone. The increased use of mobile wallets may entail a risk as so much personal data is collected in one place. On the other hand, the fact that payment data is protected on the mobile phone may increase security, compared the current lack of protection, for example on a payment card.<sup>18</sup>

16 Transferred funds are available immediately if the payer and payee are customers of the same bank. Transferred funds in the form of e-money can also be made instantly available to the payee. The problem is that the funds cannot be used universally.

17 Instant payments are credit transfers in NOK where the payee's bank has undertaken to immediately increase the available balance of the payee's account on receipt of a notification from the payer's bank. The payee's bank thus makes a commitment to its customer before the bank has received funds in settlement.

18 The discussion is based on Finanstilsynet (2015).

## 2 SYSTEM DEVELOPMENT – SUPERVISION AND OVERSIGHT

Norges Bank is the licensing authority for interbank systems in Norway and *supervises* the Norwegian Interbank Clearing System (NICS) and the DNB settlement system. This means that Norges Bank sets requirements for these systems. With regard to systems Norges Bank oversees, the Bank can exert influence by publishing evaluations and recommending changes.

This section discusses developments in the various systems and the supervision and oversight conducted by Norges Bank. Retail payment systems, which are primarily subject to supervision by Finanstilsynet (Financial Supervisory Authority of Norway), will not be discussed in this section.

### 2.1 NORWEGIAN INTERBANK SYSTEMS

Interbank systems are systems for interbank payment transfers, with common rules for clearing and settlement.

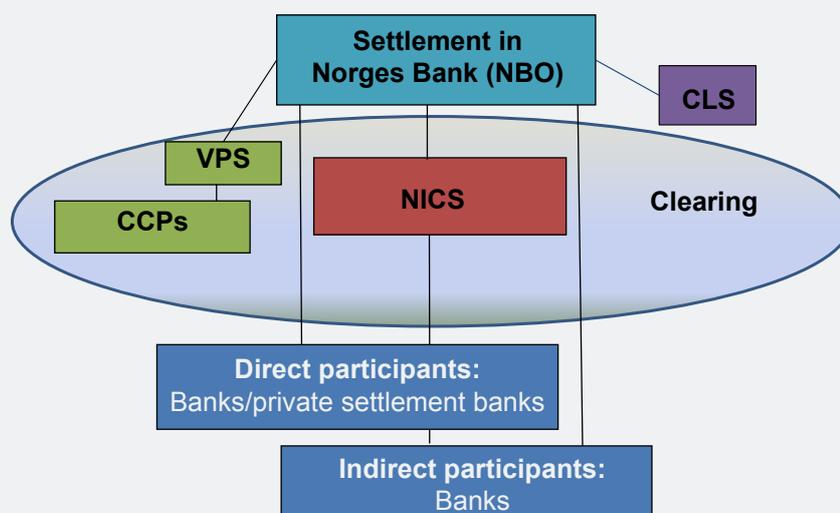
#### 2.1.1 NORGES BANK'S SETTLEMENT SYSTEM

##### The system in brief

Norges Bank is the ultimate settlement bank in the Norwegian payment system. Norges Bank's settlement system (NBO) is an interbank settlement system and payments are settled in banks' accounts with Norges Bank. NBO receives and settles net positions cleared by NICS, the Norwegian central securities depository (VPS) and the Norwegian branch of SIX x-clear (see Chart 2.1). NBO also receives payments from Norwegian banks and sends and receives payments to and from CLS Bank, a settlement bank for foreign exchange transactions. Net settlements take place at fixed times through the day<sup>19</sup>, while individual payments can be sent to Norges Bank in NBO operating hours and are settled immediately. About 130 banks have an account with Norges Bank. More than 20 of these banks take part in net settlement at

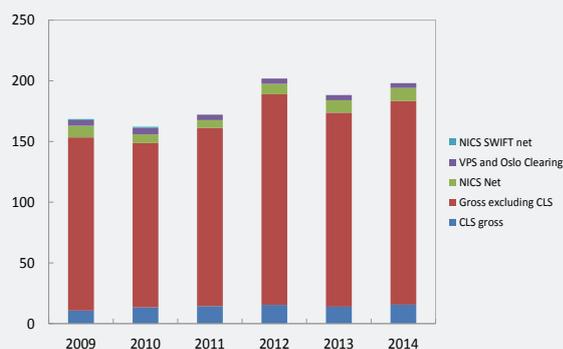
<sup>19</sup> The NBO operating schedule is described in Norges Bank (2012b).

CHART 2.1 Interbank and securities settlement systems in Norway<sup>1</sup>



<sup>1</sup> The chart has been simplified for reasons of clarity. Source: Norges Bank

CHART 2.2. Average daily turnover in NBO by settlement. In billions of NOK. 2009–2014<sup>1</sup>



<sup>1</sup> Break in series in 2009.  
Source: Norges Bank

Norges Bank; the remaining banks' positions are settled through one of these banks.

### Oversight

Two separate departments at Norges Bank are responsible for the operation and for the oversight of NBO. Oversight meetings about NBO are conducted twice a year. In 2014, oversight work included a focus on efforts to ensure the observance of international principles (see page 36). Work is in progress to establish a new disaster recovery solution for NBO.

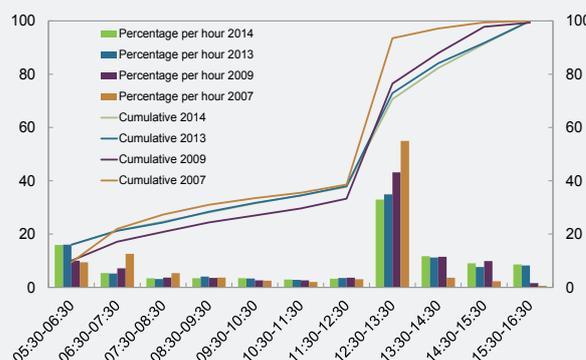
### Operations

Daily turnover in NBO averaged NOK 198bn in 2014 (see Chart 2.2).<sup>20</sup> Turnover varies from day to day, and maximum turnover in 2014 reached just below NOK 600bn. On average, gross settlements made up 93% of the turnover. The percentage of net settlements is comparatively small, as many payments are netted into one net position for each bank.

Most individual payments are sent for settlement at about 1 p.m. (see Chart 2.3). Banks in Norway have an agreement to send and receive payments simultaneously, and this reduces banks' liquidity needs in the course of a day.

In 2014, the share of individual payments sent for settlement towards the end of NBO operating hours

CHART 2.3 Gross settlements during the day. Daily average. Percentage of total gross settlement value

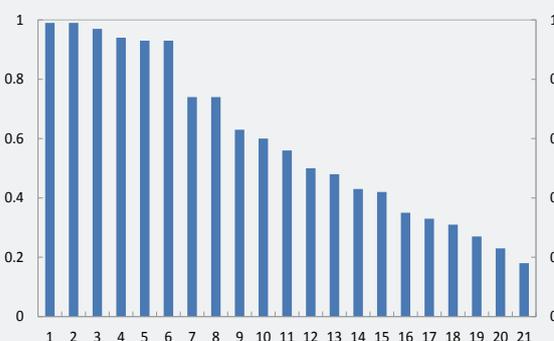


Source: Norges Bank

was somewhat larger than in previous years (see Chart 2.3).

Banks can meet their payment obligations by drawing on their deposits at Norges Bank or by utilising their borrowing facilities at the Bank. The level of borrowing is high at certain times of the day and on days when payment obligations are particularly high. On most days, banks' deposits and borrowing facilities are far higher than required to meet their payment obligations (see Chart 2.4).

CHART 2.4. Liquidity fraction.<sup>1</sup> 2014



<sup>1</sup> Maximum liquidity needs during a single day for banks in NBO relative to the bank's available liquidity in NBO. Normal transaction order. Average for banks with direct settlement in NBO.  
Source: Norges Bank

<sup>20</sup> This sum does not include the net settlement liaison account.

Even temporary disruptions in Norges Bank's settlement system can have serious consequences for payment services in Norway. In 2014, system availability in NBO operating hours was close to 100%.

Even though system availability is high, Norges Bank had to extend NBO operating hours six times in 2014 because of technical problems at participant banks and Norges Bank, compared with once in 2013.

### Changes to the system

Norges Bank is working on three major changes to the NBO system:

- Norges Bank is preparing to put a new disaster recovery solution into operation. This solution will be implemented if Norges Bank's primary and secondary operative systems both fail. The new disaster recovery solution replaces a manual recovery solution, which testing has shown to be unsatisfactory.
- Norges Bank is planning a new system for the management of banks' securities pledged as collateral for loans from Norges Bank. Implementation of the new system is planned for November 2015.
- Norges Bank has put a new contingency communication solution into operation for communication with CLS. If SWIFT communication between Norges Bank and CLS breaks down, transaction messages will now be transmitted via the Internet, replacing messages via telefax. Norges Bank has so far only used telefax messaging during contingency exercises with CLS.

Norges Bank has also made changes in the system of agreements relating to NBO:

- The Riksbank, Danmarks Nationalbank and Norges Bank have discussed the discontinuation of the Scandinavian correspondent bank model for pledging securities as collateral.<sup>21</sup> The model involves highly manual processes, and banks have the alternative of using an account with Clearstream or Euroclear for pledging securities as collateral.

<sup>21</sup> In the correspondent bank model, banks pledge securities registered in a central securities depository in a Scandinavian country in favour of the central bank in another Scandinavian country (thereby increasing their borrowing facility in this country), using their home country central bank as correspondent bank.

- Norges Bank is preparing changes to the account management agreement between banks and Norges Bank. The changes primarily involve two new conditions. One of these conditions is that banks utilising Norges Bank as their settlement bank in the net settlements must be able to send SWIFT messages. The other is that banks participating directly in settlements of clearings from NICS must be staffed from 7 a.m. until NBO closes.

### Contingency arrangements

To ensure that settlements can be completed in the event of a disruption, Norges Bank took part in 35 disruption management exercises in 2014. Exercises are held with NBO participants, VPS and NICS, and with system providers such as SWIFT. Disruption management exercises are important for system providers and participants to learn how the contingency arrangements works and the procedures that apply under different scenarios.

## 2.1.2 NORWEGIAN INTERBANK CLEARING SYSTEM

### The system in brief

The Norwegian Interbank Clearing System (NICS) is the banks' joint system for clearing payment transactions. Nearly all payment transactions in Norway are sent to NICS. Most of the transactions received by NICS are included in a multilateral clearing in which each bank's position against other banks has been calculated. The clearing result is sent to NBO. Banks also send transactions via NICS that are not included in a multilateral clearing. These transactions are settled one by one, i.e. gross transactions, and are typically payments of more than NOK 25m. These transactions are settled as they are received by Norges Bank's settlement system.

Settlements at Norges Bank that are based on the multilateral NICS clearings take place at about 5.30 a.m., 11 a.m., 1.30 p.m. and 3.30 p.m. After settlement, the transactions (so-called accounting data) are returned to the banks via NICS to be entered as credits or debits in bank customer accounts.

### Supervision

The NICS Operations Office is licensed by Norges Bank as the operator of NICS. Norges Bank conducts semi-annual supervisory meetings with the NICS Operations Office. Additional meetings on specific issues are conducted as necessary. At the most

# SWIFT (SOCIETY FOR WORLDWIDE INTERBANK FINANCIAL TELECOMMUNICATION)<sup>1</sup>

The company S.W.I.F.T. SCRL (SWIFT), which has its head office in Belgium, provides a network that financial market participants can use to transmit financial information. The company is organised as a cooperative in which the users of the network are also owners. The SWIFT network serves more than 10 000 financial institutions in over 200 countries. The network has been available in Norway since it went live in 1977. <sup>1</sup>

In the financial infrastructure, SWIFT plays an important role in three areas:

- 1 SWIFT is the provider of a secure network over which messages (such as payment messages) are exchanged. The availability of this network is critical for the execution of all settlements at Norges Bank. SWIFT has an operational target of 99.999 percent availability over a 24-hour period.
- 2 SWIFT develops and offers message standards. In the decades before the network went into operation, there was no common standard for transactions sent between financial institutions. The launch of the SWIFT network was accompanied by defined message formats. SWIFT was initially a network for banks. In recent decades, SWIFT has also gained prominence as a provider of message standards in the securities market. At the beginning of the 2000s, SWIFT was an active contributor to the

development of the ISO 20022 message standards. SWIFT is now the ISO 20022 Registration Authority, which means that SWIFT is responsible for publishing and maintaining message standards. In accordance with European legislation, all mass payments in EUR must be sent in ISO 20022 format as from 1 February 2014.

- 3 SWIFT offers an increasing array of additional services to network users. In recent years, a number of services have been launched to support banks in complying with regulatory requirements to combat money laundering and terrorist financing. SWIFT offers its members a functionality to check payments against various sanctions lists. If a payment is being sent to a person or institution on such a list, SWIFT will be able to stop the payment message. Another additional service that has recently been launched is the Market Infrastructure Resiliency Service (MIRS), a disaster recovery solution for central bank settlement systems.<sup>2</sup> MIRS can settle SWIFT messages, even if the central bank's primary and secondary operating centres become unavailable.

SWIFT is overseen by the G10 central banks<sup>3</sup>. The Belgian central bank chairs the oversight group.

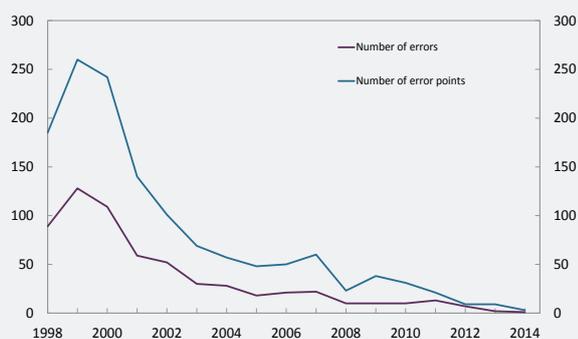
---

<sup>1</sup> This box is based on Scott and Zachariadis (2010) and Scott and Zachariadis (2014).

<sup>2</sup> For further information about MIRS, see Bank of England (2014).

<sup>3</sup> The G10 countries: Belgium, France, Germany, Italy, Japan, Canada, Netherlands, UK, US, Germany, Sweden and Switzerland.

**CHART 2.5 Disruptions in NICS operations. Number of errors and error points. 1998-2014<sup>1</sup>**



<sup>1</sup> Error points indicate error severity level.

Source: NICS Operations Office

recent supervisory meetings, topics of discussion have included the NICS Operations Office's work to comply with the Principles for Financial Market Infrastructures (PFMI) (for further details, see Section 2.3).

The NICS Operations Office has outsourced the operation of NICS to Nets Norge Infrastruktur AS, which is wholly owned by Nets Norway AS, which in turn is owned by the Danish holding company Nets Holding A/S. Nets Norge Infrastruktur AS relies on service delivery by Nets Norway AS. In its supervision, Norges Bank emphasises that the NICS Operations Office has ultimate responsibility even though the operation of NICS has been outsourced.

### Operations

Daily turnover in NICS net settlements averaged NOK 122bn in 2014, a 4% increase on the previous year.

NICS operation was stable in 2014. Operational stability is measured by recording all disruptions and assigning error points according to the level of severity. The number of disruptions and error points in 2014 was the lowest recorded since this method of measurement was introduced in 1998 (see Chart 2.5).

### Changes to the system

On 24 March 2014 Advent International, Bain Capital and ATP signed an agreement to acquire 100% of the shares in Nets Holding A/S from Danish and Norwegian banks and Danmarks Nationalbank. Ownership was transferred on 9 July 2014.

Norges Bank received a change notification from the NICS Operations Office in March 2014 concerning a new service agreement between the NICS Operations Office and Nets Norge Infrastruktur AS. Norges Bank noted that more explicit rules as to how the NICS Operations Office will manage and monitor outsourced operations have been included. The agreement states that the NICS Operations Office must have access to the source codes for NICS if there should be a need to move NICS operations to another provider. Rules are also included to provide the NICS Operations Office with information about the financial position of the provider, and to define a course of action that must be followed by the provider if key financial figures fall below specific levels. Norges Bank submitted comments on those sections of the agreement dealing with the transfer of rights and obligations. The NICS Operations Office sent a change notification containing a revised service agreement incorporating Norges Bank's comments in June 2014.

Over the past year, the NICS Operations Office has been following up Norges Bank's comments related to the assessment of NICS against international principles conducted in 2014. In this connection, the NICS Operations Office has drawn up a general risk framework and amended its articles and rules. Norges Bank received change notifications concerning these matters in December 2014 and March 2015.

### Contingency arrangements and risk

The NICS system has shown a high degree of stability in recent years. Although the likelihood that NICS will be affected by a serious fault or a serious event is very low, the consequences of such an event could be substantial. NICS operates from two different sites. The software and data bases are mirrored so that in practice the two operating sites are identical. If the primary site encounters problems, all operations are transferred to the secondary site. The NICS Operations Office conducts an annual test to confirm that one site can function with enough capacity if the other site fails.

Mirroring provides protection against faults in physical components. Serious faults in software or data errors, however, could lead to disruption in both operating sites at the same time. These faults must be corrected as soon as possible. If necessary, databases and software should be reset to their pre-crisis condition based on backup copies.

Norges Bank notes that the banking industry as represented by Finance Norway is now looking into the possibility of establishing a clearing solution for use in the event the two existing operating sites are not available. Norges Bank will also assess the need for a clearer specification of the requirements with regard to continuity and disaster recovery in the terms of the NICS Operations Office licence.

### 2.1.3 PRIVATE SETTLEMENT BANK SYSTEMS

#### The systems in brief

There were three private settlement banks in Norway at the end of 2014. DNB is the settlement bank for 97 banks, SpareBank 1 SMN for 11 banks and Danske Bank for one bank.

The role of a settlement bank is to take over the positions participant banks have in the NICS clearing. Once the NICS clearing has been settled at Norges Bank, participant banks' settlement accounts are credited or debited at the settlement bank. Direct participants in Norges Bank's settlement system, NBO, are called first-tier banks, while banks participating through private settlement banks are called second-tier banks.

Private settlement bank systems are not separate technical systems, but are based on settlement banks' systems and procedures for exchanging other transactions.

#### Supervision and oversight

Norges Bank conducts regular, semi-annual supervisory meetings with DNB about its settlement bank system. At the most recent supervisory meetings, topics of discussion have included DNB's extensive plans to outsource ICT solutions and outsourcing measures that have already been implemented.

Norges Bank does not supervise the SpareBank 1 SMN settlement bank system, but conducts an annual oversight meeting. At the meeting in 2014, discussions included the work and experience of SpareBank 1 SMN in connection with its self-assessment against international principles (PFMI).

The Danske Bank settlement bank system is too small to be subject to oversight by Norges Bank.

#### Operations

Operation of the DNB settlement bank system was fairly stable over the past 12 months. One serious disruption occurred on 17 June 2014, when a power outage affecting the IT service provider EVRY caused damage to important IT components. DNB decided, in collaboration with EVRY, that it would be more demanding to implement disaster recovery procedures at the secondary site than to repair the fault at the primary site. DNB's deliveries to NICS clearings and the updating of second-tier banks' accounts in DNB were delayed on 18 June, but DNB was allowed to postpone the delivery deadline for the final clearing of the day and all the transactions had been settled by the end of the day. The early morning and morning clearings on 19 June were also delayed. DNB has implemented a number of measures in response to this event that will improve continuity and crisis management.

Operation of the SpareBank 1 SMN settlement bank system was stable over the past 12 months. One disruption occurred on 28 January 2014, when EVRY encountered severe technical problems. As a result, transactions sent by SpareBank 1 SMN and its participant banks were not included in the final NICS clearing of the day. These transactions were included in the early morning clearing the following day. EVRY has taken measures to prevent similar incidents occurring in the future.

#### Changes to the systems

On 1 May 2014, DNB outsourced application management for some of its IT applications, including the applications that make up the DNB private settlement bank system. The new provider is the Indian company Tata Consultancy Services. In its capacity as supervisory body, Norges Bank emphasises that DNB must ensure that it has sufficient expertise and resources to undertake effective control of the outsourced application management services.

No material changes were made to the SpareBank 1 SMN settlement bank system in 2014.

#### Contingency arrangements and risk

The use of private settlement banks reduces the number of participants in NBO settlement and thus probably also reduces the risk of delays in the settlement process. Provisions has been made for second-tier banks to participate directly in NBO net

settlement (as first-tier banks) if a private settlement bank is no longer able to continue this activity.

To mitigate the risk associated with the role of private settlement bank, settlement caps were introduced for second-tier banks in 2012. This system has proved to function as intended. DNB and SpareBank 1 SMN report that the introduction of settlement caps has increased second-tier banks' attention to liquidity management.

### 2.1.4 CONTINUOUS LINKED SETTLEMENT

#### The system in brief

CLS operates the world's largest multicurrency cash settlement system, settling payment instructions for foreign exchange transactions in 17 currencies, including Norwegian kroner (NOK).<sup>22</sup> Foreign exchange transactions are settled on a gross basis in each settlement member's account with CLS. CLS calculates funding as a net position for each settlement member in each currency. Ingoing and outgoing currency payments are transacted through CLS and banks' accounts with the various central banks (see box on CLS on page 27). A settlement member may use another bank (a nostro agent) to make and receive CLS-related payments.

Most of the CLS transactions involving NOK are against EUR or USD. Calculations from CLS show that 73% of all transactions between NOK and USD and approximately 51% of all transactions between NOK and EUR are settled in CLS.

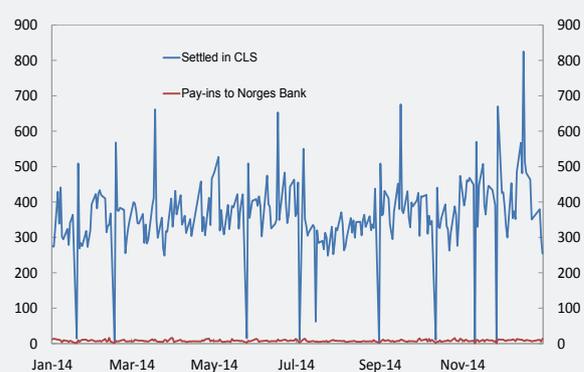
#### Oversight of CLS

CLS is subject to both supervision and oversight. CLS is supervised by the Federal Reserve, while 22 central banks whose currencies are settled in CLS, including Norges Bank, cooperate on oversight of CLS via the CLS Oversight Committee (OC). The Federal Reserve chairs the OC. An oversight protocol signed by the participating central banks describes how the OC is organised, what information CLS should give the OC with regard to changes in the settlement system, and how the OC is to assess proposed changes.<sup>23</sup>

22 The other currencies are the US dollar, euro, pound sterling, Canadian dollar, Swiss franc, Hong Kong dollar, Australian dollar, New Zealand dollar, Mexican peso, Israeli shekel, South Korean won, Singapore dollar, Japanese yen, South African rand, Danish krone and Swedish krona.

23 See Federal Reserve (2008) [http://www.federalreserve.gov/paymentsystems/cls\\_protocol.htm#oversightInformation](http://www.federalreserve.gov/paymentsystems/cls_protocol.htm#oversightInformation).

CHART 2.6. Value of NOK settled in CLS and value of pay-ins to Norges Bank. In billions of NOK. 2014



Sources: CLS and Norges Bank

#### Operations

Settlement of NOK in CLS averaged NOK 353bn per day in 2014. The average value of pay-ins to settlement amounted to NOK 7.8bn.

Together with pay-outs from CLS, these payments generate turnover in the central banks in connection with CLS settlement. Due to the sizeable effect of multilateral netting, there is a considerable difference between the value of net pay-ins and the gross value of settled NOK transactions in CLS (see Chart 2.6).

There were no incidents that affected settlement of NOK in CLS in 2014.

#### Changes to the system

Over the past year, CLS has worked to expand the range of services it offers:

- In 2014, CLS introduced a new member category, "Transition Settlement Member" (TSM). The TSM membership category may be used to accommodate an expedited transfer of CLS membership to another (non-CLS settlement member) financial institution in the event a settlement member becomes subject to resolution CLS may use TSM membership to temporarily extend membership to a bridge bank or acquiring institution, assuming the applicant meets CLS's membership requirements and any additional assurances as requested. The TSM must also agree to succeed to all the rights, liabilities, and obligations of the predecessor settlement member, including in connection with

# CLS – A SETTLEMENT SYSTEM FOR BANKS' FOREIGN EXCHANGE TRANSACTIONS

CLS enables participating banks to settle their foreign exchange transactions securely and efficiently. When a foreign exchange transaction is to be settled, a payment must be made in each of the currencies in the transaction. Traditionally, these two payments were settled separately and independently of each other in their separate national payment systems. With this form of settlement, there is a risk that one side of a foreign exchange transaction is settled with finality without the corresponding counter-currency payment also being settled with finality: so-called "settlement risk." This form of settlement gives rise to credit risk associated with the foreign exchange settlement.

CLS is a system for settling foreign exchange transactions where the two payment instructions are simultaneously settled, thereby eliminating the risk that one payment is made without the corresponding payment being made (a risk which exists when payments arising from the two legs of a foreign exchange transaction are settled separately). The payment versus payment set-

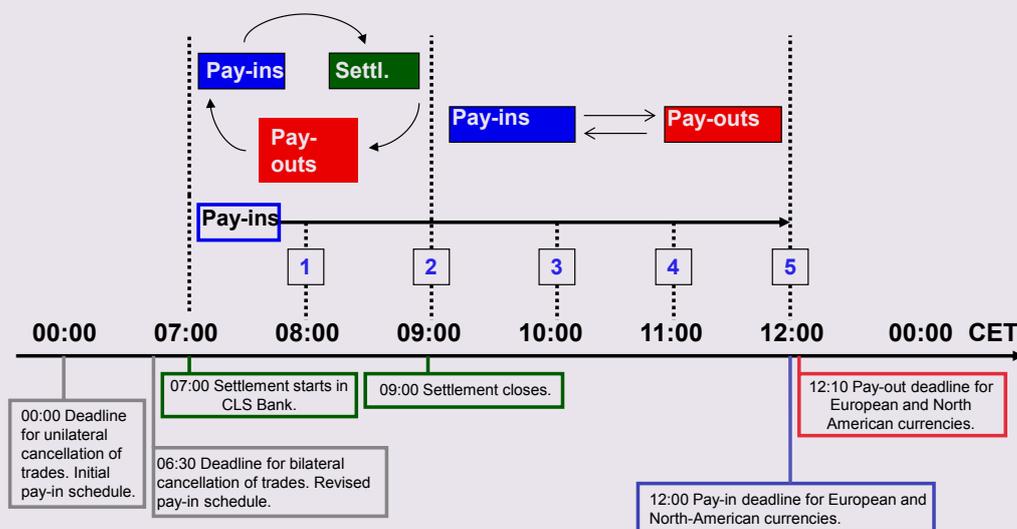
tlement process ensures that the principal amount involved in the settlement of the FX payment instruction is protected. The problem with the traditional form of settlement, in which payments were sent independently of each other, was amplified by the fact that central banks on different continents did not have overlapping opening hours. Today, 17 currencies are settled in CLS, and the respective central banks for these currencies have coordinated opening hours to accommodate the funding necessary for the settlement of payment instructions, maximizing the benefits of participation in CLS while also mitigating the liquidity implications of such participation.

Three key processes in CLS are pay-ins, settlement of foreign exchange transactions and pay-outs.

## Pay-ins

CLS has an account with the central banks of each of the 17 participating currencies. Prior to each settlement day, CLS calculates a net position in each currency for

CHART 1 CLS settlement process



Source: Norges Bank

each settlement member. A member with a net pay-in requirement in a currency must pay in that amount to CLS's central bank account in accordance with a timeline provided by CLS.

Settlement in CLS takes place between 7 a.m. and 9 a.m. CET. A settlement member need not pay in the entire pay-in requirement while settlement is ongoing. Within what is called the "short position limit" (SPL) in each currency, and in line with the pay-in schedule set by CLS, settlement members can also make pay-ins after settlement has been completed. The deadline for completing pay-ins is 10.25 a.m. CET in Asian currencies and 12 noon CET in European and North American currencies. Chart 1 shows deadlines for pay-ins, completion of pay-in requirements and pay-outs from CLS.

### Settlement

While pay-ins and pay-outs of currencies take place on a net basis over CLS's accounts with the individual central banks, the actual settlement of foreign exchange transactions takes place in multicurrency accounts that settlement members have with CLS. Each transaction submitted to CLS is settled individually and sequentially. Settlement members have a zero balance in their account with CLS at the start of the settlement process, and a zero balance in this account when all pay-outs have been executed.

What affects a settlement member's balance in its account with CLS is what that settlement member has paid in to CLS's central bank account in the individual currencies, as well as their settled transactions. Pay-ins to CLS's central bank account increases the balance of the account with CLS, while pay-outs will reduce the balance.<sup>1</sup>

<sup>1</sup> CLS applies haircut rates to members' obligations to CLS (short positions) as well as to CLS's obligations to members (long positions). The haircut rates increase short positions, while they reduce long positions.

CLS is exposed to some residual risk as a result of settling transactions before receiving all funding from settlement members. To mitigate this risk, CLS has three criteria (risk management tests) that must all be met for any transaction to settle:

- 1 The settlement member's CLS account balance must be positive after the application of currency-specific haircuts (expressed as a USD equivalent).
- 2 The settlement member may not have a short position in any one currency that exceeds the respective currency's Short Position Limit (SPL).
- 3 The settlement member may not have an aggregate total of all short positions (expressed as a USD equivalent) in excess of a set Aggregate Short Position Limit (ASPL), which has been determined for each participant.

Any transaction must meet all three of these criteria for both parties to the transaction before it can be settled. An example illustrates how the three risk tests relate to the settlement of transactions and settlement members' CLS account balances. Assume that Bank 1

TABLE 1 Two trades in settlement queue

Trade nr.	Trading party	NOK	SEK	Counter-party
1	Bank 1	100	-100	Bank 2
2	Bank 1	200	-200	Bank 2
Net funding need	Bank 1	300	-300	Bank 2
Assumptions:			NOK:	SEK:
1 NOK = 1 SEK		SPL	200	200
5 NOK = 1 USD				

Source: Norges Bank

and Bank 2 have entered into two trades between NOK and SEK. Bank 1 sells SEK 300 and purchases NOK 300 (see Chart 2). For the sake of simplicity, we will focus on the balance of Bank 1 in Tables 2 and 3 and only take the first two criteria into account.

At the start of the settlement process, the balance of Bank 1's account with CLS is zero. We assume further that Bank 1 pays in SEK 50 to CLS's central bank account. After this pay-in, there will be 8.5 USD equivalents in Bank 1's account with CLS after haircuts are applied. After the first transaction is settled in CLS, Bank 1 will be credited NOK 100 and debited SEK 100 in its account with CLS. Bank 1's total balance with CLS is now 5.5 USD equivalents. Table 3 shows how this balance changes if CLS settles the second payment instruction.

If CLS settles the second instruction, Bank 1 will owe SEK 250 and its CLS account balance will be negative. This violates criterion 1 and criterion 2, as the balance in USD equivalents after haircuts is negative and the short position in SEK exceeds the SPL of 200. The transaction will not be settled until Bank 1 has paid in at least SEK 50 to CLS's central bank account. If Bank 1 pays in

SEK 50, Bank 1 must finance the remaining SEK 200 that Bank 1 owes CLS by 12 noon CET.

Each payment instruction is placed in a random order prior to start of settlement, and they are settled one by one in the order in which they are placed. While banks have a net funding obligation in connection with settlement, each transaction is settled one by one (gross).

### Pay-outs

Currency pay-out is a process that takes place simultaneously with the settlement of transactions. Like pay-ins, pay-outs are made from CLS's central bank accounts. Before CLS makes a pay-out, CLS checks whether the same three criteria are met as when CLS settles transactions. CLS will give priority to carrying out settlement before making pay-outs, but as long as a settlement member has adequate funds for any unsettled transactions in its CLS account, CLS will begin making pay-outs. By the deadline for pay-outs, CLS will have made pay-outs to all settlement members with a long position in each of the individual currencies. At that point, CLS's accounts with each central bank will all be flat.

TABLE 2 Bank 1's balance in CLS account

Balance is 0 at start of settlement. Bank 1 has made a pay-in of 50 SEK

Currency	Balance	Balance USD-equivalents	Haircut percentage	Balance after haircuts in USD-equivalents
NOK	0	0	15	0
SEK	50	10	15	8,5
Total				8,5

First instruction is Bank 1 selling 100 SEK and buying 100 NOK

Currency	Balance	Balance USD-equivalents	Haircut percentage	Balance after haircuts in USD-equivalents
NOK	100	20	15	17
SEK	-50	-10	15	-11,5
Total				5,5

Source: Norges Bank

TABLE 3 Bank 1's balance on CLS-account (cont'd)

Second instruction has Bank 1 selling 200 SEK and buying 200 NOK

Currency	Balance	Balance USD-equivalents	Haircut percentage	Balance after haircuts in USD-equivalents
NOK	300	60	15	51
SEK	-250	-50	15	-57,5
Total				-6,5

Violates both SPL and positive balance criteria. The trade instruction will be stopped. Payment will not settle until Bank 1 has paid at least 50 SEK.

Source: Norges Bank

liquidity facilities. This option may mitigate issues relating to the ability of financial institutions subject to resolution to continue to participate in the CLS system.

- CLS is collaborating with the Hungarian and Turkish central banks on inclusion of the Hungarian forint (HUF) and Turkish lira (TRY). The forint is expected to go live in November 2015, subject to securing all necessary approvals.
- CLS has announced that it will collaborate with Tri-Optima to deliver a foreign exchange forward compression service. The new service will enable participants to reduce the number of trades, substantially reducing gross exposures and therefore counterparty credit risk and leverage ratios while facilitating compliance with regulatory requirements.

All of the above-mentioned changes are proposals and must be submitted to the authorities, which will determine whether they require approval.

#### Contingency arrangements/risk

CLS conducts regular exercises with participants and central banks in which disruption management procedures are reviewed.

## 2.2 SECURITIES SETTLEMENT

The securities settlement system (VPO) performs settlement of cash and securities. VPS, the Norwegian Central Securities Depository (CSD) calculates the positions and settles the securities leg of the settlement. The cash leg is carried out by Norges Bank. CCPs participate in VPO because they enter into equity trades on trading venues, becoming the counterparty to both sellers and buyers of equities.

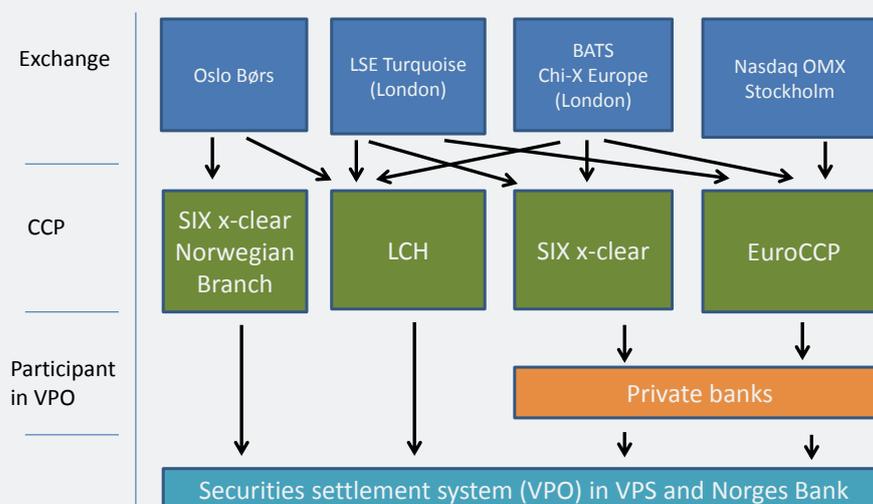
Equity transactions sent to VPO for settlement come from a number of trading venues and pass through several CCPs and banks (see Chart 2.7).

### 2.2.1 VPS SETTLEMENT SYSTEM

#### The system in brief

VPS is the operator of VPO. Securities settlement consists of the settlement of ownership rights over securities in VPS and the settlement of an associated cash leg at Norges Bank. VPO takes place twice a day, at 6 a.m. and 12 noon. In 2014, 74% of the total volume of transactions was settled in the early morning settlement.

CHART 2.7 Trading, clearing and settlement of equities in NOK



Source: Norges Bank

Thirty-seven investment firms/banks participate directly in securities settlement in VPS. Of these, 20 banks also participate directly in the cash leg of settlement at Norges Bank. Thirty-three participate indirectly, both in the securities leg and in the cash leg of VPO.<sup>24</sup>

CCPs clear net equity positions and net NOK positions and send these positions to VPS (Chart 2.7). Trades in bonds and short-term paper in NOK are not settled via CCPs. These transactions are sent directly to VPS by investment firms/banks.

For each participant, VPS calculates a net cash position and a net position for each security. On the basis of this clearing, the cash leg is settled at Norges Bank. VPS then registers each securities transaction (gross) in the VPS accounts of participants and their customers. In 2014, such transactions in VPS averaged 48 000 per day. By comparison, there is a maximum of 40 settlement transactions per day at Norges Bank.

#### Operations in 2014

The net settlement volume for securities at Norges Bank averaged approximately NOK 4bn per day in 2014. The gross value was considerably higher. According to VPS, the total value of settlements averaged NOK 127bn per day in 2014, up from NOK 103bn in 2013.

System availability for VPS was 100% in 2014. There were no disruptions or delays in the VPS system in 2014.

#### Changes to the system

For many years, securities trades have normally been settled three days after the trade is executed, called a T+3 settlement cycle (T stands for "trade date"). The settlement cycle was reduced to two days (T+2) on 6 October 2014. The changeover to T+2 took place simultaneously throughout the Nordic countries and in most European countries. Because market participants now have 24-hours less to perform administrative tasks and obtain cover, there has been a reduction in the settlement ratio, i.e. the percentage of transactions and value of settlements settled on the agreed date.<sup>25</sup> In the period from the changeover date until end-2014, approximately 4% of transactions and 10% of the value of settlements in VPO were not settled on the agreed

date.<sup>26</sup> According to VPS, this is on a par with markets in other countries. EU rules have been proposed to improve settlement discipline (see box on page 33).

VPS is planning to introduce a new IT system for the CSD and settlement business in spring 2017. The system will be delivered by the Estonian company Percival and operated by VPS. The new system will comply with new EU regulations and participation in TARGET2-Securities (T2S).<sup>27</sup> In 2012, VPS announced its intention to join T2S in 2018/2019.

#### Oversight

VPS and VPO are supervised by Finanstilsynet and are subject to oversight by Norges Bank. Norges Bank has two annual oversight meetings with VPS, with Finanstilsynet participating as observer. In addition, Norges Bank has meetings with VPS to discuss specific issues, if needed. In its oversight activities, Norges Bank has focused on the steps taken by VPS to follow up the international principles that were assessed by Norges Bank as not fully observed (see page 38).

#### Contingency arrangements and risk

As the operator of VPO, VPS conducts regular disruption management procedures with Norges Bank. Occasionally, other participants are involved in these tests. Norges Bank and VPS tested disruption management procedures for VPO three times in 2014.

VPS has not outsourced operation of its systems. VPS is planning to replace its core systems and will use an external provider (Percival) in developing the new solution, but VPS will be responsible for operation of the new system. As boxes on EU regulations and T2S make clear, VPS will face more competition and will have to adapt operations to new rules.

### 2.2.2 CCP SYSTEMS

Norwegian investment firms use a number of foreign CCPs for clearing various products. Four foreign CCPs are authorised by the Ministry of Finance to offer services in Norway. Two of them offer cross-border services from another country, while two offer services from branches in Norway.

24 Oslo Børs VPS (2015).

25 Transactions not reported in time to VPS or with insufficient cover on the settlement date are placed in a queue for up to 20 days.

26 The settlement ratio (measured in terms of the number of transactions) fell from 96.59% in 2013 to 96.15% in 2014 (95.90% for 2014 after the changeover). Similarly, the settlement ratio in terms of the value of settlements declined from 92.93% in 2013 to 91.33% in 2014 (90.21% for 2014 after the changeover).

27 A single technical platform for securities settlement in Europe.

### SIX x-clear

On 1 May 2015, Oslo Clearing was legally integrated into the Swiss CCP SIX x-clear. In October 2014, SIX x-clear was granted a licence to operate as a CCP in Norway by the Ministry of Finance. One of the conditions for the licence was the conclusion of a Memorandum of Understanding (MoU) between the financial supervisory authorities and central banks of Switzerland and Norway. Such an MoU was signed in March 2015. The clearing services previously provided by Oslo Clearing will now be provided by SIX x-clear's branch in Norway (SIX x-clear Norwegian Branch).

SIX x-clear uses two different technology platforms (clearing models), one for the Norwegian branch and one for the rest of its activities. This is a joint default fund for the Norwegian branch and the rest of SIX x-clear. SIX x-clear clears equities and fixed income securities on various trading venues.

### The system in brief

The Norwegian branch of SIX x-clear clears equities, equity derivatives and securities lending transactions in NOK. Oslo Clearing was the only CCP for equity trades on Oslo Børs from 2010 until March 2014, when the UK CCP LCH.Clearnet (LCH) began to offer these services.

The buyer and seller in an equity trade on Oslo Børs may choose different CCPs. For that reason, the Norwegian branch of SIX x-clear and LCH have established a link between their businesses. They have also established a link for clearing equity derivatives.

The Norwegian branch of SIX x-clear has a common system for equity and derivative clearing (CLARA). This system has recently been modernised and is largely adapted to comply with EMIR requirements.

The Norwegian branch of SIX x-clear participates in VPO with its own settlement account both in VPS and at Norges Bank. The branch also participates in the daily settlement of equity derivatives at Norges Bank (6.40 am) and in the settlement of equity lending transactions (12.15 pm).<sup>28</sup>

### Oversight

In 2014, Norges Bank had two oversight meetings with Oslo Clearing, with Finanstilsynet participating as an observer. In addition, the institutions held meetings on a number of topics. Norges Bank also oversees the risk in the links between the Norwegian branch of SIX x-clear and LCH in cooperation with the Bank of England and Finanstilsynet. Norges Bank and Finanstilsynet will cooperate with Swiss authorities on oversight and supervision of SIX x-clear's activities.

### Operations in 2014

System availability for Oslo Clearing was 100% in 2014, and there were no disruptions in operations.

### Contingency arrangements and risk

Oslo Clearing has regularly conducted joint disruption management procedures with VPS, Norges Bank and Oslo Børs. Oslo Clearing had not outsourced operation of its systems and therefore had no risk associated with critical service providers.

### Other CCPs that provide services in Norway

LCH started to provide equity clearing on Oslo Børs in March 2014, in competition with Oslo Clearing. In 2014 and 2015, several members of the exchange moved their clearing transactions from Oslo Clearing to LCH. Some of them are international market participants that were already members of LCH. LCH participates in VPO with its own VPS account, but is an indirect participant (via a private bank) in the cash leg of settlement at Norges Bank. Norwegian and UK authorities cooperate on supervision and oversight of LCH's activities that could have consequences for financial stability in Norway.

Nasdaq OMX Clearing provides clearing of several different derivatives, including equity derivatives on the Stockholm exchange and a number of commodity derivatives, especially power derivatives. The company has a branch in Oslo, Nasdaq OMX Oslo NUF, which is under the supervision of Finanstilsynet. Settlement takes place primarily in EUR and USD, except for seafood derivatives, where settlement takes place in NOK. Nasdaq OMX Clearing is an indirect participant (via a private bank) in derivative settlement at Norges Bank. Norges Bank does not oversee Nasdaq OMX Clearing, but conducts an annual contact meeting with the Norwegian branch. Finanstilsynet participates as an observer.

<sup>28</sup> SIX x-clear Norwegian Branch and two banks participate in this settlement.

# NEW EU RULES CONCERNING SECURITIES SETTLEMENT AND CENTRAL COUNTERPARTIES

## **Cooperation agreement between the EEA EFTA States and the EU**

On 1 January 2011, the EU established a new financial supervisory structure, with three new bodies for banking, securities and insurance supervision (EBA, ESMA and EIOPA). These supervisory bodies may issue decisions that are binding on national authorities and/or individual institutions. The new supervisory structure raised constitutional questions in Norway.

In a press release of 14 October 2014, the Ministry of Finance announced that the EEA EFTA States<sup>1</sup> and the EU had agreed on a draft cooperation agreement. Under the agreement, the EFTA Surveillance Authority (ESA) will be given authority to adopt legally binding decisions towards national supervisory bodies and institutions in the EEA EFTA States. The decisions will be based on the recommendations of the relevant EU supervisory body. ESA and EU supervisory bodies will have access to one another's work, and Norwegian supervisory bodies will continue to have observer status in EU supervisory bodies.

If the proposal is approved by the Storting (Norwegian parliament), it will be possible to implement several important regulations related to the financial infrastructure in Norway, in particular EMIR, which regulates OTC derivatives, CCPs and trade repositories, and CSDR, which regulates central securities depositories (CSDs) and securities settlement.

1 Norway, Iceland and Liechtenstein.

## **Common features of EMIR and CSDR**

EMIR and CSDR establish a "single passport" regime for CCPs, trade repositories and CSDs. This means that a company authorised to offer services in any EU Member State is entitled to operate throughout the EU. Non-EU operators may apply to ESMA for third-country authorisation.

The regulations also include provisions concerning interoperability arrangements (links) between CCPs and between CSDs, which are intended to allow investment firms to choose freely between CCPs and allow investors and issuers to choose freely between CSDs. This is intended to stimulate competition.

## **EMIR for CCPs and trade repositories**

EMIR, with associated technical standards, provides rules for the operation of CCPs and requires market participants to clear standardised OTC derivative contracts through a CCP. EMIR also contains requirements for risk management in connection with clearing of derivative trades, whether they are cleared through a CCP or bilaterally. Furthermore, EMIR requires all derivative contracts to be reported to a trade repository.<sup>2</sup>

A key point in EMIR is that all CCPs seeking to offer services in the EU must have EMIR authorisation for banks to be able to use them without being subject to high capital requirements. CCPs in the EU submit applications to their national supervisory authorities, while

2 See the discussion of EMIR in Norges Bank (2012c) and the discussion of trade repositories in Norges Bank (2014b).

CCPs from third countries (non-EU) submit applications to ESMA. ESMA publishes a list of authorised CCPs. Currently, 16 CCPs are on the list, including LCH, Nasdaq OMX Clearing, ECC and EuroCCP.

To prepare for the introduction of EMIR in Norway, the Ministry of Finance has conducted a review of the Norwegian legislative provisions that would contravene EMIR, and some amendments have been made as a result. Thus, EMIR may be implemented in Norway if the Storting gives its consent to the agreement between the EEA EFTA States and the EU Member States.

If EMIR is introduced in Norway, Norwegian market participants will have to report all derivatives trades to a trade repository. ESMA has authorised six trade repositories. It is Norges Bank's understanding that some Norwegian market participants voluntarily report to trade repositories at the request of their EU counterparts.

If EMIR is introduced in Norway, Norwegian banks will be required to clear eligible OTC derivatives through a CCP. ESMA has proposed a clearing obligation for certain OTC derivative contracts in EUR, USD, GBP and JPY. Interest rate derivatives are by far the largest category of OTC derivatives.

#### **CSDR for securities settlement and CSDs**

CSDR, with associated technical standards, provides rules for the securities settlement process and for the operation of a CSD. All CSDs that wish to offer services

in the EU may apply for authorisation under CSDR. Such authorisation will allow the CSDs to compete on equal terms in the EU.

ESMA is currently opening public consultations on more technical standards. When these technical standards are adopted, CSDs will have six months to seek authorisation from the authorities in their home country. The authorities will have up to six months to process applications, after which ESMA can grant authorisation to the CSD.

If CSDR is introduced in Norway, VPS will apply to Finanstilsynet for authorisation under CSDR. Because the CSDR technical standards are still in draft form, the Ministry of Finance has not yet conducted a review of the Norwegian legislative provisions that would contravene CSDR.

CSDR is aimed at improving participants' settlement discipline to improve the settlement ratio. In a technical standard, ESMA is proposing to make it obligatory for CSDs to levy cash penalties for late payment and delivery of securities.

## TARGET2-SECURITIES

To promote a single securities market in Europe, the European Central Bank (ECB) and euro area central banks have established the TARGET2-Securities (T2S) project. T2S is a common IT platform that central securities depositories (CSDs) and central banks can use for settling securities trades in EUR and other European currencies. T2S and CSDR will remove 15 barriers to cross-border securities trading in the EU identified by the European Commission 2001. CSDR will allow CSDs to outsource the technical operation of their settlement services to T2S. T2S is based on CSDR and as a technical platform facilitates compliance with the regulation.

There are now 24 CSDs from 21 countries participating in the T2S project, all of which, with the exception of Danish VP Securities, settle trades in EUR. Norges Bank will consider participation in T2S if requested by VPS or other market participants.

T2S is scheduled to go live on 22 June 2015. CSDs that settle trades in EUR will migrate to T2S in four waves between June 2015 and February 2017. The three largest CSDs in Europe (Euroclear, Clearstream and Monte Titoli) will join T2S in separate waves. Danske VP Securities will join T2S with DKK in 2018, i.e. after the four waves for EUR.

CSDR and common settlement in T2S will promote increased competition among CSDs. Because CSD operation is characterised by economies of scale, competition may eventually result in fewer CSDs. In recent years, three new CSDs have been established in Europe: VP Lux and LuxCSD (both in Luxembourg) and Bank of New York Mellon CSD (in Belgium).

European Commodity Clearing (ECC) provides clearing of commodity derivatives (cellulose etc.) that are traded on the Norwegian trading venue Norexco. Settlement takes place in EUR and USD. Finanstilsynet supervises the Norwegian business. ECC's business in Norway is small and is not overseen by Norges Bank.

Until 1 May 2015, EuroCCP cleared equities on the Norwegian trading venue Burgundy, which was closed down on that date. EuroCCP is currently a CCP for equity trades in NOK on several foreign trading venues, including the Stockholm exchange. EuroCCP is an indirect participant in VPO. Norwegian and Dutch authorities cooperate on supervising and overseeing EuroCCP's activities that could have consequences for financial stability in Norway.

### 2.3 FOLLOW-UP OF THE ASSESSMENT OF NORWEGIAN SYSTEMS AGAINST INTERNATIONAL PRINCIPLES

The aim of the 24 principles in CPMI-IOSCO (2012) is to ensure a robust and efficient financial infrastructure that promotes financial stability. The principles provide a comprehensive standard for financial infrastructure across borders and across system types.

In 2012, Norges Bank asked the operators of Norwegian FMIs to conduct a self-assessment against the CPMI-IOSCO principles by the end of 2013. Some of the principles are applicable to all types of FMIs, while most of the principles are only applicable to some of the FMIs.

Based on the self-assessments and other information, Norges Bank conducted its own assessments, which were published in Norges Bank (2014). The assessments of VPS and Oslo Clearing were prepared in cooperation with Finanstilsynet. Norges Bank published a similar assessment of three of the systems in 2007.

The FMIs were assessed against each principle. The degree of compliance is based on criteria defined by CPMI-IOSCO:

- Observed: the FMI observes the principle. Any shortcomings are minor and not issues of concern.

- Broadly observed: the FMI broadly observes the principle. The system has one or more deficiencies that give reason for concern. The FMI should follow up and rectify the shortcomings by a specified date.
- Partly observed: the FMI partly observes the principle. The system has one or more deficiencies that could become serious if not addressed in a timely manner. The FMI must give high priority to addressing the issue.
- Not observed: the FMI does not observe the principle. The system has one or more serious deficiencies that warrant immediate action.
- Not applicable: the principle is not applicable.

Following the assessment in 2014, system owners have taken measures to rectify the identified deficiencies. On the basis of these measures, Norges Bank conducted a new assessment against the principles that were assessed as not fully observed in 2014 (see Table 2.1). No reassessment against other principles was carried out.

On the basis of the assessments conducted in 2014 and 2015, Norges Bank finds that Norwegian FMIs must largely be considered secure and efficient.

#### NORGES BANK'S SETTLEMENT SYSTEM

NBO was assessed against 17 of the 24 principles. Norges Bank found 15 of the principles to be observed.

Principle 13 (participant default rules and procedures) was considered broadly observed. There were deficiencies relating to two key considerations. First, no formal procedures had been adopted to ensure that Finanstilsynet notifies Norges Bank when a bank is placed under public administration. Second, Norges Bank had not sufficiently involved the participants in the testing of the default procedures.

Notification procedures are now in place to ensure that Finanstilsynet immediately notifies Norges Bank if a bank is placed under public administration. Norges Bank has also conducted exercises with participants to test default procedures. Norges Bank now considers Principle 13 observed.

TABLE 2.1. OVERVIEW OF THE SYSTEMS AGAINST THE PRINCIPLES. PRINCIPLES REASSESSED IN 2015 ARE MARKED

Principle / type of FMI	NBO	NICS	Oslo Clearing settlement system <sup>1</sup>	VPO	VPS registry function	DNB (private settlement bank)	SMN (private settlement bank)
1 Legal basis	Observed	Observed	Observed	2015	Observed	Observed	Observed
2 Governance	Observed	2015	2015	Observed	Observed	Observed	Observed
3 Framework for the comprehensive management of risks	Observed	2015	Observed	Observed	Observed	Observed	Observed
4 Credit risk	Observed	Observed	2015	Observed	Observed	Observed	Observed
5 Collateral	Observed	Observed	Observed	Observed	Observed	Observed	Observed
6 Margin	Observed	Observed	Observed	Observed	Observed	Observed	Observed
7 Liquidity risk	Observed	Observed	Observed	Observed	Observed	Observed	Observed
8 Settlement finality	Observed	Observed	Observed	Observed	Observed	Observed	Observed
9 Money settlement	Observed	Observed	Observed	Observed	Observed	Observed	Observed
10 Physical deliveries	Observed	Observed	Observed	Observed	Observed	Observed	Observed
11 Central securities depositories	Observed	Observed	Observed	Observed	Observed	Observed	Observed
12 EoV settlement systems	Observed	Observed	Observed	Observed	Observed	Observed	Observed
13 Default procedures	2015	Observed	Observed	2015	Observed	Observed	Observed
14 Segregation and portability	Observed	Observed	Observed	Observed	Observed	Observed	Observed
15 General business risk	Observed	Observed	Observed	Observed	Observed	Observed	Observed
16 Custody and investment risk	Observed	Observed	Observed	Observed	Observed	Observed	Observed
17 Operational risk	2015	2015	Observed	Observed	Observed	Observed	Observed
18 Access requirements	Observed	Observed	Observed	Observed	Observed	Observed	Observed
19 Tiered participation	Observed	Observed	2015	2015	Observed	Observed	Observed
20 FMI links	Observed	Observed	Observed	Observed	2015	Observed	Observed
21 Efficiency and effectiveness	Observed	Observed	Observed	Observed	Observed	Observed	Observed
22 Communication	Observed	Observed	Observed	Observed	Observed	Observed	Observed
23 Publisering av informasjon	Observed	Observed	Observed	Observed	Observed	Observed	Observed
24 Transaksjonsregister	Observed	Observed	Observed	Observed	Observed	Observed	Observed

Explanation of the table: ■ Observed ■ Broadly observed ■ Partly observed ■ Not observed  Not applicable

<sup>1</sup> On 1 May 2015, Oslo Clearing was legally integrated into the Swiss CCP SIX x-clear. The clearing business previously run by Oslo Clearing is now being run by SIX x-clear's branch in Norway (SIX x-clear Norwegian Branch).

Principle 17 (operational risk) was considered broadly observed. The most important follow-up measures involve increasing Norges Bank's expertise relating to the technical operation of NBO to make the system more robust. Norges Bank is working to establish a new disaster recovery solution for NBO, which is planned for implementation before the end of 2015. Norges Bank still considers Principle 17 broadly observed.

#### **NORWEGIAN INTERBANK CLEARING SYSTEM**

NICS was assessed against 13 of the 24 principles. Norges Bank found 10 of the principles to be observed.

Principle 2 (governance) was considered broadly observed. Norges Bank pointed out that the NICS Operations Office did not have procedures in place for assessing the work of each individual board member. The NICS Operations Office has now included provisions in its articles concerning assessment of the work of board members.

Principle 2 also contains a requirement for the board of an FMI to have a sufficiently varied composition. In 2014, Norges Bank pointed out that the NICS Operations Office did not have independent board members, since all members of the board are employed in the banking sector.

The NICS Operations Office has now amended its articles to include requirements for the composition of its board and to allow the appointment of board members who are not employed in the banking sector. A varied board composition can therefore be achieved when new members are appointed who are neither employed in nor otherwise affiliated with the banking sector. The NICS Operations Office considers the principle observed. Norges Bank still considers Principle 2 broadly observed.

Principle 3 (framework for the comprehensive management of risks) was assessed as partly observed. Norges Bank pointed out, for example, that the NICS Operations Office's risk management framework did not specify who is responsible for the various risk management processes and how often reports are submitted to the board and management of the NICS Operations Office.

The NICS Operations Office has included a provision in its articles that underscores the board's responsibility for ensuring the establishment of sound risk management systems at the NICS Operations Office. A formal framework for overall risk management has also been drawn up.

The NICS Operations Office's new risk management framework includes overarching principles specifying the division of roles between board and management and the delegation of authority in risk management. In addition, management has drawn up supplementary procedures for implementing risk management tasks, including procedures for conducting an overall, systematic annual review of all risks that are relevant for NICS. A separate risk assessment committee for the NICS Operations Office will also be established, whose primary aim is to provide an independent assessment of the work and assessments performed by the management of the NICS Operations Office's in connection with the risk management process. Norges Bank now considers Principle 3 observed.

Principle 17 (operational risk) was considered broadly observed. Norges Bank called attention to deficiencies in the risk management framework. The NICS Operations Office has now drawn up a new risk management framework that also addresses operational risk (discussed under Principle 3).

In 2015, Norges Bank conducted an assessment of the NICS Operations Office's business continuity and disaster recovery arrangements. The principle states that an FMI should be able to resume operations within two hours following disruptive events. In case of extreme circumstances, the FMI should be able to complete settlement by the end of the day of the disruption. In the opinion of Norges Bank, it is not sufficiently documented that the NICS Operations Office's disaster recovery arrangements are in line with the latter requirement. The principle also states that it may be necessary to consider the need for a third site if the FMI has an especially important role in the financial infrastructure. In the assessment of Norges Bank, NICS has such a role. Norges Bank notes that the banking sector as represented by Finance Norway is now devising a system for clearing that can be used if the NICS system is no longer available. The NICS Operations Office considers the principle observed. Norges Bank still considers Principle 17 broadly observed.

## THE SECURITIES SETTLEMENT SYSTEM

VPS was assessed against 18 of the 24 principles. Norges Bank and Finanstilsynet considered 15 of the principles observed.

Principle 1 (legal basis) and Principle 13 (participant default rules and procedures) were considered broadly observed. With regard to both of these principles, Norges Bank and Finanstilsynet pointed out that the rules followed by VPS for handling a participant bankruptcy were unclear and that VPS agreements must be read in conjunction with the agreements used by Norges Bank in order for the rules to be clear.

One source of the lack of clarity in VPS agreements has been a lack of clarity in the Payment Systems Act relating to the handling of transactions from a participant that becomes insolvent. In February 2015, the Ministry of Finance circulated for comment a draft regulation intended to clarify how this provision is to be understood. As long as VPS agreements are unclear with regard to handling transactions from a participant placed under public administration, Finanstilsynet and Norges Bank will continue to consider Principles 1 and 13 broadly observed.

Principle 19 (tiered participation arrangements) was considered broadly observed. Norges Bank and Finanstilsynet pointed out that VPS had not adequately arranged for quantitative analyses of tiered participation arrangements in the system, and that VPS could have pursued a more systematic approach to risk management.

VPS plans to put in place solutions that can provide better analyses of tiered participation arrangements, but this will not take place until a new core system is introduced in 2017. Norges Bank and Finanstilsynet still consider Principle 19 broadly observed.

## VPS REGISTER FUNCTION

The VPS register function was assessed against 14 of the 24 principles. Norges Bank and Finanstilsynet considered 13 of the principles observed.

Principle 20 (FMI links) was considered broadly observed because VPS does not conduct its own assessment of links where securities issued in a

foreign CSD are also partly registered<sup>29</sup> in VPS. According to the principle, VPS must perform its own risk assessment and implement measures to mitigate the risk associated with establishing links.

VPS plans to rectify these deficiencies when the Regulation on settlement and Central Securities Depositories (CSDR) technical standards have been adopted. Norges Bank and Finanstilsynet still consider Principle 20 broadly observed.

## OSLO CLEARING'S SETTLEMENT SYSTEM

Oslo Clearing's settlement system was assessed against 20 of the 24 principles. Finanstilsynet and Norges Bank considered 17 of the principles observed.

On 1 May 2015, Oslo Clearing was legally integrated into SIX x-clear, and Oslo Clearing's operations will be conducted by SIX x-clear's Norwegian branch. The financial supervisory authorities and central banks of Switzerland and Norway will cooperate on oversight of SIX x-clear's compliance with the principles.

## THE DNB AND SPAREBANK 1 SMN SETTLEMENT SYSTEMS

The DNB and SpareBank 1 SMN settlement systems were assessed against 14 of the 24 principles. Norges Bank considered the principles observed and therefore did not issue any request to rectify deficiencies in 2014.

The settlement systems of DNB and SpareBank 1 SMN are so-called "quasi systems".<sup>30</sup> They resemble FMIs, but manage accounts for other banks. In its assessment, Norges Bank took into account that only parts of some of the principles are applicable to such settlement systems. Norges Bank therefore emphasised that they fulfil the intentions of the principles, not that each individual key consideration must be observed.

## CONTINUOUS LINKED SETTLEMENT

Norges Bank has not conducted a separate assessment of CLS against the principles. Along with the other central banks on the oversight committee, Norges Bank was given the opportunity to comment on CLS's self-assessment prior to publication.

29 Registration of part of a security in a register other than the primary register.

30 A commercial institution responsible for clearing and settling payments on behalf of other institutions and that is responsible for a substantial percentage of payments (see CPSS (2005), page 20).

# REFERENCES

CPMI-IOSCO (2012). *Principles for financial market infrastructures*. CPMI Publications No 101. Basel: Bank for International Settlements.

CPMI-IOSCO (2014). *Recovery of financial market infrastructures*. CPMI Publications No 121. Basel: Bank for International Settlements.

CPSS (2005). *Central bank oversight of payment and settlement systems*. CPSS Oversight Report May 2005. Basel: Bank for International Settlements.

Federal Reserve (2008). *Protocol for the Cooperative Oversight Arrangement of CLS*. [http://www.federalreserve.gov/paymentsystems/cls\\_protocol.htm](http://www.federalreserve.gov/paymentsystems/cls_protocol.htm)

Finanstilsynet (2015). *Risk and Vulnerability Analysis (RAV) 2014*. Oslo: Finanstilsynet.

Kelsey and Rickenbach (2014). "Enhancing the resilience of the Bank of England's Real-Time Gross Settlement Infrastructure". In *Quarterly Bulletin* Volume 54 No. 3. London: Bank of England.

Murphy (2013). *OTC Derivatives: Bilateral Trading and Central Clearing*. New York: Palgrave Macmillan.

Norges Bank (2012a). *Collaboration with Finanstilsynet*. <http://www.norges-bank.no/en/about/Mandate-and-core-responsibilities/financial-stability/Collaboration-with-Finanstilsynet/>

Norges Bank (2012b). *Operating Schedule for Norges Banks Settlement System (NBO) from 12 October 2012*. <http://www.norges-bank.no/en/Published/Circulars/2012/6Operating-schedule-for-Norges-Banks-settlement-system-NBO-from-12-October-2012/>

Norges Bank (2012c). *Annual Report on Payment Systems 2012*. Oslo: Norges Bank.

Norges Bank (2013). Letter to the Ministry of Finance: Attachment to "Calculation of the NIBOR rate". [http://www.norges-bank.no/pages/94015/130320\\_attachment\\_nibor.pdf](http://www.norges-bank.no/pages/94015/130320_attachment_nibor.pdf)

Noregs Bank (2014a). "Costs in the Norwegian payment system". *Norges Bank Papers* 5/2014. Oslo: Norges Bank.

Noregs Bank (2014b). *Financial Infrastructure Report 2014*. Oslo: Norges Bank.

Oslo Børs VPS (2015). *Annual Report 2014*. Oslo: Oslo Børs.

Scott and Zachariadis (2010). *The Impact of Diffusion of a Financial Innovation on Company Performance: An Analysis of SWIFT Adoption*. CEP Discussion Paper No. 992/2010. London: London School of Economics.

Scott and Zachariadis (2014). *The Society for Worldwide Interbank Financial Telecommunication (SWIFT)*. London: Routledge.

# DEFINITIONS AND ABBREVIATIONS

*Only definitions and abbreviations that are specific to the Norwegian system are included. The international reader will find definitions of general concepts in material released by the BIS, EU, etc.*

**AvtaleGiro:** A form of direct debit whereby funds to cover recurring payments are automatically drawn from the payer's bank account on the due date.

**BankAxept card:** Debit card issued by Norwegian banks and linked to the customer's bank account for use in Norway. It is the dominant card system for transactions in Norway.

**BankID:** A PKI-based (public key infrastructure) form of electronic identification which can be used for online payments or payments via a mobile device.

**Finance Norway:** the trade organisation for banks, insurance companies and other financial institutions in Norway.

**LCH:** London Clearing House. Clearnet, central counterparty licensed by the Norwegian Ministry of Finance to offer cross-border clearing of trades in equity capital instruments at Oslo Børs.

**Nasdaq OMX Oslo NUF (branch of Nasdaq OMX Clearing):** Central counterparty for energy derivatives.

**NBO:** Norges Bank's settlement system in which banks can settle claims and liabilities with other banks through their accounts in Norges Bank. NBO comprises both gross and net settlement facilities.

**NICS:** the Norwegian Interbank Clearing System, which is the banks' joint clearing system for transactions denominated in NOK. It is used by all banks that are part of the industry's common payment services infrastructure. Cleared positions in NICS are settled in NBO.

**Oslo Clearing:** central counterparty for trading in equity capital instruments and derivatives with securities as the underlying instrument. Legally integrated into SIX x-clear on 1 May 2015.

**VPO:** Norwegian securities settlement system.

**VPS:** Norwegian Central Securities Depository.



# ANNEX<sup>1</sup>

**TABLE 1: AVERAGE DAILY TURNOVER IN CLEARING AND SETTLEMENT SYSTEMS (TRANSACTIONS)**

	2001	2002	2003	2004	2005	2006	2007	2008	2009 <sup>3</sup>	2010	2011	2012	2013	2014
<b>NICS</b>														
NICS Gross	303	300	596	611	532	547	593	605	524	568	548	594	659	624
NICS SWIFT Net <sup>1</sup>	4 719	4 925	5 155	4 480	4 744	5 301	5 908	6 390	6 269	-	-	-	-	-
NICS Net (million) <sup>2</sup>	3,4	3,7	4,0	4,3	4,7	5,1	5,5	5,9	6,5	6,8	7,2	7,8	8,2	8,7
<b>NBO</b>														
Total number of transactions									1 165	1 146	1 138	1 274	1 406	1 367
RTGS Gross transactions excl. NICS									463	477	479	549	595	592

1 Phased out in 2010.

2 Previous NICS Retail and NICS SWIFT Net payments below NOK 25m are included as from June 2010 in NICS Net.

3 For NBO, the figures for 2009 are calculated for the period 17 April to 31 December. There is a break in the series this year.

Sources: The numbers under NICS are from the NICS Operations Office. The numbers under NBO are from Norges Bank.

**TABLE 2: AVERAGE DAILY TURNOVER IN CLEARING AND SETTLEMENT SYSTEMS (IN BILLIONS OF NOK)**

	2001	2002	2003	2004	2005	2006	2007	2008	2009 <sup>3</sup>	2010	2011	2012	2013	2014
<b>NICS</b>														
NICS	211,4	212,5	248,7	195,7	200,8	224,8	254,5	246,6	213,1	196,5	221,4	247,8	253,5	262,8
NICS Gross	151,2	149,5	187,8	129,4	135,5	155,3	176,8	165,9	124,1	107,2	119,1	138,6	136,0	140,9
NICS SWIFT Net <sup>1</sup>	16,1	16,2	12,6	5,2	5,7	6,7	7,6	7,3	6,1	-	-	-	-	-
NICS Net <sup>2</sup>	44,1	46,8	48,3	61,1	59,6	62,8	70,1	73,4	82,9	89,3	102,3	109,2	117,5	121,9
<b>NBO</b>														
NICS Gross	150,7	149,5	187,7	128,9	135,5	155,3	180,2	163,9	113,2	106,3	119,0	137,7	135,2	140,8
RTGS Gross transactions excl. NICS	6,9	4,8	7,2	11,1	12,1	16,1	31,1	45,6	40,2	42,5	42,4	51,1	38,5	42,5
NICS SWIFT Net <sup>1</sup>	5,3	5,5	2,1	1,0	0,9	1,0	1,2	1,1	0,9	1,1	-	-	-	-
NICS Net <sup>2</sup>	6,8	6,9	6,7	7,6	8,5	8,1	8,1	9,2	9,6	7,1	6,3	8,7	10,3	10,8
VPO and Oslo Clearing	2,3	2,5	3,1	3,7	3,8	4,7	5,5	5,1	4,5	5,3	4,5	4,4	4,2	3,9
VPO						4,4	5,1	4,9	4,4	5,2	4,5	4,4	4,2	3,9
Oslo Clearing						0,3	0,4	0,3	0,1	0,1	0,1	0,0	0,0	0,1

1 Phased out in June 2010.

2 Previous NICS Retail and NICS SWIFT Net payments below NOK 25m are included as from June 2010 in NICS Net.

3 For NBO, the figures for 2009 are calculated for the period 17 April to 31 December. There is a break in the series this year.

Sources: The numbers under NICS are from the NICS Operations Office. The numbers under NBO are from Norges Bank.

1 For tables showing developments in retail payment services, see *Norges Bank Papers* 1/2015.

**TABLE 3: NUMBER OF PARTICIPANTS IN CLEARING AND SETTLEMENT SYSTEMS (AT YEAR-END)**

	2006	2007	2008	2009	2010	2011	2012	2013	2014
Norges Bank's settlement system (NBO): Banks with account in Norges Bank	145	142	143	140	134	129	130	128	131
Norges Bank's settlement system (NBO): Banks with retail net settlement in Norges Bank	23	23	22	21	21	21	22	22	21
DNB	104	103	103	106	105	103	98	98	97
SpareBank 1 SMN	17	18	16	16	13	12	11	11	11
Norwegian Interbank Clearing System (NICS)	146	146	143	145	142	138	132	131	130

Source: Norges Bank



