

## Payment and settlement systems

### Providing a sound foundation for business

*Considerable changes have taken place in Iceland's payments infrastructure since the publication of the 2006 Financial Stability report. A new arrangement was introduced for netting of payment orders in the FGM netting system and full collateral is now provided for overdrafts between participants. Technical locks were activated in the netting system to ensure that agreed overdrafts cannot be exceeded. Other technical locks were introduced to prevent large payments from being split, which is unauthorised under Central Bank rules. Collection and processing of payment system data is under review and user fees are being brought into line with real costs. The Central Bank has reviewed its rules on the activities of netting systems and the RTGS system. Its contingency plans with the Financial Supervisory Authority have also been reviewed and a dedicated payment system contingency exercise was held in January 2007. More focus will be given to contingency exercises and measures to ensure payment system business continuity. The need for new technological solutions in the RTGS system will be assessed over the next few months. Securities settlement procedures will be reviewed with an assessment of feasible arrangements for settlement of payment orders in other currencies. The Central Bank of Iceland is keeping a close watch on international developments such as the Single Euro Payments Area and plans for the euro area's centralised Target2-Securities system.*

#### Systemically important payment systems in Iceland

Three systemically important payment systems are in operation in Iceland. Two are also settlement systems, one of which handles settlements of securities transactions.

The Central Bank's real-time gross settlement (RTGS) system is the largest and most important payment system in Iceland. It handles final settlement of individual payment orders between participants of 10 m.kr. or above as soon as the deposit in the payer's account allows this to be done.

Smaller payments are handled by the netting system operated by Fjölgreiðslumiðlun (FGM). This calculates net credit or debit positions between all participants which are then settled at a scheduled time on participants' accounts in the Central Bank, through the RTGS system.

The third system, the securities settlement system, uses a comparable method to settle securities transactions, i.e. payment orders are netted and the resulting settlement is made before opening for business the following day. Settlement is made on a DvP basis.

At the end of 2006, OMX AB acquired Eignarhaldsfélag Verðbréfafangs hf., the holding company for Iceland Stock Exchange (ICEX) and the Iceland Securities Depository (ISD). As a result, Icelandic credit institutions, securities companies and traders are no longer involved in these companies as owners. A similar development has taken place in other Nordic countries. OMX operates exchanges in Denmark, Finland and Sweden, while Norway's Oslo Børs is under the ownership of local financial companies. Nordic depositories also have other owners besides OMX. The main owners of OMX are Investor

with a 10.7% holding, the Swedish state with 6.6% and Nordea with 5.3%. Other owners hold stakes of less than 4%.

### Separation of payment systems and assessment of system efficiency and security

Work has been ongoing on separation of the RTGS and netting systems as far as possible in the current technological environment. A large part of the two systems is in effect the same and they can only be separated to a limited extent. FGM has now formally acquired access and user rights for the netting system and is also responsible for its day-to-day operation.

Collection, storage and processing of data from the payment systems is under review with the aim of enhancing communication and establishing a firmer foundation for assessing the systems' efficiency and operational security.

Technical locks were introduced in 2006 to prevent payments over 10 m.kr. from being split and then sent through the netting system after the RTGS system has closed, which is unauthorised under current rules.

### Technical locks in payment systems

On a Central Bank initiative, preparations were made in 2006 for technical locks on overdrafts in the FGM netting system, which were activated on April 17, 2007. Comparable locks were activated in the RTGS system on September 16, 2005 and have functioned well.

It is crucial to ensure that payment flows are smooth and unhindered, and that technical locks on overdrafts are never actually applied. To prevent the likelihood of this happening, ample overdraft limits were set in the netting system and credit institutions were also authorised to make deposits in their netting system accounts during RTGS system business hours on days when flows are heavy. It was also decided to transfer unused collateral in the RTGS system to the netting system to raise the overdraft limits there, in order to prevent locks from being applied outside RTGS system opening hours.

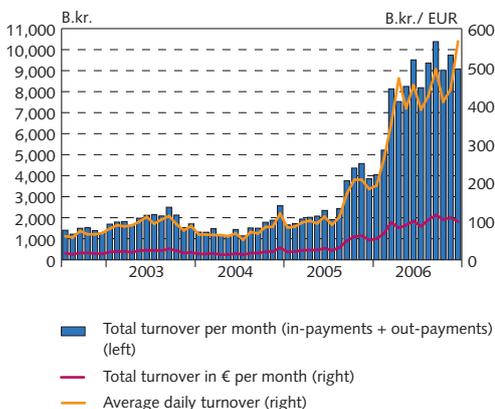
### Changes in the netting system

In consultation with system participants, it was decided in March 2007 to adopt multilateral netting instead of bilateral netting. This change reduced the number of technical locks from 30 to 5, simplified system administration and increased transparency. Participants now decide for themselves their overdraft limits with respect to the system, based on their own requirements, and provide full collateral for them. The new arrangement entered into effect on April 17, 2007.

### Central Bank rules on payment systems

The Central Bank of Iceland set rules in 2003 on the RTGS system (No. 788/2003) and activities of netting systems (No. 789/2003). In light of subsequent changes in the payment system environment it was considered necessary to adapt the rules to the new conditions. In 2005, for example, a broader range of collateral was deemed eligible for credit institutions to provide as security for settlements. In 2006 the frequency

Chart 1  
RTGS system turnover  
July 2002 - December 2006



Source: Central Bank of Iceland.

of settlements made in the netting system was increased and the timing of securities settlements was altered.

In December 2006, it was decided to undertake a thorough review of the rules on payment systems in effect at that time. The review of netting system rules was completed in April 2007. Of the considerable changes made, the main ones involved netting procedures, collateral requirements and calculation of individual participants' risk. Eligibility of collateral was specified more closely, as were arrangements for deploying it between payment systems. A review of rules on the RTGS system was completed as well and new rules entered into force in April 2007.

### **Payment system fees**

The Central Bank commenced operation of the RTGS system in December 2000 but only began collection of user fees in 2005. However, the fee structure announced then did not reflect the real cost of operating the RTGS system. Fees were reviewed at the end of 2006 with the aim of bringing them closer into line with actual cost. The tariff is posted on the Central Bank website.

In January 2007, the Board of Governors appointed a committee to assess the real cost of operating the RTGS system and draw up proposals for disaggregating it to establish a basis for setting user fees. The aim is that RTGS system fees should reflect the actual cost of operating it. The committee is expected to present its findings in the coming weeks.

FGM's user fees for the netting system were reviewed on May 1, 2006. Before then, fees had been solely based on the charge that FGM had to pay to the Icelandic Banks' Data Centre (RB) for operating the system. FGM is currently redesigning its fee structure. One aim is to reduce transaction charges in line with increased use of the system.

### **Collateral securities in the payment systems**

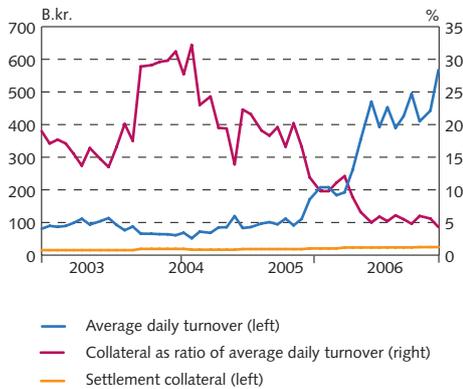
Adequate collateral for payment system settlement is vital for ensuring the sound and efficient operation of the financial system in the event that a credit institution cannot honour its settlement obligations. Collateral security amounts in the RTGS system are set so as to meet in full the single highest amount that credit institutions have agreed on at any time. Hitherto, the Central Bank has recorded the highest daily settlement exposure to give a benchmark for the collateral requirement. However, collateral provided in the netting system covered only part of the highest possible settlement exposure.

When new netting system arrangements went into effect on April 17, 2007, it was decided to insist on full collateral for overdrafts by each participant, and collateral amounts were reviewed at the same time. At the beginning of 2006, collateral of all credit institutions amounted to 23.3 b.kr. in the RTGS system and 5.9 b.kr. in the FGM netting system, a total of 29.2 b.kr.

### **Payment system turnover**

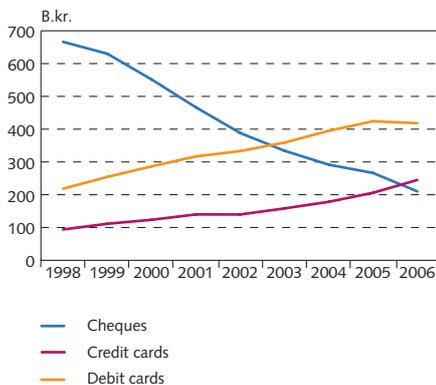
Monthly turnover (deposits and withdrawals) in the RTGS system averaged 8,203 b.kr. in 2006, equivalent to 404 b.kr. per day, compared with 129 b.kr. per day in 2005.

Chart 2  
Average daily turnover in the RTGS system and settlement collateral  
January 2003 - December 2006



Source: Central Bank of Iceland.

Chart 3  
Turnover: Payment cards and cheques  
1998-2006



Source: Central Bank of Iceland.

Almost 69 million transactions were made in the netting system in 2006, a 5% increase year-on-year. Total turnover in the netting system amounted to 2,500 b.kr. and average monthly turnover 209 b.kr., equivalent to 2.5% of total turnover in the RTGS system.

In 2006, 22 thousand transactions were made through the Icelandic Securities Depository (ISD) system to the value of 1,273 b.kr., an increase of 127%. A further 155 thousand transactions were made in connection with off-exchange trading, up 38% from 112 thousand in 2005. A large share of transaction types which were previously settled outside the system, such as asset transfers relating to the winding-up of estates, etc., are now settled in the system.

### Payment system business continuity

Payment intermediation between credit institutions may be described as a major part of social infrastructure. Any disruption to systemically important payment systems may easily amplify into threats to financial stability. Iceland's payment systems generally operate smoothly and serious problems are rare, although minor operational disruptions and incidents occur from time to time. Increased turnover and transaction volume have been matched by larger and higher-capacity payment systems. Risks in payment system operations are constantly monitored and a priority is to identify and manage underlying risks.

Payment system business continuity involves both preventive measures attempting to preclude problems in the operation of systemically important payment systems, and systematic predetermined responses aimed to restore and maintain business continuity if serious problems arise relating to the operation of individual payment systems or the payment infrastructure as a whole. Such measures aim as far as possible to maintain the agreed level of service, or at least ensure that it will be attained.

External events such as September 11 are examples of threats that may persist for days, weeks or even months on end. Following these events, the focus has increasingly turned to the organisation and operation of systemically important systems, such as the framework for and development of payment infrastructure. Other contributing factors have been faster and more advanced technology and an emphasis on real-time payment processing, combined with massive growth in turnover and transaction volume. Numerous stakeholders are involved, such as central banks, financial supervisory authorities, credit institutions and a wide range of service providers, power companies and operators of data transmission systems. From a central bank viewpoint, a far-reaching problem in payment intermediation, for technical or other reasons, could threaten financial stability and the conduct of monetary policy. Priority is therefore given to identifying and managing underlying risks and organising responses to any emerging problems in payment intermediation.

One common characteristic of all payment intermediation is the speed at which a scenario can unfold, which calls for a disciplined response and decision-making process to minimise operational disruptions and costs incurred. The aim is to reduce the probability of multiplier effects and chain reactions. Since time for decision-making may

be limited, it is important for the decision-makers at any time to have a clear remit for action and fully understand the impact of their decisions on the whole process.

### Contingency plans for payment systems

On October 3, 2006, the Central Bank and the FME renewed their cooperation agreement which includes provision for a joint contingency plan for payment systems. The Central Bank's earlier plans were updated in 2006 and a new joint contingency plan confirmed in April 2007. RB is informed about this plan and will take its provisions into account when implementing its own contingency plan if technical problems arise in its operations which have a bearing on payment intermediation in one way or another. The aim of payment system contingency plans is to create a framework for addressing difficulties in payment intermediation while causing the least possible disruption in the financial system.

### Payment system contingency exercise

A contingency exercise for payment systems was held on January 25, 2007. The first of its kind dedicated to payment systems, this exercise tested cooperation, communications, responses and decision-making connected with the events in the scenario. In addition to the Central Bank, RB, FGM and the FME participated in the exercise.

The exercise scenario was partly based on real conditions, although the credit institutions involved were fictional. Events presented in the scenario could easily arise in day-to-day operation of payment systems, but must be considered unlikely to coincide on a single day. Staged in real time, the exercise consisted of the following three tests:

- A problem in netting system settlement in the morning
- A technical problem at RB, the payment system operator
- Problems caused by tight liquidity in payment systems

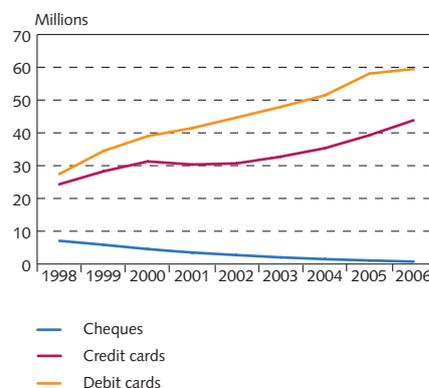
Participants agreed that the exercise was fruitful and provided valuable experience to draw upon in further design of solutions and adjustment of outstanding issues. Contingency exercises of this type will in future constitute part of the Central Bank's regular payment intermediation functions.

### International developments in payment system infrastructure

Payment system infrastructure is in a process of considerable change in Europe and elsewhere, and the trend is likely to continue in the years to come. The main drivers of change are globalised trade, market liberalisation, and advances in information and communication technology.

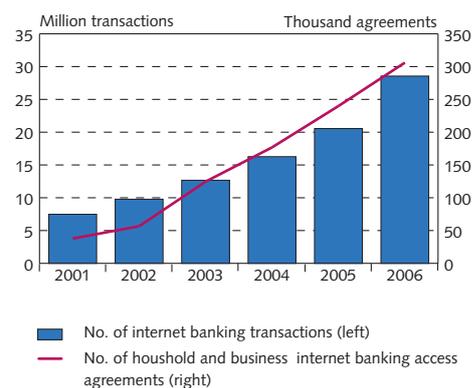
The European Economic Area (EEA) agreement introduced the "four freedoms" – free movement of goods, services, people and capital – in Iceland. Market liberalisation and Iceland's membership of the EEA have proved to be a watershed for Icelandic business and integrated it into the process of change now sweeping Europe in

Chart 4  
Number of payment card and cheque transactions 1998-2006



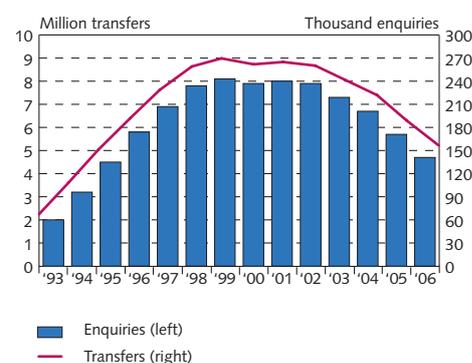
Source: Central Bank of Iceland.

Chart 5  
Internet banking access agreements and transaction numbers 2001-2006



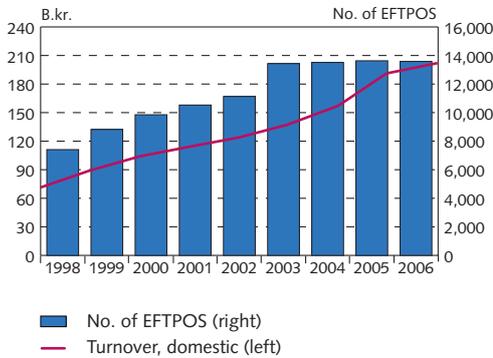
Source: Central Bank of Iceland.

Chart 6  
Commercial banks' and savings banks' telebanking 1993-2006



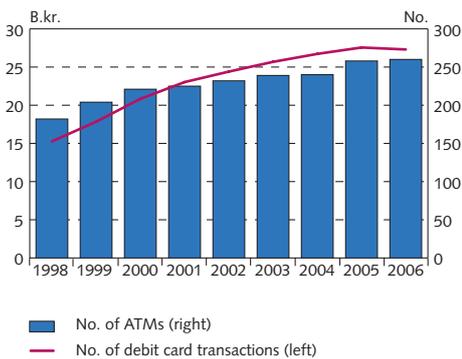
Source: Central Bank of Iceland.

Chart 7  
EFTPOS: Domestic debit card turnover and volume 1998-2006



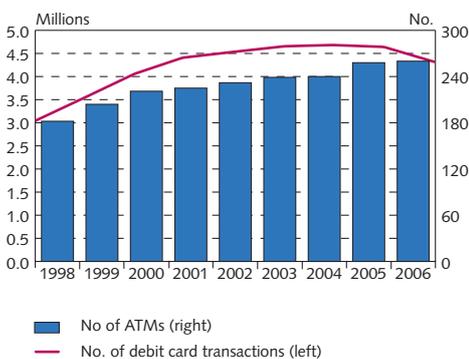
Source: Central Bank of Iceland.

Chart 8  
Debit card turnover in ATMs 1998-2006



Source: Central Bank of Iceland.

Chart 9  
Debit card use in ATMs 1998-2006



Source: Central Bank of Iceland.

various fields, including payment system infrastructure. This is because secure payment intermediation between parties to business transactions is a precondition for the free movement of goods, services, people and capital.

A regulatory review and definition of communications protocols are under way in Europe, aimed at ensuring active competition in payment services and enhancing efficiency and security. The goal is to ensure high levels of service, regardless of where parties to business transactions and banks are located. Payment transfers are to be simplified through technical and legislative integration of computer systems between countries. The requirement is for secure, efficient and economical capital flows between payers and payees within and across borders, irrespective of the amount involved or the nature of the transaction.

### Cross-border payment orders

Iceland is party to the Single Euro Payments Area (SEPA) project and has a representative on its self-regulatory body, the European Payment Council (EPC). The project has been ongoing for five years and the preparation and design stage is now complete. The next major step will be implementation of the first phase in January 2008, which will reform traditional structures for transferring funds to establish a single price for them in euros, regardless of whether payment orders involve national or cross-border transfers.

### New RTGS systems

In 2007, the European Central Bank (ECB) will launch a new centralised RTGS system for euros, Target2, replacing the national systems of euro area countries. Sweden and Norway are also introducing new, sophisticated RTGS systems offering more advanced technical solutions than their current payment infrastructure.

### New securities trading arrangements

Preparations have been underway in 2006 and so far in 2007 to bring the settlement cycle in Iceland into line with the T+3 norm in neighbouring countries, i.e. shares are settled and delivered three days after being bought or sold. The new arrangement is scheduled to take effect in late April or early May 2007. Subsequently, trading in derivatives is expected to begin on OMX Nordic Exchange in Iceland, with settlements made through the payment systems by special arrangement with OMX and Kaupthing/Arion.

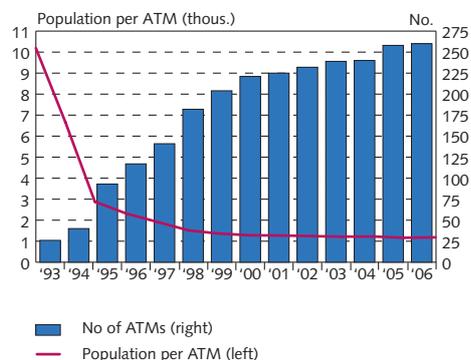
Since the middle of 2006, the ECB has been exploring the development of its centralised Target2-Securities system for settlement of national and cross-border securities transactions. In the ECB's view this project is commercially, legally and technically feasible. In cooperation with market agents, securities depositories, national central banks and other stakeholders, the ECB has now begun assessing the requirements of individual participants. This phase of the project is expected to be completed at the beginning of 2008, when a decision on whether to go ahead will be made.

### Settlements in euros

There has been some discussion in Iceland in recent months about the use of the euro as an accounting currency by companies that conduct the bulk of their business in currencies other than the króna. Several companies have been granted permission by the government to keep their accounts in other currencies. Per se, a decision by individual companies to use a different currency from the króna has no effect on domestic payment intermediation. These companies still have the same need for krónur in their operations and such payments will continue to be transferred as before through domestic payment systems. Payment transfers by these companies in other currencies will presumably also be made under a similar arrangement to the current one, i.e. mainly through SWIFT and correspondent banking services in cooperation with the credit institution of which they are a client.

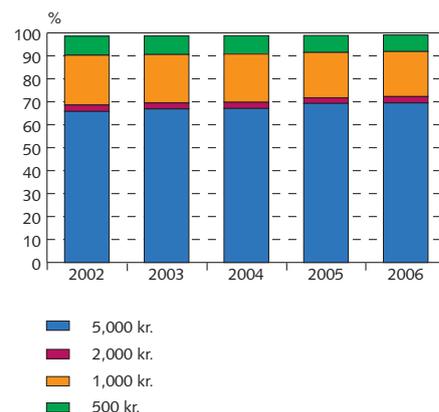
However, transactions with equities denominated in euros are a more complex matter. Only two securities settlement systems are currently operative in Europe that handle cross-border securities settlements: Euroclear and Clearstream. All other securities settlement systems still operate on a national basis. The basic principle in payment transfers is that all systemically important systems make their final settlements through the RTGS system of the respective national central bank using its funds, i.e. the national currency. In order to conduct payment settlements in euros, that bank must handle and guarantee final settlement of the transactions and have secure access to funds in euros. The settlement process must also fulfil the Basel Committee's 10 Core Principles, and DvP must be ensured. Furthermore, credit and liquidity risks in connection with the settlement must be taken into account. All these requirements would need to be met in order to enable securities transactions to be settled in euros in Iceland.

Chart 10  
No. of ATMs and access to them 1993 -2006



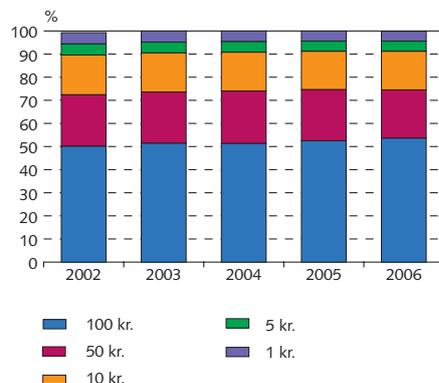
Source: Central Bank of Iceland.

Chart 11  
Banknotes by denomination at end of year



Source: Central Bank of Iceland.

Chart 12  
Coin by denomination at end of year



Source: Central Bank of Iceland.

## The impact of an influenza epidemic on the financial sector

### Box 1

There is growing awareness of the impact of external factors that can pose a threat to business continuity and financial stability. The terrorist attacks on the US in September 2001 brought such events into the spotlight. The SARS outbreak in Asia was another example of an external economic shock, and most recently bird flu has shifted the focus towards responses to a situation where a large proportion of the workforce could be absent. As a rule, current contingency plans address short-term problems, but in such cases the effects may last for weeks or months. Over the past 400 years there have been 2-3 serious influenza epidemics each century. Since the last occurred some 40 years ago, the next one can be expected relatively soon.

#### Contingency preparations in Iceland

In October 2005 the government of Iceland established a task force to study the local economic impact of a possible global influenza epidemic. It also delegated the Chief Epidemiologist and the Civil Protection Department of the National Commissioner of Police to appoint a project management team to prepare contingency plans in cooperation with public agencies, businesses and organisations. The task force then appointed 20 groups, including one for the banking and financial intermediation sector. In September 2007, the public health authorities plan to organise a contingency exercise for responses to an epidemic.

The banking and financial intermediation sector group began work on October 24, 2006. It was led by the Central Bank, which called in representatives from the Banks' Data Centre (RB), Association of Financial Institutions in Iceland (SFF), Confederation of Icelandic Employers (SA) and the Fjölgreiðslumiðlun netting service provider. The group presented the Civil Protection Department with an overview of factors that were particularly relevant to financial companies. Each company/agency also supplied general information on its internal contingency plans and level of service based on different levels of crisis.

#### Conclusions of the working group

The working group concluded that a considerable reduction can be made in banking system services if a situation of danger or emergency is declared. However, all basic services must still be at hand, such as payment and settlement systems and unlimited access by customers to their accounts.

Access to computers and home banking services enables most households and businesses to purchase necessities and pay for them at the same time. Financial companies have increasingly expanded the opportunities for distance working by allowing their employees conditional access to systems. Technically speaking, employees could therefore temporarily perform certain tasks from home if needed. The crucial consideration is to have effective liquidity management and settlement systems as well as ensuring necessary access to notes and coin.

In order to ensure basic services of the banking sector, the following components of system infrastructure need to be in place and functional:

- RB, which provides basic banking sector services such as technical operation of the payment infrastructure.
- Electricity companies. Most commercial banks and savings banks operate reserve generators that take over immediately in the event of a power supply outage. Computers of households, companies and agencies would be rendered inoperative, however, as would EFTPOS terminals of shops and service providers.

- Telecommunications companies with data transmission lines used by banks.

If the above services are functional, it should be possible to rely primarily on the economical and sophisticated electronic payment systems that characterises the Icelandic financial markets' infrastructure.

Experience in other countries shows that, in such situations, people tend to prefer having more cash than normal. Iceland has a highly effective and efficient payment infrastructure that, other things being equal, makes a rise in demand for cash less likely. If necessary, the Central Bank can increase the quantity of notes in circulation by three- to five-fold almost instantaneously, and also boost its reserves in storage at short notice.

