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Improving the efficiency of the handling of cash - Cash Cycle Models

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Executive summary

Today, consumers continue to make significant use of cash - it is real, instantaneous and perceived to be free. However, in reality cash payments are costly for society. Studies over the years have shown that the social cost of cash still remains considerable and the demand for cash continues to grow.

The current SEPA landscape for the distribution and processing of cash is characterised by differing national infrastructures. This lack of harmonisation, common approach and sharing of best practice increases the cost of cash processing and creates inefficiencies across SEPA. In addition, recent EU legislation and decisions made by the European Central Bank (ECB) now need to be taken into consideration.

All these developments lead to new challenges for commercial cash cycle participants in the various SEPA countries in order to optimise the general efficiency of their cash cycles.

This document, compiled by the European Payments Council (EPC) together with the European Security Transport Association (ESTA) explains how a Balance Sheet Relief (BSR) mechanism (expansion of the NHTO concept - Notes Held To Order) may prove to be a valuable component for commercial cash cycle participants when evaluating their existing cycle. This mechanism reduces the financial cost of cash inventories and stimulates wholesale recirculation whilst reducing the operational involvement of the National Central Bank (NCB).

The aim of this document is to highlight the different levels of responsibility of the NCB as well as the commercial cash cycle participants in a given model. Various cooperation structures that can be formed by these participants are also addressed in this document and widens the spectrum of potential improvements within the cash cycle.

The **partial delegation, total delegation** and **partial transfer models** appear to provide a combination of the necessary elements to obtain the most efficient cash cycle model for the future and in particular, in such cases where the NCB decides to reduce its branch network, services and operating hours.

These three models provide logistical cost optimization opportunities for the NCB and the commercial cash cycle participants and allows flexibility for developing customized cash services. In addition, they facilitate the direct exchange of excess cash among the different commercial participants. Finally, these models also achieve balance sheet relief for those commercial cash cycle participants involved. However, irrespective of the cash model (or combination of models) chosen, security of cash remains a key consideration when reviewing existing cash cycles.

0. Document information

0.1 References

External studies:

Cap Gemini, RBS and EFMA: World Payments Report 2011

Retail Banking Research: The Future of Cash and Payments, 2010

EU legislation:

- Council Regulation (EC) No 1338/2001 laying down measures necessary for the protection of the euro against counterfeiting as last amended by Council Regulation (EC) No 44/2009
- Regulation (EU) No 1210/2010 of 15 December 2010 concerning authentication of euro coins and handling of euro coins unfit for circulation

European Central Bank (ECB):

- Decision of the European Central Bank of 16 September 2010 on the authenticity and fitness checking and recirculation of euro banknotes (ECB/2010/14)
- ECB banknotes and coins circulation statistics dated November 2012
- ECB Occasional paper series n° 137 / September 2012: The Social And Private Costs Of Retail Payment Instruments A European Perspective

0.2 Abbreviations

BSR	Balance Sheet Relief Mechanism
CC	Commercial Cash Centre
CIT	Cash-In-Transit Company
ECB	European Central Bank
NCB	National Central Bank
PSD	Payment Services Directive
PSP	Payment Services Provider
RTGS	Real-Time Gross Settlement
SEPA	Single Euro Payments Area
SPE	Special Purpose Entity

0.3 Lexicon

CIT Company	Commercial company providing cash transport and/or cash processing services
Eurosystem	Comprises the ECB and the NCBs of those countries that have adopted the euro
Commercial cash cycle participant	Party other than a NCB and consumers taking part in the cash cycle: e.g. PSP, CIT company, retailer
Recirculation	The action, by a professional cash cycle participant, of putting back into circulation, directly or indirectly, banknotes and coins that they have received, either from the public as payment or as a deposit in an account at a PSP, or from another professional cash cycle participant
Seigniorage	Difference between the interest earned by the issuer of banknotes and coins on a portfolio of securities - equal to the total value of notes and coins in circulation - and the cost of producing, distributing and replacing these notes and coins

1. General

1.1 About EPC

The European Payments Council (EPC, see www.epc-cep.eu) is the coordination and decision-making body of the European banking industry in relation to payments. The purpose of the EPC is to support and promote the Single Euro Payments Area (SEPA). The EPC contributes to the development of the payment schemes and frameworks necessary to realise an integrated euro payments market. In particular, the EPC elaborates on common positions of payment service providers (PSPs) for the cooperative space of payment services, assists in standardisation processes, formulates best practices and supports and monitors the implementation of decisions taken.

The EPC members represent banks, banking communities and payment institutions. More than 360 professionals are directly engaged in the EPC's work programme, representing organisations of all sizes and sectors of the European banking industry. The European Central Bank acts as an observer in all EPC working and support groups as well as in the EPC Plenary (the Plenary is the decision-making body of the EPC). The EPC is a not-for-profit organisation which makes all of its deliverables, including the SEPA Scheme Rulebooks and adjacent documentation, available to download free of charge on the EPC Website.

1.2 Vision

The vision of the EPC is to contribute to the evolution of an integrated market for payments by helping in or facilitating the development and promotion of standards, best practices and schemes.

The introduction of euro bank notes and coins in January 2002 was a successful step towards increased European financial integration. Today, consumers continue to make significant use of cash - it is real, instantaneous and perceived to be free.

However, in reality cash payments are costly for society. In 2008, the total cost of distributing, handling, processing, recirculating of cash and accepting cash payments amounted to 84 billion euro; equivalent to 0.60 percent of Europe's gross domestic product or 130 euro per person (source: Retail Banking Research: The Future of Cash and Payments, 2010).

Europe continues to incur significant costs from rising euro cash in circulation. One key finding of the World Payments Report 2011 by Cap Gemini, RBS and EFMA was that the ratio of cash in terms of gross domestic product (GDP) within the euro zone is more than twice that of the U.S.A. If the euro zone were to reduce cash usage, even when taking into consideration the inefficiencies resulting from fragmentation, it is expected that a saving of approximately €20 billion per annum could be achieved.

A study[1] by the ECB on the social and private costs of the retail payment instruments (approximately 0.5% of GDP) indicated that due to the high usage of cash, the social cost of cash represents nearly half of the total social costs of all retail payment instruments in Europe.

The current SEPA landscape for the distribution and processing of euro cash is characterised by differing national infrastructures. This lack of harmonisation, common approach and sharing of best practice increases the cost of cash processing and creates inefficiencies across SEPA. Retailers, PSPs and Cash-In-Transit companies are all finding it challenging to handle the increasing volumes of cash.

Therefore, actions by all stakeholders within SEPA are needed in order to contribute towards reducing the processing and handling costs of cash.

[1] ECB Occasional paper series n° 137 / September 2012: The Social And Private Costs Of Retail Payment Instruments A European Perspective

1.3 Objectives

This document aims to provide a better understanding of the various existing cash cycle models in SEPA and how the introduction of a Balance Sheet Relief (BSR) mechanism[2] can reduce the cost as well as the security risk of cash (re)circulation for all commercial cash cycle participants.

1.4 Audience

This document is primarily aimed at National Central Banks (NCBs), Ministries of Finance, PSPs as described in the Payment Services Directive (PSD)[3] providing cash to their customers, and CIT companies within SEPA.

This document can also be beneficial for commercial cash cycle participants operating in non-euro countries of SEPA.

[2] Definition of BSR is covered under section 3.1

[3] Directive 2007/64/EC of the European Parliament and of the Council of 13 November 2007 on payment services in the internal market

2. Factors impacting the cash distribution landscape in SEPA

2.1 Demand for cash

Since its introduction in January 2002, the value of the euro in circulation[4] has strongly grown from 221.5 billion EUR to 919 billion EUR in banknotes and from 12 billion to 23.9 billion EUR in coins.

Cash is still the predominant retail payment instrument in Europe. It accounted for 78% of the 388 billion retail payments in Europe in 2008 or nearly 301 billion transactions[5]. This has led to growing stocks of cash in circulation.

The economic events since 2008 have also highlighted the importance of cash at the height of the financial crisis and the demand has since remained strong. However, disparities have also been noted in the demand for cash amongst SEPA countries.

2.2 Supply of cash

The supply of cash starts with the issuance of banknotes and coins by an NCB and Mint which are then distributed to the wholesale cash industry (PSPs, CIT companies). These in turn provide cash to PSP branches, ATMs and retailers.

As NCBs and Mints are the source of cash supply, the size of their network and range of services offered, determines the organization of the subsequent cash cycle phases.

NCBs in certain SEPA countries are scaling down their cash services, operational windows and branch networks. This in turn impacts the cost and security of cash transport for the commercial cash cycle participants in order to guarantee supply to the general public. Such NCB decisions lead to differing national cash cycle models amongst SEPA countries resulting in differing conditions for commercial cash cycle participants in order to reach a cost efficient cash supply.

Currently, the direct supply of cash to the public is predominantly made by means of the automated distribution of banknotes through ATMs offering a 24/7 supply of cash.

2.3 EU Legislation and ECB Decisions

I. Authentication of euro banknotes and coins

The amended EU Regulation 1338/2001[6], the EU Regulation 1210/2010[7] and the ECB Decision/2010/14[8] have resulted in an increase in authentication responsibilities for commercial cash cycle participants.

This involves the need for checking the authenticity of euro cash before putting it back into circulation, withdrawal from circulation of suspected counterfeit euro cash and handing these over to the appropriate national authorities. This means that commercial cash cycle participants now need to manage fitness sorting in accordance with ECB standards (within the euro zone) and at the same time maintain segregated stocks of fit, unfit and possible counterfeit cash.

[4] ECB banknotes and coins circulation statistics dd August 2013

[5] Based upon an analysis for 28 countries conducted by Retail Banking Research (RBR) for its report *The Future of Cash and Payments*.

[6] Council Regulation (EC) No 1338/2001 laying down measures necessary for the protection of the euro against counterfeiting as last amended by Council Regulation (EC) No 44/2009

[7] Regulation (EU) No 1210/2010 of 15 December 2010 concerning authentication of euro coins and handling of euro coins unfit for circulation

[8] Decision of the European Central Bank of 16 September 2010 on the authenticity and fitness checking and recirculation of euro banknotes (ECB/2010/14)

II. Value date rule

The PSD (currently under revision) stipulates strict value date rules that PSPs have to apply to their customers' cash deposits and specifies that the value date D+0 is applicable in cases where cash is deposited on a payment account by a consumer.

This means that credit is immediately granted to the consumer. However, these cash deposits are often collected by CITs at D+1 and then still need to undergo the necessary authentication checks at cash centres.

Provisions foreseen for consumers in the PSD can also be applied to micro enterprises by each individual EU Member State. These enterprises are important cash depositors as they accept predominantly cash payments.

This results in PSPs having to reconsider how to credit their own balance sheets more efficiently in order to mitigate the PSD value date impact.

III. Cross-border euro cash transport

The EU Regulation on professional cross-border transport of euro cash by road[9] opens opportunities allowing various ways of organising cash transport as well as the subsequent handling activities executed amongst commercial cash cycle participants, their clients and NCBs across borders.

This cross-border cash transport supports the goals of the ECB's Roadmap for more convergence of NCB cash services towards a "virtual" NCB cash centre model. This model allows basic cash services of different NCBs within the Eurosystem to become interchangeable without any practical obstacle. Today, the NCBs within the Eurosystem have developed the technical measures to swiftly accept and process cross-border euro cash transports.

As a result, commercial cash cycle participants will have the opportunity to make use of a much wider range of cash service facilities. PSPs now have the possibility of making use of the cash services of their nearest NCB branch or CIT cash centre, whether or not being located within their own country.

A significant reduction in security risk can also be achieved as CIT companies can determine more efficient cash transport routes for their existing clients situated within border regions. CIT companies can further expand their cash services to a wider range of potential clients located in cross-border regions.

Due to past geographical restrictions, the percentage of cross-border cash transport has been minimal when compared to the size of the national euro cash transport. Nevertheless, it offers the potential of enhancing the cash cycle of particular EU Member States provided such cross-border cash transport services are offered by the CIT companies.

[9] Regulation (EU) 1214/2011 of 16 November 2011 on the professional cross-border transport of euro cash by road between euro-area Member States modified by Regulation (EU) 55/2013 of 17 December 2012

3. Balance Sheet Relief Mechanism

The developments in EU legislation and the demand and supply of cash over the past decade have led to new challenges for commercial cash cycle participants in the various SEPA countries to maintain a cost-efficient cash cycle.

The structure of each national cash cycle has to be analysed as to whether it can reduce the overall cost of cash. Such analysis should be carried out taking into consideration existing challenges, future fluctuations in supply and demand and potential legislative developments at EU or national level.

Therefore, a Balance Sheet Relief (BSR) mechanism may prove to be a valuable component for commercial cash cycle participants to consider when evaluating their national cash cycle.

3.1 BSR Definition

Arrangement between the NCB and certain commercial cash cycle participants to hold currency at selected locations (usually secure centralised vaults), in the name and to the value of the NCB, resulting in a reduction in the financial cost of cash inventories in a cash cycle.

This stimulates wholesale cash recirculation whilst reducing the operational involvement of the NCB. The introduction of a BSR mechanism can lead to cash cycle improvements.

3.2 Factors leading to the introduction of BSR mechanism

There are six factors determining the need for the introduction of a BSR mechanism within a cash cycle (see Figure 1).

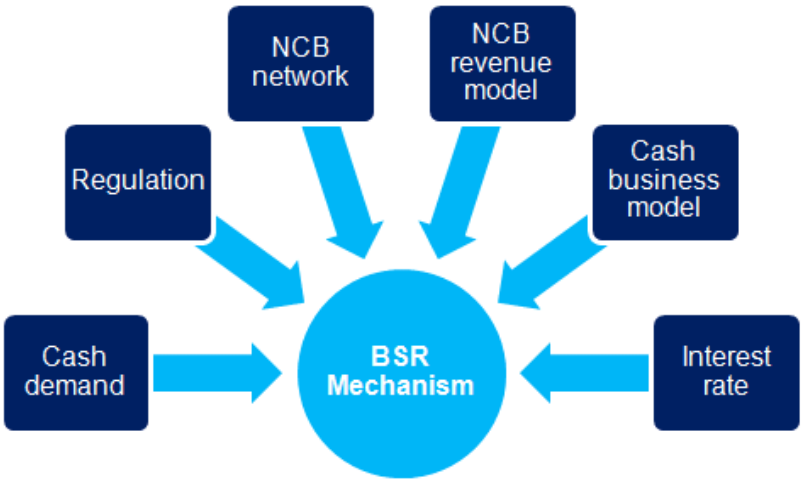


Figure 1: Factors of a BSR mechanism

1. **Cash demand:** The need for a BSR mechanism is proportional to the level of cash demand - the higher the demand for cash, the more the need to re-evaluate the existing cash cycle.

2. **Regulation:** The following regulatory developments may result in the need for introducing a BSR mechanism:
   - What authentication obligations, fitness and counterfeit checking are imposed on each commercial cash cycle participant?
   - Are certain commercial cash cycle participants prohibited from conducting cash authentication checks?
   - Are all commercial cash cycle participants allowed to make use of a BSR mechanism or is it restricted to a specific group of participants only?

3. **NCB Network:** The size of the NCB network or the commercial cash cycle participants' access to it will determine the need for a BSR. The need for a BSR is reduced when the NCB network is widespread and offers a large operating window and an extensive number of services.

4. **NCB Revenue Model:** The amount of seigniorage[10] is a cost recovery stream for the NCB. However, should the amount of seigniorage decrease significantly, central banks would introduce other measures to cover their costs when executing their monetary authority duties.

5. **Cash Business Model:** The implementation of a BSR mechanism will depend on the cost of the cash cycle for its commercial cash cycle participants and whether the costs of these cash services can be passed on to the final cash cycle participant requiring cash.

6. **Interest Rate:** When the overnight interest rates are high on the cash withdrawals of a PSP, the PSP is inclined to deposit any excess cash as soon as possible in order to relieve its balance sheet. However, before doing so, a cost benefit analysis needs to be made between the interest cost of holding cash versus the transport cost involved in depositing this cash at the NCB.

The Eurosystem view on the implementation of a BSR mechanism is that there cannot be a "one-size-fits-all" model applicable to each national cash cycle in the euro zone as conditions vary between euro zone countries (e.g. geography, density of NCB network, etc.). Therefore, decisions on the possible implementation of a BSR mechanism need to be taken at national level by the NCB, national regulators and commercial cash cycle participants.

3.3 Key considerations for the introduction of a BSR mechanism

A community planning to introduce a BSR mechanism within its cash cycle needs to take into consideration the following key aspects:

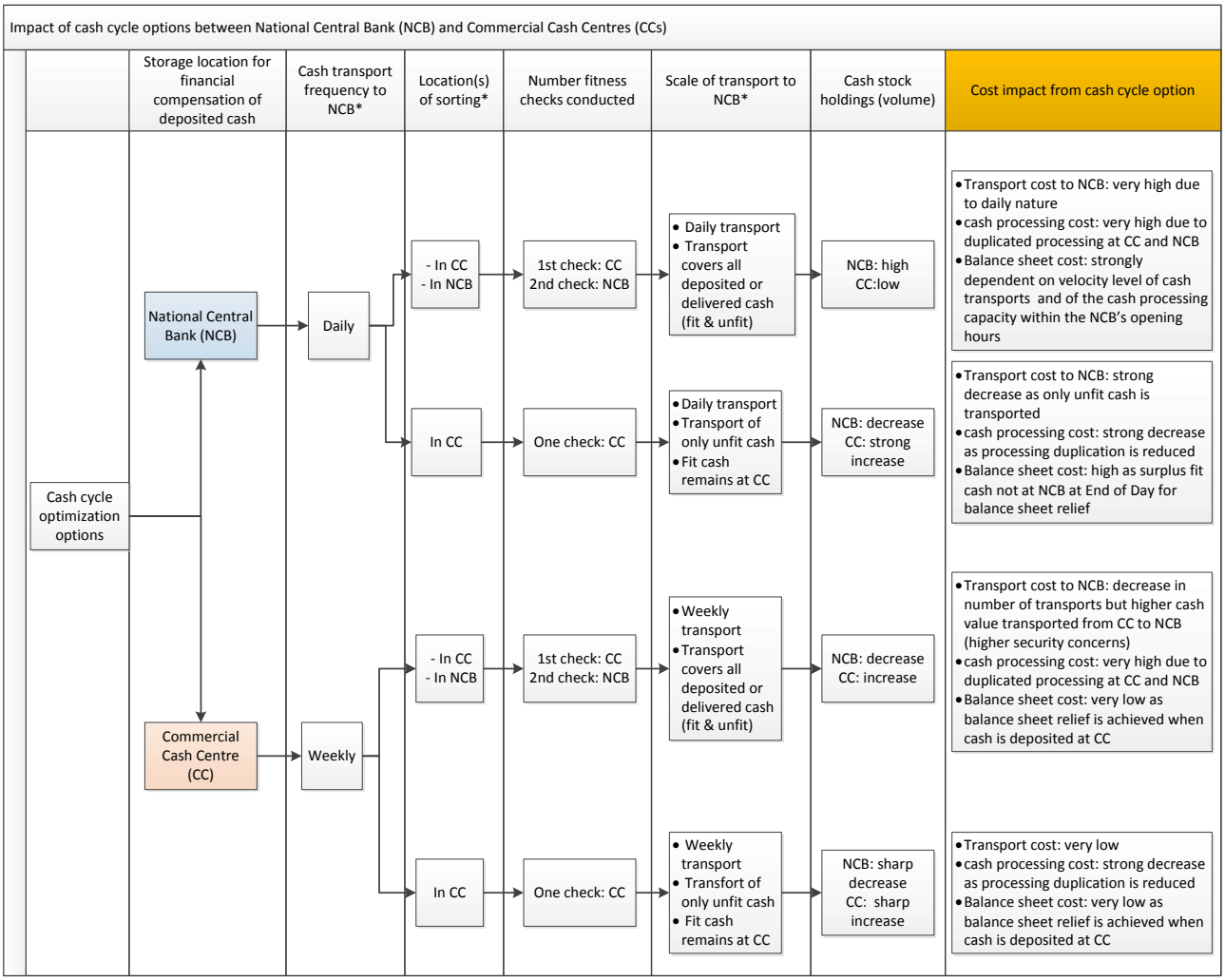
- The cash depot providing financial compensation to PSPs - Does this already take place at the commercial cash centre or only at the NCB?
- The frequency of cash transfers allowed to NCB - A key consideration is the logistical cost of transporting cash to the NCB versus the cost of holding cash at a commercial cash centre. In addition, cash storage capacity in commercial cash centres and insurance limits for cash held, will further influence the frequency of cash transports.
- The type of cash transported to the NCB - It can be decided that particular denominations (e.g. high banknote denominations of 200 and 500 EUR) should be transported to the NCB before they can be recirculated. As for lower denominations, these can be recirculated by commercial cash centres. The same principle can apply for fit and unfit cash (e.g. only unfit cash is returned to the NCB). As an alternative, unfit banknotes could also be destroyed by professional cash handlers (depending on the cost model) provided that this takes place under the supervision of the NCB.
- Allocation of cash cycle process steps between the NCB and commercial cash cycle participants - It is important that duplication of cash sorting, authentication and fitness checking is avoided. Therefore, a transparent arrangement between the parties involved is needed.
- Strict cash quality verification procedures.

[10] The seigniorage on euro **coins** is assigned to the Ministry of Finance in the majority of euro zone Member States (except for Estonia, Cyprus, Slovakia - in these countries the responsible body for the issuance and circulation of euro coins are the respective NCBs. Moreover, the nominal value of the euro coins in circulation appears as a liability item on the respective NCBs' balance sheets and hence no seigniorage on euro coins is assigned to the respective Ministries of Finance in these three countries.), the seigniorage on euro **banknotes** is assigned to the ECB and to the NCBs within the Eurosystem

- Determine NCB incentives or penalties to guarantee the efficiency of cash distribution and cash quality.
- Set key performance indicators for NCB and commercial cash cycle participants in their revised roles.

Figure 2 outlines the impact when implementing logistical improvements in the cash cycle.

It must also be noted that a considerable volume of cash deposited by the PSPs on a given day at the NCB may be re-ordered by the same PSPs in the same denominations within a relatively short time span (e.g. within five days). This phenomenon of "cross-shipping" cash could be eliminated through a combination of logistical improvements as well as a balance sheet relief on surplus cash inventories.



*Note: this illustration restricts itself to a few combinations only in cash frequency to the NCB and in the scale of transport to the NCB

Figure 2: Impact illustration of different cash cycle options

4. Cash cycle models

4.1 The various roles of the NCB in the cash cycle

The manner in which a cash cycle is organised may differ from one country to the other and largely depends on the following: past investments, NCB organisation, number of CIT players in the market, geographical layout.

Four "generic" cash cycle models can be clearly distinguished (see

Figure 3)

- **Centralised Model:** The NCB plays a pivotal role in the cash distribution cycle at national level, acting - through its branch network - as the primary warehouse, distribution centre and processor of cash.
- **Joint-Venture Model:** A joint venture company is established between the NCB and PSPs (both acting as financial shareholders). This joint venture company deals with all aspects of wholesale cash activities on a lower operational cost basis when compared to the centralised cash cycle model. Such joint venture model would have to comply with requirements set by national competition authorities.
- **Delegation Model:** The NCB delegates some cash handling activities such as authentication checks, fitness sorting and bundling to the commercial sector (PSPs and/or CIT companies).
- **Transfer Model:** PSPs assume responsibility (and costs) for all wholesale cash functions. The NCB is no longer present within the cash supply cycle (except for issuing).

LEVEL OF NCB PARTICIPATION IN MAIN CASH CYCLE CATEGORIES

Key components	NCB central in cash cycle	Joint venture NCB - commercial participants	NCB activity delegation to commercial participants	NCB activity transfer to commercial participants
Daily cash transfer to NCB	Yes	Between joint - venture and cash cycle participants	Reduced transport	No
Retail cash processing by NCB	Yes	By joint venture	No	No
Fitness sorting by commercial participant and at industrial scale*	Yes	By joint venture	Yes	Yes
NCB cash stock stored at a commercial participant	No	Possible at joint venture	Yes	No
Cash stock held in defined depots/vaults outside NCB with full or limited interest relief for depot/vault holder	No	No	Yes	No

* In light of the Decision of the European Central Bank of 16 September 2010 on the authenticity and fitness checking and recirculation of euro banknotes (ECB/2010/14)

Figure 3: Level of NCB participation in the main cash cycle categories

4.2 Cash cycle models between the NCB and commercial cash cycle participants

I. Centralised Model: all services by NCB

The NCB plays the central role in the cash circulation process. Cash withdrawals and deposits by commercial cash cycle participants are handled by the NCB. The account of a PSP is credited when cash is delivered to the NCB and debited when the cash has left the NCB premises.

The advantage of this model is that the re-circulated cash has passed through the NCB verification and handling process. However, this generates a high number of cash transports to and from the NCB resulting in a timely and expensive cash cycle.

Commercial cash cycle participants are completely dependent on the NCB's operating window for cash withdrawals and deposits. High operating costs are incurred for the same volume of cash as it undergoes handling at both the commercial cash centre and NCB level. No stimulus is provided for wholesale cash recirculation outside of the NCB. There is also no mechanism of balance sheet relief available other then when depositing cash at the NCB.

If the NCB decides to scale down its branch network, this will result in a concentration of cash transports as well as longer delivery times to the remaining NCB branches.

Even though the ECB Decision/2010/14[11] allows for the recirculation of euro banknotes over the counter, via cash dispensers, staff- and customer-operated machines, it does not provide an optimal solution for the wholesale recirculation of cash and does not mitigate the financial impact on the balance sheet of PSPs.

Note: some NCBs do not participate in the coin cycle. Other NCBs put into circulation coins through their NCB branch network on behalf of the EU Member State's Treasury. In Slovakia, Estonia and Cyprus the central bank is also responsible for the issuance of euro coins.

II. Joint Venture Company between NCB and PSPs

The NCB together with PSPs establish a joint venture company for cash handling and distribution to meet the cash needs of commercial cash cycle participants. PSPs only deal with the joint venture and no longer directly with the NCB. Only the joint venture makes cash deposits and withdrawals with the NCB.

The physical cash centres of the joint venture can be located within the premises of the NCB to facilitate a swift transfer of cash from the joint venture vault to the NCB vault.

Each individual PSP still holds an account at the NCB for cash transactions. However, through the joint venture, the PSP's account can be credited where facilities of the joint venture are co-shared with the NCB. The companies in charge of the cash transport to and from the joint venture premises are contracted by the individual PSPs. The joint venture directs and manages the injection of new cash, the destruction of unfit cash, fitness-sorting, storage and cash distribution. However, it does not generally operate its own CIT fleet.

The advantages of such joint venture is that PSPs benefit from the expertise of the co-shareholders' staff. The cost of the existing NCB and commercial cash centre facilities can also be shared. The joint venture provides a wide range of cash handling services and an extended operating window. It further shortens the cash cycle for PSPs from a three-tier to a two-tier cash cycle flow (see Figure 4).

[11] Decision of the European Central Bank of 16 September 2010 on the authenticity and fitness checking and recirculation of euro banknotes (ECB/2010/14)

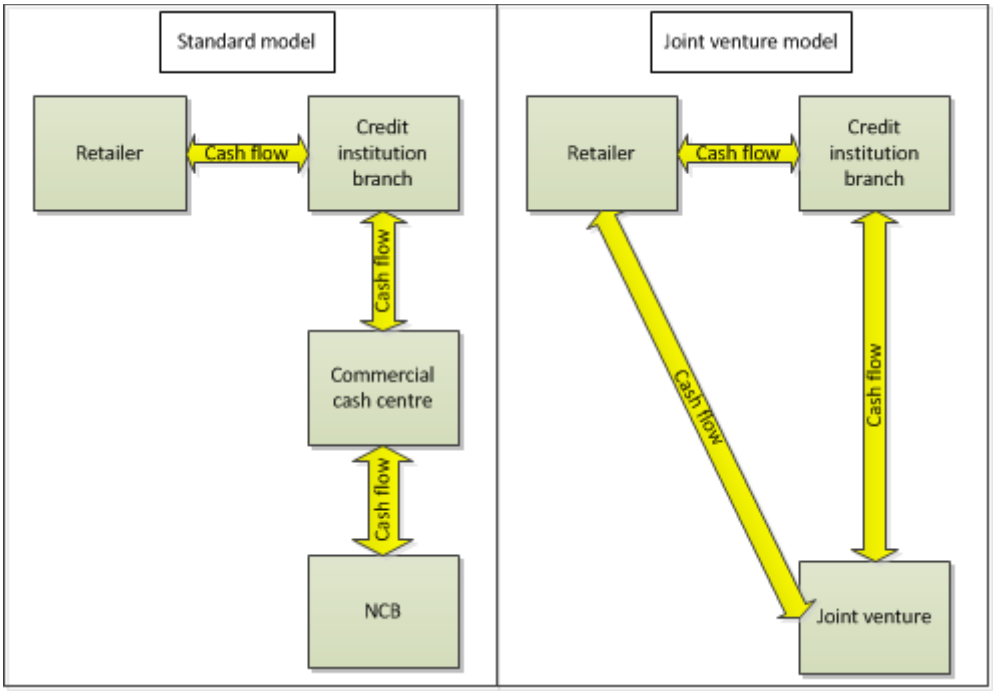


Figure 4: Two-tier model Joint Venture

One of the limitations of this model is that it requires a considerable amount of investment from both the NCB and PSPs. This also means that PSPs are no longer in the position of only acting as an end-user making use of cash services provided by the NCB.

Even though such joint venture offers logistical improvements reducing the cost of cash handling, not all joint venture cash centres can be located within the NCB premises. Therefore, the cash held overnight in these delocalised vaults of the joint venture cash centres is not relieved from the PSPs' balance sheets.

There is a potential risk of a cost-plus pricing approach. However, this can be overcome by introducing cost allocation rules whereby the cost amount is divided proportionally in accordance with the level of usage by each of the joint venture's customers.

If there is an unbalanced shareholder division between the NCB and (competing) PSPs, it may complicate the decision making process within the joint venture.

III. Partial Delegation

The NCB delegates certain cash handling activities to commercial cash cycle participants. The operational involvement of the NCB is reduced to pre-determined volumes and/or denominations. Overnight funding relief is provided by the NCB to the PSPs for those cash volumes stored in special consignments in the commercial cash centres (irrespective of the location).

This model is less NCB transport intensive and provides a wider operating window. As certain cash handling activities are delegated to commercial cash cycle participants, cash needs between PSPs can now be handled more effectively. It also allows the NCB to switch over to cash container deliveries to commercial cash centres.

When deciding on the implementation of a partial delegation model, it is important to develop a clear roadmap and timeline for the delegation of cash cycle responsibilities from the NCB to the commercial cash cycle participants. This will improve confidence between the NCB and the various commercial cash cycle participants.

IV. Complete delegation of cash services

Commercial parties no longer deposit fit cash at the NCB as the latter accepts only unfit cash and excess fit cash resulting from seasonal peaks or in exceptional cases. Overnight funding relief is provided by the NCB to the PSPs for the cash volumes stored in special consignments within the commercial cash centres. These commercial parties become custodians of the fit NCB cash inventory.

As the NCB takes on a limited operational role within this cash cycle model, an even wider operating window can be established in accordance with the needs of the commercial cash cycle participants and allows direct exchange of cash surpluses. It also allows the pooling of cash stocks in case of unforeseen surges in cash demand.

This model allows for the wholesale handling of fit cash resulting in high cash volumes, industrial-scale cash centres and an increased velocity of cash recirculation.

The NCB can define clear incentives and penalties to guarantee the efficiency of cash distribution and quality. However, such a model can become complex in terms of regulatory supervision (e.g. external audit) of the commercial parties responsible for the consignments and will require Management Information System (MIS) reporting.

Regulatory prescriptions for these cash centres could relate to e.g. minimum capital requirements, the qualifications of management, third party liability insurance, implementation of money laundering prevention measures and internal cash processing rules.

V. Partial transfer

Cash processed and stored remains on the balance sheet of each PSP. The commercial cash cycle participants are fully responsible for all fitness verification, sorting and circulation. The NCB's role in the cash cycle is restricted to the withdrawal of unfit cash and issuing of new cash.

The NCB only transacts with approved institutions acting as cash depots. The NCB transfers recirculation and handling duties to those commercial cash cycle participants that are capable of executing the services required in a more efficient manner. These depot owners will also receive a form of cost remuneration for operating the depot.

PSPs can form a single or several depots. The costs of running a depot are then divided amongst its owners. Those PSPs only making use of the services provided by the depot do so on a pay-per-service basis.

The NCB has a reduced operational role and cost in this model as it handles very few cash transport deliveries and orders. The commercial cash cycle participants are now in the position to continuously develop efficient solutions for cash distribution within a wide operating window in accordance with their needs. This model allows a direct exchange of cash surpluses between PSPs. This can result in a reduction of cash in circulation due to improved velocity (improved turnaround of cash between the depot and commercial cash cycle participants).

The responsibility of storing fit cash as well as excess cash lies with the depot. The depot must establish security requirements for protecting the cash as well as the appropriate insurance.

In cases where all cash is held with one single depot, the selection and stability criteria for such single depot owner needs to be well-defined by the NCB.

VI. Total transfer

This model envisages a complete transfer of the cash handling responsibilities to the commercial cash cycle participants. The NCB conducts regular checks and determines the costs of the cash circulation and pays a fixed sum to each PSP. The NCB only accepts large volumes of unfit cash. Depending on the volume of banknotes that are unfit and require destruction, significant savings could be made if the NCB were to grant PSP's the authority to destroy banknotes in the primary processing cycle. This would also save the NCB the operational cost to perform this function. In addition, NCB officials could be on-site to monitor the destruction process within this cash-cycle.

The main advantage of this model is that there is a very limited operational role and costs for the NCB. However, the main risk involved when implementing this model is that a considerable deterioration in the quality of cash in circulation can arise if the NCB does not monitor cash fitness closely.

4.3 Cooperation structures among commercial cash cycle participants

I. Special purpose entities centralizing cash handling activities

PSPs together with other commercial cash cycle participants may establish a special purpose entity (SPE) which offers a variety of cash services, which can include transport, wholesale recirculation, ATM replenishment and maintenance. The cash processing responsibilities of these PSPs are entirely outsourced to the private SPE. Those services that are not provided by the SPE can be acquired from other commercial cash cycle participants (e.g. CIT companies, technology vendors).

Only the SPE executes cash deposits and withdrawals with the NCB. In some key geographical areas the SPE facilities can be located within the premises of the NCB.

The SPE holds an account with the NCB with a pre-determined limit for notes and coins. CIT companies execute deposits and withdrawals with the SPE on behalf of the commercial cash cycle participants wanting to make use of the services provided by the SPE. In turn, CIT companies deposit excess cash to the NCB on behalf of the SPE for volumes exceeding the pre-determined limits for notes and coins.

The advantages of establishing an SPE is that PSPs can benefit from the expertise of the commercial cash cycle participants forming the SPE.

One of the limitations of this model is that it requires a considerable amount of investment from the SPE owners.

Even though the SPE offers logistical improvements reducing the cost of cash handling, not all SPE facilities can be located within the NCB premises. The cash held overnight by the SPE is not relieved from the PSPs' balance sheets.

If there is an imbalance of shareholder division, it may have a negative impact on the decision making process.

II. Inter-PSP Cash Market

The Inter-PSP cash market is a bilateral market of daily supply and demand amongst PSPs operating within a community during or outside the opening hours of the NCB.

Individual PSPs must first arrange bilateral agreements for exchanging cash amongst themselves. Cash bids and offers are made by telephone. This role can also be delegated to their respective CIT partners (e.g. for overnight transactions).

The settlement of these bilateral cash transactions is conducted by means of the Real-Time Gross Settlement (RTGS) system. Transactions conducted outside of the RTGS operating hours are settled on the next business day (D+1) basis. The main risk facing PSPs when making use of this type of cooperation structure, is the overnight financial risk when the trading takes place outside of the RTGS operating hours with settlement only taking place the next business day (D+1). This risk can be eliminated by only conducting cash trades during RTGS operating hours.

The set-up of this market can be established without any cost and no common ICT platform for information exchange is needed as bids and offers are made over the phone.

It must also be stressed that this form of cooperation has limited development possibilities. As each PSP has different cash needs, this market may not be utilised by all PSPs. Furthermore, it does not stimulate industrialization of cash handling and does not include a balance sheet relief.

Therefore, an integrated multilateral electronic cash market could be a possible alternative operated by an independent institution (e.g. NCB). As each PSP has differing cash requirements, this market may become

fully utilised if access to services is granted to all PSPs (irrespective of size). Furthermore, if its operation is less expensive than the cash services offered by the NCB, it could provide a positive alternative for PSPs by matching their cash supply and demand requirements resulting in a decrease of deposits/withdrawals from the NCB directly.

In cases where there is a limited number of CIT companies operating within a community, cash can simply be shifted from the vault of one PSP to the other if they are both making use of the services of one and the same CIT company.

This Inter-PSP cash market serves as an alternative in cases where the NCB has a limited number of branches.

4.4 Hybrid cash cycle models

Sections 4.2 and 4.3 describe in detail the varying roles of the NCB and commercial cash cycle participants within the different cash cycle models. It should be noted that a given model described under 4.2 can co-exist with a cooperation structure described under section 4.3.

Communities planning to re-evaluate their existing cash cycle should not necessarily limit themselves to one specific model as a combination of two or more cash cycle models could meet the demands of the NCB and all commercial cash cycle participants within a given community.

For example, the NCB and the commercial cash cycle participants could agree on a hybrid model made up of a combination of elements from:

a. **The centralised cash cycle model**: a reduced NCB branch network is maintained for regions with very low cash volume circulation (and where commercial cash centres are not present or too distant). The NCB executes the cash handling and recirculation activities. Balance sheet relief for PSPs is granted once the cash is deposited at the NCB branch.
b. **The delegation model:** the logistical cash handling and recirculation is fully covered by commercial cash cycle participants and whereby balance sheet relief is granted by the NCB when the cash is kept in the vaults of these commercial cash cycle participants. Such model could work well for certain urban areas or regions with a medium level of cash circulation volume. The NCB could play a very limited role in such areas.
c. **The industrialization of cash handling:** logistical industrialization of cash handling takes place and the recirculation is covered by commercial cash cycle participants. However, the balance sheet relief for PSPs is granted only once the cash is deposited at the NCB branch. This in effect implies only a logistical outsourcing of cash handling and recirculation from the NCB to commercial cash cycle participants. Such set-up could function well for dense urban regions or cities having a very high need for cash.

4.5 Coins

It must be noted that the models described in this document can also be applied to coins in order to optimise their handling and recirculation.

Approximately 104.9 billion euro coins are in circulation representing about 23.9 billion euro[12]. The collection, handling and recirculation of such volume form a labour-intensive process.

Implementing a BSR mechanism for coins can be a starting point for the NCB towards developing a cash cycle model with a BSR mechanism for banknotes. By doing so, the commercial cash cycle participants have the opportunity to gain experience and gradually assume more cash distribution and handling responsibilities from the NCB.

[12] August 2013 statistics on http://www.ecb.int/stats/euro/circulation/html/index.en.html

5. Key considerations when selecting an efficient cash cycle model

A number of considerations are to be taken into account when selecting a cash cycle model. Firstly, a "one-size-fits-all" approach is not possible due to the differing geographical layout of each country. In addition, national legislation imposing cash transport protection obligations has to be taken into account.

An important aspect of establishing an efficient cash cycle will largely depend on the capabilities and experience of commercial cash cycle participants in taking over the NCB cash authentication and recirculation responsibilities.

Therefore, a clear roadmap and timeline needs to be defined between the NCB and the commercial cash cycle participants as the latter may need to make considerable investments. In addition, the NCB can provide transparent supervision and determine quality control requirements that are to be met by the commercial cash cycle participants.

The following characteristics best describe an effective cash cycle:

- A lean supply chain significantly reducing duplicate cash handling steps (counting, fitness sorting, checking, packaging)
- Direct exchange of cash surpluses between commercial cash cycle participants
- A wide operating time window
- Stimulates improvements for transport optimization, security and storage facilities
- A BSR mechanism is made available to these commercial cash cycle participants irrespective of whether they wish to make use of it or not
- The cash cycle guarantees public confidence in terms of authenticity and fitness of the cash
- The NCB has the necessary tools to conduct strict controls on the quality and volume of the cash being recirculated by the commercial cash cycle participants

6. Future efficient cash cycle models

6.1 Long term vision

In order to achieve an optimal level of wholesale cash recirculation with a low involvement of the NCB, all commercial cash cycle participants should have the option to benefit from a cash cycle model allowing a BSR mechanism. Cash cycles with a BSR mechanism will in effect reduce the return frequency of fit cash to the vaults of the NCB.

The efficiency of the cash cycle requires constant monitoring and may evolve in accordance with cash demand or technological developments.

The development of BSR mechanism is needed for both banknotes and coins. However, these two instruments have their specific handling, storage and distribution requirements.

6.2 Preferred cash cycle models

When considering the continuous rise of cash in circulation, the cost of maintaining the **centralised NCB model** will only continue to increase. In this model each cash cycle participant is focused on setting its own cost reduction priorities. Therefore, this model will not reduce the overall cost of cash and its lack in flexibility remains a key issue.

Commercial cash cycle participants establishing **Special Purpose Entities** (SPE) can mitigate the logistical cost of recirculating cash. However, the establishment of such a purely logistical solution does not provide balance sheet relief. Furthermore, if such SPE would represent the majority of PSPs and/or other commercial cash cycle participants, it could lead to a market concentration resulting in a limited choice in cash service providers for smaller existing and new commercial cash cycle participants.

Even though the **Inter-PSP Cash Market** is a valuable alternative solution to meet the daily cash needs of PSPs, it does not stimulate the wholesale industrialization of cash handling nor does it provide balance sheet relief.

In terms of establishing a **Joint Venture Company,** the main question is whether a PSP would be willing to invest in such an entity and whether the NCB would consider forming a partnership with commercial parties. Defining the correct balance amongst the shareholders, governance issues and goals may hinder the establishment of a joint venture model. In addition, the overall strategy of the NCB in terms of cash as means of payment may differ considerably from that of the PSPs.

A **total transfer** of cash handling is a significant shift of responsibilities from the NCB to the commercial cash cycle participants. However, a strong commitment from the NCB in terms of quality control is needed in order to prevent cash quality deterioration which could result in a negative perception of a given currency.

Therefore, the most efficient models encompass elements from the **partial delegation, total delegation** and **partial transfer** models, and especially should the NCB decide to reduce its branch network, services or operating hours.

These three models provide logistical cost optimization opportunities for the NCB (less cash volume to be handled, containerization of cash orders, cash handling cost reduction), and for the commercial cash cycle participants (less cash transport to and from the NCB, shortening the recirculation of fit cash to the end-user, wholesale industrialization of cash handling). These three models also allow flexibility for developing customized cash services. In addition, they facilitate the direct exchange of excess cash among the different commercial cash cycle participants.

Furthermore, these models effectively achieve balance sheet relief for the commercial cash cycle participants whereby either the overnight cash in commercial cash centres' vaults belong to the NCB or the cash depot owners obtain cost remuneration for the services assumed from the NCB.

Annex

Annex I provides the current cash cycle position of certain SEPA countries within the four main cycle clusters as mentioned in Figure 3. This annex is provided for illustrative purposes only and the current cash cycle position for each country mentioned may evolve.

Position of national cash cycles within the four main cash cycle models (status October 2013)