

IMPROVING THE EFFICIENCY OF THE HANDLING OF CASH “RECIRCULATION PAPER”

Document Reference	EPC115-18
Issue	Version 1.0
Original Date of Issue	29 May 2017
Reason for Issue	EPC publication
Reviewed by	Cash Efficiency Working Group
Produced by	Cash Efficiency Working Group Secretariat
Authorised by	EPC Board 23 May 2018
Circulation	Public



CONTENTS

0	Executive Summary	4
1	Introduction	4
1.1	OBJECTIVE	4
1.2	DEFINITIONS	6
2	Regulatory Framework	7
2.1	EU REGULATION 1338/2001 AMENDED BY EU REGULATION 44/2009	7
2.2	ECB RECIRCULATION FRAMEWORK (DECISION ECB/2010/14 OF 16 SEPTEMBER 2010 ON "THE AUTHENTICITY AND FITNESS CHECKING AND RECIRCULATION OF EURO BANKNOTES")	8
2.3	REVISED PAYMENT SERVICES DIRECTIVE (PSD2) ART. 3	9
2.4	EXAMPLES OF SPECIFIC NATIONAL DISPOSITIONS	9
2.4.1	<i>Austria</i>	9
2.4.2	<i>Belgium</i>	10
2.4.3	<i>France</i>	10
2.4.4	<i>The Netherlands</i>	10
2.4.5	<i>Spain</i>	11
3	Some data	11
4	Best practices	14
4.1	A MULTIFACETED EUROZONE LANDSCAPE	14
4.2	CASH CENTRES AND BEST PRACTICES (CITs AND PSPs)	16
4.2.1	<i>Austria</i>	17
4.2.2	<i>Portugal</i>	18
4.2.3	<i>Spain</i>	18
4.3	RECIRCULATING MACHINES	19
4.3.1	<i>Belgium</i>	19
4.3.2	<i>Finland</i>	19
4.3.3	<i>The Netherlands</i>	19
4.4	CASHBACK	21
5	What could stakeholders in society do to foster recirculation?	21
6	Conclusions	22
7	Annexes	23
7.1	ECB CHARTS ON BANKNOTES RETURNED FROM CIRCULATION	23
7.2	NCB BRANCHES AND PSP OFFICES OFFERING PAYMENT SERVICES TO THE PUBLIC ..	26
7.3	PAYMENT BEHAVIOUR ACROSS THE EURO AREA	28
7.4	EPC REFERENCES	29
8	Glossary	30
9	Figures and Tables	31



Change History

Issue number	Dated	Reason for revision
Cash 014-17 V0.1	29/05/2017	Early version of a working document
Cash 014-17 V0.2/3/4	08-10/10/2017	Updated working version
Cash 014-17 V0.5/6/7	14/12/2017 - 2018	Updated working version
Cash 014-17 V0.8/9	2018	Updated working version, review
EPC115-18 V1.0	23 May 2018	Approved by the EPC Board



0 Executive Summary

16 years after the introduction of the physical euro, in a context where policy makers foster a single market in all its dimensions (from a Single Euro Payment Area (SEPA) to a Digital Single Market (DSM)), both the usage of cash and the ways in which it circulates and recirculates still differ – at times significantly – between Eurozone countries. Whilst convergence of these should become a policy objective (in line with the single market objectives), payment service providers and other participants in the cash value chain pursue 2 main, complementary strategies:

- Shortening, and thus optimising, the cash cycle.
- Continuing reducing manual handling and any redundant processes.

in order to continue and allow convenient and affordable access to fit and trusted cash (financial inclusion) and ensure customer choice with respect to means of payment, in a context where national central banks (NCBs) reduce their physical presence and their range of services to financial institutions.

Whilst the European Payments Council (EPC) welcomes and supports the initiatives taken by the European Central Bank (ECB) to facilitate recirculation of euro banknotes and to harmonise the testing procedures for recirculation machines, NCBs should continue and create conditions that allow the optimisation of recirculation in the context of the legal framework. Dispositions that hinder recirculation, e.g. imposing a minimum volume of banknotes to be handled by the central bank, should be avoided.

Furthermore it would be helpful if the Eurosystem considered either extending the scope of existing dispositions (e.g. the Level 3 control, which is actually reserved to the central bank only, could be applied to Cash in Transit (CIT) companies under the control and supervision of the ECB), or stepping up to a more risk-based approach (e.g. it could be tested through pilots whether a differentiated fitness and counterfeit checking approach to the different denominations of banknotes – e.g. having less stringent requirements for retailers with respect to the 5 and 10 denominations – would have negative consequences on handling processes and the perception of cash).

The EPC wishes to thank the European stakeholders who reviewed this paper – which it will endeavour to update on a yearly basis - and offered feedback. The EPC would now welcome a dialogue with the Eurosystem to discuss these elements and achieve an optimal cash cycle.

1 Introduction

1.1 **Objective**

The objective of this paper is to delineate the position of the EPC with respect to the recirculation of notably euro banknotes, in order to promote this position within national banking communities and other relevant stakeholders, with the ultimate goal of increasing cash efficiency by means of recirculation.

The development of digitisation will ultimately affect and transform all society strata. Digitisation can be defined as the mass adoption of connected digital services by consumers, enterprises, and governments, complemented by the (not always accompanying) transformation of sourcing, manufacturing and production, delivery, and the related processes. Digitisation comes hand-in-hand with the expectation of growing demand for immediacy – in terms of responses, transaction completion, and payment - and that meeting such expectation and demand has, and will continue to have, profound implications far beyond the systems and entities striving to provide such immediacy. In parallel, digitisation – mainly due to the spread of mobile devices – enhances participation by all, both at political and economic levels.



As European policy makers and legislators promote digitisation, notably through initiatives such as the DSM and the SEPA, it inevitably befalls on all stakeholders to reassert how best to handle cash, in order for society as a whole to achieve a range of objectives:

1. Financial inclusion should continue to be ensured, notably by allowing all segments of population access to a choice of payment instruments. This will notably support European policy such as expressed in the Payments Account Directive ([2014/92/EU](#)) that promotes access of all to a payment account and a minimum set of payment instruments including a cash withdrawal card. In order to meet that policy maker's objective of financial inclusion at low cost, and as NCBs are closing their branches and reducing their services to payment service providers, thus transferring costs to the private sector, it will be essential to facilitate recirculation. It becomes a societal objective to minimise the cost of cash whilst ensuring its availability at the required levels of quality (fit and not counterfeit) for those to whom cash remains a means of payment of choice.
2. The ever-growing societal concerns with environmental quality will not remain without impact on the logistics of cash distribution. The existing cash cycle has to be revisited with a view of reducing journeys whenever possible, with a view of keeping transport-related pollution in check and minimizing the associated costs.
3. Whilst acknowledging that other forms of risk continue to exist or emerge (e.g. cyber-attacks), the opportunity to decrease risk for society by lowering the transport over public roads, hence improving overall security (as less transport reduces the exposure to criminal attacks) should not be lost.
4. A better understanding of how cash handling is evolving (to which this paper aims to contribute) will also enable stakeholders in the cash value chain to anticipate market shifts and plan for the retaining and reallocation of workforces accordingly.

Recirculation of banknotes has been growing in recent years and is expected to continue and do so over the longer term due to a number of factors – some of which are interrelated:

- The reduction in the number of NCB branches;
- The shortening of the latter's operating hours;
- A reduction in the number of bank branches due to changing consumers' habits (physical branch "traffic" no longer justifying a physical presence) and digital transformation (implying on occasion a reduction in the number of automated teller machines (ATMs));
- The search for an increase in efficiency (comprising and optimising and shortening of the cash handling cycle and inter alia a reduction of cash transportation costs).

In parallel, as new actors (e.g. independent ATM networks) and new activities linked to recirculation emerge, it becomes necessary to assess the new environment and ensure the continuity of a level playing field.

It should be noted that recirculation is also a tool to ensure business continuity. In business continuity plans, 'recirculating as much as possible', locally and in the chain



between client and cash centre¹, is an important principle, because it is understood that the weaknesses in capacity are in the logistics.

Recirculation puts more pressure on enforcing the right procedures of classification of banknotes (counterfeit, unfit). The right attention to procedures and technical solutions should be provided in cooperation between NCBs, payment service providers and ancillary service providers.

Obviously, none of these developments should stand in the way of the objective that all stakeholders in the cash cycle hold in common, i.e. the continued provision to the public of a high quality of cash service in terms of authentic, fit and conveniently available banknotes.

1.2 Definitions

The ECB and the NCBs of the Eurosystem are the issuing authorities for the euro banknotes and are tasked with maintaining public trust in the single currency. This is done by, among other things, ensuring the integrity of the euro banknotes in circulation. Basically, recirculation can be defined as the process to put again in circulation banknotes received from the public (consumers, retailers or others) without handing over these banknotes to a national central bank. Banknotes follow a specific path through the economy. Commercial banks order them from central banks and then distribute them. People spend them in shops, markets and other places and the banknotes are in turn deposited by retailers and others at their banks. The banks and other cash handlers² then either send them back to their respective central bank or recirculate the banknotes after having checked them for authenticity and fitness for circulation.

The figure below outlines the circulation of banknotes (solid arrows) between the various actors and identifies possible areas where recirculation of banknotes (circular arrows) takes place. This recirculation can take place in various layers: either between Payment Services Providers (PSPs) (for example, banks) and/or NCBs, or between PSPs and cash users, and/or between cash users.

¹ A cash centre is an interbank service point for cash services.

² Pursuant to Article 6(1) of Regulation (EC) No 1338/2001, "cash handlers" include credit institutions, and any other institutions engaged in the sorting and distribution to the public of notes and coins as a professional activity, including establishments whose activity consists in exchanging notes and coins of different currencies, such as *bureaux de change*.

Layers of Recirculation

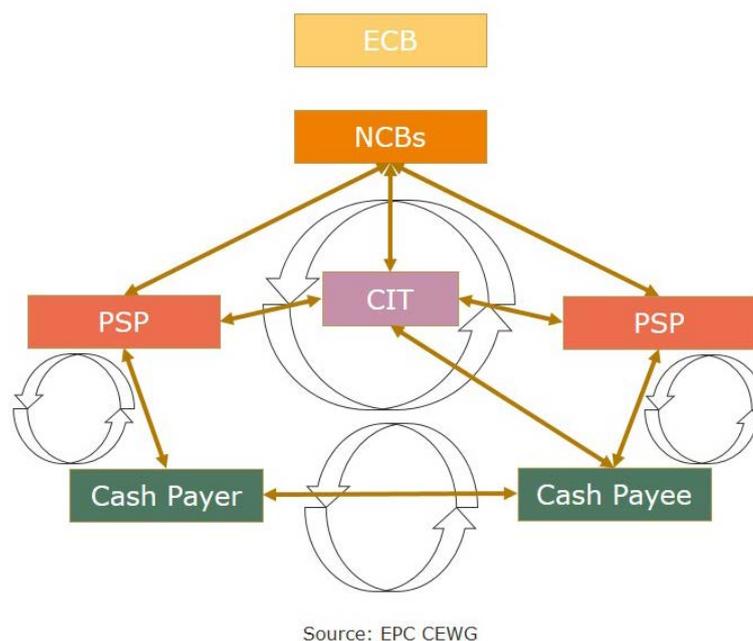


Figure 1: Layers of Recirculation

There are several methods for recirculation:

- either by PSPs (over the counter of a bank branch by trained staff),
- or through an ATM with recirculation function, fully automated without intervention of an employee,
- or in a private cash centre of a commercial bank or a CIT/CMC (Cash In Transit/Cash Management Company)
- or via merchants or retailers (cash back or devices with recirculation capabilities).

Euro coins are not affected by [Decision ECB/2010/14](#), as they do not fall within the ECB's competence and coin recirculation is not subject of this paper. However, stakeholders observe that coins might be considered as being largely recirculated, notably due to the cost of obtaining them.

2 Regulatory Framework

At European level, recirculation is defined by 3 pieces of legislation or quasi-legislation – the relevant excerpts are provided hereafter.

2.1 EU Regulation 1338/2001 amended by EU Regulation 44/2009

This [Regulation](#) lays “down measures necessary with a view to issuing euro banknotes and coins in such a manner as to protect them against counterfeit”. In particular Art. 6.1 provides that “Credit institutions, and, within the limits of their payment activity, other payment service providers, and any other institutions engaged in the sorting and distribution to the public of banknotes and coins, including

- establishments whose activity consists in exchanging banknotes and coins of different currencies, such as bureaux de change,
- transporters of funds,



- other economic agents such as traders and casinos engaged on a secondary basis in the processing and distribution to the public of banknotes via ATMs (cash dispensers³), within the limits of these secondary activities,

shall be obliged to ensure that euro banknotes and coins which they have received and which they intend to put back into circulation are checked for authenticity and that counterfeits are detected. For euro banknotes, this check shall be carried out in line with procedures defined by the ECB (see the "[Framework for the detection of counterfeits and fitness sorting by credit institutions and other professional cash handlers](#)").

The institutions and economic agents referred to in the first subparagraph shall be obliged to withdraw from circulation all euro banknotes and coins received by them which they know or have sufficient reasons to believe to be counterfeit. They shall immediately hand them over to the competent national authorities".

2.2 ECB Recirculation framework (Decision ECB/2010/14 of 16 September 2010 on "the authenticity and fitness checking and recirculation of euro banknotes").

The decision has been amended by [Decision ECB/2012/19](#) of 7 September 2012 to extend its scope to the authenticity and fitness checking and recirculation of new series of euro banknotes and to clarify a few requirements.

The possibility of recirculating euro banknotes enables credit institutions and other cash handlers to perform their role in the currency supply chain in a more effective and cost-efficient manner. Decision ECB/2010/14 ensures that credit institutions and cash handlers only recirculate euro banknotes if they have been checked for both fitness and authenticity. These checks can be carried out either: (i) by a type of banknote handling machine which has been tested by a Eurosystem NCB; or (ii) by trained staff. Banknotes that have successfully passed machine checks can be recirculated via ATMs or other customer-operated machines. Banknotes which have been tested by trained staff can only be disbursed over the counter (OTC). To ensure the integrity of the euro banknotes, the Governing Council of the ECB adopted the above Decision, which became applicable on 1 January 2011. Relevant excerpts are:

- 'Cash handlers' means the institutions and economic agents referred to in Article 6(1) of Regulation (EC) No 1338/2001; In Figure 1 these are referred to as PSPs.
- The obligation of cash handlers to check euro banknotes for authenticity and fitness shall be carried out in line with procedures laid down in this Decision.
- Euro banknotes may only be recirculated via customer-operated machines or cash dispensers if they have been checked for authenticity and fitness by a type of banknote handling machine successfully tested by an NCB and classified as genuine and fit. However, this requirement shall not apply to euro banknotes that have been delivered directly to a cash handler by an NCB or by another cash handler that has already checked the euro banknotes for authenticity and fitness in this manner.

³ Pursuant Article 2(9) of Decision ECB/2010/14, "cash dispenser" means a self-service machine which, through the use of a bank card or other means, dispenses euro banknotes to the public, debiting a bank account, such as an ATM dispensing cash. Self-checkout terminals with which the public can pay for goods or services either by bank card, cash or other payment instruments, having a cash-withdrawal function, are also considered cash dispensers.



- Euro banknotes which have been checked for authenticity and fitness and classified as genuine and fit by trained staff members but not by a type of banknote handling machine successfully tested by an NCB may only be recirculated OTC.
- Annex IV of this Regulation addresses data collection from cash handlers. The objectives of data collection are to enable the NCBs and the ECB to monitor the relevant activities of cash handlers and to oversee developments in the cash cycle, and is based on some general principles: Data on banknote handling machines are only reported when the machines are used for recirculation; and Cash handlers regularly provide the NCB of their Member State with information on establishments where cash is handled such as branch offices, and information on banknote handling machines and cash dispensers. In addition, cash handlers that recirculate euro banknotes via banknote handling machines and cash dispensers regularly provide the NCB of their Member State with information on the volume of cash operations (number of euro banknotes processed) involving banknote handling machines and cash dispensers, and information on remote branches of credit institutions with a low level of cash operations where fitness checks are carried out manually.

2.3 Revised Payment Services Directive (PSD2) Art. 3

Directive (EU) 2015/2366 (known as PSD2) seeks to improve the existing EU rules for electronic payments. It takes into account emerging and innovative payment services, such as internet and mobile payments.

This [Directive](#) does not apply to the following (art. 3):

(e) services where cash is provided by the payee to the payer as part of a payment transaction following an explicit request by the payment service user just before the execution of the payment transaction through a payment for the purchase of goods or services;⁴

and

(o) cash withdrawal services offered by means of ATM by providers, acting on behalf of one or more card issuers, which are not a party to the framework contract with the customer withdrawing money from a payment account, on condition that those providers do not conduct other payment services as referred to in Annex I (of PSD2). Nevertheless, the customer shall be provided with the information on any withdrawal charges referred to in Articles 45, 48, 49 and 59 before carrying out the withdrawal as well as on receipt of the cash at the end of the transaction after withdrawal.⁵

2.4 Examples of Specific national dispositions

2.4.1 Austria

In Austria, the Central Bank (OeNB) outsourced the cash operation to a subsidiary, Geldservice Austria (GSA), a joint venture with the Austrian banks and the Post. GSA is responsible for 100% of the cash in circulation in Austria. Almost all the Austrian banks outsourced their main vaults and cash processing to the same company – GSA. Every banknote passes the cash centres of GSA 3 to 5 times per year (depending on denomination and series).

The OeNB monitors the cash in circulation, manages the long and short-term demand in cooperation with ECB and is the governing body of GSA. Cashback is allowed in Austria and offered by some retailers but has little public acceptance. OeNB and GSA

⁴ In practice, this exemption describes the cashback practice

⁵ In practice, this exemption corresponds to Independent ATM Deployers (IADs)



are not encouraging this service because checking of quality (stains, ...) and counterfeits is only done manually by retailers' employees and may lower the standards of banknotes in circulation.

2.4.2 Belgium

Banks that provide cash services sign, on a bilateral basis, a cash contract with the central bank (National Bank of Belgium) to organise the cash logistics behind the cash cycle. The contract has been negotiated at sector level and is the same for every bank. Since January 2017, the central bank offers free basic services only (boxes of 10,000 banknotes); before that period the central bank charged for processing smaller volumes (<10,000 banknotes). This new strategy of the central bank creates opportunities to increase recirculation in private cash centres (e.g. CIT companies). However, at the same time, the central bank wants to process a minimum volume on its own machines. This demand from the NCB might be an obstacle for increased recirculation in private cash centres in the future.

2.4.3 France

Based on the decision ECB/2010/14 of 16 September 2010, the French legal framework on recirculation was amended on 1 January 2011.

In France, private operators are allowed to sort and recirculate banknotes and coins if they bilaterally sign agreements with Banque de France for processing and / or distribution. They are then subject to obligations, such as the use of positively tested machines (as tested under the ECB framework) and the periodic reporting of statistical data.

The recirculation of banknotes by private operators is monitored on a permanent basis by Banque de France from the perspective of compliance with the obligations set out in the agreements and through regular on-site checks to verify the operation of machines and the procedures implemented by the operators.

In the event of a crisis, Banque de France may authorise, on an exceptional and temporary basis, institutions which have not signed any agreement to carry out manual recirculation of banknotes to supply their ATMs in order to ensure business continuity. These operations however should be carried out by staff trained in the authentication of banknotes.

Related to PSD2 transposition, France decided to insert in the national law the exemption for the service of cashback and therefore to allow such service to be provided by retailers.

2.4.4 The Netherlands

The Dutch National Bank and the Dutch banks have agreed on the goal to reducing cash logistic movements as much as possible. The following processes are used:

- Discouraging ordering and depositing of the same denomination in the same week from a bank to the Dutch National Bank, by using penalties.
- Facilitating the exchange of amounts of banknotes of the same denomination from a bank that doesn't need them to a bank that needs them ("matching"). This is further facilitated by using the same cash centres in the case of the three biggest banks in the Netherlands. Matching can be used as well between cash centres of the banks and cash centres of the CITs.
- Encouraging storing banknotes overnight in the cash centres of banks and the CITs by using the instrument of "consignment".
- By using the same cash centres, the effectiveness of the above instruments is augmented.



2.4.5 Spain

The Spanish NCB addresses the major part of its regulation in the “Aplicaciones Técnicas de Efectivo” (Cash technical usages), in particular in ATE 1/2016 “Servicio de Caja del Banco de España” and ATE 2/2015 “Selección y tratamiento de billetes en euros de las entidades adheridas en los centros de selección”. The last 3 years more and more convergence to EU Regulation is experienced in Spain, and some singularities have disappeared. For instance, when it comes to the management of coins.

The Spanish NCB has started on 21-7-2017 a pilot project to perform checks on PSP branches – the NCB is checking if the implemented recirculating mechanisms are applied according to the banknote framework. Further, the NCB is auditing the level of training of the employees and is focusing their checks into the counterfeit detection and management of the counterfeit. Finally, the NCB is supervising how the PSP is periodically auditing all these procedures.

Pilot inspections have begun at the end of November 2017 and have lasted a few months, with an informative, non-punitive nature, and is used to adapt the NCB inspection procedures and management by the PSPs.

3 Some Data

Figure 2: Third parties share in banknote recirculation is based on data provided by the ECB. It shows the ratios of third party recirculation in overall recirculation per country and has been calculated according to the BANCO methodology⁶. The indicators are calculated by the formulas agreed by BANCO and are based on semi-annual data and cover the recirculation done on the banknote handling machines (BHMs) pursuant to ECB Decision 2010/14. The OTC transactions and manual recirculation are not covered.

⁶ The BANCO methodology uses the following formula: the recirculation ratio is calculated as the number of notes recirculated by credit institutions (CIs) and other cash handlers (CHs) / (Number of notes recirculated by CIs and other CHs + Number of notes returned to NCBs + Number of notes issued by notes-held-to-order (NHTO) banks). If the (number of notes returned to NCB - the number of notes returned from the whole sale banks) is lower than the number of notes issued by NCB, the number of notes returned to NCB - the number of notes returned from the whole sale banks is used. If the (number of notes returned to NCB - the number of notes returned from the whole sale banks) is higher than the number of notes issued by an NCB, the number of notes issued by NCB is used.

Third parties' share in banknote recirculation



Source: ECB
 Note: Due to methodological differences the ratio may deviate from the ratio used by NCBs. OTC transactions are not considered

Figure 2: Third parties share in banknote recirculation

In 2016-H2, the recirculation rate for the Eurosystem as a whole was 40,4%, however, distinct differences at national level could be observed. Countries like Germany, France, Cyprus, Malta, Austria and the Slovak Republic were below the Eurosystem average, and Belgium, Estonia, Ireland, Spain, Italy, Latvia, Lithuania, the Netherlands, Portugal, Slovenia and Finland were above this average whilst Luxembourg had nothing reported at all.

There seems to be no clear correlation between the levels of recirculation and high or low levels on the use of cashless transactions and the use of cash (see Annex 7.3 for more details on these levels). However, when compared to the density of NCBs and PSP Offices per country (see section 4.1) it can be observed that countries with low density rates of these offices seem to have higher recirculation rates.

When looking at recirculation rates at banknote level, there is a paucity of data with respect to banknote recirculation. This paper hence resorts to a proxy, i.e. focusing on banknotes returned to central banks and attempts to infer from these data observations as to the possible evolution of banknote recirculation. Of course, this approach presents the difficulty of not being able to segregate recirculation by commercial banks from recirculation by other actors and channels.

Annex 7.1 contains charts that are extracts from the ECB Statistical Warehouse.

Table 1: Data on Banknotes (Source: ECB) below summarises, for comparison purposes, relevant data for the periods 2014 and 2017 (quantities of banknotes, in millions, evolution and return rates are computed by EPC). Returned means the number of banknotes returned to the reporting NCB during the reporting period.



Euro area	Total	500	200	100	50	20	10	5
Share of Circulation (End 2017)	100%	2,4%	1,2%	12,3%	45,9%	17,9%	11,7%	8,7%
Circulation 2014 (millions)	17.528	606	204	2.016	7.509	3.233	2.244	1.716
Circulation 2017 (millions)	21.407	514	247	2.624	9.826	3.830	2.504	1.863
Evolution	+22,1%	-15,2%	+21,1%	+30,2%	+30,9%	+18,5%	+11,6%	+8,6%
Returned 2014 (millions)	35.894	180	75	1.193	11.079	10.660	8.927	3.780
Returned 2017 (millions)	34.012	175	71	1.247	10.846	10.132	8.118	3.423
Return rate 2014	2,05	0,30	0,37	0,59	1,48	3,30	3,98	2,20
Return rate 2017	1,59	0,34	0,29	0,48	1,10	2,65	3,24	1,84
Evolution return rate	-22,4%	+14,6%	-21,8%	-19,7%	-25,2%	-19,8%	-18,5%	-16,6%

Table 1: Data on Banknotes (Source: ECB)

The following observations can be made:

- The volume of banknotes in circulation increased significantly between 2014 and 2017. All series are affected (except the 500 banknotes). This increase in circulation is too significant to be explained by the expansion of the Eurozone to Latvia (2014) and Lithuania (2015). One possible explanation is that cash is not only used as a means of payment, but also as a store of value, with almost a quarter of consumers keeping some cash at home as a precautionary reserve⁷, possibly in the context of a low-interest rates environment.
- The rate of return (i.e. banknotes returned / banknotes in circulation) decreased between 2014 and 2017 for all series, again except for the 500 banknotes).
- It should be highlighted that the decrease in return rates between 2014 and 2017 is significantly more marked for the 50, 100 and 200 denominations, than for the 5, 10 and 20 denominations.
- The 5, 10, 20, and to a lesser extent the 50 banknotes, can be considered as “transactional banknotes” – which means these are the most used in daily transactions (see also share of circulation).
- It should also be highlighted that overall, the return pattern for the 5 EUR note remained pretty flat almost since 2002. The 10, 20, 50 and 100 banknotes have relatively similar return patterns, increasing over the early period and only starting to flatten out recently. The 200 banknotes began a decreasing pattern almost in 2002, whilst the 500 banknotes stand out with a very distinct pattern over the whole period.
- It is also worth noting that the ECB starting issuing new banknotes (the Europa series): the new 5 EUR note has been introduced in 2013, the new 10 EUR note in 2014, the new 20 EUR note in 2015, and the new 50 EUR note in 2017. Furthermore, the ECB announced that the EUR 500 note issuance will be stopped once the issuance of the Europa series has been completed. These facts and announcements might have impacted the return flows.

⁷ As per ECB [Occasional Paper Series](#), “The use of cash by households in the euro area”, No 201 / November 2017



4 Best practices

4.1 A multifaceted Eurozone landscape

The organisation of the cash supply chain varies from country to country and depends on, e.g. the structure of the central bank, including its branch network, the banks and their branch networks, the payment habits of the public, the infrastructure of CIT companies operating on the market, and the geography of each country, its history and traditions.

For these reasons, a "one-size-fits-all" approach to national cash cycles in the euro area is not realistic at this point in time. Despite these differences, the goal is however to aim for a greater convergence of the cash services and recirculation. Indeed, coherence with the policy makers' objective of a single market (that translates into a series of Directives and Regulations aiming inter alia at harmonising conditions between Member States) must be ensured. Increased harmonisation and integration will allow stakeholders to obtain greater benefits from the single currency.

Recirculation occurs and may occur in a variety of locations and channels. Figure 1: Layers of Recirculation already outlines various layers of recirculation. In random order – i.e. not an indication of preference, recirculation can occur as outlined in Table 2: Examples where recirculation can happen⁸:

Actor	Location	Device
CIT / CMC	Cash Centre	Dedicated Machines
PSP	Bank Branch	ATM with recirculation function
PSP	Remote Location	ATM with recirculation function
PSP	OTC	Front Office Machine or trained staff
Retailer	Shop	ATM after mandatory fitness and authenticity checking as per ECB regulation
Retailer	Shop	No device use: cashback over Counter

Table 2: Examples where recirculation can happen

It should be stressed that the counterparty to a recirculation transaction – i.e. the transaction where cash is being put in circulation again - is the debit to an account held with an account servicing payment service provider. Although up to now such debit is usually triggered by a card-based instruction, any form of instruction is in scope of this paper, e.g. SCT Instant payments could be considered as well.

The recirculation "mix" of any Member State will depend on a range of factors:

- The usage of cash in that Member State compared to other payment instruments (and the pattern of usage of non-cash payment instruments – which leads to the former);

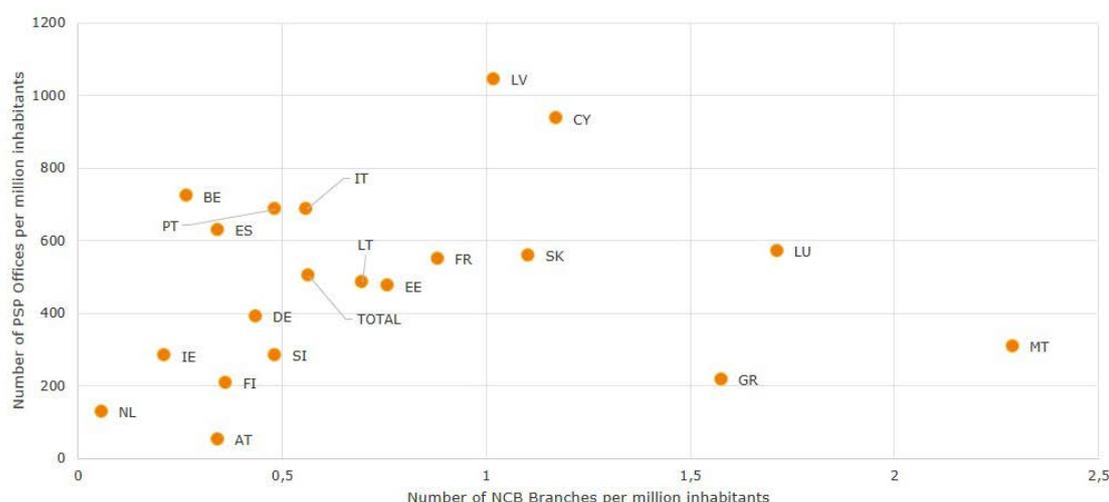
⁸ The ECB identifies other actors as well, but for the sake of clarity the overview has been limited as per this table. Casinos and Traders can be considered as Retailers, and Bureaux de Change can be considered as PSPs.

- Decisions taken (or not) by NCBs with respect to the number of locations they maintain, the distance and ease of access to these locations, their opening hours;
- The flexibility allowed by the NCB with respect to recirculation, including by retailers;
- Possibilities for stakeholders (banks, retailers, cash centres) to put overnight cash off-balance sheet subject to certain restrictions by NCBs;
- Decisions taken (or not) by the banking community and banks individually with respect to access to ATMs, the number of remaining bank branches, and the establishment of shared cash centres;
- The level of the dialogue between the NCB, the banking community, and other key stakeholders;
- The relative (Member State-wise) density of services made available by NCBs and banks.

The latter factor is reflected in the following graphs. These graphs are based on data and definitions as specified in Annex 7.2.

Figure 3: NCB and PSP Offices per country per million inhabitants plots, per country, the number of branches and offices per million inhabitants:

NCB and PSP Offices per country per million inhabitants



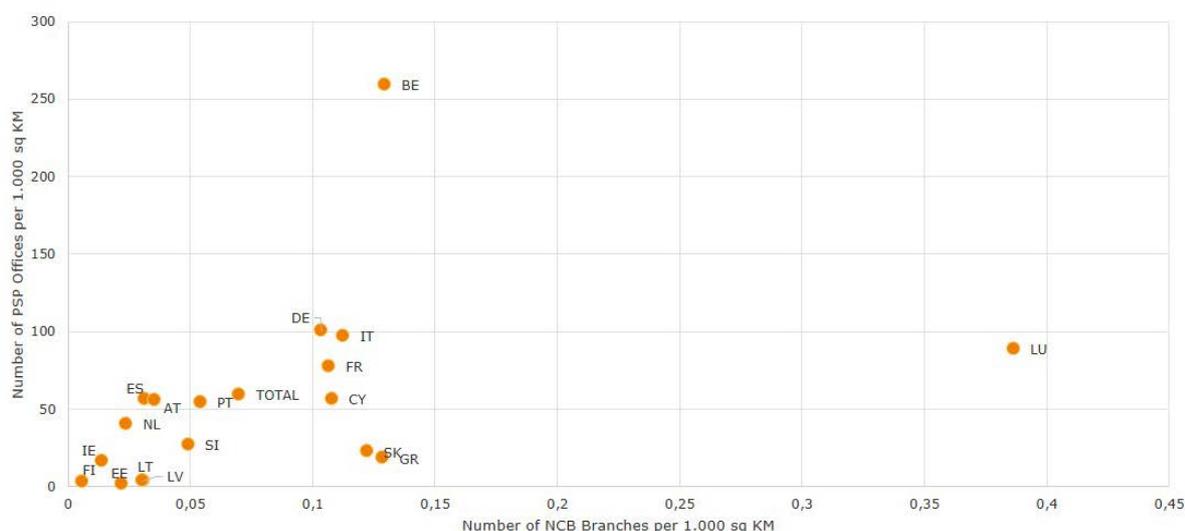
Source: ECB Statistical Data Warehouse

Figure 3: NCB and PSP Offices per country per million inhabitants

Figure 4: NCB and PSP Offices per 1.000 square KM plots per country, the number of branches and offices per 1.000 square kilometres. Please note that Malta is not included in this graph.



NCB and PSP Offices per country per 1.000 square KM



Source: ECB Statistical Data Warehouse

Figure 4: NCB and PSP Offices per 1.000 square KM

The following sections provide some examples of how Member States improve the level of recirculation. Either the mention of a country or its absence has no specific meaning: the list is illustrative and not exhaustive.

4.2 Cash Centres and best practices (CITs and PSPs)

Cash centres are places where banknotes are checked for authenticity and fitness, counted, sorted and packed. They play an essential role in the cash cycle.

According to ECB figures ([ECB 2016 Annual Report](#)), the NCBs within the euro area checked the authenticity and fitness for circulation of some 32.3 billion euro banknotes in 2016, withdrawing from circulation around 5.4 billion of them. Credit institutions and other professional cash handlers (CIT companies) checked some 33 billion euro banknotes for authenticity and fitness. It is the first time that recirculation by banks and other private cash handlers overtakes recirculation by Eurozone central banks. Banks and other private cash handlers take advantage of the possibility of recirculating euro banknotes to handle the cash cycle in a more cost-efficient manner.

One of the main objectives of a cost-efficient cash cycle in general and of recirculation in particular is to shorten the cash cycle, in terms of both time and distance. On the one hand, this can be achieved by limiting transport over (public) road and, on the other hand, by reducing the number of times that banknotes are counted before they are being booked. Therefore, when banknotes are deposited in a private cash centre (belonging to a bank or CIT company) to be counted and sorted, it is preferable to check the banknotes for authenticity and fitness in the same place in order to avoid transport to the central bank. Even destroying the unfit banknotes (under supervision of the Central Bank) could be considered. There are different reasons why unnecessary transport should be avoided: less transport over public road means there is less possibility for criminals to attack the vehicles and staff, which will result in a higher level

of security. Less transport means less CO2 emissions and thus a more environmentally friendly way of working. And, last but not least, less transport lowers the cost of cash.

4.2.1 Austria

Austrian Example

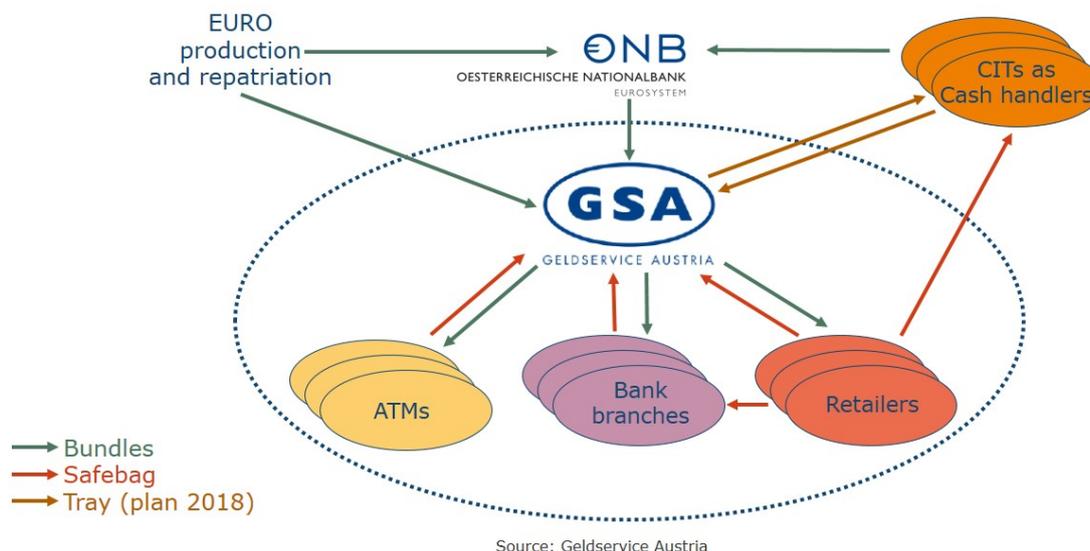


Figure 5: Austrian Example (Source: GSA)

The Austrian banks digitalise their services and resize their branch networks. More self-service zones are established where new multifunctional devices are installed (Cash recirculating machines - CRMs). In 2017 about 8.900 self-service devices were in use. About 50% are operated by GSA (4.800 machines). The rest of the devices are replenished by the employees of the banks. Of the 4.800 machines 1.400 are CRMs. Hence a growing number of banknotes is recirculated via CRMs at the branch level.

As a ceteris paribus "high cash usage country" (see Annex 7.3 for a comparison between countries), Austria permanently optimises cash handling processes and services. The latest development is the implementation of cash-terminals located at the back office of retailers. Cash is booked daily at the bank account and stays in the machine until value/banknote-limit is reached. That means reduction of transport cost. Other countries like e.g. Spain uses this technology already on a big scale.



Cash is widely used in Austria, even for transactions above €100:

Payment instrument share by transaction value, according to amount categories

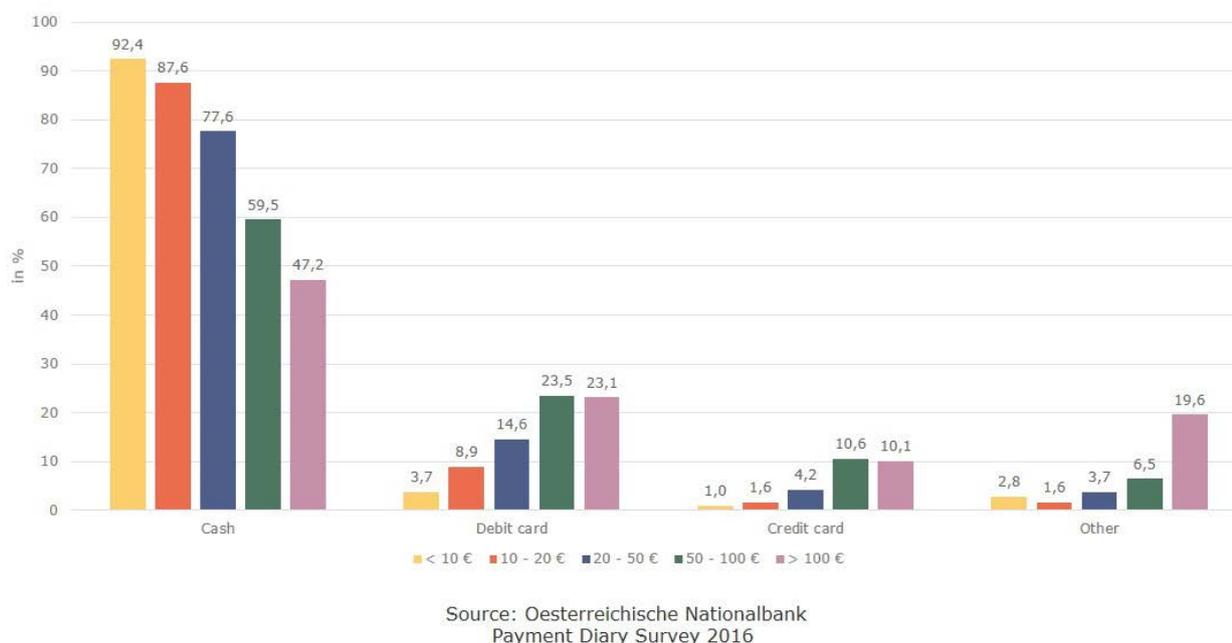


Figure 6: Payment behaviour in Austria (Source: OeNB)

4.2.2 Portugal

The cash recirculation level in Portugal (between commercial banks and the Central Bank) is around 80%. This situation is the result from market evolution, i.e. procedures naturally adopted by banks and CIT's, and does not derive from any specific regulation or formal directive.

Even though the main source for this level of recirculation resides in a positive cooperation between the different commercial banks, and between these and the CITs (at the level of their Cash Centres), it is also notable that the adoption of increased recirculation procedures receives a strong encouragement by the Central Bank.

This recirculation level reflects that there is a high degree of confidence in CITs and that processes to carry out regular checks and controls are in place.

4.2.3 Spain

In Spain a system of auxiliary cash centres is used to extend the network of the NCB, called SDA or "Sistema de depósitos auxiliares". This system could be considered into the NHTO (notes held to order) model. There are 4 players in this model:

- Banco de España (NCB): It contracts the SDA service to a company called Iberpay.
- Iberpay: a company owned by the banks and regulated by the NCB. It contracts the CITs for their cash centres services.
- CITs: They supply cash centres and the connections to NCB's branches.
- PSPs: They contract the CITs for their cash management services such as transport, storage and validations, always under the banknote framework rules.



This system allows NCB to minimize its network, and it offers a network of 49 cash centres all around Spain which is quite complicated.

4.3 Recirculating machines

Recirculation machines are referring to any type of device, owned by any kind of stakeholder.

Only the types of banknote handling machine that have passed a test at a NCB and on which the manufacturer has provided the testing NCB with all requested information are listed on the relevant ECB webpage and can be used in compliance with the ECB recirculation framework. Machines are separated into customer-operated machines (which are used in the front office) and staff-operated machines (which can be used in both front and/or back office).

New machine types that have passed the NCB test will be published on the ECB webpage within one month following the date on which the respective test was completed.

Banknotes detected and authenticated using these devices allow the owner of the recirculation machine to hand over these banknotes to public by loading banknotes to ATMs or using withdrawal feature of the actual machine.

Machines that are only suitable for withdrawal are aimed to be replaced by machines with recirculation capabilities, whenever life cycle management, or client-oriented choices (less machines locally, new formulas of branches) request that decision.

In fact, the new machine-lines that are presented by the suppliers, aim for the combination of depositing/withdrawing – cash recirculation machines (CRM) instead of offering Cash in Machines (CIMs) or Cash out Machines (COMs). The widespread introduction of CRMs could be vital to the smooth circulation/recirculation of cash.

Obviously achieving a 100% balance between deposits and withdrawals in CRMs is not a realistic objective.

4.3.1 Belgium

In Belgium on a total of over 8,000 ATMs managed by banks (end 2016), more than half have a “recirculation function”. The number of banknote deposits have doubled from 16 million in 2010 to 31 million in 2016; this growth stabilized in recent years. So, it should be clear that ATM recirculation machines play a major role in an efficient cash cycle. Customers (retailers and consumers) can deposit (and withdraw) their cash irrespective the opening hours of the bank branch. Less transport and servicing is needed thanks to the recirculation function. Less transport on public road means higher level of security and is helping creating a better environment.

4.3.2 Finland

Theoretically, recirculating banknotes deposited by one customer and withdrawn by another customer could generate savings due to lesser needs for CIT visits. So far success stories showing a balance between banknotes deposited and banknotes withdrawn are however rare. With a fleet of 100 devices only, few recirculating devices show such balance. At the same time the need for 1st line or 2nd line maintenance is substantially higher due to the poor quality of some banknotes or customers accidentally depositing e.g. a piece of paper etc. as part of a note bundle. Experiences have proven that CIT´s visits are actually higher at recirculating ATMs compared with CIT replenished only ATMs.

4.3.3 The Netherlands

Cash still plays an important role in the Netherlands, despite the substantial increase of electronic payments at the point-of-sale and other upcoming P2P-payment methods. In

2018 it is expected that still 40% of the number of payments in the shops will be done with cash.

Cash Service Netherlands (in Dutch GSN) handles cash transactions for a number of large banks in the Netherlands. Rabobank, ABN AMRO and ING are the shareholders of GSN. In addition to these banks, the Volksbank and a number of IAD's also operate ATM's in the Netherlands. The GSN banks cover roughly approximately 90% of the Dutch ATM volume.

GSN counts and distributes the money for these three banks. It also takes care of the filling, emptying and technical maintenance of the banks' cash dispensers. Other banks can also use their services. GSN wants to relieve their customers as much as possible and strive for continuous improvement of their services. Their ultimate goal: to guarantee the availability and affordability of cash in the Netherlands.

Dutch Example

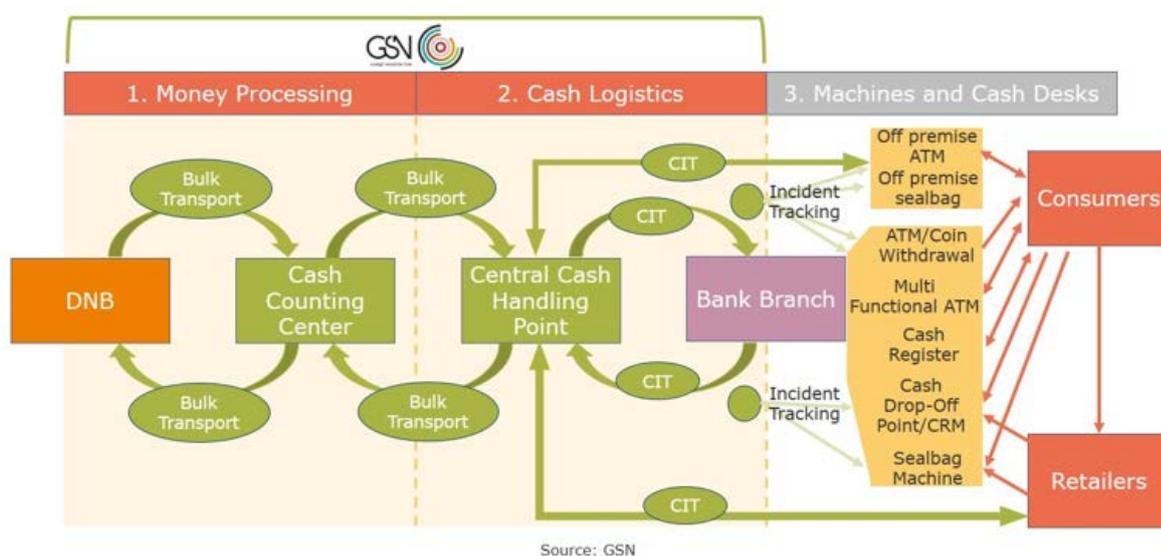


Figure 7: Dutch Example (Source: GSN)

GSN focuses on the execution of two main activities:

- 1. Cash processing
- 2. Cash logistics

More recently, in 2017, ABN AMRO, ING, Rabobank and GSN signed a cooperation agreement. This agreement was drawn up in close consultation with the National Bank (DNB), which is based on proven successful initiatives in Sweden and Finland that are leading the way for the situation in the Netherlands.

A project is currently under way in which all Dutch stakeholders in relation to cash use are involved. The first ATM via the new platform will be operational in July 2018. White label ATM's will be in operation on this new platform.

The 3 banks participating in GSN will hand over to GSN as a best practice to invest in CRMs instead of COMs (only) or CIMs (only). At this moment, those CRMs add up to approximately 1.000, of which some in public places instead of in bank branches. It is to be expected, therefore, that the percentage of CRM in the total ATM estate will grow over the next years, to stimulate recirculation locally further on.



4.4 Cashback

Definition: a cashback facility is a service whereby the customer pays electronically a higher amount to the retailer than the value of the purchase for goods and/or services and receives the difference back in cash. In PSD2 this service is defined as services where cash is provided by the payee to the payer as part of a payment transaction following an explicit request by the payment service user just before the execution of the payment transaction through a payment for the purchase of goods or services.

As of today, it cannot be stated that cashback is a common practice among European countries. In those already offering such a service, the usage is based on a range of procedures: the maximum amount differs from one country to another, as well as the minimum required amount of purchase.

Banks are considering such a solution with the following comments:

- Cashback is a positive answer to improve the efficiency of the cash cycle by reducing the circuit of banknotes.
- Retailers are able to offer it to customers under their own responsibility under the PSD2 regulation and with local rules if applicable. PSPs are only involved in card processing and potentially other payment instructions' processing to validate and finalise the transaction.

5 What could stakeholders in society do to foster recirculation?

There are a range of possibilities for stakeholders in society to foster recirculation. Stakeholders are invited to consider for implementation the (non-mutually exclusive) examples presented below:

- NCBs could be stimulated to store their own cash in Cash Centres of PSPs and/or service providers like CITs. Instruments to stimulate that are "Notes Held to Order"⁹ and "consignment". These instruments would limit cash transports to and from NCBs.
- NCBs could be stimulated to perform "matching" of cash. This instrument stimulates cash owners, like PSPs, to exchange cash denominations, which is settled via NCB accounts (TARGET2). This instrument would limit cash transports to and from NCBs.
- In fact, NCBs are able to set rules to restrict ordering and depositing of the same denomination by the same cash owner within a period of time. This is called "ban on overlap" and can in fact lead to penalties if the cash owner orders twice the same denomination while depositing this denomination in the same period, e.g. a week. By this rule, cash owners, like PSPs, are discouraged to transport cash to and from NCBs and are encouraged to keep cash available for recirculation and to exchange cash by matching.
- NCBs can stimulate the counting and sorting to be executed by others than themselves and this is even possible for verification of the category 2 and 3 banknotes. The role of an NCB is more and more focussed on the caretaker part, instead of the operations itself. An audit approach and testing activities will be the main instrument of an NCB, to make sure cash operations takes place with the right licence to operate.
- Providers of cash services, like PSPs and/or IADs are able to invest in CRMs, rather than single COMs and single CIMs. This facilitates recirculation locally. To make sure recirculation really takes place, it is important not only to invest in technology

⁹ Please refer to the document "Improving the efficiency of the handling of cash - Cash Cycle Models", European Payments Council, document reference EPC037-13, Version 2.0, 13 December 2013.



(hardware, software, firmware), but in steering public behaviour as well, in order to make sure CRMs are not used as CIMs or COMs in practice. The most drastic way would be to ban COMs, with the result that withdrawals are executed only at CRMs with a fair chance that the cash was deposited earlier by another customer.

- Retailers should be able to replenish ATMs whenever possible, under specific security requirements and regulation.
- Hardware suppliers should invest more and more in CRMs and not in COMs and CIMs, to make sure the CRMs are affordable, less subject to failure and able to recognize banknotes and coins, as ruled by the ECB. Investments are necessary in machine technology, in particular to make machines fail-proof and user-friendly as well, because a vast amount of the disruptions are the result of depositing 'mistakes' by customers.
- Experiments could be conducted by large retailers to enable smaller retailers in their vicinity to deposit cash.
- A smart national location policy for offering cash services might be useful as well. By addressing this topic more and more on a societal level, rather than a policy of each cash provider, it's more possible to give the public access to depositing and withdrawal facilities where needed and where deposits and withdrawals meet. This also means that local recirculation should not only take place in PSP branches. In fact, this might be one of the least suitable places and less available in the coming years. Of course, safety aspects are very important to address, but it is a great advantage to consider the whole public and private (retailers) area as a possibility to offer cash services and cash recirculation especially.

6 Conclusions

In essence PSPs and other participants in the cash value chain pursue two main, complementary strategies:

- Shortening and fastening and thus optimising the cash cycle.
- Continuing and reducing manual handling and any redundant processes.

It is indispensable to pursue these strategies in order to continue and allow convenient and affordable access to fit and trusted cash in a context where NCBs reduce their physical presence and their range of services to financial institutions.

For PSPs and other participants in the cash value chain to be able to deliver on the expectations of the public, it is necessary that the Eurosystem ensures that no unnecessary burden is placed on the distribution and recirculation of banknotes.

Furthermore it would be helpful if the Eurosystem considered either extending the scope of existing regulations (e.g. the Level 3 control, which is actually reserved to the central bank only, could be applied to CITs under the control and supervision of the ECB), or stepping up to a more risk-based approach (e.g. it could be tested whether a differentiated fitness and counterfeit checking approach to the different denominations of banknotes – e.g. having less stringent requirements for retailers with respect to the 5, 10 and 20 series – would have negative consequences on handling processes and the perception of cash).

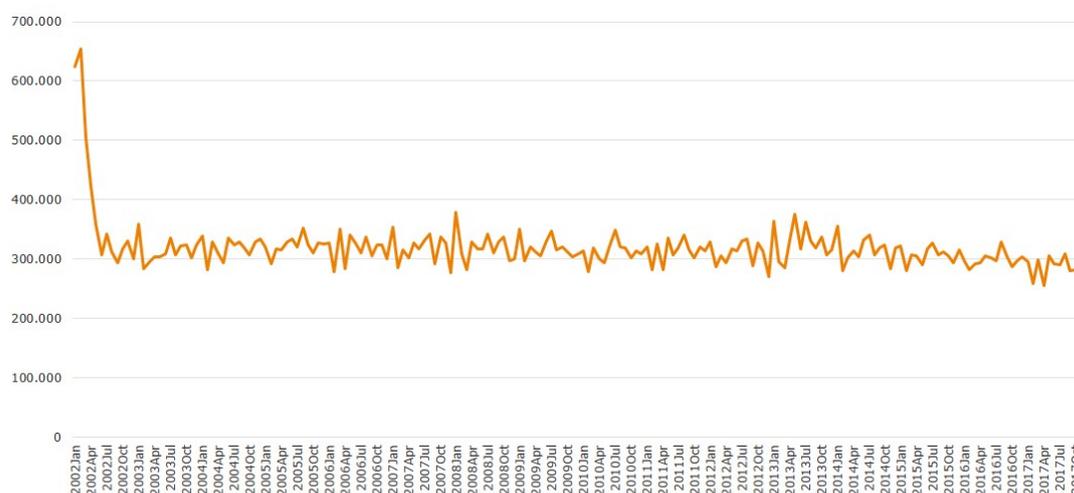
Finally, it is important not to lose sight of the fact that recirculation of euro banknotes takes place in a context where policy makers foster a single market in all its dimensions (from a SEPA to a DSM). Hence differences of treatment between Member States will become unacceptable (in particular as they distort the level playing field) and will have to be removed.



7 Annexes

7.1 ECB Charts on banknotes returned from circulation

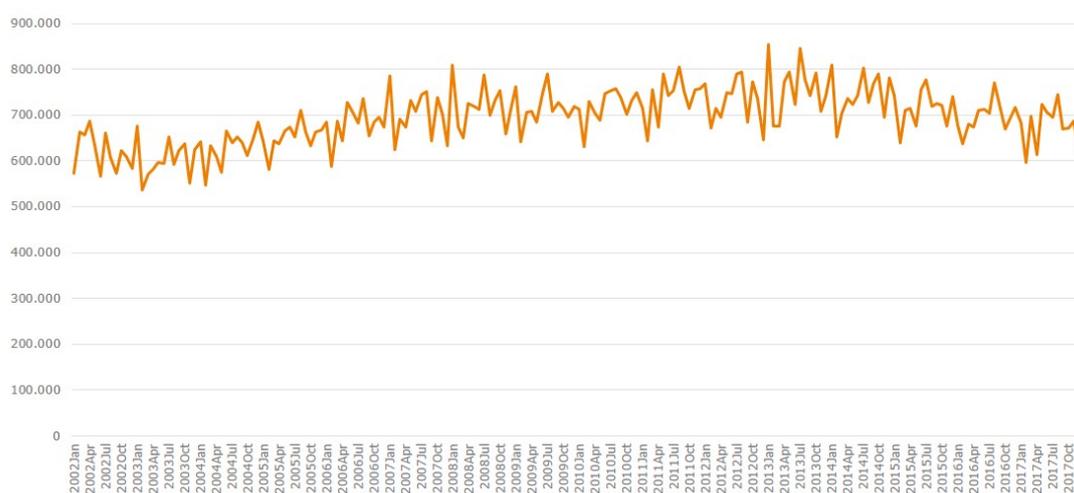
Number of banknotes returned from circulation (thousands) – EUR 5, all series



Source: ECB Statistical Data Warehouse

Figure 8: Number of EUR 5 banknotes returned from circulation

Number of banknotes returned from circulation (thousands) – EUR 10, all series

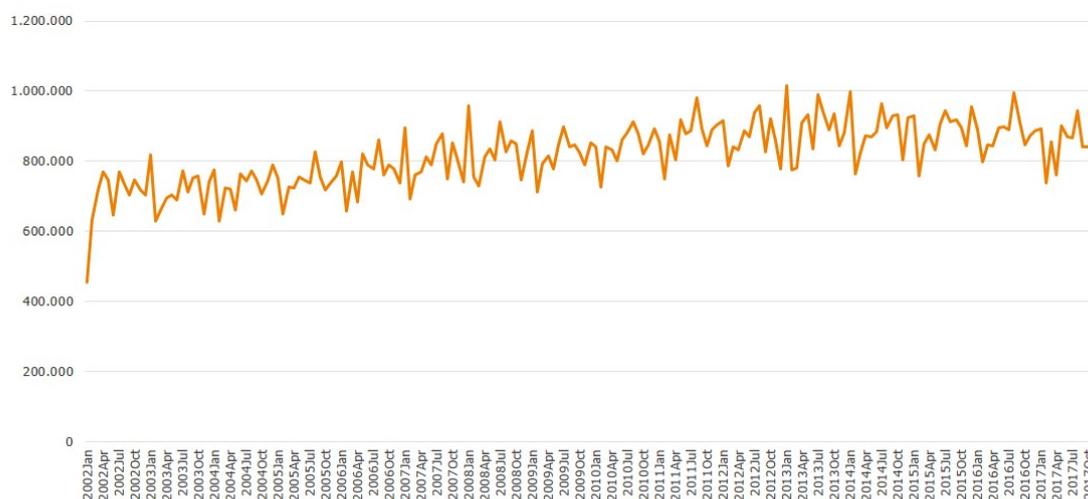


Source: ECB Statistical Data Warehouse

Figure 9: Number of EUR 10 banknotes returned from circulation



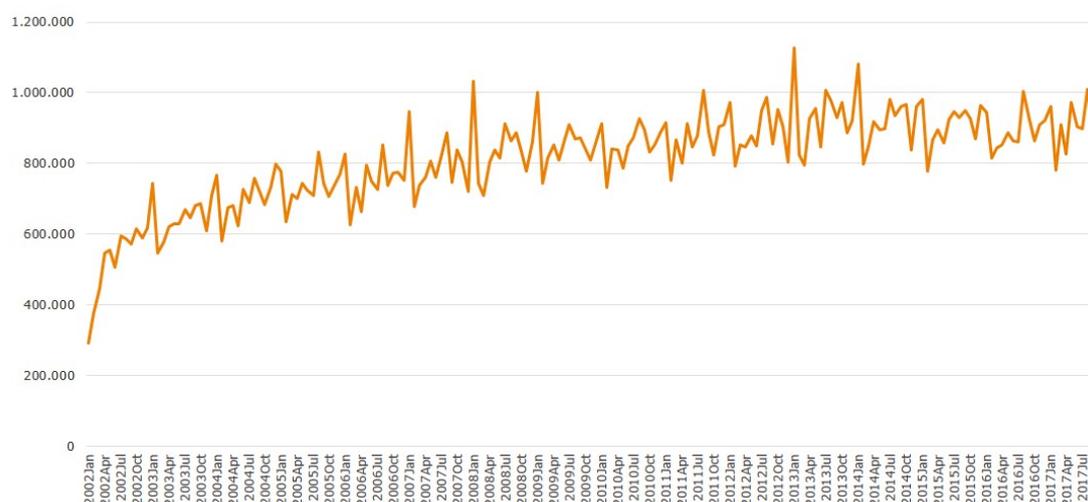
Number of banknotes returned from circulation (thousands) – EUR 20, all series



Source: ECB Statistical Data Warehouse

Figure 10: Number of EUR 20 banknotes returned from circulation

Number of banknotes returned from circulation (thousands) – EUR 50, all series

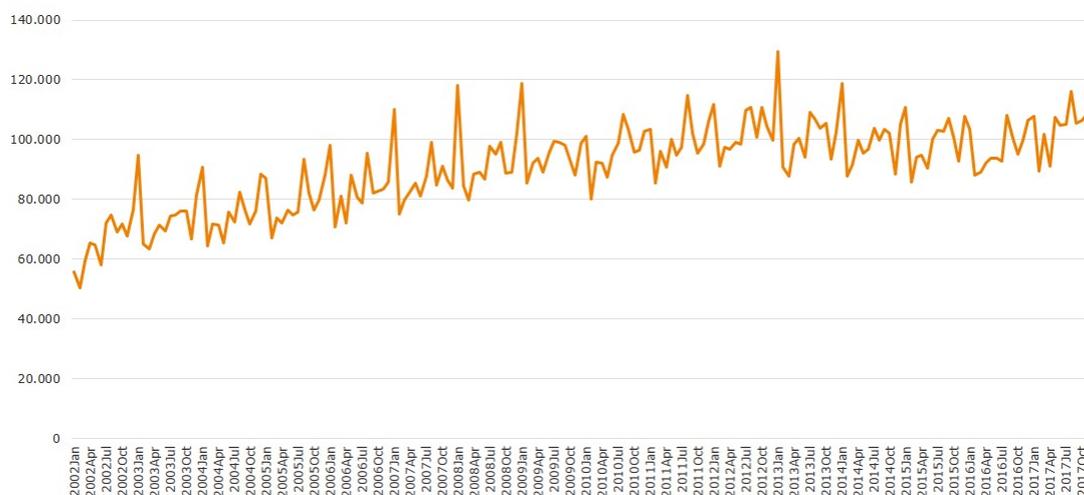


Source: ECB Statistical Data Warehouse

Figure 11: Number of EUR 50 banknotes returned from circulation



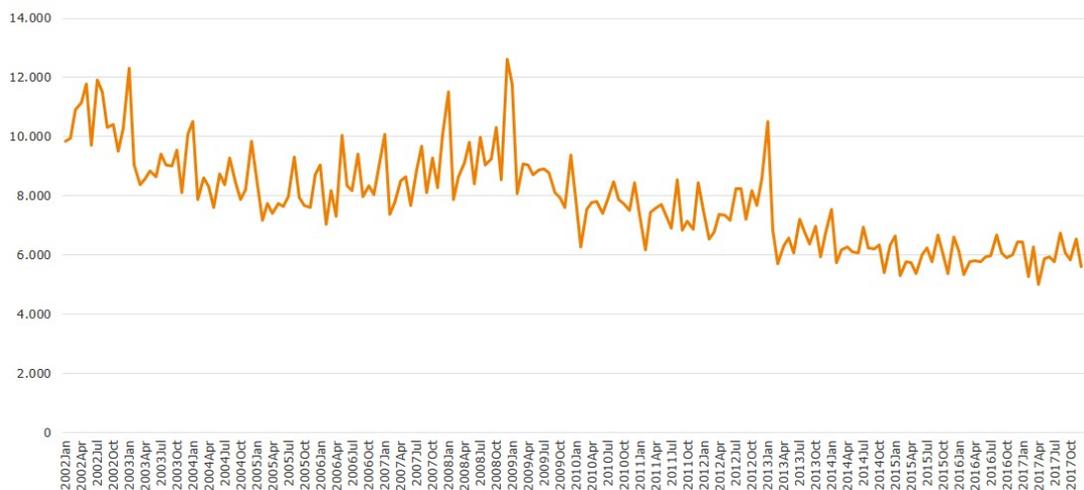
Number of banknotes returned from circulation (thousands) – EUR 100, all series



Source: ECB Statistical Data Warehouse

Figure 12: Number of EUR 100 banknotes returned from circulation

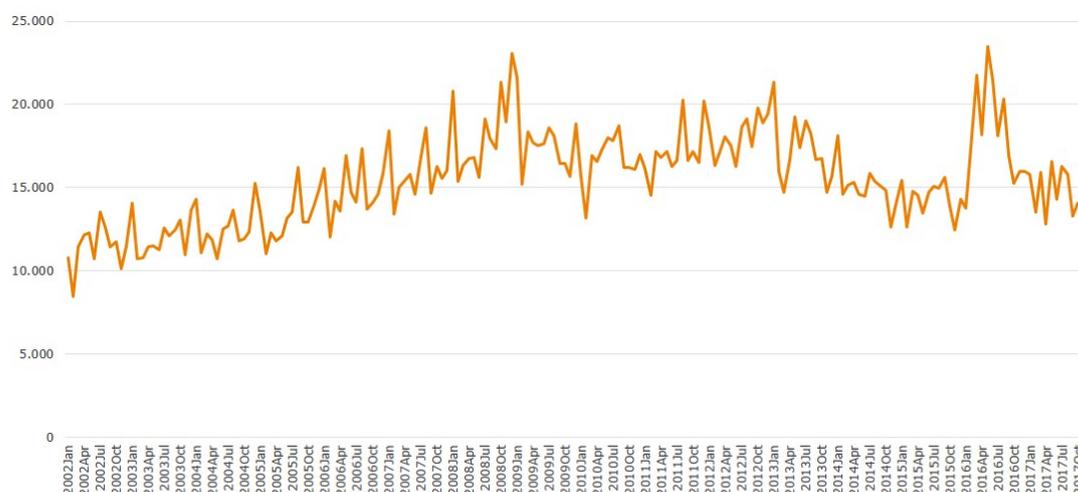
Number of banknotes returned from circulation (thousands) – EUR 200, all series



Source: ECB Statistical Data Warehouse

Figure 13: Number of EUR 200 banknotes returned from circulation

Number of banknotes returned from circulation (thousands) – EUR 500, all series



Source: ECB Statistical Data Warehouse

Figure 14: Number of EUR 500 banknotes returned from circulation

7.2 NCB Branches and PSP Offices offering payment services to the public

The table below shows the number of branches of NCBs, the number of offices of PSPs that offer payment services to the public and some background data on the countries. The exact definitions are provided after the table. All information is based on data from the ECB as per ultimo 2016, except the country surface which is based on information from the [CIA World Factbook](#).



Country	Number of NCBs' Branches	Number of Offices of PSPs offering payment services to the public	Population (millions)	Country surface (in thousand square kilometres)
Belgium	3	8.131	11,271	30,828
Germany	36	32.215	82,491	357,022
Estonia	1	624	1,316	45,228
Ireland	1	1.321	4,683	70,273
Greece	17	2.348	10,784	131,957
Spain	16	29.190	46,468	505,370
France	59	36.673	66,858	551,500
Italy	34	41.667	60,623	301,340
Cyprus	1	798	853	9,251
Luxembourg	1	333	584	2,586
Latvia	2	2.046	1,961	64,589
Lithuania	2	1.395	2,869	65,300
Malta	1	135	437	0,316
Netherlands	1	2.169	17,030	41,543
Austria	3	454	8,739	83,871
Portugal	5	7.072	10,326	92,090
Slovenia	1	587	2,065	20,273
Slovakia	6	3.038	5,431	49,035
Finland	2	1.137	5,495	338,145
TOTAL	192	171.333	340,282	2.760,517

Table 3: NCB Branches and PSP Offices offering payment services to the public

Data used for the number of PSP Offices offering payment services to the public are in fact the ECB data for the number of offices of institutions offering payment services to non-Monetary Financial Institutions (MFIs).

As per the ECB, institutions offering payment services to non-MFIs comprises the following legally independent institutions operating in the reporting country:

- central bank;
- credit institutions legally incorporated in the reporting country (up to April 2011 includes electronic money institutions);
- branches of euro area-based credit institutions;
- branches of European Economic Area (EEA)-based credit institutions (outside the euro area);
- branches of non-EEA-based banks;
- electronic money institutions;
- other PSPs.

These sub-categories are mutually exclusive. The total number of institutions is the sum of all sub-categories.

A Non-MFI is defined by the ECB as any natural or legal person who/which does not belong to the MFI sector. For the purposes of payments statistics, all PSPs are excluded from the non-MFI sector. The non-MFI sector comprises general government including central government, other financial intermediaries and financial auxiliaries, insurance corporations and pension funds, non-financial corporations, households and non-profit institutions serving households.

The number of offices is defined by the ECB as the number of places of business in the reporting country. Each place of business set up in the same reporting country is counted separately. Includes only those offices (regardless of their size and operating hours) that provide payment services with cashless clearing and settlement. Mobile offices are not included. The head office of the institution is counted as an office if it offers payment services with cashless clearing and settlement.

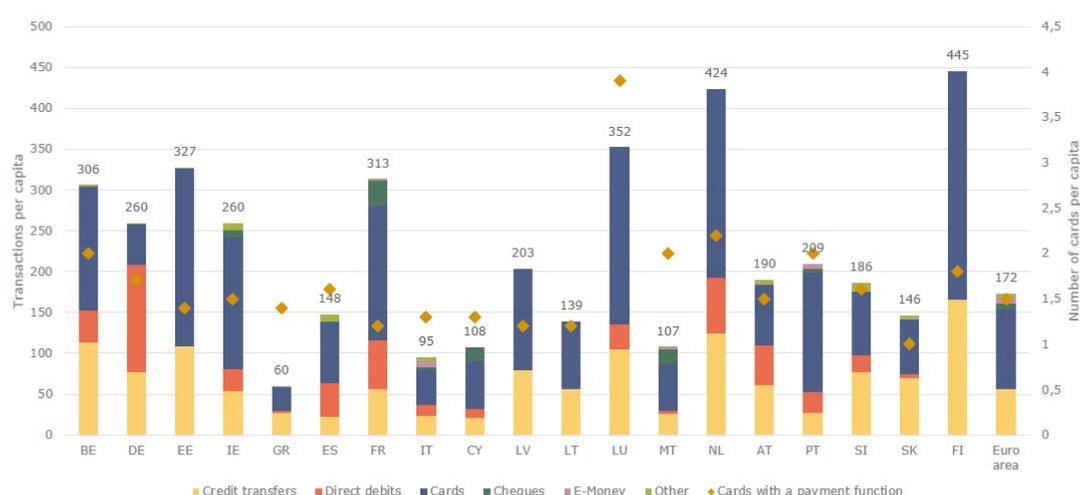
An office is defined by the ECB as a place of business which forms a legally dependent part of PSP and which carries out directly some or all of the transactions inherent to the business of PSPs. Each place of business set up in the same reporting country is counted separately.

7.3 Payment behaviour across the Euro Area

This Annex provides some data points on the use of cashless transactions and the use of cash; these data points can assist in establishing whether a country shows a high usage of cash or not.

The graph below shows the number of cashless payment transactions per inhabitant across the Euro Area. This graph is based on data from the ECB as per ultimo 2016. It should be noted that the number of E-Money transactions per inhabitant in Luxembourg (3.743) have been omitted from the graph. The first six entries are represented in number of transactions by bar charts against the left-hand axis, and the last element represents the number of cards against the right-hand axis.

Number of cashless transactions and cards per capita across the Euro area (2016)



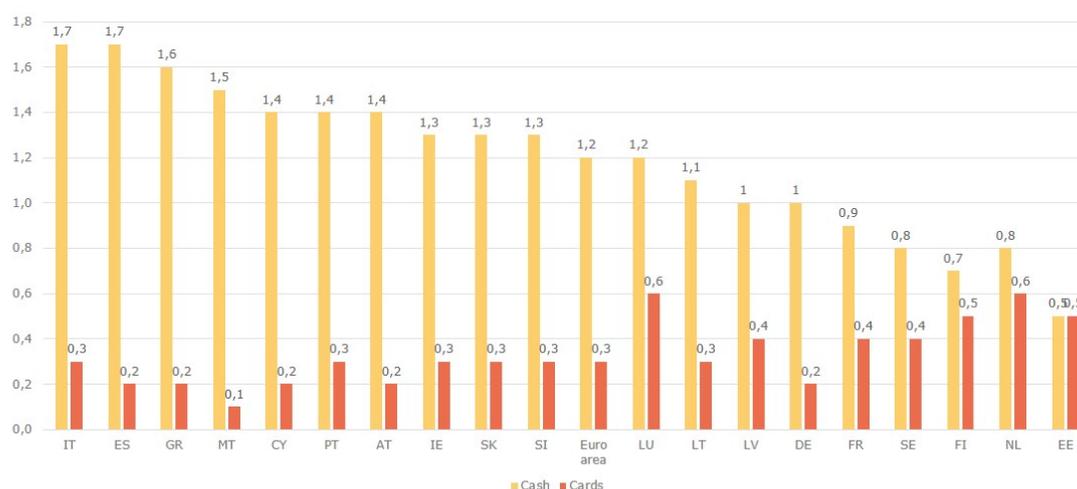
Source: ECB Statistical Data Warehouse

Figure 15: Cashless transactions and Cards per capita across the Euro Area



The graph below is based on the ECB [Occasional Paper Series](#), "The use of cash by households in the euro area", No 201 from November 2017 and shows the average number of transactions per person per day, by instrument of payment. It should be noted that the number of "other" transactions per inhabitant has been omitted from the graph.

Average number of transactions per person per day, by instrument of payment



Source: ECB Occasional Paper Series, "The use of cash by households in the euro area", No 201 / November 2017

Figure 16: Average number of transactions per person per day

7.4 EPC references

- ["Single Euro Cash Area" \(SECA\) Framework](#), European Payments Council, document reference Cash 021-05, Version 4.0, 10 May 2016.
- Improving the efficiency of the handling of cash - Cash Cycle Models, European Payments Council, document reference EPC037-13, Version 2.0, 13 December 2013.



8 Glossary

Term	Definition
ATM	Automated Teller Machine
BHM	Banknote Handling Machine
CH	Cash Handler
CI	Credit Institution
CIM	Cash in Machine (ATM with deposit function)
CIT	Cash In Transit company
CMC	Cash Management Company
COM	Cash out Machine (ATM with withdrawal function)
CRM	Cash Recirculating Machine (ATM with recirculation function)
DSM	Digital Single Market
EC	European Commission
ECB	European Central Bank
EEA	European Economic Area
EPC	European Payments Council
EU	European Union
GSA	Geldservice Austria
GSN	Geldservice Nederland
IAD	Independent ATM Deployer
MFI	Monetary Financial Institution
NCB	National Central Bank
NHTO	Notes Held To Order
OeNB	Austrian National Bank
OTC	Over the Counter
PSD2	Payment Services Directive 2
PSP	Payment Services Provider
SEPA	Single Euro Payments Area

Table 4: Glossary



9 Figures and Tables

Overview of Figures:

Figure 1: Layers of Recirculation.....	7
Figure 2: Third parties share in banknote recirculation.....	12
Figure 3: NCB and PSP Offices per country per million inhabitants.....	15
Figure 4: NCB and PSP Offices per 1.000 square KM.....	16
Figure 5: Austrian Example (Source: GSA).....	17
Figure 6: Payment behaviour in Austria (Source: OeNB).....	18
Figure 7: Netherlands Example (Source: GSN).....	20
Figure 8: Number of EUR 5 banknotes returned from circulation.....	23
Figure 9: Number of EUR 10 banknotes returned from circulation.....	23
Figure 10: Number of EUR 20 banknotes returned from circulation.....	24
Figure 11: Number of EUR 50 banknotes returned from circulation.....	24
Figure 12: Number of EUR 100 banknotes returned from circulation.....	25
Figure 13: Number of EUR 200 banknotes returned from circulation.....	25
Figure 14: Number of EUR 500 banknotes returned from circulation.....	26
Figure 15: Cashless transactions and Cards per capita across the Euro Area.....	28
Figure 16: Average number of transactions per person per day.....	29

Overview of Tables:

Table 1: Data on Banknotes (Source: ECB).....	13
Table 2: Examples where recirculation can happen.....	14
Table 3: NCB Branches and PSP Offices offering payment services to the public.....	27
Table 4: Glossary.....	30