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PARLIAMENT AND THE COUNCIL**

Issues related to the continued issuance of the 1 and 2 euro cent coins

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Table of Contents

I. INTRODUCTION	4
1. Mandate.....	4
2. Approach and methodology	4
3. Stakeholder consultation based on questionnaire	5
4. Four possible scenarios for the 1 and 2 euro cent coins.....	6
II. TWO SCENARIOS OF CONTINUED ISSUANCE OF THE 1 AND 2 EURO CENT COINS.....	8
1. Scenario of continued issuance under unchanged conditions ("Status quo scenario").....	8
1.1. <i>The legal framework of euro coin denominations</i>	8
1.2. <i>Overview of issuance on 1 and 2 euro cent coins</i>	9
1.3. <i>The two smallest coin denominations: comparison between euro and other currencies</i>.....	10
1.4. <i>Low value coins and the loss of purchasing power</i>.....	11
1.5. <i>Appropriateness of the coin denomination structure</i>.....	12
1.6. <i>Domestic demand and the loss rate</i>	14
1.7. <i>Rounding of fractional prices</i>	15
1.7.1.The situation in Finland and the Netherlands.....	15
1.7.2.The situation in the other euro area Member States.....	17
1.7.3.Rules to be applied in line with the principle of legal tender of euro cash	17
1.8. <i>Cost factors of 1 and 2 euro cent coin issuance</i>	18
1.8.1.Coin production and issuance costs	18
1.8.2.Understanding the variation in costs	20
1.9. <i>The citizens' experience with the use of the 1 and 2 euro cent coins</i>	21
1.10. <i>Usefulness of continued issuance</i>	22
2. Scenario of continued issuance at reduced costs ("Issuance at reduced costs")	23
2.1. <i>Reducing issuance costs by changing the coin composition</i>	24
2.2. <i>Reducing issuance costs by increasing efficiency of coin production</i>	25

III. TWO SCENARIOS OF WITHDRAWAL OF THE 1 AND 2 EURO CENT COINS.....	26
1. Scenario of withdrawal with loss of legal tender ("Quick withdrawal scenario")	26
1.1. <i>Economic implications</i>	26
1.1.1. Inflation: real or perceived?	26
1.1.1.1. View of the European Central Bank and euro area Member States.....	27
1.1.1.2. View of consumer and retailer associations.....	29
1.1.2. Impact on state income: tax revenues and seigniorage	30
1.1.3. Impact on private stakeholder business.....	31
1.2. <i>Social impact</i>.....	32
1.3. <i>Impact on other coin denominations and the use of other means of payment</i>..	33
1.4. <i>Implementing measures accompanying a possible withdrawal scenario</i>.....	34
1.4.1. Legislative act by the European legislator	34
1.4.2. Implementing measures to be taken by public key stakeholders	34
1.4.3. Implementing measures to be taken by private key stakeholders	36
1.5. <i>Experience with withdrawal of low value coins</i>	37
1.5.1. Euro area Member States prior to the euro changeover	37
1.5.2. Other EU Member States and European countries.....	37
1.5.3. Withdrawal experience outside Europe.....	38
1.6. <i>Continued issuance or cessation</i>.....	40
2. Scenario of withdrawal through fading out while keeping legal tender ("Fading out scenario").....	42
2.1. <i>Need for euro area rounding rules and practical consequences for the cash user</i>	43
2.2. <i>Duration of the fading out scenario and role of the loss rate</i>.....	43
2.3. <i>Specific cost aspects of the fading out scenario</i>	45
IV. CHARACTERISTICS AND OVERVIEW OF THE FOUR SCENARIOS	45
V. GENERAL CONCLUSIONS	50

I. INTRODUCTION

1. Mandate

The introduction of the euro in 1999 was a major step in European integration. Since 1 January 2002 the euro has been available in physical form, as banknotes and coins with now around 330 million EU citizens in 17 of the EU Member States using the euro as their currency. The euro coins denominations are determined by the Council in accordance with Article 128(2) of the Treaty on the Functioning of the European Union and include eight denominations in the range from 1 cent to 2 euro. The denomination of euro coins is laid down in Council Regulation (EC) No 975/98.

Recital 7 of Regulation (EU) No 651/2012 of the European Parliament and of the Council of 4 July 2012 on the issuance of euro coins (2012 OJ (L 201) 135) states that the use of different denominations of euro coins and euro banknotes should be periodically and carefully examined by the competent institutions against the criteria of cost and public acceptability. Against this background and in accordance with Article 2, paragraph 2 of the Regulation, the European Commission "*shall conduct an impact assessment on the continued issuance of 1 and 2 cent coins. That impact assessment shall include a cost-benefit analysis which takes into account the real production costs of those coins set against their value and benefits.*"

This mandate should be seen against the background of the current debate surrounding the usefulness of the two smallest euro coin denominations since their introduction. The main elements of this debate are the high production and processing costs of the one and two euro cent coins compared to their face value, the significant loss rate of these coins¹, the decrease of the purchasing power of these two denominations and, should the coins be withdrawn, the concern among the general public that the cessation of issuance of the 'red coins' could raise consumer prices (problem of perceived inflation).

In line with this mandate, the Commission hereby submits an assessment on the continued issuance of 1 and 2 euro cent coins taking costs and benefits as well as the public acceptance of these two denominations into account.

2. Approach and methodology

In accordance with the mandate, the analysis is a fact-finding and stock-taking exercise on the continued issuance of the two lowest euro cent denominations. Against the background of the debate on these coins, the analysis investigates a range of possible scenarios implying (a) no change; (b) maintaining current issuance levels but reducing issuing costs; (c) immediate cessation of issuance and withdrawal from circulation; and (d) immediate cessation of issuance but gradual withdrawal from circulation.

The analysis has been conducted from a cost/benefits and public acceptability perspective. Even though the mandate specifically focuses on the real production costs

¹ The loss rate can be defined as the calculation of one minus the circulation rate, the latter being the number of coins returned to the central bank divided by the number of coins put into circulation.

compared to benefits, the term costs is to be understood in a broader sense with the cost/benefits analysis embracing not only the costs of coin minting but also the costs of issuance, re-circulation as well as the handling and packaging costs.s.

The facts and figures and other reported data of the analysis have three main sources: 1) a compilation of existing statistics, including ECB databases; 2) results from a questionnaire conducted with key stakeholders; 3) analysis of the Eurobarometer surveys on coin usage and acceptance. Indeed, the citizens' views on the issuance of 1 and 2 euro cent coins were captured by relying on the analysis of Eurobarometer surveys on the use of euro coins. The European Commission's Flash Barometers (2003-2012) provide systematic survey data over the period 2002-2011 that include a number of important questions on the use of euro coins.

3. Stakeholder consultation based on questionnaire

A group of 'key stakeholders' was consulted on the issue of continued issuance and a potential withdrawal scenario by using a questionnaire. The stakeholders were identified and divided into two main groups: public key stakeholders (from EU Member States and the ECB) and private key stakeholders (from European associations and business).

Chart 1

Groups of key stakeholders	
<i>Private actors (represented by their respective European association)</i>	<i>Public actors (National and European)</i>
Banks	Treasuries
Retailers	National mints
Cash-in transport companies	National central banks
Vending machine business	European Central Bank
Small and medium enterprises	
Consumers	

The questionnaires for the 'key stakeholders' were tailor-made to take into account the specific role of the stakeholder with regard to the use of 1 and 2 euro cent coins. Besides the two more general key questions "*Do you consider the issuance of 1 and 2 euro cent coins useful?*" and "*Would you prefer issuance of 1 and/or 2 euro cent coins to be continued or ceased?*", the questionnaires embraced two groups of questions: on the current use of 1 and 2 euro cent coins and on a scenario where the issuance of 1 and/or 2 euro cent coins were to cease (see annex for a summary of the questions).

The response rate varied considerably between the different groups of key stakeholders with comparatively low response rates in certain groups. Often, the respondents

submitted general observations and statements in broader terms rather than, as requested where appropriate, providing facts and figures.

Chart 2: Response rate of key stakeholder groups

•	Euro area Member States:	65% (n=17) ²
•	Other member states:	50% (n=10)
•	National mints:	50% (n=12)
•	National banks:	58% (n=17)
•	Banking associations:	25% (n=4)
•	Consumer associations:	100% (n=2)
•	Retail associations:	33% (n=3)

4. Four possible scenarios for the 1 and 2 euro cent coins

In principle, issuance and use of 1 and 2 euro cent coins could continue as at present or stop completely. Against this background, there are two main scenarios to be explored. However, based on the results of the questionnaires and the stock-taking exercise, four possible scenarios can be identified: the two main scenarios with one variant of each.

The first main scenario ("status quo scenario") is the continued issuance of the 1 and 2 euro cent coins under today's issuance conditions without changing the legal and/or material context. The coins remain legal tender and continue to be produced in line with the current technical specifications (such as metal, weight and size) and without changing the production and issuance processes.

A variant of this scenario is the continued issuance at reduced costs ("issuance at reduced costs"). The cost reduction could be realised by changing the material composition of the coin or by increasing the efficiency of coin production or both.

The second main scenario ("quick withdrawal scenario") aims at the abolition of the 1 and 2 euro cent coins. Under this potential scenario, the issuance of these denominations ceases while the coins are withdrawn from circulation mainly through retailers, supermarkets and banks within a pre-established time period. Following experience with the withdrawal of national low value coins gained in various countries, this time period would be rather short.³ Binding rounding rules would apply as of the first day of the withdrawal period and 1 and 2 euro cent coins would cease to be legal tender at the end of this period. If considered appropriate, this scenario could also provide for the

² n=size of the addressees that received the questionnaire.

³ As a recent example, the period for the withdrawal of the 50 øre coin in Sweden in 2010 lasted one month.

possibility to change coins still in circulation after the withdrawal period has ended at the central banks for a limited or even unlimited period.⁴

A variant of the quick withdrawal scenario is a "fading out scenario" which would have the effect of withdrawal but achieve it by different means. Rather than steering the withdrawal through a 'call-back exercise', the mere cessation of issuance and 'market forces' together with a constant high loss rate would suffice to remove 1 and 2 euro cent coins from circulation. The coins would disappear from circulation over time and without any supporting intervention, because no new coins would be issued and injected into the market. The fading out scenario is based on the assumption that cash users question the usefulness of 1 and 2 euro cent coins as a means of payment, the proof of which would be the very high loss rate of these coins. Under this potential scenario, issuance of the 1 and 2 euro cent coins ceases but the coins remain legal tender while legally binding rounding rules apply as of cessation of issuance. The 1 and 2 euro cent coins could still be used, but only for payment to the rounded final sum.

The chart below provides an overview of the four possible scenarios that are investigated in this paper.

Chart 3

1 and 2 euro cent coins: 4 scenarios	
Continued issuance	Scenario 1: <i>"Status quo scenario"</i> Continued issuance under unchanged conditions
	Scenario 2: <i>"Issuance at reduced costs scenario"</i> Continued issuance at reduced issuance costs
Withdrawal	Scenario 3: <i>"Quick withdrawal scenario"</i> Issuance ceases and withdrawal with loss of legal tender and applying rounding rules
	Scenario 4: <i>"Fading out scenario"</i> . Issuance ceases and fading out of coin circulation while keeping legal tender and applying rounding rules

This staff working paper provides an analysis of all four scenarios. The analysis starts with the two scenarios of continued issuance focusing initially on the status quo and then the variant scenario. The analysis then turns to an assessment of the two withdrawal scenarios, followed by an overview on all four scenarios. The overview identifies the

⁴ Coins to be changed after the withdrawal period has ended would likely be hoarded coins. As central banks would probably ask for a change fee, it is uncertain – given the low value of the two denominations – that the change of 'late coins' (even of high amounts) would actually occur.

necessary implementation measures for each scenario and highlights their advantages and disadvantages. The paper concludes with presenting the key findings of the overall assessment.

II. TWO SCENARIOS OF CONTINUED ISSUANCE OF THE 1 AND 2 EURO CENT COINS

1. Scenario of continued issuance under unchanged conditions ("Status quo scenario")

Under this scenario, the 1 and 2 euro cent coin continue to be issued without making any changes to the legal context or the production process of the coins. The coins remain legal tender and continue to be produced further to the current technical specifications (diameter, thickness, weight, shape, colour and metal composition)⁵ and without changing the production and issuance processes. The Status Quo Scenario is investigated because it constitutes a useful benchmark for evaluating the three alternative scenarios.

1.1. The legal framework of euro coin denominations

The determination of the denomination of euro coins is the exclusive competence of the European Union pursuant to Article 128, paragraph 2 of the TFEU⁶. In accordance with this provision, Council Regulation (EC) No 975/98 has laid down the details of the euro coin denominations and set the number of denominations at eight.

Chart 4

Denomination of euro coins	
Face value: euro cent	Face value: euro
1 cent	1 euro
2 cent	
5 cent	2 euro ⁷
10 cent	
20 cent	
50 cent	

⁵ See Article 1 of Regulation (EC) No 975/98 (Official Journal L 139, 11.5.1998, p. 6), as amended by Council Regulation (EC) No 423/1999,

⁶ Former Article 106 of the Treaty establishing the European Community.

⁷ Pursuant to Regulation (EC) No 975/98 (Official Journal L 139, 11.5.1998, p. 6), as amended by Council Regulation (EC) No 423/1999 and Council Regulation (EU) No 566/2012, and Regulation (EU) No 651/2012 (Official Journal L 201, 27.7.2012, p. 135), the 2-euro coin can be issued as regular coin, commemorative coin or common commemorative coin as the case may be.

In line with Article 128, paragraph 2 of the TFEU, only the Council, on a proposal from the Commission and after consulting the European Parliament and the European Central Bank, may adopt measures to harmonize the denominations of all coins intended for circulation to permit their smooth circulation within the Union.

The number of euro coin denominations has remained unchanged since the introduction of the euro. All eight coin denominations are legal tender in the euro area. In line with the Commission's Recommendation on the scope and effects of legal tender of euro banknotes and coins⁸, all eight denominations should be accepted for payment and, as stated in Council Regulation No 974/98 on the introduction of the euro, within the margin of maximum 50 coins per payment except for the issuing authority and for those persons specifically designated by the national legislation of the issuing Member State.⁹¹⁰

1.2. Overview of issuance on 1 and 2 euro cent coins

Since January 2002, the central banks of the euro area Member States have issued more than 46 bn coins with 1 and 2 euro cent denominations. This represents about 137 coins of these denominations per capita in the euro area. Although the number of issued 1 and 2 euro cent coins is very high, the total value of these coins is only about EUR 714 million. This is only 2.8% of the value of all euro coins in circulation.

In terms of value, the total of euro coins in circulation has nearly doubled since the introduction in January 2002 from EUR 12,3 bn to EUR 23,5 bn in August 2012, The total value of 1 and 2 euro cents compared to the value of all euro coin denominations issued has increased by 94.5% over the same period, moving from 1,45% to 2,81 % (see Chart 4). (Within the same period, the total circulation of euro banknotes quadrupled in value from EUR 221,5 bn to EUR 896,4 bn.)

Chart 5: Value of 1 and 2 euro cents (% over total value of coins)

	2002 January	2012 August	Increase (%)
2 cents	0.50%	1.09%	119.1%
1 cent	0.95%	1.72%	81.5%
Total (1 and 2 cents)	1.45%	2.81%	94.5%

Source: European Central Bank and Commission calculations

With on average 1 coin out of 3 being a 1 or a 2 euro cent coin, the number of these coins has been already high in the first years after the introduction of the euro. Today, the ratio

⁸ Official Journal L 83 of 30.3.2010, p 70.

⁹ Article 11 of Council Regulation No 974/98 on the introduction of the euro (Official Journal L 139 of 11.5.1998, p. 1).

¹⁰ The same procedure under Article 128, paragraph 2 of the TFEU would apply also, should the composition of the 1 and 2 euro cent coins (e.g. in order to lower production costs) rather than the number of euro coin denominations be changed.

is already close to 1 out of 2 given that both coins now make up for 45.6% of the total number of coins in circulation (see table 5).

Chart 6: Number of 1 and 2 euro cent (% over total number of coins)

	2002 January	2012 August	Increase (%)
2 cents	16.07%	25.46%	36.9%
1 cent	15.31%	20.09%	23.8%
Total (1 and 2 cents)	31.38%	45.55%	31.1%

Source: European Central Bank and Commission calculations

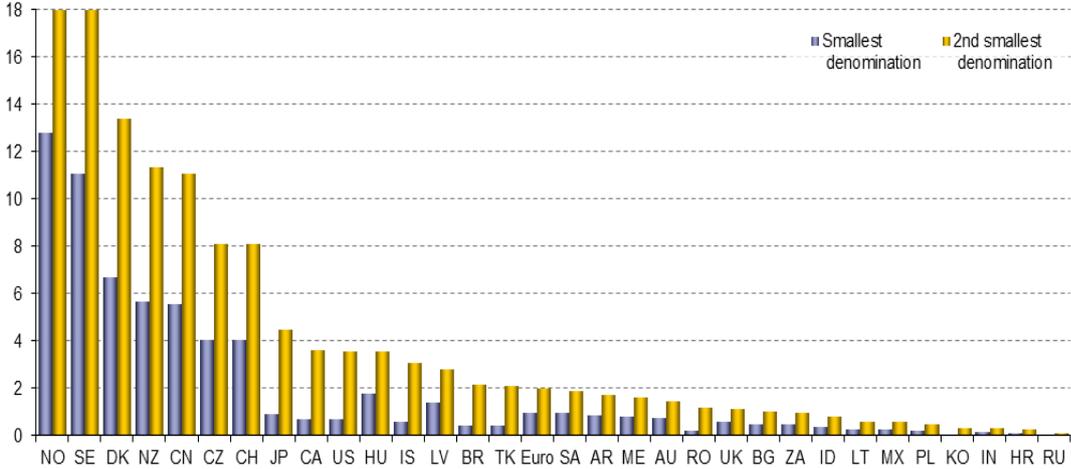
The high increase of 1 and 2 euro cent coins is due to the high loss rate of these denominations, as these coins appear to be often hoarded rather than re-circulated.

1.3. The two smallest coin denominations: comparison between euro and other currencies

An analysis has been undertaken that aims at comparing the value of the 1 and 2 euro cent coins with the two smallest denominations in a broad range of countries, so as to assess the structure of euro coins denominations against international practices. The set of analysed countries includes the, the non-euro area EU Member States, other European countries and other G20 countries. The value of the two smallest denominations was calculated in euro cent (for the calculation in purchasing power parity, see annex).

It appears that that the value of the two smallest denominations is substantially higher in the Nordic Countries (Norway, Sweden, and Denmark) as well as in New Zealand and Switzerland than in the euro area. However, when comparing with USA and Japan, the differences with the euro area are much less pronounced. While the value of the smallest denomination in those countries is a little bit smaller than in the euro area, the value of the second smallest denomination is slightly higher than in the euro area. In comparison with the other countries, the value of the two smallest euro coin denominations is not exceptional.

Chart 7: International comparison of the value of two smallest coin denominations by country (in € cent equivalent)



Source: European Central Bank and Commission calculations

Chart 8: International comparison of the two smallest denominations by country (in € cent equivalent)

Code	Country	Euro (cents)		Code	Country	Euro (cents)	
		Smallest denomination				2nd smallest denomination	
NO	Norway	12.83		NO	Norway	64.16	
SE	Sweden	11.07		SE	Sweden	22.15	
DK	Denmark	6.71		DK	Denmark	13.42	
NZ	New Zealand	5.68		NZ	New Zealand	11.36	
CN	China	5.56		CN	China	11.12	
CZ	Czech Republic	4.07		CZ	Czech Republic	8.13	
CH	Switzerland	4.06		CH	Switzerland	8.11	
HU	Hungary	1.79		JP	Japan	4.51	
LV	Latvia	1.42		CA	Canada	3.63	
Euro	Euro Area	1.00		US	United States	3.59	
SA	Saudi Arabia	0.96		HU	Hungary	3.58	
JP	Japan	0.90		IS	Iceland	3.10	
AR	Argentina	0.87		LV	Latvia	2.83	
ME	FYROM	0.81		BR	Brazil	2.15	
AU	Australia	0.74		TK	Turkey	2.14	
CA	Canada	0.73		Euro	Euro Area	2.00	
US	United States	0.72		SA	Saudi Arabia	1.92	
IS	Iceland	0.62		AR	Argentina	1.74	
UK	United Kingdom	0.58		ME	FYROM	1.63	
BG	Bulgaria	0.51		AU	Australia	1.48	
ZA	South Africa	0.50		RO	Romania	1.18	
BR	Brazil	0.43		UK	United Kingdom	1.15	
TK	Turkey	0.43		BG	Bulgaria	1.02	
ID	Indonesia	0.41		ZA	South Africa	0.99	
LT	Lithuania	0.29		ID	Indonesia	0.82	
MX	Mexico	0.29		LT	Lithuania	0.58	
PL	Poland	0.24		MX	Mexico	0.58	
RO	Romania	0.24		PL	Poland	0.49	
IN	India	0.15		KO	Korea	0.32	
HR	Croatia	0.13		IN	India	0.31	
KO	Korea	0.06		HR	Croatia	0.27	
RU	Russia	0.02		RU	Russia	0.12	

Source: European Central Bank and Commission calculations.

1.4. Low value coins and the loss of purchasing power

As will be illustrated later in this paper (see section III.5), there are many examples of low value coin denominations from other currencies that have been withdrawn over time. It appears that an important consideration in this process has been the gradual loss of purchasing power of these small coins as a consequence of inflation, together with a widening gap between the price of the metal used for production of the coins and the declining purchasing power of the denomination. For example, the Canadian Government decided to withdraw the one cent coin ('penny') as of February 2013 because of its rising

production costs relative to face value but also because of inflation. Due to the latter, the purchasing power of the 'penny' has eroded over the years retaining today only about one-twentieth of its original purchasing power.

Smaller denominations are by definition more prone to falling into disuse by the effect of inflation since their face value is already very low. The following chart shows the evolution of inflation in the euro area since the introduction of euro cash expressed in the value of the 1 euro cent coin. It shows the extent to which the coin has lost purchasing power over that period. Today's purchasing power of the 1 euro cent coin is on average 0.81 euro cent.

Given the existence of inflation differentials within the euro area, the loss of purchasing power has been more pronounced in countries with higher inflation rates. Though inflation has remained at a very low level since the launch of the euro, the purchasing power of 1 and 2 euro cent coins has already eroded substantially.

Chart 9: Development of the purchasing power of the euro since the introduction of euro cash (in 1 euro cent)

Country	2002	2005	2008	2012
IE	1.00	0.93	0.86	0.86
DE	1.00	0.95	0.90	0.84
NL	1.00	0.95	0.91	0.83
FR	1.00	0.94	0.89	0.83
FI	1.00	0.98	0.92	0.82
Euro area	1.00	0.94	0.88	0.81
PT	1.00	0.93	0.87	0.81
AT	1.00	0.95	0.89	0.81
BE	1.00	0.94	0.87	0.79
CY	1.00	0.93	0.87	0.79
IT	1.00	0.93	0.87	0.79
MT	1.00	0.93	0.85	0.79
ES	1.00	0.91	0.84	0.76
LU	1.00	0.91	0.85	0.76
EL	1.00	0.91	0.83	0.75
SI	1.00	0.90	0.81	0.74
SK	1.00	0.83	0.76	0.69
EE	1.00	0.91	0.73	0.66

Note: Data for December of each year.
 Source: ECB and European Commission calculations

1.5. Appropriateness of the coin denomination structure

Despite long-standing research on the "ideal" coin denomination, experts still diverge when trying to define the optimal denomination structure. As a matter of fact, most countries in the world use a currency denomination based on the 1-2-5 ratios or 1-2.5-5

ratios between one denomination and the next. There has been a considerable amount of research on the topic, a good summary of which is provided by Van Hove (2001).¹¹

A widely discussed approach to analyse the appropriateness of a denomination structure has been proposed by Hentsch (1973). Hentsch observed that if the ratios of successive denominations are more or less constant, then the amounts in circulation for each denomination should generally be proportional to the square root of the denomination. He defined an indicator of "corrected circulation" (CC) constructed as the amount in circulation per each denomination (V) divided by the square root of the denomination.¹² When the value of the indicator for a specific denomination is considerably higher than the values calculated for the other denominations, this would suggest that there could be a need for a higher denomination. Conversely, when the value of the indicator for a denomination is considerably lower than the values calculated for the other denomination, this would suggest that there could be a rationale for withdrawing the denomination concerned.

Although not being a general rule, denomination anomalies are more likely to manifest themselves at the upper or lower end of the denomination structure. One reason for an anomaly could be linked to inflation. Higher inflation leads to an overall loss of purchasing power of the smallest denominations which would induce consumers to prefer higher denominations thus pushing the entire denomination structure upwards. While it certainly applies to the country level within the euro area, where inflation differentials have persisted for a long time, it is somewhat less true for the euro area as whole since inflation has been relatively stable over the last decade.

The chart below shows the result for the calculations of the Hentsch indicator at the Euro area level over time. The values of the Hentsch index are significantly lower for the 1 euro cent coin (2 598 743) and 2 euro cent coin (2 890 147) than for the other euro coins (between 3 681 599 and 6 886 736). These results would point to the existence of a rationale for withdrawing these two denominations.¹³

¹¹ See Pattanarangsum, *The Optimal Currency Denomination Structure* (2011) and Leo Van Hove, *Optimal Denominations for Coins and Banknotes: In Defence of the Principle of Lost Effort*, in: *Journal of Money, Credit and Banking*, Vol. 33 No 4 (2001).

¹² The corrected circulation (cc) is defined as:

$$CC = \frac{V_i}{\sqrt{v_i}}$$

¹³ There are two other interesting results. First, the index is significantly higher for the 50€ banknotes than for all the others denominations, pointing to extensive use of this denomination. Second, the index for the 2€ and 1€ coins is higher than for all other coins and even than the index computed for the 5€ banknote.

Chart 10: Appropriateness of the euro denomination (calculated by 'Hentsch' indicator)

Euro	2002	2005	2007	2009	2012
500	3731178	8281135	10121602	12606556	13182834
200	1709055	2103977	2201731	2520647	2617013
100	6731707	10184424	12093299	14718611	16774507
50	17215979	25627815	31411332	36765598	43409189
20	8831415	9658371	11035786	12030980	12384792
10	5196543	5569918	6215317	6458248	6367981
5	2662198	2872593	3177654	3348703	3440856
2	3499325	4664960	5389039	6030803	6886736
1	3586526	4909868	5717568	6184311	6412731
0,5	2598428	2999949	3293128	3539022	3746346
0,2	2243797	3035820	3512867	3875099	4254611
0,1	1749219	2658976	3139071	3497939	3900785
0,05	1355944	2267250	2763496	3179161	3681599
0,02	947662	1644100	2035550	2404215	2890147
0,01	706717	1393958	1757898	2105860	2598743

1.6. Domestic demand and the loss rate

A large majority of Member States and national mints pointed out that there is a stable or increasing demand for 1 cent coins. In some smaller Member States, the demand is strongly influenced by withdrawals from non-domestic customers from neighbouring countries. This is not the case in the two euro area Member States which actively limited the circulation of 1 and 2 cent coins. With a few exceptions, there have generally been no shortages or surpluses. In one Member State, there were supply disruptions in the past that were caused by strikes. In some cases, reduced production of coins is offset by imports from other euro area Member States.

Demand of private business for the 1 and 2 euro cent coins is relatively stable, with an increase in a few euro area Member States. However, the private sector replies to the questionnaire point to a variation across Member States. It was also reported that customers do not seem to use the 1 or 2 euro cent coins much while paying, but rather receive them as change from the retailers. In addition, it seems that - once the customer has received those coins - they are often hoarded in cash collection devices such as piggy banks and others for possible future spending or for charity donations. However, it appears that in those countries which are more severely affected by the financial and economic crisis, the smallest euro coins are beginning to playing a more important role. In those countries, the consumers' financial situation has worsened and consumers started to increasingly use the smallest denominations and ask for small coin change in retail stores.

The loss rate for 1 euro cent coins varies between 30% up to 100% in Euro area Member States. However, the majority of euro area Member States reported a loss rate higher than 50% as 1 euro cent coins are often hoarded and sometimes, as stated by one euro area

Member State melted by hoarders for resale of the metal since their face value is lower than the value of the metal used for the production of the coin.

The loss rate for 2 euro cent coins varies between 25% and close to 100% in euro area Member States. The majority of euro area Member States reported a loss rate of above 50%, which nonetheless would be a little bit lower than the loss rate of the 1 cent coins.

1.7. Rounding of fractional prices

Fractional prices are prices, which if paid in cash to the exact amount, would require the use of one or more 1 and/or 2 euro cent coins at the moment of payment.¹⁴ Fractional prices play an important psychological and economic role mainly in the retail sector to make prices look cheaper and the product more attractive as they allow for an advantageous use of the digits 8 and 9, namely with regard to consumer products of smaller value (such as products put out for purchase at e.g. EUR 0,89, EUR 2.98, EUR 3.99 or EUR 19.98).¹⁵

Fractional prices play an important role if payment is made in cash (including coins), when a client buys one item or, several products with a fractional final sum.¹⁶ As a principle, any change would have to be given in cash and at the exact amount, which means that small denominations including the 1 and 2 euro cent coins must be available at the point of sale to handle each cash transaction of any possible amount.

1.7.1. The situation in Finland and the Netherlands

As a rule, cash payments in the euro area can always be made to the exact amount.¹⁷ The situation of the issuance and use of 1 and 2 euro cent coins in Finland and the Netherlands is different from the situation in the other countries of the euro area. At the euro changeover in 2002, Finland issued 1 and 2 euro cent coins in smaller quantities and mainly for coin kits but it ceased further issuance of these two denominations to the public shortly after the changeover. Sporadically, 1 and 2 euro cent coins are being issued in Finland in very limited quantities for coin kits intended for collectors. The Netherlands issued 1 and 2 euro cent coins initially, but stopped further issuance in 2004.

¹⁴ For a few goods and services of consumption at large-scale (e.g. petrol, telecommunication services) a custom is established to sell the good or service to the thousandths part of the euro (three digits behind the comma). Exact cash payment of these fractional prices cannot be effectuated with the existing coin denominations and rounding has to be applied for both cash and non-cash payment of the sum of the fractional prices.

¹⁵ The higher the value of a good or service is, the less the use of fractional prices is important from a mere point of view of setting the highest but still generally accepted price. However the psychological effect of using the digits 8 and 9 for price setting (the price looks attractive) remains equally important even for higher amounts (e.g. EUR 9,98 or EUR 13,89 versus EUR 2.998,- or EUR 24,890).

¹⁶ Fractional prices play also an economic and psychological role where payment of the product(s) is usually done electronically, such as large-scale purchase of technical products (e.g. spare parts) in the industry.

¹⁷ Except for prices with more than two digits behind the comma, where rounding to the nearest cent has to be applied (for both cash and non-cash payments).

Finland and the Netherlands consider the costs of production and handling of 1 and 2 euro cent coins to be too expensive compared to the face value of the coins and the benefit these denominations have for payments and cash transactions in their countries. While all eight euro coin denominations remain legal tender in Finland and in the Netherlands, the two countries limited the circulation of the 1 and 2 euro cent coins by introducing rounding rules.¹⁸

The Finnish Act 890/2000 of 27 October 2000 on the rounding of payments denominated in euro, as entered into force on 1 January 2002, provides that cash payments denominated in euro shall be rounded downwards or upwards to the nearest multiple of 5 euro cent. While prices of goods and services can still be set, agreed and displayed while using any 0 to 99 cent for calculation¹⁹, the total sum of the payment is rounded to the nearest EUR 0.05 when paying with cash. Sums ending in EUR 0.01, EUR 0.02, EUR 0.06 and EUR 0.07 are rounded down; sums ending in EUR 0.03, EUR 0.04, EUR 0.08 and EUR 0.09 are rounded up. Payments in the amount of 1 and 2 euro cents shall not be rounded. In principle, the rounding applies also to electronic payments except if the payment is effected by credit transfer between accounts, but contrary to cash payments rounding by non-cash means is not mandatory (payments "may" rather than "shall" be rounded).²⁰ It is local custom in Finland that payments by bank card or other payment cards are not rounded but debited to the exact amount ending in cent.

Whereas Finland has introduced legally binding rounding rules for cash payment, rounding rules apply on cash payments in the Netherlands since September 2004 on a voluntary basis, which is largely accepted by citizens and business. Voluntary rounding rules were introduced accompanied by a public campaign after a pilot project on cash payment without 1 and 2 euro cent coins, while applying rounding rules was carried out and tested in a retailer district of the Dutch city of Woerden in 2004.

As in Finland, prices of goods and services in the Netherlands can still be set, agreed and displayed while using any 0 to 99 cent for calculation. However, since 1 September 2004 business in the Netherlands is free to decide to round the final sum of a cash payment to the nearest multiple of 5 euro cents. Sums ending in EUR 0.01, EUR 0.02, EUR 0.06 and EUR 0.07 are rounded down; sums ending in EUR 0.03, EUR 0.04, EUR 0.08 and EUR 0.09 are rounded up. In practical terms, nearly all small and big retailers in the Netherlands have moved to rounding the final sum of payment and do not handle 1 and 2

¹⁸ In principle Finland and the Netherlands issue very little amounts, amongst others for collector purposes (sets of circulation coins with all 8 denominations) The average issuance since the introduction of the rounding is as follows: Netherlands (2005-2012): 892.270 (1 euro cent coins) and 921.380 (2 euro cent coins), Finland (2002-2012): 92.910 (1 euro cent coins) and 63.430 (2 euro cent coins). In 2012 the Netherlands issued nearly 8 million 1 and 2 euro cent coins (which were on stock) to react to requests from Dutch commercial banks.

¹⁹ Prices indicated in sub-divisions smaller unit than cents (as typically done for telecommunication services with reference to minutes or seconds or for petrol with reference to one liter) would have to be rounded to the nearest cent.

²⁰ Act 890/2000 on the rounding of euro-denominated payments as amended by Act 496/2002 provides that "a payment may be rounded" [according to an established rounding parameter] "also when debiting it in writing or when recording it as debt in lieu of payment, or when paid for a bank card or another payment card". "Cent amounts shall not be rounded if so agreed on by the parties or if the payment is effected by credit transfer between accounts".

euro cent coins anymore. The rounding does not apply to payments by electronic means such as payment by debit card, e-purse, mobile phone or credit card. It appears that the voluntary rounding practice, as established in September 2004, is generally well-accepted by citizens and business as a customary habit in the Netherlands.

1.7.2. The situation in the other euro area Member States

Only a few euro area Member States provided replies to the question on the existence of rounding rules of cash and/or electronic payments. From the responses received, it appears that there are no Member States, other than Finland and the Netherlands, which apply rounding rules in cash payments with regard to the use of 1 and 2 euro cents in their country. It seems, however, that in some countries habits of "voluntary" rounding can be found typically at the local level for example in supermarkets, bakeries and other retailers which sell products with fractional prices. In these cases, it seems that sellers and purchasers apply rounding in order to speed up and facilitate the payment process.

A few Member States reported on rounding rules that were applied successfully to cash payments prior to the euro changeover. One case concerned the abolition of the two lowest denominations of the sub-unit (ending in 10 and 20), with the denomination 50 of the sub-unit becoming the smallest denomination.²¹

1.7.3. Rules to be applied in line with the principle of legal tender of euro cash

The Commission has received complaints from citizens on the rounding of fractional prices²² in Finland and the Netherlands. They argue that they cannot use 1 and 2 euro cent coins for payment of the exact amount, whereas an exact electronic payment would be possible. This would lead to the 5 euro cent coin becoming de facto the lowest coin denomination in circulation in parts of the euro area (Netherlands and Finland) although all eight denominations are legal tender throughout the entire euro area.

Against this background, it must be understood that any rounding habits in the euro area, either legally binding or by social convention, cannot alter the legal tender status of 1 and 2 euro cent coins as of any other euro cent coin. Only EU rules could change this situation. Existing rounding rules must be interpreted and applied in the light of the principle of the legal tender of euro cash, meaning that these coins should continue to be accepted as means of payment in order to pay the rounded sum if the customer wishes to do so. What is more, confidence in the currency is very much reflected in how consumers perceive the value of cash (both banknotes and coins). Therefore, there should not be left room for any doubt on price transparency and the value of cash compared to other means of payment. Limiting the rounding rules to payments in cash might even affect the legal tender status of coins other than 1 and 2 cent coins. "Losses" and "gains" when applying rounding to final sums may equalise over time and regardless of whether payment was

²¹ As an example, for the sum of 150,30 or 150,70 to be paid in cash, the purchaser had to pay 150,50, whereas for the sum 150,80 the amount of 151 had to be paid.

²² Fractional prices are prices which if paid cash to the exact amount would require the use of one or more 1 and/or 2 euro cent coins at the moment of payment.

done cash or by non-cash means. However, cash payments of rounded up amounts always suffer the effect of a surcharge compared to non-cash payments of precise amounts. This is in conflict with Commission Recommendation 2010/191/EU on the scope and effects of legal tender of euro banknotes and coins as consumers who want to avoid rounding losses might feel forced into non-cash payment means.

1.8. Cost factors of 1 and 2 euro cent coin issuance

The cost factors are a key variable for public actors to make an informed decision to continue the production and circulation of the smallest euro coin denomination. As for any other means of payment, the use of coins comes with costs. The costs of coin production and issuance are covered by state income through tax contribution of citizens or factored into prices for goods and services (e.g. to cover coin handling costs of retailers or banks).²³

The costs of non-cash payment tools (such as debit cards, prepaid cards, credit cards or other electronic and mobile phone payment devices) are mostly visible to the user by means of banking or service fees and rates. The costs of cash including coins, however, are less visible given that the costs are not directly charged to the user of cash and are therefore less 'noticeable'.

The overall costs of cash are related to various cost factors: raw materials, coin production, packaging, transportation, storage and other distribution and re-circulation related costs for banks and retailers. In addition, there are costs related to the fitness and counterfeit checking of coins by banks and professional coin processors, to the supply of change and to the accounting costs of retailers. In principle, these cost factors apply to all coins regardless of their denomination. However, with regard to production and processing costs they vary according to the size and weight of the respective coins including the raw material chosen for the production of blanks. While the cost factors can be relatively easily identified, the challenge lies in trying to quantify the different cost factors.

1.8.1. Coin production and issuance costs

As regards the costs of 1 and 2 euro cent coins as the two lowest denominations, the survey has revealed that two cost factors are of particular importance: (1) the production costs which tend to be above the face value of the coins causing a 'negative' seigniorage²⁴ and thereby a loss for the issuing Member State and (2) the over-production of 1 and 2 euro cent coins to compensate for the high loss rate. The production of coins involves the use of raw material (i.e. metal used for the production of blanks) as well as labour and capital (i.e. personnel, machines and infrastructure). When considering the coin

²³ Given the non-visibility of direct cash costs, there is a risk of a misperception that the provision of cash comes for free.

²⁴ Seigniorage of coins is the difference between the face value of a coin and the costs to produce and issue it. The positive difference between the two parameters ('positive seigniorage') is a lucrative source of state income. Given that coins are issued in high quantities, production and issuance costs decrease with any increase of coin issuance.

production costs, three key components need to be investigated: (1) the costs of the raw material used for blanks; (2) the production cost of the blanks; (3) the costs of the final production (i.e. minting) of the coins. Different economic actors are involved in the coin production process and have 'their share' in the different costs components: metal producers and commodity traders (raw material), the blank producers (coin blanks) and the minting facilities²⁵ ('ready-for-issuance' coin production).

It has been difficult to obtain detailed information on the various costs elements mentioned above since the key players involved in the production process (i.e. blank producers and mints) are sometimes reluctant to provide information on the costs elements, as they consider it company-sensitive information, whose release could jeopardise their position on the market. Nevertheless, the low face value of the 1 cent and 2 euro cent coins suggests that production costs tend to outweigh the actual face value of the coin denominations.

Only 10 out of 17 euro area Member States answered the question whether the acquisition/production costs of the 1 euro and the 2 euro cent coins correspond to or fall below the face value. It is likely that the absence of answers reflects a desire not to highlight an existing unfavourable situation. The majority of respondents replied that the acquisition costs of the 1-euro cent coins are equal or exceed the face value. The average calculated from the 5 euro area Member States that provided an indication of the acquisition costs amounts to approximately 160% of the coins' face value. The difference in terms of acquisition costs across euro area Member States is large. While in a few euro area Member States the acquisition costs are slightly less than the face value of the coin, in other euro area Member States it can be as high as three to four times the face value.

When it comes to the 2 euro cent coin, almost half of the euro area Member States which responded is confronted with acquisition costs that are higher than the face value. The other half reports that the acquisitions costs remain lower than the face value. The average calculated from the 5 Member States that provided an indication of the acquisition costs amounts to approximately 150% of the coins' face value.

Whereas it is questionable whether concrete numbers on ('negative') seigniorage in the euro area can be extrapolated from the above figures provided by euro area Member States, there is nonetheless a strong indication that the euro area as such suffers losses from the 'negative seigniorage' attached to these coins. Since the introduction of the euro, 20,2 billion 1 euro cent coins and 25,6 billion 2 euro cent coins have been issued with the overall issuance of both denominations having nearly doubled since the introduction of the euro. The face value of these coins now amounts to EUR 714 million²⁶ and there is evidence that the costs of all 1 and 2 euro cent coins issued are higher. The exact calculation of the 'negative seigniorage' related to these coins is difficult as the relevant and complete set of data was not made available by the euro area Member States. However, an estimate could be made by extrapolating the information provided by the 5

²⁵ A majority of euro area Member States uses their national mint for euro coin minting purposes. Some euro area Member States do not have own mints and commission mints of other Member States for minting. Germany has 4 public mints. For information on the mint structure of Member States see http://ec.europa.eu/economy_finance/euro/cash/mints/index_en.htm

²⁶ 20,2 bn 1 cent coins = 202 million euro face value. 25,6 billion 2 cent coins = 512 million euro face value.

euro area Member States that provided figures to the whole euro area. On this basis and on the assumption that the acquisition costs are respectively 160% and 150% of the face value of 1 and 2 euro cent coins since the introduction of euro cash in 2002, today's total acquisition costs of all 1 and 2 euro cent coins would amount to 1,09 bn EUR with an estimated accumulated 'negative seigniorage' related to 1 and 2 euro cent coins of around EUR 376 million for the euro area. Using a weighted average, the negative seigniorage attached to the issuance of 1 and 2 euro cents coins could reach EUR 1.4 billion euros (the difference is due to a very unfavourable acquisition price in a large Member State).

It is understood that the 'negative seigniorage' would be lower (but still negative) if the loss rate of the 1 euro cent coin were at a normal level.²⁷ As stated above, following information provided by euro area Member States on the loss rate, the rate of loss of "their" 1 euro cent coins is in a majority of euro area Member States higher than 50 % with the consequence that less than one out of two coins is actually used for cash transactions. A similar reasoning applies for the 2 euro cent coin, whereby the loss rate is however slightly lower.

1.8.2. Understanding the variation in costs

Acquisition costs of 1 and 2 euro cent coins vary substantially between euro area Member States. Whereas a few Member States are confronted with acquisition costs that are still below face value (and issue the denominations at costs below face value), other Member States acquisition costs are as high as three to four times the face value. While detailed and systematic information on the various production cost components was not available, some preliminary and broad indications can be made on the basis of bilateral contacts with some of the relevant players (e.g. blank producers, mints). The costs of the coin blanks are reported to amount approximately to around 50-60% of the coins' face value with costs for the 2 cent coin at the lower end of the range.

It is reported that the largest part of the 50-60% blanks production costs is related to the costs of the raw material. This seems plausible, taking into account that the production of blanks takes place by private companies in a competitive market environment. Because of the relatively small margins involved in the blank production process, the industry has witnessed a vertical integration process whereby recently blank producers and mints have started to combine forces to increase their financial resilience in a business that is characterized by high volumes and small margins.

Based on these preliminary findings, the substantial variation in coin production costs cannot be explained by the costs of the raw material or the blank production process but should rather be attributed to the final production process of the coins (i.e. minting) that is undertaken by the national mints of the euro area. However, further analysis would be needed to investigate whether the variation in costs among national euro area mints is caused by the differences in the labor and/or capital costs involved in the final coin

²⁷ No figures are available on the loss rates regarding the other euro coin denominations for direct comparison. However, it is understood that no coin denomination can reach a loss rate of 0% as, depending on the way coins are used in cash transactions (e.g. vending machines, exposure to dirt and dust, mechanical impacts and corrosion) coins can become unfit for circulation over time and need to be replaced.

production process or if it is related to potential inefficiencies in the production process. The existence of these substantial cost differences between national mints can maybe be explained by the quasi-monopolistic situation by which the minting-industry is characterized. Substantial costs differences are more likely to persist under such market conditions.

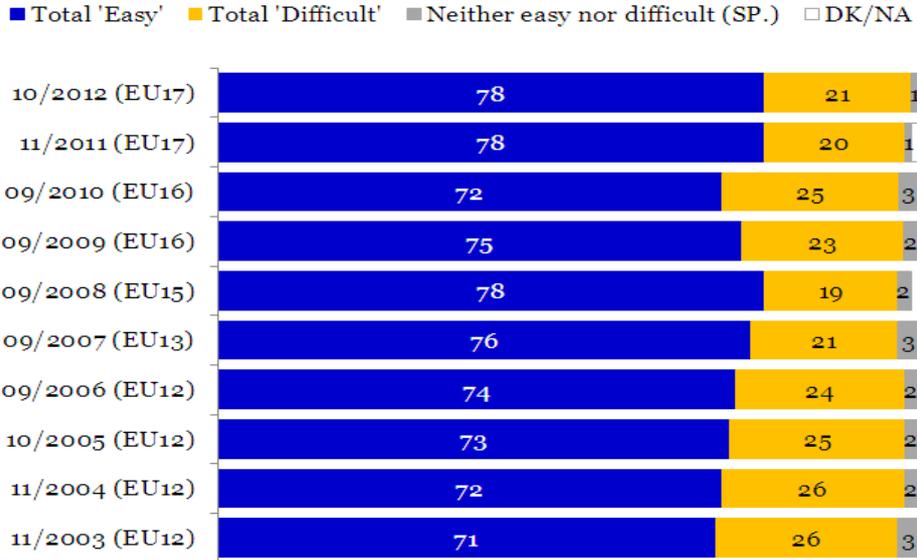
1.9. The citizens' experience with the use of the 1 and 2 euro cent coins

Since the changeover in 2002 until now, regular surveys have been conducted on the experience of citizens with using the single currency. Those surveys also included specific questions related to the experience and to the preferences of citizens regarding the use of the different coin denominations.

In a 2012 Flash Eurobarometer, euro area citizens were surveyed regarding their experience with the handling of euro cent coins including the 1 and 2 cent coins. 78% of citizens in the euro area say it is easy to distinguish and handle euro coins, while 21% experience difficulties. Since 2003, the proportion of respondents considering it easy to handle euro coins has remained relatively stable (around 70%-78%).²⁸

Chart 11

Recognising and handling the euro coins, 2003-2012



Q3a.2 (2012)/Q4a(2011)/Q3b(2008-2010)/Q5(2007)/Q4a(2003-2006).
 When you pay cash, would you say that it is: very easy, rather easy, rather difficult or very difficult to distinguish and handle euro coins?
 Base: all respondents, % EURO AREA

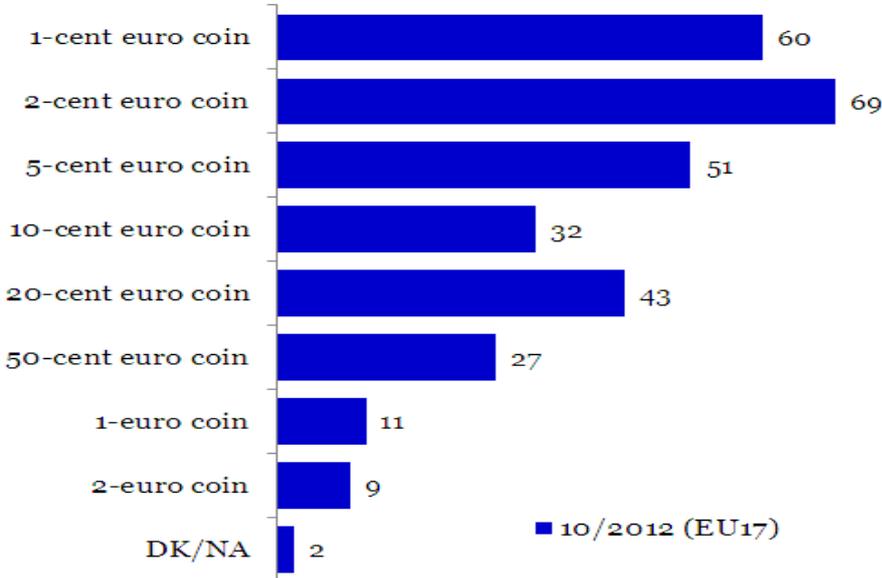
Source: Flash Eurobarometer 362 in 2012

²⁸ Flash Eurobarometer 362, 2012 p.14.

The 21% of respondents who found it difficult to recognise and handle euro coins were asked which coins caused them particular difficulties.²⁹ The result shows clearly that the 2-cent euro coin was considered to be the most problematic – by 69% of those who said they had difficulties handling euro coins (this represented 14% of all respondents). The second most difficult coin to handle was the smallest denomination, the 1 cent euro coin – according to 60% of those having problems handling the euro coins (13% of all respondents). Just over half (51%) mention the 5 cent coin, while 43% the 20 cent coin. Based on the Eurobarometer results, it can be concluded that citizens consider overall that the euro coins are relatively easy to handle with however less favourable responses for the 1 and 2 euro cent coins.

Chart 12

Difficulties with euro coins



Q3b. With which of the following euro coins do you have particular difficulties?
 Base: those who found it rather or very difficult to distinguish and handle euro coins, % EURO AREA

Source: Flash Eurobarometer 362 in 2012

1.10. Usefulness of continued issuance

When assessing the usefulness of the continued issuance of the 1 and 2 euro cent coins, it is appropriate to mention a number of known benefits of continued issuance for stakeholders and citizens. The 1 and 2 cent euro coins allow small cash payments to be made. Cash is anonymous, widely accepted and allows for easy circulation without direct costs for the consumer. Cash including the small coin denominations is the most accessible means of payment for the financially weaker members of society as it does not

²⁹ Flash Eurobarometer 362, 2012 p. 17.

necessitate a financial intermediary at the moment the payment is made.³⁰ The small coins allow charging low prices for specific retail products. In addition, it allows charging fractional prices. Finally, keeping the 1 and 2 cent euro coins allows the continued use of these coins for social fundraising and donations. Very often, customers in shops are invited to donate their change at the cash desk for charity.

Notwithstanding the known benefits of the continued issuance, a majority of euro area Member States that responded to the questionnaire did not consider the issuance of the 1 euro cent coin useful based on a number of arguments. First, the acquisition costs of 1 and 2 euro cent coins are too high with production costs exceeding the face value. Second, 1 and 2 euro cent coins cause additional costs for business and consumers including very high transportation and processing costs. Third, the coins are not accepted by vending machines and are often hoarded by people. However, some euro area Member States want continued issuance of the 1 and 2 euro cent coins. They argue it will help to avoid inflation by avoiding upward rounding of prices. Moreover, it allows charging low prices for very specific retail products.

The majority of the private actors, which were consulted, consider the issuance of 1 euro cent coins useful. Many prices are still set at the cent level and therefore the smallest denominations remain useful to provide change. However, consumer associations point out that the debate is larger than simply weighing the financial costs of 1 and 2 euro cent coins. Beyond factors such as consumer habits, traditions and the economic situation, the discussions on the issuance of the smallest denominations of euro cent coins are part of the larger debate, namely the cost of cash versus electronic payment instruments.

Consumer associations point out that cash remains the most popular means of payment among consumers, especially as regards relatively small transactions. These associations complain that considerable resources are spent by the financial industry on trying to convince the policymakers that cash is much more expensive than electronic payment instruments, and that the market share of cash transactions should therefore be reduced. It is said that the financial industry's arguments are based on studies that usually calculate the cost of cash for banks and retailers, while omitting the consumer and advantages offered by cash. The associations argue that cash has an important financial and social inclusion aspect. For "unbanked" people, it is the only accessible means of payment and does not necessitate an intermediary at the moment the payment is made. In addition, cash is convenient for many consumers, at least for small payments, and it enables consumers to keep a close check on their spending.

2. Scenario of continued issuance at reduced costs

This scenario entails the continued issuance of the smallest denominations while looking into possibilities to reduce the current costs of issuance. As explained, the production costs of 1 and 2 euro cent coins appear too high causing 'negative' seigniorage in several euro area Member States with the issuance of those coins having become a loss-making

³⁰ As regards the increasing relevance of payment transactions through a payment card see Commission Staff Working Paper: Impact Assessment accompanying the Document Commission Recommendation of 18 July 2011 on access to a basic payment account (SEC 2011(906)).

business from a state income point of view. There seem to be two major options to lower the costs and make the 1 and 2 euro cent coins cheaper to produce.

2.1. Reducing issuance costs by changing the coin composition

The first option is to change the composition of the coins and use cheaper and less precious metal, although with changing the diameter and thickness of the coins.³¹ However, the analysis of the cost of the coin production process has revealed that the cost of the blanks does not exceed 50-60% of the face value.

Even on the assumption that the biggest part of blank production costs relates to raw material costs, it is not obvious why coin acquisition costs are of up to three or four times the coins' face value. In this regard, the final coin production process (i.e. minting) plays a crucial role. A second option would, therefore, be to focus on the coin production process and investigate the potential inefficiencies to be tackled.

There is some room for cost reduction by changing the composition of the coins. Further to a technical statement by technical experts from European mints³², there seems to be a number of potential alternatives that are broader than only focusing on a change in the composition. Also other actors have emphasised that the current composition of copper-plated steel is already a rather cheap solution particularly in view of the technical requirements which the euro cent coins need to fulfil. However, according to the technical statement improvements on the material costs side could be reached in three different ways:³³

- Optimising the existing manufacturing tolerances of the 1 and 2 euro cent coins, without changing the overall specification. This could lead to costs savings around 5% of the price for coin blanks.
- Reducing the thickness of the copper layers, without changing the other specifications. This could potentially reduce the coin blank costs by 5 to 10%.
- Changing the composition of the coins towards stainless steel. This would change the colour of the 1 and 2 cents from red into grey but could lead to cost savings in the range of 10-13% on the cost of the blanks.

³¹ Additional savings while producing smaller 1 and 2 euro cent coins are not an option given that the current 1 and 2 euro cent coins are already small and the parameters are set to meet the practical needs of euro cash users and amongst others visually impaired people in particular. The legally binding technical specifications laid down in Council Regulation (EC) No 975/98, as discussed with euro cash users during the legislative process provide. When preparing the introduction of the euro in 1998, the technical specifications of the coins were also discussed with euro cash users. A consensus was reached that the minimum weight of the euro coins is 2 grams whereas the variation of the diameter between two coins must be 2 mm at least.

³² Letter from the Mint Directors Working Group, Utrecht, 23 January 2013.

³³ The second and third solution would require extensive testing and further studies in order to check the technical feasibility of these options.

Further to the technical statement, there are currently no viable non-metallic alternatives known for the small metallic coins. Any move to non-metallic solution would require a very high financial effort by the industry. Moreover, it would require a complete change in the production process, since non-metallic coins cannot be minted on the standard coin presses of the mints.

Others relevant actors have argued that substantial savings could be made by changing the composition of the euro cent coins to aluminium with some percentages of magnesium. It is reported that it could potentially reduce the costs by 45-50% in comparison with the current copper-plated steel. A recent study undertaken for the United States Mint also highlights aluminium and steel, but also added zinc as leading alternative candidates to reduce the costs of coinage.³⁴

Any change in the composition of the euro cent coins would require technical in-depth studies and also extensive testing in collaboration with blank producers and other technical partners and stakeholders. In addition, it would also require an amendment to the EU regulation on technical coin specifications. In case a change in composition would change the colour of the coins, there would be the need for a public information campaign in order to inform the wider public thereof.

It can be concluded that there is room for cost savings, although views on alternative compositions of the 1 and 2 euro cent coins and the size of the potential cost reductions diverge. Nevertheless, the impact on the overall costs would remain relatively limited as the cost of the raw material constitutes only a minor part of the total costs of the finished product. Consequently, several euro area Member States would remain confronted with negative seigniorage on these small coins, even after a change in their composition.

2.2. Reducing issuance costs by increasing efficiency of coin production

An important second option to reduce cost would focus on the coin production process. The earlier analysis of the cost factors of the issuance of the 1 and 2 euro cent coins has shown that the substantial variation in coin production costs cannot be explained by the costs of the raw material or the blank production process but should rather be attributed to the final production process of the coins (i.e. minting) that is undertaken by the national mints of the euro area. However, further analysis would be needed to investigate whether the variation in costs among national euro area mints is caused by the differences in the labor and/or capital costs involved in the final coin production process or whether it is related to potential inefficiencies of specific aspects of the production process.

³⁴ Concurrent Technologies Corporate, 31 August 2012, Alternative Metals Study, Final Report. In the study, a very thorough assessment is undertaken to assess the potential use of alternative metals covering issues such as the cost of the material, the technical properties of material, the environmental impacts and including also coin striking trials on the sets of alternative candidate materials. Most of the analysis focused on higher denomination coins (e.g. 5 dollar cent, 25 and 50 dollar cent, 1 dollar coin) whereby one of the main concerns was the potential impact a change in composition might have on vending machines and weight-based coin acceptance equipment. Rather often, the potential savings to be made by the US Mint were overshadowed by the additional costs incurred by the coin handlers. With regard to the 1 dollar cent coin, the study concluded that copper-plated steel 1 cent coins (i.e. composition of 1 euro cent coin) would offer no costs savings from the incumbent copper-plated zinc 1 cent coin and no other alloys matched the required specifications for the coin.

A systematic in-depth analysis of ways to enhance the efficiency of the coin production process has for example taken place in the context of a recent study prepared for the US in 2012. The first part of the study involved investigating whether changes in production technology, in the machinery and methods used to produce coins could be expected to achieve costs savings. The second part was a detailed analysis of circulating coin production by the US mints in Philadelphia and Denver with the differences in production practices between the two mints investigated. The US study concluded that there was room for some improvements with regard to efficiency. However, it did not foresee any forthcoming means of markedly improving the coin production process. Finally, the study interestingly noted that the impact of using alternative metals for coinage could have significant effects on the production efficiency (e.g. lower temperature might be needed for coinage).

It has to be understood that the continued issuance at reduced issuance costs cannot tackle the other costs related to the circulation of coins (such as the cash handling costs) and the problem of hoarding. The over-production of 1 and 2 euro cent coins to compensate loss would have to continue under the scenario of continued issuance at reduced issuance costs. However, in case both options (i.e. change in composition and enhanced efficiency of production process) would be fully implemented, the negative seigniorage related to the issuance of the 1 and 2 euro cent coins could be significantly reduced, if not eliminated.

III. TWO SCENARIOS OF WITHDRAWAL OF THE 1 AND 2 EURO CENT COINS

1. Scenario of withdrawal with loss of legal tender ("Quick withdrawal scenario")

Under this scenario, the issuance of 1 and 2 euro cent coins is stopped and the coins would be withdrawn from circulation. Questions on the active withdrawal scenario with loss of legal tender were addressed to all groups of key stakeholders, both public and private. However, only a relatively small group of key stakeholders answered them and provided observations on the withdrawal scenario. The stakeholders replying to the questionnaire in general provided answers that applied equally to the 1 and 2 euro cent coins. It appears that there is generally no need to differentiate between those two denominations when it comes to the practicalities of their potential abolition.

1.1. Economic implications

1.1.1. Inflation: real or perceived?

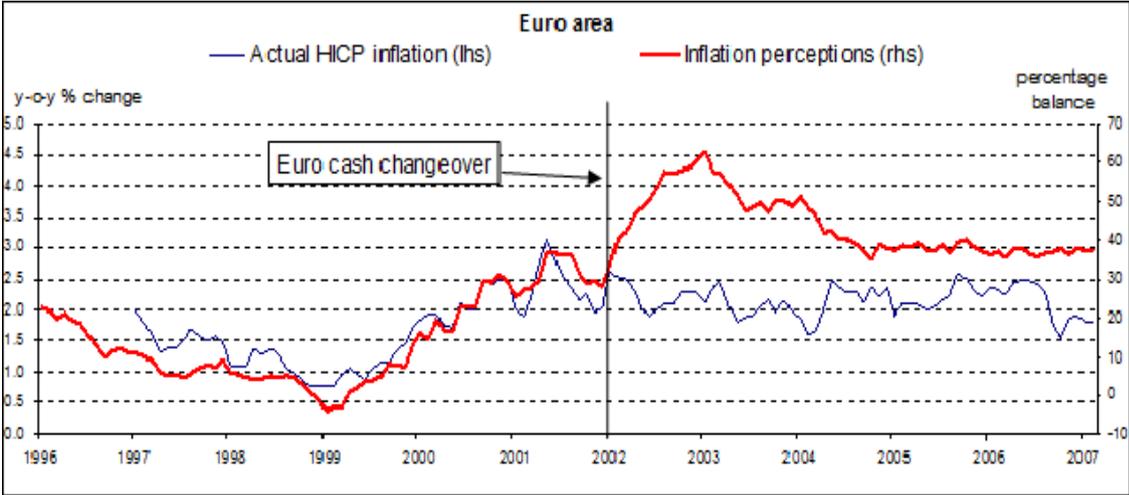
A substantial concern raised by stakeholders is the inflation that might occur under the withdrawal scenario of the two smallest euro coin denominations. It is feared that the abolition of the 1 and 2 euro cent coins could lead to price increases including through the application of rounding rules. When it comes to inflation in this context, it is important to distinguish between the real measured inflation and the perceived inflation. While inflation can be measured based on empirical data, perceived inflation is much more difficult to assess and explain as it mostly originates from expectations and externalities.

The distinction between real and perceived inflation has also been important in the context of the euro changeover in 2002 and provides evidence of what might occur in the context of this analysis. In analogy with the Euro changeover, the withdrawal of the 1 and 2 cent coins involves a change in the existing denomination of coins. In both cases, this might cause fear that there could be an impact on inflation as well as on the perception of inflation.

More than five years after the introduction of euro banknotes and coins, polls revealed a widespread perception that the euro has led to higher inflation. In a Eurobarometer poll of autumn 2006, more than 90% of respondents in the euro area considered that the euro had "added to the increase of prices" in the past 5 years. However, further analysis of the Euro changeover showed that inflation perceptions might deviate significantly from actual inflation. Before and after the Euro changeover took place on 1 January 2002, there was a strong belief in the public that prices increased substantially. This opinion was very persistent, even though inflation measurements provided different results and proved the opposite.

Inflation perception might be driven by a broad sense of cost of living. It might also be dependent on psychological factors with a key role for people's expectations. At the time of the euro changeover it was argued that consumers' inflation perceptions were mainly formed on the basis of an "out-of-the-pocket" expenditure. Incidental price increases in frequently purchased goods, like for example for food, could have led to the impression of a general price increase. Although the annual HICP inflation rate in 2002 was slightly below inflation in 2001, people's perceptions of inflation increased significantly with the euro cash changeover and, in a number of Member States, remained well above measured inflation thereafter.

Chart 13



1.1.1.1. View of the European Central Bank and euro area Member States

According to the European Central Bank, the abolition of the 1- and 2-euro cent coins and a rounding to the nearest 5 euro cent in total cash payments would not be expected to have a noticeable impact on inflation measures. The following considerations were taken into account in assessing the possible impact on price stability.

Consumer price inflation in the euro area is measured by the 'Harmonised Index of Consumer Prices' (HICP). It is compiled by Eurostat and the national statistical institutes in accordance with harmonised statistical methods. The HICP aims to be representative of the developments in the prices of all goods and services available for purchase within the euro area for the purposes of directly satisfying consumer needs. It measures the average changeover time in the prices paid by households for a specific, regularly updated basket of consumer goods and services, purchased by means of directly conducted monetary transactions. In the HICP, the statistical authorities take the quoted (non-rounded) prices into account when calculating the price indices. Hence, as long as the abolition of coins does not lead to changes in the quoted prices of individual goods and services, measured price inflation should not be affected.

The 'Deflator for Private Consumption' is another measure to determine price changes in consumer goods and services. In contrast to the HICP, it is based on actual and imputed expenditures of households. Whereas the HICP refers to a fixed basket of consumer goods and services, the private consumption deflator takes into account consumers' changing consumption habits due to price changes. According to the European Central Bank, when computing the 'Deflator for Private Consumption', statistical authorities consider the actual amounts paid. However, as rounding to nearest 5 cents would only apply to final cash payments and not prices for individual items, there should be no systematic bias on the summation and therefore on the private consumption deflator.

An issue however would arise if the abolition of 1 and 2 cent coins led to the quoted price being rounded to the nearest 5 cents on individual items. The withdrawal of 1- and 2-euro cent coins could provide an opportunity for producers and retailers to round up also a broader set of individual quoted prices, and could then lead to some increase in the general price level and - at least one-off - to higher inflation.

Irrespective of the impact of abolishing 1 and 2 euro cent coins on actual prices, could be an impact on the inflation expectations of consumers. The rounding of final cash sums or individual prices might lead consumers to expect upward rounding or outright price increases also in the future. This might then influence inflation expectations in the same manner as the euro cash changeover. This holds in particular if the rounding affects items that are frequently purchased and typically paid in cash. However, in retrospect, it should be noted that the cash changeover did not appear to give rise to more fundamental changes in price and wage expectations.

A majority of euro area Member States do not expect a withdrawal of 1 and/or 2 euro cent coins to have any significant impact on price stability for two reasons:

- First, a number of studies have demonstrated that the inflationary effects would be very limited³⁵. According to a Belgian study in 2005, the estimated impact on prices in Belgium would be a maximum of 0.11 %. In Slovakia, a study on inflationary impacts of the withdrawal of 10 and 20 Haller coins concluded that the cessation and related rounding rules would have only limited inflationary effects of less than 0.01%. According to the interim results of a pending cash study conducted on behalf of the

³⁵ Ehrmann M. (2006), "Rational inattention, inflation developments and perceptions after the euro cash changeover", European Central Bank, Working paper no. 588. INSEE (2007), "La mesure du pouvoir d'achat et sa perception par les ménages" in "Rapport sur les comptes de la Nation de 2006".

Bundesbank³⁶, which has yet to be published, the inflationary effect due to the introduction of a rounding rule appears to be very small. In the case of commercial rounding of the sum on the cash receipt, the rounding-up and rounding-down effects largely balance each other out. Even in a scenario where retailers round up all final transaction amounts to the nearest 5 cent (e.g. EUR 1,79 to EUR 1.80 but also EUR 1,81 to EUR 1,85 or EUR 1,86 to 1,90 EUR), the one-off effect of the price increase would amount to no more than around 0,1%.

- Second, the experience in FI and the NL has shown that the impact of inflation was minimal or non-existent. The Finnish approach to rounding on cash payments did not apparently cause inflationary effects. In this case, the rounding to the closest 5 euro cent is applied to the final cash sum only (not to individual prices). Based on statistical theory, there should be no inflationary impact if the number of goods purchased is random.

Some euro area Member States indicated that the withdrawal of 1 and/or 2 euro cents coins could have a very limited and transitory effect on the price level. In light of the competitive structure of trade and distribution sectors, commodity prices could be rounded upward more frequently than downward. This would also lead to a perception of a higher inflation, particularly on low-priced units and/or frequently purchased products. Furthermore there would be a limited inflationary risk if the producers and retailers round up a broader set of prices, which could then lead to some increase of the general price level or have a negative impact on inflation expectations.

Several Member States suggested potential accompanying measures that could reduce inflation or the perception of inflation. First, the introduction of an appropriate rounding rule should normally have no impact on price stability as the upward and downward rounding would even each other out. In contrast, the rounding of individual prices is deemed to have a negative impact on price stability. Second, Member States called for taking measures to fight perceived inflation by countering possible negative perception by the public through setting up a targeted information campaign. A clear message to the public, consumers and retailers is important in view of informing them that there are no reasons to fear inflationary effects. However, the cost dimension of such information campaigns would have to be taken into account when weighing the costs and benefits of a potential withdrawal.

1.1.1.2. View of consumer and retailer associations

Consumer associations have mixed views regarding the impact on price stability, if 1 and/or 2 euro cent coins were withdrawn. In their view, a potential impact on inflation cannot be excluded. This impact could be relatively high if prices of individual items and not total amounts of payments were rounded. One consumer association indicated that there is likely to be a significant impact on prices of daily products, because many prices would need to be revised and certainly many economic operators would take advantage of the situation to increase prices. This could have a negative impact particularly on lower income and other vulnerable consumers.

³⁶ http://www.bundesbank.de/Redaktion/EN/Pressemitteilungen/BBK/2013/2013_01_21_summary_monthly_report_january.html

Retailers are divided with regard to the potential withdrawal of the 1 and 2 euro cent coins. The use of these coins constitutes a cost factor for them. While they provide consumers with the relevant small value coins, the consumers rarely use these coins to pay. In case of a withdrawal of these coins, it is crucial for the retailers that this should be accompanied by the appropriate changes in the EU legal framework including the introduction of the appropriate rounding rules. Retailer associations suggested a rounding of total cash payments to the nearest multiple of 5 or 10. It was noted that in the Netherlands and Finland, the impact on prices seemed to have remained very limited possibly because of the balancing effect of rounding up and down. Rounding on individual items should be avoided because it is likely to increase inflation. One retailer association emphasised that it needed to clarify whether potential rounding rules would be applied only to cash payments or also to electronic payments; this could lead to confusion for the consumer because different amounts might have to be paid depending on the payment method.

A representative from a large retail sector from a programme country emphasised that they are against the withdrawal of the coins at this moment in time. In the current economic crisis, consumers would be very suspicious with regard to any change in the coin denomination structure suspecting that the aim of the operation would be to increase prices. Once the economy has recovered, a withdrawal could be envisaged to be accompanied by an important communication campaign to inform consumers.

1.1.2. Impact on state income: tax revenues and seigniorage

When it comes to seigniorage, the withdrawal of the 1 and 2 euro cent coins is likely to have a mixed impact on the income of the Member States in the euro area. Around half of the euro area Member States is confronted with negative seigniorage in relation to their issuance of 1 and 2 euro cent coins. In those Member States, substantial savings sometime up to 4 times the face value could be made by abolishing the 1 and 2 euro cent denominations. However, in other euro area Member States the seigniorage of those coins is still positive and this positive state income stream would be lost. From this specific perspective, rather than abolishing the coins, addressing the high production costs in the euro area Member States confronted with negative seigniorage seems a better solution. It would reduce the losses in those countries while safeguarding the positive seigniorage from those euro area Member States that can produce with lower costs.

In case of withdrawal of the 1 and 2 euro cent coins, probably more coins of the denominations following next on the denomination scale, in particular the 5 and 10 euro cent coins, would be needed. Given the higher face value of those coins (issued at positive seigniorage), the seigniorage from these coins would increase. This would therefore have a positive yet probably modest impact on the state income.

Since it is envisaged that there are no inflationary effects linked to the withdrawal of the 2 smallest denominations, there should normally also be no impact on indirect taxation, i.e. VAT. In case of withdrawal, most likely rounding rules would apply to the final sum with rounding up and rounding down equalling each other out thereby have no impact on the overall price level and consequently the VAT receipts.

1.1.3. Impact on private stakeholder business

The analysis of the economic impact of the withdrawal scenario examines the consequences for economic operators including private companies and businesses. For the purpose of this analysis, Mints are considered economic operators. Even though some Mints are public companies and fulfil certain extent tasks in the public interest, they function like private companies in the market. Against this background, Mints, as well as various retailers, banking and cash in transport associations were asked to provide their observations on the question of what kind of impact the cessation of the smallest euro coin denominations would have in their field of economic activity.

None of the banking associations took a position and submitted a reply to this question. It is understood that provision of cash does not come for free and it cannot be excluded that for banks the provision of certain (coin) denominations to clients is less profitable than the provision with others. However, it appears that banks as cash providers may not see themselves in the driving seat of the discussion on 1 and 2 euro cent coins. The role of banks in cash management and procession is to provide euro cash users with cash as such and independently of the range of legal denominations. The question whether the one or the other denomination requested by the users is (dis)advantageous from the bank's business and profitability point of view seems to be of less interest for banks as they in any case pass the costs of provision of cash on to their customers.

The cash transportation business highlighted the positive effect of the withdrawal of both denominations. Given their shape and high quantity, the 1 and 2 euro cents are difficult to process technically. What is more, margins for processing these two denominations are low compared to the higher value coins, given that in some countries income deriving from coin processing is proportional to the deposit value rather than to the number of coins or the weight of the coins. Other positive impacts of a withdrawal include less weight to be handled by the coin processing infrastructure (machines, vehicles) and staff as in total less coins would need to be handled and reduced costs related to the maintenance of coin sorting and packaging machines as less machines would be needed.

While processing small denominations is a necessary business -as 1 and 2 euro cent coins are legal tender and actually used - it generates low profits. Resources in the cash processing business could probably be used more effectively in other cash processing activities which generate higher profits due to higher margins. On the other hand, the cash transport association points out that with a lower volume of delivery, processing and transportation there would certainly be a loss in turnover and margins which could trigger employee layoffs and financial risks due to severance pay for employee terminations. Furthermore, additional costs could arise from the excess of packaging material for 1 and 2 euro cent coins and the necessary resetting of production lines.

While not being able to quantify the exact amount, the retailers signalled that the withdrawal of the relevant coins would clearly lead to cost savings. It was reported by a large retailer that the costs of obtaining a set of fifty 1 cent coins costs the 50 cents plus an extra 40 cents. In addition to those cost savings, the handling and transportation costs related to the 1 and 2 euro cent coins would also be reduced even if they could not provide quantitative data in this regard. Retailers indicated that the withdrawal scenario could risk provoking a negative attitude from consumers in relation to the fear for inflation. However, retailers were positive that this problem could most likely be

addressed by focused public relations campaigns informing citizens that the withdrawal of the coins and rounding would not impact on inflation.

As regards the Mints, the question of the impact of the ceasing coin issuance was submitted with a focus on their field of activity with regard to the variables time and costs (e.g. termination of long-term contracts on supply of blanks) under the withdrawal scenario. Generally speaking, the Mints stated that the cessation of issuance of 1 and 2 euro cent coins would negatively impact on their business. The 1 and 2 euro cents already minted would have to be destroyed, causing additional costs including the costs of melting the coins. All Mints except one, however, seem to face no problems with running contracts on the supply of blanks. The contracts generally do not run for more than 12 to 18 months, which – as a conclusion for this study – does not appear to be a problem as the preparation of the possible withdrawal scenario would take more or less the same time.

A number of mints emphasised that 1 and 2 euro cent coins represent more than 50% of their production of coins. Over capacity in terms of production under the possible withdrawal scenario would imply the closing of production units, with a negative financial impact on those Mints and causing workers to lose their jobs. However, it could be considered whether the freed capacities could not be used to concentrate on more lucrative business. For other Mints, ceasing the issuance of 1 and 2 euro cent coins would have a relatively small impact on their field of business. The impact would be temporary and occur mainly during the transition period.

1.2. Social impact

Observations made by stakeholders also touched indirectly upon the general social impact of a withdrawal scenario. As an example, stakeholders pointed out that fair and easy rounding rules would have to be introduced and applied only to the final sum of the payment. It also appears that in order to be accepted widely, the withdrawal scenario would have to be prepared well in advance and be accompanied by an appropriate information campaign. Moreover, it should rather be carried out at a convenient moment of economic and financial upswing, since citizens are currently very sensitive to plans and initiatives which could be perceived as affecting their financial situation because of the difficult general economic environment.

From a social point of view, the withdrawal scenario could negatively impact on social fund raising and donations. As stated above, in some countries supermarkets have been inviting customers to sporadically donate "red coin" change at the cash desk for charity. Although customers may want to donate more than "red coin change", the withdrawal scenario would eliminate charity donations of 1 and 2 euro cent coins. It would be difficult to quantify this impact on the overall amount of donations, but given the low face value of the 1 and 2 euro cent coins "lost chances" for donations are likely to be marginal. What is more, the costs of handling and processing low value coin donations (relatively low sums, relatively high amount of coins, probably long collection intervals)

would have to be factored into the calculation of the costs/benefits of this kind of social fund raising and charity.³⁷

Charity associations could probably assist (central) banks and other cash processing bodies with the withdrawal of the 1 and 2 euro cent coins (e.g. through "kettle actions" in shopping malls and streets). The reimbursement of the collected coins could be injected into charity projects rather than be returned to the state while causing a one-off beneficial effect of the withdrawal. From a state income and costs of withdrawal point of view, collecting of coins through charity while renouncing to collected receipts may probably be more cost efficient for Member States than involving (exclusively) costly professional cash procession bodies and business in the withdrawal and keeping the receipts.

The social impact of the withdrawal scenario on tipping in restaurants and bars is likely to be irrelevant, given that in general prices for beverages and prepared meals in locations with service are not fractional. What is more, customers really willing to tip are unlikely to give 1 or 2 euro cent as overall tip or to round up the total sum to the next 5 or 0 cent only.

1.3. Impact on other coin denominations and the use of other means of payment

Under the withdrawal scenario, the number of euro coin denominations would drop from 8 to 6 denominations. In their answers to the questionnaire on whether to abolish the 1 and/or 2 euro cent coin, the stakeholders mostly did not take a different view on the potential withdrawal of the 1 euro cent coin than that they expressed on the potential withdrawal of the 2 euro cent coin. Therefore, the more likely potential withdrawal scenario would be the abolition of the two lowest denominations. Against this background, the 5 euro cent coin would become the lowest denomination.

The Member States and the central banks were questioned about a potential impact of the 1 and 2 euro cent abolition on the other coins denominations such as the 5 euro cent coin. The overall view is that the demand for 5 euro cent coins but also for 10 euro cent coins would increase and that the demand for 5 euro cent coins would increase more than the demand for 10 euro cent coins. Member States and central banks find it difficult to quantify the scale of such an increase, as the demand for the coins would depend on rounding policies and price pointing. Central banks and Member States report that the increase is expected to be small, in particular because rounding would apply to the overall due sum rather than to each item to be purchased and because rounding would have the effect to even out the demand for 5 and 10 euro cent coins.

³⁷ Figures from examples in Europe are not available. As an example from outside Europe, a recent "kettle coin campaign" during the Christmas period in Ottawa (Canada) brought receipts of around 150.000 € (coins of all Canadian dollar denominations). The charity organization had to face around 1,5% of the receipts (ca. 2.300 €) to cover related cash processing and bank services.

1.4. Implementing measures accompanying a possible withdrawal scenario

1.4.1. Legislative act by the European legislator

As a prerequisite of a possible withdrawal scenario, relevant secondary EU law would have to be amended. The determination of the denomination of euro coins is the exclusive competence of the European Union pursuant to Article 128, paragraph 2 of the TFEU. The withdrawal scenario would imply the abolition of the 1 and 2 euro cent denominations. Therefore, Council Regulation (EC) No 975/98 which laid down the details of the euro coin denominations and set the number of denominations at eight would have to be amended.

Under the withdrawal scenario, it is expected that fractional prices would continue to exist. Exact cash payment of the final sum of fractional prices would not always be possible anymore. Therefore, legally binding rounding rules for the euro area would need to be introduced, most likely based on Article 133 TFEU following the ordinary legislative procedure and after consultation of the ECB. On grounds of the principles of equal treatment, non-discrimination and fair competition, rounding would have to apply to all means of payment it being cash or non-cash payments.

1.4.2. Implementing measures to be taken by public key stakeholders

The possible withdrawal scenario would affect every cash user and thereby all citizens and key stakeholders in the euro area. As an example, with the 1 and 2 euro cent coins ceasing to be legal tender in the euro area, citizens would try to spend their (hoarded) 1 and 2 euro cents as much as possible in retailer transactions (e.g. in supermarkets) or return them to the banks before the expiry date is reached. Regardless of the impact of the withdrawal on everyone's lives, key stakeholders with public and private tasks would have to play a pro-active role and need to take implementing measures that accompany the withdrawal of the coins.

Against this background, three guiding principles appeared to be important for a successful withdrawal:

- Timely preparation of implementing measures and information of the public
- Central banks and banks to play a pivotal role in the practical withdrawal
- Appropriate duration of the implementing measures

Any withdrawal of 1 and 2 euro cent coins including cessation of further issuance would have to be organised in the view of ensuring a proper and adequate implementation. The central banks supported, where necessary, by the public administration would have to organise the physical withdrawal of the 1 and 2 euro cent coins. In addition, Member States would have to decide which accompanying measures to take to prepare the withdrawal from a socio-economical (public campaign to inform citizens, administration and business) logistical and legal point of view.

On the side of public key stakeholders, treasuries, central banks and the ECB would play a pivotal role in preparing the withdrawal, including considering a wide range of activities with regard to timing and appropriate information of the public.

The key stakeholders stated that in addition to the preparation of the mere physical withdrawal of the 1 and 2 euro cent coins preparatory measures would be necessary. Such measures should consist of appropriate publicity campaigns which inform the public on the withdrawal and its ramifications and practicalities as such. The stakeholders underlined that the public should be informed with the aim of reassuring consumers and retailers that there would not be any reason to fear inflationary effects. Some Member States referred to their experience with regard to the abolition of small national denominations and advised to discuss the possible abolition of the 1 and 2 euro cent with consumers, retailers and banks prior in preparation of the withdrawal campaign.

As to the duration of the accompanying measures, several Member States pointed out that the public information campaign should run at least for 6 months although the overall withdrawal procedure including the application of accompanying measures would need one or even up to two years.

Member States were confronted with the key question on the practical preparation of a possible withdrawal scenario and the role their national central banks would play in the implementation. Although none of the addressees of the questions provided comprehensive information on how the withdrawal would have to be organised in the respective Member State, key public stakeholders tend to agree that the withdrawal should be carried out as it was done when the national cash was withdrawn in its territory at the moment of the euro changeover. Several key stakeholders pleaded for a progressive withdrawal with instructions to the central bank and commercial banks to stop further issuance to customers and return all stocks progressively. Finally, some stakeholders advocated for leaving the withdrawal measures to Member State discretion while proposing that the Commission should lay down the withdrawal framework such as the redemption time for 1 and 2 euro cent coins and leave the specific details to the individual Member States.

As to the practicalities of the withdrawal, some of the central banks implied the need to adapt the central bank's internal proceedings and IT systems as well as the website and public information about the coins. Finally, central banks are of the opinion that the higher return of the coins to the central banks upon withdrawal would imply a higher demand for storage and logistics in central bank facilities until the melting down of the coins.

None of the central banks quantified the implementation measures of the physical coin withdrawal in terms of money and personnel. The reason could be that in recent years central banks have been outsourcing cash distribution where possible and reducing cash handling services to the minimum. Consequently, a large proportion of the physical cash withdrawal would be borne by the cash handling service providers to which cash distribution has been outsourced rather than by the central banks' own staff and resources.

As to the question on how long it would take to perform the implementing measures, central banks agreed that sufficient time must be given to all stakeholders to prepare themselves and inform the citizens. On average, central banks stated that the implementing measures in general should last at least one year but some central banks considered a two-year period more adequate. In order to carry out the public information

campaign and provide for the rounding rules, central banks think that one year may be sufficient. In general, central banks pointed out that the physical withdrawal would take several years as the 1 and 2 euro cent coins would not lose their qualification as legal tender, at least not before an appropriate legal transition period of several years has elapsed.

However, it appears to be difficult to estimate the amount of coins to be returned and to calculate and set an appropriate timeframe up-front. None of the central banks were in a position to provide observations on how many 1 and 2 euro cent coins are expected to be returned. Some stakeholders expect very limited amounts of these denominations to return.

As discussed earlier, the 1 and 2 euro cent coins have been issued in high quantities. Moreover, these coins have been hoarded in high quantities in private households. Nevertheless retailers and above all supermarkets would be owners of the largest quantities of these denominations as they have to provide change at the cashier. The loss rate of both denominations is very high and their face value low. Therefore, one may probably expect a relatively low return rate. It is envisioned that a citizen with a small amount of 1 and 2 euro cent coins in his wallet is unlikely to change the small amount or pay it into a bank account at a bank counter but use them for payments in the supermarket.

1.4.3. Implementing measures to be taken by private key stakeholders

Similar to public key stakeholders, also private key stakeholders such as banks, retailers and cash-in transport industry would have to play a specific role should the 1 and 2 euro cent coins be withdrawn. Therefore, stakeholders were confronted with questions on which implementation measure they would consider necessary in their field of business. However, only a few private stakeholders who were contacted submitted replies on these issues.

The banking industry highlighted the sensitivity of a withdrawal scenario and called for a thorough ex-ante discussion with stakeholders about any implementing measures and the various possible options to put a withdrawal scenario into practice. The timeline for phasing out the use of 1 and 2 euro cent coins should be considered and an information campaign should be developed. Banks pointed out that, in principle, they would have to provide their customers with all cash denominations. The banks' costs to provide euro coins would not change significantly if one or two denominations such as the 1 and 2 euro cent coins were dropped or new coin denominations added. Banks could face specific implementation measures, for example in the case that the rounding rules for cash payments would apply to electronic payments. In the latter case, the banks' IT-systems for accounting and for running the coin processing machines would have to be adapted. Costs related to those changes would however remain rather limited.

The cash in transport business expects a limited impact when involved in the possible withdrawal scenario and reported that the withdrawal would imply software and hardware modifications to the coin processing machines and some changes in the client reporting system. The association believes that the adaptations would require up to six months, but some partners may be in a position to carry out the modifications in only a couple of weeks.

1.5. Experience with withdrawal of low value coins

Historical experience with the abolition of small denominations in various countries shows that, namely for reasons of legal certainty, the abolition of a coin denomination is usually accompanied by the withdrawal of the respective coins. In these circumstances, individuals and professional coin users can either exchange the denominations at the bank counter or return them directly or via an agent to the central bank. In most cases, and as an incentive for fast and effective withdrawal, the abandoned denomination loses its quality as legal tender at the end of a legally defined transition period.

In the past, various European countries including Member States which now belong to the euro area, abolished and withdrew lower denomination coins. No denominations have been withdrawn in the euro area so far. The measures taken in Finland and the Netherlands to physically limit the circulation of 1 and 2 euro cent coins combined with the use of rounding rules cannot be considered as withdrawal. These denominations continue to be legal tender in the whole euro area including Finland and the Netherlands.

The experience with the withdrawal of small denomination coins is not limited to European countries. Other (Western) countries, including recently Canada, have decided to abolish low value coins.

1.5.1. Euro area Member States prior to the euro changeover

Some EU Member States which became members of the euro area gained experience from the withdrawal of low denomination coins before the euro changeover took place. Belgium, Finland, Greece, the Netherlands and Slovakia withdrew several low denomination coins from circulation.

Over the years, amongst others the following denominations were withdrawn (EUR according to conversion rates): BEF 0.25 (EUR 0.006), FIM 0.01 and 0.05 (EUR 0.002 and 0.008), GRD 0.05, 0.10 and 0.20 (EUR 0.00015, 0.0003 and 0.0006), NLG 0.01 (EUR 0.005), SKK 0.10 and 0.20 (EUR 0.003 and 0.006).

Luxembourg, the Netherlands, Portugal and Spain changed the metallic composition of their national coin denominations to reduce costs but it is not reported that these specific denominations have been abolished later on.

1.5.2. Other EU Member States and European countries

Many low denomination coins have been withdrawn from circulation in countries outside the euro area, in countries of the European Economic Area or in other European countries.

A long tradition of withdrawal can be noted in Scandinavia. Denmark, Norway and Sweden introduced common coin denominations and units of account (krone) in 19th century, when the Scandinavian Monetary Union was built. Whereas in Sweden and Norway the lowest denomination is 1 krona today, the lowest denomination of 50 øre

coins remains being legal tender in Denmark. However in Norway and Sweden, the øre is only an arithmetical unit, which can be used for quoted prices and electronic payments. Furthermore Iceland has withdrawn low denomination coins over the years.

In Denmark, on separate occasions 1, 2, 5 and 10 øre coins were removed. With the abolition of the 25 øre coin in 2008, rounding to the nearest 50 øre was introduced to cash payments.

In Sweden 1, 2, 5, 25, 10 and 50 øre coins were withdrawn between 1972 and 2010.³⁸ The Swedish Riksbank recommended the cessation of 50 øre issuance in 2010, because its surveys revealed that two-third of the population considered the 50 øre coins no longer necessary. It was assessed that abolishing the 50 øre coin would not have any significant effect on the demand for other denominations of coins, but would lead to a relatively small increase in demand for 1 krona coins. The costs of withdrawal for the Swedish Riksbank were calculated at SEK 10-15 million. At the same time new rounding rules were introduced. Cash payments must be rounded to the nearest krona/or, meaning that amounts from SEK 0.01 to 0.49 are rounded down and amounts from SEK 0.50 to 0.99 are rounded up. In Sweden retailers sent recently a request to the Swedish Ministry of Finance, asking for clarification on the issue of equal rounding rules for electronic payments, because some retailers apply rounding rules for all kind of payments, which might have an impact on competition.

Over the years, the Scandinavian countries also changed the metallic composition and the size of coins using iron, bronze, nickel-bronze, cupro-nickel, copper, zinc or tin in order to reduce costs. With a view to inflation, these attempts were considered insufficient to solve the problems of low denominated coins over time. Therefore countries started to withdraw coins with the lowest denominations. Rounding rules for cash payments were introduced, which apply only to total amounts of payments and not to the price of each individual article.

In 1984, the United Kingdom removed the legal tender status of GBP 0.005. . In Switzerland, the second lowest denomination, CHF 0.02 was withdrawn from circulation in 1978. It was followed by the cessation of the lowest denomination, CHF 0.01, in 2007.

Poland is currently considering withdrawing the two lowest denomination coins (1 and 2 grosz) to save money as the production costs seem to be much higher than the face value of these coins.

1.5.3. Withdrawal experience outside Europe

Several countries have ceased to produce or have removed from circulation their lowest-denomination coins as they became less used for transactions and more costly to produce.

- *Canada*

A recent example is the withdrawal of 1 cent coins (EUR 0.007) in Canada which took effect in February 2013. In 2010 and 2011, the Government paid the Mint CAD 120

³⁸ The Swedish case shows that the order of withdrawals over time does not necessarily have to follow the denomination scale. The 25 øre coin was withdrawn seven years before the withdrawal of the 10 øre coin in 1992.

million (EUR 92 million) for coins and earned CAD 131 million (EUR 101 million) on the subsequent sale of these coins to financial institutions at face value. However, the cost to produce a Canadian 1 cent coin ('penny') exceeds its face value by about 0.6 Canadian cent. The Canadian Government calculated that the cost of supplying Canadian cents to the economy is about CAD 11 million (EUR 8 million) per year.

A study carried out in Canada estimated that the economic costs of maintaining 1 cent coins, including direct production costs and indirect costs to financial institutions, retailers and consumers, amounted to CAD 150 million (EUR 116 million) in 2006. Financial institutions together handled more than nine billion pennies per year, which translated into an annual cost of at least CAD 20 million (EUR 15 million).³⁹

Against this background, the Government of Canada announced in its 2012 Economic Action Plan its intention to withdraw the Canadian 1 cent coin from circulation due to its low purchasing power, its rising cost of production relative to face value, the increased accumulation of 1 cent coins by Canadians in their households, environmental considerations, and the significant handling costs the penny imposes on retailers, financial institutions, and the economy more generally. Due to inflation, the purchasing power of the 1 cent coin has eroded over the years, retaining only about one-twentieth of its original purchasing power.

The Royal Canadian Mint ceased minting of Canadian 1 cent coins on 4 May 2012. A transition date of 4 February 2013 has been set after which the penny will no longer be issued. However these coins will continue to be Canada's smallest unit for the pricing of goods and services. Rounding is introduced for cash payments but payments by other means, such as cheques, credit cards and debit cards, will remain to be made to the exact amount.

Withdrawing Canadian 1 cent coins from circulation is expected to save the Canadian tax payers around 7,5 million EUR production costs a year. The withdrawal is likely to increase slightly the demand for higher-denomination coins, such as CAD 0.05, 0.10 and 0.25. This would increase net coinage revenues as these coins are worth more than they cost to produce. Withdrawing the penny shall bring economic and financial savings to financial institutions, retailers and consumers. In addition it is expected to bring some environmental benefits.

Over the past five years, around 7,000 tons of pennies were produced and distributed annually from the Mint's plant in Winnipeg to the rest of the country. The withdrawal will reduce the annual use of base metals by the Mint in the production process. Metals from existing pennies will be recycled for use in other products. Ceasing the production of pennies will save energy that is currently used in the production, transportation and distribution of pennies.

- *USA*

In the United States, a long debate has started on the future or possible cessation of issuance of 1 cent coins. According to recent statements, however, there seems to be a

³⁹ Study carried out by the Desjardins Group (Canada) in 2006.

preference to use an alternative material⁴⁰ to produce the coins rather than to opt for the withdrawal as currently taking place in Canada.

- ***Other countries***

Many other countries outside the EU and North America have withdrawn low denomination coins. For example (EUR according to recent conversion rates):

Chart 14

<ul style="list-style-type: none">• Australia: withdrew AUD 0.01 and 0.02 (EUR 0.008 and 0.016) from circulation in 1992.
<ul style="list-style-type: none">• Brazil: stopped issuing BRL 1.00 (EUR 0.37) coins in 2005.• Israel: stopped issuing ILS 0.01 and 0.05 (EUR 0.002 and 0.004) by 2008.• New Zealand: withdrew NZD 0.01, 0.02 and 0.05 (EUR 0.006, 0.01 and 0.03) from circulation by 2006.

1.6. Continued issuance or cessation

Confronted with the question whether issuance of 1 and 2 euro cents should be continued or ceased, three EU Member States stated that they are in favour of continuation whereas four EU Member States stated that they prefer cessation. Fifteen EU Member States did not provide any answer to this question, it being understood that some EU Member States did not provide any answer to any of the (other) question raised in the questionnaire. While this provides a first indication, no definite conclusions can be made on the basis of this partial result.

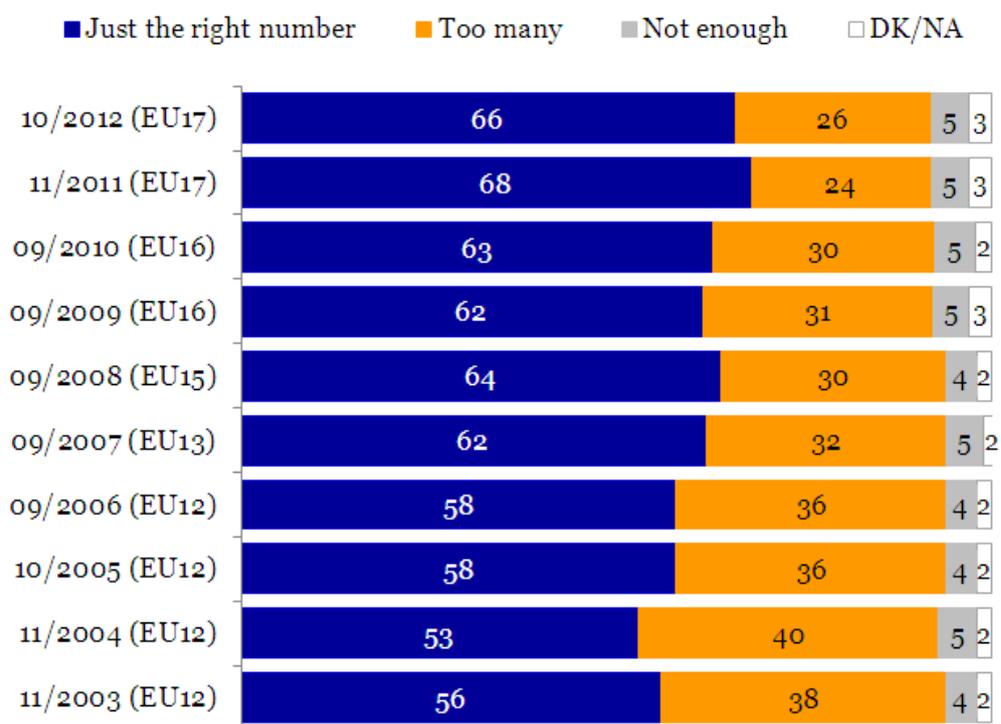
Also European consumer associations were invited to take a position on continued issuance or cessation. One of the two consumer associations that replied to the question was in favour of the continued issuance of the small coins. The other one chose the option to not provide an answer. The only retailer association that replied also chose not to answer the question. These results leave us with an unclear reply to this crucial question.

In order to explore the citizens' opinion on continued issuance or cessation, the Commission's Eurobarometer could be used as an indicator, given that it gives useful information on the EU citizens' views on the current euro coin denominations. It also provides information on which euro coin denominations citizens would most like to be removed. As in previous years, a majority of survey participants in the euro area countries were satisfied with the current selection of euro coins – 66% believed that there was just the right number of euro coins. In contrast, 26% of the respondents thought that there were too many euro coins with different values, and 1 in 20 (5%) interviewees considered that there were not enough (see graph 6).

⁴⁰ http://money.cnn.com/2012/02/15/news/economy/pennies_nickels/index.htm?hpt=hp_t3

Chart 15

Satisfaction with the current selection of the euro coins, 2003-2012



Q4a(2012)/Q5(2011)/Q4(2008-2010)/Q6(2007)/Q5(2003-2006). Do you consider that there are too many or, on the contrary, not enough euro coins with different values or do you consider that there are just the right number?

Base: all respondents, % EURO AREA

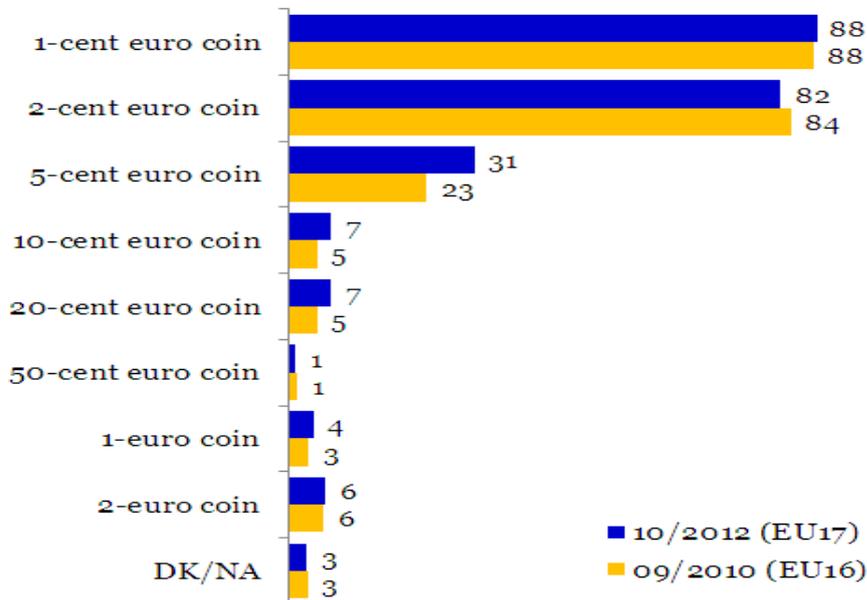
Source: Flash Eurobarometer 362 in 2012

26% of the citizens that participated in the Eurobarometer survey stated that there were too many euro coin denominations. This group of respondents were asked which denominations they consider superfluous. Almost 9 in 10 (88%) of them would like to see the 1 euro cent coin removed from circulation (23% of all respondents). A similar share (82%), of those interviewees in the euro area countries who felt that there were too many euro coin denominations, would like the 2 euro cent coin removed (representing 21% of all survey respondents). These are the most mentioned coins by a considerable margin.

It can be concluded that there seems to be satisfaction with the different coin denominations, with however less support for 1 and 2 euro cent coins.

Chart 16

**Which euro coins should be removed?
2010-2012**



Q4b (2012) Q4bis (2010) Please indicate whether any of the euro coin denominations should be removed. If yes, which one or which ones?

Base: those who answered there are "too many" coins with different values, % EURO AREA

Source: Flash Eurobarometer 362 in 2012

2. Scenario of withdrawal through fading out while keeping legal tender ("Fading out scenario")

A variant of the quick withdrawal scenario is a "fading out scenario" which would have the effect of withdrawal but achieve it through cessation of issuance of the 1 and 2 euro coins combined with the application of rounding rules. Without further intervention, these denominations would disappear as a consequence of the high loss rate and the fact that no new coins are issued and injected into the cash cycle.⁴¹

The rationale of the fading out scenario is the same as for the quick withdrawal scenario. Both scenarios are based on the assumption that the 1 and 2 euro cent coins are impractical and too cumbersome and expensive for payment transactions. The attractiveness of the fading out scenario compared to the quick withdrawal scenario derives from the fact that one big organisational step in abolishing the 1 and 2 euro coins (i.e. the cost generating physical withdrawal exercise) does not have to be carried out.⁴²

⁴¹ See above chapter I.4.

⁴² The transportation costs under the withdrawal scenario are likely to be an important factor in the overall withdrawal costs. On the generous assumption that the return rate would be as high as the withdrawal rate of the 50 øre coin in Sweden in 2010 (30% of the issued coins were returned to central

2.1. Need for euro area rounding rules and practical consequences for the cash user

As with the quick withdrawal scenario, legally binding rounding rules would also be needed under the fading out scenario. One reason for the introduction of rounding rules is that, from a legal point of view rules on rounding fractional sums need to be put into place to provide legal certainty in cash payments of fractional final sums in the euro area. The second reason for rounding rules under the fading out scenario is to make this scenario efficient. 1 and 2 euro cent coins still circulate until they are fully absorbed and disappear from circulation. In principle, the parties of a euro cash transaction still possess these denominations and can use them for payment, although these coins would become rarer. In order not to jeopardise the scope of the fading out scenario and slow down the effect of gradual disappearance of the coins, it should be avoided that cash transaction parties still use the 1 and 2 euro cent coins to settle the exact amount. A binding rounding rule would force the parties legally to settle the rounded amount, it being understood that 1 and 2 euro cent coins could still be used, but only for rounded settlement.

2.2. Duration of the fading out scenario and role of the loss rate

The fading out scenario is based on the assumption that upon cessation of issuance, the 1 and 2 euro cent coins disappear automatically and gradually from circulation without any further intervention. Against this background, it is important to learn by when disappearance from circulation or at least substantial absorption of these denominations could be expected. The loss rate of these coins, as reported by euro area Member States, could be informative for these calculations.⁴³

As stated above, euro area Member States, answering to the question on the loss rate of 1 and 2 euro cent coins, reported that the rates differ between 25% and close to 100%. Not all euro-area Member States have answered the question on the loss rate. It is understood that the amounts of coins in circulation in Member States naturally diverge considerably as also the average amount of 1 and 2 cent coins in cash transactions of euro cash users is likely to vary substantially across the euro area.⁴⁴ Therefore, the absorption of the coins in one Member State would take longer than in another. Against this background, one can only roughly estimate on the basis of the loss rate by when the amount of coins still in circulation has reached a level that can be considered as a negligible quantity of cash payment means.

The calculation below simulates the effects of a fading out scenario based on the average loss rate (around 60%) of the 1 and 2 euro cent coins as reported by euro area Member

banks), the volume of issued 1 euro cent coins would amount to 45.450 tons whereas the volume of returned 2euro cent coins would be around 65.208 tons.

⁴³ At least from a mathematical point of view full disappearance is not possible, given that the calculation by means of the loss rate approaches zero without ever reaching it.

⁴⁴ This amount is shaped by the size of the economy of the Member State, the number and 'coin composition' of the cash transactions, the cash payment habits and external factors such as coin migration across the euro area. As an example for the latter, in 2012, around 37% of all coins in circulation in Germany were issued abroad.

States. It is based on the assumption that the loss rate would be the same in all euro area Member States and that it remains stable over time during the fading out scenario. The table shows that based on the current loss rate, very large amounts of 1 and 2 euro cent coins would already have disappeared from circulation within 3 or 4 years after the cessation of issuance.

Chart 17

Simulation on the loss of 1 and 2 euro cent coins (number of coins, millions)

	1 cent coins			2 cent coins		
	Annual loss rate			Annual loss rate		
	60%	40%	20%	60%	40%	20%
2013 (Jan)	26,260	26,260	26,260	20,606	20,606	20,606
2014	10,504	15,756	21,008	8,242	12,364	16,485
2015	4,202	9,453	16,806	3,297	7,418	13,188
2016	1,681	5,672	13,445	1,319	4,451	10,550
2017	672	3,403	10,756	528	2,671	8,440
2018	269	2,042	8,605	211	1,602	6,752
2019	108	1,225	6,884	84	961	5,402
2020	43	735	5,507	34	577	4,321
2021	17	441	4,406	14	346	3,457
2022	7	265	3,525	5	208	2,766
2023	3	159	2,820	2	125	2,213
2024	1	95	2,256	1	75	1,770
2025	0	57	1,805	0	45	1,416

Source: ECB and Commission calculations

The exact speed and development cannot be calculated nor predicted, given that there is no empirical data on fading out scenarios from Member States or other countries. A decision could be taken to end the legal tender of these coins when their circulation becomes purely residual (e.g. end of 2020, based on a 60% loss rate scenario).

2.3. Specific cost aspects of the fading out scenario

It has to be analysed whether, compared to the quick withdrawal scenario, the fading out scenario would allow to save costs in addition to those that would be generated by the effective withdrawal of the coins. This would make the fading out scenario more advantageous from a financial point of view.

No lessons can be learned from Member States or other countries, given that no fading out of low denominations has been reported. It appears that only in Sweden, a country where low denominations coins have been withdrawn over decades, the issuance of one denomination (2-krona coin) was ceased while the coin remained legal tender. The 2-krona coin, the face value of which is around EUR 0,23, was issued from the 1870s until 1971 while its metallic composition was changed several times. Nowadays, the coin is mostly absorbed by the collector market rather than used as payment means.

The fading out would have to be accompanied by an appropriate euro area-wide information campaign that informs about the practicalities of the fading out and the rounding rules. It would be a particular challenge in such a campaign to explain that rounding rules would apply even if the exact change for paying the unrounded final would be available. The considerable costs of such an information campaign have to be factored into the overall costs of the fading out scenario. Similar public campaign costs would however also be generated under the quick withdrawal scenario.

Nonetheless, it is evident that even though the circulation of these small coins would diminish under the fading out scenario, banks, supermarkets and other retailers would have to bear the costs for handling these coins because they remain legal tender. This would not be the case under the quick withdrawal scenario, even though these businesses would face an increased inflow of 1 and 2 euro cent coins during the withdrawal period and bear the related additional one-way handling costs.

Finally the impact of the two scenarios on state receipts is the same. While under the fading out scenario, there might be a slight increase in the demand for 5 and probably also 10 euro cent coins, this would be the same under the quick withdrawal scenario. Under both scenarios, this is expected to have positive impact on seigniorage.

IV. CHARACTERISTICS AND OVERVIEW OF THE FOUR SCENARIOS

The characteristics, advantages and disadvantages of all four scenarios that were discussed in the previous sections are summarised in the chart below. In principle, the variants share the main (dis)advantages of the respective main scenario.

Chart 18

SCENARIO	MEASURES NEEDED	ADVANTAGES	DISADVANTAGES
Continued issuance ('status quo scenario')			
	None	No disruption of current cash payment habits	Continued loss ('negative' seigniorage) in Member States where coin acquisition costs are above face value
			Continued 'over production' due to high loss rate
			Handling, storage and transportation costs
			Fragmented approach in euro area due to situation in Finland and the Netherlands
Continued issuance at lower issuance costs ('issuance at reduced costs scenario')			
<i>Option 1: Issuance of new coins of less precious metal replacing progressively the current coins</i>			
	Amendment to EU Regulation on technical coin specifications	No need for public information campaign except if colour of new coins change due to new metallic composition	Alternative raw material may result in a different colour of new coins (white rather than red)
	Technical in-depth study and testing on the use	Possibility to reduce impact of coinage on	Challenge to ensure the requested quality characteristics of the

SCENARIO	MEASURES NEEDED	ADVANTAGES	DISADVANTAGES
	of alternative raw material	environment due to better material	coins (e.g. weight, diameter, thickness, size)
		Lower issuance costs for Member States	Continued loss ('negative' seigniorage) in Member States where coin acquisition costs remain above face value after saving on the costs of the raw material
			Handling, storage and transportation costs for cash users unchanged
			Costs related to withdrawal of old coins
<i>Option 2: Reducing costs through enhancing the efficiency of the coin production process (minting)</i>			
	In-depth analysis of the coin production process (blank production and minting) with focus on how production costs can be lowered (e.g.. Member States to put minting out for public tender, other efficiency gains)	No need for public information campaign	Handling, storage and transportation costs for cash users unchanged
		Lower issuance	Continued loss

SCENARIO	MEASURES NEEDED	ADVANTAGES	DISADVANTAGES
		costs for Member States	('negative' seigniorage) in Member States where coin acquisition costs remain above face value after attempts to save on the coin production costs
			Increasing efficiency of coin production might lead to lower staff levels or different levels of capital investment
Withdrawal ('quick withdrawal scenario')			
	Amendment to EU Regulation on euro denominations	Loss ('negative' seigniorage) in Member States where coin acquisition costs are above face value put to an end	Large and costly information campaign to explain euro cash users the consequences of the withdrawal scenario including that there is no real impact on inflation (perceived inflation)
	Rules on end of legal tender and transition periods for change at (Central) Banks	One-off income of charity organizations if involved in practical withdrawal (collection jars, kettles)	No possibility to pay exactly to the arithmetical final amount
	Withdrawal of coins mainly through banks and cash handlers	Overall less handling, storage and transportation costs for cash users	Costs related to withdrawal of coins

SCENARIO	MEASURES NEEDED	ADVANTAGES	DISADVANTAGES
	Transition period for withdrawal	Cash users put hoarded coins into the economy	Impact on blank producers and on the mint business (e.g. negative effect on staff levels)
	Public information campaign		
Fading out with coins remaining legal tender ('fading out scenario')			
	Legally binding EU rounding rules	Loss ('negative' seigniorage) in Member States where coin acquisition costs are above face value put to an end	Large and costly information campaign to explain the impact of this scenario on euro cash users including that withdrawal has no real impact on inflation (perceived inflation)
	Public information campaign	Handling, storage and transportation costs for cash users expected to decrease over time	No longer seigniorage income in the few Member States where coin acquisition costs are below face value
		From timing perspective not a 'big-bang' solution but allowing euro cash users sufficient time to get used to payments without 1 and 2 euro cent coins	Mostly retailers, supermarkets and banks to bear costs of coin processing as long as coins remain legal tender
			Difficulty to explain euro cash users that they have to pay to

SCENARIO	MEASURES NEEDED	ADVANTAGES	DISADVANTAGES
			the rounded amount although cash at hand would allow for exact payment of the arithmetical (= unrounded) final sum
			Impact on blank production and mint business (e.g. negative effect on staff levels)

V. GENERAL CONCLUSIONS

This chapter draws general conclusions from the analysis of the fact-finding and stock-taking exercise on the continued issuance of 1- and 2-euro cent coins and makes suggestions on how to move the discussion on the future of the 1- and 2-euro cent coins forward.

FOUR POSSIBLE SCENARIOS

- *Four possible scenarios are presented to tackle the challenges of the 1 and 2 euro cent coins, each of them providing solutions that apply to both denominations equally.*

The assessment of the facts and figures as well as the related input from private and public euro cash stakeholders led to the identification of two main scenarios (continued issuance of coins and withdrawal of coins) with one sub-scenario each. This makes up four possible scenarios for the 1 and 2 euro cent coins in total. The scenarios are as follows:

Continued issuance

(1) Continued issuance of the 1 and 2 euro cent coins under today's issuance conditions without changing the legal and/or material context ("status quo scenario");

(2) Continued issuance at reduced costs through changing the material composition of the coins or by increasing the efficiency of the coin production or both ("issuance at reduced costs scenario");

Withdrawal of coins

(3) Withdrawal of the 1 and 2 euro cent coins entailing that these coins cease to be legal tender, legally binding rounding rules are introduced and that the coins are actively withdrawn from circulation ("quick withdrawal scenario");

(4) Fading out whereby the issuance of the 1 and 2 euro cent coins would cease but the coins keep their legal tender status while legally binding rounding rules apply. The coins would be expected to disappear gradually from circulation due to the high loss rate and the lack of attractiveness of these coins as convenient payment means and because of the lack of new coins being issued and injected into the market ("fading out scenario").

Each of the four scenarios would apply to the 1 and 2 euro cent coins even-handedly. The analysis did not bring up any indication that one of the scenarios should or could apply to one of the two denominations only.

STATUS QUO SCENARIO

- ***Costs of production and issuance of 1 and 2 cent coins are generally high***

The costs of production and issuance of 1 and 2 euro cent coins are high with most Member States facing even 'negative seigniorage' as the acquisition costs of 1 and 2 euro cent coins exceeds the face value. There are important differences in the production costs between euro area Member States with some Member States having production costs below face value while others have costs as high as three to four times the face value. This important cost gap cannot be explained by the costs of the raw material or the blank production process only, but is rather to be attributed to the final production process of the coins (i.e. minting).

The transportation and handling costs of 1 and 2 euro cent coins are also significant. The demand for 1 and 2 euro cent coins is increasing because these coins are not circulating but are hoarded. The loss rate for both denominations is very high and there is no indication that this trend would stop. Given the 'negative' seigniorage on these coins and the high loss rate, the continued issuance of 1 and 2 cent coins appears to be a loss-making activity for euro area Member States with a global loss that could exceed 370 million euro.

- ***Public acceptance of the continued issuance: citizens are generally positive but some private key stakeholders are open to explore alternatives to status quo***

Evidence from Eurobarometer polls shows that citizens are generally satisfied with the current coin denominations with somewhat less support for the 1 and 2 euro cent coins. Given that many prices are still set at euro cent level, the two denominations remain useful to provide change, except in Finland or the Netherlands where cash payments are rounded.

From the business perspective, the position of cash-related businesses such as Mints, banks, cash transport companies and retailers on the issuance of 1 and 2 euro cent coins is of particular interest. Mints support the continued issuance of these coins, since they represent a substantial part of their activity. They do not have to cover the losses attached

to their production, which are charged to the treasury. Banks take a neutral view on the topic, since they are able to pass the costs attached to their customers via the handling fees.

The cash processing industry earns money with transportation and processing of cash. Therefore, this industry, generally speaking is positive on handling of any coin denomination. However, from a logistical point of view transportation of coins is quite cumbersome and fees in some cash processing industries are rather based on the value processed and transported rather than on the quantity of coins or weight.

The vending machine industry does not use these coins, while retailer organisations do not have firm views on whether to maintain them.

SCENARIO OF ISSUANCE AT REDUCED COSTS

- ***The costs of continued issuance could be reduced by changing the raw material of the coins***

Two major options to reduce issuance costs have been identified. The first option is to change the composition of the coins and optimize existing manufacturing tolerances or use cheaper metal such as stainless steel, while keeping the size and parameter of the coins unvaried. The use of less precious metal could in some cases lead to a change of the colour of the new coins (e.g. light grey). While the views on the potential alternative compositions of the 1 and 2 euro cent coins (stainless steel, aluminium, zinc) and the size of the potential cost reductions diverge, it is evident that the potential to save costs is real. Nevertheless, the impact of the first option on the overall cost level would remain relatively limited as the cost of the raw material constitutes only a minor part of the total costs of the finished product. Important differences in production costs between euro area Member States are not due to the costs of the raw material or the blank production process but have to be attributed to the final production process of the coins.

- ***The costs of continued issuance could be reduced by enhancing the efficiency of the coin production process***

The second option to reduce the issuance costs would be to focus on the high costs related to the final production process of the coins (such as minting). In this regard, there is clearly a need to investigate more closely the potential inefficiencies that would need to be addressed in the final coin production process.

The application of both options while continuing the issuance of the 1 and 2 euro cent denominations seems to bear potential for substantial savings.

QUICK WITHDRAWAL SCENARIO

- ***Citizens' view on a possible withdrawal scenario: mainly fear of inflation***

There is an overall satisfaction with the euro coin denominations in general. The few people dissatisfied with the present coin denomination structure generally indicate that they would like the 1 and 2 euro cent coins to be withdrawn.

The impact of a possible withdrawal of these denominations on inflation is a key concern of citizens. However, it is more likely that the perceived inflation would be the real problem rather than the impact of the withdrawal of the coins on the real inflation. The euro changeover in 2002 showed that inflation perceptions and measured inflation can deviate significantly. There was a strong belief of the public that prices increased extensively but inflation was actually not higher before and after the Euro introduction. A similar misperception could appear in case of the withdrawal of the 1 and 2 cent coins. Against this background, a possible withdrawal should be accompanied by a timely and targeted information campaign to address the issue.

Generally speaking, it appears that consumer organizations are in favor of continued issuance of the small coins, it being understood that consumer organizations provided only rather partial replies to the questionnaire on the consumers' view. Consumer and retailer associations are indeed expecting that prices for some goods would increase at the moment 1 and/or 2 euro cent coins are withdrawn. Contrary to consumers and retailers, the European Central Bank and the majority of euro area Member States do not expect a noticeable impact on inflation in case the 1 and/or 2 euro cent coins are withdrawn, provided that appropriate rounding rules are applied.

- ***The Member States' views on a possible withdrawal scenario are divided***

Generally speaking, Member States seem to be reserved on the question of a potential withdrawal. The Member States response rate to the questionnaire on the view on a possible withdrawal scenario was relatively low and there were a number of respondents, which have not provided a clear answer to this question. A small majority of the Member States stated that the issuance of the two smallest euro coin denominations should be ceased. Member States which have abolished smaller denominations of their (former) currency over time are rather open-minded with regard to the withdrawal scenario. The two euro area Member States where 1 and 2 euro cent coins do not circulate *de facto* (Finland and the Netherlands) are in favour of a withdrawal scenario.

- ***Possible withdrawal and key stakeholders' business: mints fear losses but impact on other private key stakeholders is rather limited***

The mints indicated that the cessation of issuance would negatively impact on their business. Overcapacities in terms of production would force some mints to downsize or close down production units to some extent.

By contrast, the replies from the coin processing industry are rather positive regarding the withdrawal exercise even though the abolition of the 1 and 2 euro cents would cause some minor losses for some cash in transport companies.

Retailer organisations have not voiced a common opinion but some of them indicated that the storage and handling costs are not substantially different from the costs related to other euro coin denominations. Some voiced concerns on launching a withdrawal scenario during the current economic crisis given that consumers would likely to perceive changes in the coin denomination structure as a way to increase prices.

- ***Appropriate timing and information campaign is considered as crucial for success of a possible withdrawal***

In times of economic and financial downturn and particularly in Member States that are confronted with challenging economic adjustment programmes, citizens are sensitive to any changes that could or are perceived as impacting their financial situations. Several stakeholders signalled that disregarding their overall positive attitude vis-à-vis the withdrawal scenario, such scenario would only be acceptable if it took place at a politically appropriate moment of relative economic stability. In addition, key stakeholders emphasized that any withdrawal scenario should be accompanied by a timely and appropriate information campaign.

FADING OUT SCENARIO

- ***The fading out scenario implies the introduction of rounding rules with cash users having to develop new payment habits***

Like under the quick withdrawal scenario, legally binding rounding rules would have to be introduced in the case of a fading out for the sake of legal certainty. Habits of euro cash users would change. Rounding would also have to take place in situations where the availability of 1 and/or 2 euro cent coins would still allow for the exact payment of the fractional sum, which could lead to adverse reactions from some customers

- ***Fading out would cause a rather automatic elimination of the 1 and 2 euro cent coins from circulation due to the very high loss rate***

Upon cessation of issuance by the Member States under the fading out scenario, the high loss rate of the 1 and 2 euro cent coins would become instrumental for a fast and massive disappearance of these denominations from circulation over a limited period of time (3 to 4 years). In an early phase of the scenario, cash users would most probably more actively 're-inject' the coins into circulation through payments in supermarkets and at retailers which, in return would contribute to a faster grower disappearance of the coins via the dispatch of the received coins to banks and central banks for absorption. However, it should be noted that the speed of the fading out could substantially differ across euro area Member States due to factors such as the substantially different amounts of coins in circulation, numbers of cash transactions and existing payment habits.

Because of the rather automatic disappearance of coins, there are no withdrawal costs as would be the case under the quick withdrawal scenario. Nonetheless, there would remain some costs for the handling of these coins until their disappearance from circulation which mainly supermarkets, retailers and banks would have to bear.

The legal tender of these coins would be terminated when their circulation would become purely residual.

KEY ADVANTAGES AND DISADVANTAGES OF THE FOUR SCENARIOS

A major advantage of both the status quo and the issuance at reduced costs scenario is that the existing cash payment habits would not be disrupted. This is not true for the quick withdrawal and fading out scenario which would both call for rounding rules and changes in payment habits.

While being attractive from a cash user perspective insofar as no new habits would have to be established, the status quo is quite unattractive from a cost perspective since it could perpetuate the situation of negative seigniorage in many euro area Member States. The issuance at reduced costs scenario, on the contrary, would allow reducing issuance costs by changing the raw material of the coins and/or enhancing the efficiency of the coin production. Important cost savings could also be achieved through the quick withdrawal or fading out scenario. The discontinuation of the 1 and 2 euro cent coin issuance would make an end to the negative seigniorage and reduce the overall coin handling costs.

The costs of an information campaign that could be needed must also to be taken into account when weighing the various options.

Under the fading out scenario, the high loss rate of the 1 and 2 euro cent coins would promote a fast disappearance (3 to 4 years) of these denominations from circulation thereby avoiding the costs that would be related to the active withdrawal of coins in a very short period of time as under the quick withdrawal scenario. However, supermarkets, retailers and banks would have to bear the costs for the handling of these coins until they have disappeared from circulation.

Discussions between stakeholders are needed on the basis of these 4 scenarios. If agreement would be reached on a preferred scenario, the Commission will come forward with the necessary proposals.

SUMMARY OF SURVEY QUESTIONS

Questions on status quo

Demand and habits over time, including rounding:

1. What is the demand for 1 and 2 euro cent coins and has it changed since its first issuance? Is there any shortage or surplus of these coins?
2. Circulation and re-use of 1 and 2 euro cent coins: what is the rate of loss⁴⁵ for 1 and 2 euro cent coins?
3. Has the use of 1 and 2 euro cent coins as means of payment changed over time? If yes, what is the nature of the change(s), especially with regard to the introduction of new payment tools and consumers' habits and preferences?
4. What is the experience of the cash in transit industry with euro coin transports to/in Finland and the Netherlands in comparison to other Member States? Was there any change due to the introduction of rounding rules in these countries?
5. Are there any prevailing rounding rules for cash payments and are electronic payments treated differently or equally for the purposes of rounding?

Acquisition and production costs:

6. Do production/acquisition costs of 1 and 2 euro cent coins exceed, correspond to or fall below the face value?
7. What are the costs of the use of 1 and 2 euro cent coins (e.g. handling cost, storage cost) in retail business compared to the one of other denominations?

Questions on the withdrawal scenario

Need for implementing measures

8. Should the issuance of 1 and/or 2 euro cent coins cease, which implementation or accompanying measures would be appropriate? How long would it take to perform these measures?
9. Should the issuance of the 1 and/or 2 euro cent coins cease, how would euro area Member States arrange the withdrawal of the coins issued?

Impact on inflation

10. Should the issuance of 1 euro cent cease without introducing rounding rules, what would be the impact on pricing and inflation? Which accompanying measures would be helpful in order to avoid impacts on pricing?

⁴⁵ One minus the circulation rate, the latter being the number of coins returned to the central bank divided by the number of coins put into circulation.

Impact on other coin denominations

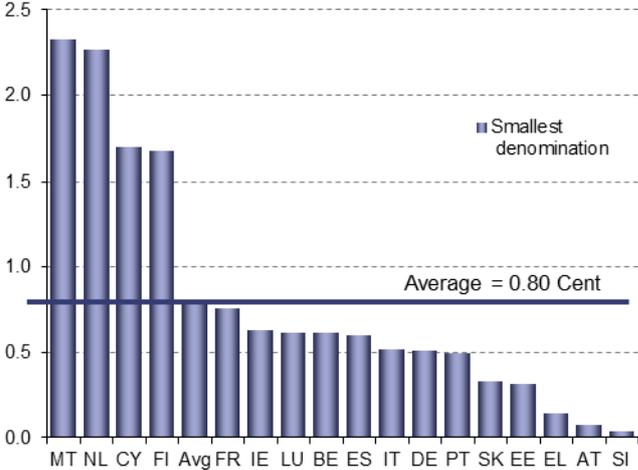
11. Would the cessation of 1 and/or 2 euro coins have any impact of payment in cash on items costing less than 5 euro cent?
12. Would the cessation of 1 and/or 2 euro cent coins have any impact on the production or use of other euro coin denominations (such as the 5 euro cent)? Would it have any impact on the use of electronic means of payment?

Impact on key stakeholders

13. Should the issuance of 1 and 2 euro cent coins cease what impact would business expect on their field of action? Which implementation measures would business consider necessary in their field of action? How long would it take to perform these implementation measures?
14. Should the issuance of 1 and/or 2 euro cent coins cease what impact would mints expect on their field of activity in terms of time and cost (e.g. termination of long-term contracts on the supply of blanks)? What impact would occur in the mints' field of tasks and business and other euro coin denominations in particular and which implementation measures would be required in mints' field of tasks and business? How long would it take to perform these implementation measures?

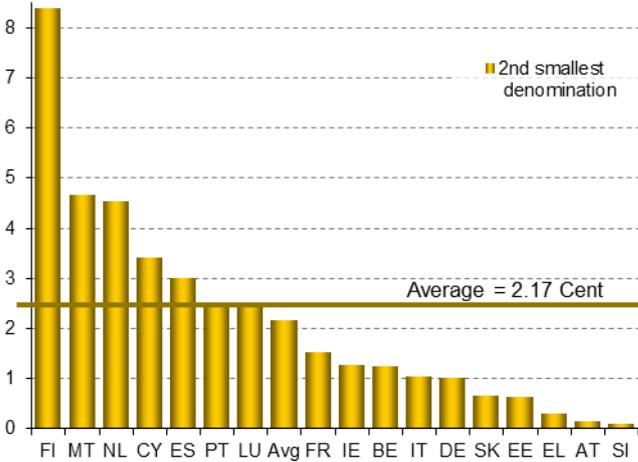
Statistics on small denominations

Currencies before introduction of the Euro. Smallest denomination
 € cent equivalent



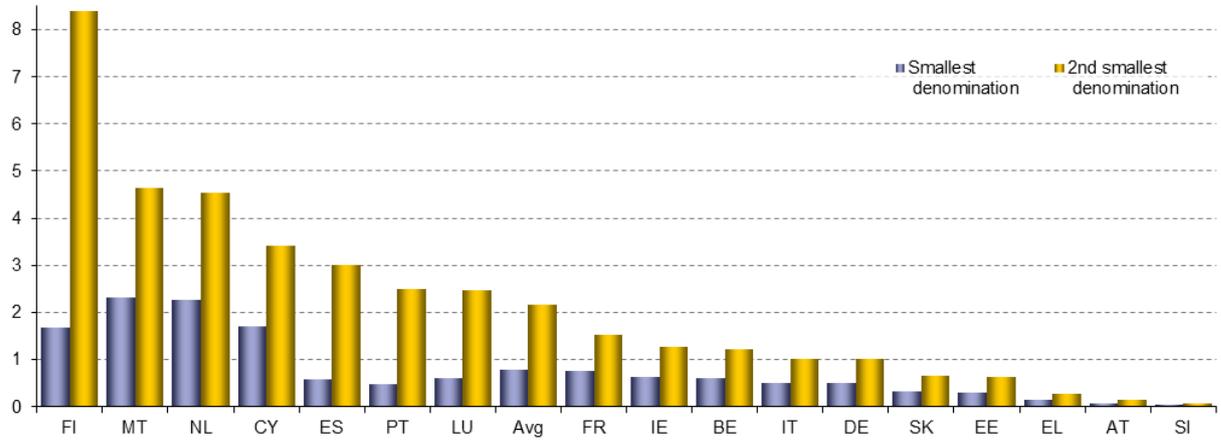
Source : European Central Bank and Commission calculations.

Currencies before introduction of the Euro. 2nd smallest denomination
 € cent equivalent



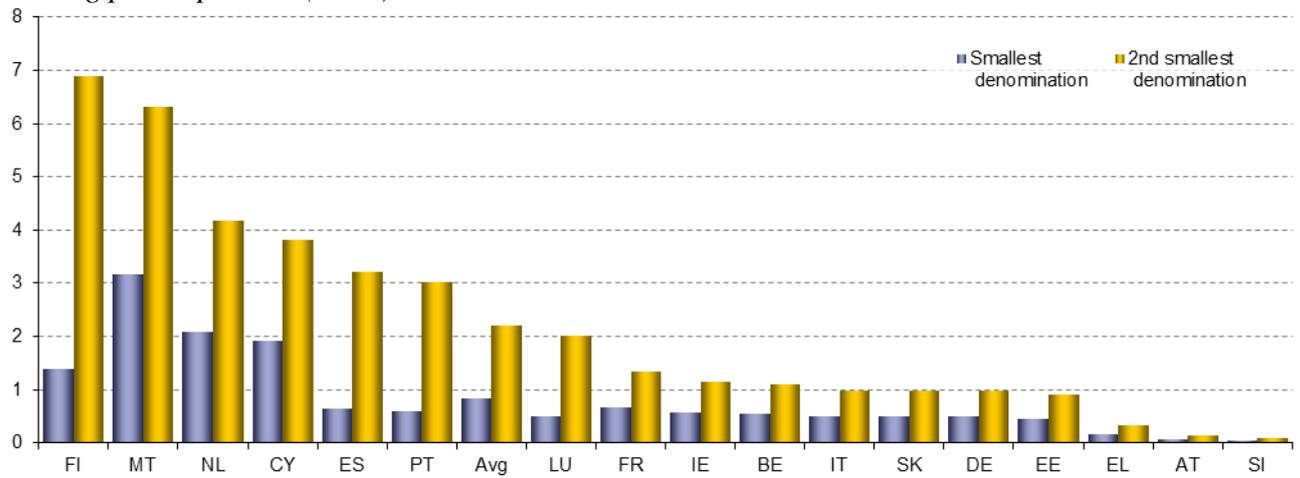
Source : European Central Bank and Commission calculations.

***Currencies before introduction of the Euro. 1st and 2nd smallest denomination
€ cent equivalent***



Source : European Central Bank and Commission calculations.

***Currencies before introduction of the Euro. 1st and 2nd smallest denomination
Purchasing power parities (cents)***



Source : European Central Bank and Commission calculations.

*Currencies before introduction of the Euro. 1st and 2nd smallest denomination
€ cent equivalent*

Country	Euro (cents)	
	Smallest denomination	2nd smallest denomination
Finland	1.68	8.41
Malta	2.33	4.66
Netherlands	2.27	4.54
Cyprus	1.71	3.42
Spain	0.60	3.01
Portugal	0.50	2.49
Luxembourg	0.62	2.48
France	0.76	1.52
Ireland	0.63	1.27
Belgium	0.62	1.24
Italy	0.52	1.03
Germany	0.51	1.02
Slovakia	0.33	0.66
Estonia	0.32	0.64
Greece	0.15	0.29
Austria	0.07	0.15
Slovenia	0.04	0.08

Source : European Central Bank and Commission calculations.

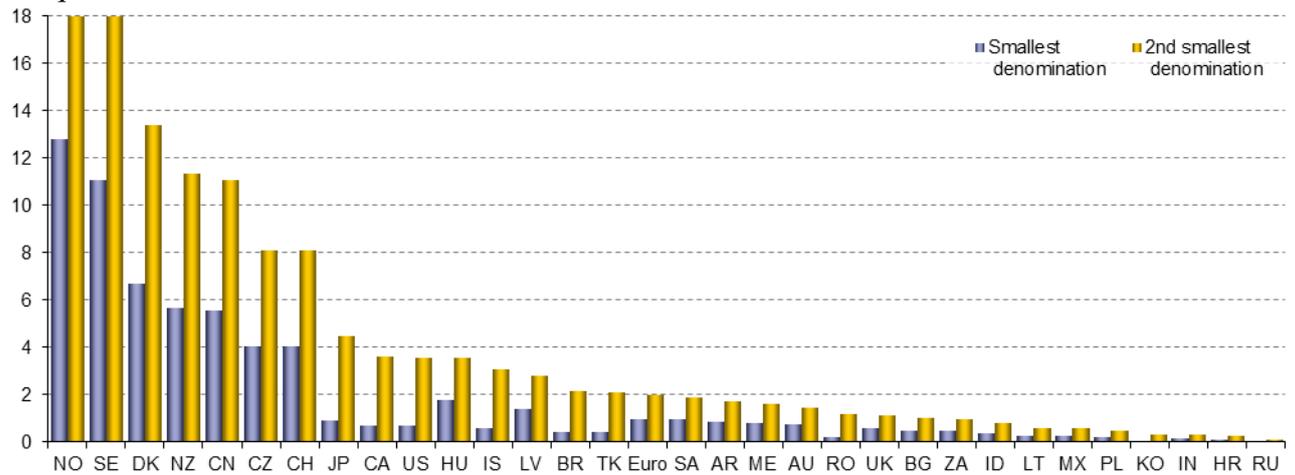
*Currencies before introduction of the Euro. 1st and 2nd smallest denomination
Purchasing power parities (cents)*

Country	Purchasing power standards (cents)	
	Smallest denomination	2nd smallest denomination
Finland	1.38	6.90
Malta	3.16	6.31
Netherlands	2.09	4.17
Cyprus	1.91	3.82
Spain	0.65	3.23
Portugal	0.61	3.03
Luxembourg	0.50	2.00
France	0.67	1.34
Ireland	0.58	1.16
Belgium	0.55	1.10
Italy	0.49	0.99
Slovakia	0.49	0.98
Germany	0.49	0.98
Estonia	0.46	0.92
Greece	0.16	0.32
Austria	0.07	0.13
Slovenia	0.05	0.10

Source : European Central Bank and Commission calculations.

International comparison. 1st and 2nd smallest denomination

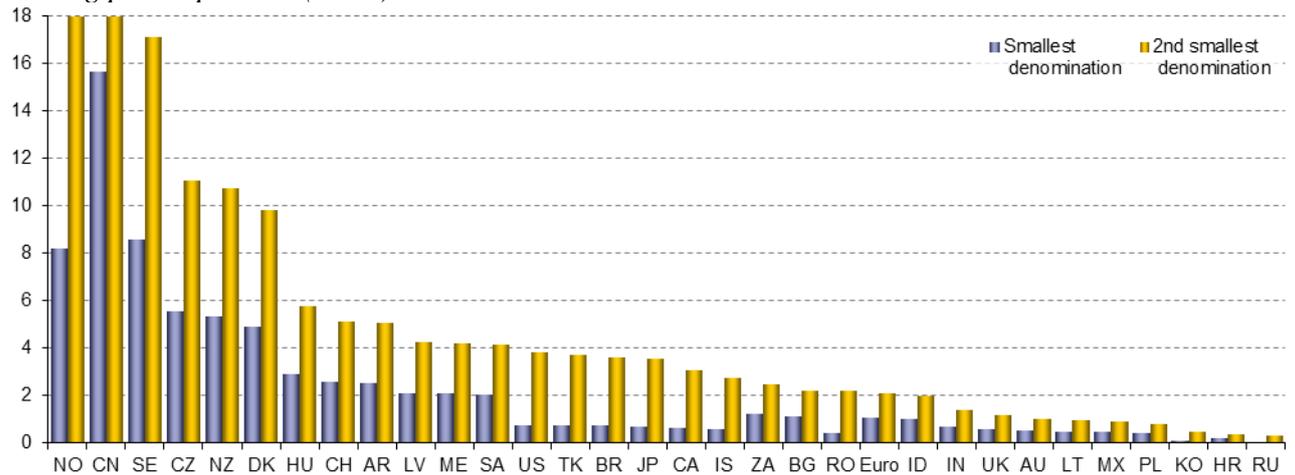
€ cent equivalent



Source : European Central Bank, National Central Banks and Commission calculations.

International comparison. 1st and 2nd smallest denomination

Purchasing power parities (cents)



Source : European Central Bank, National Central Banks and Commission calculations.

International comparison. 1st and 2nd smallest denomination

€ cent equivalent

Code	Country	Euro (cents)	
		Smallest denomination	2nd smallest denomination
NO	Norway	12.83	64.16
SE	Sweden	11.07	22.15
DK	Denmark	6.71	13.42
NZ	New Zealand	5.68	11.36
CN	China	5.56	11.12
CZ	Czech Republic	4.07	8.13
CH	Switzerland	4.06	8.11
JP	Japan	0.90	4.51
CA*	Canada	0.73	3.63
US	United States	0.72	3.59
HU	Hungary	1.79	3.58
IS	Iceland	0.62	3.10
LV	Latvia	1.42	2.83
BR	Brazil	0.43	2.15
TK	Turkey	0.43	2.14
Euro	Euro Area	1.00	2.00
SA	Saudi Arabia	0.96	1.92
AR	Argentina	0.87	1.74
ME	Macedonia FYR	0.81	1.63
AU	Australia	0.74	1.48
RO	Romania	0.24	1.18
UK	United Kingdom	0.58	1.15
BG	Bulgaria	0.51	1.02
ZA	South Africa	0.50	0.99
ID	Indonesia	0.41	0.82
LT	Lithuania	0.29	0.58
MX	Mexico	0.29	0.58
PL	Poland	0.24	0.49
KO	Korea	0.06	0.32
IN	India	0.15	0.31
HR	Croatia	0.13	0.27
RU	Russia	0.02	0.12

Note: Issuance of the Canadian one cent coin ceased on 4 February 2013.

Source: European Central Bank, National Central Banks and Commission calculations.

International comparison. 1st and 2nd smallest denomination

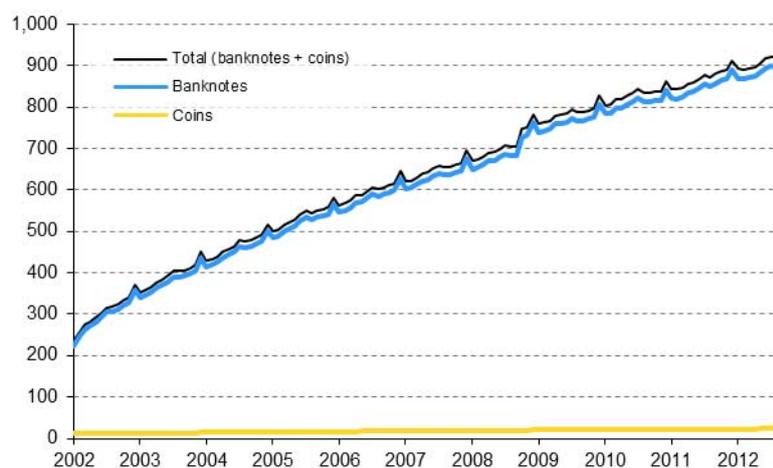
Purchasing power parities (cents)

Code	Country	Purchasing power standards (cents)	
		Smallest denomination	2nd smallest denomination
NO	Norway	8.21	41.04
CN	China	15.68	31.36
SE	Sweden	8.57	17.14
CZ	Czech Republic	5.53	11.07
NZ	New Zealand	5.36	10.73
DK	Denmark	4.92	9.85
HU	Hungary	2.90	5.79
CH	Switzerland	2.56	5.11
AR	Argentina	2.55	5.10
LV	Latvia	2.12	4.24
ME	Macedonia FYR	2.12	4.23
SA	Saudi Arabia	2.07	4.13
US	United States	0.76	3.82
TK	Turkey	0.74	3.70
BR	Brazil	0.72	3.62
JP	Japan	0.71	3.57
CA*	Canada	0.61	3.04
IS	Iceland	0.55	2.77
ZA	South Africa	1.23	2.45
BG	Bulgaria	1.11	2.21
RO	Romania	0.44	2.19
Euro	Euro Area	1.06	2.12
ID	Indonesia	0.99	1.98
IN	India	0.68	1.37
UK	United Kingdom	0.58	1.16
AU	Australia	0.51	1.03
LT	Lithuania	0.47	0.93
MX	Mexico	0.46	0.93
PL	Poland	0.41	0.81
KO	Korea	0.09	0.46
HR	Croatia	0.20	0.39
RU	Russia	0.06	0.29

Note: Issuance of the Canadian one cent coin ceased on 4 February 2013.

Source : European Central Bank, National Central Banks and Commission calculations.

Total circulation of Euro banknotes and coins (€ billion)



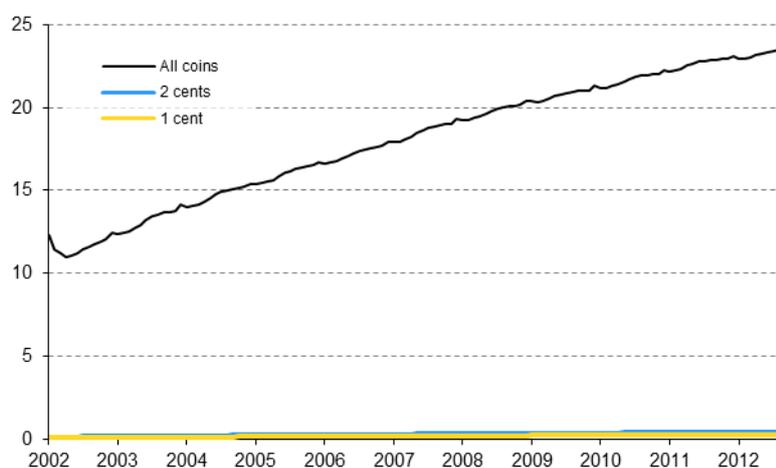
Source : European Central Bank and Commission calculations.

Total circulation of Euro banknotes and coins (€ billion)

	2002 January	2012 August	Increase (%)
Banknotes	221.5	896.4	304.7%
Coins	12.3	23.5	91.1%
Total	233.8	919.9	293.5%

Source : European Central Bank and Commission calculations.

Total circulation of Euro coins (€ billion)



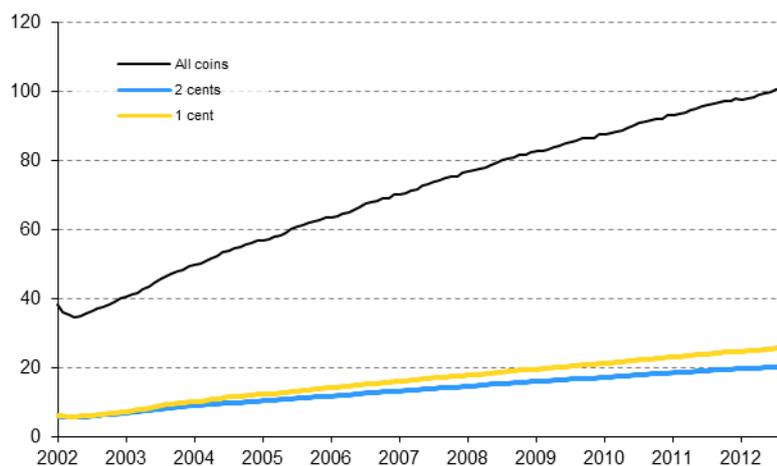
Source : European Central Bank and Commission calculations.

Total circulation of Euro coins (€ billion)

	2002 January	2012 August	Increase (%)
2 cents	0.06	0.26	318.7%
1 cent	0.12	0.40	246.8%
Coins (all denominations)	12.30	23.50	91.1%

Source : European Central Bank and Commission calculations.

Total circulation of Euro coins (quantity, billion)



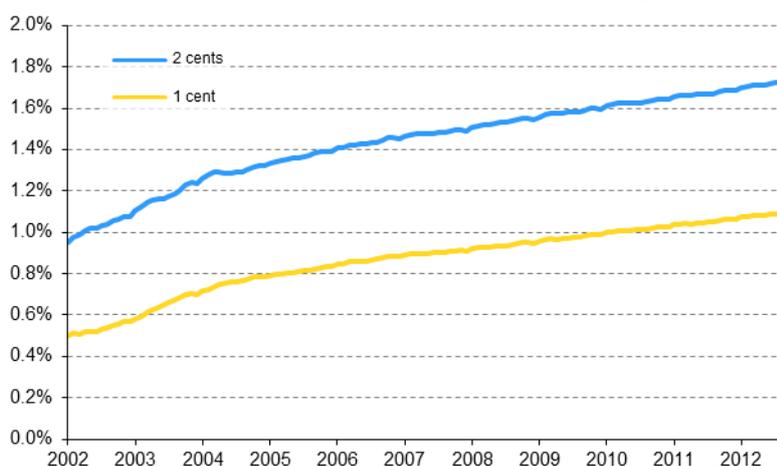
Source : European Central Bank and Commission calculations.

Total circulation of Euro coins (quantity, billion)

	2002 January	2012 August	Increase (%)
2 cent	6.1	25.6	76.1%
1 cent	5.8	20.2	71.2%
Coins (all denominations)	38.1	100.7	62.2%

Source : European Central Bank and Commission calculations.

Value of 1 and 2 Euro cent (% over total value of coins)



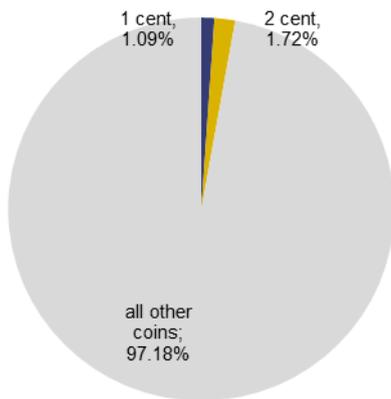
Source : European Central Bank and Commission calculations.

Value of 1 and 2 Euro cents (% over total value of coins)

	2002 January	2012 August	Increase (%)
2 cents	0.50%	1.09%	119.1%
1 cent	0.95%	1.72%	81.5%
Total (1 and 2 cents)	1.45%	2.81%	94.5%

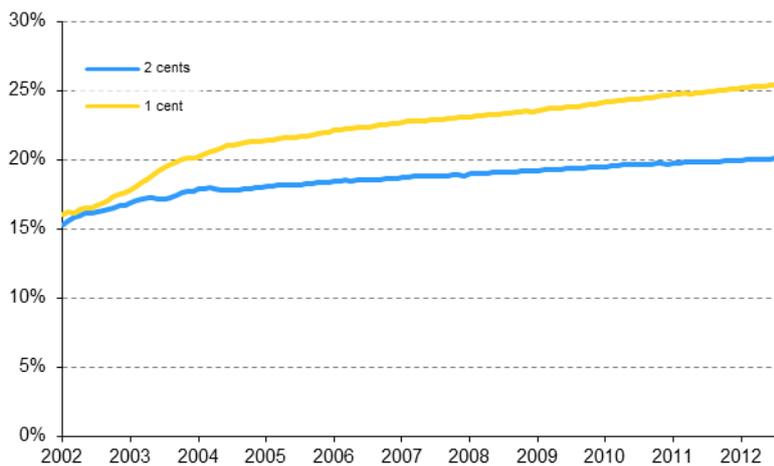
Source : European Central Bank and Commission calculations.

Percentage of 1 and 2 cent coins over total coins, August 2012 (value)



Source : European Central Bank and Commission calculations.

Number of 1 and 2 Euro cent (% over total number of coins)



Source : European Central Bank and Commission calculations.

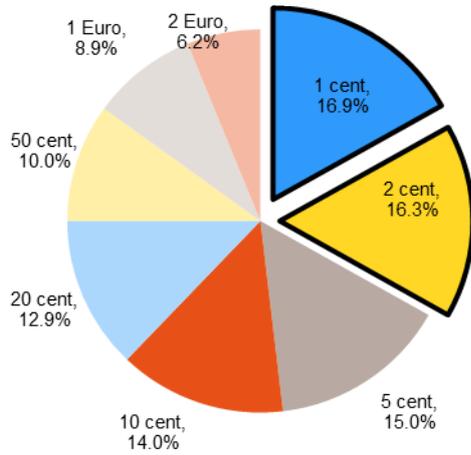
Number of 1 and 2 Euro cent (% over total number of coins)

	2002	2012	Increase
	January	August	(%)
2 cents	16.07%	25.46%	36.9%
1 cent	15.31%	20.09%	23.8%
Total (1 and 2 cents)	31.38%	45.55%	31.1%

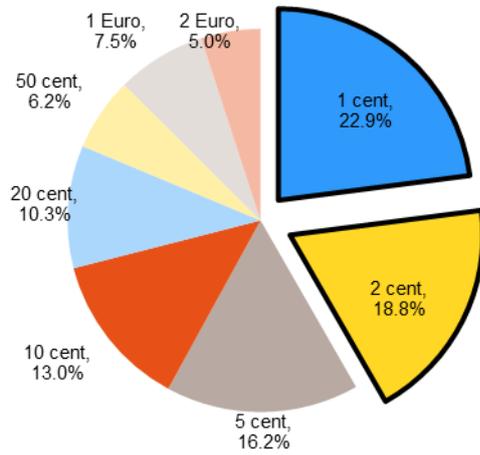
Source : European Central Bank and Commission calculations.

Percentage of 1 and 2 cents coins over total coins (number)

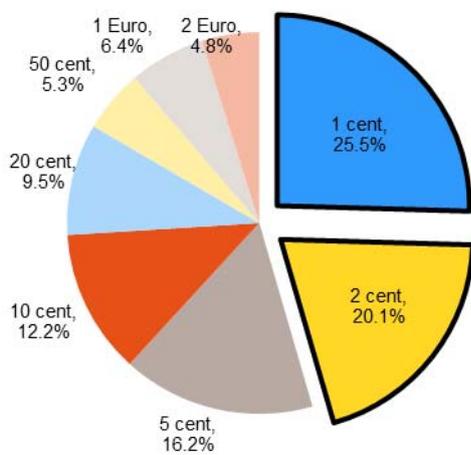
August 2002



August 2007

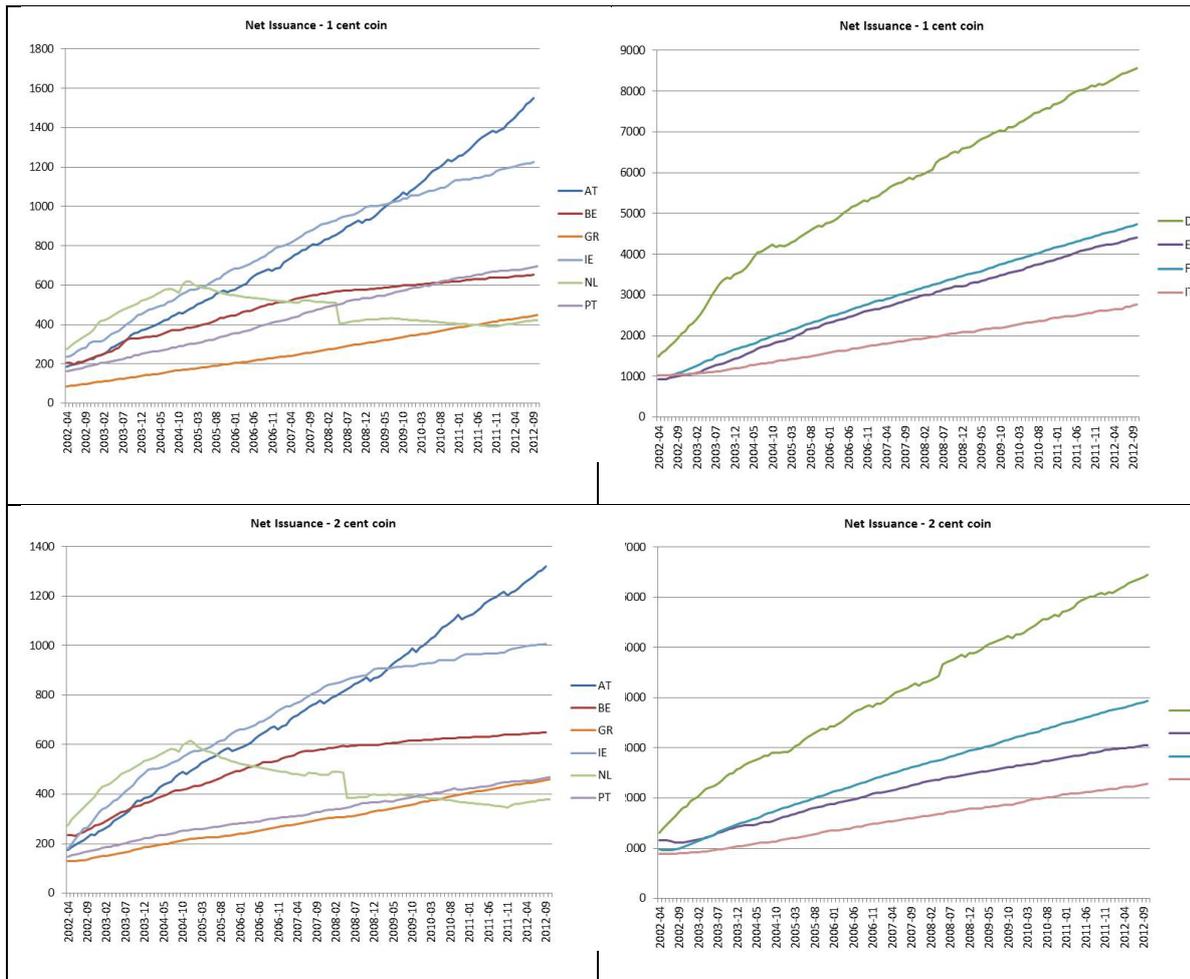


August 2012

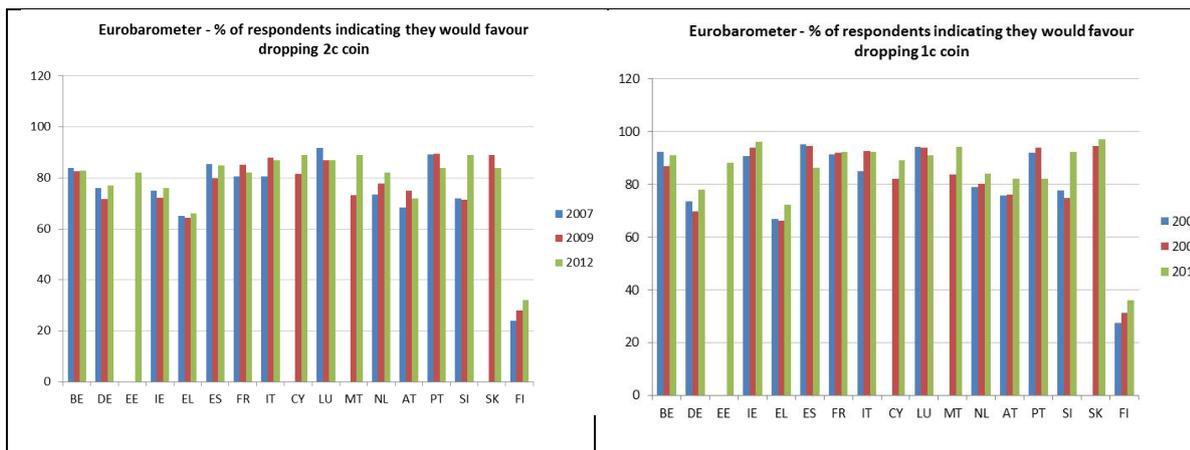


Source : European Central Bank and Commission calculations.

Net issuance of 1 and 2 euro cent coins at national level

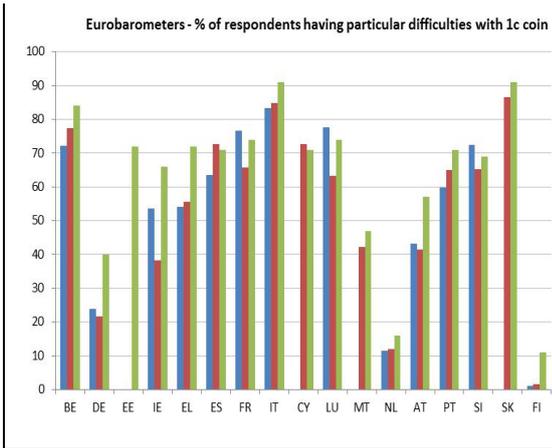


Eurobarometer results at country level

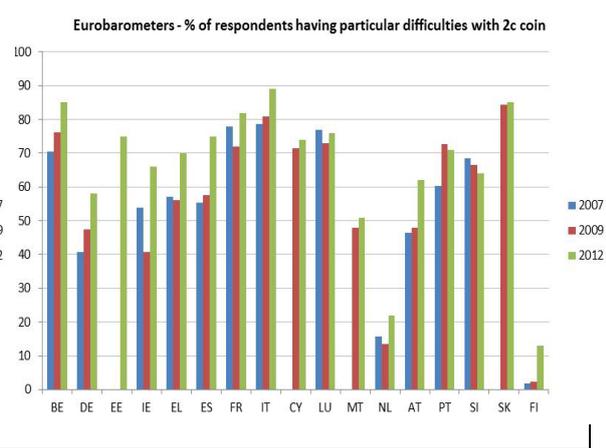


Base: those who answered there were too many coins with different values

Base: those who answered there were too many coins with different values



Base: those who found it rather or very difficult to distinguish and handle the coins



Base: those who found it rather or very difficult to distinguish and handle the coins