

# Erika Leszkó: Rounding is not to be feared

Nearly one and a half years have elapsed since the MNB withdrew 1- and 2-forint coins from circulation on 1 March 2008, which simultaneously saw the rule on rounding to the nearest value of 5 enter into force. While it was perfectly clear from a professional perspective that rounding would make cash payments easier on a daily basis, there was nevertheless strong concern surrounding the introduction of rounding. The actual developments, however, have not underpinned preliminary fears. The withdrawal of 1- and 2-forint coins did not bring about an inflationary effect, due to the symmetrical direction of the rounding for final amounts payable only, and the application of new rounding rules did not cause any particular difficulties. It does not come as a surprise that the use of rounding did not cause any disruption in the economy, as rounding has a more than decade-long tradition in Hungary on account of the withdrawal of the filler in the 1990s. In this article, we will present the reasons and the economic rationale behind the introduction of rounding rules with the help of Hungarian and numerous foreign practices. As Hungary's legal tender will hopefully be the euro within a few years, the experiences of euro area countries in the practice of rounding will be examined more closely.

## INTRODUCTION

Due to changes in price levels and price structures, the issue of the circulation of small denomination coins emerges in almost every country from time to time. The greater tendency of small denomination coins with low purchasing power of being placed into circulation compared to higher denomination ones is a global phenomenon. The reason why they are placed into circulation significantly above average is that they do not circulate in cash payments, they have a low purchasing power, they are not used, accumulate at the bottom of drawers or are lost, and a portion of them is kept by foreign tourists.

The economic cost of using small denomination coins is comprised of several factors, among which the most obvious is production cost. In countries which decided to withdraw small denomination coins from circulation, their production cost generally exceeded their face value by far; however, this was not the sole reason behind their elimination. Other cash-related costs (circulation, transportation, processing, storage, etc.) can account for up to 0.5–0.6% of GDP on the national economy level, according to foreign studies. The lion's share of these costs is generated by coin circulation, due to the substantial weight and quantity of the coins. The introduction of measures aimed at limiting the use of small denomination coins – ceasing production, withdrawal, imposing rounding rules – can save billions on the overall social level for a country.

In our article, we examine what factors led to Hungary's decision to withdraw 1- and 2-forint coins and how the introduction of rounding rules contributed to reducing the weight of wallets and making day-to-day life easier without

causing prices to creep higher. Then we will present the practice and experiences of other countries regarding this issue before drawing our general conclusions on the use of small denomination coins.

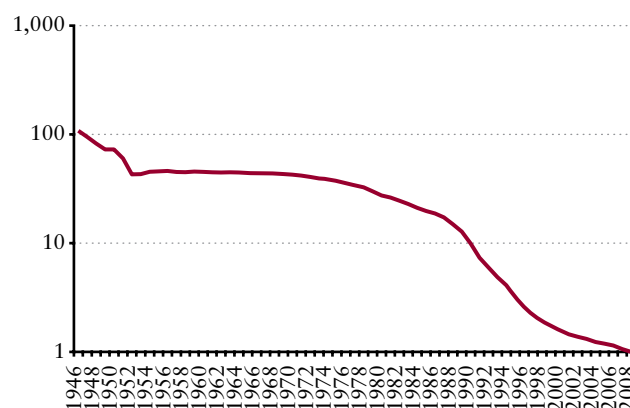
## WHAT CONSIDERATIONS LED TO THE WITHDRAWAL OF SMALL DENOMINATION COINS FROM CIRCULATION IN HUNGARY?

Over recent years the purchasing power of 1- and 2-forint coins had fallen to such an extent that they were used increasingly less by people in the course of their purchases. For a long time, these coins could not be used to purchase anything and were only needed for the precise settlement of

Chart 1

### Fall in the purchasing power of the 1-forint coin between 1946 and 2008

(represented on a logarithmic scale)



Source: CSO (Central Statistical Office), MNB calculation.

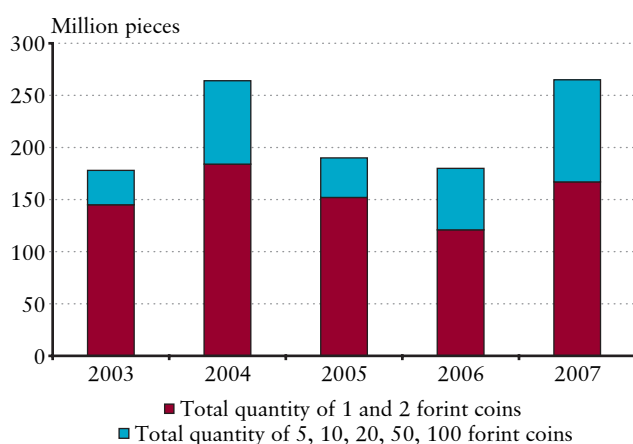
generally low-value cash transactions carried out in the course of daily shopping. The following chart (Chart 1) clearly illustrates that the 1-forint coin worth 1 unit in 2008 was worth 100 units at the time of its introduction in 1946, but had lost 90% of its purchasing power by 1990.

1- and 2-forint coins received as change from cash payments were then not put into circulation again by buyers due to their impractical nature (size, weight) and low purchasing power. The majority of vending machines did not accept 1- and 2-forint coins, further contributing to the lack of use of small denomination coins. The coins produced tended to become increasingly ‘disposable after one use’, with the majority left in wallets, piggy banks or lost after the first payment transaction following their issuance by the central bank.

On daily average, the MNB placed nearly one million 1- and 2-forint coins into circulation, replenishing their continuously dwindling quantity. The continuous production and expulsion from circulation of 1- and 2-forint coins – much like pouring water into a leaking bucket – required substantial additional outlays by the Magyar Nemzeti Bank. Given the fact that the MNB relies on public funding, this represented an additional expense for the entire country.

Chart 2 reveals that the production of 1- and 2-forint coins accounted for over 70% of annual coin production.

**Chart 2**  
**Quantity of circulation coins produced by the MNB between 2003 and 2007**



Source: MNB.

The total social cost of keeping the coins in circulation is comprised of several factors. When the decision to withdraw 1- and 2-forint coins was made, the coins’ production cost

was five to six times higher than their face value, yet this was not the principal factor which prompted the decision, but rather the fact that the coins were not actively used in cash payments. Consequently, as 1- and 2-forint coins did not fulfil their function, keeping them in circulation would not have been economically justified, even if their production costs were lower than their face value. Spending on a coin of a denomination deemed useless by citizens is an unnecessary burden for the economy.

The social costs of keeping 1- and 2-forint coins in circulation greatly exceeded the annual production, storage, transportation and processing costs – approximately HUF 1.5 billion – incurred by the MNB. The majority of the savings stemming from the withdrawal of small denomination coins is due to the fact that there is no longer any need for their transportation, storage and processing (counting, sorting into rolls, packaging) in commerce, banks and post offices. On a social level, the profit derived from no longer having to search for small coins, count them or wait for the cashier to open a new roll of coins and hand back change during cash transactions (purchases, paying in and out in banks and post offices) is also a decisive factor. These expenses, which do not affect the central bank, may account for HUF 2-2.5 billion annually.

Therefore, due to their waning role and the increasing social costs of keeping them in circulation, the Magyar Nemzeti Bank decided to withdraw 1- and 2-forint coins as of 1 March 2008.<sup>1</sup>

### PRELIMINARY FEARS SURROUNDING THE INTRODUCTION OF ROUNDING AND ACTUAL DEVELOPMENTS

On account of the withdrawal of 1- and 2-forint coins, legislative regulation on rounding became necessary, in order to ensure the execution of cash payments according to a unified order and the settlement of related accounting and taxation issues.<sup>2</sup> Prior to the entry into force of the act, many fears emerged, which later proved to be unfounded. For instance, there were fears that it would lead to an increase in the price of certain items, or the adjustment of cash registers would incur huge costs for the commercial sector, which it would pass on to households. A further fear was that unfamiliarity with rounding rules would lead to never-ending queues at tills.

Prior to the withdrawal of 1- and 2-forint coins, in 2007 the MNB examined what the inflationary effect would be if

<sup>1</sup> MNB Decree 10/2007 (X. 1.) on the withdrawal of 1- and 2-forint coins from circulation.

<sup>2</sup> Act III of 2008 on the rules of rounding required as a consequence of the withdrawal of 1- and 2-forint coins from circulation.

cashiers did not proceed according to the provisions of the rounding rule, in other words, if the price of individual articles were rounded instead of the final sum. The study revealed that if the price of every item was rounded upwards, the inflationary effect would be 0.3% at the most, and if prices were rounded downwards – i.e. if prices ending in 1 and 6 were rounded downwards, while the remainder were rounded upwards –, the effect would be 0.2%, and finally, if prices were rounded according to the rule<sup>3</sup>, the effect would remain below 0.1%.

In practice, retail traders did not re-price articles on account of the withdrawal of 1- and 2-forint coins (which, as a matter of fact, would have been very costly), but opted instead for rounding the final sum payable on goods, in line with the stipulations of the act on rounding. Small retail outlets, as well as large supermarket chains maintained their so-called marketing prices, ending in 9. Neither the Hungarian Authority for Consumer Protection, nor the National Association for Consumer Protection in Hungary received any complaints regarding rounding. Consumer price index data for March 2008 also revealed that the withdrawal of 1- and 2-forint coins did not have an inflationary effect. (The MNB examined developments in the prices of two items which typically have low unit prices and are generally purchased alone, not in combination with other articles, expressly from this perspective. In the case of espresso coffee, a minimal price increase of 0.1% ensued compared to February. In the case of newspapers, the seasonally adjusted one-month price change did not diverge significantly from the price changes observed previously.)

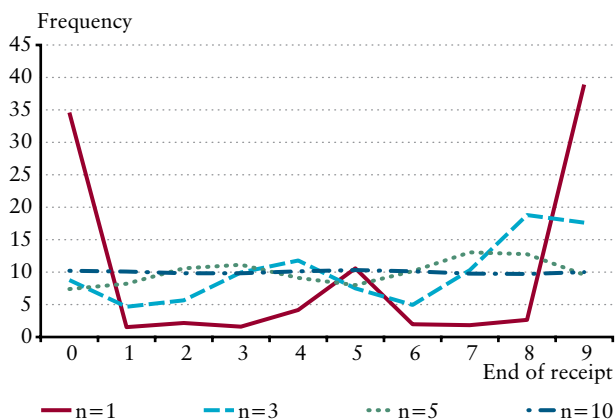
Chart 3 shows that the more items we purchase simultaneously, the more evenly the last digit of the final sum on the receipt is distributed between 0 and 9. The chart shows that in the case of purchases of 10 or more items, there is an equal probability of the cashier rounding the final sum upwards or downwards, i.e., taking the average of multiple purchases, the consumer and the seller ‘wins’ and ‘loses’ in equal proportion.

In drafting the Rounding Act, an important criterion was to avoid increasing the administrative burden on economic actors. Therefore, the Rounding Act does not prescribe the adjustment of cash registers, for example. It is up to companies’ business policy whether they adjust cash registers to also display the rounded final sums on receipts or whether cashiers do the calculation themselves. For further simplification, the Rounding Act also provides the possibility to apply rounding not only for cash transactions, but for bank

Chart 3

### Frequency of receipts ending in 0, 1, etc. in the case of processed foods

(n=number of items purchased)



Source: MNB.

card transactions as well; however, consumers must be notified in advance of such rounding.

Prior to the withdrawal of 1- and 2-forint coins, the MNB conducted a representative nationwide survey regarding the withdrawal of the coins on two occasions, one in October and November 2007 and one in February 2008, to be repeated in April 2008 following the withdrawal. According to the survey results, the sweeping majority of respondents supported the withdrawal of the coins (88% in October and November 2007, 90% in February 2008, and 93% in April 2008). 85% of respondents in the first survey and 96% in the last survey claimed they did not fear that withdrawal would affect their financial situation.

The study also attempted to assess knowledge of rounding rules. Almost all respondents knew that the final sum had to be rounded instead of individual product prices. The majority of those surveyed rounded the numbers properly, so that they ended in 0 or 5 in line with the rules of rounding, while those rounding incorrectly mainly encountered difficulties in the case of numbers ending in 7. The MNB sought to provide colour stickers and posters showing the rules of rounding to all inquiring retailers, lending assistance to both consumers and cashiers in the initial period.

All in all, the use of rounding did not cause any disruptions in the economy despite the initial fears, which is not surprising as the practice of rounding was not a novelty. Following the withdrawal of the fillér, economic actors – by merely applying the mathematical rules of rounding

<sup>3</sup> In other words, prices ending in 1, 2, 6, 7 are to be rounded downwards, while those ending in 3, 4, 8, 9 are to be rounded upwards.

automatically, without any legislation regulating it – adjusted smoothly to operating without the fillér.<sup>4</sup> In relation to the withdrawal of 1- and 2-forint coins, the decision was made to apply the so-called Swedish rounding – which has been used successfully in many countries – thanks to which the inflationary effect could be avoided.

In the following section, we will present several countries worldwide where rounding has been successfully employed for years or decades.

## FOREIGN PRACTICE RELATED TO SMALL DENOMINATION COINS

Countries which have introduced rounding rules due to the withdrawal or lack of small denomination coins, or in order to cut back on the use of such coins, apply the so-called Swedish rounding. The Swedish rounding is symmetrical both downwards and upwards, and means that the final sum has to be rounded to the nearest unit of money in circulation. Such rounding is generally used for cash payments only, as the exact amount can be paid through transfers and bank card payments, rendering rounding unnecessary.

Nordic countries are in the vanguard of employing rounding rules. In *Sweden*, 1- and 2-öre coins of the krona's subunit were withdrawn from circulation in 1972, and rounding to the nearest figure ending in 5 or 0 was applied until 1985. In 1985, the 5- and 25-öre coins were eliminated, and the 10-öre coin was scrapped in 1992. On 25 March 2009, production of the 50-öre coin was discontinued, as the denomination will be withdrawn on 30 September 2010 simultaneously to the introduction of rounding to the nearest krona for cash payments. Legislation regulates rounding rules, as a result only its amendment will be necessary. Two-thirds of the population and retail traders were in favour of the withdrawal of the 50-öre coin. The examination of the inflationary effect revealed that the withdrawal of the coins and rounding would not lead to price increases. *Norway* ceased production of the 1- and 2-öre coins in 1972, that of the 5- and 25-öre coins in 1982 and that of the 10-öre coin in 1992. *Denmark* withdrew 1- and 2-öre coins in 1973, 5- and 10-öre coins were withdrawn in 1989 and the 25-öre coin on 1 October 2008. Both countries used rounding to the nearest coin denomination in circulation, without triggering any price increases.

The term 'Swedish rounding' became widely known in 1990, when the 1- and 2-cent coins were scrapped in *New Zealand*

and rounding to the nearest sum ending in 5 or 0 was introduced. The rounding method applied in *New Zealand* was based on the well-functioning Swedish model, with a history of two decades. In 2006, the 5-cent coin was also removed from circulation in *New Zealand*, having lost its value to such an extent that people became less and less inclined to use it. The Reserve Bank of *New Zealand* issued 30 million new 5-cent coins on an annual basis, incurring a cost of over 1 million NZD. Prior to the withdrawal of the 5-cent denomination, the central bank commissioned a public opinion poll (AC Nielsen: Reactions to Proposed Changes to Silver Coinage, January 2004). The survey revealed that 68% of the population and 70% of retail traders were in favour of the step. The economics department of the Reserve Bank of *New Zealand* and the *New Zealand* statistical office both examined the inflationary effect of rounding, concluding that price increases in the expenditure of households would be negligible. The rounding rules governing cash payments were put forward as a recommendation by the *New Zealand* Retailers Association. Retailers may diverge from the rules according to their own business policy, but must notify consumers if doing so.

*Australia* ceased production of 1- and 2-cent coins in 1990, and has not issued such denominations since 1992. The rounding recommendation issued by the Australian Price Surveillance Authority only applies to cash payments. A surprising side-effect of the withdrawal of 1- and 2-cent coins was that large quantities of other, higher – 5- and 10-cent – denomination coins were also returned to the banks, constituting a so-called 'money box effect'. This effect could also be felt in *Hungary* on account of the removal of 1- and 2-forint coins, with people exchanging other coinages stored in jars and boxes at the banks and post offices.

*Israel* withdrew its smallest denomination, the 1-agora coin in April 1991, simultaneously introducing rounding to 5 in cash transactions. The 5-agora coin was scrapped in January 2008, thus rounding is now performed to the nearest 10-agora value. According to public opinion polls, 80% of the population supported the decision to remove the coins from circulation.

*South Africa* ceased production of 1- and 2-cent coins on 31 March 2002, while *Singapore* ceased production of 1-cent coins on 2 April 2002. Cents remained a legal tender in both countries, and all cash transactions are rounded to the nearest 5-cent value.

<sup>4</sup>The Magyar Nemzeti Bank withdrew 2- and 5-fillér coins from circulation on 30 September 1992, 10- and 20-fillér coins on 1 October 1996 and 50-fillér coins on 1 October 1999 [MNB Announcement 2/1992 (MK 30), 2/1996. (MK 22) and 1/1999 (MK 23)]. The withdrawal of fillér coins did not affect the fillér's use as an accounting unit: ME Decree 9000/1946 (VII. 28) – stating that the Hungarian legal tender is the forint, and that the forint is subdivided into 100 fillérs – was not amended, therefore the fillér could still be used in the course of calculations.

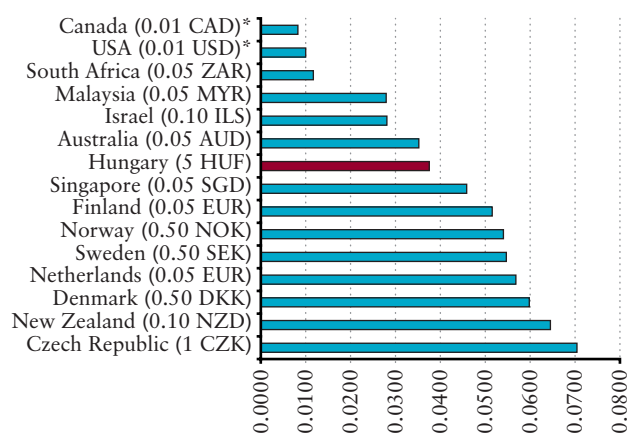
The *Czech central bank* withdrew 10- and 20-heller subunits of the Czech koruna on 31 October 2003, and consumer protection legislation stipulated that for cash payments, the final sum of purchases had to be rounded to the nearest denomination in circulation. On 31 August 2008, the 50-heller coin was also withdrawn, making rounding to the nearest 1-koruna value necessary. According to the Czech central bank's study, rounding did not trigger an inflationary effect.

*Malaysia* introduced rounding to the nearest 5-sen value on 1 April 2008, while maintaining 1-sen coins as a legal tender which must be accepted as a means of payment in amounts up to RM 2 (Malaysian ringgit, 1 ringgit=100 sens). All payments are subjected to rounding irrespective of their mode, be it cash or non-cash (bank card, electronic payments, cheque).

In conclusion, small denomination coins did not fulfil their function in cash payments, due to their weak purchasing power in all of the countries presented above, prompting the decision to withdraw them and/or to round to the nearest higher coinage in circulation.

In the following section (Chart 4), we will present the countries included in our study together, listing them in the order of the value at purchasing power parity of the coin denomination based on which rounding is performed

**Chart 4**  
Value at purchasing power parity (PPP) of the smallest coin denomination actively used in countries applying rounding in 2007<sup>5</sup>



\* There is no rounding in Canada or the US; the two countries are only included in the chart for the sake of comparison.

Source: rounding – websites of national issuing authorities; PPP values – IMF website.

according to the country's effective rounding rules. Canada and the USA (which will be examined further in the article) were only included in the chart as a point of interest, as they have not yet introduced rounding, with 1-cent coins still in circulation. The international comparison reveals that Hungary has not 'overdone it' with the introduction of rounding to the nearest 5-forint value.

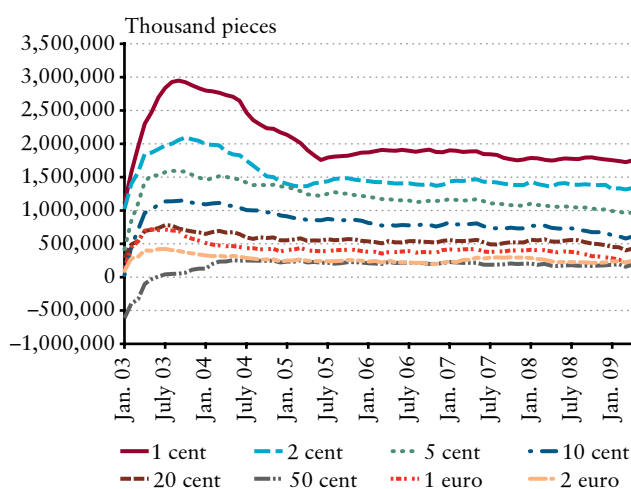
**USE OF 1- AND 2-CENT COINS IN THE EURO AREA**

The purchasing power of 1- and 2-eurocent coins is quite low given European price levels, thus people tend to use them increasingly less for payments, and the small denomination coins regularly emptied from wallets are not reintegrated into active cash circulation. This is the reason why following the introduction of 1- and 2-cent coins on 1 January 2002, the release into circulation of these coinages greatly exceeds that of other coin denominations.

Currently, there are approximately 19 billion 1-cent coins and 16 billion 2-cent coins in circulation, accounting for over 40% of the stock of coins in circulation. Chart 4 shows that following the introduction of the euro, the release into circulation of 1- and 2-cent coins increased for one and a half years, then stagnated at a relatively stable level following a slight decline until 2005. This means that 10% of 1- and 2-cent coins, i.e. 1.9 and 1.6 billion pieces are ejected from

**Chart 5**  
Changes in the stocks of coins in circulation between 2003 and 2009, in units

(differences between the stock during the given month of each year and the stock during the same month of the previous year)



Source: ECB.

<sup>5</sup> Purchasing power parity measures the quantity of goods and services which can be purchased in a given currency (USD) compared to another currency, reflecting diverging prices between various countries.



circulation annually, a quantity which then has to be replaced every year.

Finland and the Netherlands do not produce 1- and 2-cent euro coins for cash circulation, as these coinages are not used for cash payments, with the final amount of retail payments being rounded to the nearest 5 cent value.

*Finland* introduced an act in 2000 which stipulates rounding for cash payments as of 1 January 2002. As payment by bank card is rather widespread in Finland, the legislation was amended in June 2002 in order to allow rounding to be applied to bank card payments as well.<sup>6</sup> The legislation on rounding was based on previous experiences with the Finnish mark, when the smallest denomination was the 10 penny, which accounted for 70% of the coin quantity in circulation. In order to rein in the use of 10-penny coins, broad consultation with the affected economic actors preceded the entry into force of the rounding rule in 1980.

The decision on 1- and 2-cent coins also took into account the argument that it would be irrational to issue coins worth less than the smallest national coinage (10 penny=1.7 eurocents), furthermore, it would be easier and cheaper for retail outlets to handle only six coin denominations instead of eight. As a result of obligatory rounding, 1- and 2-cent coin subunits are therefore not needed in Finland.<sup>7</sup> Similarly to other euro area countries, 1- and 2-cent coins are legal tender, so the remaining 1- and 2-cent coins can be used for payment. The rounding of final sums, however, strongly limits their use. The position of the Finnish consumer protection is that retailers in Finland may refuse to accept 1- and 2-cent coins on condition that this policy is visibly and clearly indicated at the outlet's entrance.

Upon the recommendation of the social forum (MOB)<sup>8</sup> created for rationalising the payment system in *the Netherlands*, rounding the final sum of cash payments to the nearest 5-cent value is possible since 1 September 2004. The procedure is chosen and applied freely by retail traders based on the principle of 'freedom of contract', on condition that they notify consumers of their policy (at the outlet's entrance and at cash registers). According to the rule, only the final sum, and not the individual articles purchased is rounded. The rounding rule does not apply to electronic transactions and does not affect the status of 1- and 2-cent coins as legal tender. Experience shows that rounding has simplified

purchases and has reduced the total cost of cash circulation. Rounding did not and does not increase the price level due to the fact that rounding up and down occurs in equal proportions.

Prior to the introduction of the euro in the form of cash, the Netherlands already applied the rounding rule from 1983 for the guilder, therefore it already had experience in rounding. A one and a half month test period preceded the introduction of the rounding rule applying to 1- and 2-cent coins in April 2004, in the context of which 150 retail traders began to apply rounding in the Dutch city of Woerden. The aim of this test period was to assess the level of support for the reintroduction of rounding among consumers, retailers and banks. The outcome of the study revealed that retail traders and banks strongly supported the rounding rule (95%), the majority of consumers also supported the step (83%), while the initial proportion of those against the introduction of rounding – 32% – fell to 16% by the end of the one and a half month test period. According to estimates, the cost of cash management incurred on traders in the Netherlands was slashed by EUR 30 million annually, thanks to the comprehensive application of the rounding rule, further complemented by the savings derived from ceasing production, storage and processing of 1- and 2-cent coins for circulation, which was implemented in 2004.<sup>9</sup>

The European Commission commissioned a survey in November 2006<sup>10</sup> on the level of satisfaction regarding the use of euro coins and banknotes. According to the survey, 36% of respondents found the number of euro coin denominations too high. This value – over one third of those surveyed – represents the average of the 12 euro area countries; there are substantial divergences between the level of satisfaction of the populations of various countries. Regarding the number of denominations, Finland's population is the least dissatisfied (9%) (however, there are no 1- and 2-cent coins in circulation there), followed by Germany with 14%. It should be noted regarding Germany that the 1-pfennig coin – despite its purchasing power having been eroded by inflation – remained a legal tender until the introduction of the euro. The majority in Italy (64%), Belgium (61%) and Luxembourg (59%) think that there are too many coin denominations in circulation. Among respondents who deem the number of euro denominations excessive, 87% are in favour of removing the 1-cent denomination, while 82% favour removal of the 2-cent

<sup>6</sup> Act on rounding of euro payments No. 890/2000 (27 October 2000), amended by No. 496/2000 (14 June 2002).

<sup>7</sup> 1.5 million pieces per denomination are therefore minted for collectors.

<sup>8</sup> The Social Forum on the Payment systems (MOB) was created in January 2003 with the aim of examining how the payment system's effectiveness could be improved. Members of the MOB include representatives of retail traders, the banking sector and consumers.

<sup>9</sup> The Netherlands only mints 150-200 thousand 1-2 cent coins for collectors, for the series of annual circulation coins (year-set) and the roll-set.

<sup>10</sup> The eurozone, 5 years after the introduction of euro coins and banknotes. Analytical report, November 2006. *Eurobarometer*.

denomination. Among the new members of the euro area, the Slovakian population is also dissatisfied with the use of 1- and 2-cent coins, as the smallest denomination coin prior to the introduction of the euro (50 hal = 0,5 SK) was worth 1.7 cents. Consequently, the recommendation – also discussed by Parliament – to introduce a rounding rule in order to rein in the use of 1- and 2-cent coins was formulated.

Although the possibility of introducing rounding rules to limit the use 1- and 2-cent coins was brought up in several other euro area countries as well, so far none of them have joined the ranks of those not using 1- and 2-cent coins, besides Finland and the Netherlands. The main reason behind this is that decision-makers are afraid to bring any measures which may weaken the population's confidence in the euro, despite the fact that rounding did not lead to an inflationary effect in countries (including those outside the euro area) where the rounding rule was introduced. The fears can be understood in part; suffice to recall the so-called 'teuro debate'<sup>11</sup> surrounding the transition to the euro, when the inflation perceived by the population was higher than reality. The main concern of countries introducing rounding was that retailers would round the price of products – especially those ending in 8 or 9 – upwards. This fear, however, proved unfounded. A study carried out in 2005 (El Hehity, Hoesl, Kirchler) revealed that after the initial shock following transition to the euro, retail traders are just as willing to use marketing prices as before the transition, which in certain cases required them to actually decrease prices.

The Finnish and Dutch examples prove that the use of 1- and 2-cent coins, representing a futile burden for cash circulation can be reduced without any disruptions and to the satisfaction of all economic actors with the introduction of rounding. Possible fears in connection with rounding can be managed with proper communication and consultation with stakeholders.

## **TWO COUNTRIES WHERE THE WITHDRAWAL OF SMALL DENOMINATION COINS HAS BEEN THE SUBJECT OF DISPUTE FOR DECADES**

The series of positive examples presented in the previous section begs the question why two such developed countries as the USA and Canada have not yet withdrawn the 1-cent coin, which is practically of no value. For a long time now, there has been a debate surrounding the withdrawal of small

denomination coins in these countries, with a plethora of articles and studies both in favour and against it.

The bill on halting the production of 1-cent coins (the penny) and implementing rounding to 5-cent values has been brought before US legislation on numerous occasions since 1989,<sup>12</sup> to no avail thus far. The penny, celebrating its 100th anniversary this year, has lost all of its value and is not accepted by vending machines, therefore consumers regularly empty their wallets of pennies received as change. The production and processing of pennies, the cost of which is substantially higher than their face value, represents a loss of approximately USD 900 million for the United States each year. The major concern of opponents of scrapping the penny is that rounding would push prices up. However, university professor of economics Robert M. Whaples presented in a study examining 200,000 purchase transactions that this fear is completely unfounded, with no price increase in case of products purchased by socially less advantaged groups. The penny represents Abraham Lincoln, the first Republican president, thus advocates of the preserving the penny are mainly motivated by emotional factors. The other major lobbying force is the zinc mining industry, as the penny contains 97.5% zinc.

The situation in Canada is similar to the USA: pennies have lost their value over the past century, therefore they are continuously expelled from circulation. The study carried by researchers from the Desjardins Group revealed that preserving pennies in circulation costs Canada 150 million dollars on an annual level. The study also takes into account that fact that handling pennies generates a loss of 2 seconds on average during every cash purchase, and taking into account average Canadian wages, the study concluded that the big winners of eliminating the penny would be consumers. The study furthermore reveals that giving more publicity to research corroborating that rounding does not go hand in hand with an inflationary effect would increase the social acceptance of scrapping the 1-cent coin.

For both countries, it can be thus asserted that attachment to national traditions and various lobby interests are what keep the penny alive, rather than rational economic arguments.

## **CONCLUSIONS**

The withdrawal of 1- and 2-forint coins in 2008, and that of the fillér in the 1990s, as well as the experience in rounding

<sup>11</sup> Teuro: amalgamating the terms 'teuer' (expensive) and 'euro', expressing the fact that in Germany, the population perceived that the price of goods and services increased in excess of official figures.

<sup>12</sup> Legal Tender Modernisation Act.

in Hungary bear a strong resemblance to foreign experiences. Economic actors did not use small denomination coins due to their low purchasing power, so their withdrawal was widely supported by both the population and the retail sector.

The rounding rule, made necessary for cash payments by the withdrawal, ensured a smooth transition for economies to operating without small denomination coins. Despite preliminary fears in connection with rounding, actual inflationary figures corroborated the findings of previous studies, claiming that the symmetrical rounding of the final sums to be paid on purchases would not trigger any price increases. By applying rounding rules – which can be learned easily – the social costs of ensuring uninterrupted payments can be reduced, and day-to-day operation becomes easier.

The success of the withdrawal of small denomination coins and the application of rounding rules can be considerably improved by engaging the affected economic actors – households, retail traders and the financial sector – as soon and as broadly as possible in preparing the decision, and by informing them adequately. Moreover, an important lesson to be drawn from the practice of the two euro countries presented in our article is that the earlier positive experience gained through the rounding of their national coins substantially contributed to the smooth elimination of 1- and 2-cent coins in their economies, and to both sides – consumers and retailers – emerging as the winners of simpler, faster payments.

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