

■ The mixing of euro coins in Germany

Euro coins have a common European side and a national side. As a result of coins being taken abroad by travellers or transported by professional cash handlers, euro coins migrate between the euro area countries. This mixing of national coin holdings with coins of other countries of origin is a reflection of the free movement of people and capital in the euro area.

The responsibility for minting euro coins lies with the individual euro area countries, which means they have a direct claim on the resulting coin revenue. As a consequence, the migration of euro coins has implications not only for national coin requirement planning, but also for the distribution of coin revenue between the countries of the euro area. If more euro coins flow out of one euro area country to other parts of the euro area than vice versa, that euro area country will have higher minting requirements and greater coin revenue. Against this background, this article examines the mixing of coin stocks in Germany and discusses the possible impact of coin migration on German coin issuance.

Every year, the Bundesbank ascertains the composition of coins in domestic circulation with regard to the various national sides using samples of around 60,000 coins each of €2, €1, 50 cent, and 20 cent coins. On this basis, insights can be obtained regarding the extent of coin flows between Germany and the rest of the euro area. Model-based analyses suggest that roughly equal numbers of €2, €1, 50 cent, and 20 cent coins have flowed from Germany to other euro area countries as in the opposite direction, although this finding is based on estimates and is therefore subject to a degree of uncertainty.

■ Background

Euro coins migrate between euro area countries

In the euro area, coin issuance remains a national matter, though it is coordinated at the European level.¹ These conditions are also reflected in the design of the euro coins, which feature a common European side and a national side.² As a result of coins being taken abroad by travellers, amongst other reasons, coin stocks in the euro area have become mixed and consist of euro coins with various national sides.

Implications for coin requirement planning and distribution of coin revenue

The migration of euro coins is of interest due to its potential implications for coin requirement planning and the distribution of coin revenue between the euro area countries.³ The euro area member states are responsible for minting national coins and accordingly have a direct claim on the resulting coin revenue.⁴ The minting of national coins is, in turn, determined by the need for coins among private cash users. If more coins flow out of one euro area country into other parts of the euro area than vice versa, that country will have to authorise the minting of greater volumes of coins than a country with net inflows of euro coins, but will also be entitled to a larger proportion of the coin revenue. Against this background, this article examines the mixing of coin stocks in Germany and discusses the possible impact of coin migration on German coin issuance.

■ Mixing of coin stocks in Germany

Bundesbank ascertains composition of coins in active circulation in Germany each year

Each year, the Bundesbank uses coin samples to ascertain the composition of coins in circulation with regard to the various national sides. These samples are taken from coin lodgements at Bundesbank branches and are therefore derived from the coins in active circulation in Germany.⁵ The upper table on p. 75 presents the current findings for 2019. According to these findings, 57.5% of €2 coins, 45.2% of €1 coins, 54.1% of 50 cent coins, and 62.4% of 20 cent coins featured a German national side. Euro

coins from the large euro area countries of France, Italy and Spain naturally appear more frequently in Germany than euro coins from smaller euro member states. In addition, euro coins from the neighbouring countries of Belgium, the Netherlands and Austria, with which Germany is closely connected via travel, are widespread.

The origin of foreign euro coins in Germany is analysed in greater detail using linear regressions based on the random samples taken at the start of 2019.⁶ In this analysis, a given euro area country's share of the foreign coin stocks in active circulation in Germany is explained using that euro area country's share of cumulative net coin issuance⁷ in the euro area excluding Germany as well as a variable for measuring the importance of that country for foreign

Linear regressions indicate that euro coins migrate to Germany via foreign travel

¹ The legal framework for coinage in the euro area is described in greater detail in Deutsche Bundesbank (2013a).

² An up-to-date compilation of the euro coin national sides can be found in Deutsche Bundesbank (2019).

³ See Deutsche Bundesbank (2003); Deutsche Bundesbank (2013a); Seitz et al. (2009) and Seitz et al. (2012).

⁴ In Germany, the annual minting requirements are determined by the Federal Ministry of Finance on the basis of estimated needs calculated by the Bundesbank, see Federal Ministry of Finance (2016) and Deutsche Bundesbank (2013a). The Bundesbank purchases these coins from the Federal Government at their nominal value and introduces them into circulation on its behalf. The respective increases in the volume of coins in circulation in the euro area countries have to be approved by the European Central Bank. Credits from the central banks to the euro area countries for coin stocks held in central bank vaults are only permissible if these coin stocks amount to no more than 10% of the national volume of coins in circulation.

⁵ The composition of coin stocks in Germany that have been permanently lost, collected or used as a store of value cannot be observed. The only observable aspect is the composition of coin stocks that are in active circulation among consumers, commercial enterprises and credit institutions and that are therefore able to return to the Bundesbank. This active circulation of coins comprises the transaction balances of consumers, commercial enterprises and credit institutions.

⁶ These regressions expand upon studies found in Deutsche Bundesbank (2013a).

⁷ In mathematical terms, cumulative net issuance is the difference between cumulative outpayments and cumulative inpayments.

travel with Germany.⁸ The results of the regressions are shown in the lower table on this page. Coins from euro area countries with large volumes of coins in circulation as well as from countries with which Germany has close travel links are found more frequently in Germany. For all of the observed denominations, the coefficient of determination R^2 is close to the theoretical maximum of 1, which means that this simple model explains virtually all of the variance in the individual shares of coins.

Rates of change in shares of German coins trending downwards

Reliable information on the composition of coins in active circulation in Germany is only available as of 2011 (see the chart on p. 76).⁹ Germany's share of coins has decreased further since 2011: from 66.2% to 57.5% for €2 coins, from 60.2% to 45.2% for €1 coins, from 67.3% to 54.1% for 50 cent coins, and from 69.2% to 62.4% for 20 cent coins. However, the decline in the share of German coins in active circulation in Germany appears to be slowing at the current end. For example, the year-on-year change in the German share of €2 coins amounted to -1.8 percentage points on average from 2012 to 2015 and -0.4 percentage point on average from 2016 to 2019. In the case of 50 cent coins, the German share fell by 2.1 percentage points on average from 2012 to 2015 and by 1.2 percentage points on average from 2016 to 2019. Using a model in which coins migrate between Germany and other euro area countries at fixed migration rates, the long-term development of coin shares can be predicted (see the box on pp. 78 ff.). The chart on p. 76 shows the coin shares derived from such a model in addition to the actual coin shares. According to the model calculations,

⁸ Information on German income and expenditure in foreign travel with other euro area countries can be found in the balance of payments statistics. The importance of a euro area country for foreign travel with Germany is measured by the average of that country's share of German travel expenditure and its share of German travel income. All goods and services that a traveller purchases from the countries visited for personal use or to take home for private use are taken into account. Expenditure on international transport (e.g. air, rail or sea travel abroad) is not included.

⁹ Coin shares for 2012 are presented in Deutsche Bundesbank (2013a).

Composition of coins in active circulation in Germany*

%				
Country/group of countries	€2 coin	€1 coin	50 cent coin	20 cent coin
Andorra	0.00	0.00	0.00	0.01
Austria	6.08	5.84	4.65	5.42
Belgium	5.70	3.33	4.84	3.54
Cyprus	0.06	0.08	0.10	0.08
Estonia	0.04	0.05	0.04	0.02
Finland	1.10	0.65	0.61	0.61
France	8.79	6.72	7.59	7.41
Germany	57.53	45.19	54.09	62.44
Greece	1.19	1.41	1.50	1.24
Ireland	0.93	0.91	0.88	0.85
Italy	6.96	14.89	10.99	7.70
Latvia	0.08	0.15	0.06	0.05
Lithuania	0.07	0.09	0.03	0.05
Luxembourg	1.04	0.71	1.14	0.98
Malta	0.08	0.07	0.06	0.06
Monaco	0.02	0.00	0.01	0.01
Netherlands	2.74	1.91	4.22	2.86
Portugal	0.34	1.82	1.41	0.78
San Marino	0.00	0.00	0.01	0.01
Slovakia	0.40	0.40	0.25	0.23
Slovenia	0.13	0.15	0.21	0.37
Spain	3.55	15.62	7.28	5.29
Vatican	0.00	0.00	0.04	0.00
Euro area	3.17	–	–	–

* The figures are based on samples of 56,000 coins of each denomination taken at the start of 2019. The "Euro area" row captures €2 coins with commemorative designs that, for technical reasons, cannot be assigned to any one euro area country.
 Deutsche Bundesbank

Origin of foreign euro coins in Germany*

Item	€2 coin	€1 coin	50 cent coin	20 cent coin
Constant	-0.002 (0.007)	-0.001 (0.005)	-0.002 (0.003)	-0.002 (0.006)
Contribution to euro coins in circulation	0.765*** (0.116)	0.702*** (0.043)	0.690*** (0.046)	0.587*** (0.101)
Contribution to travel	0.266** (0.115)	0.317*** (0.063)	0.351*** (0.049)	0.443*** (0.100)
Coefficient of determination R^2	0.917	0.974	0.982	0.933

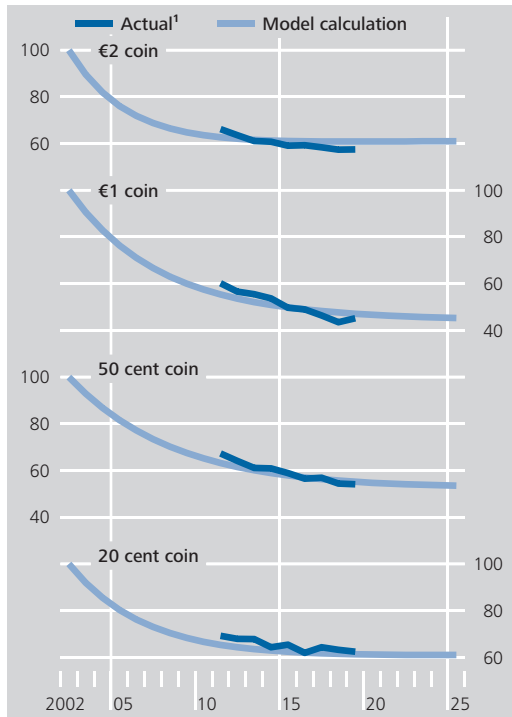
Sources: European Central Bank and Bundesbank calculations.
 * The table shows the regression coefficients of linear regressions explaining euro area countries' shares of foreign coins in Germany at the start of 2019 (18 observations). Standard errors are shown in parentheses. ** Statistically significant at 5%. *** Statistically significant at 1%.

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the actual coin shares at the current end are close to limit values derived mathematically from the model. For example, the model calculates that, in the long term, 54% of the 50 cent coins in active circulation in Germany will feature a German national side, which is in line with the current measured share. These obser-

Shares of German coins in active circulation in Germany

%, monthly data



1 Reliable figures as of 2011.
 Deutsche Bundesbank

ations suggest that coin stocks in the euro area have already become mixed to a significant degree.

Euro coins in circulation

As a result of coin migration, coin stocks in the euro area consist of euro coins with various national sides. However, the absolute extent of coin flows between euro area countries and their importance for the development of national coin issuance are unknown. Conceptually, national cumulative net issuance comprises domestic and foreign circulation. Foreign circulation is calculated based on the cumulative net outflows of coins.¹⁰ If a euro area country experiences a greater outflow of coins abroad than inflows, then this euro area country exhibits positive foreign circulation. Conversely, negative foreign circulation occurs when there is a net inflow of euro coins from abroad, causing the domestic demand for euro coins to be

Extent of the migration of euro coins unknown

met in part by other coin-issuing authorities. Domestic circulation in a euro area country consists, in turn, of the euro coins held domestically for transaction purposes as well as the hoarded euro coins. Coin hoards comprise coins that are saved or collected or that have been lost. These components of coin demand are not directly observable, but must, instead, be calculated based on models.

The upper chart on p. 77 shows the development of euro coins in circulation issued by the euro area, Germany and the euro area excluding Germany. Overall, euro coins with a value of €29.7 billion are currently in circulation, of which €8.9 billion net was brought into circulation by the Bundesbank (as at 31 October 2019). It is estimated that the transaction balances of euro coins in Germany in 2011 amounted to €2.3 billion, or 36% of the cumulative net coin issuance in Germany at this point in time.¹¹ According to this finding, the majority of German coins in circulation are accounted for by hoarding and external demand. However, there are still no data on the relative importance of domestic hoarding and outflows of coins abroad for the development of cumulative net coin issuance.

Even development of euro coins in circulation

By contrast, there is already strong evidence of a considerable outflow of euro banknotes from Germany to other countries.¹² By way of illustration, the lower chart on p. 77 shows the share of cumulative net issuance by the Bundesbank in the total cumulative net issuance of euro banknotes and euro coins by the Eurosys-

Share of German coins among euro coins in circulation is constant

¹⁰ Conceptually, foreign circulation can be further subdivided into foreign circulation outside the euro area and foreign circulation within the euro area. In the box on pp. 78 f., the foreign circulation of German euro coins refers to foreign circulation within the euro area. Foreign circulation outside the euro area, if it exists, is notionally allocated to domestic hoarding. Coin stocks abroad outside the euro area are, to a large extent, likely to be permanently removed from active circulation in the euro area and are therefore comparable to domestic hoarding. In European Central Bank (2017), it is assumed that euro coin holdings outside the euro area are negligible.

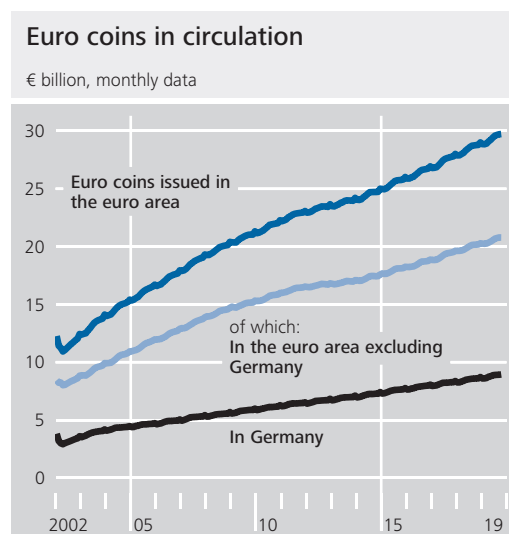
¹¹ See Altmann and Bartzsch (2014) and Deutsche Bundesbank (2015).

¹² See Bartzsch and Uhl (2017); Bartzsch et al. (2011a, 2011b) and Deutsche Bundesbank (2018b).

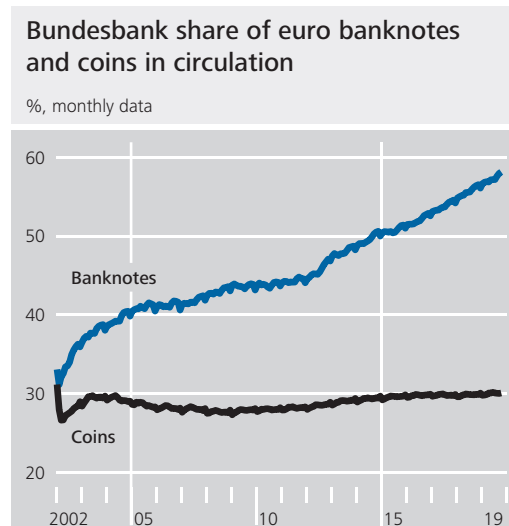
tem. The relative contribution of the Bundesbank to euro banknote circulation grew fairly evenly from 35.9% at the end of 2002 to 56.1% at the end of 2018. The observed increase in the Bundesbank's contribution to euro banknote circulation is likely to be caused by the migration of euro banknotes from Germany to other countries within and outside the euro area.¹³ If the domestic demand for cash develops evenly across the various members of a monetary union and there are net cash flows from one member state to another, over time this will lead to a rising proportion of cash in circulation attributable to the former. The German share of euro coins in circulation has, however, been rather stable at around 30% since the introduction of euro cash (see the lower chart on this page). Assuming that the domestic demand for coins in Germany develops as it does in the euro area excluding Germany, this would suggest that, in net terms, no coins migrate from Germany to the euro area excluding Germany.

Hypothesis of balanced coin flows between Germany and the euro area excluding Germany

The information presented would thus be consistent with coin inflows and outflows between Germany and the euro area excluding Germany being balanced. Coins being taken abroad by travellers is an important driver for the migration of coins between euro area countries (see the findings shown in the lower table on p. 75). When going on holiday from Germany to other euro area countries, travellers could bring a larger amount of euro banknotes with them on their outbound journey in order to be able to cover the expected travel expenditure abroad. On balance, this is likely to contribute to the observed net outflows of euro banknotes from Germany to other euro area countries. Euro coins are, however, hardly suited to covering major expenses on trips abroad. It is possible that the coin stocks held by travellers on both their outbound and inbound journeys simply result from being given change during the most recent cash transactions, suggesting that both stocks should be roughly equal. The finding that coin inflows and outflows between



Source: ECB.
 Deutsche Bundesbank



Source: ECB.
 Deutsche Bundesbank

Germany and the euro area excluding Germany are balanced would then be plausible.¹⁴

More detailed information on the extent of coin flows in the euro area requires model-based analyses. In principle, information is available on the shares of German and non-German euro coins in the coins in active circulation in the euro area countries. However, since the level of transaction balances and the composition of hoarding balances are not ob-

According to model-based analyses, coin flows between Germany and the euro area excluding Germany are balanced

¹³ See Bartzsch and Uhl (2017); Bartzsch et al. (2011a, 2011b) and Deutsche Bundesbank (2018b).

¹⁴ See Deutsche Bundesbank (2003).

The coin mixture model

Euro coins in circulation can migrate not only from one region of the euro area to another, but also from active circulation to coin hoards. By assuming fixed transition rates among the coins in active circulation in the euro area countries and between active domestic circulation and domestic hoarding, it is possible to model the coin mixture and the components of coin demand.¹

The model starts off by describing the mixture of coins in active circulation in Germany in year t , $T_{D,t}$ and in the euro area excluding Germany, $T_{A,t}$. Transaction balances in Germany comprise coins with a German side, $T_{DD,t}$ and those with a non-German side, $T_{AD,t}$. Coins in active circulation in euro area countries other than Germany consist of coins with a foreign national side, $T_{AA,t}$ and those with a German national side, $T_{DA,t}$. $\tau_{DD,t} = T_{DD,t}/T_{D,t}$ stands for the share of German coins in the German transaction balances, and $\tau_{AA,t} = T_{AA,t}/T_{A,t}$ for the proportion of non-German euro coins among coins in active circulation in the other euro area countries. The transaction balances in Germany and in the euro area excluding Germany are assumed to vary in size each year by the constant growth rates g_D and g_A , respectively. Coins can migrate from one region to another and from active circulation to hoards. α_D denotes the share of coins flowing from the transaction balances in Germany each year to hoards in Germany, and α_A the corresponding share of coins in the euro area excluding Germany. α_{DA} stands for the share of coins migrating each year from the transaction balances in Germany to active circulation in the euro area excluding Germany, and α_{AD} shows the corresponding share of

coins flowing from other euro area countries to Germany.

In summary, the quantities of domestic coins in active domestic circulation can be presented as the following equations.

$$T_{DD,t} = (1 - \alpha_D - \alpha_{DA}) T_{DD,t-1} + \alpha_{AD} T_{DA,t-1} + \Delta N_{D,t}$$

$$T_{AA,t} = (1 - \alpha_A - \alpha_{AD}) T_{AA,t-1} + \alpha_{DA} T_{DA,t-1} + \Delta N_{A,t}$$

$\Delta N_{D,t}$ and $\Delta N_{A,t}$ denote the new issuance of coins, which is typically positive for Germany and the euro area excluding Germany (see the chart at the top of p. 77). New issues of coins feature the national side of the issuer, and they result from the increase in transaction balances and from the need to replace coins which transition to hoards or flow out of the country in net terms.² Rearranging the above equations yields the following difference equation for the evolution of coin shares, where $\eta_{t-1} = T_{A,t-1}/T_{D,t-1}$.

$$\begin{pmatrix} 1 + g_D & 0 \\ 0 & 1 + g_A \end{pmatrix} \begin{pmatrix} \tau_{DD,t} \\ \tau_{AA,t} \end{pmatrix} = \begin{pmatrix} g_D + \alpha_D + \alpha_{DA} \\ g_A + \alpha_A + \alpha_{AD} \end{pmatrix} + \begin{pmatrix} 1 - \alpha_D - \alpha_{DA} & -\alpha_{AD}\eta_{t-1} \\ -\alpha_{DA}\eta_{t-1}^{-1} & 1 - \alpha_A - \alpha_{AD} \end{pmatrix} \begin{pmatrix} \tau_{DD,t-1} \\ \tau_{AA,t-1} \end{pmatrix}$$

1 The coin mixture model based on this approach originates from Seitz et al. (2009) and Seitz et al. (2012). The model presented in this box adds to this body of literature in a number of ways, one being the inclusion of the empirically important factor of hoarding.

2 In the following, the model is used to examine flows of €2, €1 and 50 cent and 20 cent coins between Germany and the euro area excluding Germany. For these coin denominations, there were no shipments between the Bundesbank and other coin-issuing authorities in the euro area. Hence, the national side can indeed be used to identify whether Germany or another euro area country was the country of first issue.

The coin shares determined in this manner converge towards a fixed limit value.³ Hoarding demand can be computed by cumulating annual hoarding, and foreign demand by cumulating annual net coin migration flows.

By setting suitable model parameters, it is possible to identify model implications for the €2, €1, 50 cent and 20 cent coins. Assumptions need to be made in this regard about how transaction balances evolve in Germany and the euro area excluding Germany. Euro area consumers receive euro coins as change and use them for low-value payments as well as alongside euro banknotes for larger amounts. This is a role which euro coins have performed ever since the euro was introduced as a physical currency. The low value of coin holdings is probably one reason why they are independent of the variables which traditionally determine transaction balances, such as income or interest rates.⁴ In light of these considerations, one could reasonably assume that transaction balances of euro coins remain constant over time.⁵ Public surveys by the Bundesbank suggest that the average stock of coins which consumers in Germany carry on their person has remained steady at around €6 ever since euro banknotes and coins were introduced, bolstering the assumption that transaction balances remain constant.⁶ Estimates regarding transaction balances of euro banknotes in Germany are available as from the year 2008; over the estimation period in question, the transaction balances of euro banknotes have remained steady.⁷

Assuming the actively circulating stocks of coins evolve in this manner, it is possible to determine the other model parameters in a way that is model-consistent. As long as the hoarding and migration parameters are small, hoarding and migration within short

Model parameters

Parameter	€2 coin	€1 coin	50 cent coin	20 cent coin
g_D	0	0	0	0
g_A	0	0	0	0
α_D	0.117	0.065	0.067	0.119
α_{DA}	0.094	0.080	0.060	0.060
α_A	0.078	0.063	0.032	0.064
α_{AD}	0.050	0.031	0.022	0.029

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horizons are negligible, which means that the transaction balances can be determined using the stock of coins in circulation at the end of 2002. Data for the coin shares in Germany and in the euro area excluding Germany are available for 2016.⁸ The model equations for the shares of domestic coins in circulation in Germany and in the euro area excluding Germany, and the equations computed for the evolution of cumulative net coin issuance, can be used to determine

3 If $\Delta N_{D,t} > 0$ and $\Delta N_{A,t} > 0$ for all t , it follows that $g_D = g_A$. In this case, the convergence of coin shares $\tau_{DD,t}$ and $\tau_{AA,t}$ towards fixed coin shares τ_{DD} and τ_{AA} can be derived straight from the theory for solving linear difference equations (see Galor (2007)). The coin shares converge even when net issuance is not positive. If net issuance is negative, the difference equations need to be adjusted, since the coin-issuing authorities take in a mixture of coins.

4 See Baumol (1952) and Tobin (1956).

5 Estimated foreign demand for German euro coins increases in line with the difference between the growth rate of transaction balances in the euro area excluding Germany and that of transaction balances in Germany. In an extreme scenario – one where the transaction balances in the euro area excluding Germany grow by 4% a year and those in Germany shrink by 4% a year – the volume of German €2 coins in circulation outside Germany would come to 19% of the German €2 coins in circulation, so foreign demand would still be comparatively moderate, even in this scenario.

6 See Deutsche Bundesbank (2003, 2018a). The survey results reveal that, at year-end 2002, respondents carried coins with a total value of €5.62 on average. By comparison, respondents were carrying coins on their person with an average value of €6.70 in 2008, €5.90 in 2011, €5.73 in 2014 and €6.29 in 2017.

7 See Bartzsch and Uhl (2017); Bartzsch et al. (2011a, 2011b); Deutsche Bundesbank (2018b).

8 Data on coin shares in the euro area excluding Germany are sourced from the Mint Directors Working Group.

Foreign demand for German euro coins*

Item	€2 coin	€1 coin	50 cent coin	20 cent coin
Cumulative net coin flows between Germany and the euro area excluding Germany	- 110	- 172	- 145	- 390

* All figures in millions of coins and as at year-end 2016.
 Deutsche Bundesbank

the hoarding and migration parameters.⁹ The table on p. 79 provides a summary of the model parameters. For most denominations, the hoarding parameter in Germany, α_D , is significantly higher than in the euro area excluding Germany, α_A , suggesting that coin hoarding plays a more important role in Germany.

After determining the model parameters, it is possible to analyse the implications of the model. The estimates for foreign demand presented in the above table show the estimated cumulative net coin flows between Germany and the euro area excluding Germany since euro banknotes and coins were introduced. According to the model calculations, net coin flows were low for all the denominations under consideration. Assuming that transaction balances do not contribute to the growth in the stock of coins in circulation, the model calculations can therefore be interpreted as suggesting that coin issuance since the introduction of euro banknotes and coins was materially driven by hoarding motives.

Coin shares converge in the mathematical model towards a fixed limit value, which

can be calculated with the aid of the model parameters. The table below shows which coin shares can be expected over the long term for German coins in Germany according to the model calculations. The actual values observed in the table at the top of p. 75 are close to these limit values.

⁹ The model's implied values for the coin shares and cumulative net issuance in Germany and in the euro area excluding Germany are a function of the hoarding and migration parameters and ought to match the actual figures. The resulting non-linear system of equations is solved using a multivariate Newton procedure; see Judd (1998).

Long-term distribution of national sides*

%

Item	€2 coin	€1 coin	50 cent coin	20 cent coin
Long-term share of German coins in Germany	61.52	43.56	54.44	61.35

* The long-term shares correspond to the limit values of coin shares $\tau_{DD,t}$.
 Deutsche Bundesbank

servable, conclusions cannot readily be drawn about the extent of coin migration. The box on pp. 78 ff. describes a model used to ascertain the shares of coins in Germany and the euro area excluding Germany, as well as the extent of coin migration between these regions. Under certain assumptions, it is possible to determine the parameters of this model and derive model implications. Overall, according to the model-based analyses, up to the end of 2016, 110 million more €2 coins, 172 million more €1 coins, 145 million more 50 cent coins and 390 million more 20 cent coins migrated from the rest of the euro area to Germany than vice versa. In aggregate terms, this amounts to a net migration to Germany of around €500 million in euro coins, which is equivalent to 7.6% of the German net coin issuance of these denominations. According to these calculations, coin flows between Germany and the euro area excluding Germany are thus almost entirely balanced.¹⁵ These model-based analyses are based on assumptions made during modelling and the establishment of the model parameters, which means they should be interpreted with caution.

Coin migration has no impact on the demand for coins in Germany

In Germany, the Federal Ministry of Finance defines the minting volumes for the individual denominations on the basis of a forecast of the coins in circulation carried out by the Bundesbank.¹⁶ The above considerations suggest that coin outflows to other euro area countries are not currently a relevant factor in German coin issuance and thus German coin requirement planning.

■ Conclusion

Mixing of euro coins

This article examines the migration of euro coins between Germany and the other euro area countries and its impact on national coin

issuance. The coin stocks in the euro area are mixed as a result of coins being taken abroad by travellers, for example. Around 40% of the €2 and 20 cent coins, around 55% of the €1 coins and around 45% of the 50 cent coins in active circulation in Germany originate from abroad, meaning that foreign euro coins are widespread in Germany. Foreign coins in Germany originate, above all, from France, Italy and Spain, as well as from the neighbouring countries of Belgium, the Netherlands and Austria.

The euro area countries are responsible for minting and issuing euro coins and have a direct claim on the resulting coin revenue. The extent of coin migration between the euro area countries is therefore relevant for coin requirement planning and assessing the distribution of coin revenue. The fact that the German share in the total volume of euro coins in circulation has remained stable at around 30% since the introduction of euro cash supports the hypothesis of balanced coin flows between Germany and the rest of the euro area. Moreover, estimations using model-based analyses suggest that coin flows between Germany and the euro area excluding Germany are virtually balanced. According to this finding, coin migration does not significantly influence the coin revenue of the Federal Republic of Germany. On the contrary, coin revenue results from meeting domestic demand in Germany.

Federal Republic of Germany meets domestic demand for euro coins

¹⁵ The slight surplus of coin inflows to Germany over coin outflows could be the result of model and estimation uncertainty. Another conceivable explanation is that people in Germany import a particularly large volume of euro coins into Germany from abroad in order to collect coins with the various national sides. This supposition is supported by the fact that the Federal Republic of Germany issues a particularly large number of collectors' coins, which might reflect a higher propensity to collect coins in Germany.

¹⁶ See Federal Ministry of Finance (2016) and Deutsche Bundesbank (2013a, 2013b)

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