Austria's Experience with Euro Migration since the Cash Changeover

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The introduction of the euro in 2002 offered a unique opportunity to learn more about the patterns and structures of cross-border cash movements. The Oesterreichische Nationalbank (OeNB) has carried out various surveys to analyze the migration of cash in greater depth. This article presents the results of two surveys, which demonstrate that cash is very mobile. An Austrian wallet will typically hold coins and banknotes from almost all euro area countries. Euro coins minted in countries other than Austria are readily discernible, as all coins have a common European face and a distinct national face. For euro banknotes, closer inspection is required, as only the letter contained in the banknote's number betrays the country of origin.

Surveys on cash migration show that the volume of euro banknotes and coins in circulation in Austria, as well as the mix of denominations, remained relatively stable at Austrian households from 2002 to 2004, albeit with a slight increase in the share of foreign banknotes and coins. In Austria, migration continues to generate an influx of banknotes. In particular, EUR 50, EUR 20 and EUR 5 banknotes exhibit a high degree of migration. The results of the two OeNB surveys clearly reveal that banknote migration took place at a considerably faster pace than coin migration.

This brief study calculates migration factors for individual countries in order to explain the migration taking place. These factors throw light on whether a country is one of cash emigration or one of cash immigration, while falling short of offering a clear explanation for the underlying reasons of migration.

JEL classification: E51
Keywords: cash, migration, cross-border cash flows.

1 Introduction

In early 2002, almost all euro banknotes and coins in circulation in Austria were still of Austrian production. Over the years, cash production stocks from different euro area countries began to mix together. This was particularly evident in the case of euro coins, which became desirable objects of collection not least due to the fact that one side betrays the national origin of the coins. For euro banknotes, however, migration is of even greater significance, as banknotes are traded internationally and play a key role in tourism. Various factors such as travel and tourism, economic integration and payment habits cause banknotes to be distributed unevenly across euro area countries. To date, knowledge of cross-border banknote flows has been scant. In this context, the euro cash changeover in 2002 offered a unique opportunity to learn more about the patterns and structures of cross-border cash movements. The OeNB has carried out various surveys to analyze this migration of cash in greater depth.

Following a brief definition of the term "migration," the results of two OeNB empirical surveys on migration in Austria are presented below. Their aim was to obtain more precise data on the speed at which euro banknotes and coins mixed, as well as on the countries in which those banknotes and coins were first issued.

By way of conclusion, this brief study makes use of a migration ratio in a bid to explain the impact of current cash migration on currency in circulation at a national level.

Refereed by:
Mara Vyborny, ECB.

2 Definition

As a rule, the term "euro migration" is defined as cross-border euro cash flows. These can proceed via several channels. First, euro banknotes are dispensed by a Eurosystem central bank and deposited by third parties at another Eurosystem central bank. Second, coins and banknotes in household volumes migrate as people travel, spending money abroad. In addition, large volumes of banknotes are moved by cash-in-transit companies, currency traders or banks. The migration of cash is therefore influenced by a multiplicity of migration factors, including geographical location, tourism, commuter movements and the international integration of banking markets.

3 OeNB Surveys on Euro Migration

This section presents the results of two studies on euro migration which were commissioned by the OeNB. The first study was carried out by GfK Austria GmbH (formerly FESSEL-GfK), and the second is a sample survey conducted at the cash logistics company GELDSERVICE AUSTRIA Logistik für Wertgestionierung und Transportkoordination G.m.b.H. (GSA), which is an OeNB subsidiary.

3.1 Survey on "Euro Migration"[1]

From March 2002 to January 2004, a study on cash migration in Austria was carried out in a series of eight surveys in all. Households throughout Austria were requested to ascertain the country of origin of the euro banknotes and coins kept in their wallets, piggy banks and glass jars. The respondents surveyed were all heads of their respective households.

The key purpose of this survey was to find out how fast euro banknotes and coins had mixed following the introduction of the euro. As a tourist destination and thanks to its geographical location, Austria is ideally suited for such a study, as it was expected that cash would migrate relatively quickly. In addition, the study aimed to throw light on how much cash Austrians actually hold in their wallets. The results below are presented first for coins and then for banknotes.

3.1.1 Coins

It is observable that the volume of coins held in wallets remained more or less unchanged over the entire survey period. The glut of small change frequently feared in the run-up to the euro's launch did not occur. Over the entire survey period, the number of coins held in wallets remained constant, and their distribution among different denominations remained stable. In January 2004, for instance, a typical Austrian wallet held 15.6 coins worth EUR 6.49 on average. Chart 1 shows the shares of different denominations held in wallets ascertained by the first and the eighth (last) survey.

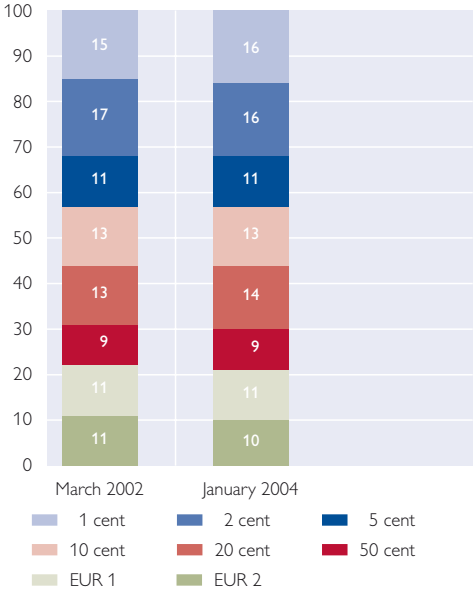
An analysis of the share of "foreign" euro coins in Austrian wallets shows that this grew rapidly following the introduction of the euro (March 2002: 6%; September 2002: 20%). In January 2004, the share of coins minted in other euro area countries reached a peak of 25.8%, its highest level so far.

[1] *FESSEL-GfK study (2002–2004), commissioned by the OeNB.*

Chart 1

Euro Coins in Austrian Wallets

Average share of individual denominations in %



Source: GfK Austria GmbH, OeNB.

After Austrian coins, the next most frequently found were German coins (around 15%), followed by those of Italian mintage (some 6%; see table 1).

As already evident in March 2002, higher-value coin denominations were far more frequently of foreign origin than lower-value denominations. In January 2004, for instance, only 13% of 1 cent coins came from abroad, compared with around 40% of EUR 1 or EUR 2 coins. Chart 2 shows that a rise in migration, albeit at varying levels, is observable over time for all coin denominations.

3.1.2 Banknotes

Banknotes revealed a similar picture as for coins. The number of banknotes and their distribution among differ-

Table 1

Share of Coins per Country of Issuance in January 2004

% of coins held in Austrian wallets

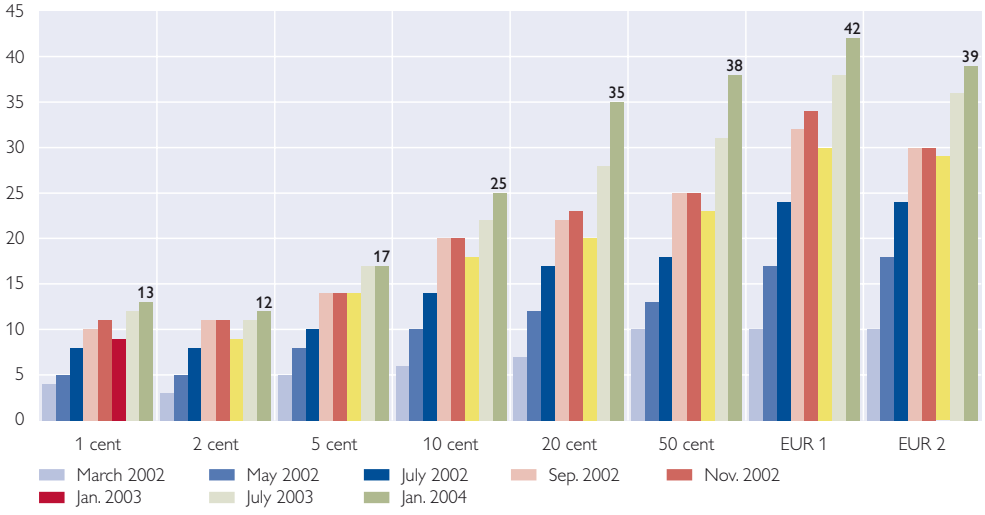
AT	DE	IT	GR	ES	PT	FR	BE	IE	NL	FI	LU
74.2	14.9	5.7	0.6	1.1	0.2	1.3	0.6	0.4	0.7	0.2	0.1

Source: GfK Austria GmbH, OeNB.

Chart 2

"Foreign" Euro Coins in Austrian Wallets

Share of individual denominations in %

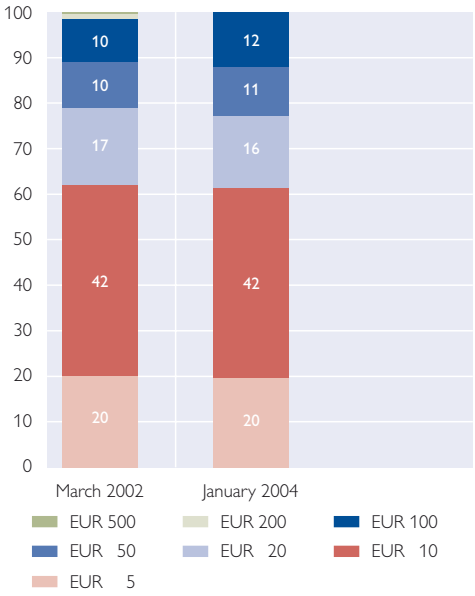


Source: GfK Austria GmbH, OeNB.

Chart 3

Euro Banknotes in Austrian Wallets

Average share of individual denominations in %



Source: GfK Austria GmbH, OeNB.

ent denominations were constant over the entire survey period. In January 2004, the typical Austrian wallet held 6.87 banknotes worth EUR 192.42 on average. The EUR 10 denomination was the most frequently found banknote, as it is dispensed by default by Automatic Teller Machines (ATMs) in Austria. In addition, EUR 5 and EUR 20 banknotes were often found in wallets. The highest denomination found in wallets was the EUR 100 banknote, which is also dispensed by ATMs.[2] For instance, every tenth Austrian had at least one EUR 100 banknote in his or her wallet, whereas people very seldom use EUR 200 and EUR 500 banknotes. Chart 3 shows a comparison of wallet contents during the first and the last survey.

An analysis of the foreign share of banknotes in Austrian wallets shows that although migration was measurable as early as March 2002, it was still not significant. At this point in time, 90% of banknotes were still printed in Austria. Unlike coins, however, banknote migration rose sharply, with the share of Austrian banknotes accounting for a share of only 61%. At the time of the last survey, every second banknote came from another country within the euro area. Of foreign banknotes, as with coins, furthermore, German (32.7%) and Italian (9.7%) banknotes made up the lion's share (see table 2).

The different foreign shares per denomination are also clearly visible in the case of banknotes. Whereas EUR 10 and EUR 100 banknotes, which are mostly brought into circulation via ATMs in Austria, were largely of Austrian origin, 72% of EUR 20 banknotes and 79% of EUR 50 banknotes came from other euro area countries in January 2004. Chart 4 shows the trend in foreign shares during the survey period.

Table 2

Share of Banknotes per Country of Issuance in January 2004

% of banknotes held in Austrian wallets

AT	DE	IT	GR	ES	PT	FR	BE	IE	NL	FI	LU
47.6	32.7	9.7	1.1	1.5	0.4	2.9	1.0	0.5	1.8	0.9	0.0

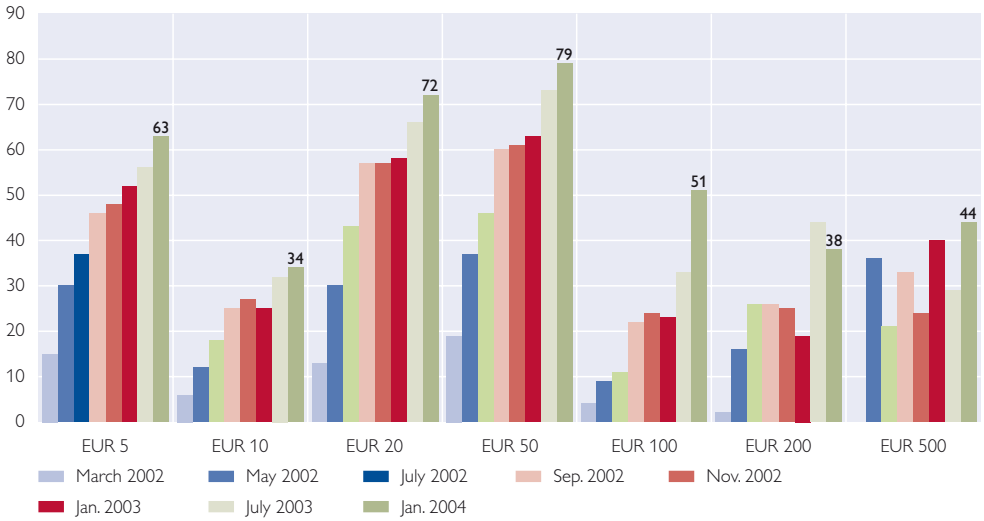
Source: GfK Austria GmbH, OeNB.

[2] *In summer 2003, a software update of outdoor ATMs made it possible to dispense EUR 50 banknotes as a third ATM banknote category. The denomination of banknotes dispensed by ATMs was thus brought in line with the needs of the population.*

Chart 4

"Foreign" Euro Banknotes in Austrian Wallets

Share value of individual denominations in %



Source: GfK Austria GmbH, OeNB.

3.2 Sample Survey at GSA

In tandem with the study on migration conducted among Austrian households, nine sample studies were carried out at the cash logistics company GSA from March 2002 to April 2005. The purpose of these studies was to analyze the cash lodgments made by the Austrian banking sector at GSA's seven different sites.

The results of this study point to a number of factors that possibly influence the share of foreign coins and banknotes in overall circulation. The factors include proximity to the border, particularly with Germany, proximity to major transit routes and transport hubs, as well as tourism. The results below are presented first for coins and then for banknotes.

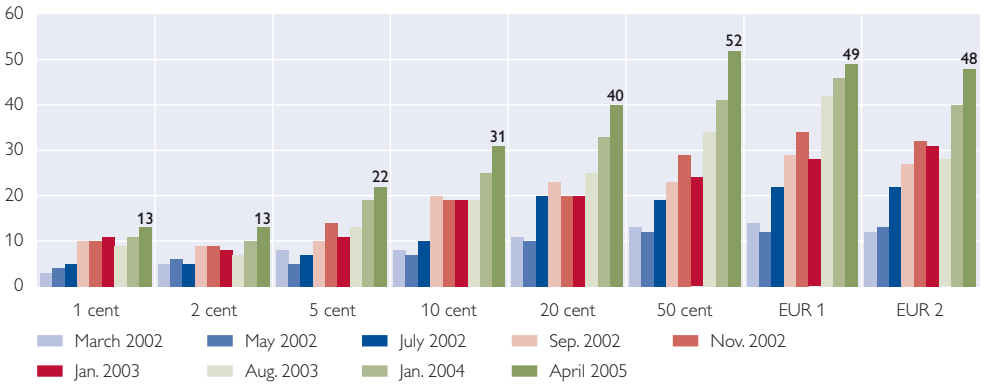
3.2.1 Coins

Chart 5 shows the trend in the shares of foreign euro coin denominations

Chart 5

"Foreign" Euro Coins in Banks' Cash Lodgments at GSA

Share of individual denominations in %

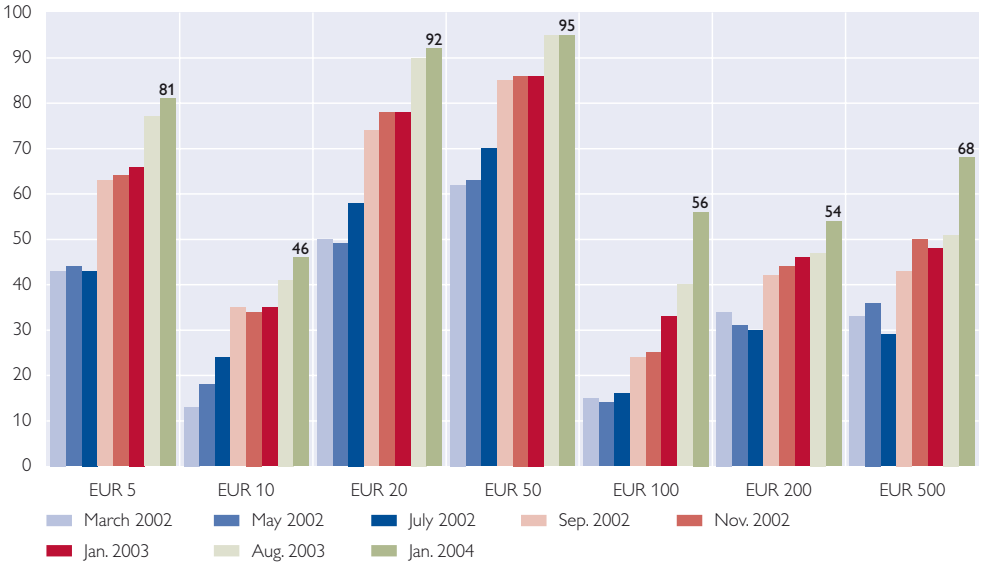


Source: OeNB.

Chart 6

"Foreign" Euro Banknotes in Banks' Cash Lodgments at GSA

Share of individual denominations in %



Source: OeNB.

lodged by banks at GSA in percentage over time.

An analysis of the sample results shows that, for 1 to 20 cent coins, the foreign share increased together with the value of the coin. For 50 cent, EUR 1 and EUR 2 coins, the two most recent surveys revealed a different picture. In April 2005, for instance, 50 cent coins exhibited the greatest degree of mix with foreign coins. They were followed in this respect by EUR 1 (49%) and EUR 2 coins (48%). This means that by April 2005 the situation had changed compared with January 2004 since the EUR 1 coin then accounted for the biggest foreign share (46%). A difference between eastern and western Austria is visible when comparing the foreign shares of coins in different Austrian regions. In April 2005, for example, Tirol's foreign share (42%) surpassed by a wide margin that of the country's eastern regions, which had an average foreign share of 25%.

3.2.2 Banknotes

Unlike for euro coins, the foreign shares for euro banknotes were surveyed in a series of just eight samples from March 2002 to January 2004. Chart 6 shows the trend in the shares of foreign euro banknote denominations lodged by banks at GSA in percentage terms.

Compared with coins, the significantly more rapid growth in the foreign share of banknotes is striking. The foreign share of individual denominations exceeded the 50% mark as early as March 2002 whereas this was the case for coins only two years after the introduction of the euro. Since currency trading moves banknotes in large volumes in particular, migration occurs at a faster pace and on a greater scale than for coins. For banknotes, furthermore, the degree of mix does not increase in parallel with denominational values. Instead, there exists a group of strongly mixed banknote denominations (EUR 5, 20,

50 banknotes) next to a weakly mixed one (EUR 10, 100, 200, 500 euro banknotes). Induced by tourism, a summer effect with a sharp increase in foreign shares from July to September 2002 is identifiable at least for 2002. An analysis of the overall survey period shows that the foreign share for EUR 50 banknotes grew quite considerably to as much as 95%. For all denominations, the foreign share since the introduction of the euro has roughly doubled, while it has even nearly quadrupled for some denominations.

The results of this sample survey show that banknotes mix more rapidly at banks, as evidenced by banks' lodgments, than in private wallets. This suggests that it takes more time for foreign cash to reach the general population than banks. In addition, the higher share of foreign euro cash in banks' lodgments appears to reflect the extensive network of Austrian bank branches in Eastern Europe, which are integrated into the Austrian cash supply chain.

3.3 Problems in Measuring Banknote Migration

The results of the two aforementioned surveys reveal that migration in Austria following the introduction of euro cash commenced at a rapid pace and on a wide scale. It was clearly measurable as early as March 2002. The speed at which Austrian euro coins and banknotes mixed with those of foreign origin was particularly surprising. The results of these surveys on migration also indicate that banknote migration occurred at a faster pace and on a greater scale than for coin migration.

Both these surveys were completed two years after the introduction of the euro, as the informative value of survey results becomes increasingly less reliable over time when cash would be expected to start remigrating. In addition, the pooling of banknote production,[3] as well as the cross-border transports of banknotes between euro area central banks that have become necessary, distort the picture.[4]

4 Migration in Numbers

Migration movements of cash within the euro area make it possible to distinguish between countries of emigration and countries of immigration. Austria's geographical location (e.g. close to large euro area countries such as Germany and Italy), its strong banking presence in Eastern Europe and its importance as a tourist destination place Austria among countries of banknote immigration. This means that more banknotes flow into Austria than flow out of the country into other euro area countries and non-euro area Member States within the EU. These banknote inflows drive up banknote holdings in the OeNB's vaults, which must be processed and then redistributed within the Eurosystem. In this way, the OeNB contributes toward the efficiency of cash supply within the euro area, without receiving any remuneration for providing this service to the Eurosystem.

[3] *Banknotes designed to cover the Eurosystem's annual requirements are produced at a decentralized level by euro area Member States. This means that every country is responsible for the production of one to three banknote denominations.*

[4] *These transports help to counterbalance national fluctuations in demand. The aim is to achieve an optimal allocation of banknotes in order to minimize printing and transportation costs.*

Table 3

Immigration Ratio from January to December 2002, Adjusted for Growth in Circulation

	Calculation:	Lodgments per Country Divided by Withdrawals per Country / Total Euro Area Lodgments Divided by Total Euro Area Withdrawals										
	BE	DE	ES	FR	GR	IE	IT	LU	NL	AT	PT	FI
EUR 500	2.12	1.14	0.18	1.15	2.41	0.00	0.95	0.15	1.00	0.83	1.81	1.34
EUR 200	1.84	1.13	0.39	1.15	1.12	0.00	0.81	0.16	1.02	0.94	1.40	1.31
EUR 100	1.41	1.13	0.54	1.10	1.23	0.04	0.68	0.38	1.25	1.18	0.76	1.39
EUR 50	1.05	1.11	0.66	1.12	0.99	0.44	0.55	1.07	1.13	2.03	0.73	1.17
EUR 20	1.01	1.05	0.89	1.01	1.00	0.92	0.85	1.27	1.16	1.00	0.73	1.10
EUR 10	1.18	1.04	0.94	1.05	1.11	1.04	0.75	1.39	1.06	0.91	0.85	0.99
EUR 5	0.99	1.05	0.91	0.96	1.07	0.93	0.83	0.82	1.03	0.94	0.83	0.94
Total	1.05	1.06	0.82	1.06	1.04	0.85	0.71	0.75	1.09	1.00	0.81	1.11

Source: ECB, OeNB.

While the value of the euro banknotes issued by the Eurosystem is steadily growing and attained a value of some EUR 628 billion as at end-2006, the net balance of euro banknotes issued by and returned to the OeNB since the cash changeover to the euro stood at –350 million banknotes (with an equivalent value of EUR 1.1 billion) as at December 31, 2006, having fallen steadily from early 2002 to end-2006 by 234% in terms of volume and 90% in terms of value. As a result of this development, three banknote denominations exhibited a negative net balance, in Austria at end-2006, i.e. lodgments exceeded withdrawals of banknotes by a number of 563.9 million for EUR 50 banknotes, by 119 million for EUR 20 banknotes, and by 35 million for EUR 5 banknotes.

However, this was not a purely Austrian phenomenon. At least for some banknote denominations, lodgments also exceeded withdrawals in Belgium, Luxembourg, the Netherlands, Spain and Greece.

4.1 Migration Ratios by Country Comparison

An ESCB subgroup on currency information systems developed a migration ratio, among other things, in order to measure cash migration within the euro area. This ratio takes into account a country's physical banknote lodgments and withdrawals and puts them in relation with the euro area's total lodgments and withdrawals.

If, in a given country, this ratio stands at 1, the ratio of lodgments to withdrawals is then equal to the average ratio of lodgments and withdrawals in the Eurosystem during the period under review in this country. Euro area countries with a ratio of less than 1 are regarded as "euro emigration countries." Euro area countries with a ratio of more than 1 are considered as "euro immigration countries." Table 3 shows the migration ratio for individual euro area countries in 2002.

In 2002, Austria on balance still had a ratio of 1. On closer analysis, however, the first signs of the development in individual denominations emerged as early as 2002. Inflows of EUR 50 banknotes from abroad, which were high from the start, made the net balance of EUR 50 banknotes issued by and returned to the OeNB turn negative for the first time in July 2002. This trend continued over the years and, in the course of time, the

Table 4

Immigration Ratio from January to December 2006, Adjusted for Growth in Circulation

	Calculation::	Lodgments per Country Divided by Withdrawals per Country / Total Euro Area Lodgments Divided by Total Euro Area Withdrawals										
	BE	DE	ES	FR	GR	IE	IT	LU	NL	AT	PT	FI
EUR 500	1.42	1.07	0.65	1.34	1.10	0.29	0.80	0.13	1.67	1.10	1.03	0.91
EUR 200	1.57	0.98	1.08	1.11	1.00	0.67	1.37	0.12	0.83	1.20	4.52	0.98
EUR 100	1.38	0.97	1.38	1.03	1.04	0.57	0.92	0.22	1.16	0.99	2.37	1.12
EUR 50	0.96	0.99	1.02	1.00	1.01	0.71	0.90	0.86	0.98	2.35	1.62	0.93
EUR 20	1.01	0.96	1.25	0.95	1.11	1.04	1.08	1.52	1.17	1.50	0.93	0.97
EUR 10	2.02	0.95	1.21	0.99	1.50	1.21	1.07	1.57	1.06	0.99	0.97	1.02
EUR 5	0.94	0.97	1.09	1.14	1.19	0.99	1.05	0.74	1.09	1.37	1.00	0.98
Total	1.02	0.97	1.14	0.99	1.07	0.91	0.99	0.78	1.06	1.21	1.01	0.97

Source: ECB, OeNB.

same happened for other denominations. Thus, EUR 20 banknotes and EUR 5 banknotes have also exhibited a negative net balance since September 2003 and November 2004, respectively. Austria's high euro inflows would appear to reflect, above all, the country's strong banking presence in Eastern Europe, as well as its geographical location.

The migration ratio shown in table 4 reflects how the situation changed in the course of 2006.

An analysis of the overall migration ratios of individual countries shows that Austria (1.21) and Spain (1.14) had the highest overall migration ratios in 2006. By contrast, Luxembourg (0.78) and Ireland (0.91) had the lowest migration ratios and can thus be regarded as euro emigration countries.

The analysis of ratios for individual denominations reveals mixed results. At 0.65, Spain, for example, had a very low migration ratio for EUR 500 banknotes. However, this is distorted, for instance, by robust domestic demand for EUR 500 banknotes in Spain.

In Austria, only two denominations had a migration ratio of less than 1 at end-2006, namely the EUR 10 and the EUR 100 banknotes, two ATM denominations for which demand remains constant. It must, however, be pointed out that this migration ratio is influenced by various factors, for which precise quantification is not possible. Owing to the anonymity of cash, therefore, domestic demand, for example, cannot be differentiated from external demand, and migration to other euro area countries cannot be differentiated from migration to countries beyond the euro area.

5 Summary

The aforementioned surveys on migration in Austria show that the volume of euro banknotes and coins in circulation in Austria, as well as the mix of denominations, remained relatively stable at Austrian households from 2002 to 2004, albeit with a slight increase in the share of banknotes and coins originally issued in other euro area countries. In Austria, migration continues to generate an inflow of banknotes. In particular, EUR 50, EUR 20 and EUR 5 banknotes exhibit a high degree of migration. The negative net balance of banknotes issued by and returned to the OeNB for these denominations

shows that Austria is largely an "importer" in these banknote denominations. The immigration of banknotes also generates ever mounting banknote processing costs, for which no compensation or reallocation scheme has been set up within the Eurosystem, however.

The results of both OeNB surveys suggest that banknote migration in Austria commenced at a very fast pace and on a large scale mainly because of the country's geographical location, tourism and commuter movements and, particularly, owing to the strong presence of Austrian banks in Eastern Europe.

Even if the calculation of migration ratios does not offer a clear explanation of migration and its underlying reasons, it is nonetheless clear that the euro has helped to remove the economic borders between countries in the euro area. Cash is no longer national. It is European.