



## Data Article

# Monitoring the distribution of euro coins across borders (2002–2010): A dataset on the contents of 22,500 European citizens' wallet



Marion Le Texier<sup>a,\*</sup>, Claude Grasland<sup>b</sup>, France Guérin-Pace<sup>c</sup>,  
Bénédicte Garnier<sup>c</sup>

<sup>a</sup> UMR 6266 IDEES, University Rouen Normandie, France

<sup>b</sup> UMR 8504 Géographie-Cités, Université de Paris, France

<sup>c</sup> French National Institute of Demographic Studies (INED), France

## ARTICLE INFO

*Article history:*

Received 16 February 2021

Revised 8 April 2021

Accepted 15 April 2021

Available online 22 April 2021

*Keywords:*

Euro

Coins

Survey

Circulation

Spatial diffusion

Cross-border

## ABSTRACT

The Euro Spatial Diffusion Observatory (ESDO) database records face-to-face questionnaire surveys conducted between March 2002 and December 2011 in France, in December 2003 in Belgium and in December 2005 in Germany. The data provides information on the coins contained in the respondents' wallets at the time of the survey, classified by country of origin and value. A series of control variables provide information on the socioeconomic profile of the respondents and the location of their place of residence at the NUTS 3 level. In total, more than 22,500 people opened their wallets and about 300,000 coins were registered allowing the tracking of euro coins circulation from their country of introduction on January 1, 2002 (or later for countries that joined the euro zone afterwards) to their place of observation at the time of the survey.

© 2021 The Authors. Published by Elsevier Inc.

This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>)

\* Corresponding author.

E-mail address: [marion.le-texier@univ-rouen.fr](mailto:marion.le-texier@univ-rouen.fr) (M. Le Texier).

## Specifications Table

Subject	Geography
Specific subject area	The circulation of euro coins within and across state borders results from the cumulative effects of many small cash transactions, while direct redistribution between banks is very local due to high transport costs (volume and weight of coins, security issues). Therefore the successive photographs of the spatial distribution of euro coins by country of issue provide information on the geographical and social factors of European integration at the scale of its residents.
Type of data	CSV dataframes (on per country of survey)
How data were acquired	The founding researchers of the ESDO entrusted the realization of the wallet surveys to the private polling institute Lavalie (I.S.L.). This institute specialized in quantitative studies for many sectors of activity (media, finance, transport, health, etc.) conducts Omnibus surveys among a representative sample of the French (resp. German and Belgian) population twice a month. A copy of the survey questionnaires is provided, along with the web link to its online access.
Data format	Raw data
Parameters for data collection	Each survey involved a sample of 2000 persons (with the exception of the French March 2002 and Belgian December 2003 surveys which investigated 1000 persons only) representative of the population at NUTS 1 level in France and Nielsen [1] level in Belgium and Germany. Representativeness was drawn at random from the population over 18 years of age based on habitat type, the socio-professional category of the head of household and the sex and age of the interviewee.
Description of data collection	All the interviews, lasting 45 min, were conducted face-to-face, at home, by ISL network interviewers, using a CAPI (Computer Assisted Personal Interviews) system. The open-ended questions as well as the occupation questions were proofread, checked and post-coded by ISL's proofreading and coding service. Only a part of the Omnibus surveys was dedicated to the content of the respondents' wallets, and participation in this part of the survey was left to the respondents' discretion.
Data source location	Belgium, France and Germany (the information on residential location is given at NUTS 3 level).
Data accessibility	Repository name: Mendeley Data Direct URL to data: <a href="https://doi.org/10.17632/f257j67ym6.1">https://doi.org/10.17632/f257j67ym6.1</a> Data, metadata, and survey files are all available at the Mendeley Data site.

## Value of the Data

- As euro coins circulate mainly thanks to the movement of people, the observation of a coin issued in another country of the euro zone is evidence of a network of relations between its place of issue and its place of observation.
- Socioeconomic and geographic factors explaining the presence (resp. absence) of foreign euro coins in a purse inform on European integration at individual and NUTS 3 levels.
- The dynamics of the coins mixing shed light on the processes of spatiotemporal diffusion carried out by human contacts in Europe.
- The ESDO data may be used as a general proxy of cross-border mobility between European countries.

## 1. Data Description

Euro bills and coins were put into circulation on January 1, 2002, in the following twelve countries: Austria, Belgium, Finland, France, Germany, Greece, Ireland, Italy, Luxembourg, the Netherlands, Portugal, Spain and Finland, i.e. in twelve of the then fifteen Member States of the European Union (EU). Seven new banknotes and eight new coins were introduced into the European money market. Each euro coin shows on one side its denomination value (1 cent, 2 cents, 5 cents, 10 cents, 20 cents, 50 cents, 1 euro and 2 euros) and on the opposite side a symbol representing its country of issue. At the launch of the Euro banknotes and coins, the value of

**Table 1**

Key figures on ESDO surveys (March 2002–December 2011).

Survey time	Survey location	Initial number of respondents	Number of wallets opened	Number of coins registered	Share of foreign coins (in %)
March 2002	France	1002	707	9831	4,73
June 2002	France	2012	1480	20,737	5,91
September 2002	France	2057	1374	19,164	9,18
January 2003	France	2042	1479	18,342	10,88
June 2003	France	1998	1284	18,284	11,08
September 2003	France	1978	1408	18,009	14,08
December 2003	France	2013	1535	20,455	13,77
December 2003	Belgium	978	658	9501	26,56
June 2004	France	1999	1480	18,463	17,18
September 2004	France	1988	1423	18,424	19,45
December 2004	France	2012	1670	21,820	18,68
June 2005	France	2003	1395	18,196	20,10
December 2005	France	1989	1575	19,854	23,66
December 2005	Germany	1949	1673	28,202	13,77
June 2006	France	1989	1304	16,037	25,71
January 2007	France	2000	1460	18,661	26,59
October 2008	France	2010	1538	18,173	29,65
December 2011	France	1906	1389	17,043	33,63

all the coins put into circulation amounted to 12 billion euros, distributed irregularly among the Member States according to the number of inhabitants and the different national payment practices. On average, this represented 134 coins per inhabitant of the euro area with a value of 43 euros per person (Commission of the European Communities 2003). Since then, seven other countries have adopted the euro: Slovenia on January 1, 2007, Cyprus and Malta on January 1, 2008, Slovakia on January 1, 2009, Estonia in January 2011, Latvia in January 2014 and Lithuania in January 2015.

Conveyed by individuals in the course of their daily, professional, tourist or other travels, the European currency is an indicator of the movements and contacts that take place between countries of Europe [2–7]. In order to monitor the mix of euro coins, a series of Omnibus-type surveys was carried out in France, Belgium and Germany from the very beginning of single currency to its 10th anniversary. In total, more than 20,000 wallets and nearly 300,000 coins were observed between March 2002 and December 2011 (Table 1).

Thanks to the set of socioeconomic and geographical variables (see Tables 2–4 for a detailed description of the questions and response modalities in each of the survey country) characterizing the respondent/money-keeper as well as every euro coins found in his/her wallet at the time of the survey, the ESDO dataset provides answers to questions as varied as: “have the coins completely mixed after ten years?”, “are the same proportions of coins from each country of origin to be found everywhere?”, “how, and at what speed, did the mixing take place?”, “do certain profiles of individuals and/or territories possess coins of certain origins more frequently than others?”, etc.

## 2. Experimental Design, Materials and Methods

ESDO data comes from a series of Omnibus surveys conducted face to face, at home, with a CAPI system. All the open-ended questions and the questions of professions have been proofread, checked and post-codified by I.S.L.’s proofreading - codification service.

Each survey wave was conducted with a sample of 2000 individuals (1000 for the French survey of March 2002 and the Belgian survey of December 2003) representative of the country’s population, aged 18 years and older (with the exception of the Belgian survey which also includes respondents aged 17). The sample is constructed from a matrix ZEAT/LAND region X

**Table 2**

Presentation of French surveys variables.

Code	Description
SURVEY	Month and year of the survey
SEX	1) Man 2) Woman
AGE	Age in years
AGGL_FR_5	Place of residence type of agglomeration in 5 categories: 1) Rural 2) from 2000 to 20,000 inhabitants 3) from 20,000 to 100,000 inhabitants 4) >100,000 inhabitants 5) Paris agglomeration
NUTS3	Place of residence location according to the European Nomenclature of Territorial Units for Statistics at level 3
NPF5	Size of the household in 5 categories: 1) 1 person 2) 2 persons 3) 3 persons 4) 4 persons 5) 5 persons and more
E15	Number of children under age 15 in 6 categories: 0) none 1) 1 child 2) 2 children 3) 3 children 4) 4 children 5) 5 children and more
PRO6_FR	Profession in 6 categories: 1) Farmer 2) Craftsman - seller 3) Manager 4) Intermediate profession, employee 5) Worker 6) Inactive
PRO6_FR_CF	Profession of the head of the family, if the head of household is not the respondent, in 6 categories: 1) Farmer 2) Craftsman - seller 3) Manager 4) Intermediate profession, employee 5) Worker 6) Inactive
SIT_SAL	Current or past salary situation in 2 categories: 1) On his/her account 2) Employment
SAL	Employer type in 3 categories: 1) state or local community 2) public company 3) private company
TPS_FR	Working time: 1) Full time 2) Part-time
SIT_CF	Current or past salary status of the head of household, if the head of household is not the respondent, in 2 categories: 1) On his/her account 2) Employment
SAL_CF	Employer type of the head of household, if the head of household is not the respondent, in 3 categories: 1) state or local community 2) public company 3) private company
TPS_FR_CF	Working time of the head of household, if the head of household is not the respondent: 1) Full time 2) Part-time
COUPLE	Lives as a couple: 1) Yes 2) No
STM	Marital status in 3 categories: 1) Married or living in a marriage 2) Single 3) Widowed, divorced, separated
DIPLIN_FR	Highest diploma obtained according to the following response modalities: 1) Primary school degree (CEP) 2) Middle school national degree (BEPC) 3) certificate of professional aptitude (CAP) and Professional studies diploma (BEP) 4) High-school diploma (Baccalauréat) 5) 2-years university diploma 6) Bachelor/Master degree 7) No diploma 8) Refuse to answer
HAB_TYP	Habitat type according in 6 categories: 1) A farm 2) A detached house without garden 3) A detached house with garden 4) An apartment HLM (low rent housing) or INL (standard rental building) 5) An apartment other than HLM/ILN 6) Other
HAB_STAT	Property status in 4 categories: 1) Ownership, including co-owner and accessor 2) tenant 3) Other 4) Refuse to answer
REVR_FR	In the first 15 surveys (March 2002 to October 2008), the respondent's average gross income is categorized according to the following thresholds: 1) < 609 EUROS 2) 610–914 EUROS 3) 915–1219 EUROS 4) 1220–1524 EUROS 5) 1525–1904 EUROS 6) 1905–2289 EUROS 7) 2290–3049 EUROS 8) 3050–3809 EUROS 9) 3810–6099 EUROS 10) > 6099 EUROS 11) Refuse to answer the question 12) NA
	Answer modalities for the December 2011 survey: 1) < 499 EUROS 2) 500–749 EUROS 3) 750–999 EUROS 4) 1000–1499 EUROS 5) 1500–1999 EUROS 6) 2000–2499 EUROS 7) 2500–2999 EUROS 8) 3000–3499 EUROS 9) 3500–4499 EUROS 10) 4500–5999 EUROS 11) 6000–7499 EUROS 12) > 7500 EUROS 13) NA 14) Refuse to answer the question
Weight	Weighting variable constructed by ISL
QFRA_1c	Number of 01 cent coins minted in France contained in the wallet
QFRA_2c	Number of 02 cents coins minted in France contained in the wallet
...	...
QSLVE_1e	Number of 1 euro coins minted in Slovenia contained in the wallet
QSLVE_2e	Number of 2 euros coins minted in Slovenia contained in the wallet

Type of habitat. In urban areas, the interviews are divided between the main commune of the agglomeration and the communes of the periphery, in proportion to their respective populations. A priori representativeness of the sample is ensured by the use of quotas on the following variables: socio-professional category of the head of household, age of the interviewee, sex of the interviewee, woman respondent/wife activity.

**Table 3**

Presentation of the Belgium survey variables.

ZEAT	Nielsen region of residence in 5 categories: 1) Nielsen I (North West), 2) Nielsen II (North East), 3) Nielsen III (centre), 4) Nielsen IV (South West), 5) Nielsen V (South East)
NUTS3	Place of residence location according to the European Nomenclature of Territorial Units for Statistics at level 3
HAB4	Place of residence type of agglomeration in 4 categories: 1) big cities, 2) urban areas, 3) intermediary areas, 4) rural areas
SEX	1) Man 2) Woman
AGE	Age in years
LIEN	The respondent is the head of the family: 1) Yes, 2) No
NPFQ	Size of the household in 9 categories: 1) 1 person 2) 2 persons 3) 3 persons 4) 4 persons 5) 5 persons, 6) 6 persons, 7) 7 persons, 8) 8 persons, 9) 9 persons and more
RS4	Professional status of the respondent in 2 categories: 1) On his/her account 2) Employment
RS14	Professional status of the head of household, if the head of household is not the respondent, in 2 categories: 1) On his/her account 2) Employment
RS20	Lives as a couple: 1) Yes 2) No
RS21	Marital status in 3 categories: 1) Married or living in a marriage 2) Single 3) Widowed, divorced, separated
RS22	Highest diploma obtained according to the following response modalities: 1) Primary (Primaire), 2) Lower secondary degree (general, technological or artistic), 3) Higher secondary degreeaire (general, technological or artistic), 4) Lower professional secondary degree, 5) Higher professional secondary degree, 6) Non-university higher education, 7) University degree
RS22B	Highest diploma obtained by the head of household, if the head of household is not the respondent, according to the following response modalities: 1) Primary (Primaire), 2) Lower secondary degree (general, technological or artistic), 3) Higher secondary degreeaire (general, technological or artistic), 4) Lower professional secondary degree, 5) Higher professional secondary degree, 6) Non-university higher education, 7) University degree
RS30	The respondent is the purchasing manager in the household: 1) Yes, 2) No
PCSI1	Profession of the respondent in 20 categories: 1) small farmer (less than 15 ha), 2) large farmer (15 ha or more), 3) craftsman, trader with 5 or less employees, 4) industrialist, large trader with 6 or more employees, 5) liberal profession or requiring qualification (doctor, lawyer, chartered accountant, ...), 6) member of the general management, senior executive (director, administrator, ...) responsible for 5 or fewer employees, 7) member of the general management, senior manager (director, administrator, ...) responsible for 6 to 10 employees, 8) member of the general management, senior manager (director, administrator, ...) in charge of 11 or more employees, 9) middle management not part of the general management, in charge of 5 or less employees, 10) middle management not part of the general management, in charge of 6 or more employees, 11) other, mainly clerical work, 12) other, not clerical work (nurse, teacher, policeman, . .), 13) skilled worker, foreman, 14) unskilled worker, laborer, 15) disabled, 16) pensioner/retired, 17) student, 18) housewife, 19) unemployed, 20) annuitant
PCSC2	Profession of the head of household, if the head of household is not the respondent, in 20 categories: 1) small farmer (less than 15 ha), 2) large farmer (15 ha or more), 3) craftsman, trader with 5 or less employees, 4) industrialist, large trader with 6 or more employees, 5) liberal profession or requiring qualification (doctor, lawyer, chartered accountant, ...), 6) member of the general management, senior executive (director, administrator, ...) responsible for 5 or fewer employees, 7) member of the general management, senior manager (director, administrator, ...) responsible for 6 to 10 employees, 8) member of the general management, senior manager (director, administrator, ...) in charge of 11 or more employees, 9) middle management not part of the general management, in charge of 5 or less employees, 10) middle management not part of the general management, in charge of 6 or more employees, 11) other, mainly clerical work, 12) other, not clerical work (nurse, teacher, policeman, . .), 13) skilled worker, foreman, 14) unskilled worker, laborer, 15) disabled, 16) pensioner/retired, 17) student, 18) housewife, 19) unemployed, 20) annuitant
E15	Children under age 15: 1) Yes, 2) No
Weight	Weighting variable constructed by ISL
QFRA_1c	Number of 01 cent coins minted in France contained in the wallet
QFRA_2c	Number of 02 cents coins minted in France contained in the wallet
...	...
QPOR_1e	Number of 1 euro coins minted in Portugal contained in the wallet
QPOR_2e	Number of 2 euros coins minted in Portugal contained in the wallet

**Table 4**

Presentation of the German survey variables.

SEXE	1) Man 2) Woman
AGQ	Age in years
NPF5	Size of the household in 5 categories: 1) 1 person 2) 2 persons 3) 3 persons 4) 4 persons 5) 5 persons and more
g10	City of residence size in 10 categories: 0) up to 1.999 inhabitants 1) 2.000 up to 2.999 inhabitants 2) 3.000 up to 4.999 inhabitants 3) 5.000 up to 9.999 inhabitants 4) 10.000 up to 19.999 inhabitants 5) 20.000 up to 49.999 inhabitants 6) 50.000 up to 99.999 inhabitants 7) 100.000 up to 199.999 inhabitants 8) 200.000 up to 499.999 inhabitants 9) 500.000 inhabitants or more
LAND	Region (17 Länder): 1) Schleswig-Holstein 2) Hamburg 3) Bremen 4) Berlin (West) 5) Lower Saxony 6) North-Rhine-Westphalia 7) Hessen 8) Rhineland-Palatinate 9) Saarland 10) Baden-Württemberg 11) Bavaria 12) Mecklenburg-Lower-Pomerania 13) Saxony-Anhalt 14) Brandenburg 15) Thuringia 16) Saxony 17) Berlin (East)
N3_03	Location of residence place according to the Eurostat NUTS 3 (2003) nomenclature
g13	Marital status in 4 categories: 1) single 2) living together without marriage certificate 3) married 4) divorced/widowed/living separated
Penf	Children in household in 2 categories: 1) Yes 2) No
g18	The respondent is the purchasing manager in the household: 1) Yes 2) No
g6	The respondent is the head of the household: 1) Yes 2) No
g23	Highest diploma obtained according to the following response modalities: 1) Pre-primary 2) Primary 3) Secondary 4) Higher 5) University degree 9) NA
g25	Highest diploma obtained by the head of household, if the head of household is not the respondent, according to the following response modalities: 1) Pre-primary 2) Primary 3) Secondary 4) Higher 5) University degree 9) NA
g3	Working status of the respondent in 3 categories: 1) Yes, full-time 2) Yes, part-time 3) No
g3c	Working status of the head of household, if the head of household is not the respondent, in 3 categories: 1) Yes, full-time 2) Yes, part-time 3) No
pcsi11	Profession of respondent in 11 categories: 1) farmer 2) liberal profession 3) shopkeeper / owner of a firm 4) civil servants / government employees 5) employees (incl. employed management) 6) workers 7) students 8) apprentice / military service 9) housewife 10) retired 11) unemployed
Pcsi	Profession of respondent in 6 categories: 1) workers 2) employees (incl. employed management) 3) civil servants / government employees 4) liberal profession / shopkeeper / owner of a firm 5) farmers 6) unemployed
ACTI	Profession of respondent in 10 categories: 1) self-employed 2) farmer / fisherman 3) white collar 4) blue collar 5) student 6) housewife 7) retired 8) temporarily not working 9) other profession 10) NA
revr	Income of respondent in 12 categories: 1) NA / refused 2) up to 499 € 3) 500 € up to 749 € 4) 750 € up to 999 € 5) 1.000 € up to 1.249 € 6) 1.250 € up to 1.499 € 7) 1.500 € up to 1.999 € 8) 2.000 € up to 2.499 € 9) 2.500 € up to 2.999 € 10) 3.000 € up to 3.499 € 11) 3.500 € up to 3.999 € 12) 4.000 € or more
pcsc11	Profession of the head of household, if the head of household is not the respondent, in 11 categories: 1) farmer 2) liberal profession 3) shopkeeper / owner of a firm 4) civil servants / government employees 5) employees (incl. employed management) 6) workers 7) students 8) apprentice / military service 9) housewife 10) retired 11) unemployed
pcsc	Profession of the head of household, if the head of household is not the respondent, in 6 categories: 1) workers 2) employees (incl. employed management) 3) civil servants / government employees 4) liberal profession / shopkeeper / owner of a firm 5) farmers 6) unemployed
ACTC	Profession of the head of household, if the head of household is not the respondent, in 10 categories: 1) self-employed 2) farmer / fisherman 3) white collar 4) blue collar 5) student 6) housewife 7) retired 8) temporarily not working 9) other profession 10) NA
revh	Income of the head of household, if the head of household is not the respondent, in 12 categories: 1) NA / refused 2) up to 499 € 3) 500 € up to 749 € 4) 750 € up to 999 € 5) 1.000 € up to 1.249 € 6) 1.250 € up to 1.499 € 7) 1.500 € up to 1.999 € 8) 2.000 € up to 2.499 € 9) 2.500 € up to 2.999 € 10) 3.000 € up to 3.499 € 11) 3.500 € up to 3.999 € 12) 4.000 € or more
Pip	Weighting variable constructed by ISL
QFRA_1c	Number of 01 cent coins minted in France contained in the wallet
QFRA_2c	Number of 02 cents coins minted in France contained in the wallet
...	...
QPOR_1e	Number of 1 euro coins minted in Portugal contained in the wallet
QPOR_2e	Number of 2 euros coins minted in Portugal contained in the wallet

A posteriori representativeness of the sample is ensured by an adjustment procedure. The variables used are: ZEAT/LAND region, agglomeration categories, sex of the interviewee socio-professional category of the head of household, number of people in the household, age of the interviewee.

In order to ensure the quality of the information collected, postal checks were carried out by ISL regularly on more than half of the interviews. In addition, targeted telephone checks by interviewers are carried out as part of the more general monitoring of the network of ISL interviewers.

Note that the raw data were recoded to harmonize variable names across surveys. Some variables were also removed from the original file, as they corresponded to parts of the Omnibus survey commissioned by agencies other than the ESDO. Only respondents who agreed to open their wallets and count the euro coins are included in the database.

## Ethics Statement

Respondents' participation was completely consensual, anonymous, and voluntary. Informed consent was obtained before conducting the survey.

## CRedit Author Statement

**Marion Le Texier:** Methodology, Writing - Original draft preparation; **Claude Grasland:** Conceptualization, Methodology, Writing - Reviewing and Editing; **France Guérin-Pace:** Conceptualization, Methodology, Writing - Reviewing and Editing; **Bénédicte Garnier:** Methodology, Writing - Reviewing and Editing.

## Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

## Acknowledgments

The ESDO database was set up in 2002 as part of a large network of financial partners: the French National Center for Scientific Research (CNRS), the French National Institute for Demographic Studies (INED), Université de Paris (former University Paris Diderot), the French Treasury Department, the French Ministry of Tourism and the ACI Systèmes Complexes en SHS.

## References

- [1] M. Vandercammen, *Marketing, Perspectives marketing*, De Boeck Supérieur, Paris, 2006.
- [2] F. Seitz, D. Stoyan, K.H. Tödter, Coin migration and seigniorage within the euro area, *Deutsche Bundesbank Jahrbücher f. Nationalökonomie und Statistik* (2000) 232-1.
- [3] D. Stoyan, Statistical analyses of Euro coin mixing, *Math. Spectrum* 35 (2002) 50-55.
- [4] D. Stoyan, H. Stoyan, G. Döge, Statistical analyses and modelling of the mixing process of euro coins in Germany and Europe, *Aust. N. Z. J. Stat.* 46 (2004) 67-77.
- [5] F. Guérin-Pace, M. Le Texier, The circulation of euro coins as markers of European mobility in France, *Eur. J. Soc. Sci.* 54-1 (2016) 129-152.
- [6] C. Grasland, F. Guérin-Pace, A. Tostain, The circulation of euros as a reflection of people's mobility, *Populat. Soc.* 384 (2002) 1-4.
- [7] C. Grasland, F. Guérin-Pace, M. Le Texier, B. Garnier, Diffusion of foreign euro coins in France 2002-2012, *Populat. Soc.* 488 (2012) 1-4.