




Digital payments in Greece after the pandemic era

Main findings

June 2024

The analysis in a snapshot

Studies by IOBE (2015, 2018, 2021, 2023) have highlighted the importance of the spread of electronic payments for the Greek economy



The new study presents and interprets recently available data covering payment trends in Greece after the pandemic era



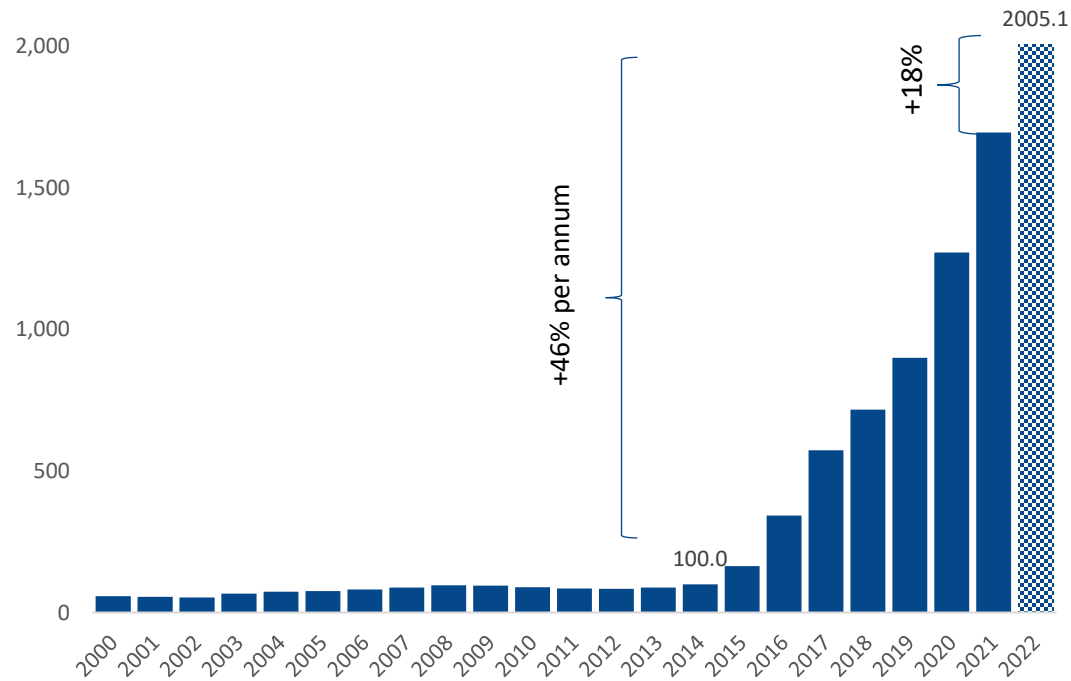
It analyses the dynamics of e-payments and their relationship with the economy and public revenues, which remain strong even after the end of the pandemic crisis

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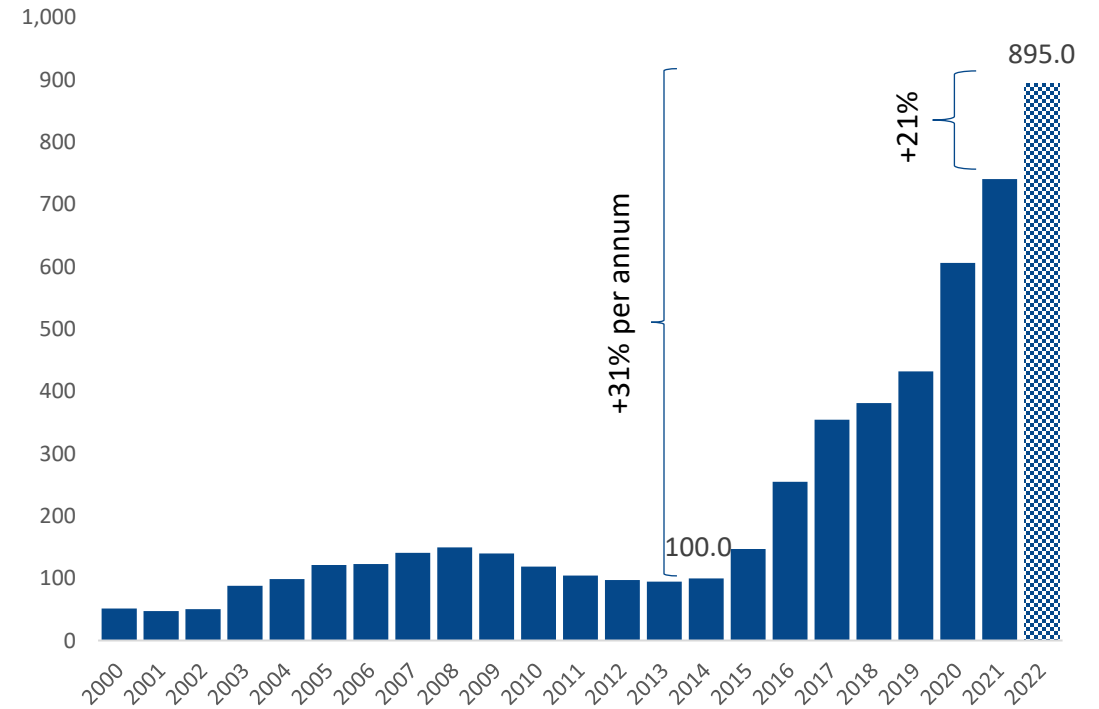
- **Motivation and objective**
- Card use by channel and sector
- Impact on VAT revenues
- Conclusions and recommendations

The use of card payments has shot up in Greece after 2014...

Number of card transactions (Index 2014=100)



Value of card transactions (Index 2014=100)



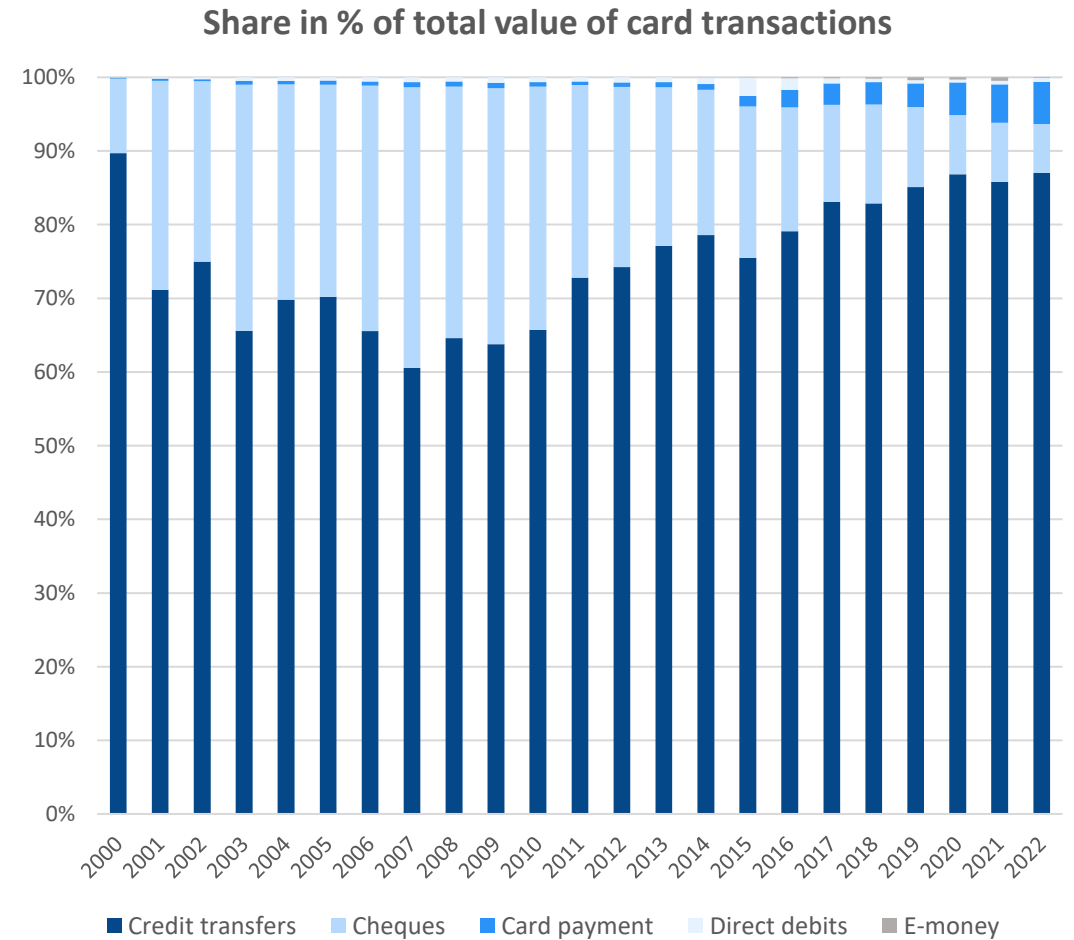
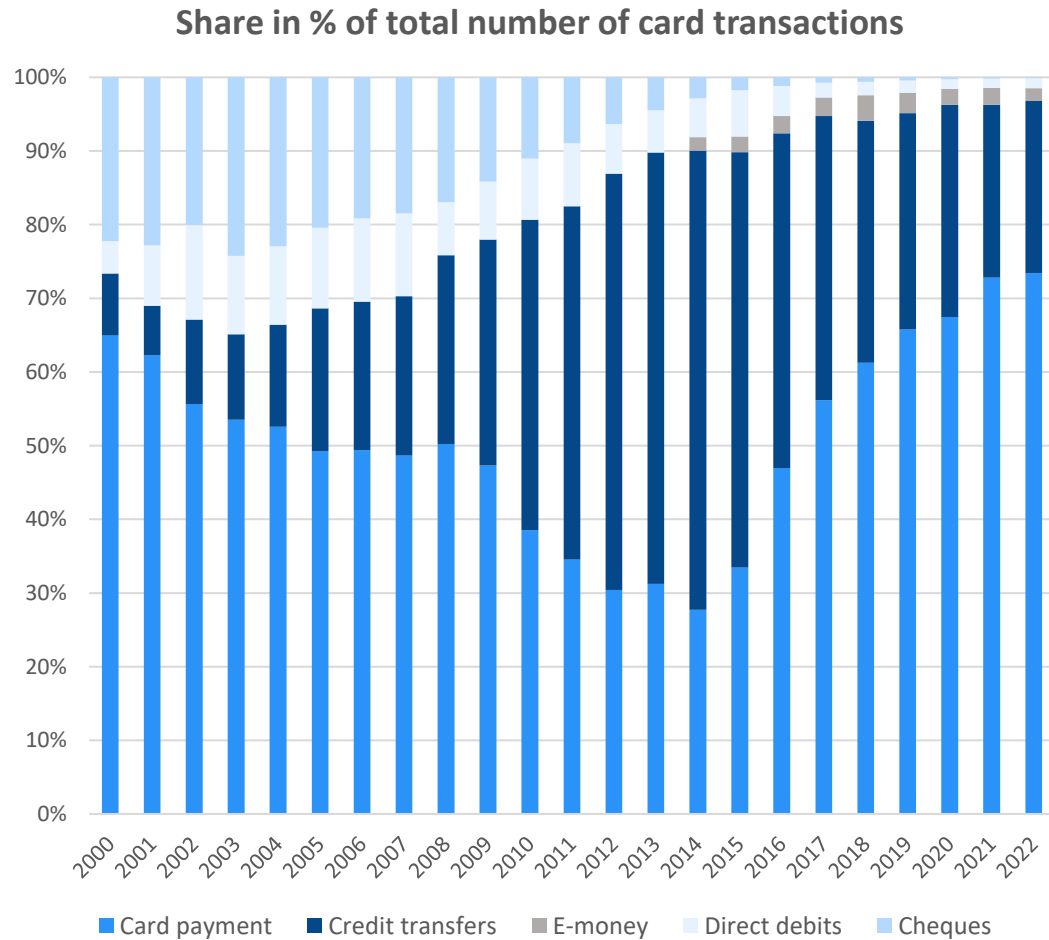
Source: ECB Data processing: IOBE. Note: The data refers to cards issued in Greece only, while it includes payments domestically and abroad.

... by more than 20 times with respect to number of transactions, almost 9 times with respect to value of transactions



Cards have been gaining share among digital payments since 2015

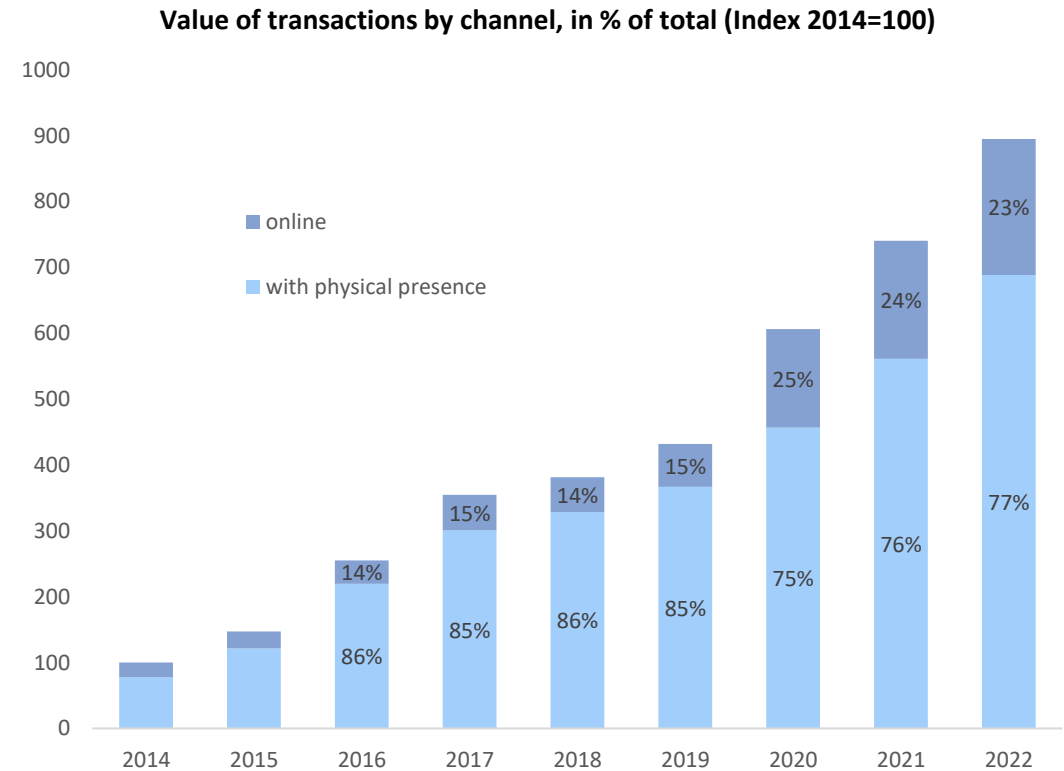
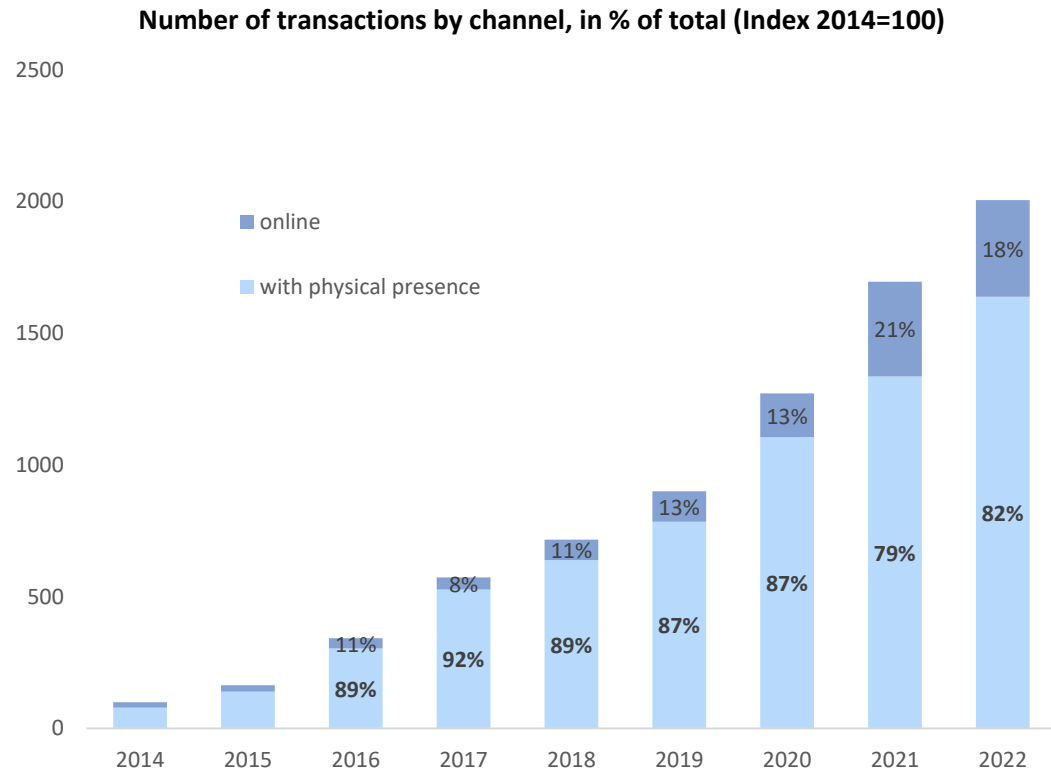
Distribution of total transactions by payment method in Greece, 2000-2022



Source: ECB Data processing: IOBE. Note: The data refers to cards issued in Greece only.



The online (card not present - CNP) channel rose stronger during and after the pandemic compared to card present (CP) transactions...



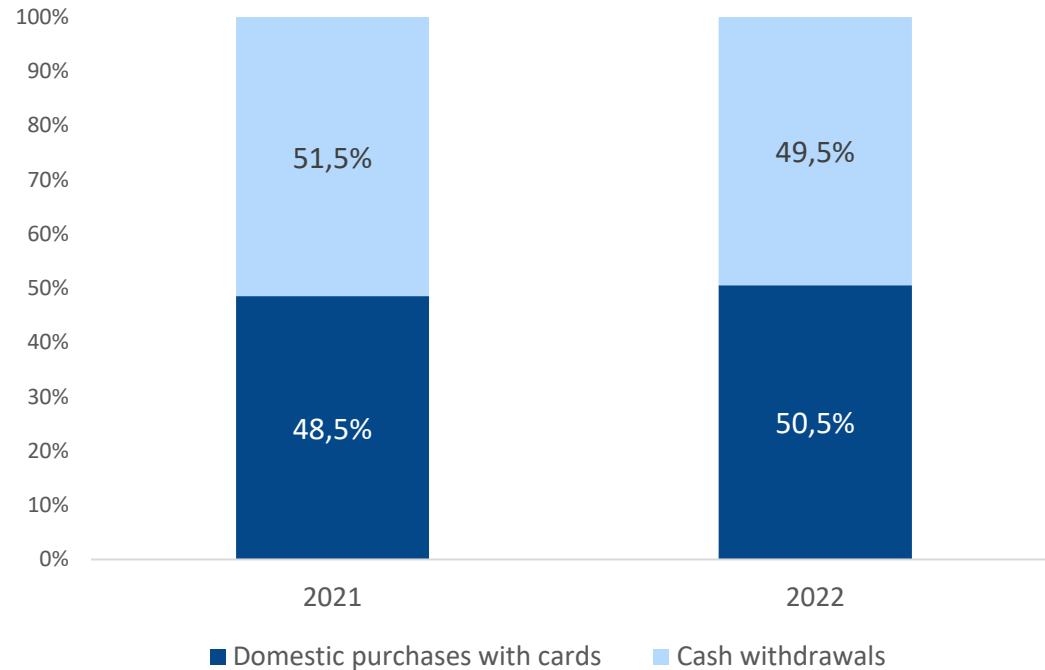
Source: ECB, HBA. Data processing: IOBE. Note: The data refers to cards issued in Greece only.

... both in terms of number and value of transactions. The share of online over face-to-face value of transactions has risen from less than 1:5 to around 1:3 during the pandemic



The value of domestic payments through Greek cards exceeded the respective total cash withdrawals for the first time in 2022...

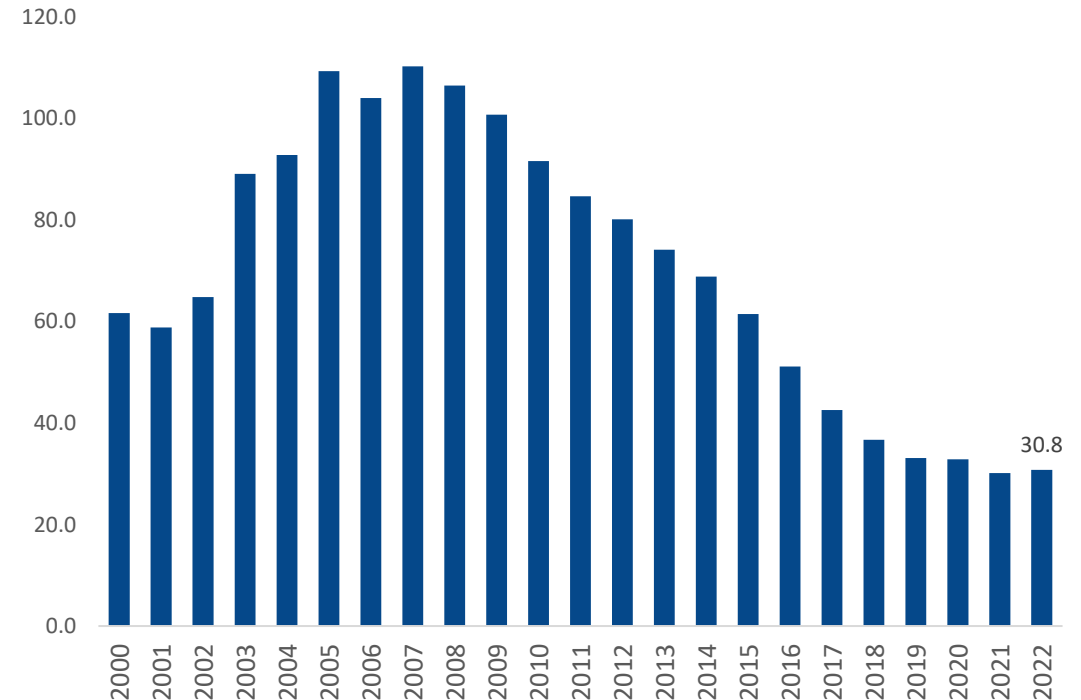
Share over total domestic transactions value (cash versus cards)



Source: Hellenic Bank Association estimates. Data processing: IOBE

Note: Data refers to cards issued in Greece. Transactions value relates to domestic payments and domestic cash withdrawals, respectively.

Card payments' average transaction value (in €)

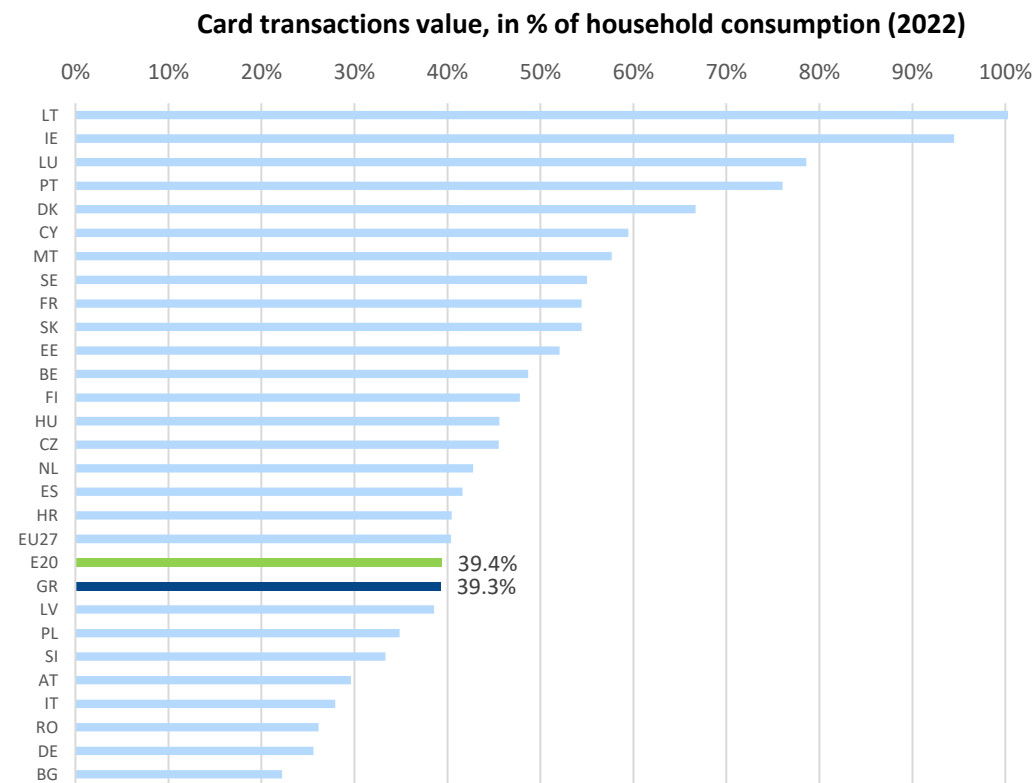
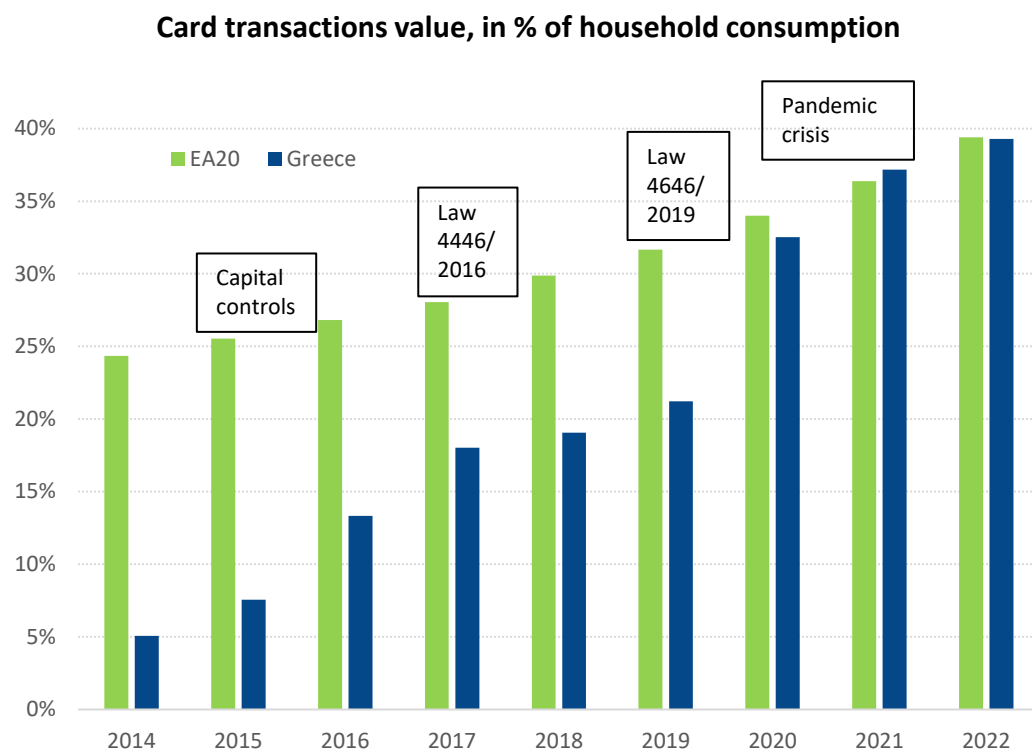


Source: ECB.

Data processing: IOBE. Note: Data refers to cards issued in Greece.

... while the use of cards has been expanding to purchases of smaller ticket items, as reflected by the continuous drop in the average card transactions' value, which has halted in 2022, inter alia due to inflationary pressures.

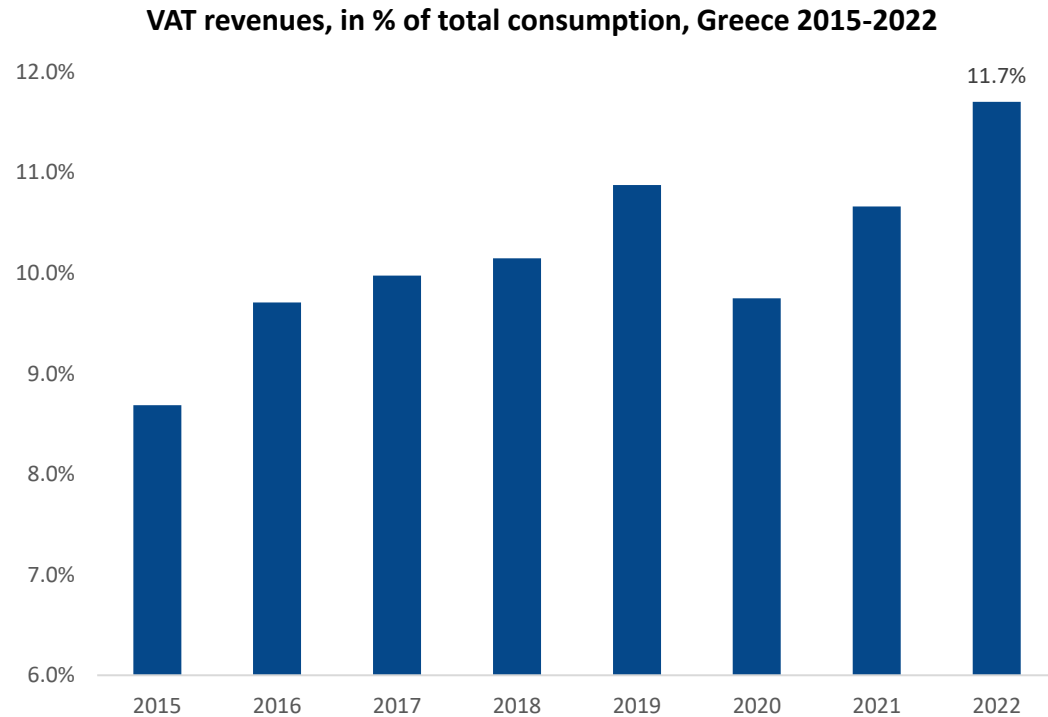
The use of card transactions in Greece, proportional to private consumption, has reached the Euro Area average after the pandemic shock...



Source: ECB, Eurostat. Data processing: IOBE. Note: Card transactions data refers to cards issued in each country/region.

...showing one of the highest penetration rate in Europe during 2015-2022. However, Greece ranks only in the 19th position among all EU members, still recording low use in particular sectors, such as services..

Since 2015, VAT revenues have increased as a percent of total consumption, while the VAT gap has shrunk



Source: Ministry of Finance, ELSTAT. Data processing: IOBE



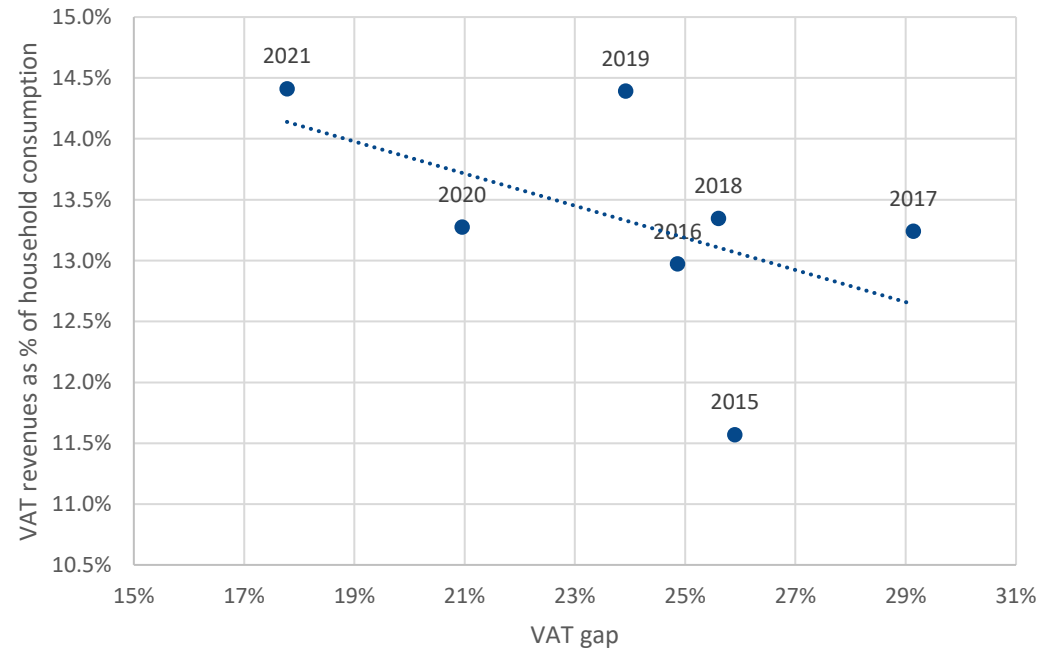
Source: European Commission, VAT gap report October 2023.

Note: VAT gap is estimated as a share (%) of annual collected VAT revenues.

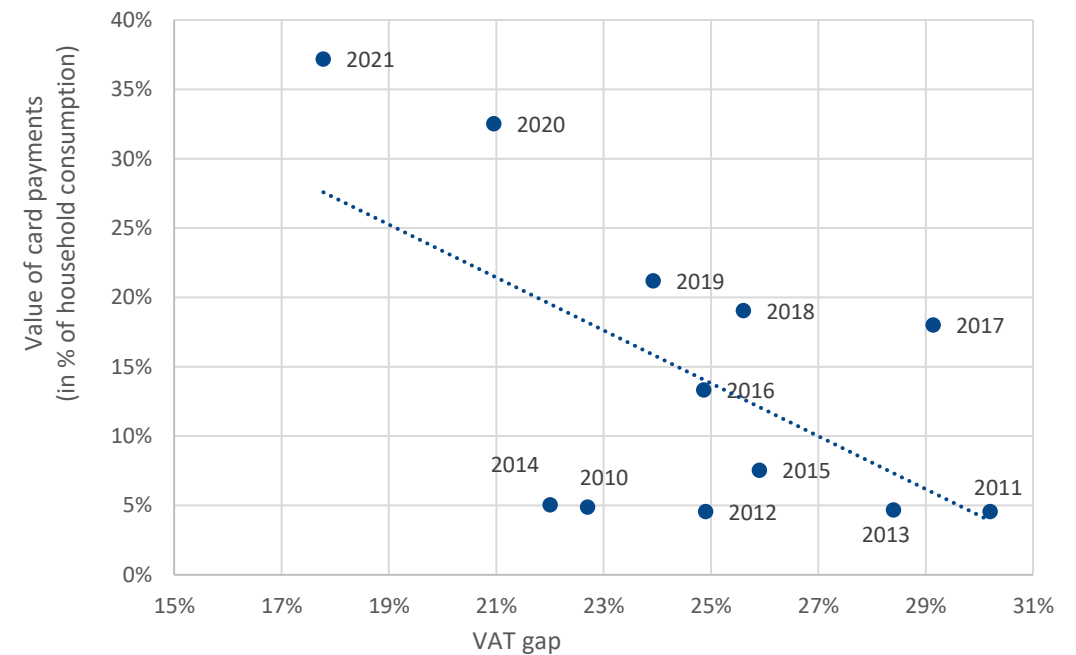
**VAT revenue increased to 11.7% of total consumption in 2022 from 8,7% in 2015.
VAT gap declined to 17.8% in 2021 from 26% in 2015.**

VAT gap is negatively correlated with the value of card payments in Greece across time

VAT revenues and VAT gap, Greece 2010-2021



Value of card payments and VAT gap, Greece 2010-2021



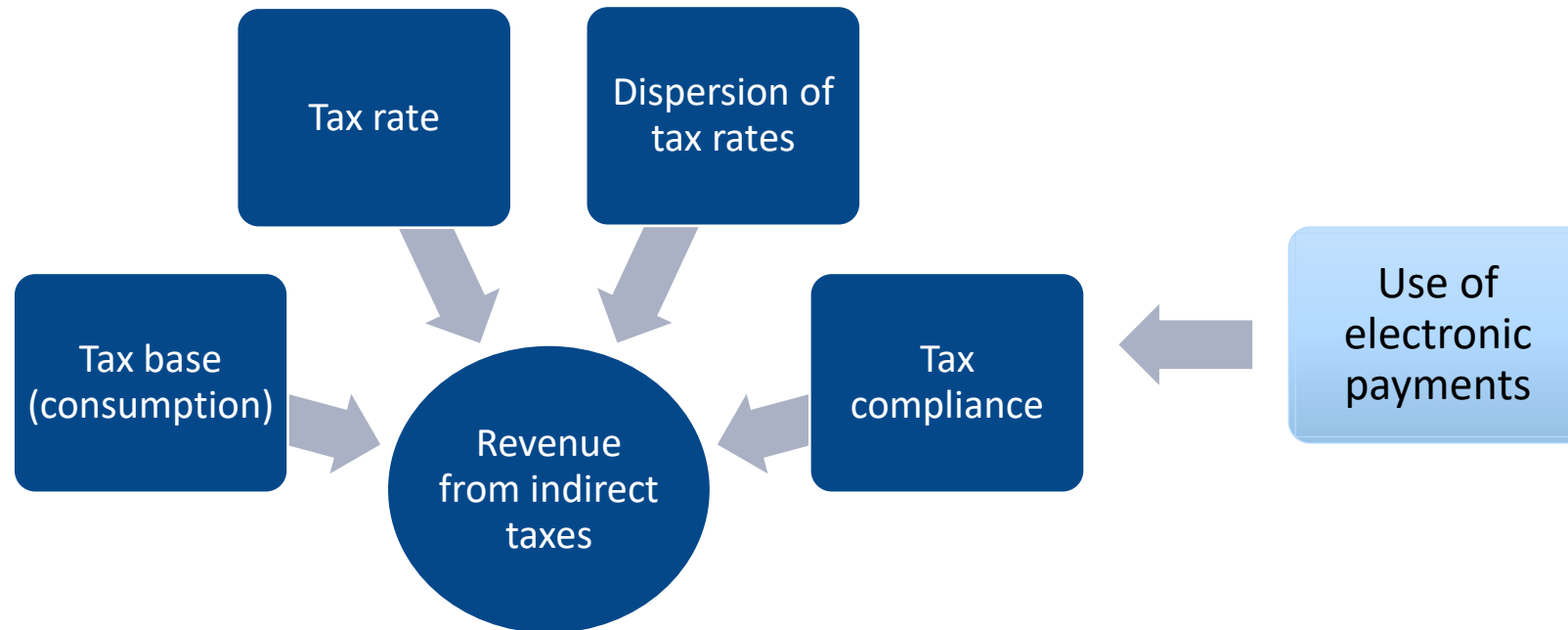
Source: European Commission (VAT gap report October 2023), Ministry of Finance, ELSTAT. **Data processing:** IOBE

Note: VAT gap is estimated by the EC as a share (%) of annual collected VAT revenues.

The reduction in the VAT gap during the last years resulted in higher VAT revenues, indicating a possible positive impact from the increased use of card payments

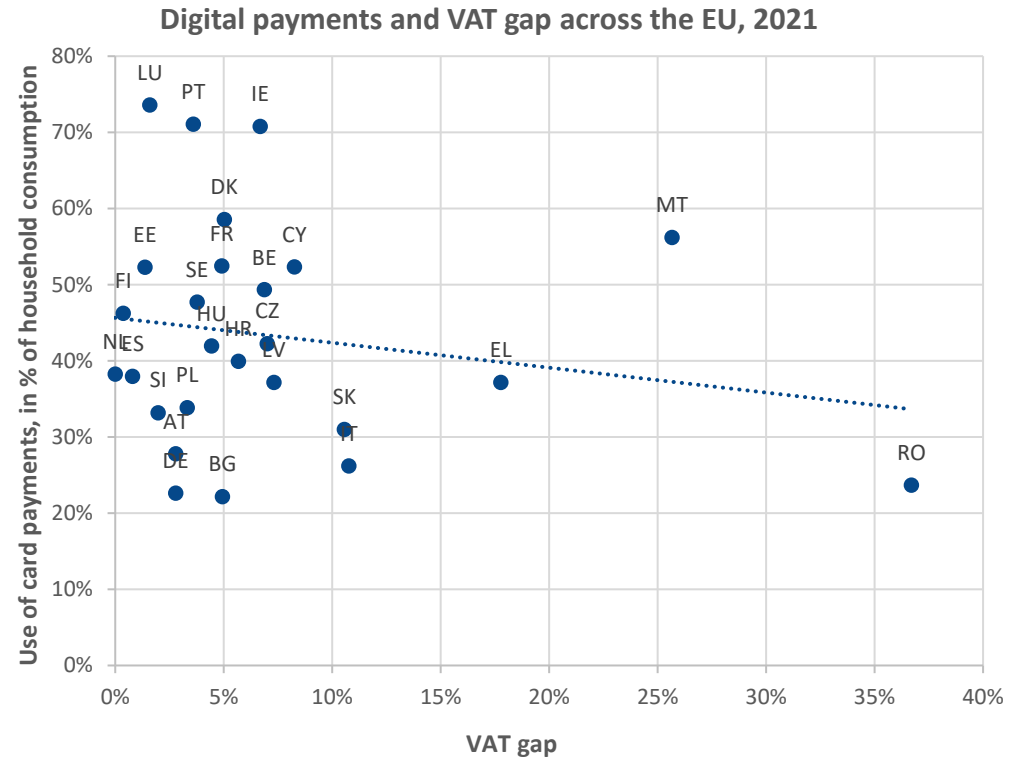
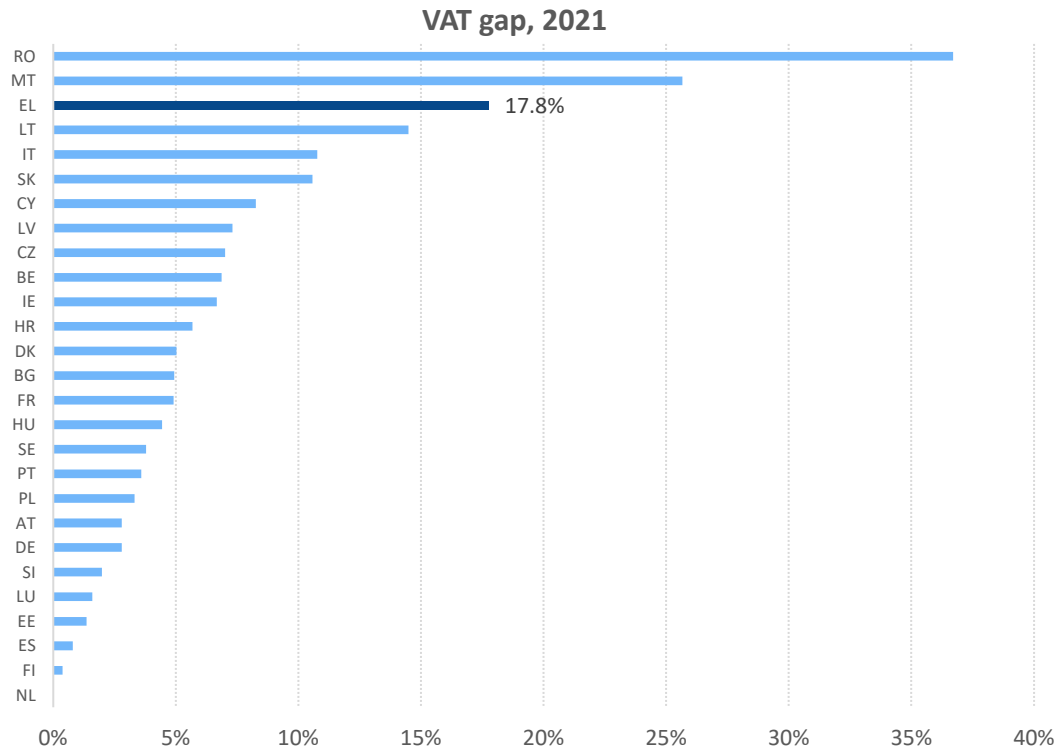
Previous IOBE studies highlighted the positive association of electronic payments and tax compliance in 2015-2019

Objective: To assess the impact of electronic payments on tax revenue after the pandemic



To what extent does the expansion of card use positively impact tax revenue in the post-pandemic era?

Why is it crucial to further enhance digital payments?



Source: European Commission estimation for VAT gap (October 2023), ECB, Eurostat, Data processing: IOBE

Despite recent progress, Greece exhibits one of the largest VAT gaps in the EU.

Higher use of digital payments is associated with lower VAT gaps across the EU.

The increase of digital payments in Greece has significant positive impact on tax revenues (IOBE 2015, 2018, 2021, BoG 2017)



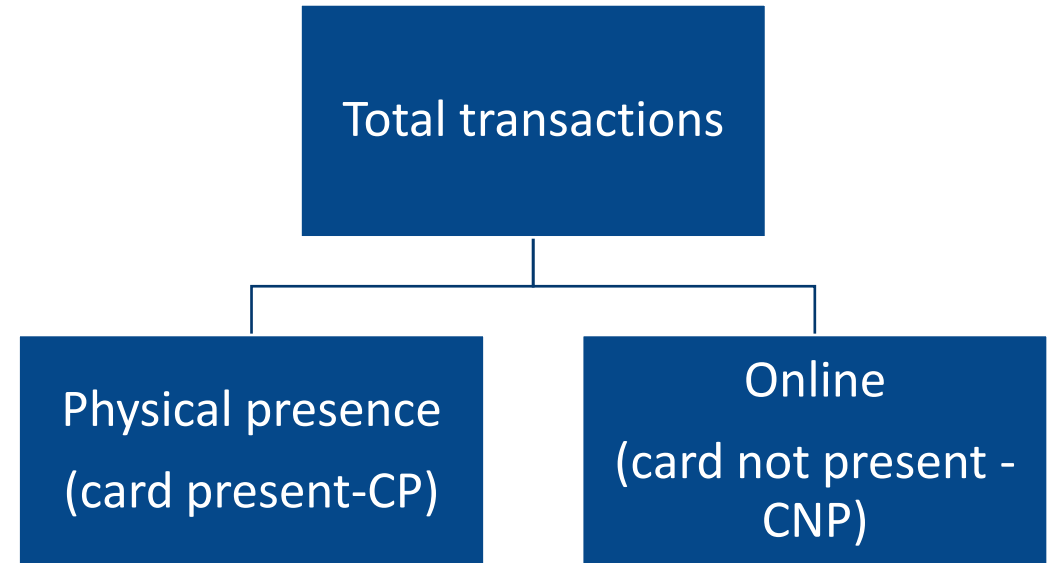
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- Motivation and objective
- **Card use by channel and sector**
- Impact on VAT revenues
- Conclusions and recommendations

Data breakdown for card transactions

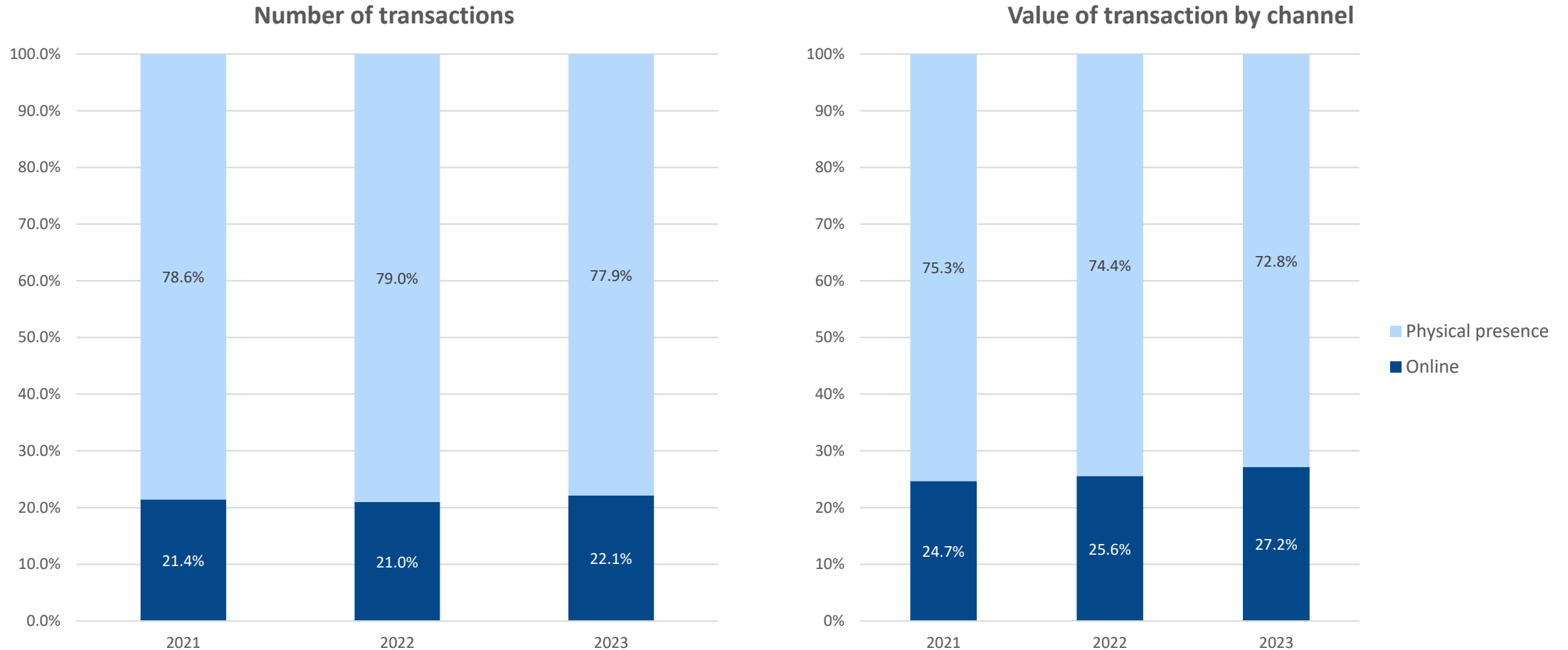
- Monthly data for transactions with domestic card payment during Jan 2021-May 2023.
- Number and value of transactions, by sector (MCC), product (credit, debit, prepaid) and channel (with/without physical presence, CP/CNP)
- Source: Mastercard

Two card payment channels



Following the boost of online transactions during the pandemic, their share has further strengthened during 2022-2023

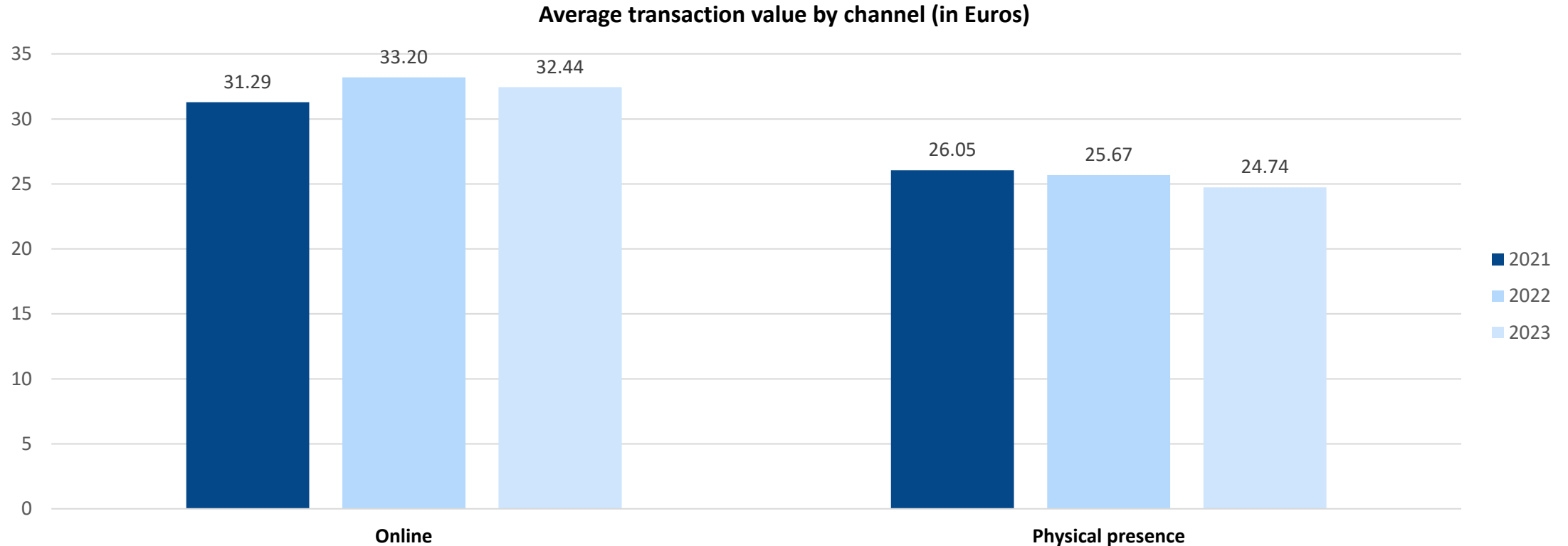
Distribution of card transactions by channel



Source: Mastercard, Data processing IOBE, Note: The calculation of 2023 includes the first five months of 2023



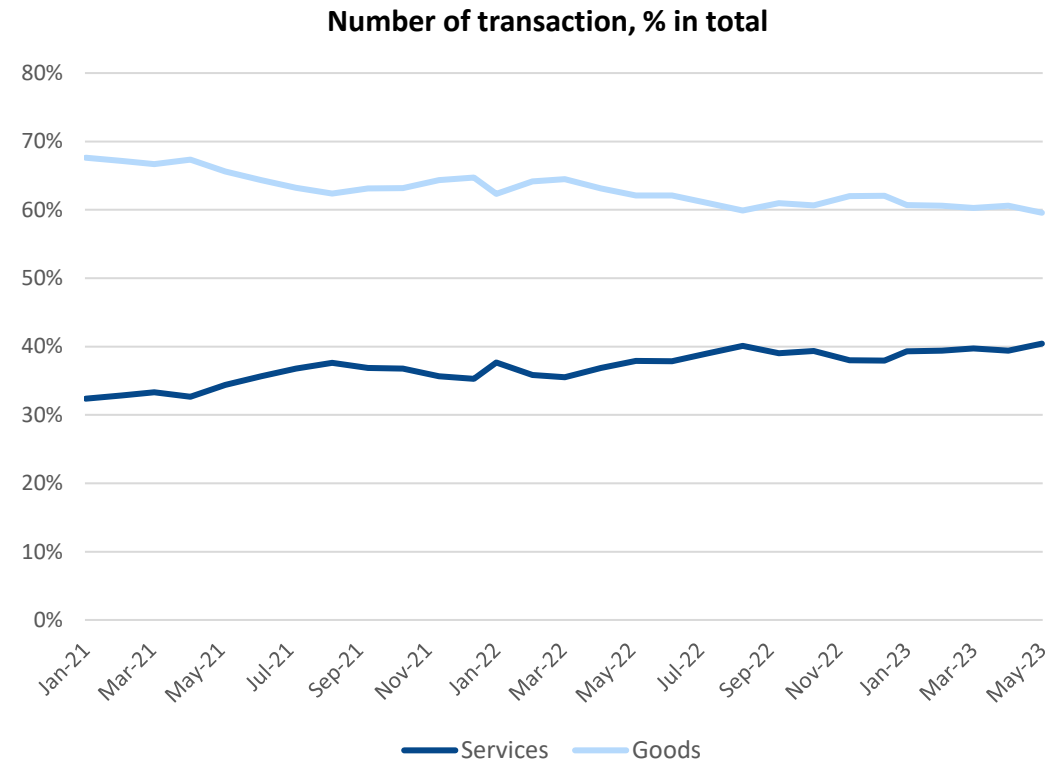
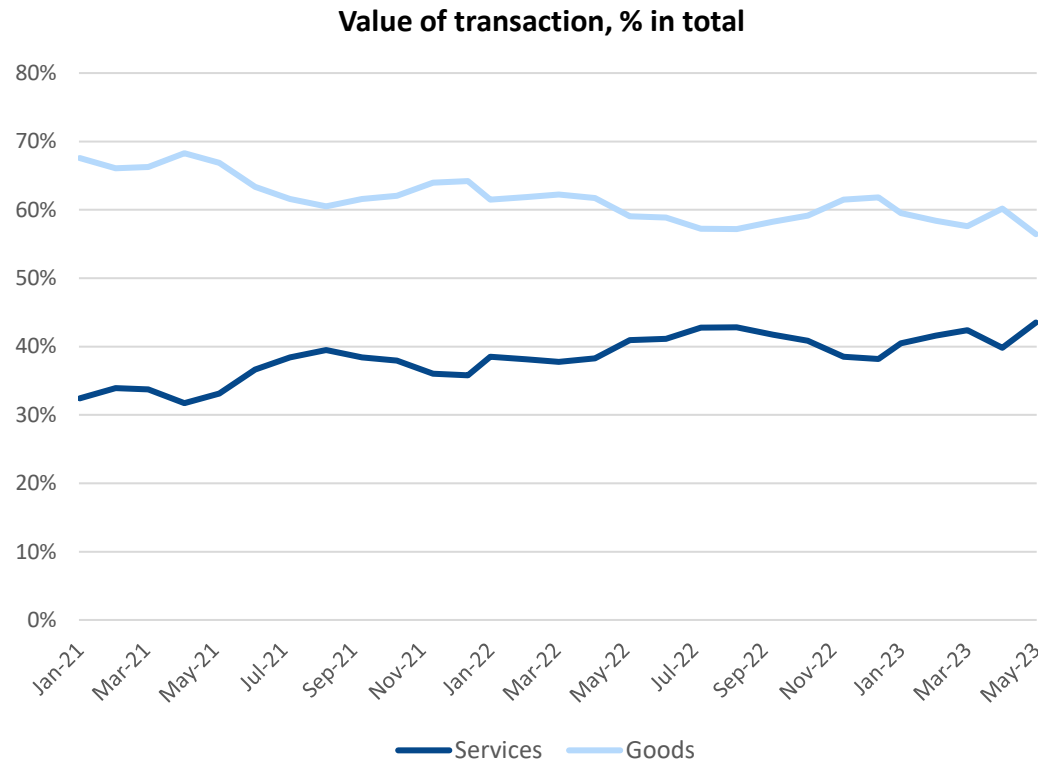
The average online transaction value is higher compared to the one with physical presence, which has been declining



Source: Mastercard, Data processing IOBE, Note: The calculation of 2023 includes the first five months of 2023

For online transactions, the average value increased to €32.4 in 2023 from €31.3 in 2021
For transactions with physical presence, there is a gradual decrease from €26.1 in 2021 to €24.7 in 2023

Services are gaining ground in card payments over time, even if goods continue to absorb the largest share...



Source: Mastercard, Data processing IOBE, **Note:** Retail includes clothing stores, department stores, discount stores, drug stores, electric appliance, food stores, gas stations, hardware, interior furnishings, sporting-toy stores, vehicles and other retail. The rest sectors are grouped as services.

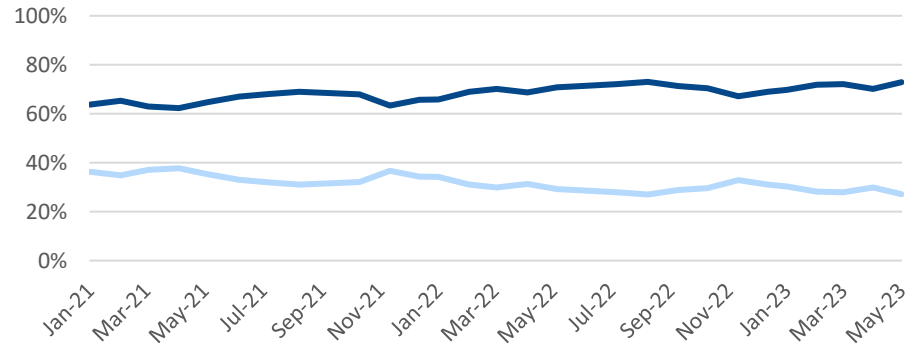
In 2023, almost 4 out of 10 card transactions concerned services, compared to a share less than 2 out of 10 in 2015. Nonetheless, the current share still compares low to the actual consumption share of services, which is estimated around 45% in 2023.

By channel, goods dominate in card transactions with physical presence, while services lead in online transactions

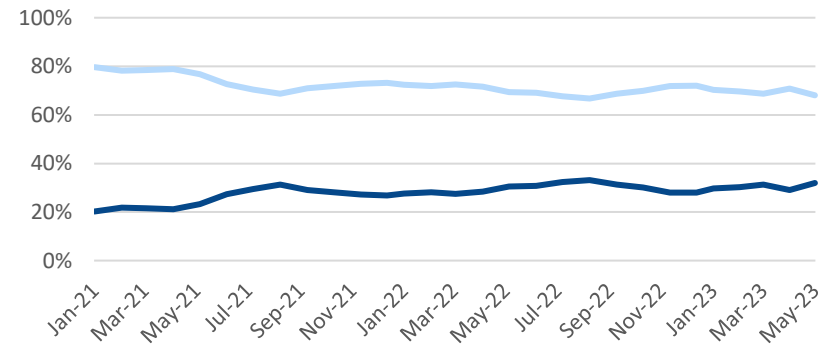
The share of online transactions for services dominates the respective for goods.

The share of transactions with physical presence for goods continues to dominate.

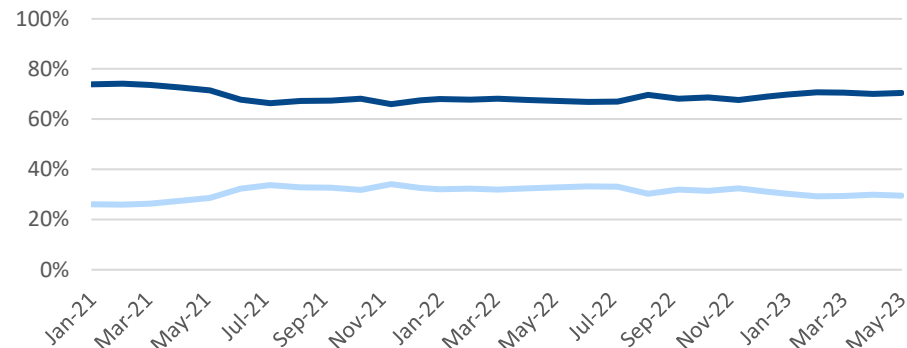
Value of online card transactions



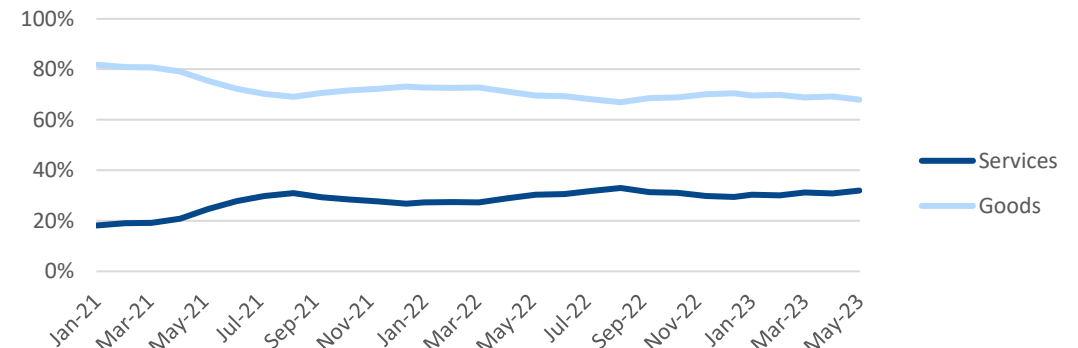
Value of card transactions with physical presence



Number of online card transactions



Number of card transactions with physical presence



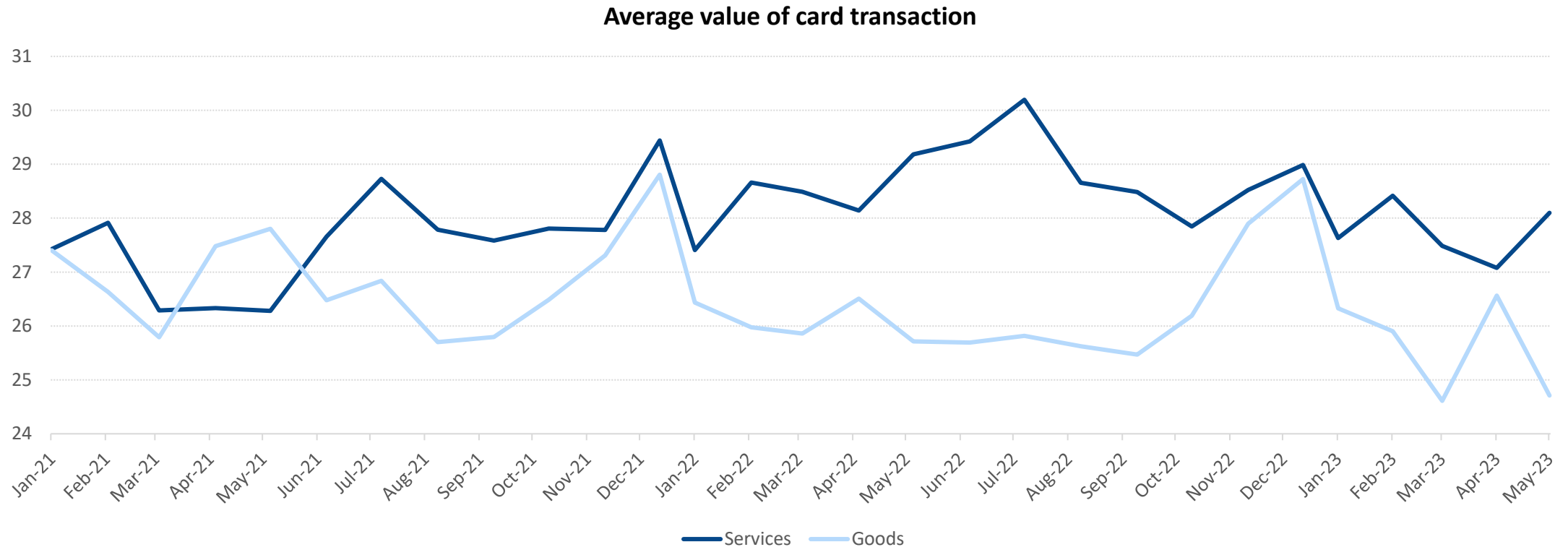
Source: Mastercard, Data processing IOBE

The ratio of services to goods among online transactions is now close to 7:3 both in value and number terms.

The ratio of services to goods among transactions with physical presence is close to 3:7 both in value and number terms.



The average value transaction is slightly higher for services compared to goods...

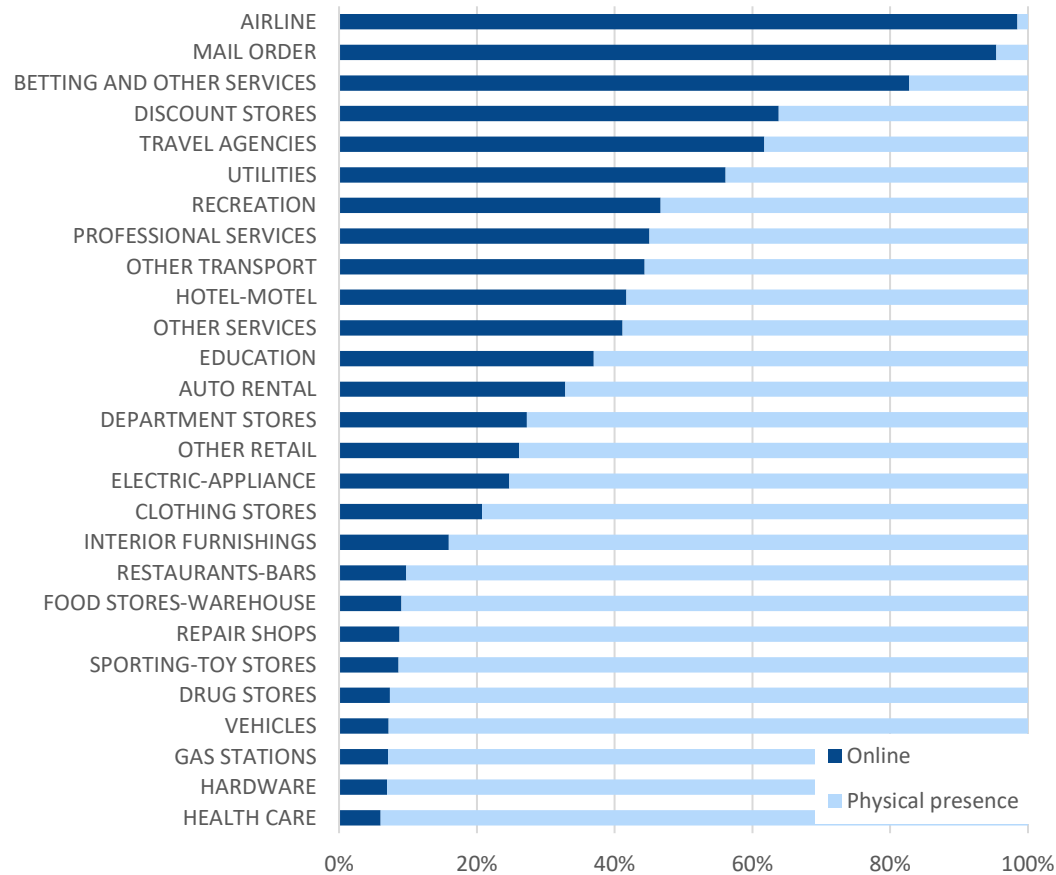


Source: Mastercard, Data processing IOBE

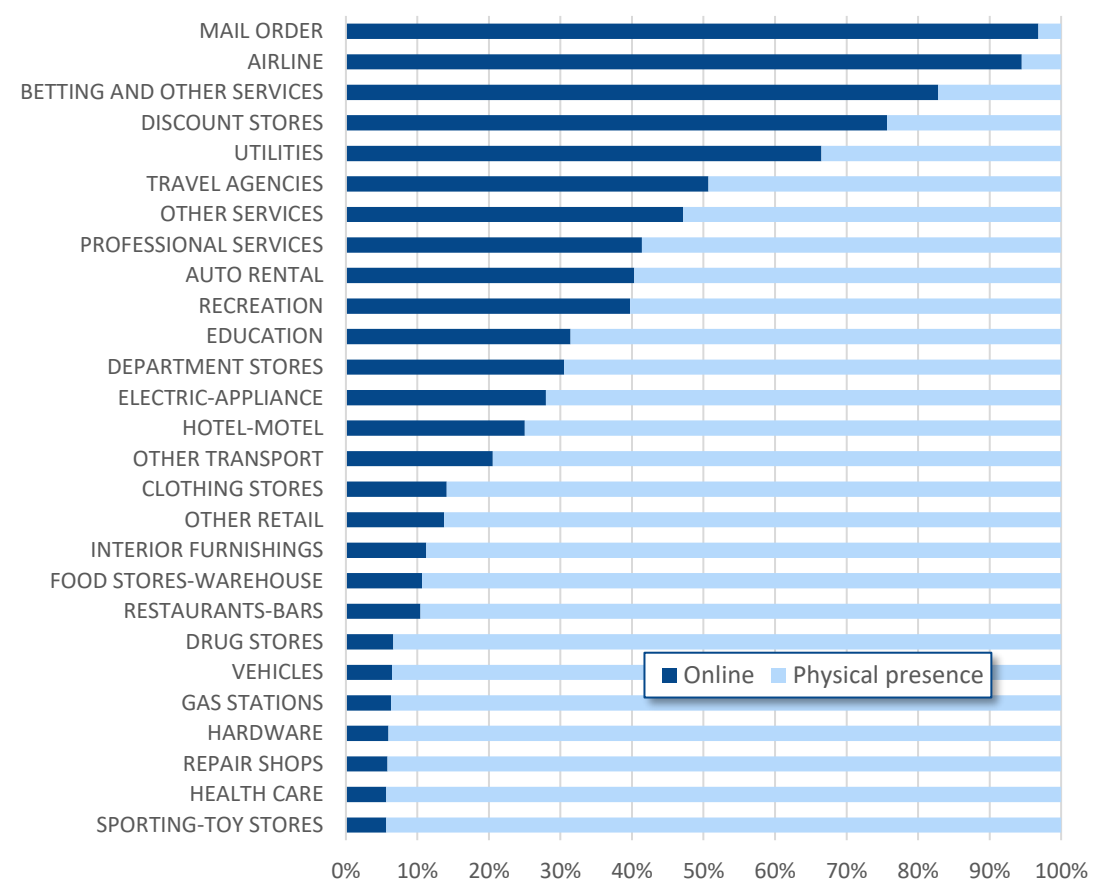
... with fluctuations over time. The average transaction value in May 2023 was €28 for services versus €25 for goods.

Mail services, airlines and betting services had the highest online share of card use in 2022

Value of transactions, share by channel within sectors, 2022



Number of transactions, share by channel within sectors, 2022

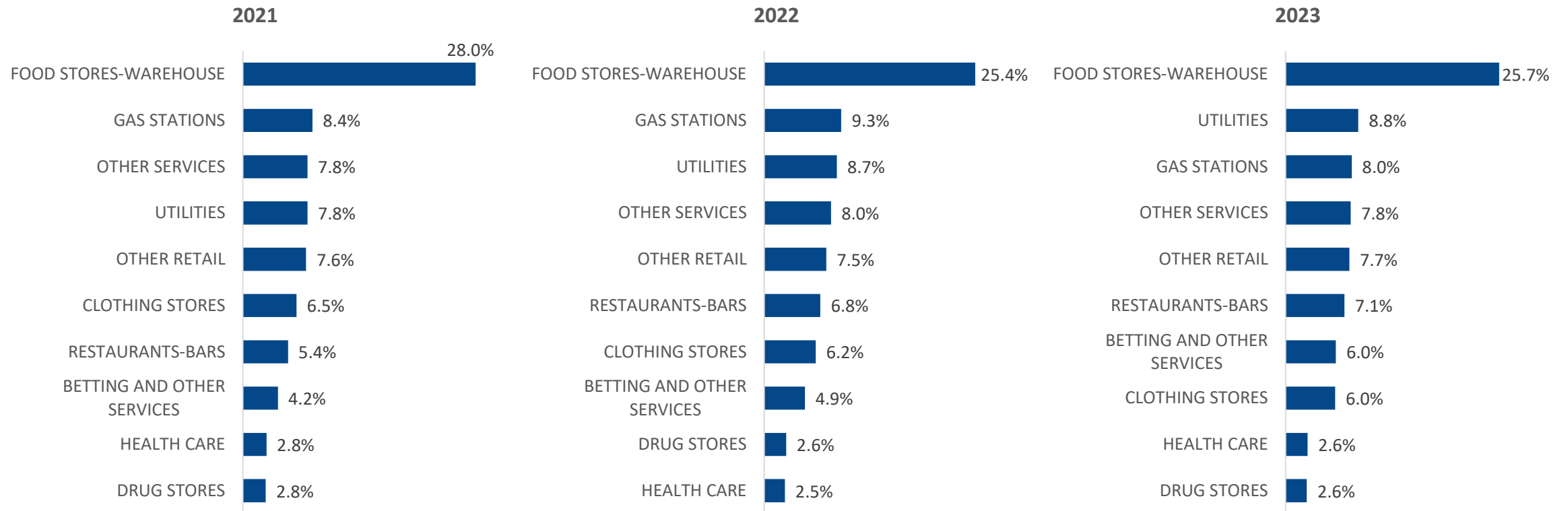


Source: Mastercard, Data processing IOBE



About ¼ of total card transactions value is spent on supermarkets and other food stores...

Top 10 card spending shares, by sector

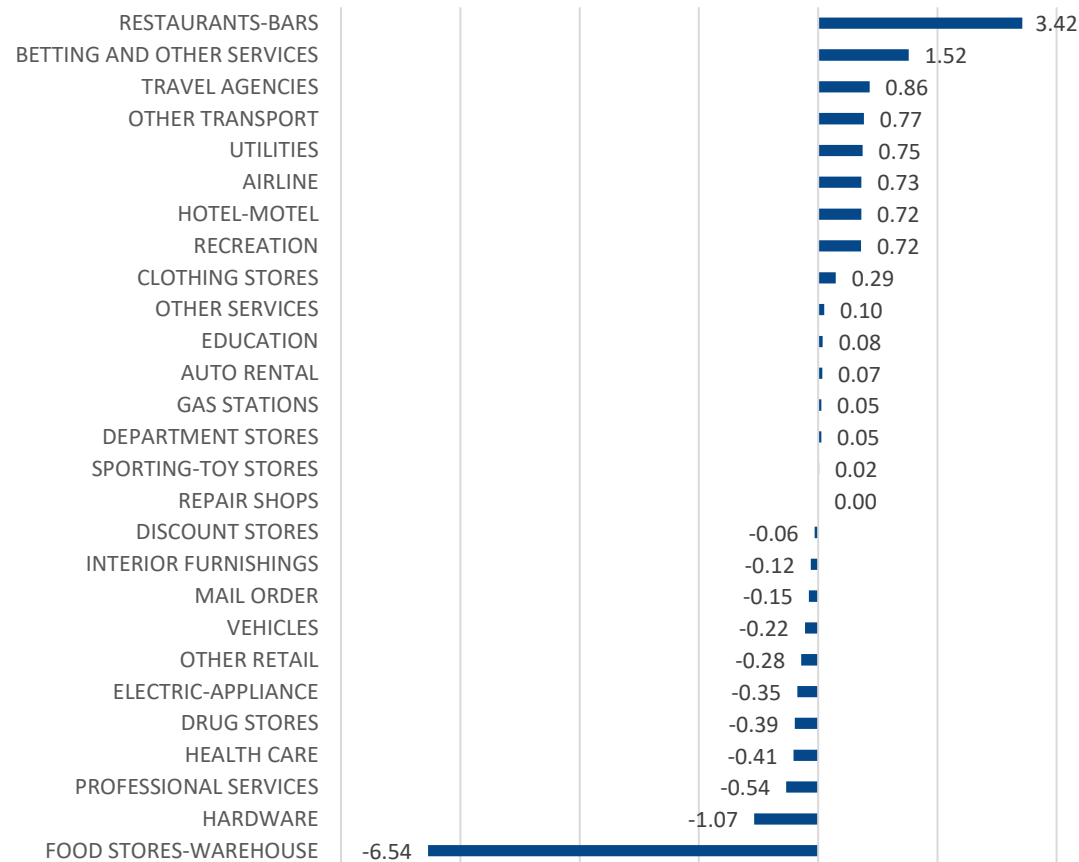


Source: Mastercard, Data processing IOBE, Note: The calculation of 2023 includes the first five months of 2023

...while gas stations and utilities account for another 15% of total card spending.

Since the pandemic, restaurants and betting services have significantly expanded their card spending shares

Change in card spending shares, by sector, 2021-2023



Restaurants and bars have the biggest increase of their market share in value of transactions, by 3.42 pp during 2021-2023

On the other hand, the market share of food stores has decreased by 6.54 pp

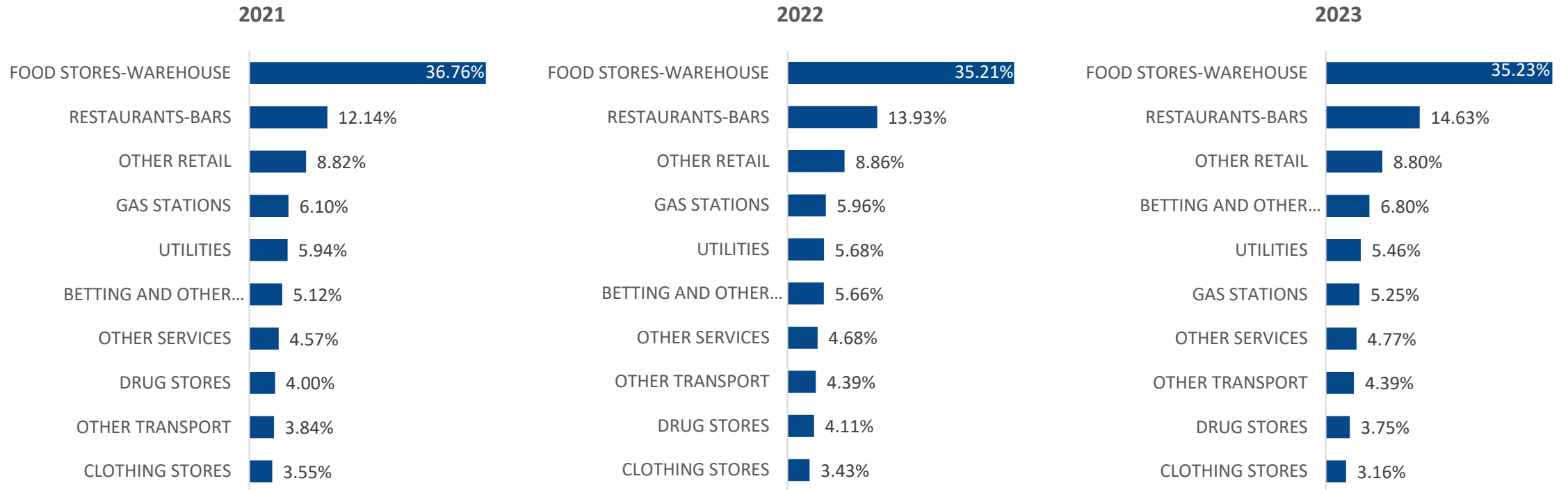
Sectors like gas stations, repair, department stores, sporting and toy stores remained almost stable (change less than 0.05 pp)

Source: Mastercard, Data processing IOBE, Note: The change in market share corresponds to the first 5 months of 2021 and 2023



In terms of transactions number, supermarkets and other food stores are once again the leading sector (35.2% in 2023)

Top 10 card transactions number share, by sector

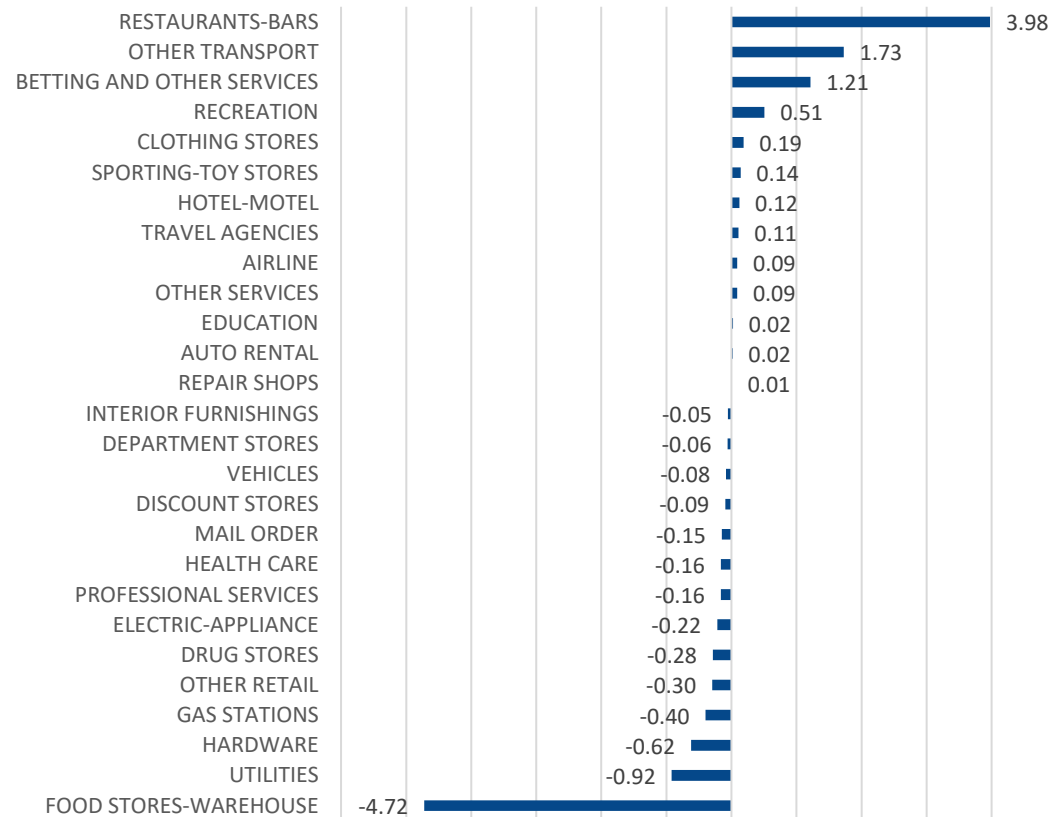


Source: Mastercard, Data processing IOBE, Note: The calculation of 2023 includes the first five months of 2023

Across recent years, restaurants and bars have the second largest card transactions number share, with an increasing trend (from 12.14% in 2021 to 14.63% in 2023).

After the pandemic, the frequency share of e-payments increased most in restaurants, transportation and betting services

Change in card transactions number share, by sector, 2021-2023



Restaurants and bars have the highest increase of their market share in number of transactions compared to all digital transactions by almost 4 pp in 2021-2023

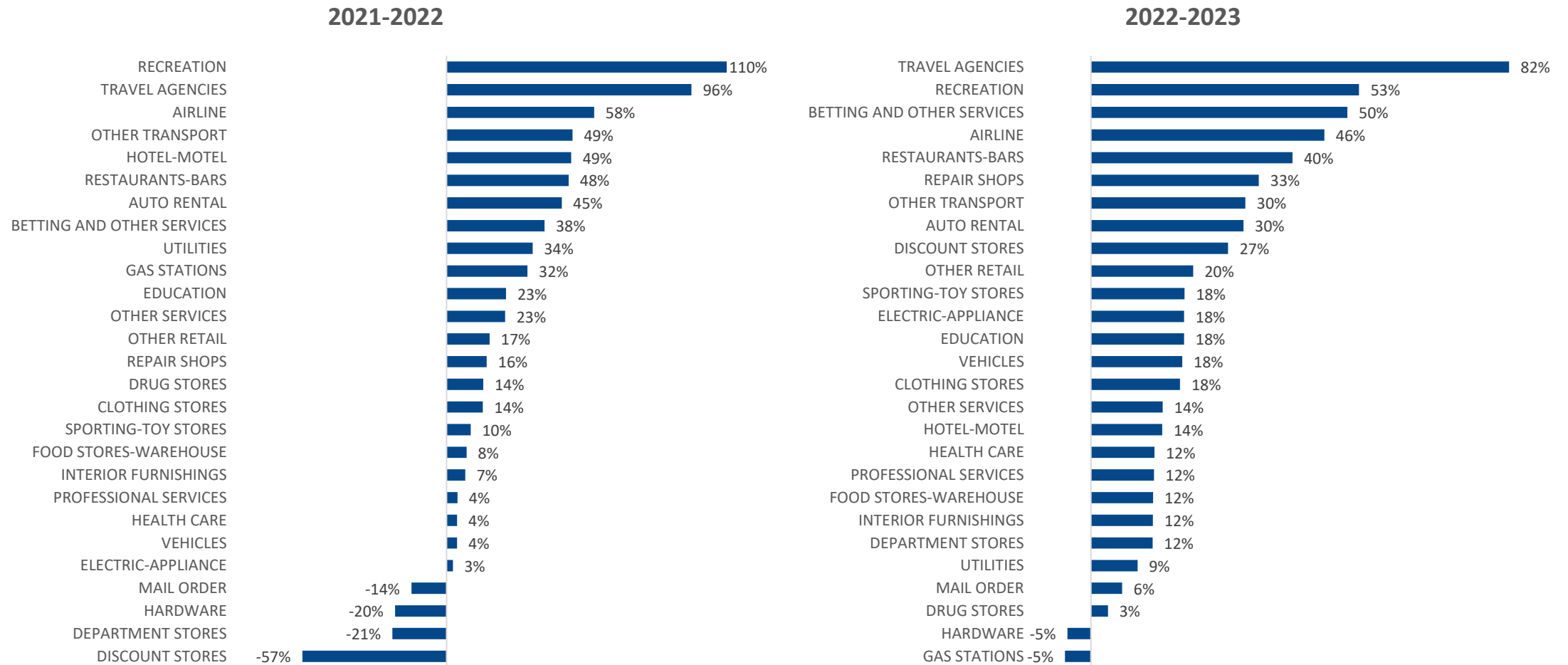
On the other hand, the market share of food stores decreased by 4.72 pp

The e-payment frequency in sectors like education, auto rental and repair shops remained almost stable (change less than 0.05 pp)



The annual growth rates of card spending are large across services, such as recreation, accommodation, catering and transportation

Value of transactions, YoY rates

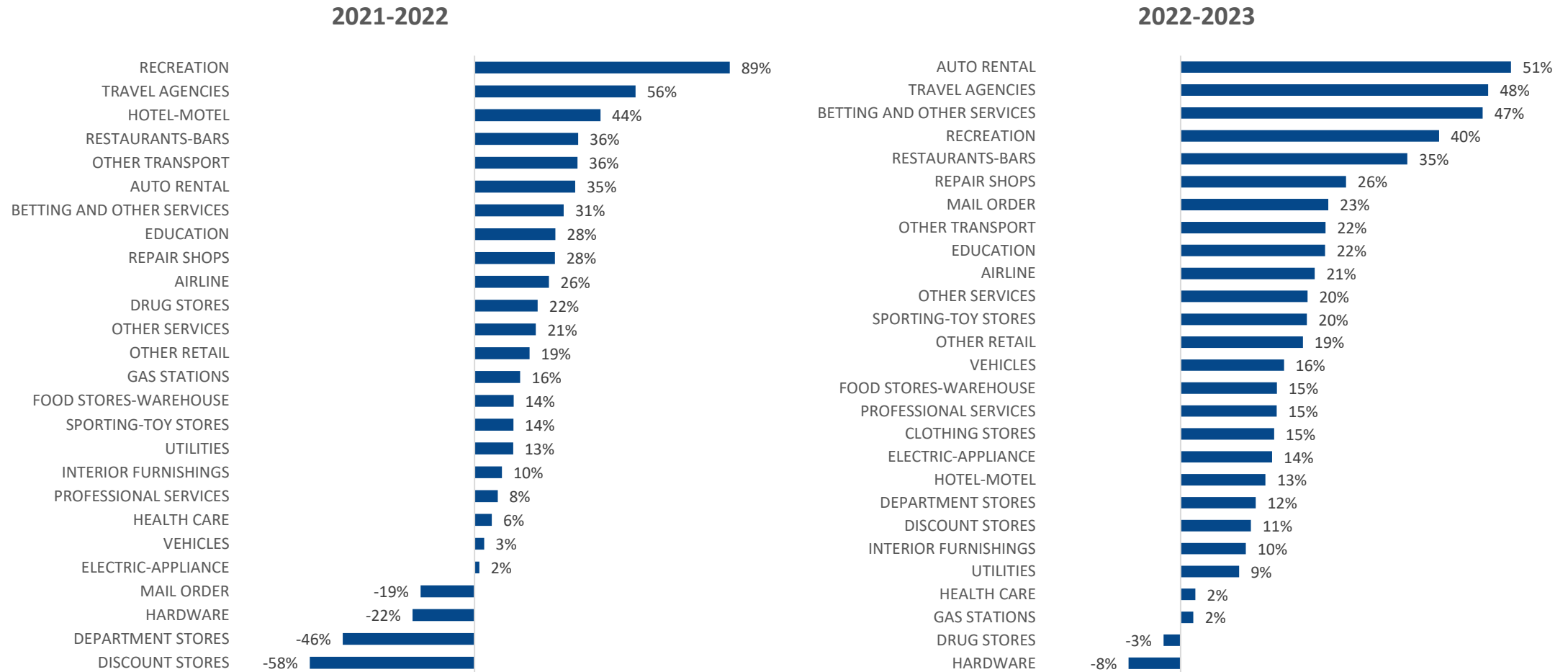


Source: Mastercard, Data processing IOBE, Note: The annual rate 2022-2023 is calculated for the first 5 months



...and a similar trend appears with respect to the number of transactions

Number of transactions, YoY rates

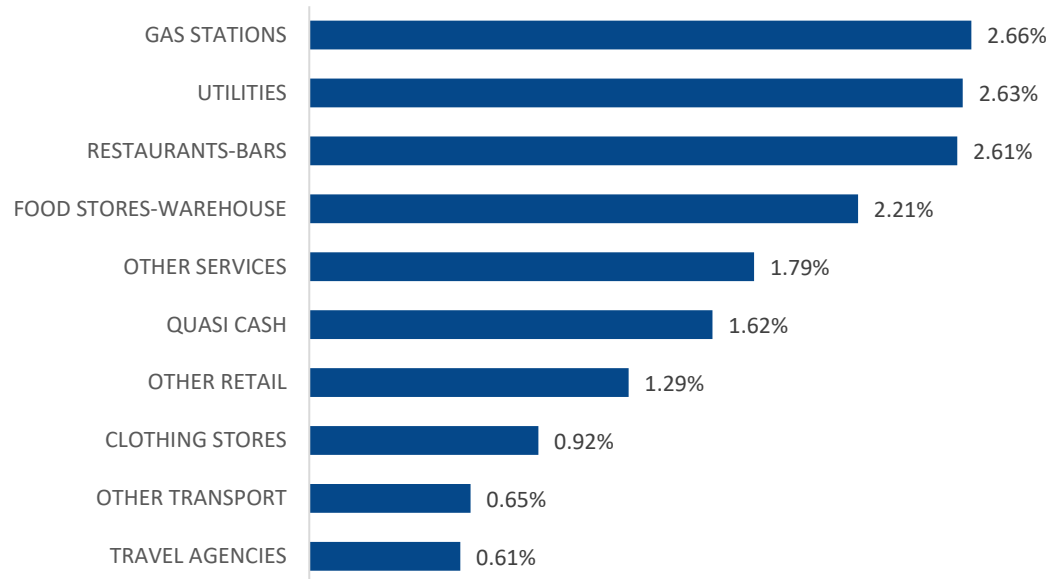


Source: Mastercard, Data processing IOBE, Note: The annual rate 2022-2023 is calculated for the first 5 months

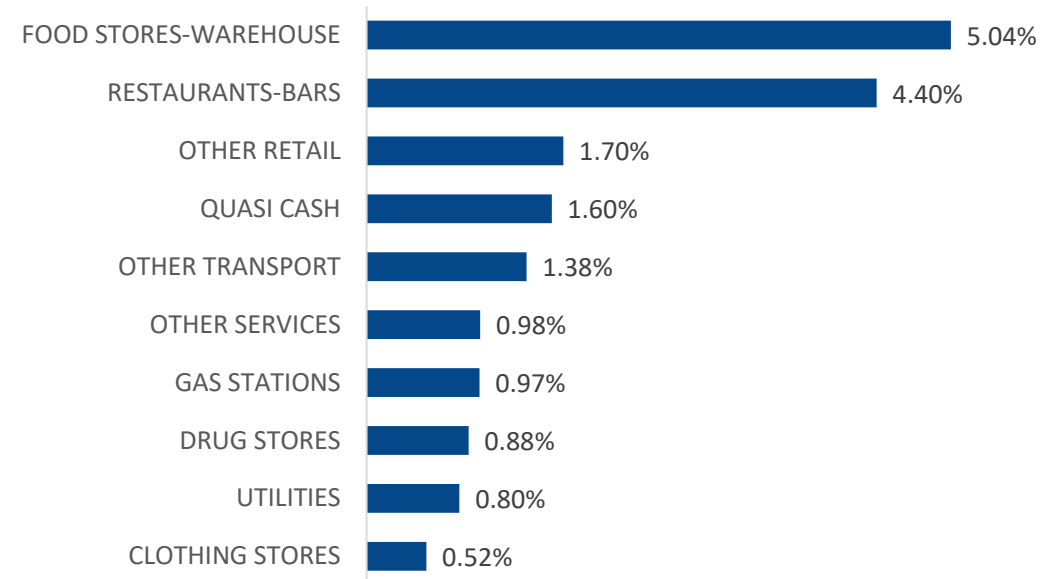


Food stores and catering services have a significant contribution to the increased number of transactions in 2022

Top 10 activities in contribution to the annual growth of the total value of transactions



Top 10 activities in contribution to the annual growth of the total number of transactions



Source: Mastercard. **Data processing:** IOBE. **Note:** Card transactions data refers to cards issued in each country/region.

- **The biggest contribution to the annual growth of value of transactions stems from Gas Stations (+2.7%), followed by Utilities (+2.6%), Restaurants and Bars (+2.6%) and Food Stores (+2.2%). This is partly due to the rise in energy inflation.**
- **With respect to the number of transactions, Food Stores (+5%) drive the trend, followed by Restaurants and Bars (+4.4%).**

In which sectors do card payments correlate more with total VAT revenues?

- Purpose of **factor analysis**

- Unveil common underlying factors affecting the value of card transactions of each MCC class
- Dimensionality reduction → addressing too few observations & multicollinearities in estimating the effect of each of multiple MCC classes on aggregate VAT revenues

- Caveats

- The impact of the pandemic on individual sectors appears to be an important driver of the results
- The construction of factors does not necessarily need to be unique

- Methodology

- We conducted factor analysis on 27 variables representing YoY changes in the value of card transactions across the 27 MCC classes
- The analysis revealed that four factors predominantly capture the variability among MCC classes
- Regressing the standardized growth of VAT revenues on these factors, we focus on the first three, as they demonstrate sufficient explanatory power, yielding an adj. R-squared of 74.6%

Step 1. Identify underlying factors affecting card use by sector

MCC class	Factor loadings			
	Factor 1	Factor 2	Factor 3	Factor 4
AIRLINE	0,95	0,01	-0,14	0,13
AUTO RENTAL	0,94	-0,18	-0,18	0,09
CLOTHING STORES	0,83	0,32	-0,27	-0,24
DEPARTMENT STORES	0,82	0,04	-0,08	0,24
DISCOUNT STORES	-0,50	0,77	-0,23	0,03
DRUG STORES	0,68	-0,34	0,17	-0,06
EDUCATION	0,60	0,03	0,51	0,41
ELECTRIC-APPLIANCE	0,46	0,82	0,06	-0,20
FOOD STORES-WAREHOUSE	-0,05	0,74	0,47	-0,33
GAS STATIONS	0,83	-0,30	0,26	-0,25
HARDWARE	0,41	0,85	-0,05	0,20
HEALTH CARE	0,46	0,54	0,07	0,55
HOTEL-MOTEL	0,90	-0,29	-0,30	0,04
INTERIOR FURNISHINGS	0,76	0,48	-0,13	-0,19
MAIL ORDER	-0,70	0,60	-0,02	0,18
OTHER RETAIL	0,28	0,81	0,26	-0,28
OTHER SERVICES	0,26	-0,21	0,83	0,09
OTHER TRANSPORT	0,97	-0,11	-0,08	-0,01
PROFESSIONAL SERVICES	0,08	0,81	0,55	-0,01
QUASI CASH	-0,68	0,40	-0,32	-0,19
RECREATION	0,95	-0,26	-0,07	0,05
REPAIR SHOPS	0,29	0,88	-0,15	0,10
RESTAURANTS-BARS	0,92	-0,02	-0,22	0,07
SPORTING-TOY STORES	0,76	0,43	-0,21	-0,30
TRAVEL AGENCIES	0,94	0,04	-0,18	-0,04
UTILITIES	0,71	-0,39	0,48	-0,22
VEHICLES	0,15	0,94	0,00	0,19

- Factor 1 seems to affect most MCC classes, particularly seasonal activities related to tourism
- Factor 2 seems to capture underlying trends related to domestic demand for goods
- Factor 3 seems to be related specifically with services activities
- Factor 4 seems to particularly impact service sectors that have been affected by the pandemic the most, such as Health Care, Education and Transportation

Source: IOBE factor model estimation on a sample of card payments during Jan 2021-May 2023.

Note: the above factor loadings reflect the estimated coefficients from the regression of the card value growth of each MCC class on the four factors.



Step 2. Highlight MCC classes where card use has strong association with VAT revenues

MCC class	Ranking
PROFESSIONAL SERVICES	1
GAS STATIONS	2
OTHER SERVICES	3
EDUCATION	4
HEALTH CARE	5
DRUG STORES	6
OTHER RETAIL	7
RESTAURANTS-BARS	8
SPORTING-TOY STORES	9
DISCOUNT STORES	10

- Using the estimated regression coefficients of the factor variables together with the factor weights, it is possible to construct the implied coefficients of the relevant MCC classes
- A ranking of the top 10 coefficients reveals a strong association of “Professional Services” with VAT revenues
- “Gas Stations” follow, which may relate to the impact of pandemic base effects from containment measures
- “Other Services”, “Education” and “Health Care” follow, filling the Top 5 ranks

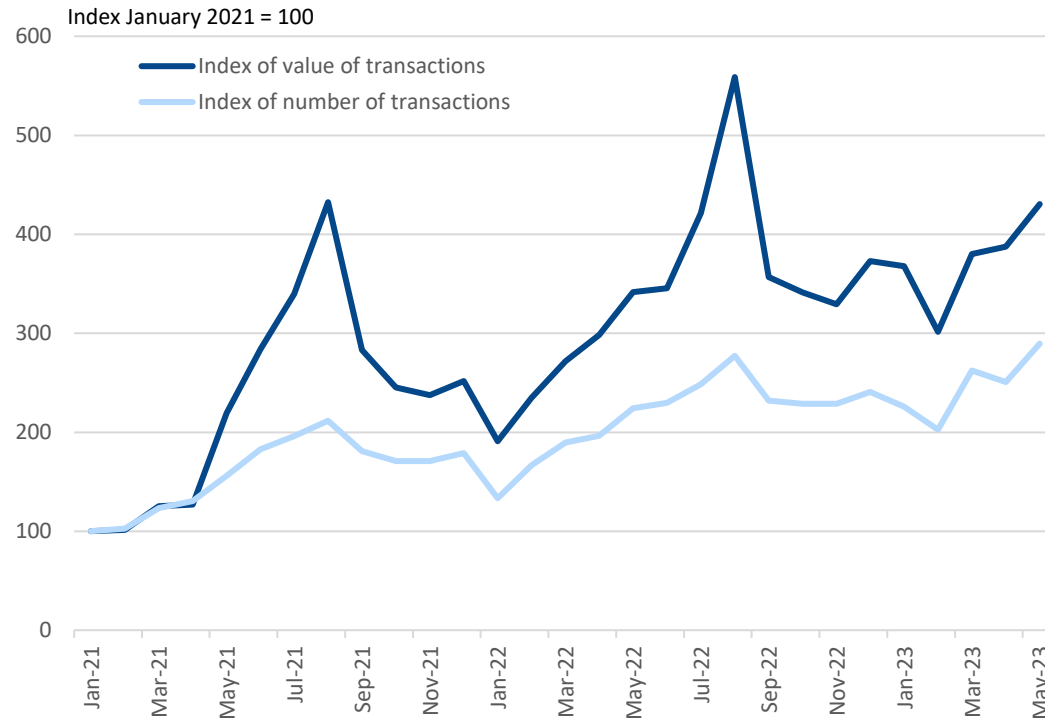
Source: IOBE factor model estimation on a sample of card payments during Jan.2021-May 2023.

Trends in digital transactions in selected industries

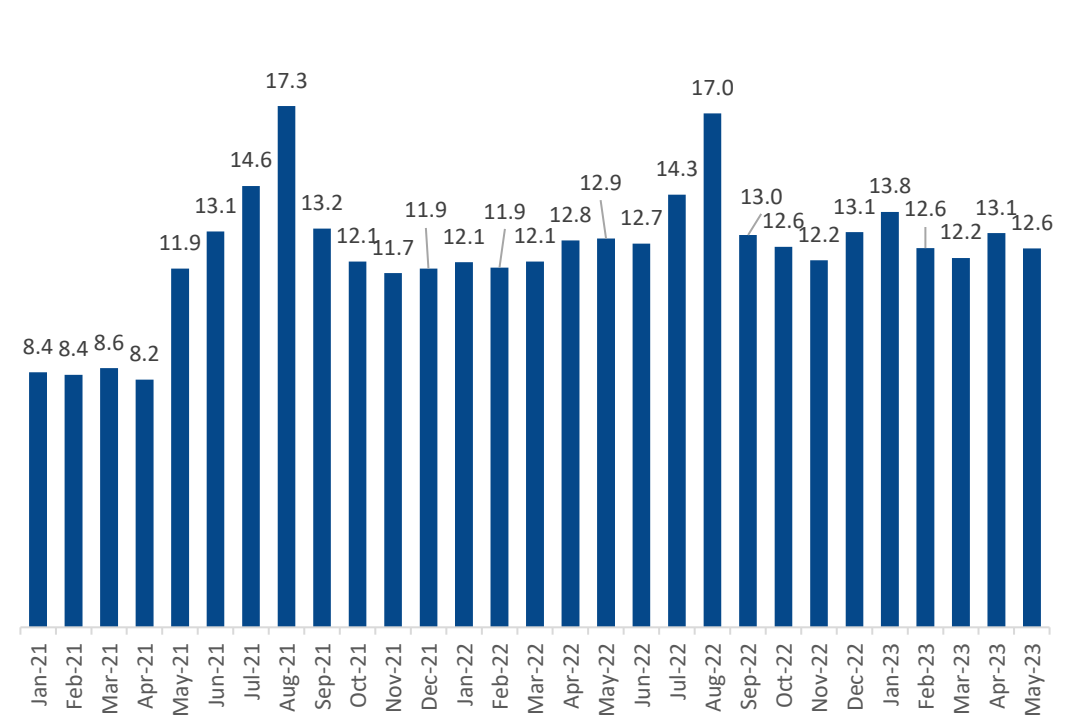


The number of online transactions for **Restaurants and Bars** is almost three times higher compared to 2021, when pandemic restrictions applied

Online card use for Restaurants & Bars



Average transaction value (in Euros)

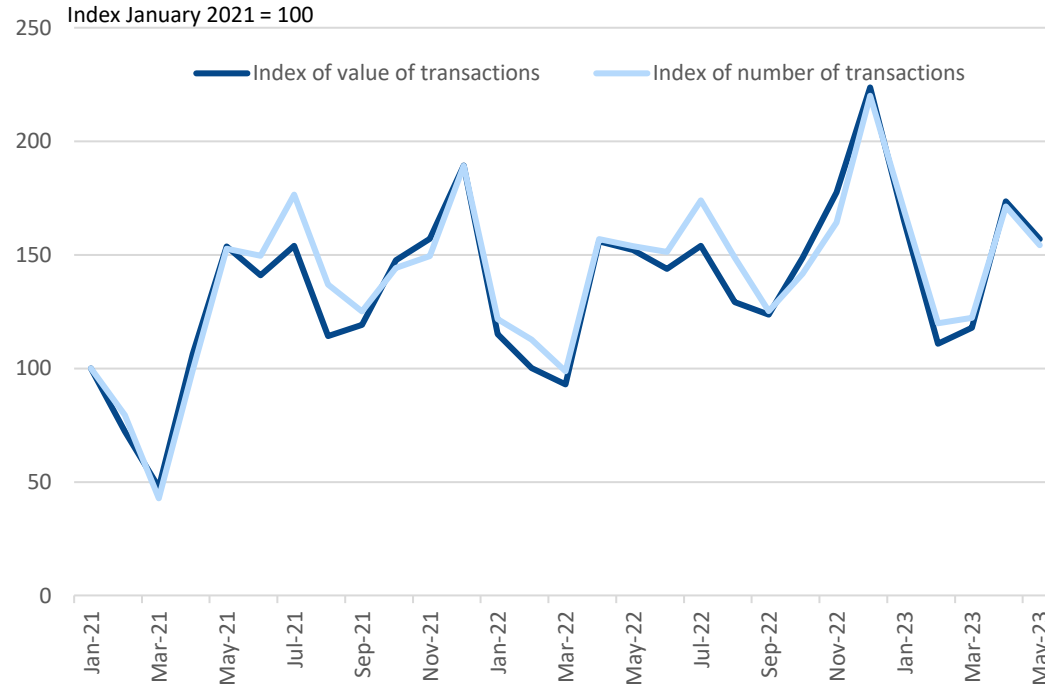


Source: Mastercard, Data processing IOBE

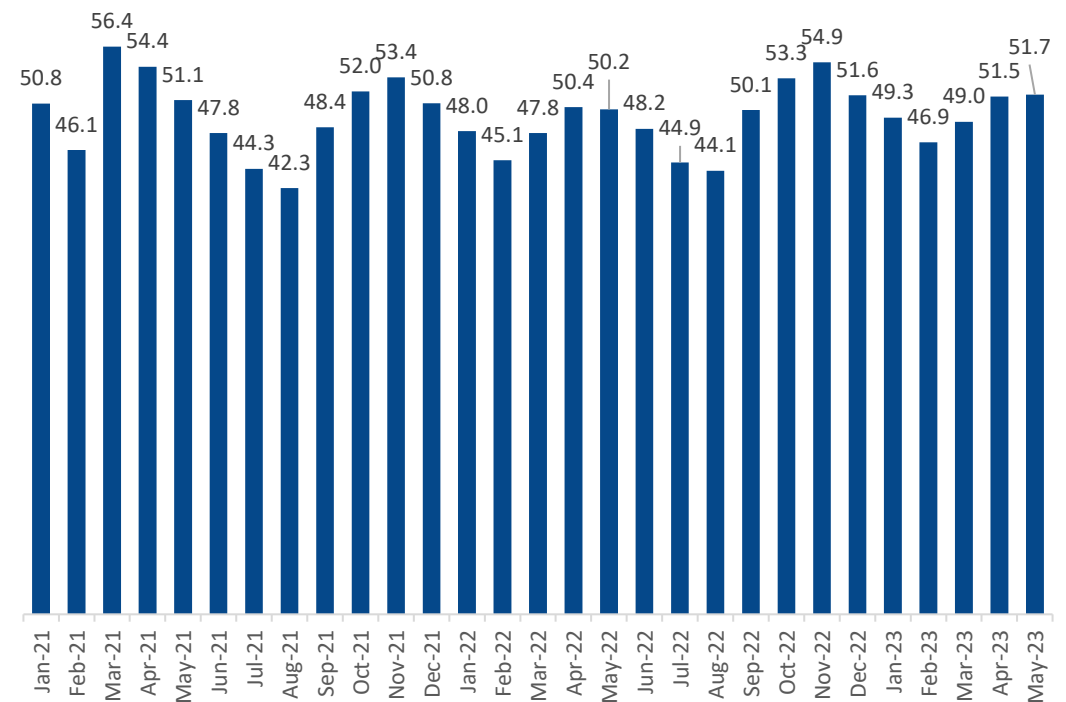
The average transaction value has stabilized around €13 during 2023, while records peaks close to €17 during the summer holidays every August.

Online transactions in **Clothing stores** have increased, with fluctuations due to seasonality

Online card use for Clothing stores



Average transaction value (in Euros)

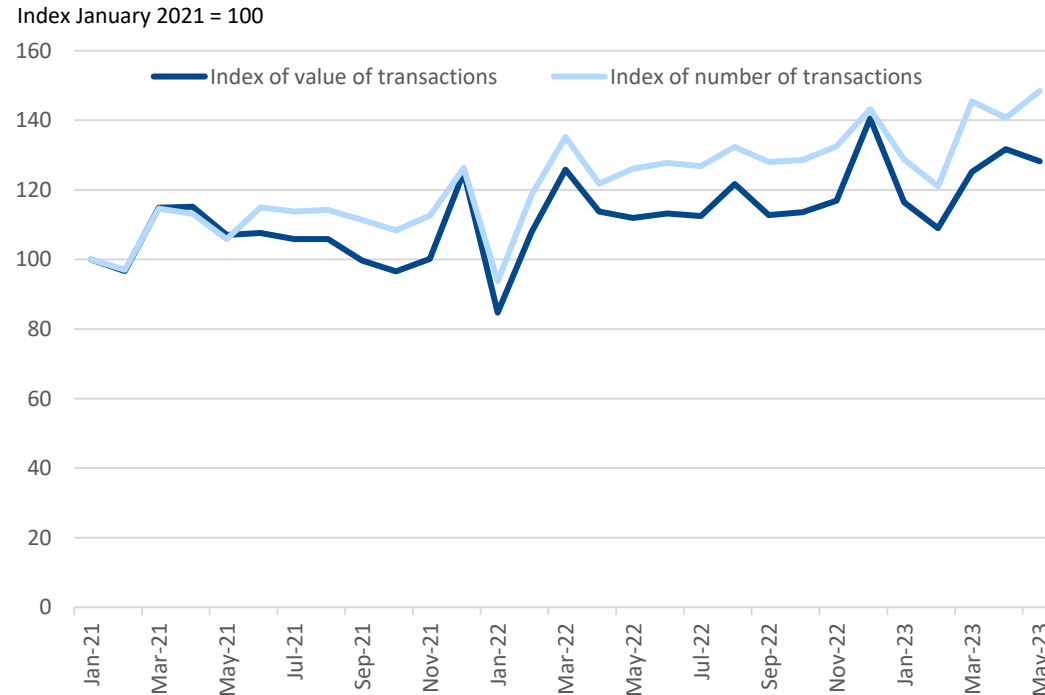


Source: Mastercard, Data processing IOBE

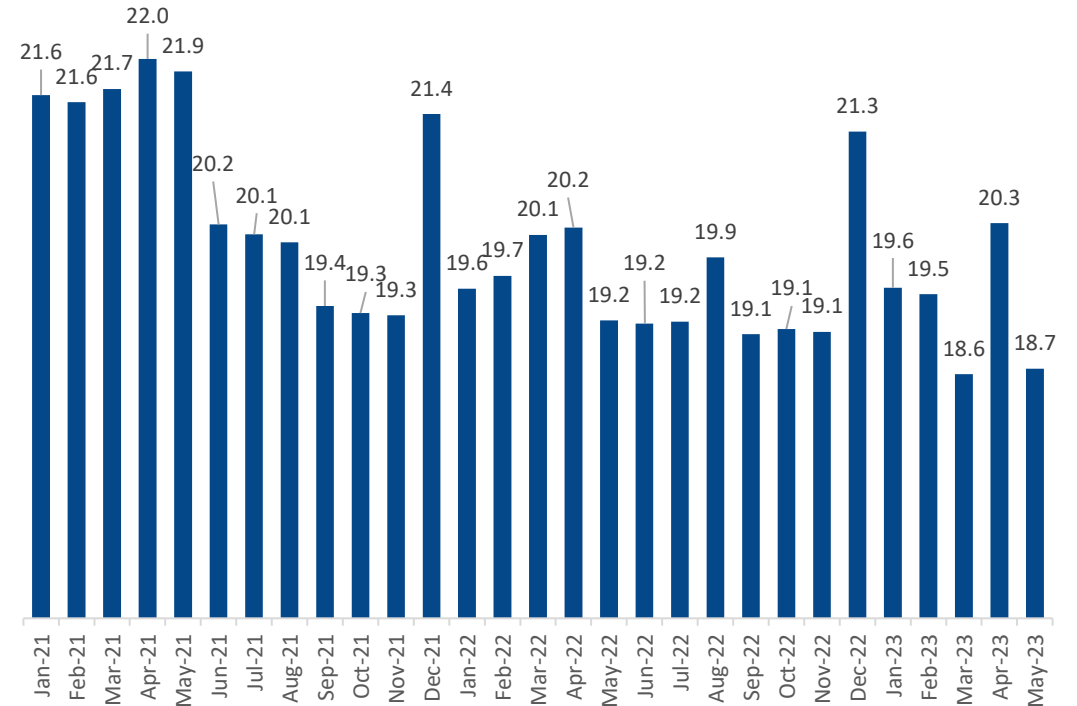
The average monthly transaction value oscillates between €46 and €52 during 2023

The increase in Food stores has been more moderate after the pandemic

Online card use for Food stores



Average transaction value (in Euros)

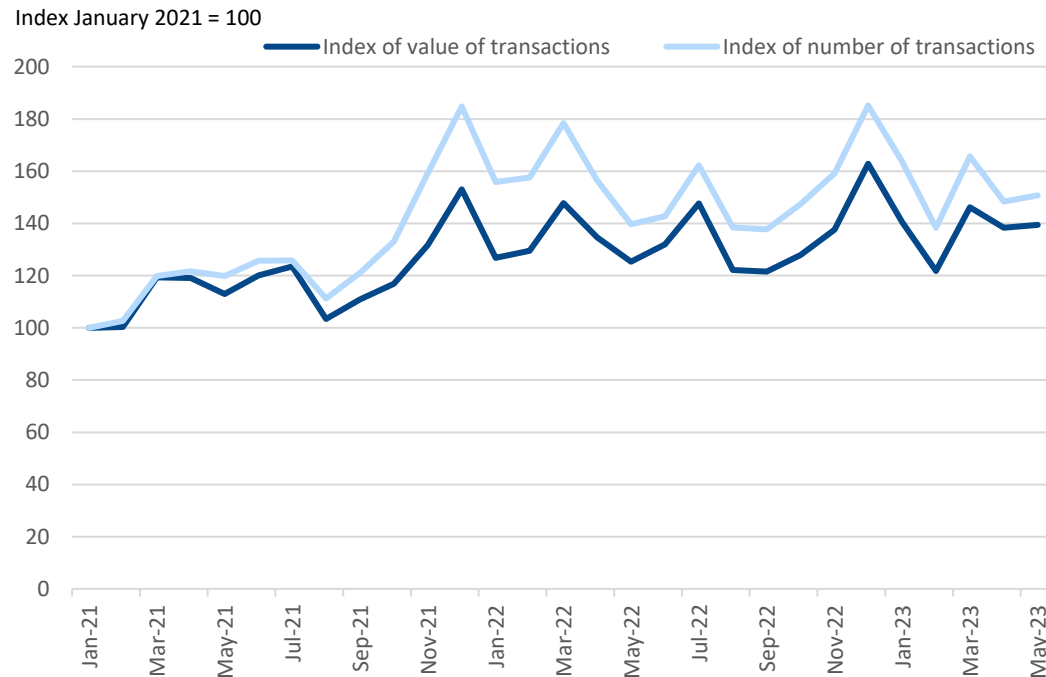


Source: Mastercard, Data processing IOBE

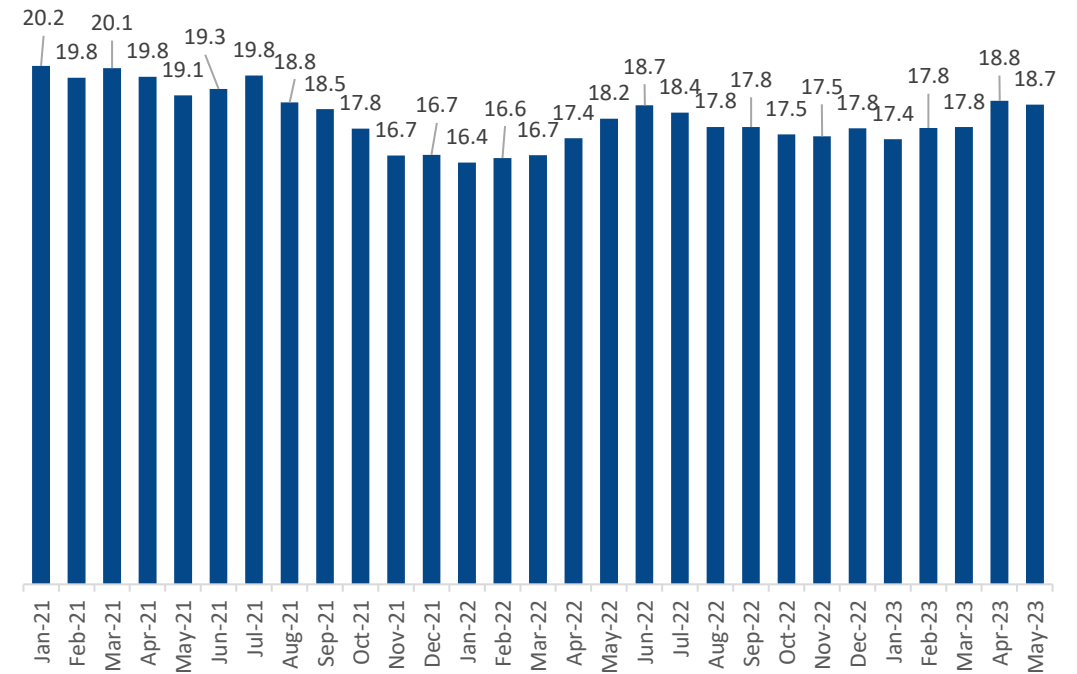
The average monthly transaction value has dropped after the pandemic, while seasonal peaks are observed during Christmas and Easter periods.

Likewise, the increase for online **Pharmacies** has been contained after the pandemic boost

Online card use for Pharmacies



Average transaction value (in Euros)

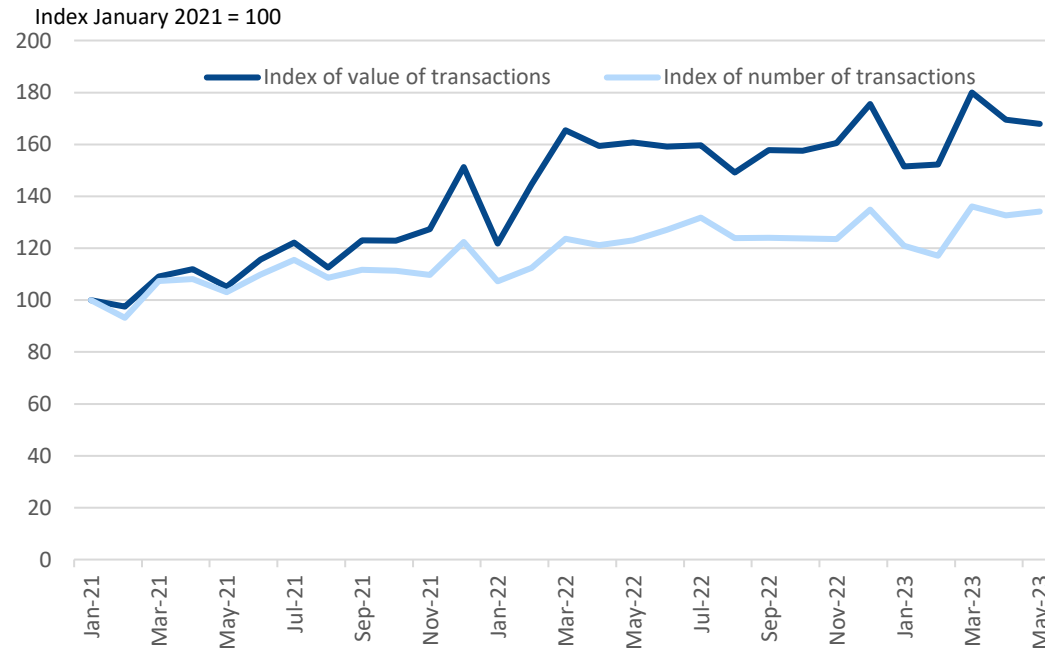


Source: Mastercard, Data processing IOBE

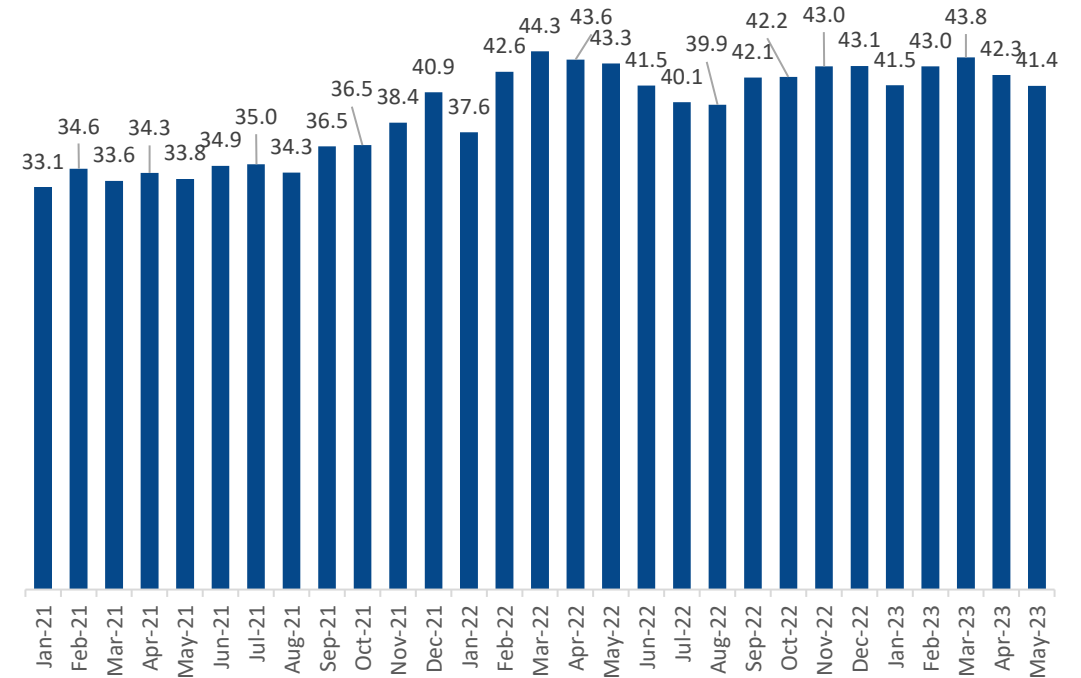
The average transaction value has stabilized close to €18 during 2023.

The card use for **Utilities** services has been increasing compared to 2021...

Online card use for Utility bills



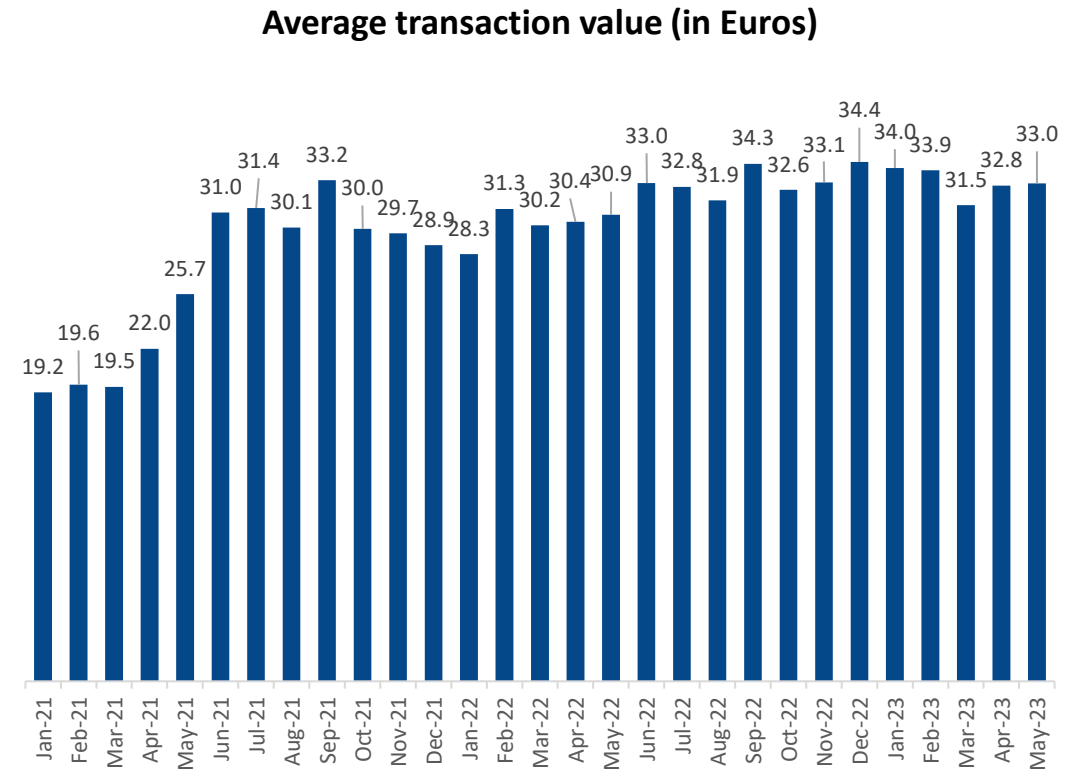
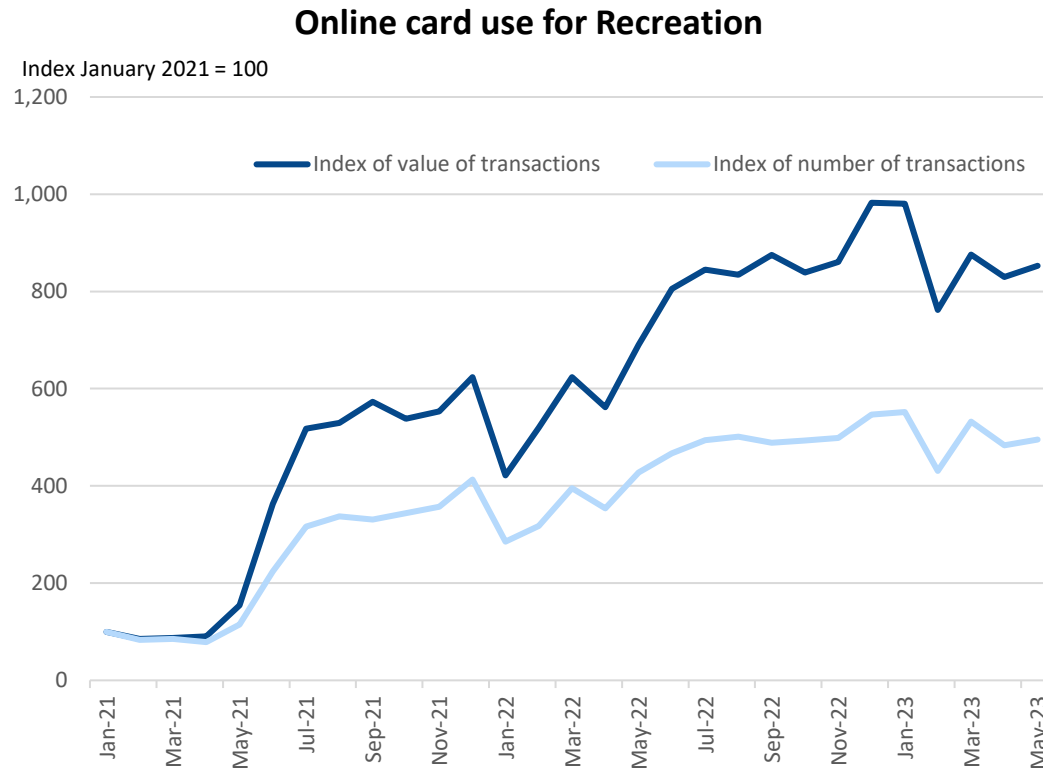
Average transaction value (in Euros)



Source: Mastercard, Data processing IOBE

... with higher average transaction values, also affected by energy inflation during 2022.

The card use for **Recreation** is now five and eight times higher compared to 2021, from a frequency and value angle, respectively...



Source: Mastercard, Data processing IOBE

...largely affected by containment measures against the pandemic which were in place in 2021. The average transaction value has increased by more than 50% since early 2021.

Contents

- Motivation and objective
- Card use by channel and sector
- **Impact on VAT revenues**
- Conclusions and recommendations

How does card use affect tax revenues in Greece after the pandemic?

Objective

- To estimate the impact of card use on tax revenues while controlling for macro trends and pandemic related shocks.

Methodology

- Time series regressions
- Use annual growth rates for stationarity
- Monthly frequency
- Use of appropriate controls
- Robustness checks

Variables and data

Dependent variable

- VAT revenues (growth rate)

Independent variables and controls

- Value of card transactions (growth rate)
- Nominal private consumption (growth rate)
- Arrivals of foreign tourists (growth rate)
- Covid is a **dummy variable**, taking value 1 only during the first year of COVID (March 2020-March 2021), alternatively 0
- Covid periods is a **categorical variable**, taking value 0 during Jan2015-Feb2020, 1 during March2020-March2021 and 2 during Apr2021-May2023

Data

- Monthly data from January 2015 to May 2023 for all cards (debit, credit, prepaid)
- Value of transactions (Mastercard)
- Digital transactions from January 2015 to December 2019 do not include online transactions and transactions with prepaid cards, however both market shares are very small. For that reason, we assume that total card transactions of this period are mainly driven by debit and credit card transactions with physical presence.
- VAT revenues (Ministry of Finance)
- Nominal private consumption (IOBE monthly estimation by Nominal private consumption in quarters-ELSTAT)
- Arrivals of foreign tourists at hotels and similar establishments, tourist campsites and short stay accommodation establishments (ELSTAT - Eurostat)

Card transactions continue to be associated with higher VAT revenues after controlling for macro and pandemic related factors

Variables	Dependent variable: VAT revenues		
	I	II	III
Value of transactions	0.134*** (0.038)		
Value of transactions # covid			
0		0.143*** (0.047)	
1		0.031 (0.025)	
Value of transactions # covid periods			
0			0.130** (0.052)
1			0.196 (0.297)
2			0.377* (0.223)
Private consumption	1.135*** (0.203)	1.183*** (0.252)	0.891** (0.406)
Arrivals of foreign tourists	0.005*** (0.001)	0.005*** (0.001)	0.005*** (0.002)
Constant term	0.002 (0.002)	-0.004 (0.025)	-0.001 (0.027)
R-squared	0.5061	0.5069	0.5174
Number of observations	101	101	101
Mean VIF	1.13	1.51	2.11

Model I: Positive and statistically significant association of value of transactions on VAT revenues (+**0.134** pp)

Model II: Positive and statistically significant relation of value of transactions on VAT revenues by excluding the first-year shock of COVID (+**0.143** pp)

Model III: Positive and statistically significant association of value of transactions on VAT revenues before pandemic (+**0.130** pp), positive but not statistically significant during the first year of COVID, indication for positive and higher contribution since April 2021 compared to before pandemic (statistically significant at 10%)

Control variables are statistically significant and have the expected signs

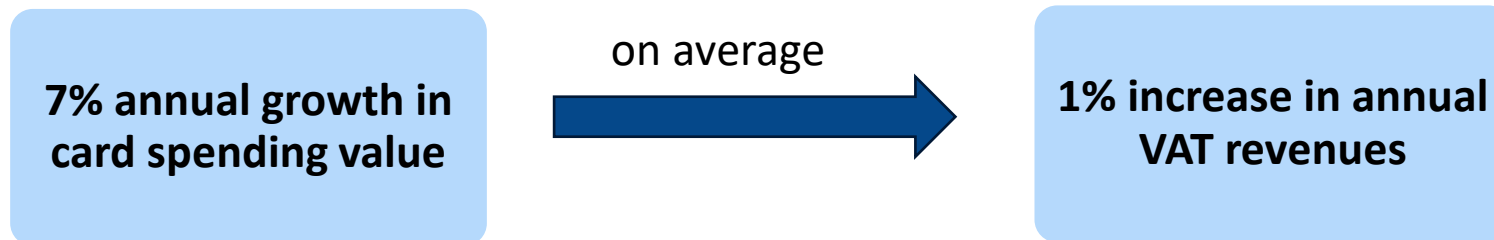
Low values of VIF (below 10) indicate that there is no multicollinearity in our model

Sources: Mastercard, Elstat, Eurostat, Estimations: IOBE

Note: (1) ***, ** and * denote levels of statistical significance 1%, 5% and 10% respectively. (2) The values in parenthesis are the robust standard errors.

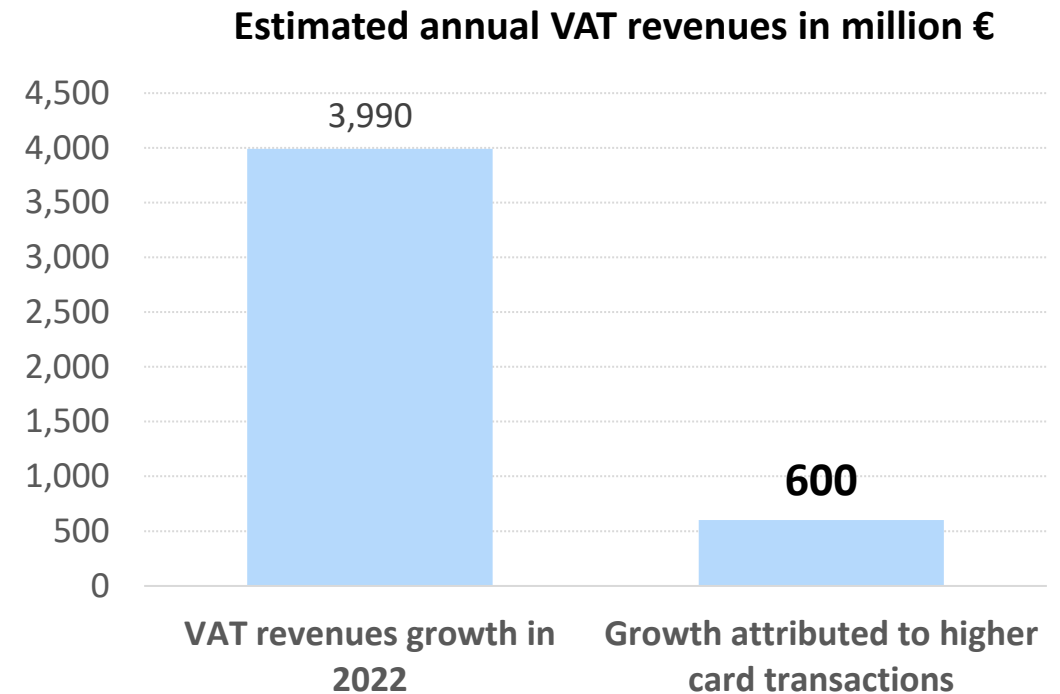
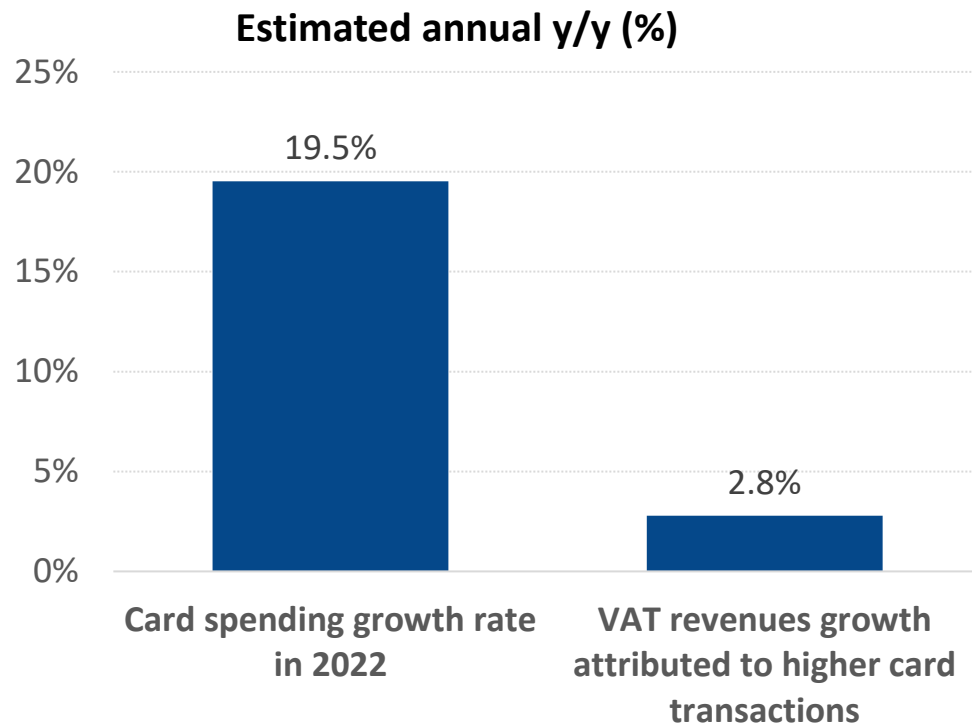
The positive relation between electronic payments and tax compliance has been documented to prevail after the pandemic period...

To what extent does the expansion of card use positively relate to tax revenue in the post-pandemic era?



... and occasionally strengthen. The relationship is heterogeneous across sectors.

In 2022 only, we estimate that €600 million additional VAT revenues were collected by the Greek state, associated with the expansion of card payments



Source: IOBE estimation

€10 of new card spending in 2022 is associated on average with €0.67 previously undeclared VAT revenues. The total impact on tax revenues is significantly larger, if one includes the positive effect on income tax revenues due to the broadening of the tax base.

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Main conclusions (1)

Digital payments have been systematically expanding in Greece during and after the pandemic era.

- The pandemic shock boosted **online payments**, seemingly in a permanent manner above their pre-crisis era.
- The **share of online over face-to-face transactions** has risen from less than 1:5 to around 1:3 after the pandemic
- Consumers continue to expand their use of plastic money for **smaller value** face-to-face transactions.
- The value of domestic payments through Greek cards exceeded the respective total **cash withdrawals** for the first time in 2022
- Higher use of card payments is correlated with smaller **VAT gap** across the EU and within Greece across time.
- The use of card payments in Greece has converged to EA average, albeit there is **potential for further targeted expansion**, especially among services sectors.

Main conclusions (2)

Card payments have grown at different pace across sectors during and after the pandemic era.

- The recent expansion of card payments has been stronger in **services compared to goods**, hence narrowing the mix gap of digital use. Almost 40% of digital use now relates to services compared to less than 20% in 2015.
- Goods dominate in card transactions with **physical presence**, while services lead in **online** transactions.
- Since the pandemic, **restaurants and betting services** have significantly expanded their card spending shares. Still, around 40% of card payments value is spent in **supermarkets, gas stations and utility** bills.
- Card payments for **Professional services, education, health care, restaurants/bars and other services** are strongly associated with total VAT revenues.

The relationship of card payments with VAT revenues has been strongly positive after the pandemic era.

- The **annual positive** relation of card payments' expansion with VAT revenues is estimated at around **€600 million**
- Every €10 of new card spending in 2022 is associated on average with €0.67 of previously uncollected VAT revenues due to undeclared transactions.

Policy recommendations in four main axes

Axis 1: Positive tax incentives (demand side)

- Introduce cashback, with higher transparency and direct implementation, at a pilot target base
- Expand scope/ recalibrate measures of Law 4876/2021 to transactions with risk for tax evasion

Axis 2: Positive tax incentives (supply side)

- Introduce targeted cash discounts for entrepreneurs and self-employed
- Link self-employed deductible expenditures with use of digital payments

Axis 3: Lottery rebranding

- Introduce lottery for targeted categories of self-employed
- Increase the publicity of existing lottery, recalibrate its parameters to make it more targeted and effective

Axis 4: Regulation

- Enforce the compulsory acceptance of digital means of payment by all service/goods providers, for both B2C and B2B transactions
- Offer public benefits through digital means of payment

Further expansion of digital payments in Greece can significantly enhance public revenues, with broader positive impact on economic and social welfare.



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