



ΙΔΡΥΜΑ ΟΙΚΟΝΟΜΙΚΩΝ & ΒΙΟΜΗΧΑΝΙΚΩΝ ΕΡΕΥΝΩΝ  
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## **Digital payments in Greece: Policies and impact on card use, 2015-2020**

Athens, March 2021

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2. Background
3. Descriptive trends
4. Geographical distribution of card transactions
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6. Impact of 2019 measures on card use
7. Impact of card use on VAT revenues
8. Policy measures
9. Conclusions

## Study objectives

1. Monitor digital payments trends 2015-2020

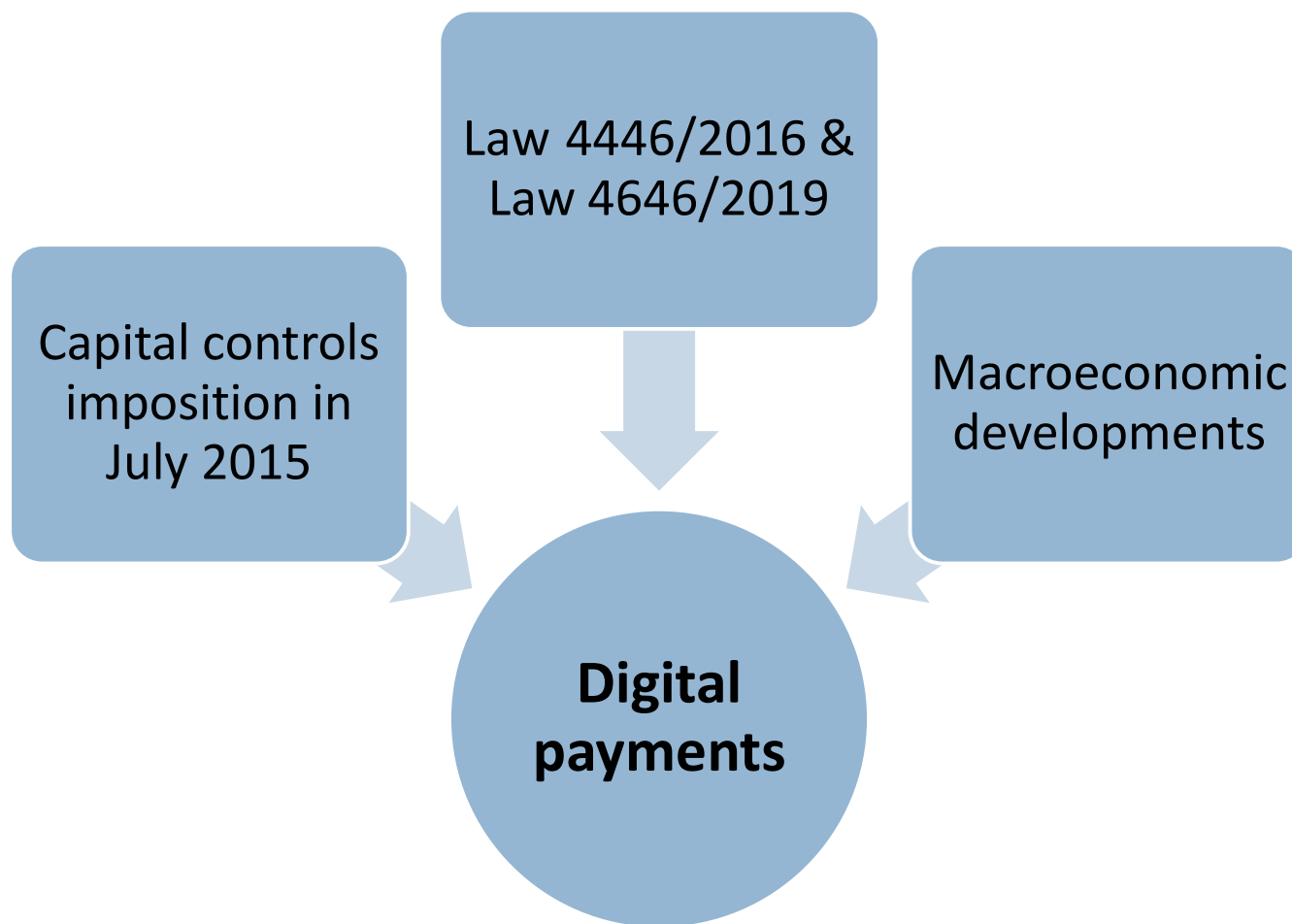
2. Highlight the effect of policy measures on cards use

3. Estimate the effect of cards penetration on tax revenues

4. Propose further measures to enhance digital payments

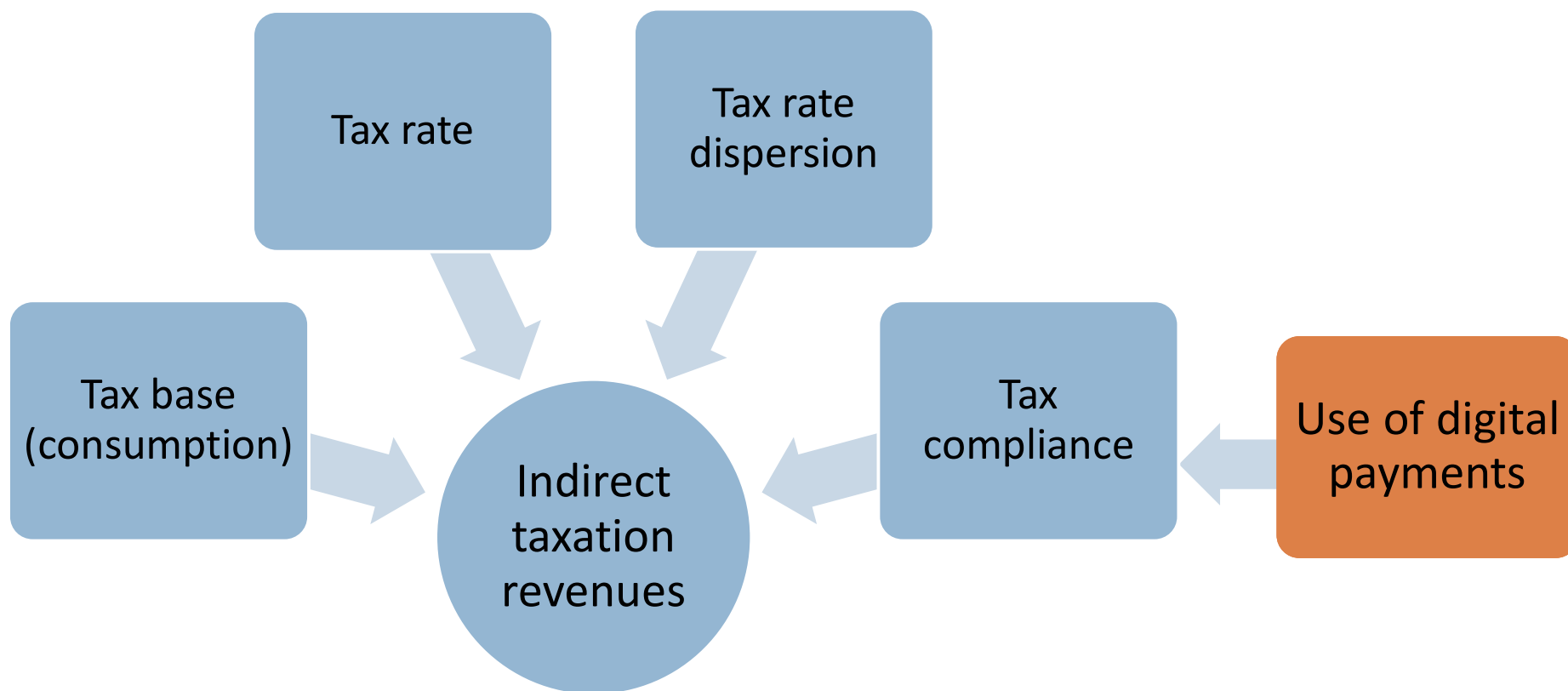
# Motivation

The imposition of capital controls, other policy measures and macro developments all affect the use of digital payments



What was the impact of policy measures on card use, after controlling for capital controls & changes in macroeconomic factors?

# The use of **Digital Means of Payments (DMP)** affects tax revenues through improved tax compliance



What was the impact of DMP use on VAT revenues, after controlling for changes in tax policy and other macroeconomic factors?

# Background

# Law 4446/2016 introduced measures to maintain the momentum of digital payments' growth after the capital controls



## Measures on the supply side (professionals)

### Obligation to accept DMP in consumer transactions

- Gradual implementation in all occupations within three years (i.e. until the end of 2019)
- 85 sectors and professions joined compulsory acceptance by the end of July 2017 (e.g. some retail stores, health shops, car rentals, pharmacies, lawyers, doctors, architects, etc.)
- A further 58 sectors are required to accept card payments from 11/3/2018 (construction, additional retail shops, transport, real estate agencies, sports facilities, repairs, dry cleaners and other services)
- Compulsory acceptance concerns four-party payment card schemes (such as VISA, Mastercard, Maestro, Union Pay)
- Obligation to inform consumers about the acceptance of cards, with fines levied in case of non-compliance

### Other measures

- Obligation to disclose invoice data by payment service providers
- Database with accounting records - data
- System of bank and payment account registries
- Mandatory payment of invoices worth more than €500 (from €1500 previously) with DMP
- Deductible business expenses in the context of an employment relationship are recognized only if they are incurred with DMP

## Measures on the demand side (consumers)

### Income tax penalty for “insufficient” digital payments

- Taxpayers are required to make expenditures with DMP
- The minimum amount is determined as a percentage of taxable income
  - Income €1-€10.000: 10%
  - Income €10.000-€30.000: 15%
  - Income €30.000 and above: 20% and up to 30.000 Euro
- If the minimum amount required is not covered, a tax penalty of 22% shall be applied on the gap between actual and required use
- Implementation from fiscal year 2017

### Eligibility of medical expenses for tax deduction only in case of payment by DMP (temporary measure)

### Public Lottery Program (Lottery)

- Total annual amount of money distributed: €12 million

The required amount of expenditure by DMP for each tax year was raised at 30% of taxable income, capped at €20,000 of expenditure.

- If the minimum amount required is not covered, a tax penalty of 22% shall be applied on the gap between actual and required use.
- Implementation from fiscal year 2020

### Taxable income base

- The taxable base on which the 30% required amount of expenditure by electronic means of payment is calculated includes: real income from salaries, pensions, business activity and real estate.
- If a household's expenditure for personal income tax payments, ENFIA, debt obligations to financial institutions and rents exceeds 60% of their real income, then the required percentage of expenditure shall be limited to 20%.

...yet it lacked emphasis on positive incentives or additional measures aiming the targeted use of digital payments in specific sectors.



## IOBE (2018) findings on the 2015-2017 period



The imposition of capital controls and law 4446/2016 both provided significant boost to DMP use in Greece

The impact of law 4446/2016 on DMP use was positive, with heterogeneous intensity across sectors

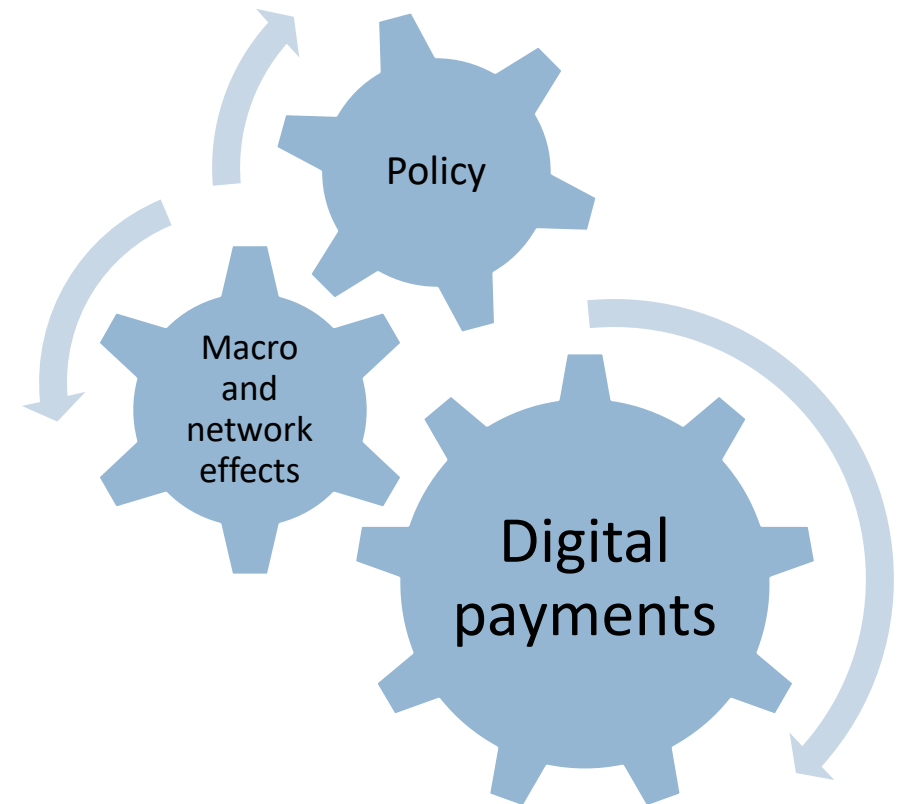
The level of cards use converged to EU28 average at the fastest pace in 2017, however it remained relatively low and heterogeneous across sectors and regions

There is positive and statistically significant impact of cards use on tax revenues

There was a positive effect of law 4446/2016 on VAT revenues, potential for further fiscal gain from greater use of DMP

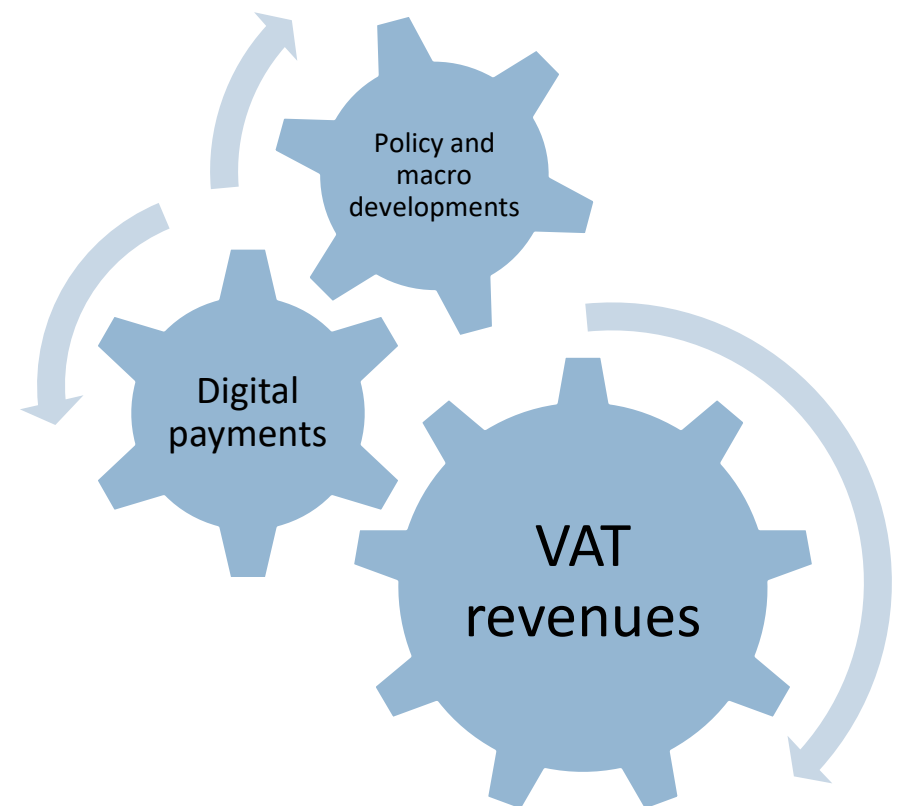
**Question:** Did the measures legislated in 2019 (Law 4646) to promote digital payments have an impact on the number and value of card transactions in early 2020, after controlling for the effects of macroeconomic factors and capital controls?

**Approach:** Check for empirical evidence up until the outbreak of the pandemic crisis and the implementation of lockdown measures, i.e. until February 2020.



**Question:** How did the increase of card transactions between 2015 and 2020 affect VAT tax revenues, after controlling for tax rate changes, the Covid-19 shock, and other macroeconomic factors?

**Approach:** Check for the IOBE (2018) findings' robustness after 2017 and highlight forward-looking policy implications and opportunities.

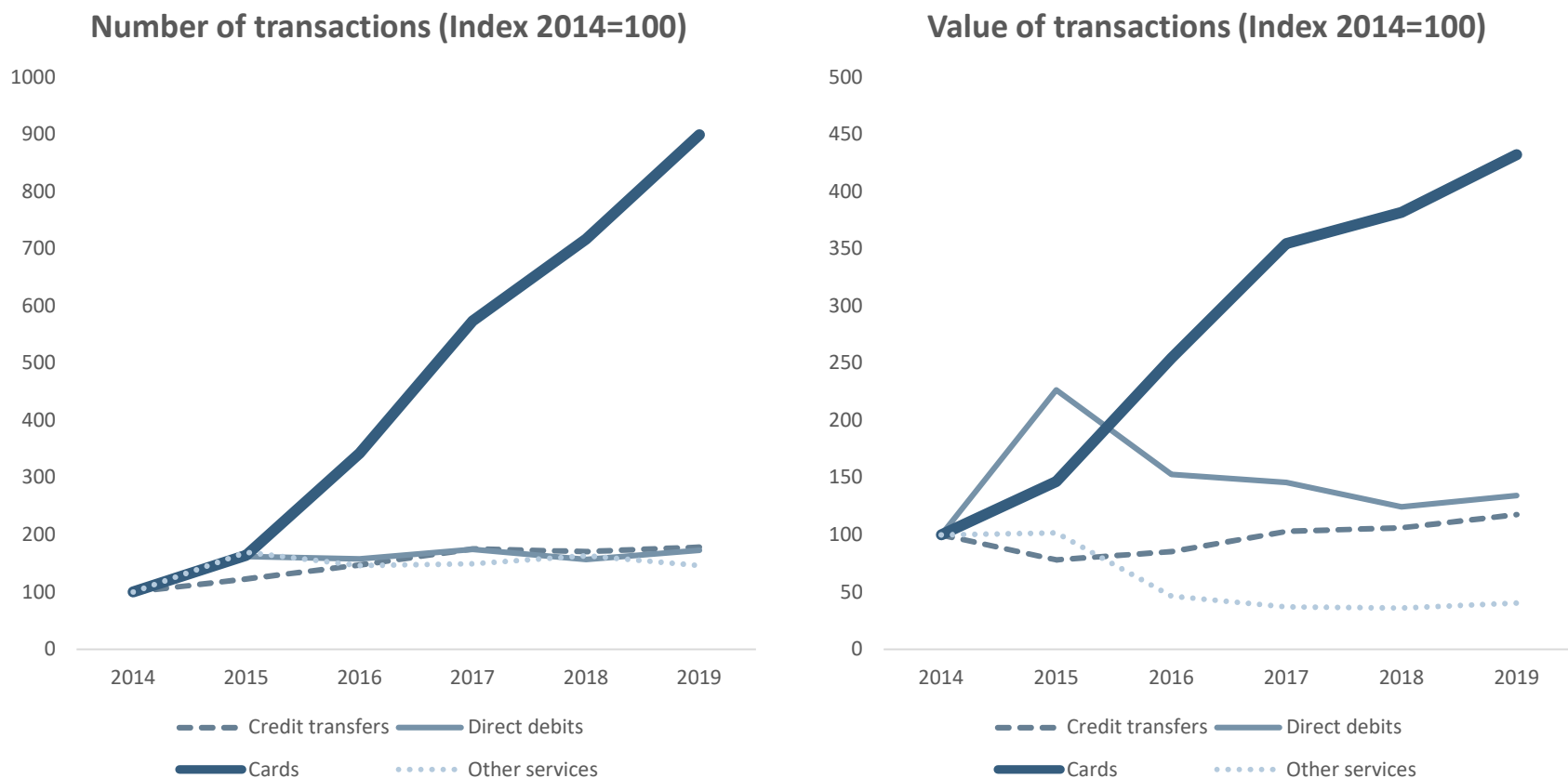


# Descriptive trends

# The use of credit transfers and direct debit steadied in 2018-2019



## Evolution of the use of electronic payments, per instrument



Source: European Central Bank, Data analysis: IOBE

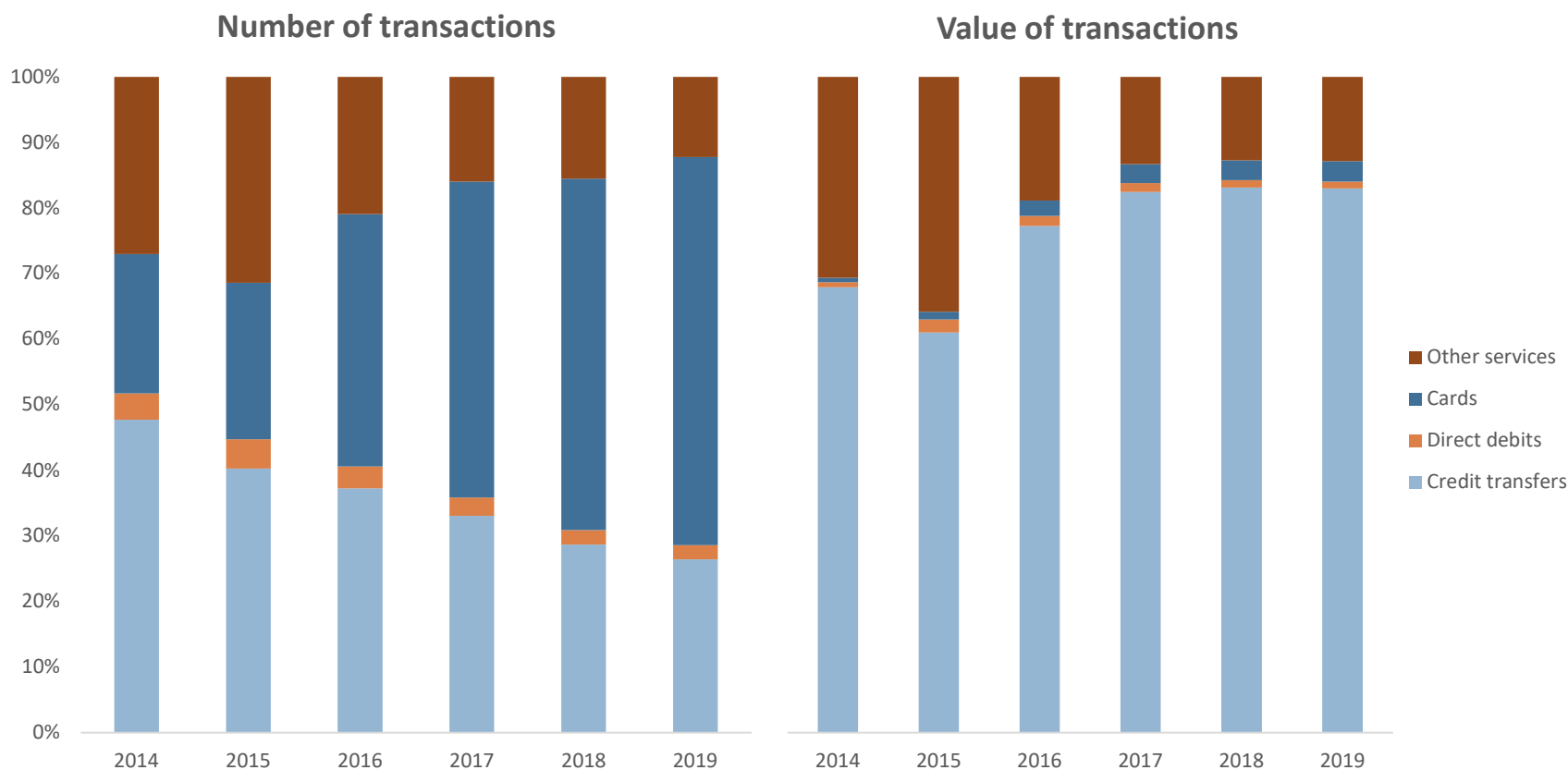
Note: (1) Payments with "other services" include e-money storages and other payment services (2) Payments with cards include transactions with physical presence and online use.

... in contrast to card payments that kept growing strongly

Cards constitute a large share of the total number of electronic payments, both in Greece...



## Distribution of electronic payments, by instrument



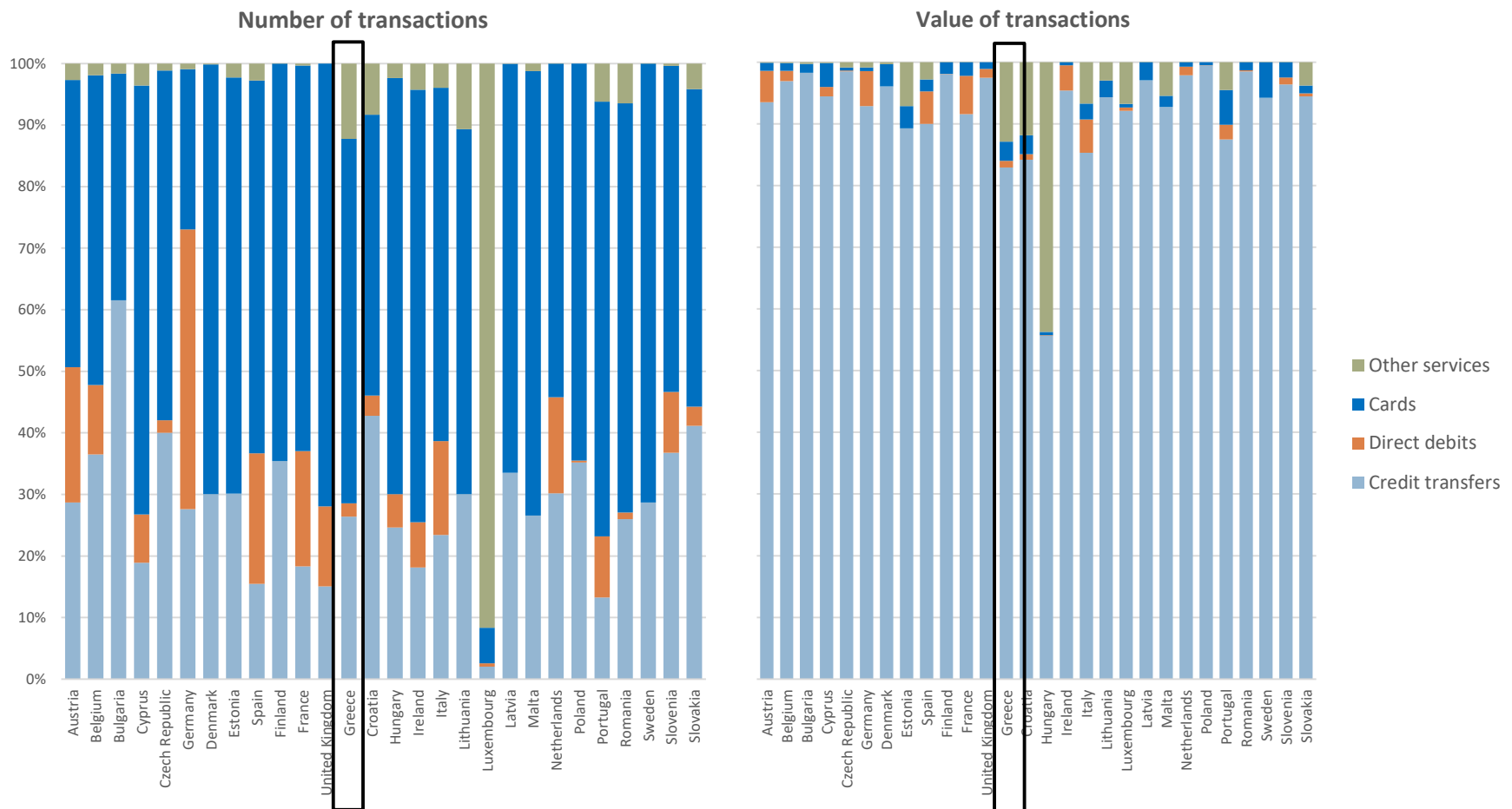
Source: European Central Bank, Data analysis: IOBE

Note: (1) Payments with "other services" include e-money storages and other payment services (2) Payments with cards include transactions with physical presence and online use (3) In terms of value, a large share of credit transfers also covers B2B transactions

...and in the majority of EU countries



## Distribution of electronic payments in the EU, by instrument, 2019



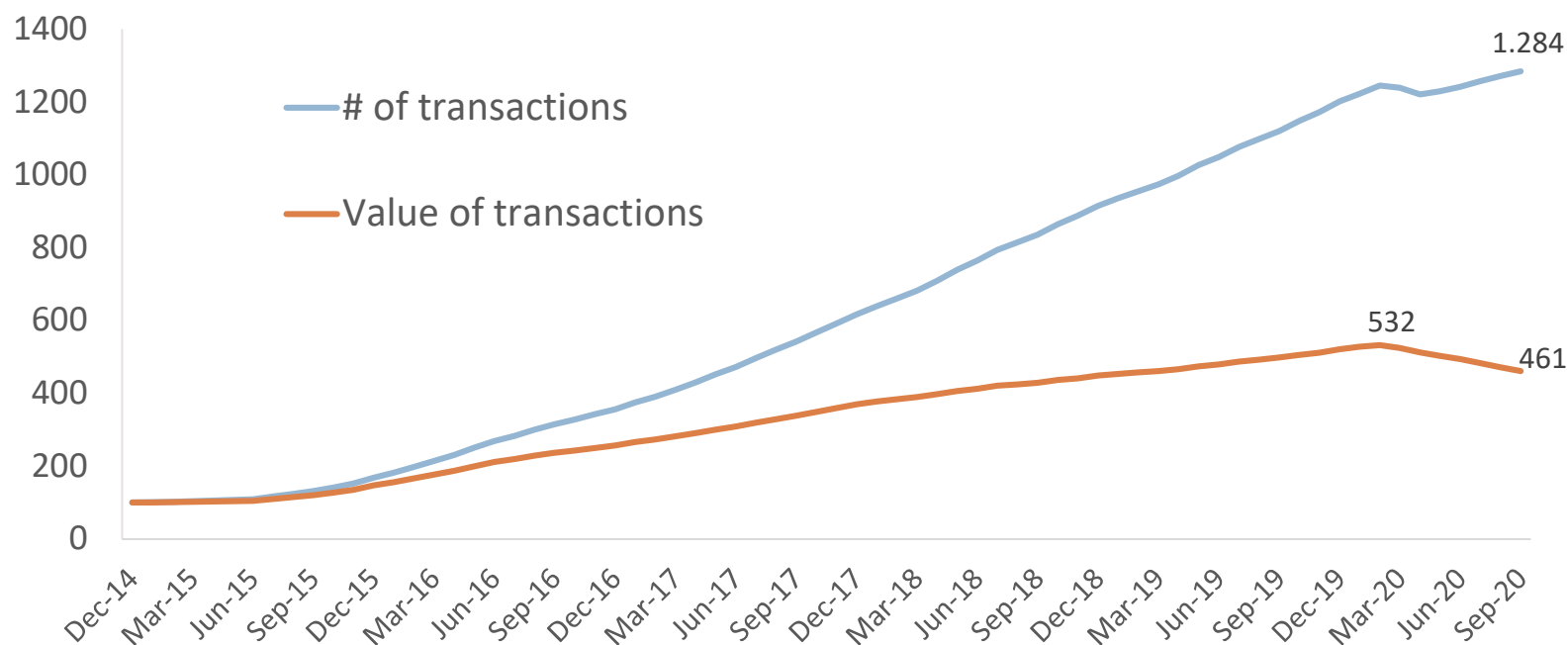
Source: European Central Bank, Data analysis: IOBE

Note: (1) Payments with "other services" include e-money storages and other payment services (2) Payments with cards include transactions with physical presence and online use (3) In terms of value, a large share of credit transfers also covers B2B transactions

The number of card transactions has increased by almost 12 times after the imposition of capital controls



**Use of Payment Cards in Greece  
(12-month rolling Index 100==2014)**



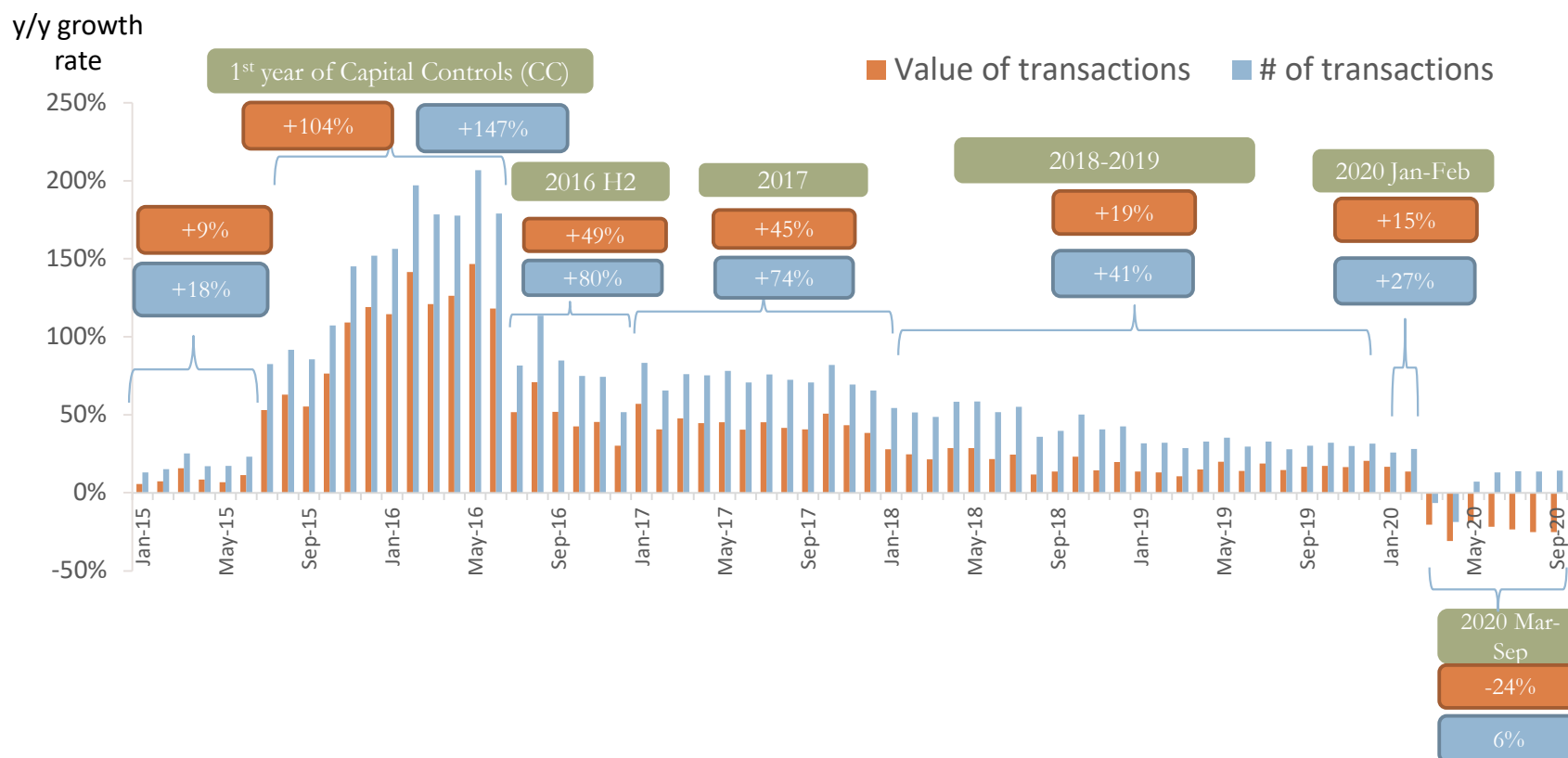
Note: Prepaid cards and on-line card transactions are not included.

Sources: Member banks of Hellenic Bank Association during 2014-2017, Mastercard during 2018-2020, Data Analysis: IOBE

The continuous growing trend in the number & value of card payments until early 2020 was interrupted by the pandemic crisis in March 2020



# The percentage growth rates of card use has been slowing down after the first year of capital controls



Note: Prepaid cards and on-line card transactions are not included.

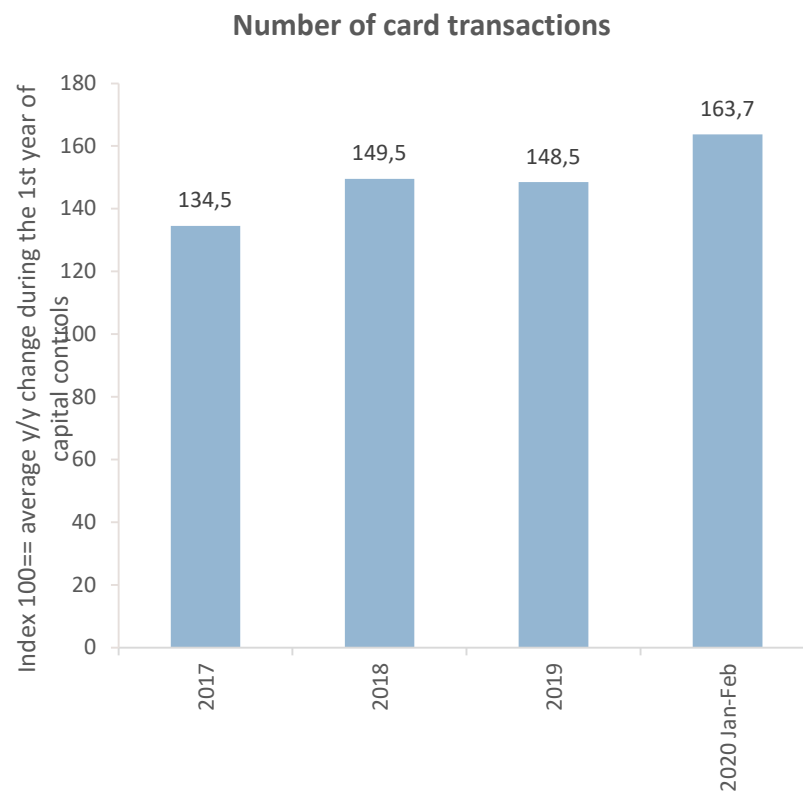
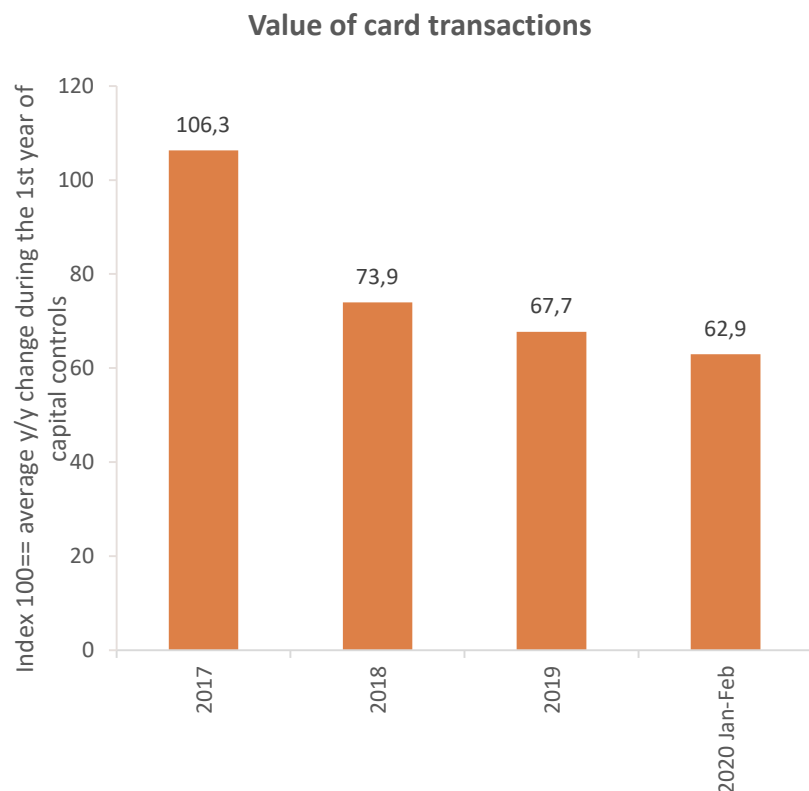
Sources: Member banks of Hellenic Bank Association for 2015-2017, Mastercard for 2018-2020 Data Analysis: IOBE

...yet growth rates continued to be large at least until February 2020.  
The trend reversal from March was particularly sizable for transactions' value.

In absolute terms, the y/y increase in value terms is following a downward trend



**Annual change in payment card use, compared to annual change in 1<sup>st</sup> year of capital controls (Index =100)**



Note: Prepaid cards and on-line card transactions are not included.

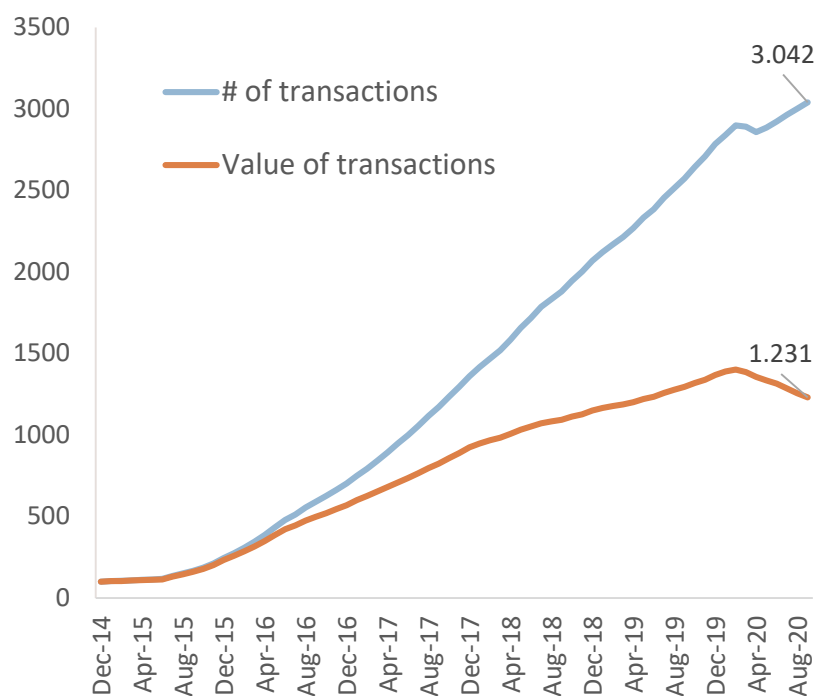
Sources: Member banks of Hellenic Bank Association during 2015-2017, Mastercard during 2018-2020, Data Analysis: IOBE

...however, in terms of number of transactions, there is a mild increase since 2016

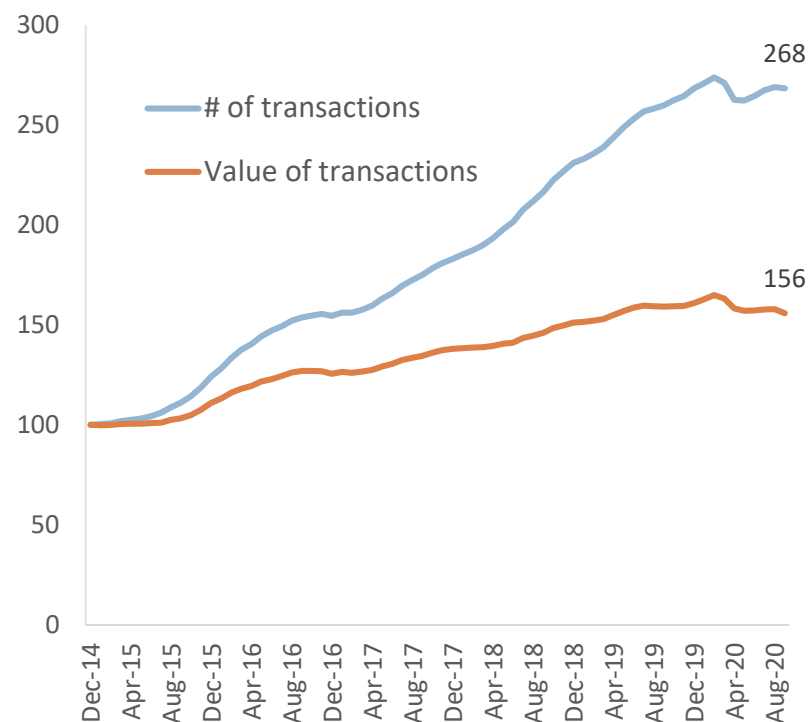
# The increase in the number of card transactions since 2015 stems mainly from debit cards ...



**Use of Debit Cards in Greece**  
(12-month rolling Index 100==2014)



**Use of Credit Cards in Greece**  
(12-month rolling Index 100==2014)



Note: On-line card transactions are not included.

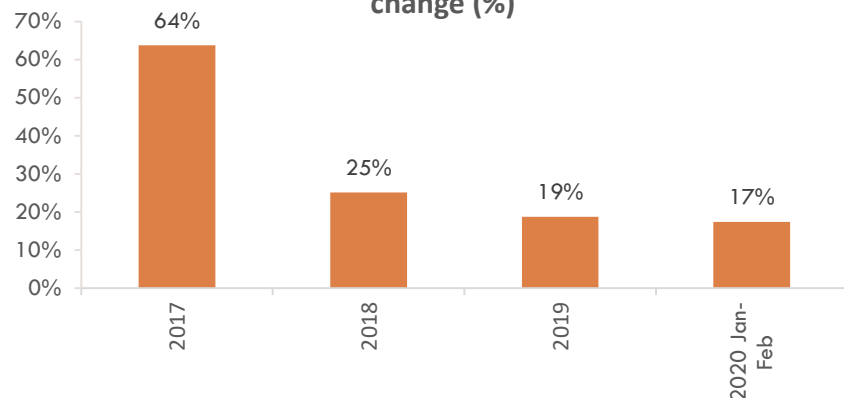
Sources: Member banks of Hellenic Bank Association during 2015-2017, Mastercard during 2018-2020, Data Analysis: IOBE

...which exhibit a higher penetration of almost 11 times compared to credit cards

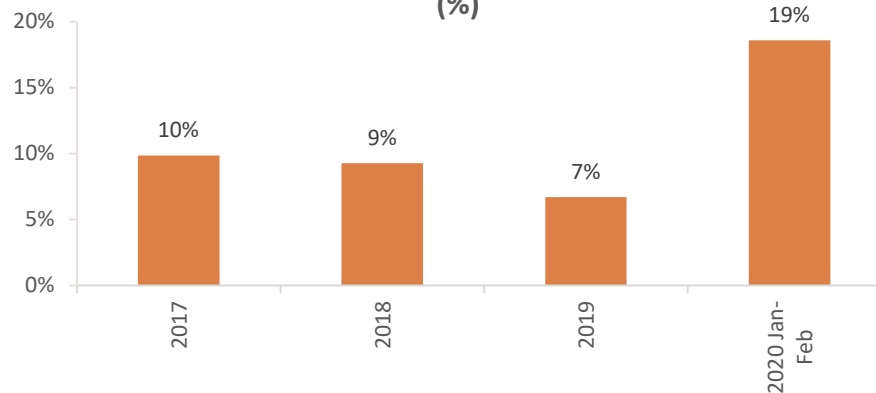
...yet credit cards' use in value terms had been gaining momentum in early 2020 in terms of y/y percentage growth rate



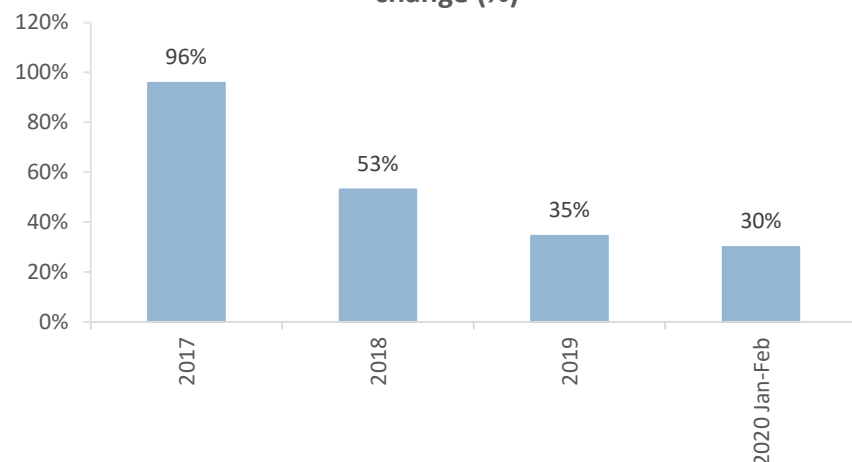
**Value of debit card transactions, average y/y change (%)**



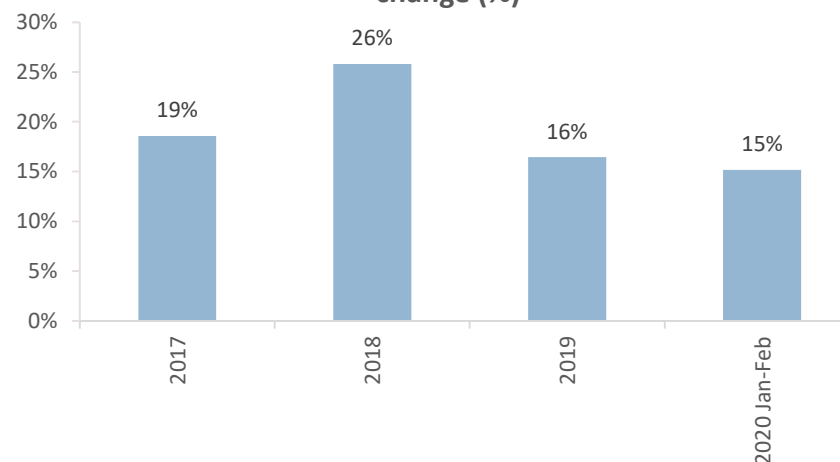
**Value of credit card transactions, average y/y change (%)**



**Number of debit card transactions, average y/y change (%)**



**Number of credit card transactions, average y/y change (%)**



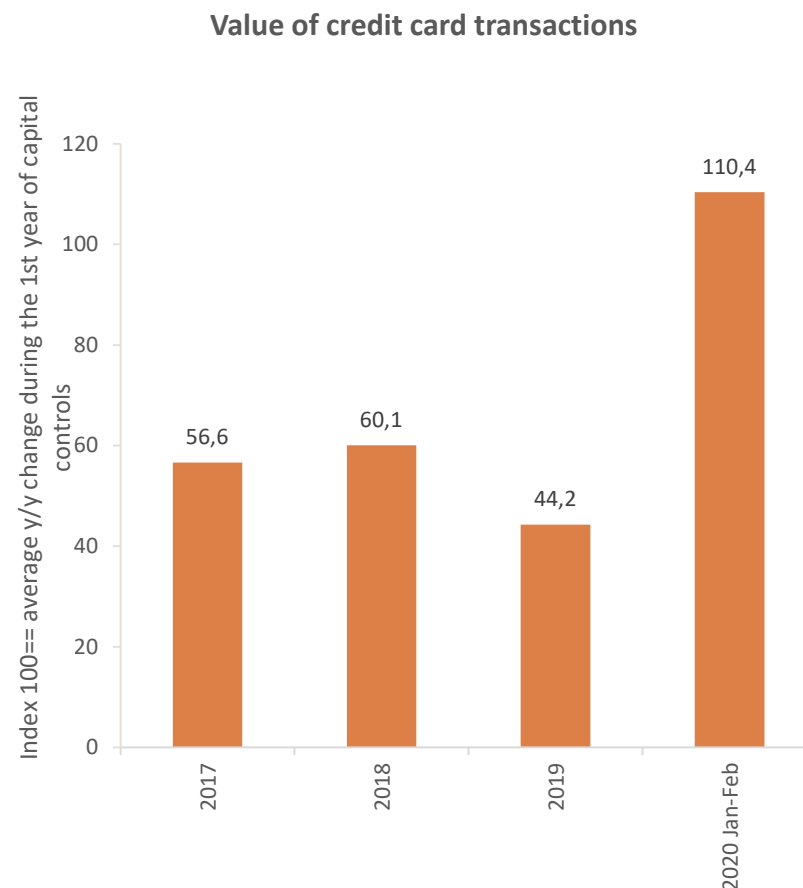
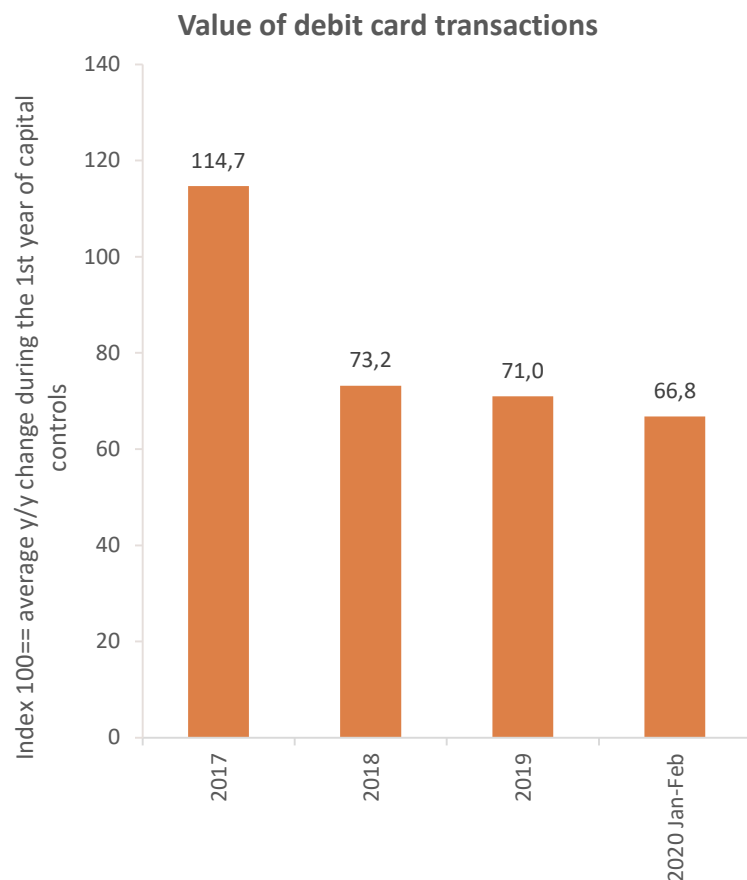
Note: On-line card transactions are not included.

Sources: Member banks of Hellenic Bank Association during 2015-2017, Mastercard during 2018-2020, Data Analysis: IOBE

... besides, the absolute y/y change in value of transactions increased only for credit cards in early 2020



**Annual change in payment card use, compared to annual change in 1<sup>st</sup> year of capital controls (Index =100)**



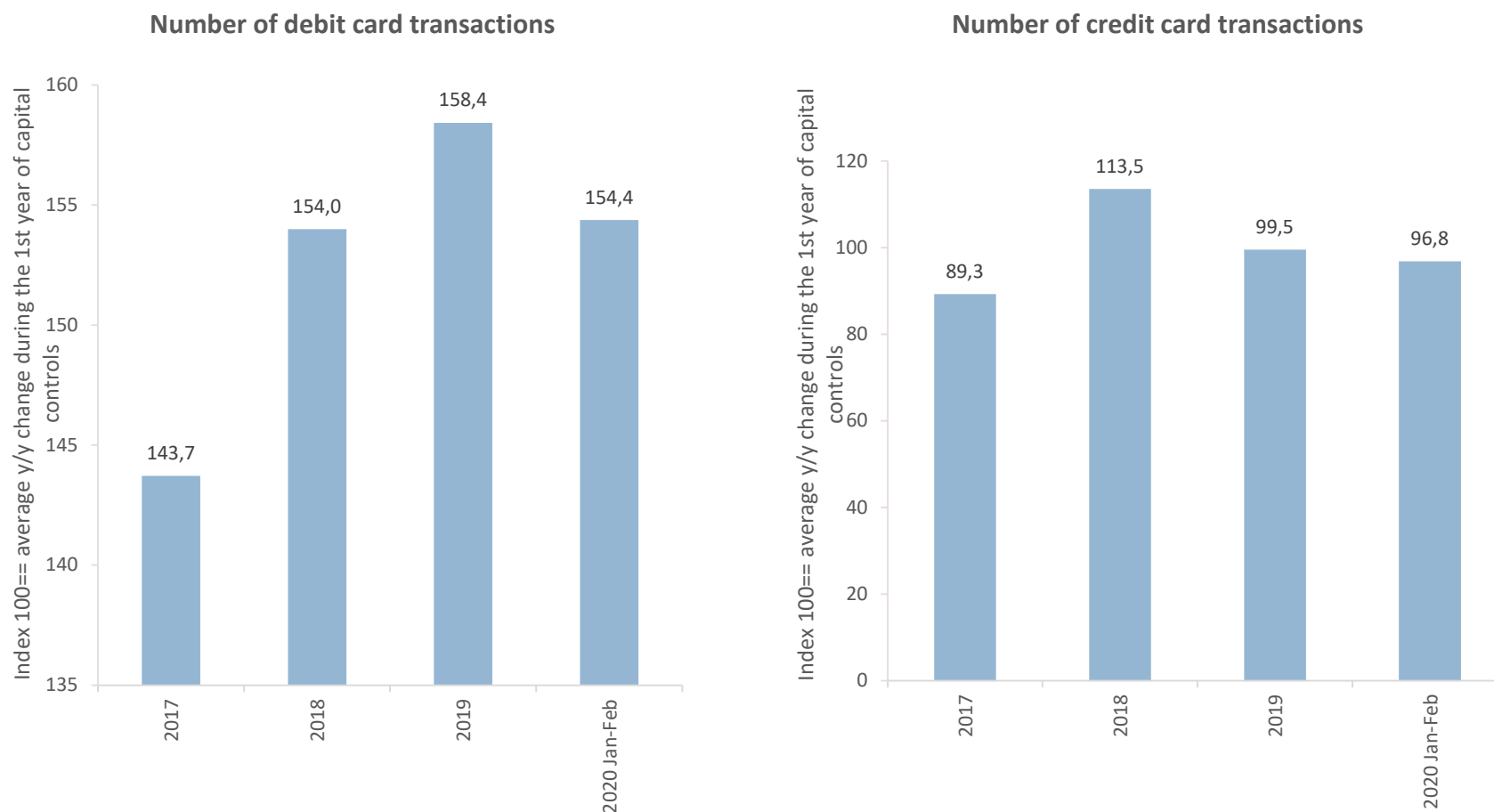
Note: On-line card transactions are not included.

Sources: Member banks of Hellenic Bank Association during 2015-2017, Mastercard during 2018-2020, Data Analysis: IOBE

... while the absolute y/y increase in the number of transactions has been more intense for debit cards since 2017



**Annual change in payment card use, compared to annual change in 1<sup>st</sup> year of capital controls (Index =100)**



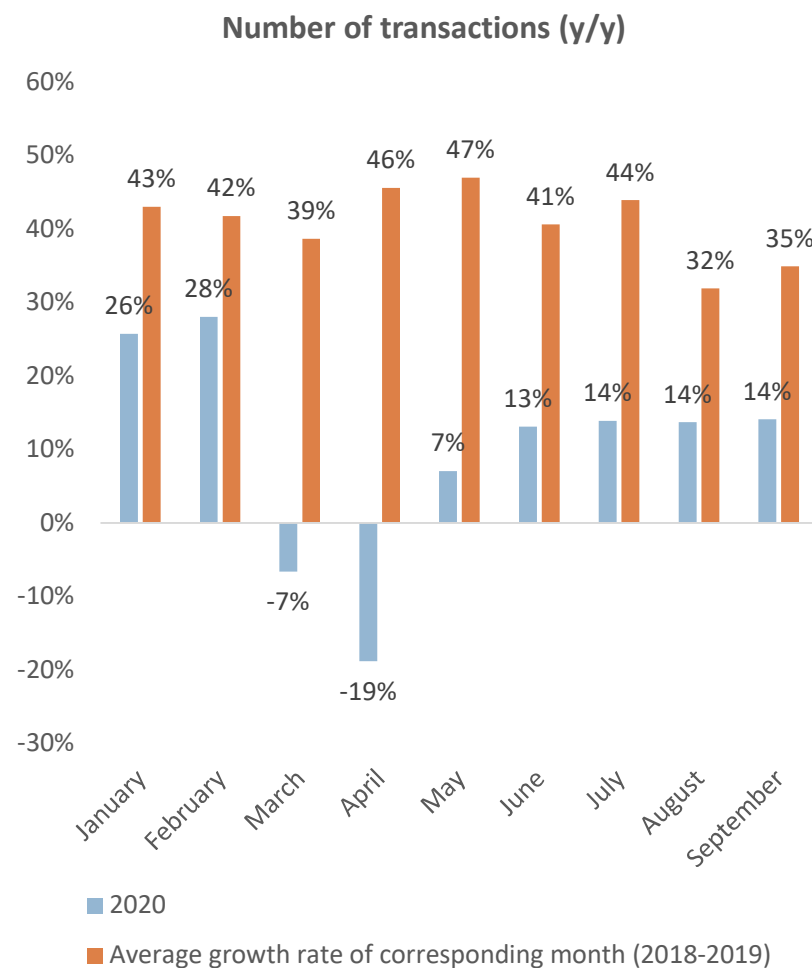
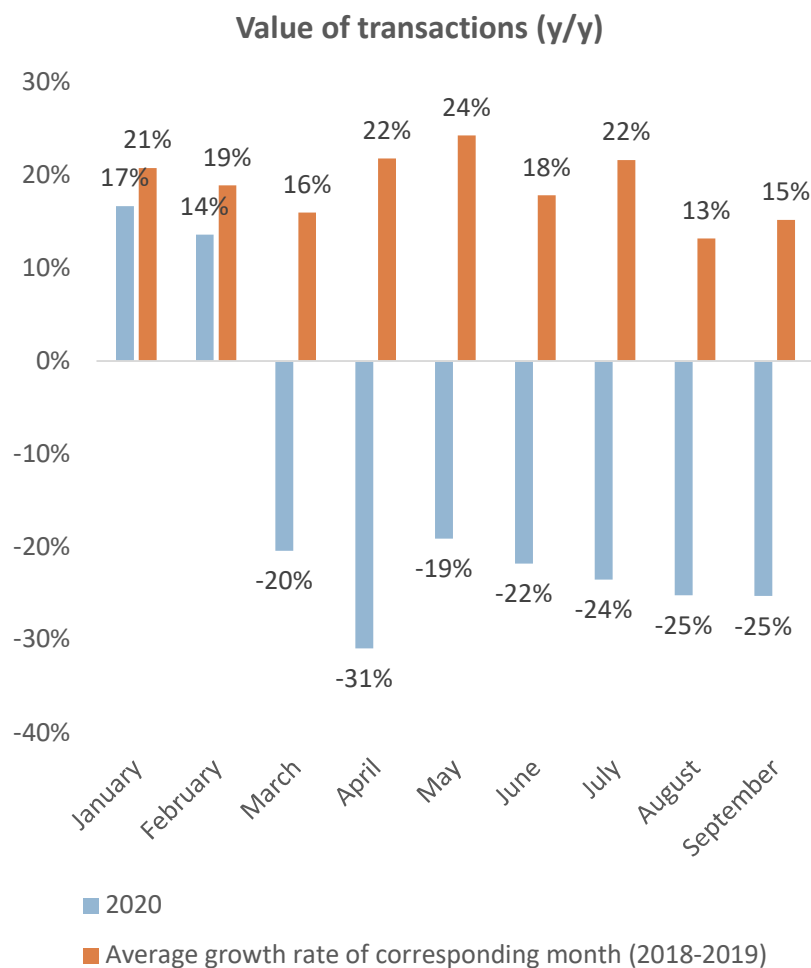
Note: On-line card transactions are not included.

Sources: Member banks of Hellenic Bank Association during 2015-2017, Mastercard during 2018-2020, Data Analysis: IOBE

# After the first lockdown, the frequency of digital payments increased but through lower value transactions...



## Payment cards use before and during the pandemic

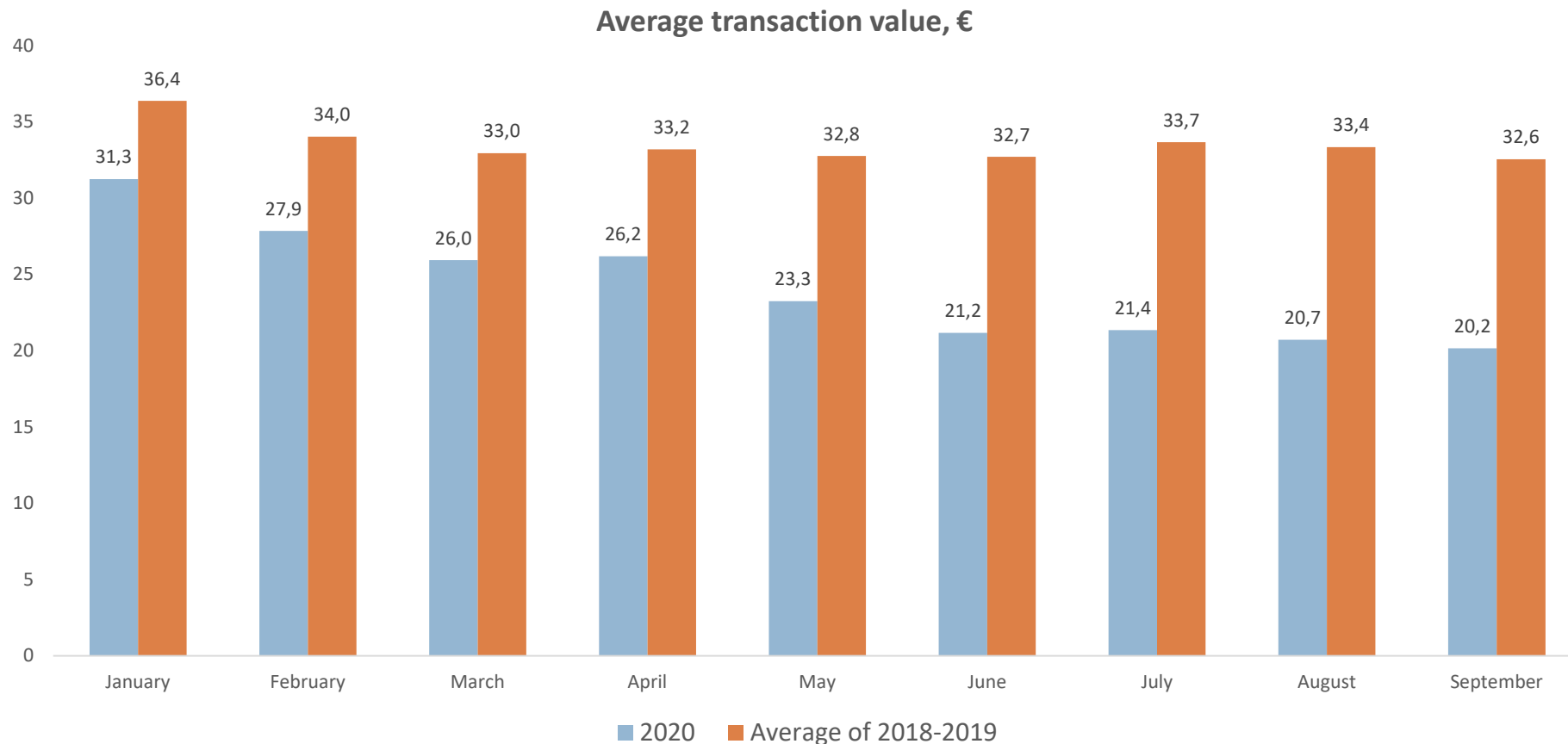


Note: Prepaid cards and on-line card transactions are not included.  
Sources: Mastercard, Data Analysis: IOBE

...as a result, the average transaction value has decreased to almost 2/3 of previous years' level



### Payment cards use before and during the pandemic



Note: Prepaid cards and on-line card transactions are not included.

Sources: Mastercard, Data Analysis: IOBE

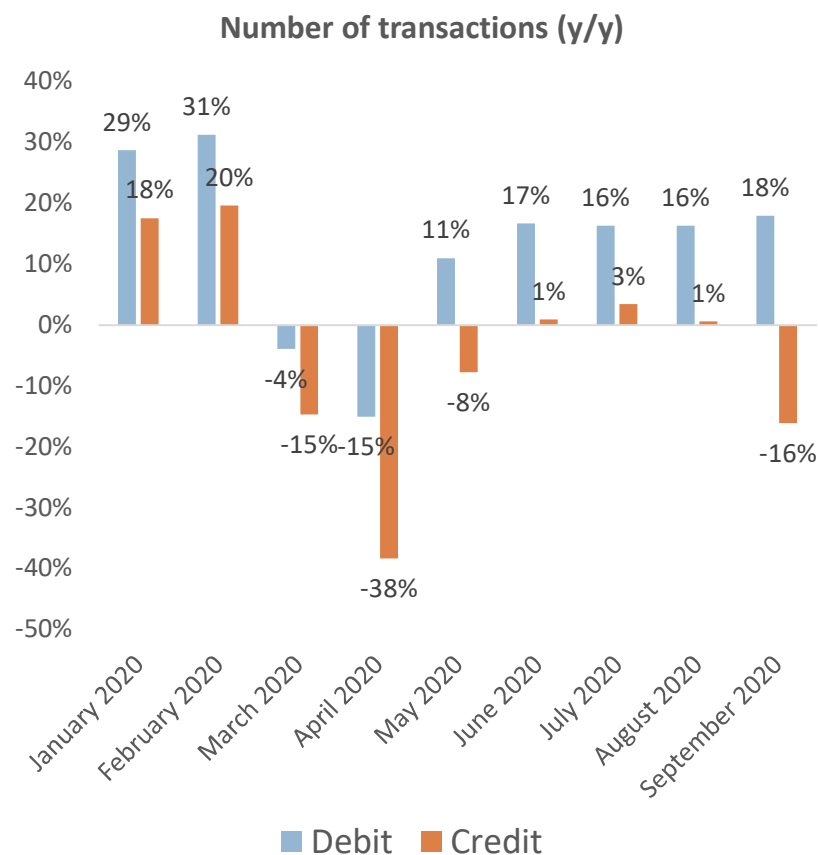
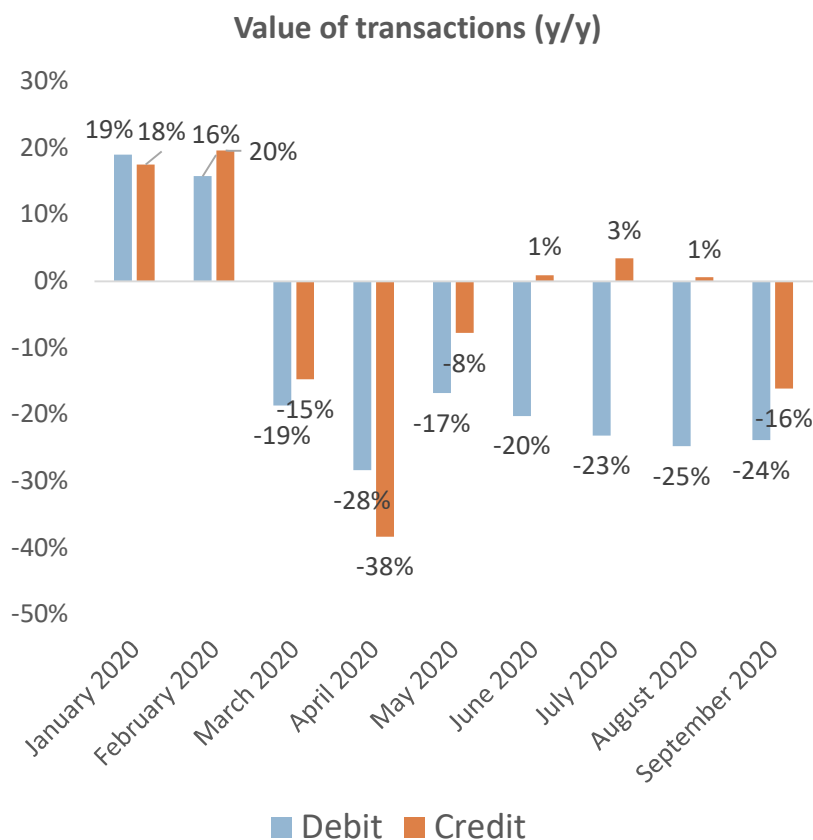
**The average transaction value decreased by 35.5% during the first nine months of 2020**



In terms of value, debit cards had a larger reduction during the pandemic compared to credit cards



### Payment cards use during the pandemic, by card type



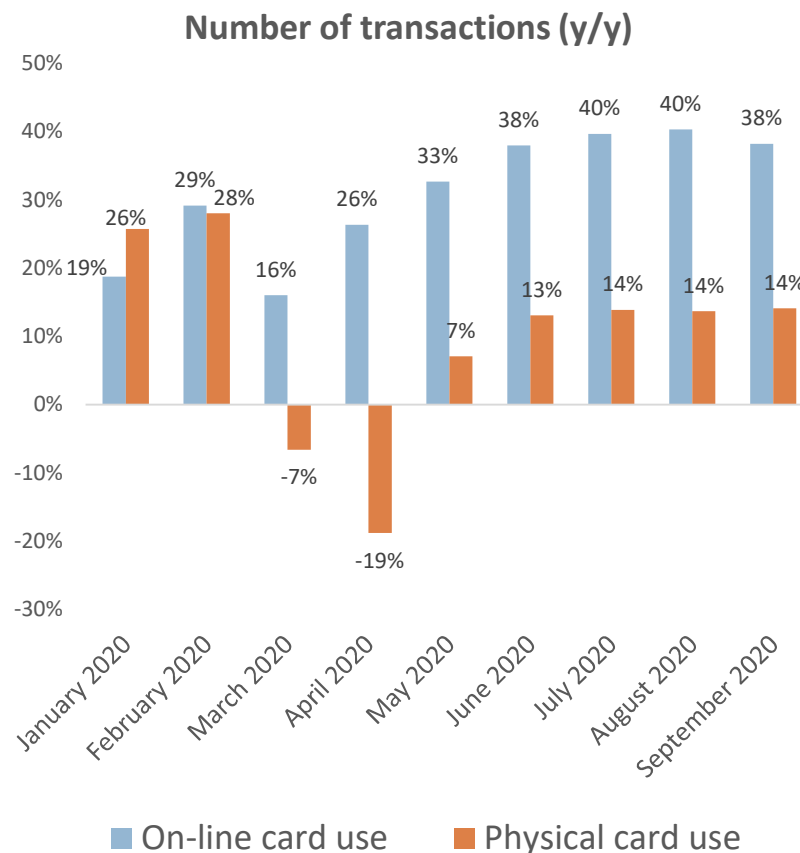
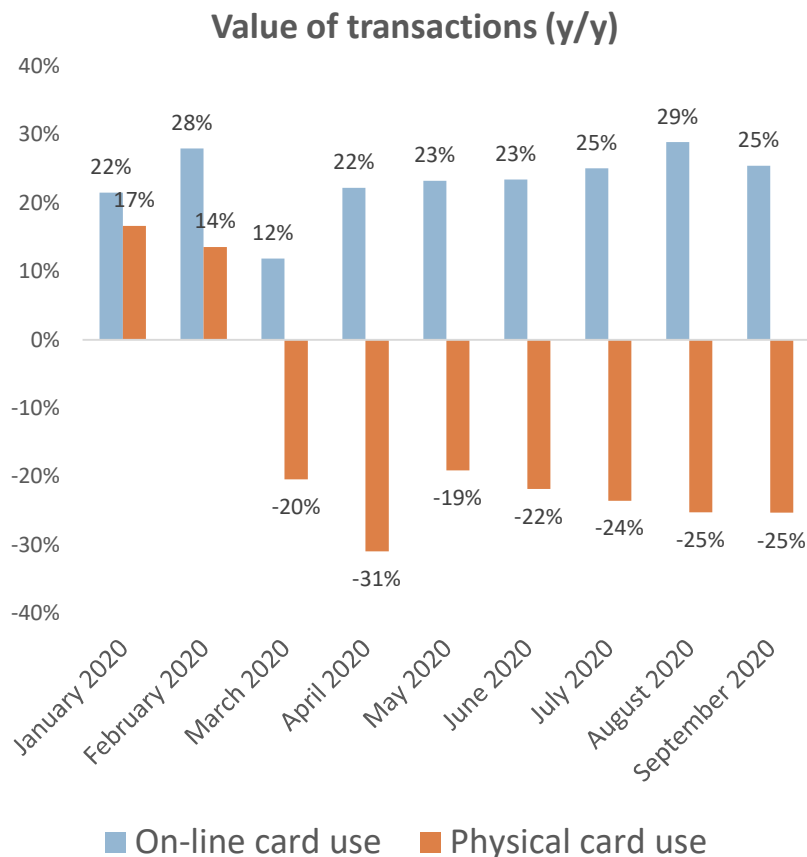
Note: On-line card transactions are not included.  
Sources: Mastercard, Data Analysis: IOBE

...while, in terms of the number of transactions, debit cards had a moderate increase

As for online card payments in 2020, their frequency has accelerated much faster than that with physical presence



### Payment cards use during the pandemic, by source



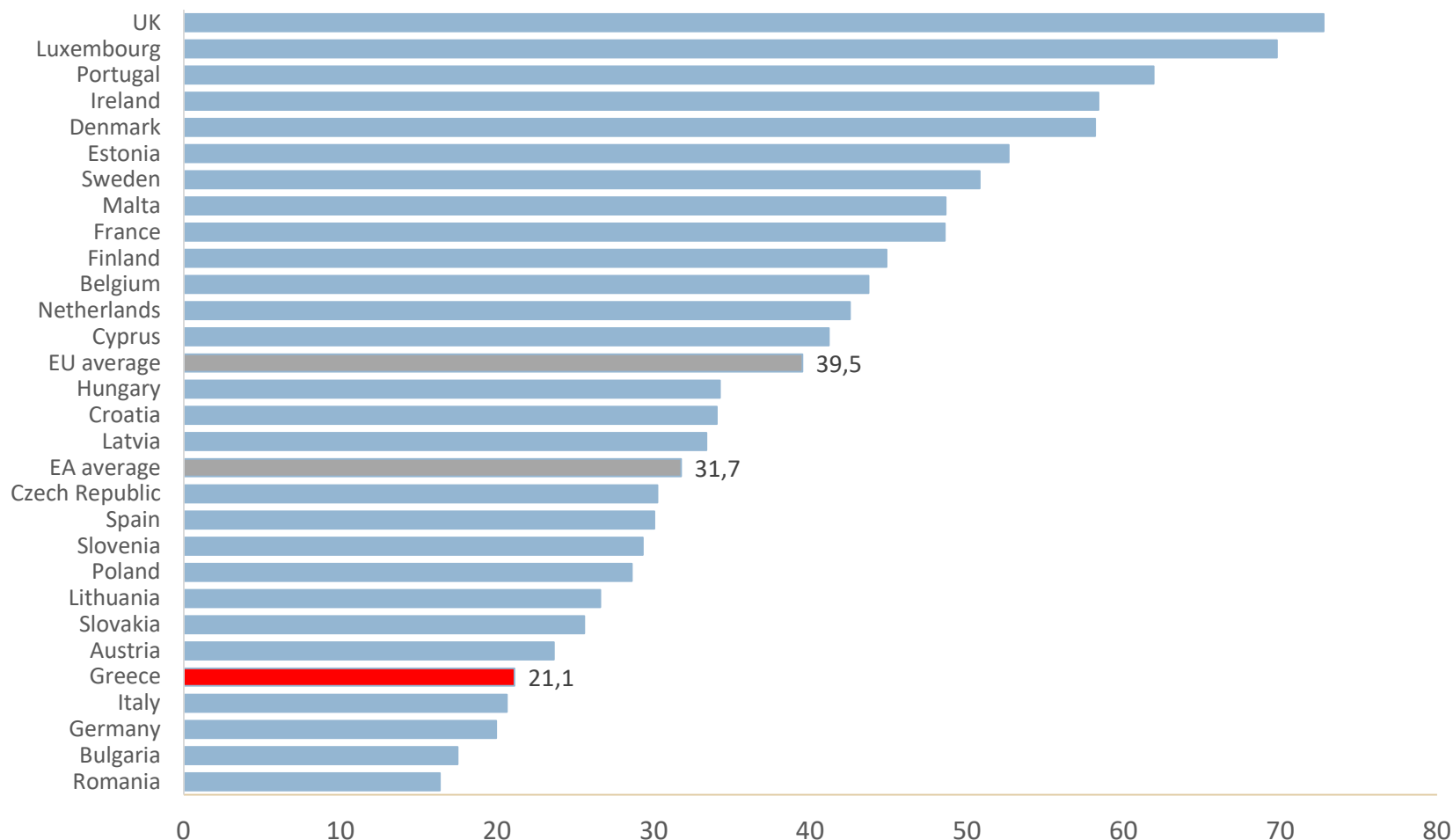
Note: Prepaid cards are not included  
Sources: Mastercard, Data Analysis: IOBE

In terms of value, card use with physical presence seems to be partially substituted by online transactions from the onset of the pandemic

## Meanwhile, cards' penetration in Greece remains significantly below EU average



Card transactions value, in % of private consumption (2019)



Source: ECB, Eurostat, Data Analysis: IOBE

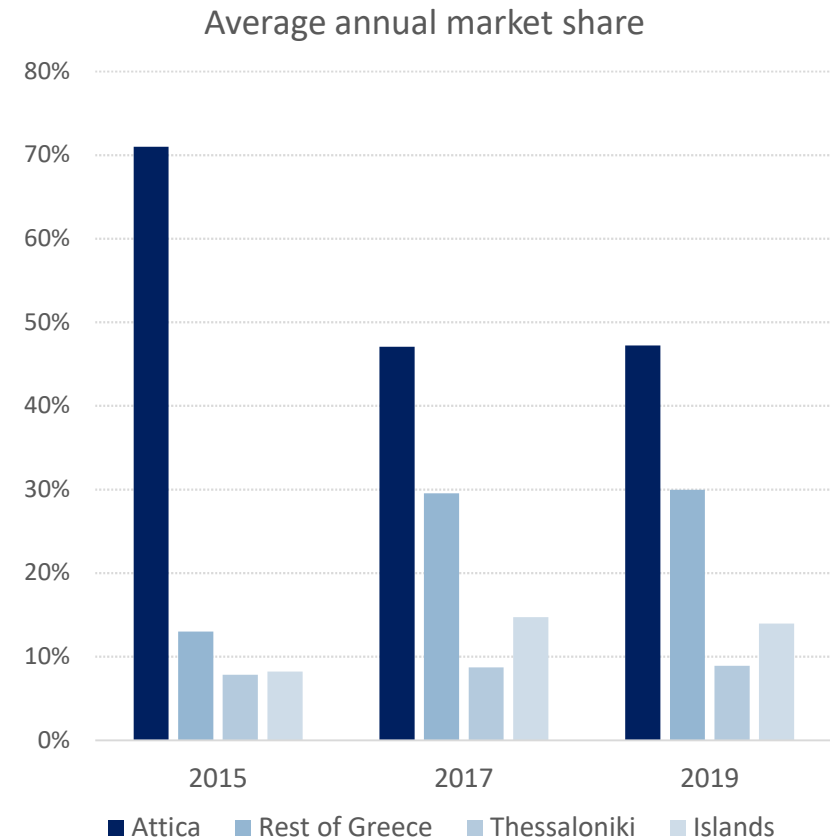
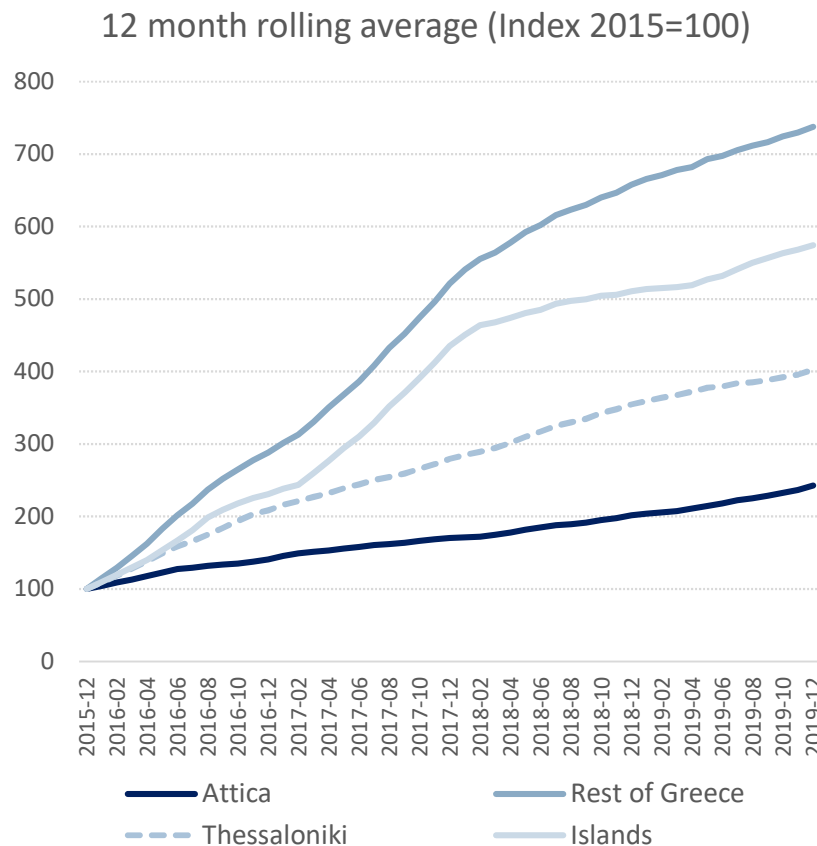
Note: (1) Card transactions refer to cards issued in each country (2) Private consumption corresponds to households only, excluding non-profit institutions.

# Geographical distribution of card transactions

As the value of card transactions has grown considerably faster outside Attica and Thessaloniki...



## Evolution of card transactions' value across regions



Note: Prepaid cards and on-line card transactions are not included.

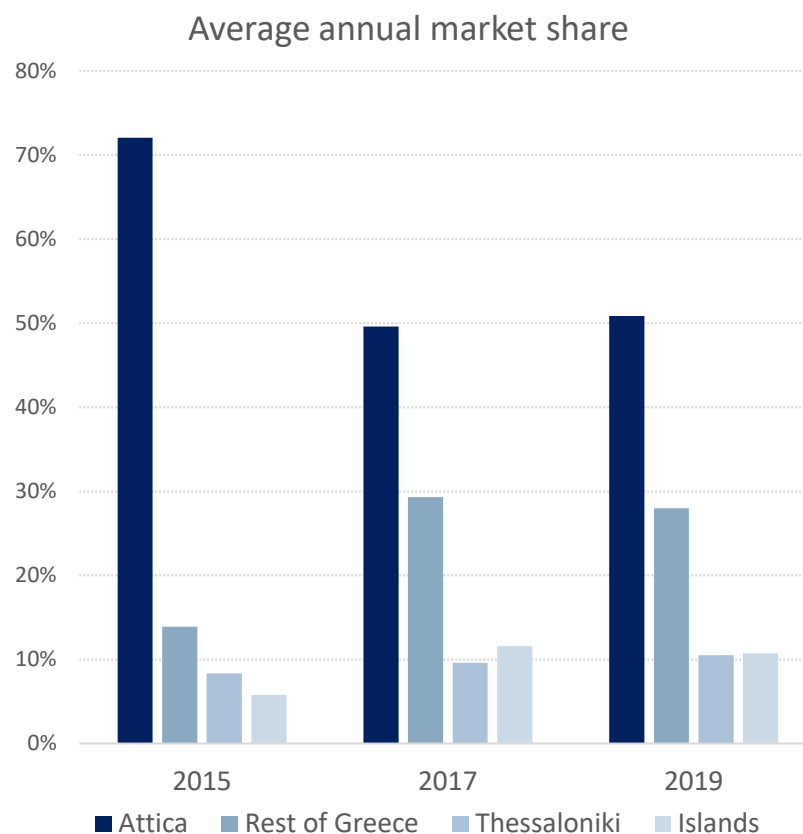
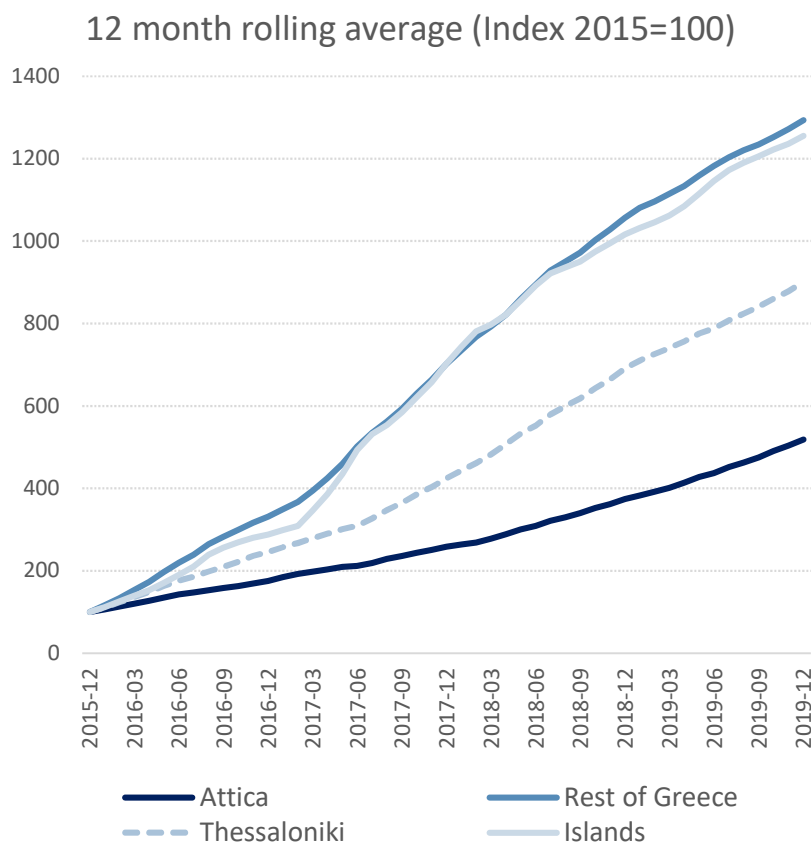
Source: Mastercard for 2015-2019 Data Analysis: IOBE

... the share of Attica declined from 71% in 2015 to 47% in 2017-2019

# The number of transactions has grown by even higher multiples...



## Evolution of card transactions' number across regions



Note: Prepaid cards and on-line card transactions are not included.

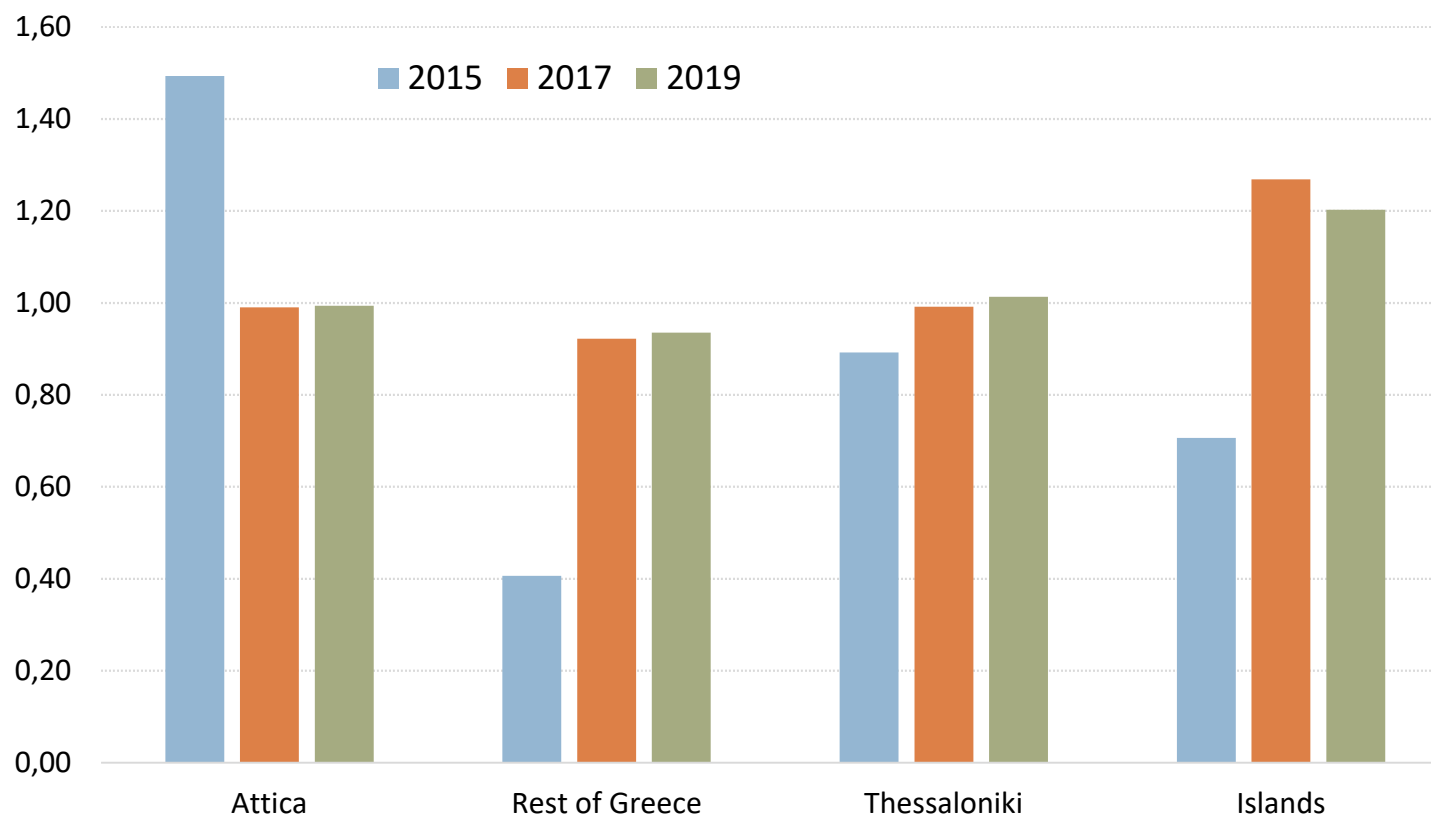
Source: Mastercard for 2015-2019 Data Analysis: IOBE

... albeit the shares of the regions have not changed much since 2017

Adjusted for GDP, the penetration of card use across regions has become much more homogeneous since 2015...



**Degree of cards use adjusted for GDP, by region**  
(region market share of digital transactions value/ region average share of GDP in 2015-2017)



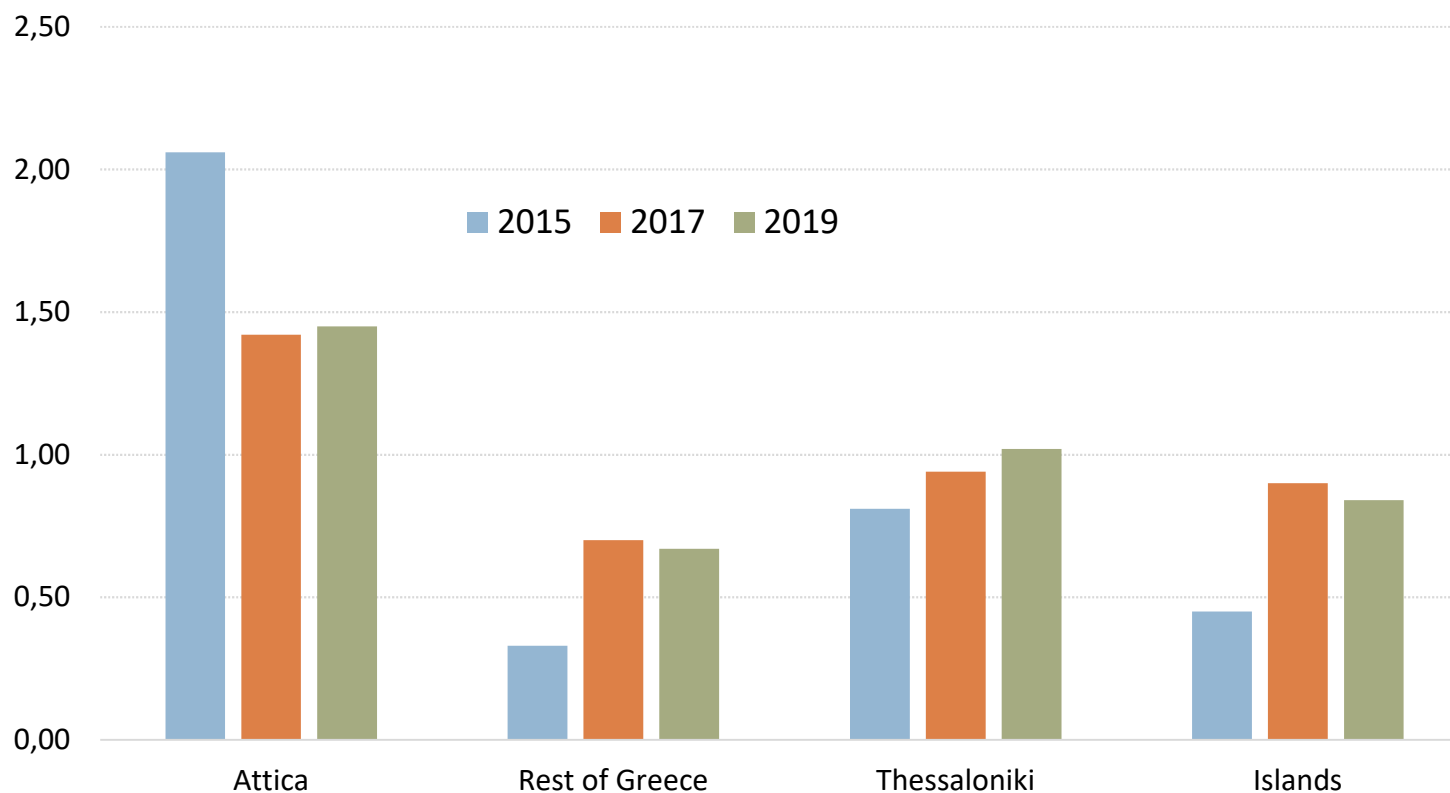
Note: Prepaid cards and on-line card transactions are not included.

Source: Mastercard for 2015-2019 Data Analysis: IOBE

...however, adjusted for population, the number of card transactions remains significantly higher in Attica...



**Degree of cards use adjusted for population, by region**  
(region market share of digital transactions number/ region share of population in 2015-2017)



Note: Prepaid cards and on-line card transactions are not included.  
Source: Mastercard for 2015-2019 Data Analysis: IOBE

... while the regional convergence has stalled since 2017

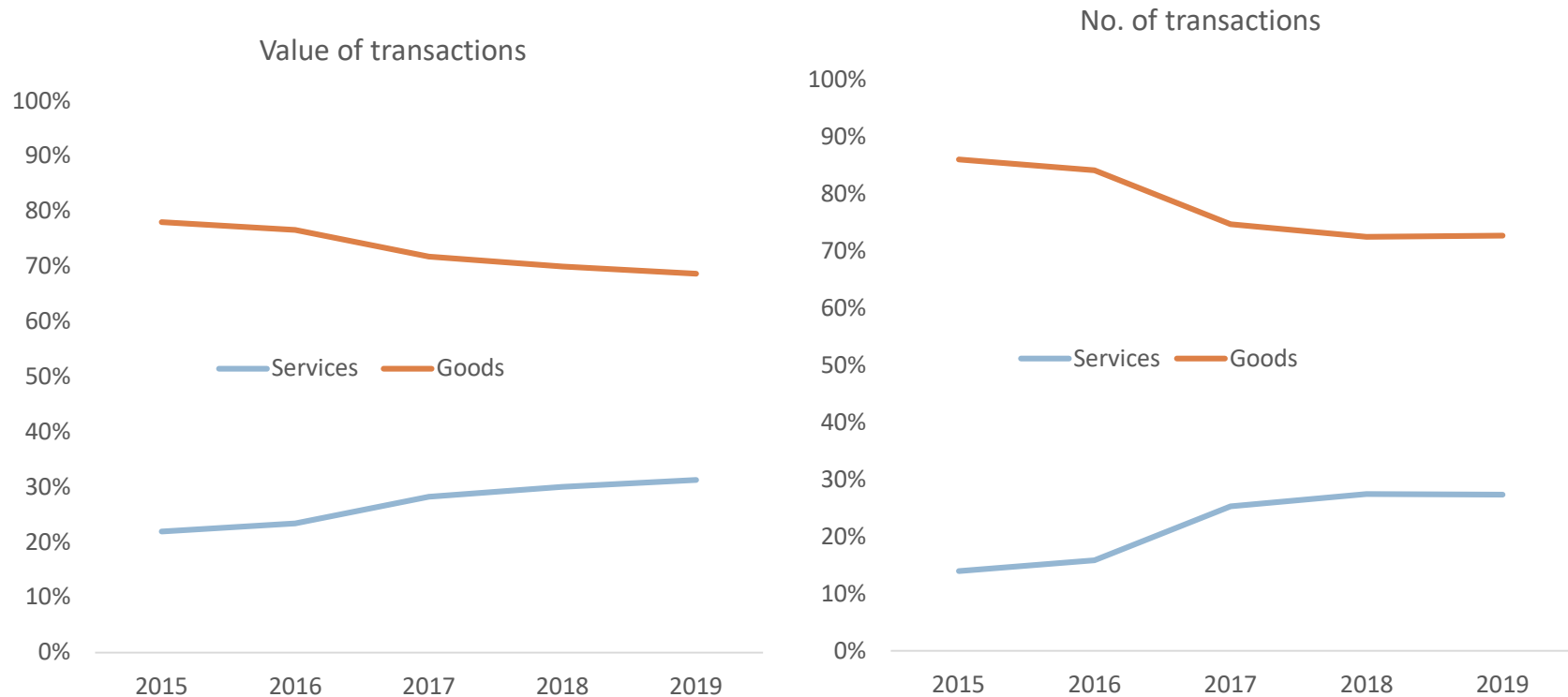


# Sectoral distribution of card transactions

# Consumers make card transactions considerably more to buy goods than services



## Market share of digital transactions across time: goods versus services



Source: Mastercard Data Analysis: IOBE

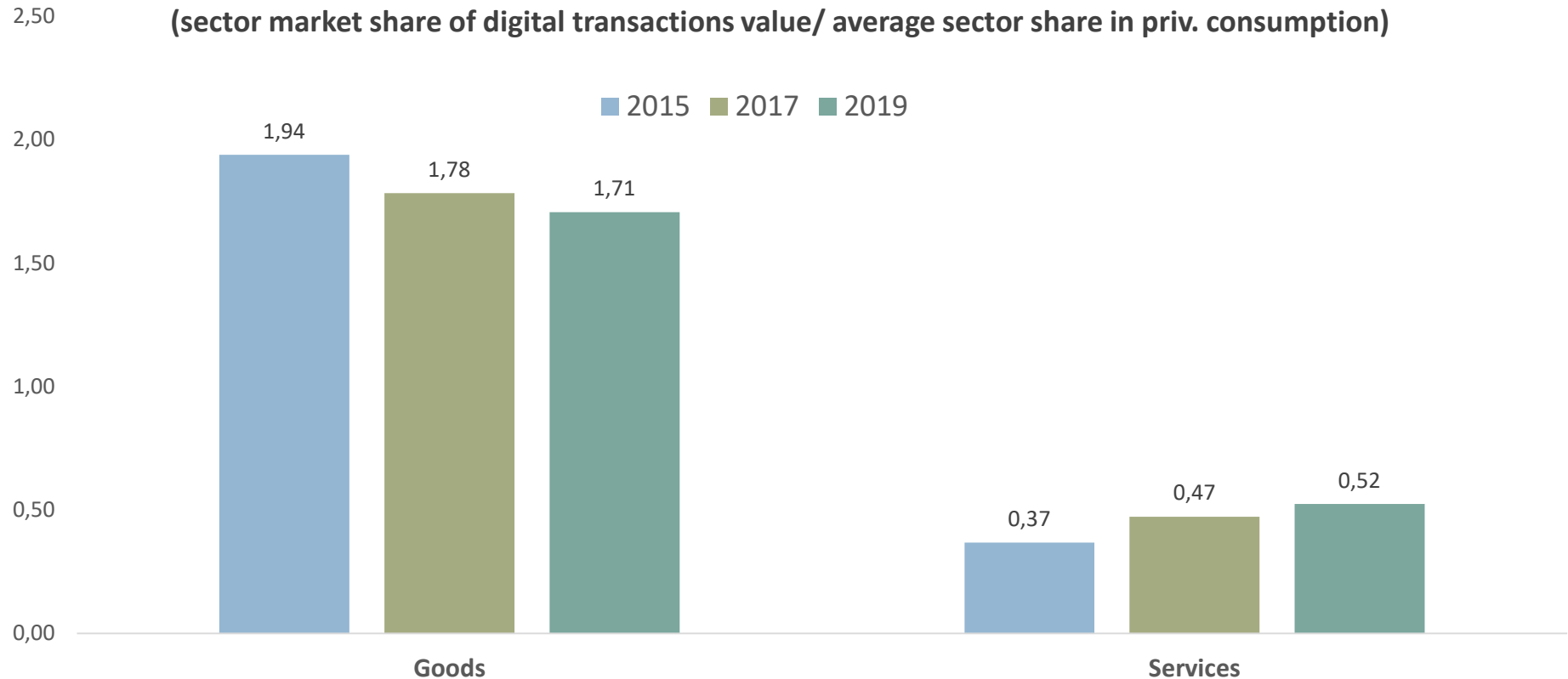
Note. Prepaid cards and on-line card transactions are not included. **Goods:** Supermarkets, Clothing Stores, Gas Stations, Food Stores, Drug Stores, Vehicles, Other Retail. **Services:** Recreation, Restaurants/Bars, Education, Health services, Hotel/Motel, Travel Services, Professional Services, Transportation, Utilities

The respective market shares slightly converged during the last years, especially in 2017

# Digital transactions in services fall short of their share in private consumption...



Degree of card use in relation to final consumption, by sector of transaction  
(sector market share of digital transactions value/ average sector share in priv. consumption)



Sources: Eurostat, Member banks of Hellenic Bank Association for 2015-2017, Mastercard for 2018-2020 Data Analysis: IOBE

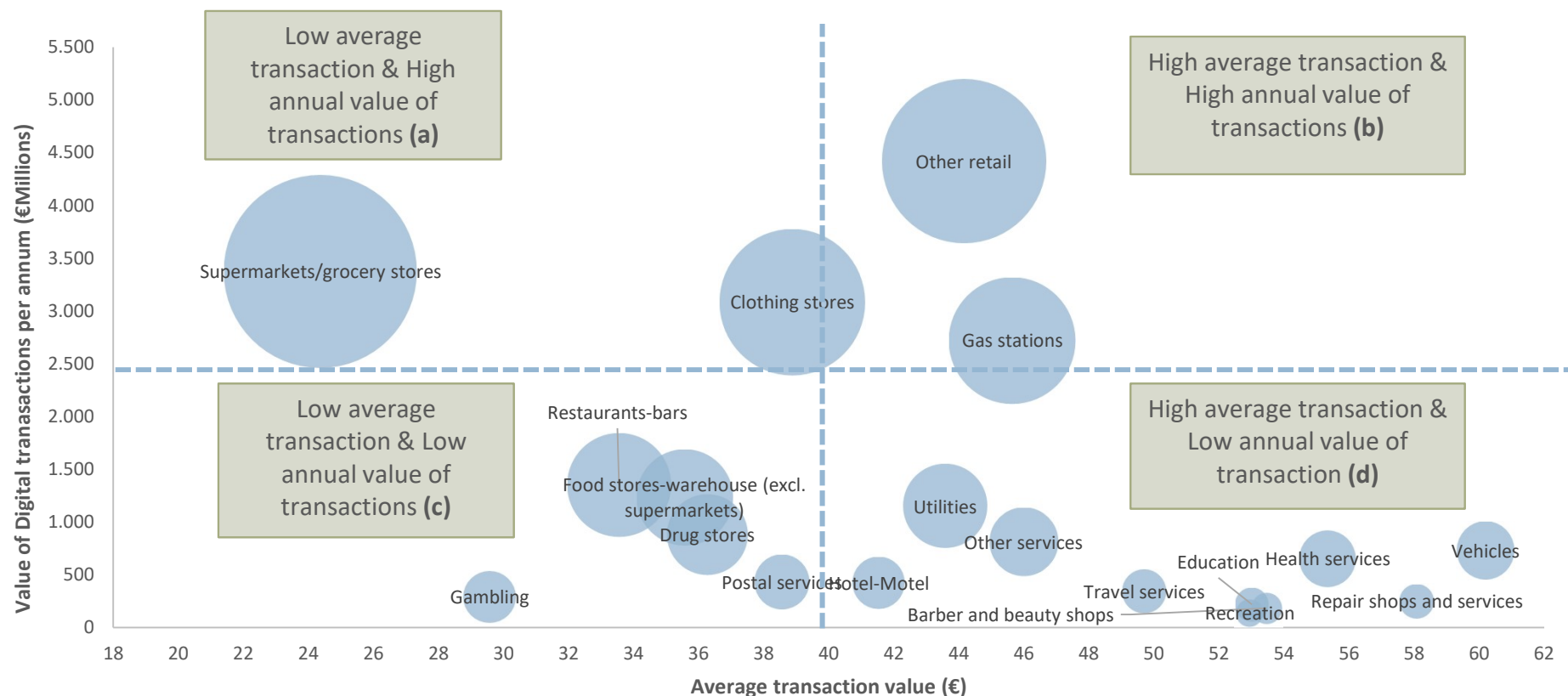
Note. Prepaid cards and on-line card transactions are not included. **Goods:** Supermarkets, Clothing Stores, Gas Stations, Food Stores, Drug Stores, Vehicles, Other Retail. **Services:** Recreation, Restaurants/Bars, Education, Health Services, Hotel/Motel, Travel Services, Professional Services, Transportation, Utilities

... which may relate to higher risk of tax evasion compared to goods' markets.  
Convergence with consumption shares has slowed down after 2017.

# Supermarkets, clothing stores, gas stations and other retail are starring sectors in digital transactions over the last four years



## Digital transactions 2015-2019, by sector



Source: Mastercard 2015-2020 Data Analysis: IOBE

Note. The bubble diameter represents the total no. of transactions in 2015-2019. Prepaid cards and on-line card transactions are not included.

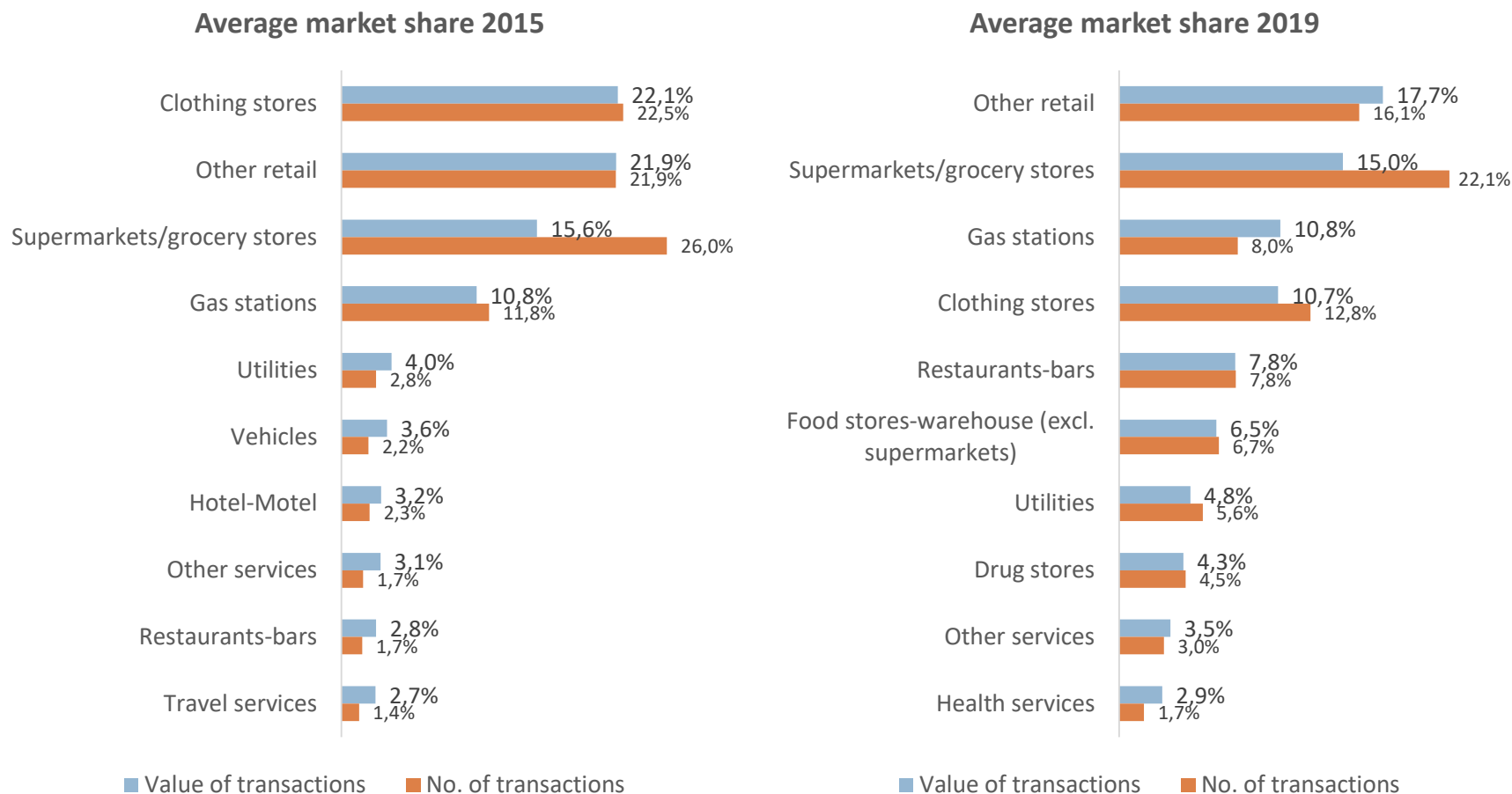
**Other retail:** Department stores, Discount stores, Electric Appliances, Hardware, Computer Equipment and Software, Home furnishings, Other retail, Sporting goods stores. **Other services:** Hospitals, Mail order, Quasi Cash, Pet shops, Cosmetic shops, Other services. **Professional services:** Architectures, Insurance, Real estate, Securities-Brokers-Dealers. **Health services:** All outpatient services excl. hospitals

Transactions with low recorded value (c and d) contain sectors sensitive to tax evasion

# Some sectoral convergence was observed between 2015 and 2019



## Top 10 sectors with a significant market share in card usage



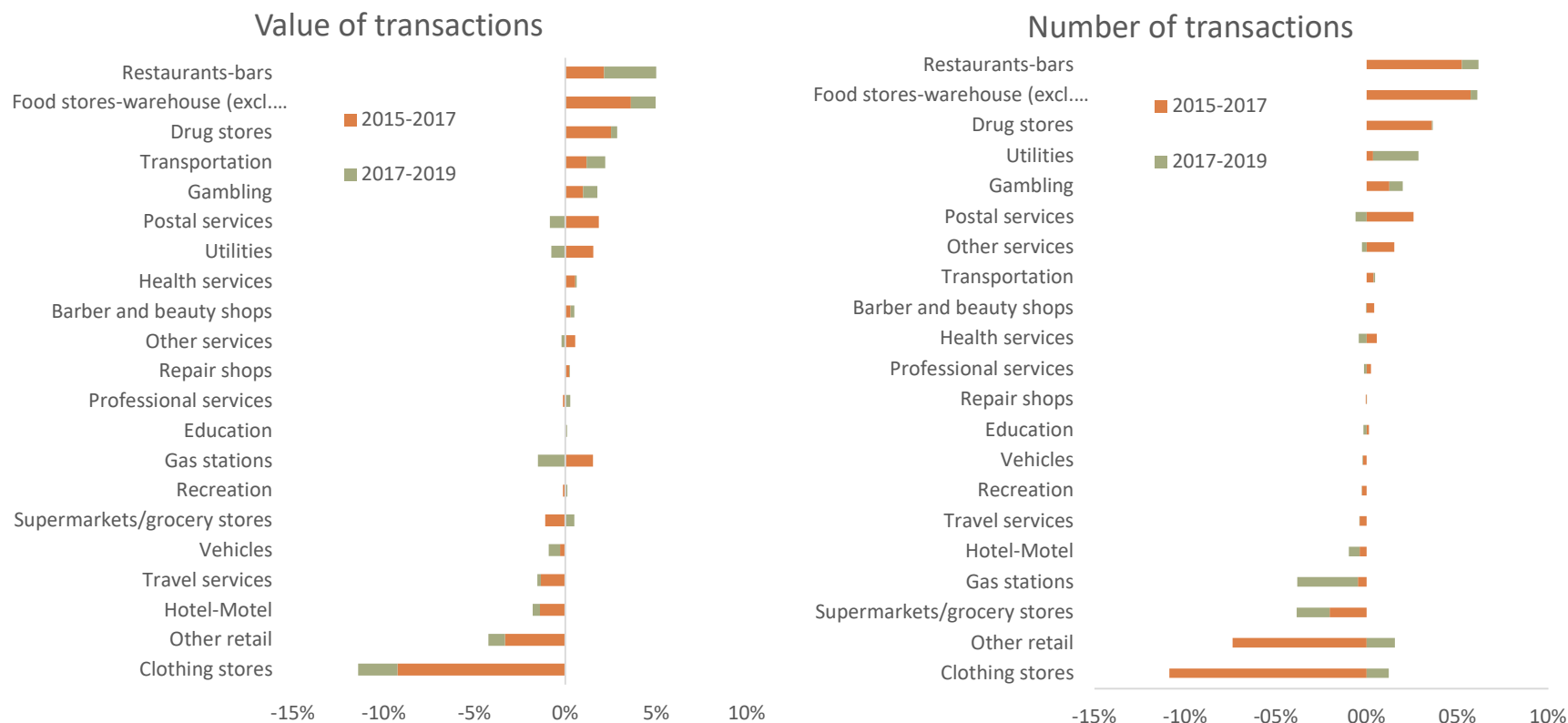
Source: Mastercard. Data Analysis: IOBE

Note. Prepaid cards and on-line card transactions are not included. **Other retail:** Department stores, Discount stores, Electric Appliances, Hardware, Computer Equipment and Software, Home furnishings, Sporting goods stores, Other Retail. **Other services:** Hospitals, Mail Order, Quasi Cash, Pet shops, Cosmetic shops, Other services. **Professional services:** Architectures, Insurance, Real estate, Securities-Brokers-Dealers. **Health Services:** All outpatient services excl. hospitals

# The market share increased significantly for Restaurants-bars and Food stores...



## Change of market share, in percentage points

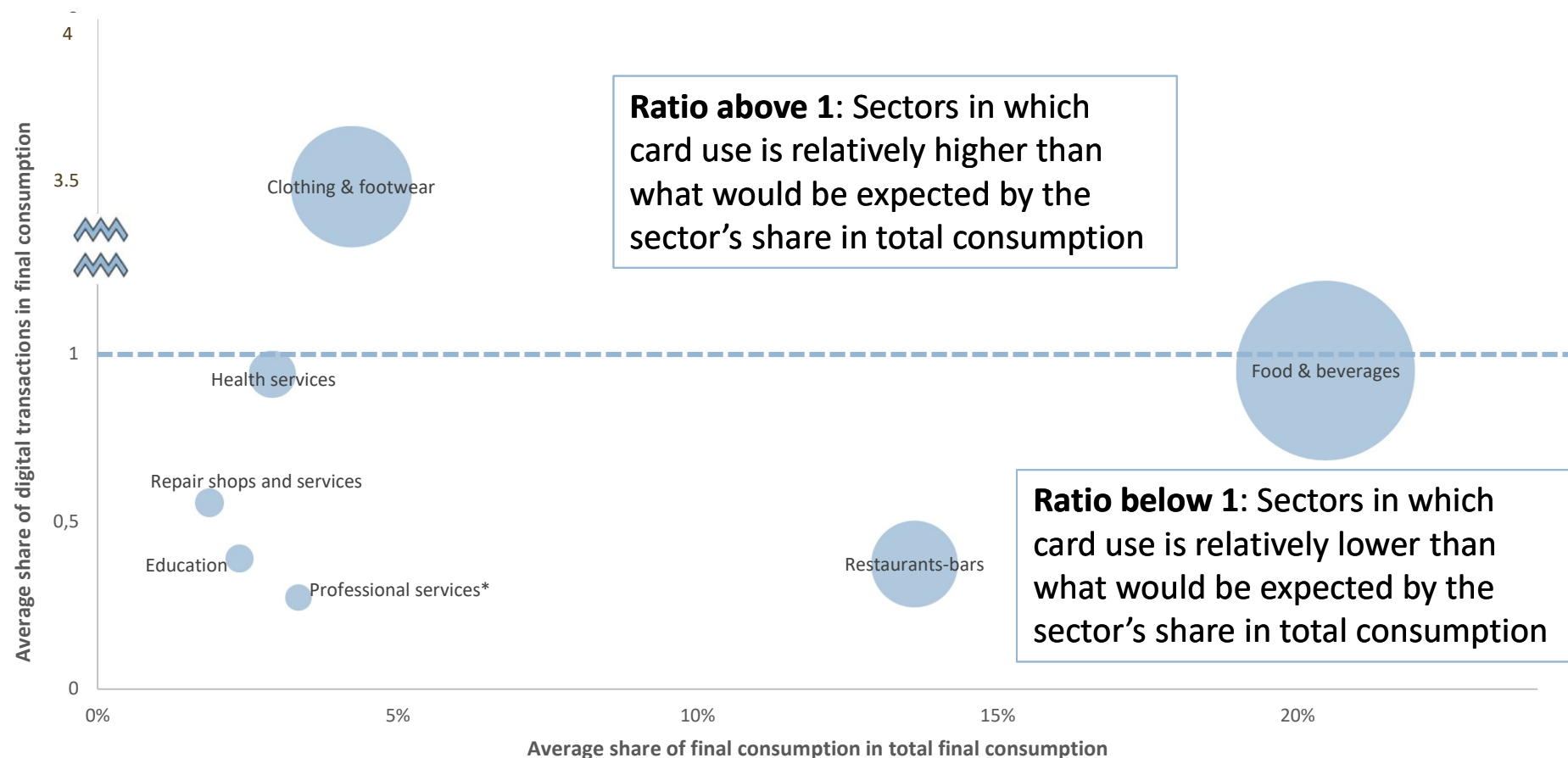


Source: Mastercard. Data Analysis: IOBE

Note: Prepaid cards and on-line card transactions are not included. **Other retail:** Department stores, Discount stores, Electric Appliances, Hardware, Computer Equipment and Software, Home furnishings, Sporting goods Stores, Other Retail. **Other services:** Hospitals, Mail Order, Quasi Cash, Pet shops, Cosmetic shops, Other Services. **Professional services:** Architectures, Insurance, Real Estate, Securities-Brokers-Dealers. **Health services:** All outpatient services excl. hospitals

...while declined for Clothing stores and Other retail

Adjusted for consumption, the use of cards is lower in sectors where the risk for undeclared transactions is higher...



Source: Eurostat, Mastercard. Data Analysis: IOBE

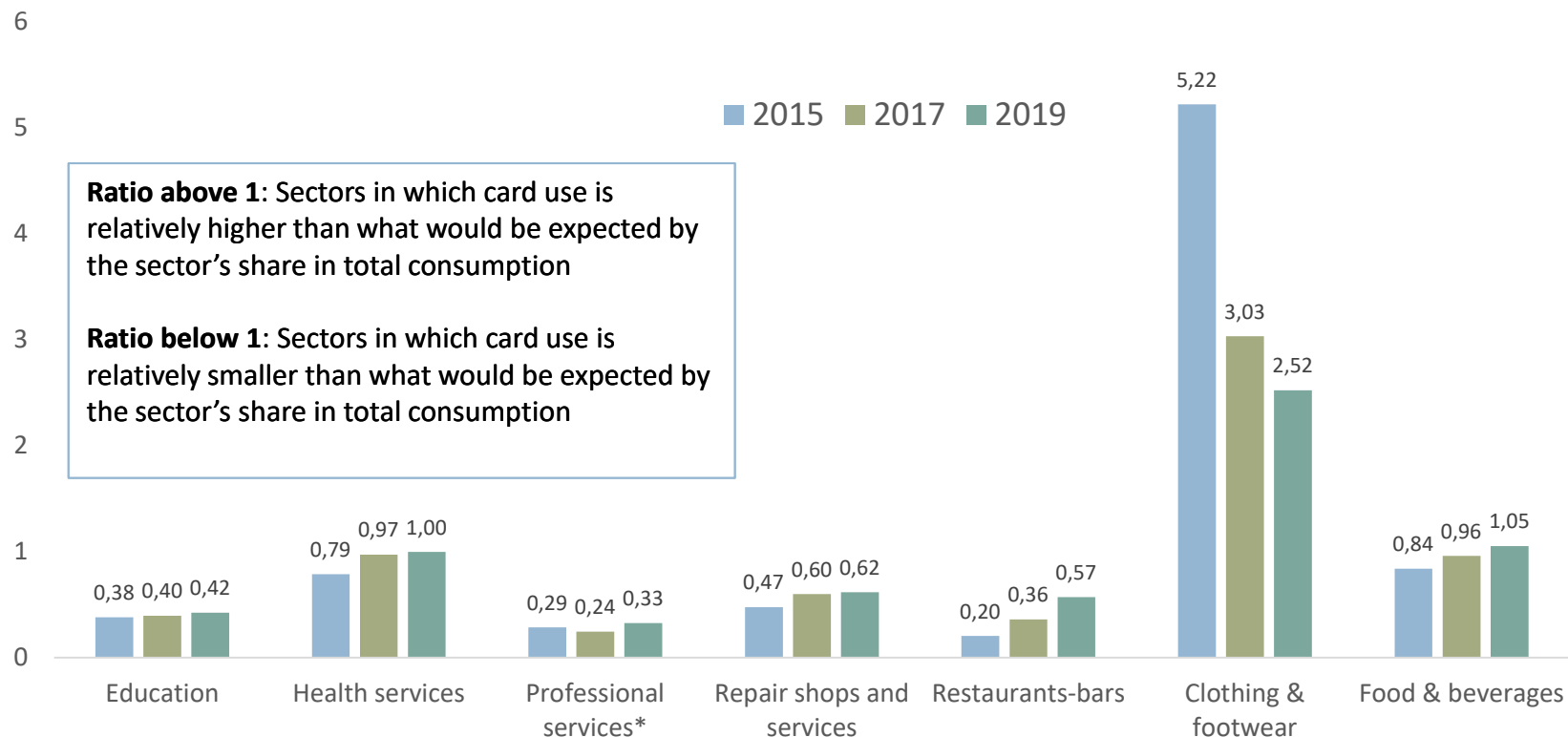
\*For final consumption share of professional services, we use the respective share of professional services' output in total output.

Note. Bubble diameter: total no. of transactions (2015-2019). Prepaid cards and on-line card transactions are not included. **Professional services:** Architectures, Insurance, Real estate, Securities-Brokers-Dealers. **Health services:** All outpatient services excl. hospitals. **Food & beverages:** Food Stores-Warehouse (excl. supermarkets)

...however, the share of DMP use converged to consumption shares in a number of sectors



**Degree of cards use in relation to final consumption, by sector of transaction**  
(sector market share of digital transactions value/ average sector share in priv. consumption in 2015-2017)



Source: Eurostat, Mastercard during 2015-2020 Data Analysis: IOBE

\*For final consumption share of professional services, we use the respective share of professional services' output in total output.

Note: Prepaid cards and on-line card transactions are not included. **Professional services:** Architectures, Insurance, Real estate, Securities-Brokers-Dealers.

**Health services:** All outpatient services excl. hospitals

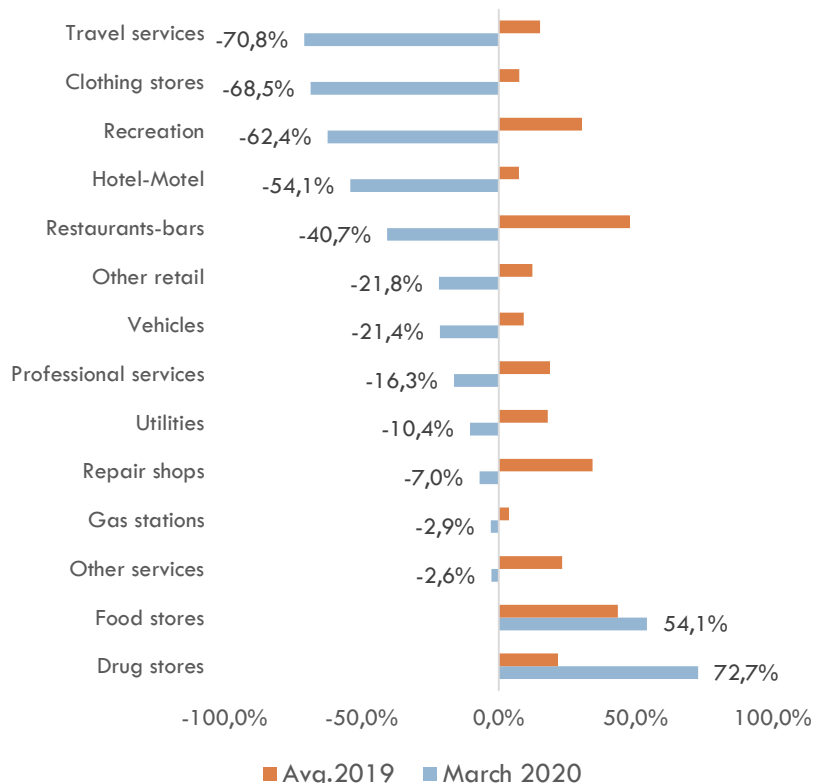
There is limited progress in Education, Professional services and Repairs, while there is room for significant further growth of DMP's share in Restaurants-bars



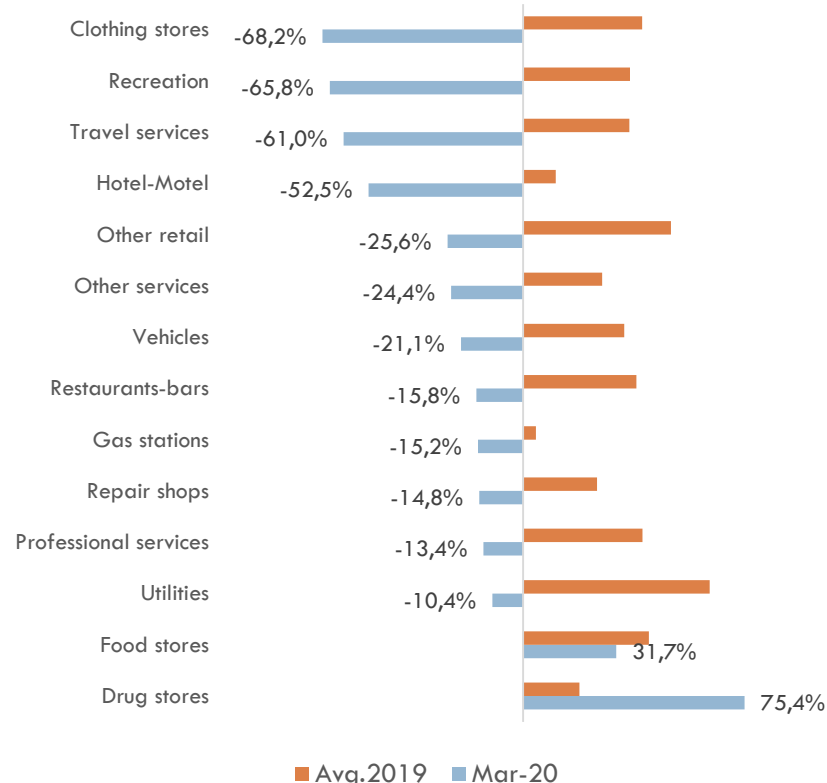
# The pandemic had a sizeable impact on the sectoral composition of digital payments



**Value of transactions (y/y % change in%)**



**No. of transactions (y/y change in %)**

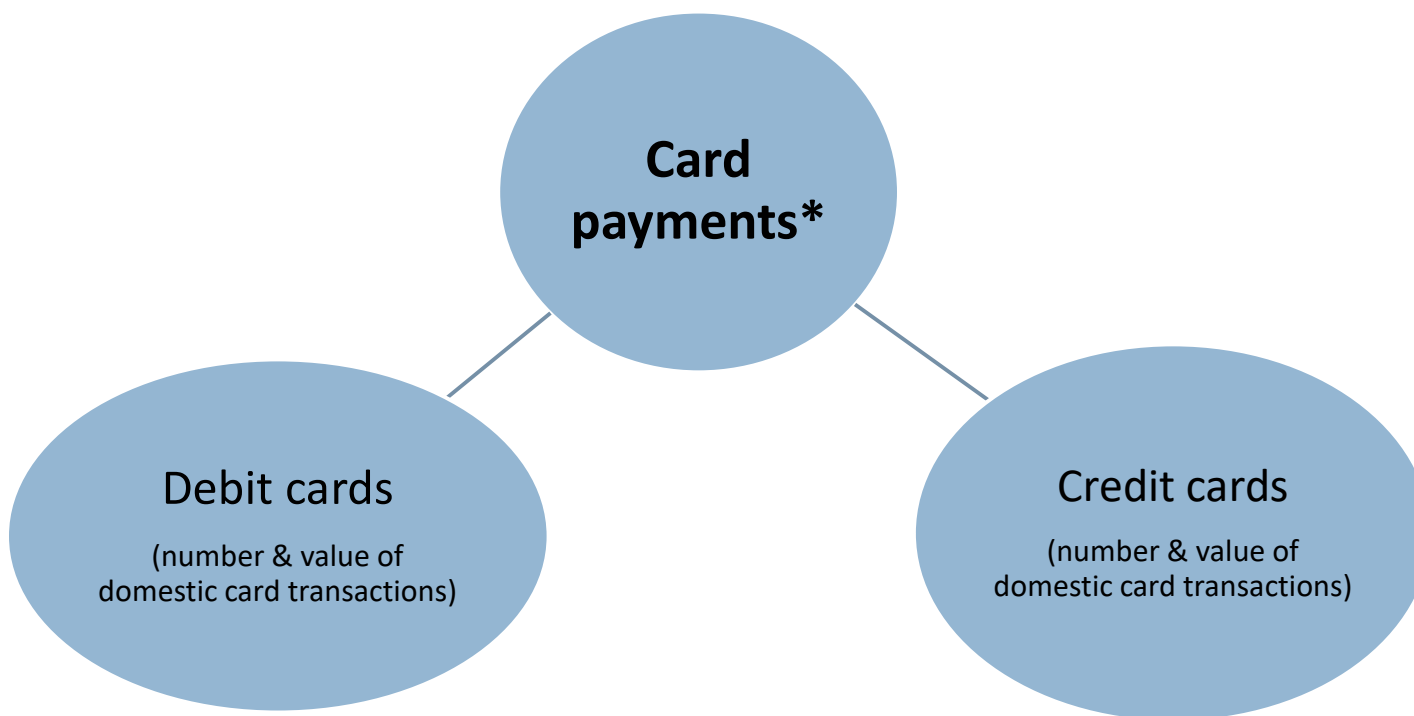


Source: Mastercard during 2015-2020 Data Analysis: IOBE

Note: Prepaid cards and on-line card transactions are not included. **Other retail:** Department stores, Discount stores, Electric Appliances, Hardware, Home furnishings, Sporting goods stores, Other Retail, **Other services:** Education, Health Care, Mail Order, Other Transport, Quasi cash, Other services, **Professional services:** Computer Equipment and Software, Architectures, Insurance, Real Estate, Securities-Brokers-Dealers

Travel, recreation, accommodation, restaurants-bars and clothing stores were hit hard by the lockdown measures, while food and drug stores received a boost

# Impact of 2019 measures on card use



\*Our sample covers monthly card transactions estimated to reflect country wide use, based on market intelligence, actual data by the 4 systemic banks for 2014-2017 and data by Mastercard for 2018-2020. The econometric analysis uses y/y percentage change in the use of card payments between January 2015 and February 2020 (63 observations). The data set includes debit and credit card transactions made with physical presence, while it excludes e-commerce and transactions through pre-paid cards.

- Objective: Estimate the impact of Law 4646/2019 on the use of cards for payments
  - ▣ Time threshold: January 2020 when law 4646 started to be implemented
  - ▣ Two sub-periods: before and after
- Choice of three dependent variables as proxies for DMP use
  - ▣ Value of card transactions, y/y growth rate
  - ▣ Number of card transactions, y/y growth rate
  - ▣ Breakdown across debit and credit cards
- Independent variables and controls
  - ▣ Lagged dependent variables (according to best ARIMA model specification)
  - ▣ Macro control: Private consumption y/y growth rate
  - ▣ Capital controls effect: Time dummy for the 1<sup>st</sup> year of capital controls (July 2015- June 2016)
  - ▣ Law 4446/2016 effect: Time dummy for the 1<sup>st</sup> year of implementation (January-December 2017)

- We use y/y changes of variables (except for dummies) to avoid the seasonality bias
- We check their stationarity through the ADF test
- We select the number of AR and MA lags for our independent variable, on the basis of Akaike, Bayesian and Hanna-Quinn information criteria
- We estimate alternative ARIMA model specifications. The selection of explanatory variables aims to account for macro factors affecting DMP use which are not related to law 4646
  - ▣ Card use = f (lagged card use, macro controls, 2015 effect, 2017 effect)
  - ▣ We expect a positive sign for all our dependent variables
  - ▣ We select consumption y/y growth as the main macro control
  - ▣ We run robustness tests with alternative macro controls, such as employment, inflation, GDP, consumer sentiment, unemployment rate, retail trade turnover and volume; the results remain broadly similar
  - ▣ We test our specifications for omitted variables bias; such tests reject the omitted variables bias hypothesis
- We evaluate both specifications' forecasting power and check that there is no autocorrelation of residuals nor multicollinearity

- We estimate the model over the period 2015-2019 (before the implementation of law 4646). The model captures how card use growth trend has been affected by macro factors, capital controls and Law 4446/2016.
- We then make out-of-sample forecasts for the period Jan-Feb 2020 and compare them with the actual values of our independent variables
- The discrepancy between forecasted and actual values in 2020 can be inter alia attributed to the impact of law 4646
- Robustness checks: We evaluate the model's forecasting power using different criteria (RMSE, Theil Coefficients)

# Determinants of card transactions use



- Economic activity, proxied by private consumption y/y growth, is positively related with card use dynamics, yet its elasticity is not statistically significant
- Capital controls' shock appears to have the most significant and sizable impact on card use penetration
- Law 4446/2016 also had a positive impact on card growth trend

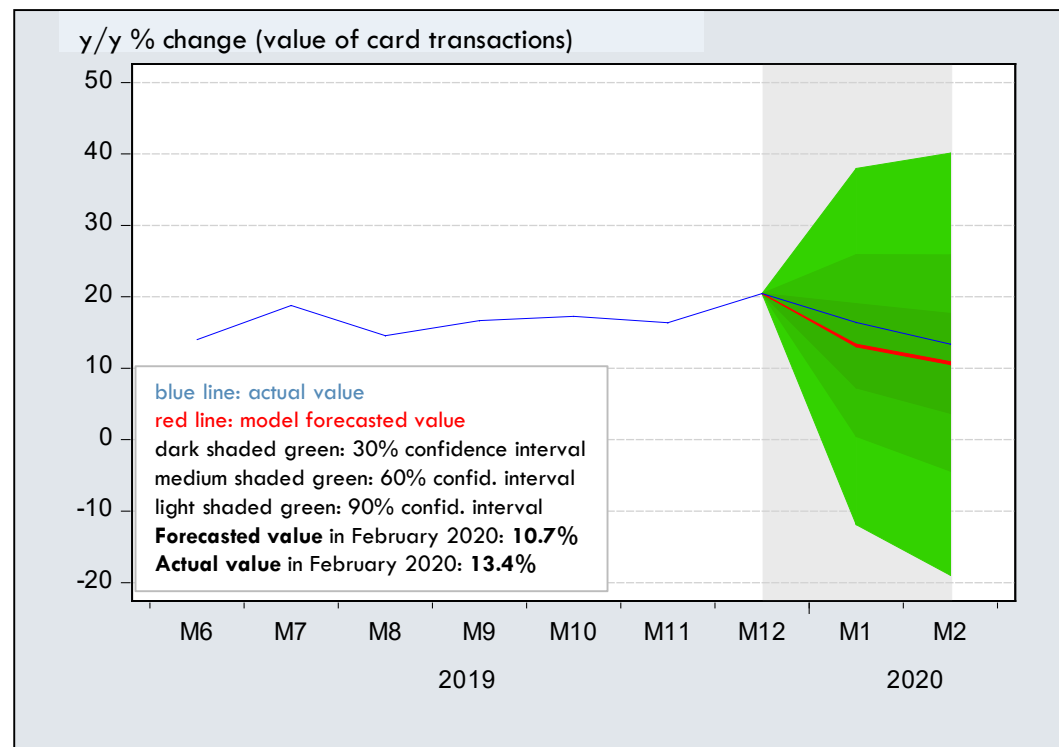
Variables	Value of digital transactions	Number of digital transactions
Nominal private consumption	0.7	
Real private consumption		0.64
Capital controls	0.58***	0.82***
Law 4646/2016	0.19**	0.22*
Specification	ARMA(1,0)	ARMA(1,0)
Adjusted R2	90.8%	91.5%
Number of observations	62	62

Note. The table presents OPG-BHHH Maximum Likelihood Estimations using monthly data from January 2015 until December 2019. Coefficients' significance at 99%, 95% and 90% confidence level is noted by \*\*\*, \*\*, \* respectively. The value of card transactions and nominal private consumption are expressed in current prices.

# Forecasting card transactions **value** without measures



- The actual growth of the **value of card transactions in Jan-Feb 2020** was slightly higher than what was forecasted by our model without the 2019 measures
- The y/y growth rate was higher in February 2020 by almost 3 ppts.
- The positive impact of the 2019 measures is not statistically significant.

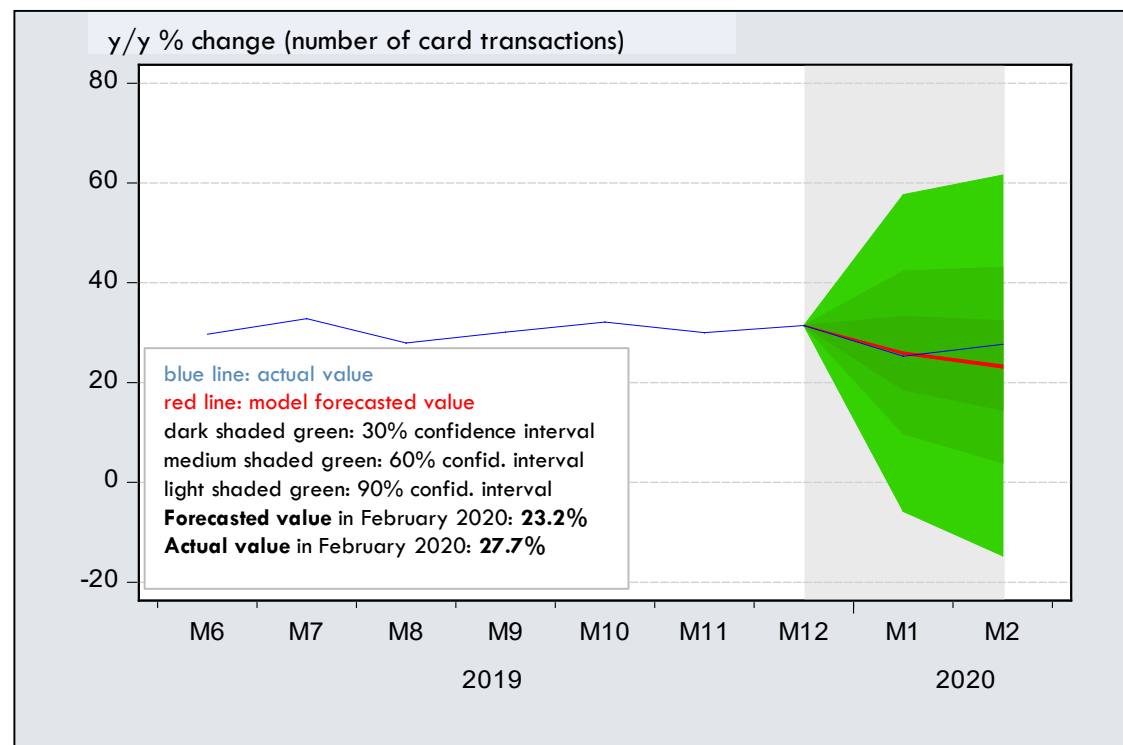




## Forecasting card transactions **number** without measures



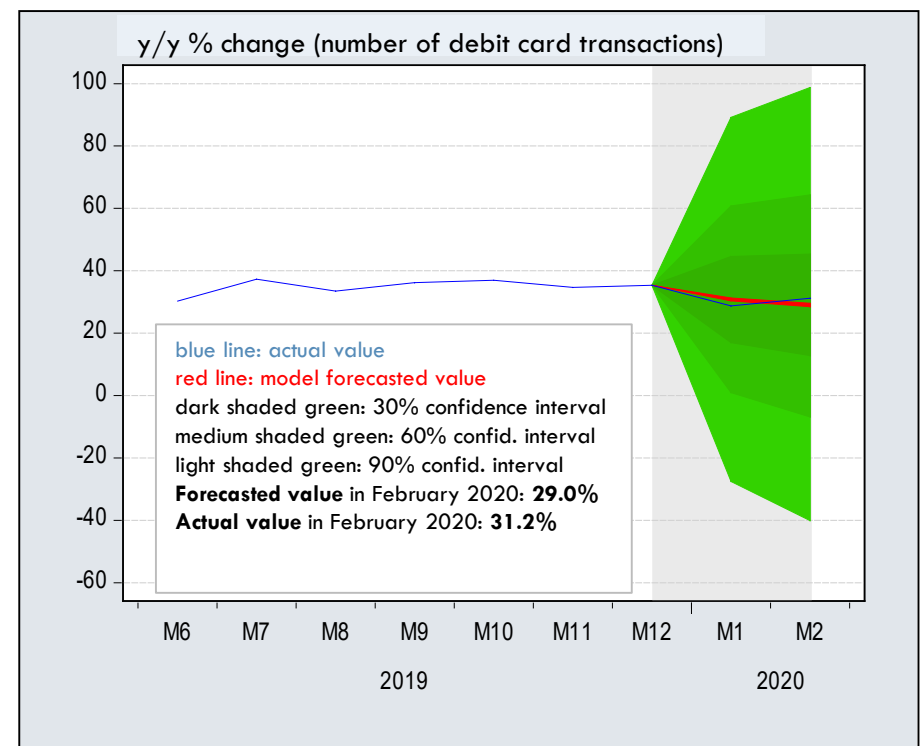
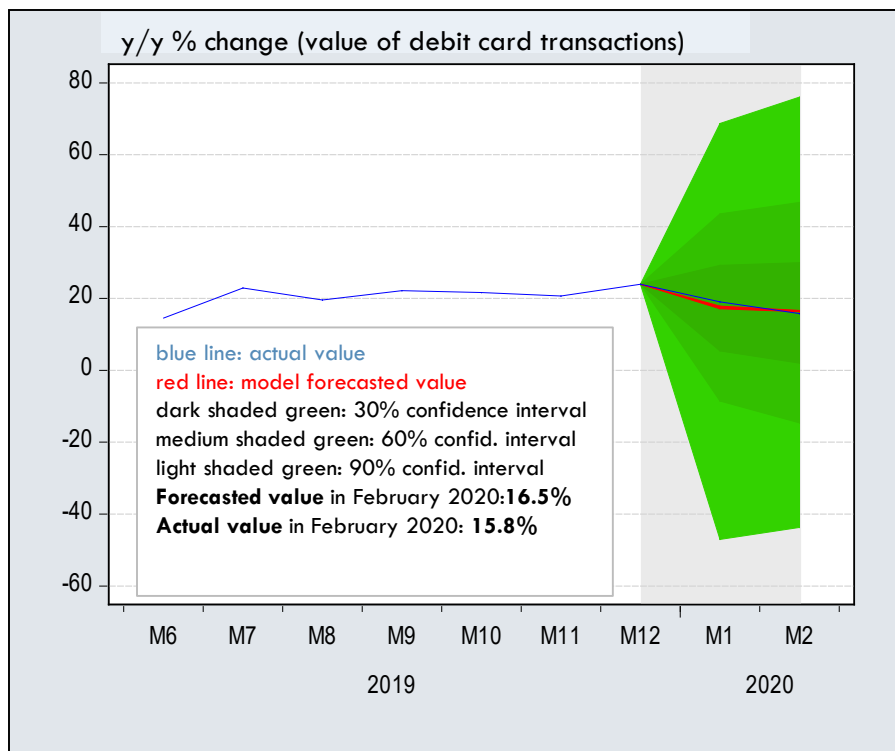
- The actual growth of the **number of card transactions in Jan-Feb 2020** was slightly higher than what was forecasted by our model without the 2019 measures
- The y/y growth rate was higher in February 2020 by 4.5 ppts.
- The positive impact of the 2019 measures is not statistically significant.



# Forecasting debit card transactions



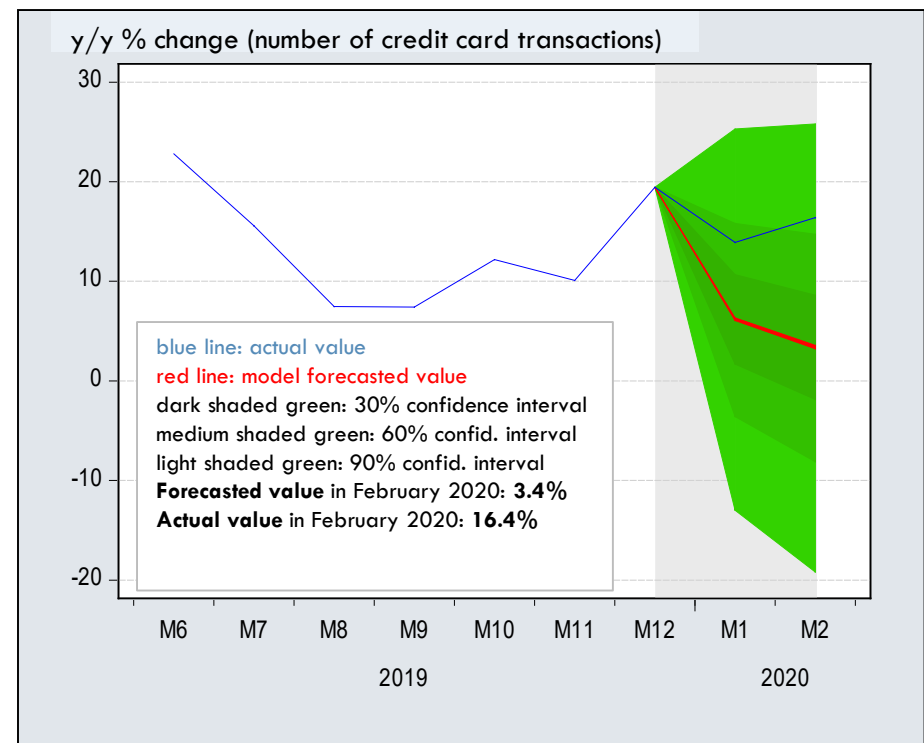
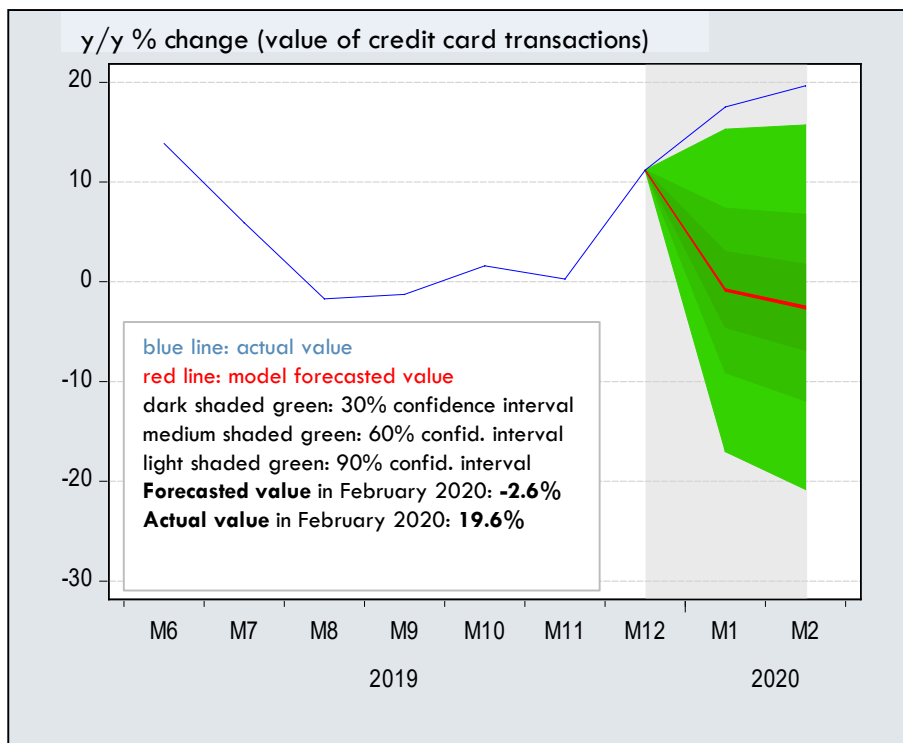
- The actual growth of the **use of debit card transactions in Jan-Feb 2020** was almost identical to what was forecasted by our model without the 2019 measures
- The marginal impact of the 2019 measures is not statistically significant.



# Forecasting credit card transactions



- The actual growth of the **use of credit card transactions in Jan-Feb 2020** was higher than what was forecasted by our model without the 2019 measures
- The y/y growth rate was higher in February 2020 by 13 ppts in terms of number of transactions and by almost 22 ppts in terms of value of transactions
- The positive impact of the 2019 measures is statistically significant in the case of value of credit card transactions.



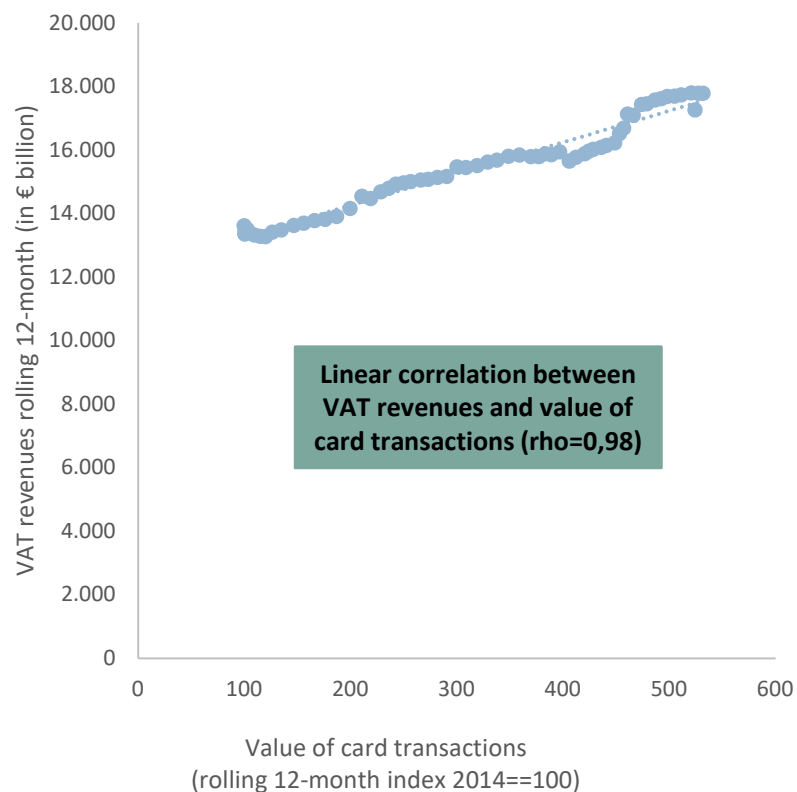
- There is **preliminary evidence that in Jan-Feb 2020 law 4646 had a mild positive impact** on the degree of cards use, through:
  - ▣ a higher y/y change rate in both the value and number of card transactions
  - ▣ the channel of credit cards mainly
- However, the impact of the law on card use was not statistically significant (yet), likely due to limited data availability after the voting of the law, and before being affected by the pandemic shock
- Results hold after controlling for macro economic factors and alternative model specifications
- **Results confirm previous findings** in relation to the:
  - ▣ Significant positive impact of capital controls' shock on card use penetration
  - ▣ **Positive effect of measures boosting digital payments initiated by law 4446/2016**
  - ▣ Need to properly control for macroeconomic factors when estimating the impact of regulatory measures on the use of digital means of payments.
    - The pandemic and several containment measures are expected to inter alia have a major impact on the use of cards.

# Impact of card use on VAT revenues

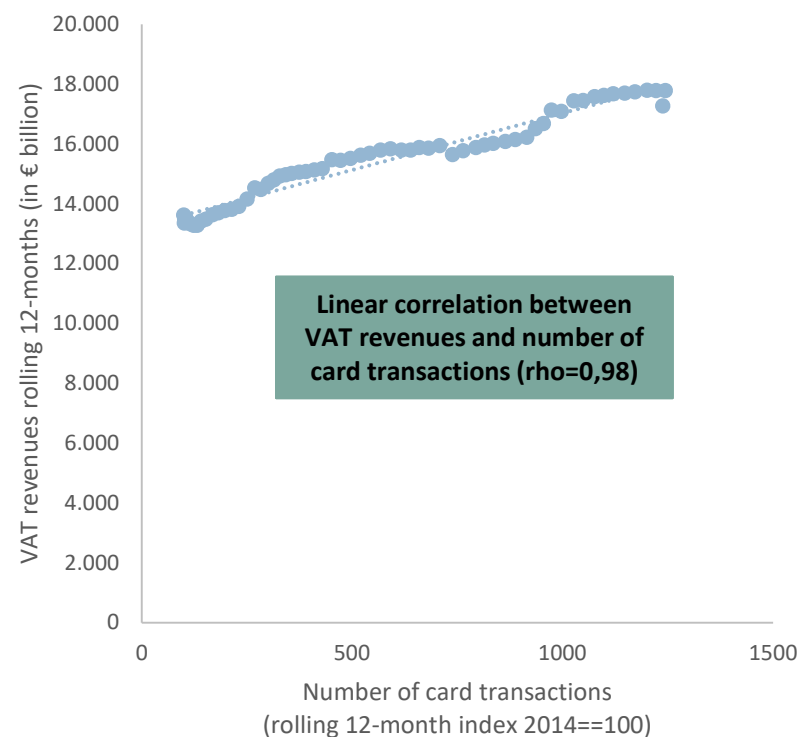
# Strong positive correlation between card use and indirect tax revenues persists during 2014-2020



**VAT revenues and value of card transactions, 2014-2020**



**VAT revenues and number of card transactions, 2014-2020**



Source: Mastercard, Independent Authority for Public Revenues (AADE)  
Data analysis: IOBE

## Dependent variable: Revenues from indirect taxation

- VAT revenues (growth rate)

## Independent variables and controls

- Value of card transactions (growth rate)
- Number of card transactions (growth rate)
- Dispersion of tax rate: dummy for VAT reform in June 2016 (fewer exceptions)
- Covid19 effect: Time dummy for March 2020

## Instruments

- Tax base: Nominal or Real private consumption (growth rate)
- Tax rate: Index for indirect taxation derived from HICP data (Eurostat)
- Capital controls: Time dummy for the 1st year of capital controls (July 2015- June 2016)
- Law 4446/2016: Time dummy for the 1st year of implementation (January-December 2017)

## Data (Jan 2015 – Mar 2020)

- Monthly VAT revenues data before refunds (Independent Authority for Public Revenues - AADE)
- Monthly data on card payments, estimated to reflect country wide use, based on market intelligence, actual data by the 4 systemic banks for 2014-2017 and actual data by Mastercard for 2018-2020
- The data set includes debit and credit card transactions made with physical presence in Greece, through cards issued domestically, while it excludes e-commerce and transactions through pre-paid cards.

## Method

- Instrumental variables (2-stage least squares) regression

# Positive and statistically significant impact of card use on tax compliance



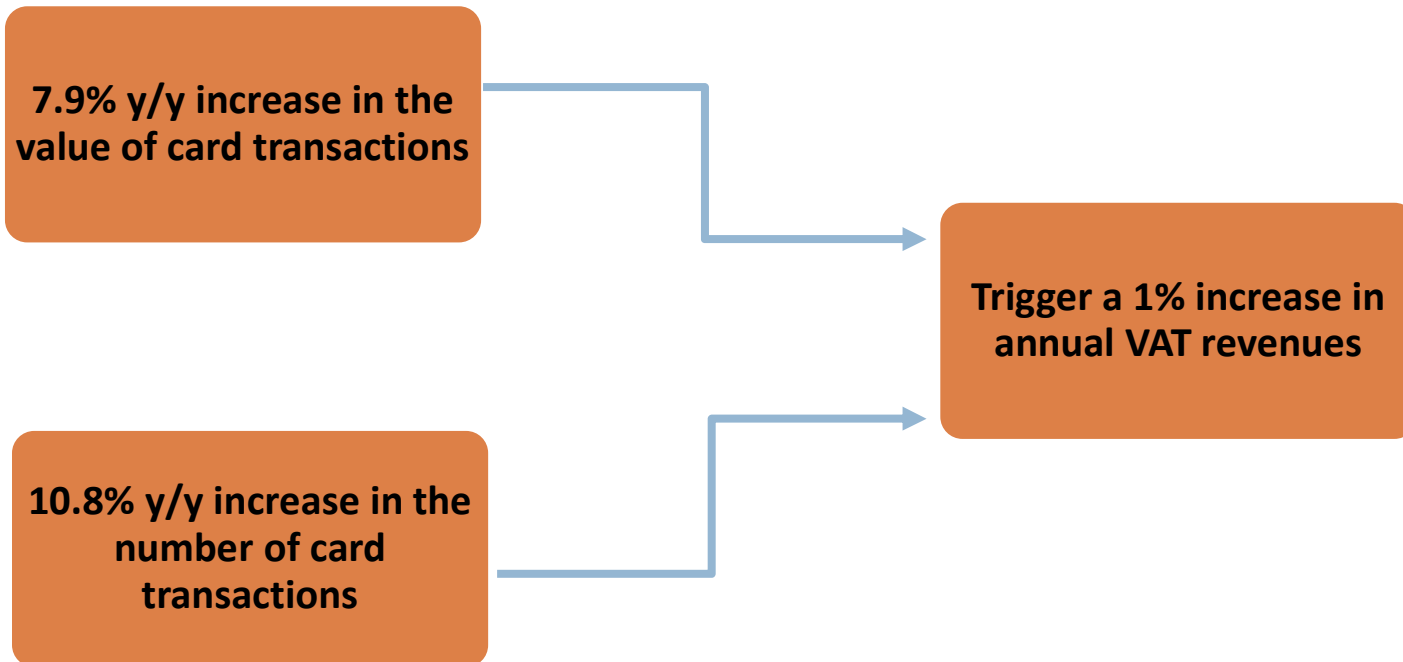
VAT Revenues		
Variables	Model 1	Model 2
Value of transactions	0.13***	
Number of transactions		0.09***
Dispersion rate	0.08**	0.07**
Covid-19 effect	-0.38***	-0.39***
Constant term	-0.05	-0.05
Instrumented variable	Value of digital transactions	Number of digital transactions
Instruments	L1.Value of transactions, Nominal private consumption, Capital controls, Law 4646/2016, Tax rate	L1.Number of digital transactions, Real private consumption, Capital controls, Law 4646/2016, Tax rate
R-squared	30.9%	31.0%
Sargan (score) chi2	4.34	3.94
Number of observations	62	62

Note: The statistical significance of the rates noted with \*\*\*, \*\* and \* for levels of statistical significance 1%, 5% and 10% respectively. The value of transactions and private consumption are expressed in current prices.

In Jan 2015 - Mar 2020, every 1% increase of card use in terms of value or number of transactions, led on average to an increase of VAT revenues by **0.13 ppts** and **0.09 ppts** respectively.



Higher penetration of card payments has contributed to an increase in VAT receipts through formalizing previously unrecorded transactions



In Jan 2015 - Mar 2020, it is estimated that on average:

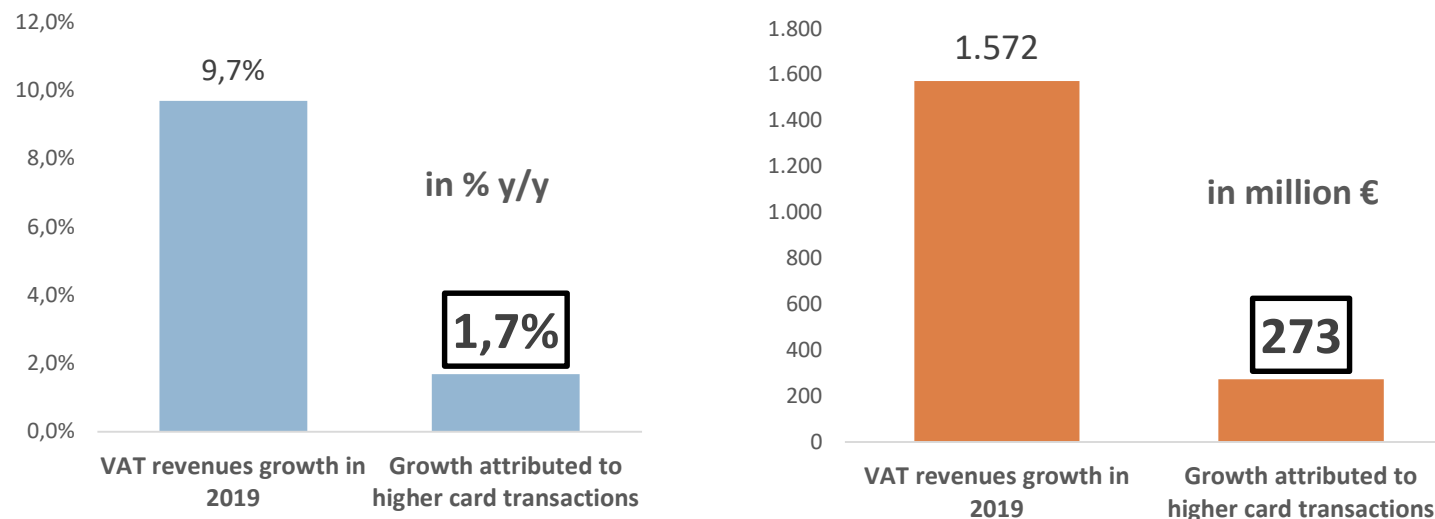
- 1€ out of every 8€ of additional card transaction value was previously unrecorded
- 1 out of 11 additional card transactions was previously unrecorded

Cards' penetration is estimated to have contributed to at least 17% of total annual VAT revenues' increase in 2019



In 2019, total VAT revenues increased by 9.7% y/y (€1.57 billion), while total card transaction value increased by 13.3% y/y (3.07€ billion)

### Quantification of the impact of increased card use in 2019 on VAT revenues



Note: Elasticity of transactions value based on estimation through 2-stage least squares

The total impact of card use penetration on tax revenues would be higher, if one takes into account income tax effects

## Annual VAT revenues would increase by 6.4% (€1.1 billion) if Greece attains the Euro Area average use



### Potential VAT revenues based on good practices of other countries as per the ratio «transaction value over private consumption»

What if Greece attains the card use of other countries?	Greece gap from other countries, (in € billion)	Potential VAT revenues (in € billion)	Potential VAT increase vs 2019 (in %)
EU28 average	22.8	2.0	11.1%
Euro Area average	13.1	1.1	6.4%

Note: Based on estimation through 2-stage least squares

Enhancing the incentives for more targeted use of card payments in locations with low use and sectors with medium and high risk of tax evasion enhances the range of expected fiscal gains

# Policy measures

# Indicative policy measures to strengthen the incentives for further use of digital payments



- Cash refund to consumers paying electronically in targeted sectors or geographical regions
- Income tax discount awarded to large digital payment use in targeted sectors
- Implement a more streamlined lottery scheme both in terms of scope and publicity

Demand side -  
Consumers



- Lottery for self-employed who meet digital penetration targets
- Credit or tax deduction to sellers of goods and service providers who meet digital penetration targets both in relation to the level of use as well as y/y penetration
- Implementation of digital billing

Supply side - Businesses



Current measures need to be complemented with further positive incentives and become more targeted on types of transactions

# Conclusions

## Main findings (1)



**The use of payment cards increased strongly in Greece between 2015 and 2019**, with varying growth across sectors, interrupted by the lockdown measures in March 2020.

The **level of card use** has been gradually converging to EU average, however it remains significantly lower and heterogeneous across sectors and regions.

Consumers make card transactions **considerably more to buy goods rather than services**.

Supermarkets, clothing stores, gas stations and other retail are top sectors in digital transactions over the last four years.

The share of DMP use in Attica declined significantly between 2015 and 2017, but Attica continues to account for almost half of total card transactions' value.

**During the pandemic**, the frequency of digital payments increased but mainly through lower value transactions.

As for **online card payments** in 2020, their use has accelerated much faster than that of card payments with physical presence.

Travel, recreation, accommodation, restaurants-bars and clothing stores were hit hard by the lockdown measures, while food and drug stores benefited.

## Main findings (2)



There is preliminary evidence that in Jan-Feb 2020, **law 4646 had a mild positive impact** on the degree of card use.

There was a **persistently positive and sizable impact of card use on tax revenues** in 2015-2019.

There is **potential for further significant fiscal gains** from greater use of digital payments.

Existing policy measures should be **complemented with further positive incentives** on digital payments, including **incentives for use on targeted types of transactions**.



# Thank you!

**Coordination**

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