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DEVELOPMENT OF ELECTRONIC PAYMENTS IN GEORGIA

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Abstract. Electronic payments are considered to be a fast and secure alternative for traditional payment methods. Today, it is impossible to imagine modern bank operations, commercial transactions and other payments without electronic payments. This article shows that electronic payments are not the only means for reducing costs with respect to other payment methods, such as cash, but can also generate significant benefits for increasing economic development and reducing shadow economy. The paper focuses on the development of electronic payments in Georgia and its impact on the economy of the country. Over the decades, the payment systems in Georgia have evolved significantly in line with the technological advancement. Significant progress has been achieved in improving the e-payment systems infrastructure. The evolution of e-payments in Georgia can be characterized by the following: debit (including prepaid) and credit cards, credit and debit transfers compose a core set of noncash payment types commonly used today by consumers and businesses. These core noncash payment types are used both in traditional ways, such as in-person purchases, payroll deposits, and bill payments, and in innovative ways, such as contactless and mobile payments, e-commerce and online bill payments. Using the economic-mathematical analyses of the information taken from the web-page of the National Bank of Georgia and commercial banks' publications, a mathematical model was built, based on which the positive relationship between e-payments and economic growth in terms of real GDP was shown.

Keywords: Payment systems; Electronic Payment Instruments, Payment Cards, Correlation-Regression analyses.

JEL Classification: C02

Introduction

Payment for goods and services has been a part of human history for the civilization of humanity. Over the centuries, the types of payment methods were changing. With the development of technology, money was actively replaced by its electronic alternatives, making it possible to conduct financial transactions at any time and place. Electronic payments are defined as transfer of cash from one account to another electronically without banknotes or coins. For example, the payment of utility payments via internet, credit transfer or direct debit, payment cards payments and so on. No one knows exactly when the first electronic payment was made, but 1870 is the date when Western Union introduced the revolutionary method of electronic money transfers. It is considered as the date of the creation of the first electronic system. Then, in 1918, the American Federal Reserve Bank transferred funds through telegraph (https://www.finder.com/history-of-money). This is when the first credit report and the payment cards appeared. In 1950, the Diners Club became the first independent credit organization, followed by American Express in 1958, which issued plastic cards (https://www.creditcards.com/credit-card-news/history-of-credit-cards.php).

Today, along the significant achievements in telecommunication, electronic systems quickly replacing the traditional means of payment. Non-cash payment is an important source of economic development and has a great influence on consumer expenditures (Zandi M., at al., 2016, The Impact of Electronic Payments on Economic Growth). The growth of e-payments reduces its cost and improves the flow of goods, increases customer confidence and access to credit products. It's a safe and effective alternative to cash and helps to

financial engagement. Electronic payments are transparent and reduce the number of unregistered transactions (Slozko, O., Pelo, A., 2014, The Electronic Payments as a Major Factor for Further Economic Development, Economics and Sociology, Vol. 7, No 3, pp. 130–140). Therefore, it increases tax revenues and reduces the share of shadow economy. Based on all the facts mentioned above, the development of electronic payments systems will lead to a virtuosic economic growth: consumption increases, goods reduces and demand rises accordingly. As a result, jobs are increasing, there is more production and prosperity is growing (Zandi M., at al., 2016, The Impact of Electronic Payments on Economic Growth).

The aim of this work is to analyse the role of electronic payments in Georgia on the development of the country's economy. Specifically, the author tries to connect the electronic payments with GDP, which is the sum of the final values of product and service within the country for a certain period of time and its real growth rate is one of the major indicators of the country's economy. The share of the national consumer spending – personal consumption expenditures in Georgian GDP is 71% (http://www.geostat.ge/index.php?action=0&lang=eng). There are many researchers conducted by international organizations and authors about electronic payments' positive effect on consumption and on the real GDP in developed and developing countries, respectively. Therefore, it was the greatest interest to show how this impact was in Georgia.

This research is directed to estimate the macro-economic effects of electronic payments in Georgia. As a research method, the system approach, economic-mathematical methods and models, methodology of general statistics theory, mathematical statistics, and econometrics was used. Economic-mathematical modelling, which is an integral part of any research in the field of economics, is a process of expressing economic processes by mathematical models.

The practical task of this research, on one hand, was to analyse the economic objects of the Georgian Economy for the period 2011–2017, such as: Gross Domestic Product (in local currency - Gel), Commercial Bank Clients' transactions, which related to payments for goods and services (hereinafter referred to as 'individual payments'), Commercial Banks Client low value interbank transactions (hereinafter referred to as 'low payments') and payments by the payment cards at merchant outlets. On the other hand, the main goal was economic foreseeing for the development of the ongoing processes and recommendations on the level of the model built. The main hypotheses of the paper were developed: the increase of electronic payments is directly linked and contributes to the development of the Georgian economy.

Literature Review

We can consider the development of cashless payments as a result of a new idea to simplify the way of payments, which was then slowly adopted in peoples' life. Nowadays, the payments business is a crucial source of revenue and data and a critical anchor for broader customer relationships (World Payment Report 2017). The payment industry continues to develop and offer new initiatives to their customers. The World Payment Report 2017 highlights the key findings of global non-cash transactions during the past decade. This is the leading source for data, trends of e-payments and main industry and regulatory initiatives. According to this source, the global non-cash payments can be characterized as a fast growing market, especially in the emerging markets: emerging Asia, with a growth rate of 43.4% and Central Europe, Middle East and Africa (CEMEA), with a growth of 16.4% (2014–15 data). While the total non-cash transaction volumes grew 11.2% during 2014–2015 and reached 433.1 billion, the rate of growth in Europe changed from 7.3% to 7.5%. Noticeable growth was shown in the following countries: Germany, Spain, Finland, Ireland, Sweden and Denmark. It should be noted that China is on the third position with 38.1 billion transactions (63.2% growth rate).

Electronic transaction technology associated positively to real economic aggregates. This is more obvious for the Euro economy countries. The findings of the European Central Bank Working paper 'Retail Payments and the Real Economy' (August 2013) provided deep analyses of 27 European Member States

over the period 1995–2009 and proved 7 main hypotheses, among which, the following may be mentioned: Efficient non-cash retail payment instruments stimulate economic development; Cheque payments exert a lower contribution on GDP, consumption and trade in comparison to other non-cash payment instruments; The positive effect of credit transfers on real economic development is higher in the euro area countries than in the non-euro area countries; The adoption of new payment technologies results in additional economic development.

The different means of non-cash payments are growing around the world. Innovations are more comfortable to use for young people. For example, emerging Asian markets are driving to accelerate e-commerce development. Despite this, 'E-Payments in Emerging Markets' (Amrish Rau, 2013) states that many rural areas still do not have banking systems, while those that do are slowly moving from cash to electronic payments. The author highlights the role of government in the investment in new technologies, managing e-instrument security, developing financial inclusion and leveraging existing market players. What will be the next steps: it's clear that the future is bright and that opportunities abound with carefully planned strategies and reliable partners (Amrish Rau [2013], E-Payments in Emerging Markets, A First Data White Paper, Journal of Payments Strategy and Systems, Volume 7, Number 4).

The specific area of e-payments is electronic commerce, which created new opportunities for sending and receiving of payment instructions. The paper E-payments in Europe – The Euro system's Perspective (16 September, 2002) investigates the new methods and techniques, which developed to adopt traditional payment instruments for use in internet: credit cards, credit transfers and debit instruments. The development of e-commerce helped to raise a new type of payment service providers and develop new types of electronic instruments such as prepaid cards, electronic wallets and others together with the security issues of those instruments. The main conclusion is that the Euro system endeavours, in co-operation with standardization bodies and market participants, to help strike the right balance between competing and commonly agreed standards.

Another in depth survey on the development of electronic money and internet and mobile payments was published by the Bank of International Settlement updated Survey, which included the information collected from 95 countries around the world. The focus of this survey was not technical purposes, but the market impact of innovations. Based on the information and data provided by the Survey respondents from individual country, comparative tables on the use of innovative products and system were designed. In the survey, the data was collected in end-2002 or 2003, and covered schemes that were being considered, piloted or implemented (Survey of developments in electronic money and internet and mobile payments [March 2004], Bank for International Settlements).

The adoption of the new means of cashless payments has a significant effect on the economy. This was proved by the study Cashless payment and economic growth (Hock-Han Tee & Hway-Boon Ong. [2016], Cashless Payment and Economic Growth). Specifically, the impact of cards, telegraphic transfers, electronic money and cheques on the economies of Australia, Belgium, France, Germany and Portugal for the period of 2000–2012. Research was conducted by the use Pedroni residual cointegration and Panel Vector Error Correction Model. The main message stated from this study is that the adoption of one type of cashless payment will affect another type of cashless payment in the short run, the consequences of adopting cashless payment on economic growth can only be significantly observed in the long run. Hence, any policy that promotes cashless payment will not affect the economy immediately.

Payment card is the most popular non-cash payment instrument in the world. It allows consumer to access his finds in the bank. Greater card usage in the world gives rise to the main question: what kind of benefits it brings to the economy. The answer on this question could be found in Moody's Analytics, which offers unique tools and best practices for measuring and managing risk through expertise and experience in credit analysis, economic research, and financial risk management. Moody analytics conducted two different researches on the influence of payment card transactions on the economy with the initiative of Visa International. In the first research conducted in 2013, the data of 56 countries was studied for the period of

2008–2012 and was stated that the use of credit and debit cards added 983 billion US dollar to the GDP of these 56 Countries. Similar study was conducted in 2016 for the data of 70 countries for card transactions in the period of 2011–2015. According to this research, payment cards usage added 296 billion US dollars to GDP, which means 2.6 million new jobs on average in each year. The main message was stated 'Card usage makes the economy more efficient, yielding a meaningful boost to economic growth, year after year, through a multitude of factors including transaction efficiencies, consumer access to credit and consumer confidence in the payment system overall' (Mark Zandi, et al . [February, 2016], The Impact of Electronic Payments on Economic Growth).

The effect of Debit and credit card transactions together with cheque transactions on GDP was also calculated by John W. Galbraith and Greg Tkacz in 'Statistics Paper Series' (August 2015) of European Central Bank 'Nowcasting GDP with electronic payments data'. The authors have divided the data received from Canadian Payment association and Bankers' Association for the investigation in two spans: the first, through the end of 2009. Credit card data were available to them from 2010. The longer data set which extends through April 2012 contained debit and cheque data. In this particular model, with debit card transaction included, some improvement in the accuracy of the earliest nowcasts was found. The results of the research give a big picture of the improvement in newscasting over time.

'The Analysis of the Factors Influencing on Electronic Payments and Relationship among Azerbaijan's Economy with Them' (2016) gives the broad analyses of factors that have negative influence on the development of cashless payments on Azerbaijan economy. Increase of electronic payments will decrease the size of shadow economy in Azerbaijan correspondingly. Moreover, illegal and low income level, low pension and high consumption, unorganized business, infrastructural possibilities and technological level, payment culture and financial literacy, gaps in legislation and other such factors that impact negatively on the development of cashless payments are analysed and the recommendations have been given in this study. In addition to these, international experience has been investigated in terms of administrative and stimulating policies in order to improve cashless payments and recommendations have been made in this direction for Azerbaijan.

A significant positive relationship between e-payment system and economic growth in term of real GDP per capita and trade per capita was found in the 'Review of Transition to Cashless Economy in Nigeria' by the authors Oginni Simon Oyewole, El-Maude, Jibreel Gambo, Mohammed Abba and Michael Ezekiel Onuh. The main finding is that most of the non-cash payments are provided through bank accounts. With this research, it was shown that only ATM operations was revealed on economic growth.

Methodology

As research tools, the system approach, economic and mathematical methods and models, the methodology of the general theory of statistics, mathematical statistics, and econometrics were used in this research.

Economic-mathematical modelling, which is an integral part of any research in the field of economics, is a process of expressing economic activities by mathematical models. Like any simulation, it is based on the principle of analogy, that is, the possibility of studying the object not directly, but through considering another, similar to it and more accessible object – its model.

The purpose of mathematical modelling of economic systems is the effective solution of problems arising in the field of economics. Designing modern information models of various economic objects allows to study their dynamics, the nature of the influence of various factors on the object being studied, as well as to predict the future conditions of the studied object/activities; it gives an opportunity to get a clear idea about the object under study, to characterize and quantitatively describe its internal structure and external relations.

The practical task of this study was, firstly, the analysis of economic objects; secondly, forecast of economic processes; thirdly, the development of conclusions and recommendations at the level of the constructed

model. However, the results obtained can be used as 'consulting' means due to the extreme complexity of economic processes.

In order to identify the main tendency of factors affecting the change in the level of GDP (Gel), the factors that have the most significant influence on the effective indicator were selected by measuring the degree of connection between them; after the correlation-regression analysis provided the most significant factors, three factors were selected. These were: 'individual payments', 'low payments' and 'card payments'. What are these factors?

The main electronic payment system in Georgia is the Real Time Gross Settlement System (RTGS), through which the interbank transactions are processed. It plays a key role in terms of high as well as low value payments. For the research purposes, only payments for goods and services were chosen from the whole transactions through 2011–2017. Under the 'individual payments', commercial banks' customers transactions processed by RTGS system were considered. 'Low payments' also related to customer payments. However, they have a low value and were processed in a separate module of RTGS system for bulk transactions. It should be noted that the examined indicators may not be fully reflected in total e-payments as the source of information were the majority (not all of them) of commercial banks – system participants and the National Bank's web-site, that contains only aggregate data. As regards the third value used in the research – payment card payments for goods and services – this data is really accurate as the source is the web-site of the National Bank of Georgia. All kinds of card payment transactions (except prepaid cards with e-money functions) on the territory of Georgia through EFTPOS were included in the research.

The chart below (Fig. 1) shows the value of the data used for the research purposes (total payments for goods and services) for selected period and the total value of commercial banks' customer payments plus payment card transactions throughout the Country. The last line represents the dynamics of Georgian GDP during 2011–2017:

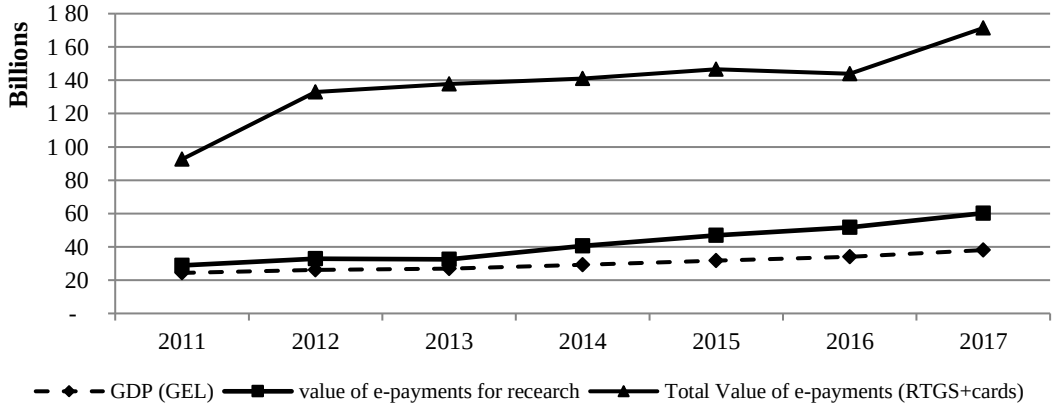

Fig. 1 The dynamics of interbank transactions and card payments in Georgia (Source: The National Bank of Georgia, Department of Statistics and the commercial banks' web-sites)

By the use of the above mentioned factors, the multiply regression model was constructed with one dependent variable – GDP, and three independent variables – individual payments, low payments and card payments. The following equation: $y = a + bx_1 + cx_2 + dx_3$ expresses this relationship. Y is the effective indicator – GDP, x_1, x_2, x_3 – individual payments, low payments and card payments at merchant outlets through POS terminals. a, b, c, d – unknown parameters.

Results

Georgia is a small county with growing economy. The table below (table 1) shows the 2017 economic indicators 2017 (World Bank Georgia: http://www.worldbank.org/en/country/georgia/overview)

Table 1. Georgia Economic Indicators 2017

Population, Million	3,70
GDP, current US Dollars, billion	14,30
GDP per capita, current US Dollars	3,864
GDP real growth, percent	5
Inflation % (annual), March 2018	2,8

An important step in the development of electronic payments in Georgia was taken in September 2001, when the first interbank real-time payment system (RTGS) was introduced with the help of international financial organizations. This led to the creation of an electronic exchange of information between commercial banks. The figure below (Fig.2) shows the dynamics of RTGS transactions value per capita:

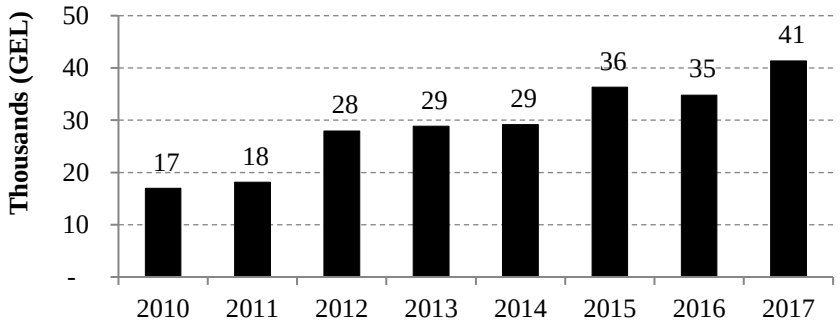

Fig. 2. RTGS transactions per Capita (Source: NBG)

While the Interbank Settlement System creates a robust infrastructure for credit transfers, the card payment networks provide an important infrastructure for card payments. The first few steps of the Georgian Payment Card market establishment were taken from the end of the 90s of the last century (www.nbg.gov.ge). The first local and international cards were issued by the commercial banks (Local in 1996; Visa in 1998; MasterCard in 1999); also, the first POS and ATM networks appeared at this period. However, the rapid development of the payment card market started a bit later – from 2004, which was mostly expressed in the significant growth of the issued payment card number and card accepting devices' network, and in the development of card infrastructure within the whole country. During the last period, card transactions turnover increased significantly, both in terms of volume and value. Figure 3 shows the dynamics of card transactions volume (%) in Georgia.

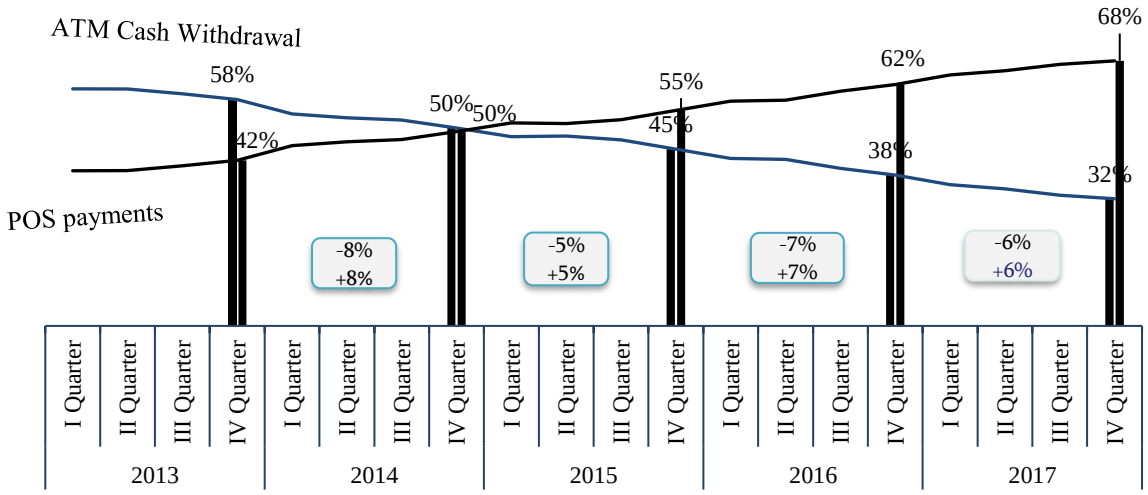

Fig. 3. Number of Card payments in Georgia (Source: NBG)

It should be noted that the payment card market in Georgia is characterized by high rate of innovative products, which is supported by the National Bank at the regulatory point of view. Chip card technologies are well developed. Gradually, it has introduced the technology of contactless cards, which are used in public transport, merchant outlets, school cafeterias and so on. Mobile POS (mPOS) was introduced by the commercial banks specifically for small business companies, which allow them to accept payment electronically, without cash. Contactless card in the accessory – payment watch appeared as a new innovative product. For the acceleration of electronic payments, the following initiatives has been taken by the policy makers (www.nbg.gov.ge):

✓ All social benefits are paid through banking channels, especially by payment cards.

✓ It became mandatory for state organizations to pay salaries to their employees using personal bank accounts. Again, banks offered payment cards to such customers.

✓ Commercial banks issued special cards for schoolchildren with limited functions, which can be used at specific food outlets (school buffet).

Along with the traditional payment instruments, the distance banking services were developed, which allow users to perform various banking transactions using electronic channels:

✓ Internet Banking, when the user has access to his bank account, and can perform various banking operations using a computer connected to the Internet

✓ Telephone-Banking – services through telephone voice communication

✓ Mobile Banking, enabling mobile phone users to manage and control their bank accounts and provide payment transactions

✓ SMS-Banking

✓ E-Commerce – enabling to buy through internet

✓ Electronic Money – offer customers to make payments through the internet within their electronic money account in order to buy services and products or transfer money to another customer's electronic money account.

✓ Self-Payment Kiosks network is growing rapidly in Georgian payment market. It allows customers to make different types of payments in a convenient and operative way.

The general Electronic Payment systems' infrastructure in Georgia is shown below (Fig.4)

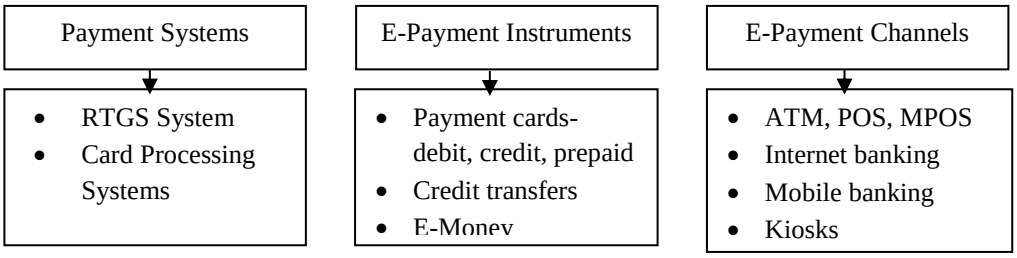

Fig. 4 General Infrastructure of Georgian E-Payment System (Source: NBG)

If we look at the statistics of electronic payments in Georgia, we can see that card payments (number of transactions) at merchant outlets have been stably growing during the past four years. In terms of value, the internet-banking transactions are the largest in total non-cash payments. The figures 5 and 6 show the distribution of non-cash payments by means of initiation during 2017.

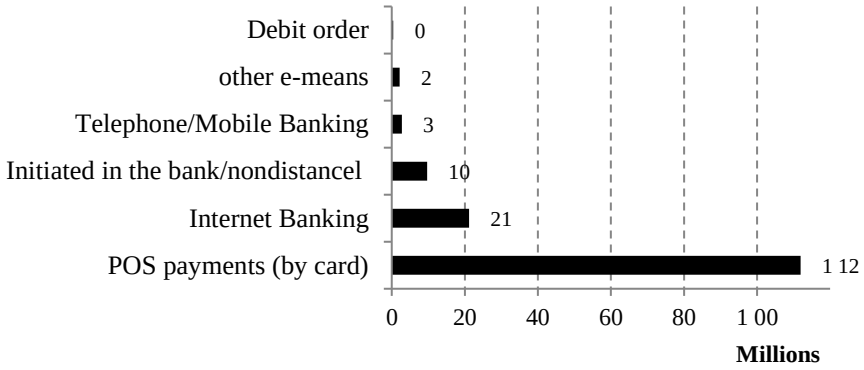

Fig. 5. The distribution of e-payments by means of initiation (volume) (Source: NBG)

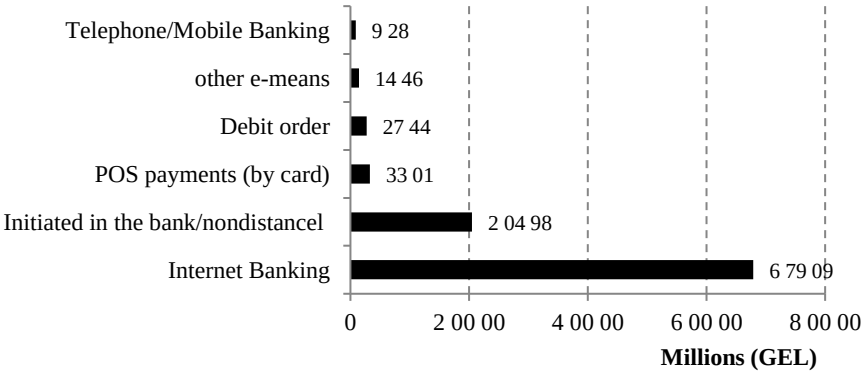

Fig. 6. The distribution of e-payments by means of initiation (value) (Source: NBG)

The brief discussion above demonstrates the positive trend of the development of electronic payments in Georgia. This was also confirmed by the correlation-regression analysis, which was conducted on the mathematical model described above. According to the calculations provided, the following results were adopted:

- An increase of Individual payments by one unit from it average level leads an increase of GDP by 0.25 unit from its average level.
- An increase of low value transactions by one unit from its average level leads an increase of GDP (Gel) by 1.08 from its average level.
- An increase of card operations by 1 unit from its average level leads an increase in GDP (Gel) by 0.34 units from its average level.

The tightness of the connection is quantitatively expressed by correlation coefficients. Coefficients of correlation, representing a quantitative characteristic of the tightness between the factors, make it possible to determine the usefulness of this factors in the construction of multiple regression equation. The size of the correlation coefficients also serves as an estimation of the correspondence of the regression equation to the revealed cause-effect relationships (Robert S. Pindyck and Daniel L. Rubinfeld).

Coefficient of uncorrected multiple determination $R^2 = 0.94$ estimates the proportion of variation in the result due to the factors presented in the equation in the overall variation of the results. This indicates a very close relationship of factors of the result.

The coefficient of adjusted multiple determination $R^2 = 0.9001$ determines the tightness of the connection, taking into account the degrees of freedom of the general and residual variance. It gives such a kind of estimation of the tightness of the connection that does not depend on the number of factors in the model, and therefore, it can be compared on different models with different number of factors. Both coefficients indicate a very high determinacy of the result Y in the model by the factors of Individual payments, low value payments and card operations (X_1, X_2, X_3).

Analysing the constructed model of multiple regressions, it was also found out that:

- One percent increase of individual transactions number from its average level leads an increase of GDP by 0.2% from its average level.
- One percent increase of low payments from its average level will increase GDP by 0.09% from its average level.
- One percent increase of card operations from its average level leads an increase in GDP by 0.01% from its average level.

Tables below (Tables 2, 3 and 4) highlight the results of analyses provided:

Table 2. Regression Statistics

Regression Statistics	
Multiply R	0.970140635
R-square	0.941172851
Normalized R-squared	0.933499745
Standard Error	317222845.1
Observation	27

Table 3. Dispersion Analysis

	df	*SS*	*MS*	*F*	*F Value*
Regression	3	3.70295E+19	1,23432E+19	122.6586477	2.72E-14
Remainder	23	2.3145E+18	1.0063E+17		
Result	26	3.9344E+19			

Table 4. Results of Analysis

	Coefficients	*Standard Error*	*t-statistics*	*P-Value*	*bottom 95%*	*top 95%*
Y-	3001119266	395159986.3	7.594694226	1.03428E-07	2183668558	3818569974
X1	0.258226178	0.104649177	2.467541407	0.02147417	0.041742862	0.474709493
X2	1.084429729	0.352461818	3.076729661	0.005333423	0.355306911	1.813552546
X3	0.3458727	0.842861532	0.410355304	0.685342887	-1.397719213	2.089464613

Conclusions

The presented analysis was an attempt to understand how the existing cashless transactions effect the Georgian economy. With the help of mathematical model built, it was found that the use of non-cash payments is closely related to the level of economic development. These results were relatively noticeable for interbank transactions (individual payments and low payments) and less for card payments. However, it should be noted that the value of interbank payments is relatively stable during the recent years, but card payments are still in the developmental stage and its value is growing year by year. That's, why the development of payment cards is a big potential for the country's economy. Consequently, the increase of initiatives and investments in the strengthening of card market infrastructure across the County will contribute to the development of electronic payments and increases the level of economy. Most people still rely on cash. Changing their habits and believing in cashless payments is not easy and its performance is a longer term plan. But today, we have a clear picture that e-payments system is going to grow and continue to develop.

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