audit FINANCIAR

Anul XIV, nr. 140 - 8/2016

8/2016

- Model de dimensionare a compartimentelor de audit în sectorul public
- Model for dimensioning the audit structures in the public sector

Camera Auditorilor Financiari din România

- Evaluarea cantitativă şi calitativă a unei societăţi comerciale din punctul de vedere al riscului de credit
- Implicaţiile performanţelor financiare asupra indicatorilor bursieri ai întreprinderilor cotate: evidenţe empirice pentru piaţa de capital românească
- Studiu privind relevanţa disciplinelor de contabilitate în formarea profesională economică a specialiştilor necontabili

- Corporate qualitative and quantitative assessment from credit risk perspective
- The implications of financial performance on stock exchange indicators of listed companies: empirical evidence for the Romanian capital market
- Study regarding the relevance of the accounting subjects in the economic vocational training of non-accountant specialists

Principalele cauze ale corupţiei în România

The main causes of corruption in Romania

ALEXANDRU IOAN CUZA
UNIVERSITY,
IAŞI, ROMANIA

GEBA 2016

The 9th edition of the Annual International Conference ***Globalization and Higher Education in Economics and Business Administration (GEBA 2016)*** will be held at the Alexandru Ioan Cuza University, in Iasi, Romania from 20th to 23rd of October 2016.

The conference aims to promote international cooperation in the field of Economics and Business Administration in Higher Education. GEBA 2016 will provide an International Forum for the presentation and discussion of recent work on different aspects of globalization.

GEBA 2016 is not only a forestage to present novel research; it also gives opportunities for new emergent ideas in economic science arising from both fundamental and cross disciplinary approaches to globalization phenomenon.

Being an inter- and multi-disciplinary conference, we encourage papers covering topics including but not limited to:

- Higher education: trends, challenges and emerging opportunities
- Higher education during global crisis: the new global learning framework
- Social, Economic and political dimensions of the global crisis: implications for European Union
- Cycles, crises and global economy
- Quantitative analysis under global challenges
- Globalization and business information systems
- Impact of globalization on finance and banking
- Global context of financial and accounting reporting
- Marketing within the triad: university - business environment - society
- Globalization and sustainable development - challenges and trends in organizational management services and business communication
- Citizen-oriented best practices in public administration

For further information please visit the Conference website:
http://www.feaa.uaic.ro/geba

Sumar / Content

audit FINANCIAR
8/2016

Revistă lunară editată de
Camera Auditorilor Financiari din România
Str. Sirenelor nr. 67-69, sector 5,
Bucureşti, OP 5, CP 83

Director ştiinţific:
prof. univ. dr. **Pavel NĂSTASE**
Director editorial:
prof. univ. dr. **Mădălina DUMITRU**
Secretar de redacţie:
Cristina RADU
Prezentare grafică şi tehnoredactare:
Nicolae LOGIN

Colegiul editorial ştiinţific şi colectivul redacţional nu îşi asumă responsabilitatea pentru conţinutul articolelor publicate în revistă.

Indexare în B.D.I.:
Academic Keys;
Cabell's;
Deutsche Zentralbibliothek für Wirtschaftswissenschaften;
DOAJ;
Ebsco;
ERIH PLUS;
Global Impact Factor;
Google Scholar;
ProQuest;
Research Papers in Economics (RePEc);
SCIPIO;
Ulrich's

Marcă înregistrată la OSIM,
sub nr. M2010 07387

Telefon: (021) 410.74.43 interior 120;
Fax: (021) 410.03.48;
E-mail: revista@cafr.ro;
http: revista.cafr.ro;
ISSN: 1583-5812,
ISSN on-line: 1844-8801

Tipar: Universal Color SA,
Str. Victoriei, Complex Fortuna-Parter,
Piteşti, jud. Argeş,
tel.: +40 248 215 788
e-mail: universal@universalcolor.ro

Important for Authors!

The articles are submitted to the editor by e-mail at: revista@cafr.ro, compulsory in MS Office Word format, in black-and-white.
The authors are kindly requested to comply with the following:

- the language the article is drafted in is English
- the optimal size of the article is: 7-10 pages with 2000 signs/page, spaces included;
- the article must mention the title, the research methodology used, authors' contributions, the imperfect on the accounting profession and the references;
- an Abstract is compulsory, which must be written at the 3rd person plural, presenting the subject of the research, the main problems and authors' contributions;
- 4-5 key words;
- JEL Classifications.

Tables and graphs are developed in black and white whit up to six shades of gray and sent also separately, if they were elaborated in MS Office Excel.
The review of the articles is performed by members of the Scientific Assessment Council of the „Audit Financiar" Journal, by means of the „double-blind review" method, that is, the reviewers do not know the names of the authors, nor the authors know the names of the reviewers.
Assessment criteria for articles: innovative input, topicality, importance and relevance for the subject matter; the quality of the research methodology; clarity and pertinence of the presentation and argumentation; the relevance of the bibliographic sources used; contribution made to the research in the area.
The resolution of the Scientific Assessment Council of the journal can be: acceptance; acceptance with revisions; rejection. The results of the assessments are communicated to the authors and only the articles approved by the Scientific Assessment Council are published.
More details can by found on our website www.revista.cafr.ro, sections „Reviews" and „Manuscripts".

audit FINANCIAR
8/2016

Monthly Journal published by the
Chamber of Financial Auditors of Romania
67-69 Sirenelor Street, District 5,
zip code 050855, Bucharest, OP 5, CP 83

Scientific Director:
Professor **Pavel NĂSTASE**, Ph.D.
Editorial Director:
Professor **Mădălina DUMITRU** Ph.D.
Editorial Assistant:
Cristina RADU
DTP: **Nicolae LOGIN**

The Scientific Editorial Board and the editorial technical team shall take no responsibility for the content of the articles published in the journal.

International Databases:
Academic Keys;
Cabell's;
Deutsche Zentralbibliothek für Wirtschaftswissenschaften;
DOAJ;
Ebsco;
ERIH PLUS;
Global Impact Factor;
Google Scholar;
ProQuest;
Research Papers in Economics (RePEc);
SCIPIO;
Ulrich's

OSIM Trademark no. M2010 07387

Chamber of Financial Auditors of Romania
Phone: (021) 410.74.43 extension 120;
Fax: (021) 410.03.48;
E-mail: revista@cafr.ro;
http: revista.cafr.ro;
ISSN: 1583-5812,
ISSN on-line: 1844-8801

Printing: Universal Color SA,
Str. Victoriei, Complex Fortuna-Parter, Piteşti, jud. Argeş,
tel: +40 248 215 788
e-mail: universal@universalcolor.ro

Audit financiar, XIV, Nr. 8(140)/**2016**, *868-874*
ISSN: 1583-5812; ISSN on-line: 1844-8801

Corporate qualitative and quantitative assessment from credit risk perspective

Maria-Monica HARALAMBIE,
Bucharest University of Economic Studies
Bogdan Ştefan IONESCU,
Bucharest University of Economic Studies,
E-mail: bogdan.ionescu@cig.ase.ro

Abstract

Until a few decades ago, the decision power to deny or grant a loan laid in the hands of a single individual: the credit analyst. Some of the bad experiences of banks losses or even failures were attributed to bad decisions made by credit analysts, who based their decision on personal knowledge, their information about the potential customer and the trust placed in the customer.

After the financial crisis, two key concerns have been raised regarding banks' activities: "too little, too late" provisioning for loan losses and "too big to fail". The credit risk management subject became not only a compliance exercise for banks, but also a key item considered when establishing the strategy and execution path. Our intention within this paper is to discuss some of the specific issues related to credit risk management, considered by commercial banks when analysing a corporate client. The result of this research is a web application named CISS (Credit Institution Scoring System), which represents a proof of concept for a bank credit scoring system. The application was developed using HTML, MySQL and PHP solutions.

Keywords: *Credit risk, scoring, multidimensional model, database, application, corporate clients.*

JEL Classification: *G21.*

To cite this article:
Haralambie, M.M. and Ionescu, B.S. (2016), Corporate qualitative and quantitative assessment from credit risk perspective, Audit Financiar, vol. XIV, no. 8(140)/2016, pp. 868-874, DOI: 10.20869/AUDITF/2016/140/868

To link to this article:
http://dx.doi.org/10.20869/AUDITF/2016/140/868

Introduction

The banking sector has a strategic importance in national and international economies and contributes heavily to the global financial stability. It is easy to understand why top decision-makers like ministries of finance, supervisory authorities or central banks are interested in setting international policies and regulations for the banking sector, with the intention to achieve cooperation and consistency within the financial sector.

Lending is an ongoing concern of a bank, as it is the main operation which allows banks to place their resources and it is also the most profitable activity of banks. Through lending, banks contribute, on one hand, to the creation of resources for companies who need to finance investment projects and, on the other hand, they support fund holders to invest in order to obtain profit. But in order to achieve high profitability, banks must assume some risks. In the recent years, especially after the global financial crisis, focus was set on adapting the business models in order to allow financial institutions to develop an effective risk assessment framework, without endangering profitability. Therefore, performance and risk in lending activities become key components of the market mechanism.

Credit risk is one of the main risks faced by a bank and it is generated by the lending activity to clients (individuals or societies).

Investors are compensated for assuming credit risk by way of interest payments from the borrower or issuer of a debt obligation (www.investopedia.com). Credit risk is closely linked to the potential return of an investment, meaning that the rate of interest that investors will demand for lending their capital is proportional to the perceived credit risk.

Developing and applying credit risk management techniques has been a concern for many years, and it has evolved from traditional techniques such as exposure assessment, to limiting excessive concentration on the debtor, business sector or industry level, to new management techniques, such as transactions with swaps and options, adapted to this type of risk.

The global financial crisis, along with a structural increase in the number of bankruptcies, increased disintermediation by the most credit-worthy borrowers, more-competitive margins on commercial loans, and growth in off-balance-sheet lending put credit risk management into the regulatory spotlight (www.sas.com). As a result, regulators began to demand more transparency from credit institutions. The regulators understand the necessity of banks to obtain a thorough knowledge of customers and their associated credit risk, so they introduced the new Basel III regulations which are meant to create an even bigger regulatory burden for banks. Even before Basel III is fully implemented, some regulators have already begun to impose requirements that emerge towards Basel IV.

After the financial crisis, two key concerns have been raised regarding banks' activities: "too little, too late" provisioning for loan losses and "too big to fail".

In respect of the first one, the International Accounting Standard Board (IASB) introduced a new standard on financial instruments' accounting, IFRS 9 *Financial Instruments* (IASB, 2015) defining the new expected credit loss model for the recognition and measurement of impairment. The main focus of the new IFRS 9 is to accelerate the recognition of losses by requiring provisions to cover both already-incurred losses and some losses expected in the future. This will have a major impact on the way banks account for loan provisioning and the expectation is that the impairment for bad debts will be higher and more volatile. This exercise will require a lot of time, effort and money.

The new "too big to fail" regulations come with a new set of requirements for banks. The European Union (EU) is establishing a Europe-wide bank union, including the adoption of a Bank Recovery and Resolution Directive (BRRD). The BRRD contains provisions relating to recovery and resolution planning, intragroup financial support, early intervention, resolution tools and powers, cross-border group resolution, relations with third countries and financing arrangements (IASB, 2015).

However, focusing on credit risk management should not only be a compliance exercise for banks, but also a way of improving the overall performance and secure a competitive advantage.

A valid scoring system eases the credit risk management process for banks at the granting date, being also an important tool for subsequent monitoring activity. We used HTML, MySQL and PHP solutions in order to create a prototype of a corporate scoring system. Our intention was to bring into discussion some specific issues related to credit risk management scoring

systems and to point out the advantages of such a system for banks and other credit institutions.

1. Literature review

According to Kealhofer (2003), "until the 1990s, corporate credit analysis was viewed as an art rather than a science because analysts lacked a way to adequately quantify absolute levels of default risk. In the past decade, however, a revolution in credit-risk measurement has taken place".

Many authors propose solutions for better credit risk management and many regulations include guidance on how to deal with borrower analysis. In the following paragraphs, we will discuss some of these solutions, as a starting point for the developed application.

Credit risk is the primary cause of bank failures.

Credit risk generally represents the risk of losses of the value of a credit exposure arising from an unexpected change of the counterparty's credit quality.

In a wider sense, credit risk can also be defined as "potential losses arising either from a default of the borrower/issuer or a decrease of the market value (or mark-to-model value) of a financial obligation due to a deterioration in its credit quality" (www.unicreditgroup.eu).

Risk management is the process of adjusting both the risk of large losses and the firm's vulnerability to them.

In order to be effective, the credit risk management must begin with gaining a complete understanding of a bank's overall credit risk by viewing risk at the individual, customer and portfolio levels.

Usually, creditworthiness of a client is analysed from six different perspectives (Rose, 2002).

1. Character

The loan officer must be convinced that the customer has a well-defined purpose for requesting a bank loan and a serious intention to repay. In other words, the loan officer must assess the borrower's responsibility, truthfulness, the serious and legal purpose of the funds and must determine if these are consistent with the bank's current lending policy.

2. Capacity

The loan officer must be sure that the customer requesting the loan has the authority to do so and the legal standing to sign the binding loan agreement.

3. Liquidity

The credit analyst must determine, based on serious documentation, if the client has the ability to generate enough cash, in the form of cash flow, to repay the loan. The main sources of money for debtors are: cash flows generated from sales or income, the sale of or liquidation of assets or funds collected by issuing debt or equity securities. Current borrower's income and borrower's income history are important pieces of evidence in loan officer's evaluation.

4. Collateral

In assessing the collateral aspect, the loan officer must determine if the borrower possesses adequate net worth or own enough quality assets to provide adequate support for the loan. The credit analyst will primarily focus on features such as age, condition and degree of specialization of the borrower's assets.

5. Conditions

The loan officer/credit analyst must be aware of recent trends in the borrower's line of work or industry and how changing economic conditions might affect the loan.

6. Control

This last factor in assessing a borrower's state of solvency focuses on questions such as whether changes in law and regulation could adversely affect the borrower and whether the loan meets the bank's and the regulatory authorities' standards for loan quality.

Credit scoring

Credit scoring, one of the most successful applications of data mining, is traditionally assessed from a binary classification perspective. Credit scoring is a process whereby information provided is converted into numbers that are added together to arrive at a score.

Credit scorecards are mathematical models which attempt to provide a quantitative measurement of the probability that a customer will display a defined behaviour (e.g. loan default) with respect to his current or proposed credit position with a lender (https://en.wikipedia.org/wiki/Credit_scorecards). A scorecard is a means of assigning importance to pieces

of data so that a final decision can be made regarding the underlying account's adequacy for a particular strategy. The main approach is separating the data into its individual characteristics and then assigning a score to each characteristic based on its value and the average risk represented by that value.

Credit scoring typically uses observations or data from clients who have defaulted on their loans plus observations on a large number of clients who have not defaulted (https://en.wikipedia.org/wiki/Credit_scorecards). Therefore, the objective of credit scoring is to forecast future performance (of a customer) from past behaviour.

Scorecards' main purpose is to replace the human judgment (the credit analyst's subjectivity) with objective and statistically valid measures.

Typically, during the scorecard building process, some quantitative and qualitative characteristics and indicators are considered one-by-one based on a training data set of previous applicants with known quality characteristics (e.g., whether or not the loan was repaid). The result of this process is a set of variables that enter into subsequent predictive modelling.

Scorecard model development will be divided in several parts:

- Data extraction: all application data (for example for an individual borrower: education level, marital status, monthly family income, monthly payments, residential status, time at current address, Credit Bureau information) is extracted for the maximum available history. For all extracted application data, the default history must be assessed and the data is submitted to a qualitative validation process.
- Univariate analysis: this phase usually includes the following activities: analysis of discriminatory power of individual factors, analysis of all factors, analysis of correlation within the factors, pre-filtering, discussion with experts regarding the preliminary results, a short list of factors to be considered for the development of the model.
- Multivariate analysis: analysis of discriminatory power for all factors selected (regression analysis).
- Model design: this phase involves the development of several alternative models, discussions with experts regarding the optimal structure of model design and the final definition of the scoring function.
- Model testing: in this phase the following results must be considered: scoring function distribution, impact of rejected applications (score ranges), performance of the new model (considering the Gini index and model stability).

  Dataset calibration: the calibration of the extended dataset (maximum available dataset) and the definition of the average probability of default, including the prudential margin.
- Logistic: logistic regression to estimate probability of default.
- Cluster analysis: logistic regression of the complete dataset.
- Rating scale: cluster aggregation in order to create the rating scale.
- Probability of default: calibration of loan default probability determined by the scoring system based on the real and subsequently collected data.

2. Research metodology

Credit assessment process has two dimensions: a quantitative and a qualitative one. The quantitative dimension of credit analysis is based on specific activities such as collecting, processing and interpreting all information regarding a debtor that a financial institution can access. A bank will use, for the financial data analysis, forecasts of future developments of a borrower's activity, its repayment capacity assessment through analysis and forecast of future expected flows of revenues and expenses, evaluation debtor's ability to withstand shocks. The results of these activities are relatively easily quantifiable. Qualitative analysis involves gathering and updating information relating to the financial responsibility of the debtor, determining the real purpose of the loan, identifying what risks the borrower may face and estimating the debtor's reliability and commitment.

The result of our research is a web application named ***CISS*** (*Credit Institution Scoring System*), which represents a proof of concept for a bank credit scoring system.

CISS is an IT system designed with the purpose of supporting credit decisions, which carries out some of the features of a credit scoring system used by banks when rating corporate loan applicants. Use of this

system will increase the speed and quality of lending decisions, with direct impact in the quality of financial services and cost of credit.

We developed ***CISS*** as a dynamic web application using *HTML* supported by PHP language interacting with a MySQL database server. ***CISS*** is a well-structured application, easy to develop and maintain and has a user-friendly interface.

We extracted information from the database according to specific user needs and then formatted it, in order to be displayed properly. ***CISS*** also allows the user to insert relevant information into the database, which is stored on the server.

CISS main feature is its responsiveness to the needs of credit institution in terms of qualitative lending decisions. Also, the system allows fast and reliable processing of large volumes of data and easy access to preconfigured reports, which give a good image about the borrower's past performance.

3. Results and discussions

Contrary to commercial rating systems that are intended to distinguish between companies in a general sense, the rating systems used by banks intend to support the loan officer in making the decision to grant a loan, with the purpose to predict the loan probability of default.

Until a few decades ago, the decision power to deny or grant a loan laid in the hands of a single individual, the credit analyst. Some of the bad experiences of banks losses or even failures were attributed to bad decisions taken by credit analysts, which based their decision on their personal knowledge, how well they known the potential customer and how much trust had in it. Supervisors' pressure on banks to develop an adequate risk assessment framework, forced banks to extend this practice to a less personal appreciation, but still a subjective one.

Nowadays, banks want all the convenience of digitization and started to invest heavily in technology. IT Risk management systems were developed with the main purpose to assist the loan officer/credit analyst in making the decision to grant or deny a loan and to monitor the evolution of a client during the lifetime of a loan. A good risk management system will use knowledge from past periods about the client in order to be able to accurately forecast its development and future performance.

The "debtor's file" will contain, aside from the financial analysis prepared on the basis of the latest financial statements of the client, as much information as possible from authorized sources about the applicant's management and marketing activity.

A valid scoring system is one created based on historical data about existing clients and which is validated periodically. A good scoring system should be aligned with the business plan, risk profile, risk appetite and strategy development of the financial institution. The size and complexity of scoring systems depends on the dimension and characteristics of the bank.

The ***CISS*** system was developed in order to assess loan applications based on a combined credit score obtained from the followings:

- A quantitative score (a number from 0 to 100) with a weight of 50% in the final combined score;
- A qualitative score (a number from 0 to 70) with a weight of 30% in the final combined score;
- A Loan-To-Value score (a number from 0 to 100) with a weight of 20% in the final combined score.

Thus, the combined score of a loan applicant will be a number between 0 and 91, with the average being a score of 46.

The financial scoring is determined by computing the following financial indicators:

- Working Capital Ratio;
- Long Term Debt to Working Capital;
- Quick Ratio;
- Return on Assets;
- Return On Sales;
- Inventory turnover;
- Receivables Turnover in sales days;
- Payables Turnover (days);
- Cash Turnover;
- Interest Coverage Ratio;
- Gross Profit Margin;
- Total Debt to Assets;
- Capitalization Ratio;
- Debt to Equity Ratio.

These financial ratios will be computed based on the most recently approved set of financial statements of the loan applicant.

The assessment also takes into account some qualitative criteria, related to the management education, experience and competence, the attitude of the debtor in terms of willingness to provide information to the bank, the quality of planning and controlling and the validity of the results of the budgetary process, the state-of-art of equipment, the market development and the market position of the company.

Loan-To-Value (LTV) represents the ratio between the loan amount requested by a potential borrower and the mortgage value. This indicator is relevant, because it reveals if the guarantee brought by the client is sufficient to repay the loan, in case of default and foreclosure.

A loan applicant obtaining less than 45 present high credit risk and the credit institution will deny its credit application. A loan applicant obtaining a combined score between 46 and 75 still present important credit risk and loan officer should request additional collateral (i.e. increase its Loan-To-Value) and, if the borrower will be able to fulfil these new conditions, the assessment should be re-performed. A loan applicant obtaining a score above 76 should not be considered risky and the lending will be approved.

When designing the application, we have used some scoring intervals defined based on our interpretation of financial and non-financial data related to financial statements of corporate clients. However, credit institutions will calibrate their scoring intervals based on their risk assessment and statistical analysis of default probabilities for different categories of clients.

Conclusions

The research conducted was intended to gain a good understanding of the characteristics considered by a bank in assessing the credit risk of a corporate client. Also, we understand the importance of technology in easing the internal processes of banks and we have provided a detailed overview not only from a theoretical, but also from a practical perspective of a scoring system used by banks in their day-to-day activities.

The web application presented is a *proof of concept* intended to fulfil some of the features of a credit scoring system used by banks or other credit institutions when rating the loan applications of corporate clients.

In order to meet all the characteristics of a scoring system used in day-to-day activities by any large credit institution, we plan to further develop the application in order to assist also the analysis of private individual clients. In order to be fully adapted to the new regulatory and accounting requirements imposed to the banks after the financial crisis, a credit risk system will contain both an application scoring and a behavioural scoring. Application scoring in consumer credit risk assessment is a static phenomenon, because it involves assessing the client's characteristics on application and afterwards their creditworthiness at some later date, based on realized performance. On the other hand, behavioural scoring involves an ongoing assessment with better response to changes, because it involves updating the assessment of consumer credit risk in the light of the current and most recent performance of the consumer, also considering changes in the economic environment which are not directly linked with the client, but which will affect its repayment behaviour.

REFERENCES

1. Apostu, T. and Preduț, A.S. (Cozmâncă, B.O., coord.), Riscul de Credit, *Colecția de working papers ABC-ul lumii financiare*, [pdf] Available at: http://www.fin.ase.ro/ABC/fisiere/ABC2_2014/lucrari/2.3.Predut_Apostol_PAPER.pdf [Accessed on July 7, 2016].
2. Bank of England, Prudential Regulation Authority (2014), *Consultation Paper CP13/14 „Implementing the Bank Recovery and Resolution Directive*", [pdf] Available at: *http://www.bankofengland.co.uk/pra/documents/publications/cp/2014/cp1314.pdf* [Accessed on July 7, 2016].
3. Chernobai, A.S., Rachev, Svetlozar, T. and Fabozzi, F.J. (2007) , *Operational Risk: A Guide to Basel II Capital Requirements, Models, and Analysis*, Hoboken, New Jersey: John Wiley and Sons, Inc.
4. Crouhy, M., Galai, D. and Mark, R. (2001), *Risk Management*, McGraw-Hill.

5. Duffie, D. and Singleton, J.K. (2003), *Credit Risk: Pricing, Measurement, and Management,* Princeton Series in Finance, Duffie, D. and Schefer, S. (ed.), Princeton and Oxford: Princeton University Press.
6. IASB (2014), *IFRS 9 Financial Instruments (replacement of IAS 39)*, [online] Available at: http://www.ifrs.org/current-projects/iasb-projects/financial-instruments-a-replacement-of-ias-39-financial-instruments-recognitio/Pages/Financial-Instruments-Replacement-of-IAS-39.aspx, [Accessed July 10, 2016].
7. Kealhofer, S. (2003), Quantifying Credit Risk I: Default Prediction, *Financial Analysts Journal,* vol. 59, no. 1, pp. 30-44, DOI: http://dx.doi.org/10.2469/faj.v59.n1.2501.
8. Regulamentul nr. 575/2013 al Parlamentului European and al Consiliului din 26 iunie 2013 privind cerințele prudențiale pentru instituțiile de credit and societățile de investiții and de modificare a Regulamentului (UE) nr. 648/2012, Jurnalul Oficial al Uniunii Europene, L 176/1/27.06.2013.
9. Risk Encyclopedia 92016), Credit Risk, [online] Available at: *http://www.riskencyclopedia.com/articles/credit_risk/,* [Accessed July 10, 2016].
10. Rose, P.S. (2002), *Commercial Bank Management*, McGraw-Hill.
11. SAS (n.d.), *Credit Risk Management – What it is and why it matters*, [online] Available at: *http://www.sas.com/en_us/insights/risk-fraud/credit-risk-management.html,* [Accessed July 10, 2016].
12. Trenca, I.I. and Benyovszki, A. (2011), *Riscul portofoliului de credite bancare,* Cluj-Napoca: Casa Cărții de Ştiință.
13. UniCredit (2013), *Reports and Accounts,* [pdf] Available at: *https://www.unicreditgroup.eu/content/dam/unicreditgroup/documents/en/investors/financial-reports/2013/UniCredit-SpA_2013-Reports-and-Accounts_General_meeting_draft.pdf,* [Accessed July 10, 2016].
14. UniCredit Group - Basel II Pillar 3 Disclosure as at December 31, 2009, [pdf] Available at: *https://www.unicreditgroup.eu/content/dam/unicreditgroup/documents/en/investors/third-pillar-basel/Basel_II_Disclosure_-_Pillar_III_-_December_31,_2009.pdf*, [Accessed July 10, 2016.]
15. Wang, R.Y., Pierce, E.M., Madnik, S.E., Fisher, C.W. and Zwass, V. (2005), *Information Quality*, Armonk/London: M.E. Sharpe.

Audit financiar, XIV, Nr. 8(140)/**2016**, *875-896*
ISSN: 1583-5812; ISSN on-line: 1844-8801

The implications of financial performance on stock exchange indicators of listed companies:

empirical evidence for the Romanian capital market

Iulia-Oana ŞTEFAN (BELCIC-ŞTEFAN)
University of Craiova,
E-mail: iulia.oana.stefan@gmail.com

Abstract

This paper examines and quantifies the implications of financial indicators of performance on the share return of companies listed on Bucharest Stock Exchange. These implications are even more relevant as the Romanian capital market could benefit from increased visibility with its reclassification as an emerging capital market in the near future. The research is conducted at the level of 33 companies listed on BSE for the time frame 2011-2013, building a multiple linear regression model that quantifies the variation in price to book value depending on the evolution of nine financial indicators of performance out of a total of 38 such possible indicators. Correcting the effects of serial correlation within the model led to its respecification resorting to the generalized differences procedure. The value of the R-squared coefficient of determination for the processed model is 0.543, eight of the nine independent variables being significant at the 1% level. The 0 probability associated to the F-test as well as its value confirm that the regression equation is globally significant. Also, all the assumptions for validating the estimated model are confirmed, both general ones, characteristic to the multiple linear regression procedure, and, in particular, according to the specific set of data under processing. The applied usefulness of the regression model is valued in the next step of the research, that of testing the effectiveness of the Romanian capital market, after which it was found that the influence of financial performance indicators was already incorporated into the market price since the end of the reporting period.

Keywords: *Financial performance, stock exchange performance, listed companies, Bucharest Stock Exchange, market efficiency, multiple linear regression model.*

JEL Clasification: *C33, C51,C52.*

To cite this article:
Ştefan, I.O. (2016), The implications of financial performance on stock exchange indicators of listed companies: empirical evidence for the Romanian capital market, Audit Financiar, vol. XIV, no. 8(140)/2016, pp. 875-896, DOI: 10.20869/AUDITF/2016/140/875

To link to this article:
http://dx.doi.org/10.20869/AUDITF/2016/140/875

Introduction

Financial accounting indicators involve a different degree of relevance depending on the interests of each category of stakeholders implicated, internally or externally, in the economic activity of the enterprise. It is equally true, however, that the information asymmetry which is formed between the company management and other users of information cannot be disputed. This asymmetry may however be minimized (Lev, 2001) through a chain of cause-effect actions that originate in the decision of some managers to provide more information when they consider that the company they are running is undervalued. As a result, investors will appreciate this extra information, allocating their funds first to these companies and under evaluating the ones that do not offer equal transparency on the evolution of their equity. The question that arises in this case concerns the extent to which this financial information is processed and transposed by investors on the size of the price that they are willing to pay for the shares of each company.

This issue is a concern for specialists ever since the mid-twentieth century. Thus, Ball and Brown (1968) were among the first to have examined how the company's results can influence the sign spread (positive or negative) between the present return of the security on the market and the forecasted one, noting that the results of profit nature exhibit more influence than cash flows. The lack of impact of cash flow on the market price of shares is supported by the results of a series of studies (Beaver and Dukes, 1972; Patell and Kaplan, 1977; Beaver, Griffin and Landsman, 1982). Some conclude only that cash flows do not contain more incremental information than gains in explaining stock quote fluctuations. Others are saying that there is a lower correspondence in the evolution cash flow – market price than in the one which relates earnings to the price on the stock market. In another study, Board and Day (1989) sustain the reduced amount of information expressed through cash flows, but conclude, however, that there is a high informational content in the traditional rates of return expressed at historical values. The content is also reflected in the evolution of shares on the stock market.

On the other hand, other empirical evidence (Schaefer and Kennelley, 1986) counters the lack of relevance of cash flows, proving that a measure of gross cash flow may surpass other more refined ratios. Starting from this idea the impact of cash flow on the market profitability in terms of its three components was investigated: cash flow derived from operating, investing and financing activity. Thus, Livnat and Zarowin (1990) conclude that the components of operating and financing cash flow are directly and significantly associated with the profitability of the share on the market, but the same cannot be said about the cash flows related to investment activity. The sphere of influence of cash flow as compared to that of profit on the evolution of the stock quote is still intensively analyzed. It is also proved in more recent studies (Kusuma, 2014) that cash flows contain a higher degree of incremental information than earnings quantified through various forms of profit.

But cash flow is not the only performance indicator whose informational efficiency was tested through the capital market. Thus, Hopwood and Schaefer (1988) analysed the impact of 38 financial ratios on market profitability of securities for 251 companies. The study is undertaken by grouping the 38 financial ratios into 7 components whose influence is subsequently tested: profitability, total assets and capital turnover, inventory turnover, receivables turnover, financial leverage, short-term liquidity, cash flow position. The conclusions place profitability indicators as the ratios that exhibit the most significant influence on the stock quote of shares, followed by total assets and capital turnover, inventory turnover, receivables turnover and financial leverage. The results of the study are all the more important as the correlation is significant at the threshold of 3.3% or less. In another study, Buchheit and Kohlbeck (2002) demonstrate that, on average, the companies' announcements on accounting earnings provide information in upward amounts to market participants, as evidenced by a reaction in the price at the announcements on profit (PREA – Price Reaction to Earnings Announcements), which intensifies over time. This temporal increase in the reaction of market price proves to be directly dependent on the size of the company, emphasized by its market value. In other words, the higher the market value of the enterprise, the bigger the extent to which the investors will incorporate information related to accounting earnings in the price they are willing to pay for the shares of that company, extent that will only increase over time. The impact of the financial indicators of performance on the variation of excess or deficit of return on the market (Abnormal return) is analysed also by Biddle, Bowen and Wallace

(1997). For this purpose they have tested the influence of four possible explanatory variables: operating cash flow, current result net of profit tax, economic profit and economic value added. Study findings reflected that the indicator with the greatest influence power on the market is net the current result, followed by the economic profit, the economic value added and the operating cash flow. It is thus proven the investors' preference for measures of profit nature which are included in the companies' reports, at the expense of those that require additional calculations.

In Romania, the implications of information contained by performance indicators on the return of shares on the market has been tested by Ciobanu (2006) in a study that included 34 companies listed on Bucharest Stock Exchange. Thus, for the period 2000-2004 the author has investigated to what extent the total shareholder return was influenced by certain indicators which either quantify the performance of a company, or have a direct or indirect impact on it. The study shows the Price to Book Value as the only indicator capable of influencing the profitability of the analysed securities on the market. However, its explanatory power diminishes from one period to another, leading to the general conclusion that, for investors making transactions on the capital market in Romania, information submitted by financial accounting performance indicators is irrelevant. This is consistent with results of previous studies. For instance the study of Ciobanu (2004) was made for 1998-2001 on companies listed on the regulated market of BSE and RASDAQ. On the other hand, more recent studies (Carp and Mironiuc, 2014) conclude that traditional financial indicators manifest their influence on stock exchange indicators, the most significant relationship being identified for the time frame 2011-2012 between the Price to Book Value and economic and financial profitability recorded by companies listed on BSE. At the same time, in a study (Buse and Stefan, 2014) conducted for the time frame 2010-2013 on companies listed on BSE belonging to the oil and retail trade industries a strong and direct correlation between market capitalization and sales, return on sales and net profit was revealed.

Nor the indicators that express value creation have been omitted by researchers in their efforts to identify the extent to which financial performance affects the profitability of shares on the market. An example is the study conducted by Fernandez (2015). Thus, by analysing a sample of 582 American companies, he observed the lack of correlation between economic value added and cash value added with market value added and shareholder return. He believes that the financial indicators can measure only historical performances of the company, highlighting their inability to truly reflect the value created for shareholders. In the spirit of this statement, Kothari (2001) looks at the evolution of share prices on the market as a direct function of the component of past profitability that has not been anticipated by investors, depending also on how their expectations on future business performance oscillate. Basically, in the spirit of the efficient markets hypothesis, he believes that any information contained by financial indicators of performance are already incorporated into the market price and that the only way they can still influence the profitability of shares on the market relies on the existence of a considerable positive or negative gap, between the published values and the investors' forecasts.

Subsequently passing through all these papers we can state that so far the economic theory could not establish with certainty whether the financial performance registered by companies influences or not their profitability on the capital market. Thus, although numerous studies have provided evidence supporting the accuracy of this statement, uncertainties surround also the identity of financial performance indicators that can explain a percentage as high as possible of the variation in the market price of shares.

In these circumstances, the present study aims to identify and quantify the implications of the information transmitted by the financial indicators of performance on the market profitability of companies listed on the capital market in Romania, a market still young and underdeveloped compared to other capital markets in Central and Eastern Europe. The analysis makes use of an extensive database built by manual collection of financial and stock data for companies listed on Bucharest Stock Exchange. Of the information held, an academic analysis of the impact of financial performance on the market performance of companies listed on the stock exchange has not so far been developed at this level for the Romanian capital market, which is why I manifest confidence that it will offer new perspectives to this long debated and still uncertain issue.

1. Data and methodology

The study took as its starting point the evolution of companies listed on the capital market in Romania. For this purpose we analysed 33 companies listed on Bucharest Stock Exchange, for a reference period of 3 years, i.e. 2011-2013, the selection process for companies considering a best possible representation of the directly productive sectors of the national economy as well as fulfilling minimum criteria relating to liquidity and the value of shares included in free-float. Thus, the analysis includes companies belonging to various industries, such as: Mining and quarrying, (OMV Petrom, Rompetrol Well Services, Dafora), Manufacturing (Vrancart, Rompetrol Rafinare, Antibiotice, Biofarm, Zentiva, Artego S.A Tg Jiu, Romcarbon S.A Buzău, Teraplast, Stirom S.A. Bucuresti, Alro, TMK-Artrom, Electromagnetica S.A. Bucureşti, Electroargeş S.A. Curtea de Argeş, Retrasib S.A. Sibiu, Mecanica Ceahlău, Altur, Compa, Aerostar, Turbomecanica), Electricity, gas, steam and air conditioning supply (Amonil, C.N.T.E.E. Transelectrica), Constructions (Impact Developer & Contractor, Condmag), Wholesale and retail trade (Alumil Rom Industry, Ropharma S.A. Braşov), Transportation (Conpet, S.N.T.G.N. Transgaz), Storage (Oil Terminal, Socep), Hotels and restaurants (Turism Felix S.A Băile Felix).

It should be mentioned that the absence from the sample structure of three major companies present on the capital market in Romania, namely S.N.G.N. Romgaz, S.N.N. Nuclearelectrica and Electrica is motivated by the lack of information on stock quotes during certain periods of time, which would have been capable of affecting the quality of the statistical processing.

For the 33 companies data were extracted from the annual financial statements but also from other published sources as well as from the records of Bucharest Stock Exchange, from where there were taken also the stock quotes of securities. The research was based, therefore, on 99 observations of each variable analysed, a number considered significant to validate the conclusions reached.

In order to start the econometric modelling we aim to elucidate the magnitude and direction in which the market development of listed companies is influenced by the following system of 38 indicators that measure different sides of their financial performance which are treated as independent variables. They are characterizing:

1. The results of the company's activity: gross profit (Pb), profit before interest and tax (EBIT), sales (CA);
2. Profitability: return on assets (ROA), return on capital employed (ROCE) return on equity (ROE), return on total expenses (Rrct), EBIT margin (RMEBIT), gross profit margin (RMPB), net profit margin (RMPN);
3. Shareholders' earnings: net profit per share (EPS), dividend per share (DPS);
4. Funding potential: self-financing capacity (CAF), self-financing (AF), net cash flow (CFn), ratio CAF/CA;
5. Value creation: economic value added (EVA), cash value added (CVA), cash flow return on investment (CFROI);
6. The size and efficiency of the company's activity: share of fixed assets in total assets (GAi), efficiency of use of fixed assets (EAi), share of current assets in total assets (GAc), efficiency of use of current assets ((EAc), equity efficiency (EKpr);
7. Liquidity and solvency: general liquidity (Lg), current liquidity (Lc), immediate liquidity (Li), general solvency (Sg), entity's solvency (Sp);
8. Balance and financial stability: global indebtedness ratio (RIG), financial leverage (LF), financial leverage effect (ELF), net working capital (CLN), ratio claims/liabilities (Rc/d) term collection of receivables (Tcr), risk coverage ratio (Rar), fixed assets finance ratio (FAi), total debt turnover ratio (RDt).

In the study there were analysed the manner in which different sides of financial performance measured by the sizes above is liable to affect the profitability of shares on the capital market, as expressed by the most relevant stock exchange indicator, assimilated as dependent variable, i.e. the price to book value (PBV). The relevance of this indicator lies in its ability to reflect the profitability of shares on the market by correspondence with the size of the activity conducted by the company and, at the same time via it being alleviated the effects of the often absurd oscillations of the stock quote. In fact, it is well known the degree of volatility that can affect the stock quote even during a trading day, more so among a series of annual intervals. These fluctuations are caused most often by simple unjustified emotions shown by investors, so that the pure level of the stock quote was not taken into account from the very outset. Instead, using the most important

indicator derived from the stock quote as a way of reflecting the profitability of the share on the market appears as more appropriate.

Once established the structure of the population of variables, the study was started by initiating the econometric modelling through the classical multiple linear regression model, which establishes a stochastic dependence for a number of I observations between a dependent (endogenous) variable Y and a number of independent (exogenous) variables X1...Xk with the equation form:

$$y_i = b_0 + b_1 x_{1i} + b_2 x_{2i} \dots + b_k x_{ki} + e_i \quad (1)$$

where: b_0, b_1, b_2,...,b_k are estimators of the parameters $\beta_0,\beta_1,\beta_2,\dots,\beta_k$;

e_i- residual term;

Determining the estimators b_0, b_1, b_2, ..., b_k for the unknown parameters β_0, β_1, β_2, ..., β_k of the multiple linear regression model is achieved through the ordinary least squares method (OLS), which considers that the function which best adjusts the data is the one which minimizes the variance of the error e, which is equivalent to minimizing:

$$S(b0,b1,b2,\dots,bk)=\sum_{i=1}^{n} e_i^2 = \sum_{i=1}^{n}(y_i - b_0 - b_1 x_{1i} - b_2 x_{2i} \dots - b_k x_{ki})^2 \quad (2)$$

Following the evaluation of goodness of fit of the regression model estimated using the ordinary least squares method it is necessary to confirm its predictive value, achieved by analysing and validating the fundamental assumptions that allowed the initial specification of the model using the multiple linear regression technique:

- The error terms εi are random variables of mean zero, E(εi)=0;
- The variance of the error terms is constant (the homoscedasticity assumption), Var(εi)=σ2;
- The absence of serial correlation (autocorrelation) between errors, Cov(εi, εj) = 0,i≠j;
- The absence of multicolinearity;
- The error terms are normally distributed, $\varepsilon_i \sim N(0, \sigma^2)$;

In order to both test the validity of the assumptions on which the regression model is based and to estimate and test the parameters of the model a number of statistical tests offered by the software EViews, version 7.0 were used. Detecting the presence of serial correlation between errors determined applying the generalized differences procedure, specific to the generalized least squares method. The procedure, as described by Georgescu (2014), involves defining the errors correlation coefficient ρ via its estimator, $\hat{\rho}$ as follows:

$$\hat{\rho} = \frac{\sum_{i=2}^{I} e_i e_{i-1}}{\sum_{i=2}^{I} e_{i-1}^2} \quad (3)$$

Multiplying the equation (1) with $\hat{\rho}$ and applying the delay operator with one period of time (lag=1), we obtain:

$$y_{i-1}\hat{\rho} = b_0\hat{\rho} + b_1 x_{1i-1}\hat{\rho} + b_2 x_{2i-1}\hat{\rho} + e_{i-1}\hat{\rho} \quad (4)$$

Then the model is expressed under the form of generalized differences ((1)-(4)):

$$y_i - y_{i-1}\hat{\rho} = b_0 - b_0\hat{\rho} + b_1 x_{1i} - b_1 x_{1i-1}\hat{\rho} + b_2 x_{2i} - b_2 x_{2i-1}\hat{\rho} + e_i - e_{i-1}\hat{\rho} \quad (5)$$

Noting the generalized differences:

$$\Delta y_i = y_i - y_{i-1}\hat{\rho} \quad (6)$$

$$\Delta x_{1i} = x_{1i} - x_{1i-1}\,\hat{\rho} \quad (7)$$

$$\Delta x_{2i} = x_{2i} - x_{2i-1}\,\hat{\rho} \quad (8)$$

The OLS method is once again applied in order to estimate the parameters of the regression equation, using as variables the generalized differences, as it follows:

$$\Delta y_i = b_0' + b_1'\Delta x_{1i} + b_2'\Delta x_{2i} + e_i' \quad (9)$$

By respecifying the regression model in the form of the generalized differences takes place the correction of serial correlation of the residual terms expressed through $\Delta e_i = e_i - e_{i-1}\hat{\rho}$, the satisfaction of the hypotheses necessary for applying the OLS method being, thus, ensured.

2. Results

2.1. Grounding the regression model of the market profitability via financial performance

A first step in the direction of grounding a regression model that highlights the trends in the stock exchange

profitability of companies listed on the capital market in Romania via the financial performance that characterizes their undertaken activity consists of selecting and processing the dependent variable, represented by the price to book value, as I present in the following paragraphs.

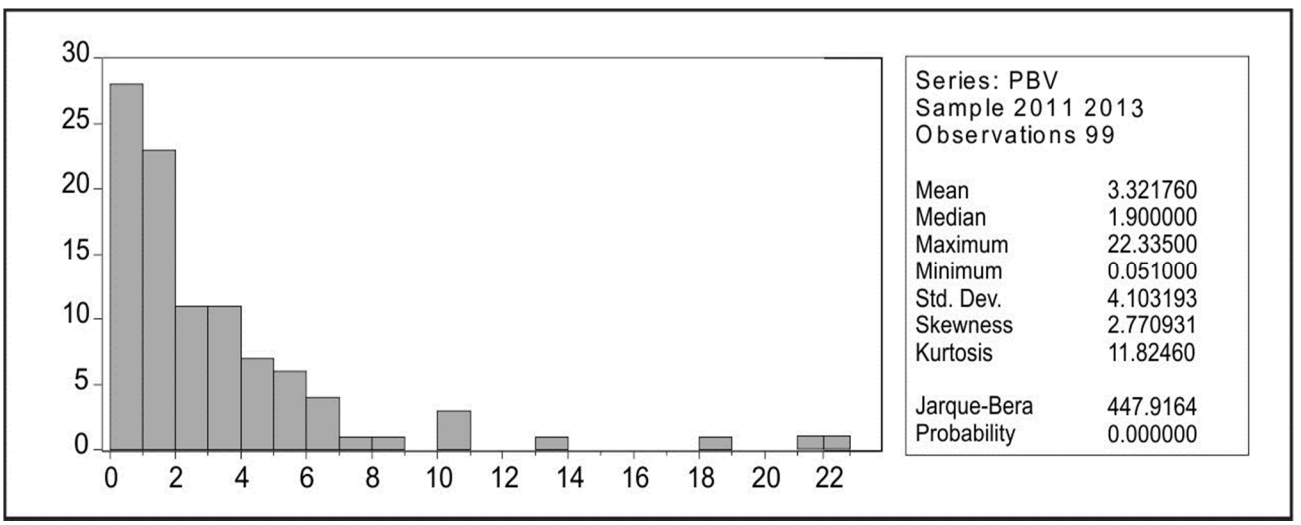
2.1.1. Selecting and processing the endogenous variable of the regression model

The opportunity of using the price to book value as the dependent variable of the study is given by the greater representativeness that it benefits of over other stock indicators, which by their way of construction are subject to certain limitations. For example, the price to earnings ratio is no longer conclusive if the profit is handled by management in order to demonstrate the quality of the exercised leadership or if the company registers losses. The same can be said about the dividend yield, if shareholders are not compensated in certain periods of time.

From this point of view I believe that the price to book value ratio of a share represents the most appropriate indicator to reflect the evolution of a company's shares on the stock market. The net assets of the company cannot be manipulated and are used as a source of information on the real situation of the entity which is considered much more eloquent by investors. The choice is supported also by records encountered in the specialized literature, foreign authors and Romanian alike (Cho and Pucik, 2005; Zaretzky and Zumwalt, 2009; Carp and Mironiuc, 2014) considering the PBV ratio as one of the most important and effective sizes to express market profitability when there are pursued the implications of different aspects of the companies' financial diagnosis on the evolution of shares on the capital market.

Once selected the dependent variable represented by the price to book value, it must be subjected to further analysis in order to verify the normality of the distribution of values, otherwise being required its additional processing.

Figure 1. Descriptive statistics of the price to book value

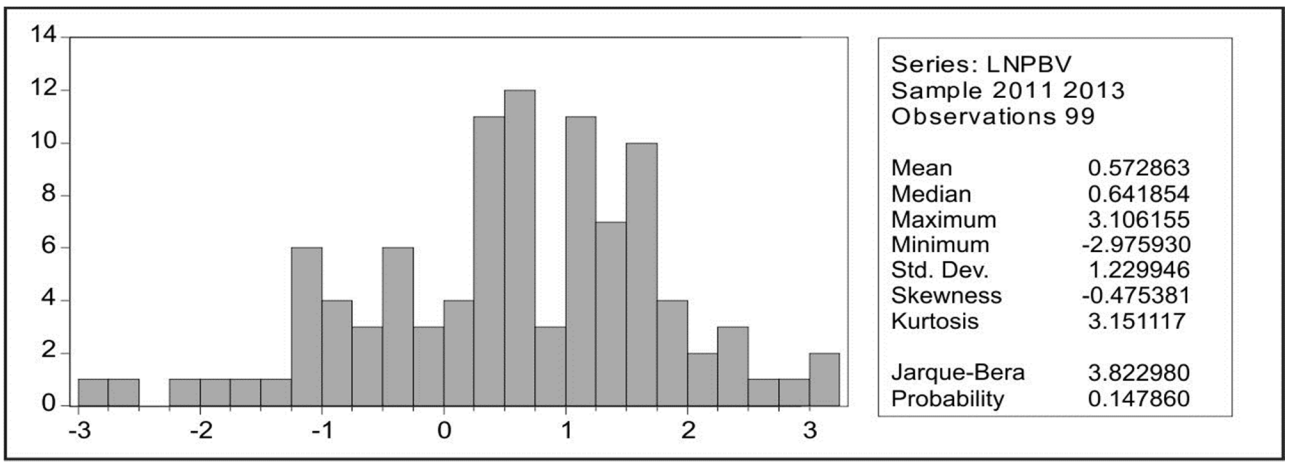


Source: author processing

As can be seen through **Figure 1**, the distribution of the dependent variable does not follow a normal law, the histogram not having the shape of a bell. Also, the value of the Jarque-Bera statistic is very high and the associated probability is 0, which does not allow us to admit that the series values are normally distributed.

To remedy this problem I will proceed to a logarithmic transformation of the price to book value, this being an often used method as a way to lessen excessive fluctuations in the value of the data series.

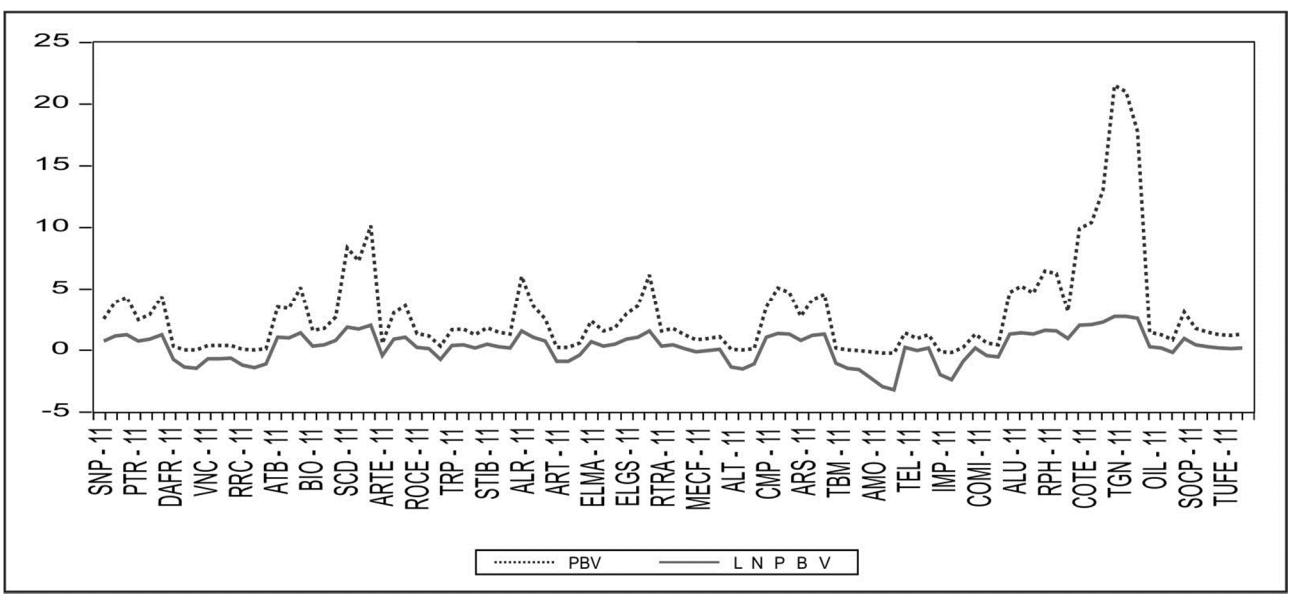
Figure 2. Descriptive statistics of the logarithm of the price to book value



Source: author processing

Following the procedure of logarithmic transformation, we notice according to **Figure 2** that the distribution of the series has become a normal one, fact proved both through the shape of the histograms from the figure and in terms of descriptive statistics. Thus, the value of the Jarque-Bera test is now much lower, of only 3.82 and the associated probability exceeds the critical threshold of 0.05, which means that we can accept the null hypothesis, that of a normally distributed variable. The beneficial effects of the logarithmic transformation procedure are shown through the comparative evolution of the initial and processed variable, as shown below:

Figure 3. The evolution of the price to book value before and after the logarithmic transformation



Source: author processing

As we can see, taking the log of the price to book value determined the correction of excessive fluctuations manifested in the data series, the variation of the processed variable being much reduced compared with the initial variable, which will allow generating a regression model characterized by increased precision and significance.

2.1.2 Generating the initial regression model

Following the selection of the price to book value as endogenous variable and its processing according to statistical principles, the next step for grounding the regression model is to explain its variation by identifying the best combination of independent variables represented by the indicators of financial performance. For this purpose we used the stepwise forwards method.

Thus, in the first stage was specified, first of all, the dependent variable of the regression equation, constituted by the natural logarithm of the price to book value calculated at the end of the current year, variable noted as LNPBV. Then, in order to respect the structure of the regression equation, we specified an always included regressor, represented by the constant c. Finally, we introduced the 38 possible independent variables of the model for a minimum threshold of significance set at 0.05. After applying the method, the independent variables considered relevant for explaining the variation of the price to book value are: gross profit margin, term collection of receivables, dividend per share, share of fixed assets in total assets, financial leverage, net working capital, financial leverage effect, equity efficiency, economic value added.

Further, the results of the multiple linear regression are presented in **Table 1**.

Table 1. Regression characteristics

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	2.775255	0.243770	11.38471	0.0000
MARJAPB	0.571254	0.148909	3.836259	0.0002
TCR	-0.003023	0.000361	-8.365367	0.0000
DPS	0.099165	0.016956	5.848446	0.0000
GAI	-2.528167	0.363389	-6.957192	0.0000
LF	-1.408572	0.213432	-6.599617	0.0000
CLN	8.57E-10	1.59E-10	5.372776	0.0000
ELF	-1.687388	0.357689	-4.717476	0.0000
EKPR	-0.042222	0.013124	-3.217169	0.0018
EVA	-2.16E-10	9.30E-11	-2.324582	0.0224
R-squared	0.749604	Mean dependent var		0.572863
Adjusted R-squared	0.724283	S.D. dependent var		1.229946
S.E. of regression	0.645830	Akaike info criterion		2.058976
Sum squared resid	37.12158	Schwarz criterion		2.321109
Log likelihood	-91.91931	Hannan-Quinn criter.		2.165036
F-statistic	29.60403	Durbin-Watson stat		1.135629
Prob(F-statistic)	0.000000			

Source: author processing

Thus, the resulted multiple linear regression model presents the following estimative equation:

$$LNPBV = C(1) + C(2)*MARJAPB + C(3)*TCR + C(4)*DPS + C(5)*GAI + C(6)*LF + C(7)*CLN + C(8)*ELF + C(9)*EKPR + C(10)*EVA + \varepsilon \quad (11)$$

Estimating the parameters of the regression equation determines rewriting the model by substituting the coefficients as follows:

$$LNPBV = 2.775255 + 0.571253*MARJAPB - 0.003023 * TCR + 0.099164 * DPS - 2.528167*GAI - 1.408571*LF + 8.565735e\text{-}10 * CLN - 1.687388 * ELF - 0.042221 * EKPR - 2.161144e\text{-}10 * EVA + \varepsilon \quad (12)$$

Before starting evaluating the quality of the linear adjustment of the multiple linear regression model, we proceeded to test its validity through the set of assumptions defined in the methodology section, the first faced challenge concerning the validation of the assumption of uncorrelated errors. The actions taken in this respect are detailed as follows.

2.1.3. Processing the model to correct the effects of serial correlation

The assumption of uncorrelated errors designates the necessity that the residuals (errors) of the regression equation are statistically independent from each other. Testing was conducted through the Breusch-Godfrey test, the decision rule being:

- If the probability is less than 0.05 then the null hypothesis is rejected, therefore exists serial correlation between residuals;
- If the probability is greater than 0.05, the null hypothesis is accepted, therefore the errors are not statistically correlated with each other.

Table 2. The result of the Breusch-Godfrey test on the serial correlation of residuals

F-statistic	22.43999	Prob. F(1,88)	0.0000
Obs*R-squared	20.11553	Prob. Chi-Square(1)	0.0000

Source: author processing

As we can see EViews offers two versions of the test, an F version, and a χ^2 (Chi-Square) version. In our case, both the probability of F and χ^2 is 0, leading to the rejection of the null hypothesis and indicating the presence of significant serial correlation within the regression model. Ignoring autocorrelation when it is present would lead to estimation of inefficient coefficients through the OLS method, whose standard error estimates could be wrong, even for samples of high volume. In fact, the database used in this study has a panel-type structure, involving observations of the variables in both space (the 33 companies) and time (2011-2013), the possibility for the presence of autocorrelation in the regression of a time series being extremely high. In this context it is necessary to undertake measures to correct serial correlation and respecify the initial regression model. In this respect, whereas the inclusion of delayed values (lags) of the dependent variable counters to a classic principle of the linear regression model, that according to which the explanatory variables must be non-stochastic, in order to respecify the model I will appeal to the generalized differences procedure related to the GLS method.

Thus, according to the mentioned procedure, we note with ρ the linear correlation coefficient of errors and with $\hat{\rho}$ its estimator. Since the number of observations is important (99> 15) it results that estimating $\hat{\rho}$ through $\hat{\rho} \approx 1 - \frac{DW}{2}$ is possible. The DW indicator represents the value of the Durbin Watson test registered for the initial regression model. Substituting, we get$\hat{\rho}$≈0,4321855.

To correct the effect of autocorrelation it is started from the original regression equation (11) which, after multiplication by ρ and applying the one period time delay operator, becomes:

$$\rho*LNPBV_{t-1} = C(1)*\rho + C(2)\rho *MARJAPB_{t-1} + C(3)\rho *TCR_{t-1} + C(4)\rho *DPS_{t-1} + C(5)\rho *GAI_{t-1} + C(6)\rho *LF_{t-1} + C(7)\rho *CLN_{t-1} + C(8)\rho *ELF_{t-1} + C(9)\rho *EKPR_{t-1} + C(10)\rho *EVA_{t-1} + \rho\varepsilon_{t-1} \quad (13)$$

Then the model is expressed using the form of generalized differences:

$$LNPBV_t - \rho*LNPBV_{t-1} = C(1)*(1-\rho) + C(2)*(MARJAPB_t - \rho *MARJAPB_{t-1}) + C(3)*(TCR_t - \rho *TCR_{t-1}) + C(4)* (DPS_t - \rho *DPS_{t-1}) + C(5)* (GAI_t - \rho *GAI_{t-1}) + C(6)* (LF_t - \rho *LF_{t-1}) + C(7)*(CLN_t - \rho *CLN_{t-1}) + C(8)*(ELF_t - \rho *ELF_{t-1}) + C(9)*(EKPR_t - \rho *EKPR_{t-1}) + C(10)*(EVA_t - \rho *EVA_{t-1}) + \varepsilon_t - \rho\varepsilon_{t-1} \quad (14)$$

With the help of the $\hat{\rho}$ estimator of ρ, the generalized differences can be further on estimated:

$\Delta LNPBV = LNPBV_t - \hat{\rho} * LNPBV_{t-1}$

$\Delta MARJAPB = MARJAPB_t - \hat{\rho} * MARJAPB_{t-1}$

$\Delta TCR = TCR_t - \hat{\rho} * TCR_{t-1}$

$\Delta DPS = DPS_t - \hat{\rho} * DPS_{t-1}$

$\Delta GAI = GAI_t - \hat{\rho} * GAI_{t-1}$

$\Delta LF = LF_t - \hat{\rho} * LF_{t-1}$

$\Delta CLN = CLN_t - \hat{\rho} * CLN_{t-1}$

$\Delta ELF = ELF_t - \hat{\rho} * ELF_{t-1}$

$\Delta EKPR = EKPR_t - \hat{\rho} * EKPR_{t-1}$

$\Delta EVA = EVA_t - \hat{\rho} * EVA_{t-1}$

Next is applied the OLS method to the model (14), considering as variables the generalized differences in order to eliminate the autocorrelation of errors expressed by the differences $\Delta\varepsilon_t = \varepsilon_t - \hat{\rho} * \varepsilon_{t-1}$, which ensures meeting the assumptions required to implement this method. Another aspect worth mentioning is that the transition to generalized differences has the negative effect of eliminating the first observation for each analysed company, which in this case would be equivalent to a reduction in the total number of observations from 99 to only 66. In order to avoid this elimination the specialized literature (Georgescu, 2014) recommends using a transformed observation of X_1[1], equal to $X_1\sqrt{1-\hat{\rho}^2}$. Considering these aspects, I present below the results of the second linear regression procedure:

Table 3. The characteristics of the generalized differences regression

Dependent Variable: ΔLNPBV
Method: Panel Least Squares
Sample: 2011 2013
Included observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.185888	0.188500	6.291180	0.0000
ΔMARJAPB	0.543118	0.169330	3.207454	0.0019
ΔTCR	-0.002180	0.000406	-5.365431	0.0000
ΔDPS	0.095632	0.022529	4.244851	0.0001
ΔGAI	-1.109454	0.411294	-2.697470	0.0084
ΔLF	-1.047203	0.278227	-3.763841	0.0003
ΔCLN	6.99E-10	2.01E-10	3.482801	0.0008
ΔELF	-1.323462	0.418028	-3.165962	0.0021
ΔEKPR	-0.038447	0.013181	-2.916952	0.0045
ΔEVA	-1.22E-10	9.57E-11	-1.278585	0.2044

R-squared	0.543286	Mean dependent var	0.390368
Adjusted R-squared	0.497101	S.D. dependent var	0.883743
S.E. of regression	0.626710	Akaike info criterion	1.998870
Sum squared resid	34.95609	Schwarz criterion	2.261003
Log likelihood	-88.94407	Hannan-Quinn criter.	2.104930
F-statistic	11.76336	Durbin-Watson stat	1.685642
Prob(F-statistic)	0.000000		

Source: author processing[1]

[1] By X_1 we refer in this case to the observation of the year 2011 (for each company) of all variables of the regression model (the independent ones and the dependent one), noted generically with X

So, following the processing of the model in order to correct the effects of serial correlation, it presents the following estimating equation:

$$\Delta LNPBV = C(1) + C(2) * \Delta MARJAPB + C(3) * \Delta TCR + C(4) * \Delta DPS + C(5) * \Delta GAI + C(6) * \Delta LF + C(7) * \Delta CLN + C(8) * \Delta ELF + C(9) * \Delta EKPR + C(10) * \Delta EVA + \varepsilon \quad (15)$$

Estimating the parameters of the regression equation determines rewriting the model by substituting the coefficients as follows:

$$\Delta LNPBV = 1.185887 + 0.543118 * \Delta MARJAPB - 0.002180 * \Delta TCR + 0.095632 * \Delta DPS - 1.109453 * \Delta GAI - 1.047203 * \Delta LF + 6.99e\text{-}10 * \Delta CLN - 1.323461 * \Delta ELF - 0.038446 * \Delta EKPR - 1.22e\text{-}10 * \Delta EVA \quad (16)$$

As can be noticed, the value of R-Squared is lower than in the initial model (0.749), which means that in the new regression model about 54% of the variation in the dependent variable is explained by the evolution of the independent variables. It should be borne in mind that this experimental approach involves modelling the market return, being obvious that in addition to economic reasons, other irrational causes will also impact the share price (like speculation). In this sense, it appears as impossible to surprise these irrational causes into any type of model. That said, the value of 54% is regarded as a meaningful one, particularly in comparison with other similar studies[1]. At the same time, the probability associated with the F-statistic test is 0 and its value (11.763) is higher than the tabular value for 9 respectively 89 degrees of freedom (1.986) confirming that the regression equation is globally significant. At the same time, it is noticed the low level of standard errors associated with the variables of the new regression model a well as the associated probability lying below the 1% threshold for almost all of them.

Thus, it can be stated that 8 of the 9 independent variables, namely gross profit margin, term collection of receivables, dividend per share, share of fixed assets in total assets, financial leverage, net working capital, financial leverage effect and equity efficiency are significant at the 1% level, while the variable economic value added is significant at the 20% level. Although a margin of error of 20% is considered usually too high to conduct a statistical analysis (15% is most often the maximum level) in this context this variable is regarded as significant. The basis for this assertion is that the process of selection and processing undertaken until now kept in the final model only the independent variables that are relevant to explain the variation in the market return.

Analysing the coefficients assigned to the independent variables, I find that the direction of their influence remains unchanged within the processed regression model compared to the original model but the intensity of the influence changes sensitively to the downside, this aspect being considered normal given the resorting to the generalized differences of the variables.

Thus, gross profit margin has a significant positive effect (at the 1% level) on price to book value, confirming, as it was expected, that a high gross profit margin will lead to better performance on the market, measured by the share price. In other words, it can be said that if a company is able to improve its gross profit margin, the stock market will react positively and investors will buy the share in question.

The term collection of receivables has a negative effect (at the 1% level) on the stock market performance, which means that a reduced term collection of receivables will lead to improved profitability on the market, a result that confirms the expectations regarding the direction of this indicator's influence.

The dividend per share is related positively (at the 1% level) with stock exchange performance, increasing shareholder remuneration causing unequivocal market appreciation of the shares of companies that take this decision.

The share of fixed assets in total assets has a significant negative effect (at the 1% level) on the stock exchange performance of companies. This indicator represents, along with total assets or market capitalization, one of the tools of expressing the size of an enterprise, size that is considered one of the most important variables in explaining the variation in the profitability of shares on the market. In the specialized literature, researching the influence of the size of companies on their stock

1 Hobarth in his thesis "Modeling the relationship between financial indicators and company performance. An empirical study for US-listed companies" (2006) considers sufficient a value of the coefficient of determination equal to 0.24

exchange performance demonstrated that the two measures are negatively related (Banz, 1981, Basu, 1983, Fama and French, 1992), smaller companies recording superior profitability on the capital market compared with the large-scale ones. The result obtained through the linear regression model developed in this study confirms this negative relationship, explained by the fact that the growth potential is much higher in the case of smaller companies. Another argument in terms of which the relationship between the two indicators is a negative one consists of that a higher share of fixed assets in the total patrimony of the company is equivalent to a high level of depreciation expenses and the remaining net profit for the remuneration of shareholders is thus diminished.

Financial leverage presents a significant negative effect (at the 1% level) on stock exchange performance, confirming expectations that increasing the indebtedness degree of the company would bring down its value in the view of investors. This result confirms the findings of previous studies (Korteweg, 2004, Zaher, 2010), which found that investments made in companies with low financial leverage give higher returns to investors.

Net working capital is related positively (at the 1% level) with market profitability, maximizing its level constituting an essential step towards increasing its efficiency, and companies with an efficient working capital will be clearly appreciated by investors.

Financial leverage effect is negatively related (at the 1% level) with the performance of shares on the stock exchange, contrary to the expectation that a significant leverage effect would attract a higher return in terms of the capital market. This aspect is caused by the fact that Romanian companies recorded a primarily negative financial leverage effect, investors associating this indicator with a poor performance.

Equity efficiency too manifests a negative effect (at the 1% level) on the price to book value, aspect that does not necessarily constitute a surprise. Indeed, an increase in equity efficiency through sales represents an important goal to pursue for any company but, at the same time, its growth can be a signal to investors that conducting the current activity of the company relies more and more on borrowed capitals, causing them to evaluate this indicator in a negative way.

Lastly, we note that economic value added is negatively related to the market return (at the 20% level). The reasons for this fact can be likened to a boomerang effect manifested by the growth of this indicator. Thus, once the economic value added of a company rises, investors will consider themselves entitled to claim a higher rate of return for their advanced equity. Given that the risk index of the share and the average return of the market remain unchanged, being no justification for them to change, the investors' request cannot be achieved and, therefore, they decide the sale of the owned shares in order to get the compensation required from holding other stocks. Thus, takes place the diminishing of the market profitability for companies generating economic value added to a higher level.

2.1.4. Testing the validity of the processed regression model

After processing the regression model it is resumed the procedure of its validation in the light of the set of assumptions specific to linear regression, as shown below. This process is initiated through firstly testing the residuals of the regression equation, after which the attention is focused on the parameters of the resulted function.

- Assumption of uncorrelated errors, $cov(\varepsilon_i \varepsilon_j) = 0$ for $i \neq j$

In order to test this assumption we perform again the Breusch-Godfrey test, as follows:

Table 4. The result of the Breusch-Godfrey test on the regression of the generalized differences

F-statistic	2.823953	Prob. F(1,88)	0.0964
Obs*R-squared	3.078168	Prob. Chi-Square(1)	0.0793

Source: author processing

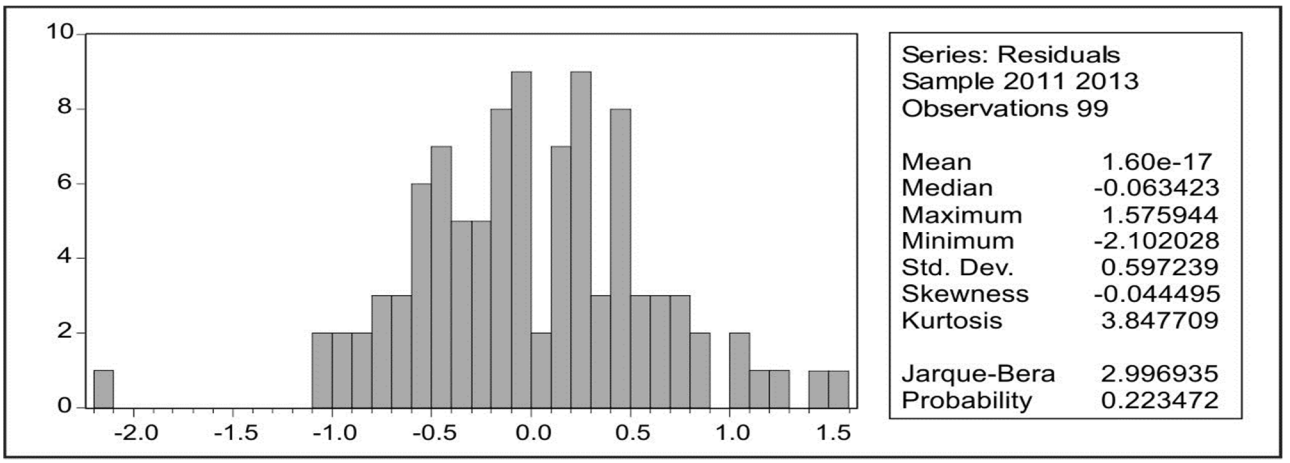
As we can see, the probability of both versions of the Breusch-Godfrey test (F and χ^2) is above the threshold of 0.05 (0.096 and 0.079), indicating, this time, to accept the null hypothesis of lack of

autocorrelation among the residuals of the regression.

- Assumption of normally distributed errors $\varepsilon \rightarrow N(0, \sigma^2)$

To test the assumption of normally distributed errors I have used both their graphical representation through histogram and the Jarque-Bera test.

Figure 4. The distribution of residuals



Source: author processing

In our case the Jarque-Bera statistics has a low value (2.996), with a probability of 0.223, therefore exceeding the threshold of 0.05, which leads to accepting the null hypothesis, of distribution of errors after a normal law. The same conclusion is provided by plotting the residuals.

- The random variable is a normal variable of average 0, $E(\varepsilon_i)=0$

In this case testing the null hypothesis is undertaken through the t-test which compares the average of residuals to 0, its acceptance or rejection resulting from comparing the test's associated probability to the critical threshold of 0.05.

Table 5. The result of the test E(εi)=0

Hypothesis Testing for RESID
Sample: 2011 2013
Included observations: 99
Test of Hypothesis: Mean = 0.000000

Sample Mean = 1.60e-17
Sample Std. Dev. = 0.597239

Method	Value	Probability
t-statistic	2.66E-16	1.0000

Source: author processing

As we can notice, the probability of the t-test is 1>0.05, which leads to the acceptance of the null hypothesis, that the average of residuals is equal to 0.

- The homoscedasticity assumption, $Var(\varepsilon_i)= \sigma^2$

In order to test the homoscedasticity of errors I have used the White test, specifying:

- H0: homoscedastic model;
- H1: heteroscedastic model.

Table 6. The result of the White test

F-statistic	0.305681	Prob. F(9,89)	0.9712
Obs*R-squared	2.968480	Prob. Chi-Square(9)	0.9655
Scaled explained SS	3.415933	Prob. Chi-Square(9)	0.9455

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Sample: 2011 2013
Included observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.342184	0.105524	3.242721	0.0017
ΔMARJAPB^2	0.100063	0.098931	1.011437	0.3145
ΔTCR^2	8.27E-08	4.07E-07	0.203255	0.8394
ΔDPS^2	-0.000517	0.000896	-0.576934	0.5654
ΔGAI^2	0.022318	0.458742	0.048651	0.9613
ΔLF^2	0.065054	0.280731	0.231730	0.8173
ΔCLN^2	-4.02E-21	1.16E-19	-0.034552	0.9725
ΔELF^2	-0.127225	0.309400	-0.411201	0.6819
ΔEKPR^2	-1.85E-05	0.000388	-0.047609	0.9621
ΔEVA^2	-5.61E-21	1.80E-20	-0.311665	0.7560

R-squared	0.029985	Mean dependent var	0.353092
Adjusted R-squared	-0.068107	S.D. dependent var	0.598880
S.E. of regression	0.618938	Akaike info criterion	1.973914
Sum squared resid	34.09453	Schwarz criterion	2.236048
Log likelihood	-87.70877	Hannan-Quinn criter.	2.079974
F-statistic	0.305681	Durbin-Watson stat	2.373679
Prob(F-statistic)	0.971191		

Source: author processing

As we can see, EViews presents three different types of the White test on detecting heteroscedasticity, in version F, χ^2 and Scaled Explained SS, the latter being based, as its name suggests, on a normalized version of the sum of the squares explained by the auxiliary regression presented in the second part of the table above. This auxiliary regression also provides useful additional information about the source of heteroscedasticity, in the event that it is detected. In this case, all three statistical tests refute the presence of heteroscedasticity in the adjusted regression model, validating, through the associated probabilities, of 0.971, 0.965 and 0.945, the null hypothesis that the model is homoscedastic.

Once confirmed the validity of the assumptions on the residual values of the regression function, we want to also certify that its parameters provide reliable information, both in terms of explanatory variables included in the model and the coefficients associated with them, further on in our work.

- Multicollinearity

Using the OLS method to estimate the regression equation is based on the implicit assumption that the explanatory variables are not correlated with one another or, in other words that the explanatory variables are orthogonal one towards the other. Even though in the first regression model this propriety was confirmed, it is necessary that it should be also validated after the regression of generalized differences of the variables taken into consideration, through analysing the variance inflation factors (VIF).

Table 7. Variance inflation factors

Variable	Coefficient Variance	VIF
C	0.035532	NA
ΔMARJAPB	0.028673	1.091757
ΔTCR	1.65E-07	1.049186
ΔDPS	0.000508	1.099234
ΔGAI	0.169163	1.122719
ΔLF	0.077410	2.943408
ΔCLN	4.03E-20	2.857278
ΔELF	0.174748	3.991673
ΔEKPR	0.000174	2.716647
ΔEVA	9.16E-21	1.736799

Source: author processing

According to **Table 7** the variance inflation factor values are low, well below the maximum acceptable level of 10, and thus confirming the absence of collinearity between the explanatory variables of the model, which are orthogonal to each other.

Next, we want to certify the relevance of the coefficients associated to the explanatory variables, ensuring that there is no possibility for them to be null and thus the regression model to be statistically invalidated.

- The coefficients are not null

In order to test this characteristic we use the Wald test.

Table 8. The result of the Wald test

Equation: EQ02

Test Statistic	Value	df	Probability
F-statistic	11.76336	(9, 89)	0.0000
Chi-square	105.8703	9	0.0000

Null Hypothesis: C(2)=C(3)=C(4)=C(5)=C(6)=C(7)=C(8)=C(9)=C(10)=0

Null Hypothesis Summary:

Normalized Restriction (= 0)	Value	Std. Err.
C(2)	0.543118	0.169330
C(3)	-0.002180	0.000406
C(4)	0.095632	0.022529
C(5)	-1.109454	0.411294
C(6)	-1.047203	0.278227
C(7)	6.99E-10	2.01E-10
=C9C(8)	-1.323462	0.418028
C(9)	-0.038447	0.013181
C(10)	-1.22E-10	9.57E-11

Source: author processing

Also regarding the Wald test the program displays its two possible versions F and χ^2, both having an associated probability of 0, well below the critical threshold of 0.05. This leads to the rejection of the null hypothesis, namely the coefficients of the regression equation are different from 0, the model being statistically significant.

Further, we consider necessary to check the quality of the regression model also in the light of the data set that underlies our experimental approach. As mentioned, the 33 companies whose financial and stock performance indicators could be maintained for conducting this study are carrying on different activities, falling through eight representative sectors of the Romanian economy. These companies were selected both for reasons of representativeness and due to limitations imposed by the still reduced size of the capital market in our country. What I aim next is to ensure that this heterogeneity of enterprises forming the support of the present study does not distort in any sense the representativeness of the regression model developed. To this end, I proceeded to create a structure variable in the software EViews. To this variable called Sector were assigned for each observation in part, values between 1 and 8, corresponding to the area of activity of each company, as follows:

Table 9. The construction of the variable Sector

Sector	Value	Sector	Value
Mining and quarrying	1	Wholesale and retail trade	5
Manufacturing	2	Transportation	6
Electricity, gas, steam and air conditioning supply	3	Storage	7
Constructions	4	Hotels and restaurants	8

Source: author processing

Then I analysed the vector of the regression equation's Resid variable, corresponding to the residual values of our model. Through this analysis, I tested the equality of means of these residual values, classifying the observations using the Sector variable of structure, issuing the following set of hypotheses:

H0*: The means of residuals are equal across sectors*

H1*: The means of residuals differ from one sector to another*

Accepting the null hypothesis of the equality of errors' means across sectors represents a confirmation of the fact that that the affiliation of companies to different areas of activity does not generate disturbances capable to affect the validity of the model from economic and financial perspective, residual values being, on average, the same from one sector to another.

Table 10. The result of the test for equality of means of the residuals classified by the variable Sector

Test for Equality of Means of RESID
Categorized by values of SECTOR
Sample: 2011 2013
Included observations: 99

Method	df	Value	Probability
Anova F-test	(7, 91)	1.813745	0.0940
Welch F-test*	(7, 15.2781)	1.165272	0.3766

Source: author processing

As we can see, **Table 10** gives the result of the F-test in ANOVA and Welch version, the latter allowing unequal observations in the testing. The probability associated with both tests is superior to the critical threshold of 0.05 (0.094 and 0.376), which is why we accept the null hypothesis that the means of the regression's residuals are equal across sectors, the type of activity of the analysed companies not affecting the economic and financial validation of the resulted model. A similar conclusion results from the analysis of variation:

Table 11. The analysis of variation of inter and intrasector residuals

Source of Variation	df	Sum of Sq.
Between	7	4.279905
Within	91	30.67619
Total	98	34.95609

Source: author processing

Analysing the data in the above table it can easily be ascertained that the source of the residuals' variation comes in, mostly, from within sectors (30.6), their variation between sectors being quite low (4.27).

After analysing all the assumptions for validating the estimated model, both of a general nature, characteristic of the multiple linear regression procedure and at a particular level, according to the specific data set being processed, we can say that

$$\Delta LNPBV = 1.185887 + 0.543118 * \Delta MARJAPB - 0.002180 * \Delta TCR + 0.095632 * \Delta DPS - 1.109453 * \Delta GAI - 1.047203 * \Delta LF + 6.99e\text{-}10 * \Delta CLN - 1.323461 * \Delta ELF - 0.038446 * \Delta EKPR - 1.22e\text{-}10 * \Delta EVA$$

Represents a valid model of multiple linear regression, the values of its coefficients' parameters thereof indicating progress, upward or downward, in the price to book value as determined by the increase with one unit of each of its explanatory variables, while the other independent variables are maintained at a constant level.

2.2. Testing the efficiency of the Romanian capital market using the regression model

As stated at the beginning of our scientific approach, the price to book value has been selected as the most representative stock exchange indicator to reflect how the financial performance of listed companies puts its mark on their evolution on the capital market. The PBV ratio is determined using the market price of shares registered at the end of each period in the analysed time frame. In fact, all indicators of financial performance and, thus, those used in this study, are determined based on the information contained in the annual financial statements whose deadline for submission is, according to the legislation of our country, 31st of May of the current year for statements concerning the previous year. However, after investigating the dates when the selected companies have decided to publish their annual financial statements, we found that these were available much earlier, the term days ranging from the second half of February, March or April and the first week of May. It can therefore arise the matter of determining the price to book value using a market price available at an earlier moment than the availability of information underlying the assessment of the financial performance of companies. This approach is consistent with the principles of the efficient market hypothesis developed in the second half of the twentieth century by Eugene Fama, that any relevant information, be it financial or not, once made public does no longer influence than perhaps in a marginal degree the stock quote since it was already anticipated by investors and incorporated into the market price.

Although there are many supporters of the efficient market hypothesis, being developed even several manifestation forms[1] of it, they are not few those

1 Weak form: the prices of securities already reflect all past information that are publicly available; Semi-robust form: the prices reflect all publicly available information and change instantly to reflect the new revealed public information; Robust form: additionally, the prices also reflect the inside information, unknown to the public.

whose opinion is contrary to these principles. An example of this is given by Robert Shiller, Nobel laureate for Economics in 2013, who believes, instead, that markets are not efficient, but tend to be influenced by human behaviour, behaviour that is not always rational and may cause distortion of the market price. Under these conditions, we intend to investigate whether the financial performance of companies is likely to influence the stock indicators to a greater extent when the information underlying its determination are made public, or, on the contrary, they were already anticipated by investors and reflected in the share price. To perform this task we will test the explanatory variables of the processed regression model in connection with a new dependent variable in order to conclude whether or not its variation is reflected to a higher or smaller extent by the independent variables, compared with the variation of the original variable. To this end I calculated again the level of the price to book value using, according to the above finding, the average daily rates for the periods 15th to 28th of February, 15th to 31th of March and 25th of April to 5th of May of the year following the one that the financial performance indicators refer to. The resulting data were used to create a variable similar to the original dependent variable, denoted ΔLNPBV (t + 1).

Since the model based on the generalized differences was the one that proved its validity according to all the principles of linear regression, also this variable is processed accordingly, the results of its regression in relation to the explanatory variables being presented as follows.

Table 12. The characteristics of the variable ΔLNPBV(t+1)'s regression

Dependent Variable: ΔLNPBV(t+1)
Method: Panel Least Squares
Sample: 2011 2013
Included observations: 99

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	1.201633	0.184415	6.515906	0.0000
ΔMARJAPB	0.562957	0.165661	3.398250	0.0010
ΔTCR	-0.002003	0.000398	-5.038923	0.0000
ΔDPS	0.095835	0.022041	4.348041	0.0000
ΔGAI	-1.100032	0.402382	-2.733804	0.0076
ΔLF	-1.064846	0.272198	-3.912026	0.0002
ΔCLN	6.46E-10	1.96E-10	3.287041	0.0015
ΔELF	-1.442834	0.408970	-3.527971	0.0007
ΔEKPR	-0.035650	0.012895	-2.764684	0.0069
ΔEVA	-7.68E-11	9.36E-11	-0.820026	0.4144

R-squared	0.549979	Mean dependent var	0.420319
Adjusted R-squared	0.504472	S.D. dependent var	0.870999
S.E. of regression	0.613129	Akaike info criterion	1.955054
Sum squared resid	33.45754	Schwarz criterion	2.217188
Log likelihood	-86.77520	Hannan-Quinn criter.	2.061114
F-statistic	12.08542	Durbin-Watson stat	1.198286
Prob(F-statistic)	0.000000		

Source: author processing

Comparing the above data to the ones from table 3 we find that the results of the regression model do not change but only in a very limited extent along with recalculating the dependent variable for time t + 1. Thus, we find an extremely low difference between the values of the coefficient of determination (0.549 to 0.543), which means that the variation of the variable ΔLNPBV (t + 1) is explained by only 0.6% more than the variable ΔLNPBV on account of the independent variables from the model. At the same time, also the values of coefficients of the regression equation parameters are maintained at an extremely close level, which shows that the influence of financial performance indicators was already incorporated into the market price since the end of the reporting period.

We can therefore affirm through testing the linear regression model, that the capital market in Romania is a sufficiently efficient market, on which the information likely to appoint the financial performance of companies are, mostly, expected by investors, their effective publication having an indistinguishably effect on the profitability of shares on the market. This does not appear to be surprising given the constant efforts of Bucharest Stock Exchange to improve the transparency and standardization in terms of issuers, investors being much better and more quickly informed of the developments in the company whose shares are of interest to them. Moreover, publicly listed companies are obliged to the preparation and publication of quarterly and half-year financial statements according to the International Financial Reporting Standards, so that the correct estimation of the information comprised in the financial statements at the level of the entire financial exercise constitutes an approach easy to undertake. Of course more accurate records on capital market efficiency can be achieved when the analysis involves also non-financial indicators but such a direction will be pursued within a further research. In addition, we can state that if financial information, for which processing is laborious and time-consuming, requiring at least mid-level knowledge of the economic and financial theory, are incorporated quickly into the market price of the shares, then even more the action sphere of the phenomenon will include also non-financial information that involve, obviously, an easier interpretation.

That said, the regression model of the market profitability of shares through the financial performance has high practical utility, serving both the interests of the management of listed companies and those of their current and potential investors. Statistically and economically validated, the regression model constitutes a genuine management tool, providing managers for the opportunity to meet more effectively shareholders' expectations of maximizing the value of their wealth, by taking action to improve financial performance parameters that are considered relevant on the capital market. At the same time, the regression model takes on the value of an effective forecasting instrument, creating conditions for current and potential investors of listed companies to estimate with a significant level of accuracy the evolutionary tendencies of market return for the shares they are interested in. Thus, they have the possibility to adjust accordingly their investment strategy and the structure of their held portfolio.

Conclusions

The essential purpose of initiating our experimental approach aims to offer new perspectives on an issue that concerns specialists within the economic and financial domain of over six decades, ie, elucidating the implications of financial indicators of performance on the profitability on the capital market.

For this purpose I proceeded to substantiate a regression model of market profitability in terms of financial performance, considering the indicator values for 33 companies listed on BSE, over the last three years of activity for which there was data availability at the initiation moment of the study, namely 2011-2013. The analysis was performed using the software package EViews version 7.0, taking into account 38 financial performance indicators and the most representative stock exchange indicator to illustrate the market profitability of shares, i.e. the price to book value.

Developing such a model presents a level of much higher utility for the economic and financial theory and practice in our country as it was ascertained the notable expansion of the Romanian capital market, whose visibility will be particularly pronounced among investors along with its reclassification as emerging capital market in the near future.

Thus, I proceeded to generate the initial regression model having as independent variables the indicators of financial performance and as dependent variable the price to book value in logarithmic form, its processing being necessary to correct excessive fluctuations

manifested in the data series. By assessing the quality of the model's linear adjustment we obtained the following regression equation:

*LNPBV = 2.775255 + 0.571253*MARJAPB - 0.003023 * TCR + 0.099164 * DPS - 2.528167*GAI - 1.408571*LF + 8.565735e-10 * CLN - 1.687388 * ELF - 0.042221 * EKPR - 2.161144e-10 * EVA + ε*; through which a percentage of about 75% of the variation in the resulting variable is explainable through the factorial variables (R^2 = 0.749).

Since the approach of testing the predictive value of the model estimated through the analysis of the fundamental assumptions specific to multiple linear regression confirmed the significant presence of serial correlation within the regression model, it has imposed the need to take measures in order to correct these correlations and revise the initial model. Following the implementation of corrective measures with the help of the generalized differences procedure, the regression model of market profitability in terms of financial performance has become:

∆LNPBV = 1.185887 + 0.543118∆MARJAPB - 0.002180*∆TCR + 0.095632*∆DPS - 1.109453*∆GAI - 1.047203*∆LF + 6.99e-10*∆CLN - 1.323461*∆ELF - 0.038446*∆EKPR - 1.22e-10*∆EVA+ ε*; where approximately 54% of the variance in the dependent variable is explained by the evolution of independent variables (R^2 = 0.543), the percentage being considered significant. This statement is substantiated by the very nature of our experimental approach based on modelling market return, being obvious that in addition to economic reasons, also other irrational causes, like speculation, will influence the price of shares on the market. Or surprising these irrational causes in any type of model constitutes an approach impossible to achieve in practice.

After analysing all the assumptions for validating the estimated model both of a general nature, characteristic of the multiple linear regression procedure and at a particular level, according to the specific data set being processed, we can state that the new regression model represents a both statistically and economically viable tool, with the help of which is quantified the influence of financial performance of companies on the market profitability of shares, in the context of the practical reality of the Romanian business environment and capital market.

Once validated, the regression model constituted the essential tool for meeting the last objective of our scientific research approach, to test the efficiency of the Romanian capital market. Achieving this goal has been implemented by investigating the extent to which the financial performance of companies is likely to influence the stock market indicators to a greater extent when the information underlying its determination are made public, or, on the contrary, they were already expected by investors and reflected in the share price. After conducting such scientific activities we drew the conclusion that the capital market in Romania is a sufficiently efficient market, on which the information likely to appoint the financial performance of companies are largely expected by investors, their effective publication having an almost imperceptible effect on the market profitability of shares.

Based on all the issues presented we conclude that researching the direction and intensity of the implications of financial performance on stock exchange indicators of listed companies as well as quantifying these implications through a viable and effective instrument represents an important step to increase the efficiency and accuracy of formulation of management strategies serving in this way, both the interests of listed companies and those of the investors on the capital market.

The complexity of the addressed theme allows its enrichment by drawing further research directions that may, for example, imply quantifying the non-financial aspects that characterize the economic activity of listed companies and including this information in the regression model.

REFERENCES

1. Ball, R. and Brown, P. (1968), An Empirical Evaluation of Accounting Income Numbers, *Journal of Accounting Research*, vol. 6, no. 2, pp. 159-178, DOI http://dx.doi.org/10.2307/2490232 .
2. Banz, R.W. (1981), The relationship between return and market value of common stocks, *Journal of Financial Economics*, vol. 9, no. 1, pp. 3-18, DOI http://dx.doi.org/10.1016/0304-405x(81)90018-0 .

3. Basu, S. (1983), The relationship between earnings yield, market value and return for NYSE common stocks: Further evidence, *Journal of Financial Economics*, vol. 12, pp. 129-156, DOI http://dx.doi.org/10.1016/0304-405x(83)90031-4 .
4. Beaver, W.H. and Dukes, R.E. (1972), Interperiod tax allocation, earnings expectations, and the behavior of security prices, *The Accounting Review*, vol. 47, pp. 320-333.
5. Beaver, W.H., Griffin, P.A. and Landsman, W.R. (1982), The incremental information content of replacement cost earnings, *Journal of Accounting and Economics*, vol. 4, pp. 15-39, DOI http://dx.doi.org/10.1016/0165-4101(82)90004-0 .
6. Biddle, G., Bowen, R. and Wallace, J. (1997), Does EVAs beat earnings? Evidence on the associations with stock returns and firm values, *Journal of Accounting and Economics*, vol. 24, pp. 301-336, DOI http://dx.doi.org/10.1016/s0165-4101(98)00010-x .
7. Board, J.L.G. and Day, J.F.S. (1989), The Information Content of Cash Flow Figures, *Accounting and Business Research*, vol. 12, no. 20, pp. 3-11, DOI http://dx.doi.org/10.1080/00014788.1989.9729389 .
8. Buchheit, S. and Kohlbeck, M. (2002), Have Earnings Announcements Lost Information Content?, *Journal of Accounting, Auditing & Finance*, vol. 17, no. 2, pp. 137-153.
9. Buşe, L. and Ştefan, I.O. (2014), *Study on the Correlation between Economic and Financial Performance and Stock Exchange Performance in Romanian Companies from Oil and Retail Trade Industries,* 21st International Economic Conference of Sibiu, Prospects of Economic Recovery in a Volatile International Context: Major Obstacles, Initiatives and Projects, Procedia Economics and Finance, Elsevier, vol. 16, pp. 149-159.
10. Carp, M. and Mironiuc, M. (2014), Fundamentarea deciziilor investiţionale prin studii de asociere între indicatorii financiari tradiţionali and indicatorii bursieri, *Audit Financiar*, vol. 12, no. 113/5, pp. 37- 47.
11. Cho, H.J. and Pucik, V. (2005), Relationship between Innovativeness, Quality, Growth, Profitability and Market Value, *Strategic Management Journal*, vol. 26, no. 6, pp. 555-575, DOI http://dx.doi.org/10.1002/smj.461.
12. Ciobanu, A. (2004), *Analiza relevanţei indicatorilor financiari de măsurare a performanţelor întreprinderii,* Academia Română, Institutul de Cercetări Financiare and Monetare „Victor Slăvescu", vol. 1, pp. 139-150.
13. Ciobanu, A. (2006), *Analiza performanţei întreprinderii*, Bucureşti: Editura ASE.
14. Fama, E.F. and French, K.R. (1992), The Cross-Section of Expected Stock Returns, *The Journal of Finance*, vol. 157, no. 2, pp. 427-465, DOI http://dx.doi.org/10.1111/j.1540-6261.1992.tb04398.x.
15. Fernandez, P. (2015), *EVA and Cash Value Added Do Not Measure Shareholder Value Creation,* SSRN Papers, available at http://ssrn.com/abstract=270799.
16. Georgescu, V. (2014), *Curs de Econometrie*, Editura Sitech, Craiova.
17. Hobarth, L. (2006), *Modeling the relationship between financial indicators and company performance. An empirical study for US-listed companies,* Doctoral Thesis, WU Vienna University of Economics and Business.
18. Hopwood, W.S. and Schaefer, T.F. (1988). Incremental information content of earnings- and nonearnings-based financial ratios, *Contemporary Accounting Research*, vol. 5, no. 1, 318-342, DOI http://dx.doi.org/10.1111/j.1911-3846.1988.tb00708.x.
19. Korteweg, A. (2004), *Financial leverage and expected stock returns: evidence from pure exchange offers*, available at SSRN: http://ssrn.com/abstract=597922.
20. Kothari, S.P. (2001), Capital markets research in accounting, *Journal of Accounting and Economics*, vol. 31, pp. 105-231, DOI http://dx.doi.org/10.1016/s0165-4101(01)00030-1.
21. Kusuma, H. (2014), The Incremental Information Content of Cash Flow Statement: An Australian Empirical Investigation, *International Journal of Business Administration*, vol. 5, no. 4, pp. 90-102, DOI http://dx.doi.org/10.5430/ijba.v5n4p90.

22. Lev, B. (2001), *Intangibles: Management, Measurement and Reporting,* Washington D.C.: The Brookings Institution.

23. Livnat, J. and Zarowin, P. (1990), The Incremental Information Content of Cash-Flow Components, *Journal of Accounting and Economics*, vol. 13, no. 1, pp. 25-46, DOI http://dx.doi.org/10.1016/0165-4101(90)90066-d.

24. Patell, J. and Kaplan, R. (1977), *The Information Content of Cash Flow Data Relative to Annual Earnings.* Working paper, Stanford University (August).

25. Pindyck, R.S. and Rubinfeld, D.L. (1998), *Econometric Models and Economic Forecasts*, Fourth Edition, Irwin, McGraw-Hill.

26. Schaefer, T. and Kennelley, M. (1986), Alternative Cash Flow Measures and Risk-Adjusted Returns*, Journal of Accounting, Auditing and Finance*, pp. 278-287.

27. Zaher, T.S. (2010), *Performance of debt free firms*, Managerial Finance, Vol. 36, No. 6, pp. 491-501, DOI http://dx.doi.org/10.1108/30743581080001333.

28. Zaretzky, K. and Zumwalt, J.K. (2007), Relation between distress risk, book-to-market ratio and return premium, *Managerial Finance*, vol. 33, no. 10, pp. 788-797, DOI http://dx.doi.org/10.1108/03074350710779232.

Audit financiar, XIV, Nr. 8(140)/**2016**, *897-908*
ISSN: 1583-5812; ISSN on-line: 1844-8801

Study regarding the relevance of the accounting subjects in the economic vocational training of non-accountant specialists

Galina BĂDICU,
Academy of Economic Studies of Moldova,
E-mail: gbadiku@mail.ru

Svetlana MIHĂILĂ,
Academy of Economic Studies of Moldova,
E-mail: sv_mihaila@yahoo.com

Abstract

The responsibility for the skills of specialists in the economic field belongs to universities, which, by modernizing the curriculum, must take into account the requirements of the professional environment (employers), where the role of the economic specialist extends beyond narrow knowledge, flexibility and high capacity to address various problems. From this perspective, in order to enhance the role of the academic environment and to develop the professional skills of the graduating economists, it is necessary to correlate the competencies and the requirements about educational outcomes. With regard to the relevance of the accounting subjects in the professional training of non-accountant economic specialists, given the competing interests of universities, students and employers in the field of education, we proposed a debate with the view to design strategies of accounting education in the higher economic education of the Republic of Moldova. The article represents a study based on the documentation of the university curriculum in undergraduate programs. With the view to test and validate the necessity of studying accounting subjects in the professional training of non-accounting economic specialists, a questionnaire was developed and implemented. The general research idea refers to the need to study accounting in economic education and practice, which could have an impact over the competitiveness of the Economics graduate.

Keywords: *Superior studies, university professional training, non-accountant economic specialists, professional environment, the relevance of accounting in the economic education and practice, the Bologna process, Republic of Moldova.*

JEL Classification: *I25, M41.*

To cite this article:
Bădicu, G. and Mihăilă, S. (2016), Study regarding the relevance of the accounting subjects in the economic professional training of non-accountant professionals, Audit Financiar, vol. XIV, no. 8(140)/2016, pp. 897-908, DOI: 10.20869/AUDITF/2016/140/897

To link to this article:
http://dx.doi.org/10.20869/AUDITF/2016/140/897

Introduction

The current problems of higher education in the Republic of Moldova (RM) generally reflect the status of the national economic complex, which is starting the reform towards a new type of society. The informational transformation of the education, the sustainability of information, the globalization process and the development of the European Union, the issues of the contemporary world, the gap between the educational systems, the accentuated dynamics of the labor market, the multiplication of higher education providers and the growth of competition between universities, and between the academic and the professional environments, have led to deep and multi-dimensional transformations within universities, in order to increase their international competitiveness. This state of fact imposed a new way of thinking and understanding the entire higher education system, including the economic one. The most significant change is the Bologna process (The Bologna Declaration, 1999).

According to the specialists in the field, the core mission of an economic university is to prepare the specialists in the field of economic sciences, who are able to join the workforce immediately and who will perform best in the different industries where they will get employed after graduation. Developing the graduates' professional abilities is a requirement of the higher education in the 21st century, a phenomenon that has been institutionalized through various normative documents, study programs, university curricula, strategies etc. both at a national and international levels. This goal is emphasized in the Education development strategy "Education 2020" (2014), including specific long-term objectives, with regard to securing the current higher education paradigm (education – research – innovation), educational outcomes, quality of studies, human resources and, implicitly, to the qualifications, modernization of the curricula and infrastructure, and financing.

All of these require not only institutional changes, but also complex changes at all levels: conceptual, institutional, managerial, educational. The University, as a cardinal institution of the higher education system, should adapt itself to the new standards and requirements so that it would develop an environment of quality and performance, in order to maintain its status in a competitive world, engaged in the process of globalization.

In order to ensure the optimal interaction between the teacher and students, universities must create and provide the needed conditions, namely a material base, resources, programs and services that are specific to a modern educational process, based on relations, the students' needs and involvement, the teaching methods, strategies, and modern teaching – learning – evaluation techniques and methods.

It is certain that the environment in which the higher education institutions activate has fundamentally changed: professional knowledge and competencies have turned into the main generator of economic development. Nowadays, it is required more and more to change the trends from the possession of knowledge to its exploitation through competitive management and quality insurance. Economists permanently face higher expectations and demands regarding their knowledge and abilities. The knowledge needed to efficiently activate as practical economists continue to rapidly change and amplify. Moreover, the need to be competitive emphasizes all the economists' roles and responsibilities.

Economists gather and analyze information, they process it, they notice trends, issue forecasts, and they especially provide solutions to the problems that have emerged as a result of the market behavior and the misbalances that result from it. Without thorough knowledge of the tax regulations, a graduate cannot be considered an economist. An economist must judge and be able to analyze the circumstances that affect him on a market. Without vast knowledge in the field of accounting, the economist cannot be an economist. He must know what the accounts are, the elements of the production cost, to prepare and analyse the financial statements, to prepare a trial balance etc.

Thus, in order to develop the professional abilities of economics graduates, we need to correlate the students' competencies with the requirements of the professional environment. "Competence is not fixed and coded, but flexible and permanently evolving. It does not involve the lack of a subsequent extension, but it is ready to take the next step" (Cabac, 2011, pp. 10-11).

As compared to the traditional practice in the higher education system, where the teacher emphasized the process of teaching his knowledge, followed by the

evaluation of knowledge, within the modern teaching systems it is no longer accepted the idea that higher economic education should "generally" prepare the students for life. Teaching must combine instruction with formation and learning with evaluation, according to the educational goals.

1. Research motivation and significance

The study is based on the fundamental research and is meant to lead to the discovery of new aspects regarding the role of accounting education within the economic field. By promoting the idea of focusing on professional competencies and skills, we consider that the relationship between the academic and professional environment is preceded by the deep and accurate study of the principles and rules generated by the requirements of the professional environment, a fact that is supported by the teachers in the academic environment. Researches in the field emphasize various problems resulting from the implemented reforms since the affiliation of RM to the Bologna Process. Reforms mainly consisted of the renewing, modernizing and diversifying the resources used in the educational process and creating networks and research cevters, to increase connectivity with the international environment. At a national level, the problems regarding the current trends within the higher education in RM have been and are approached within different scientific conferences and projects regarding the university curricula reform, the improvement of university governance and management, promoting the cooperation between the educational field and the business environment (e.g. Erasmus +, Tempus, Horizon 2020 programs etc.).

Many of these problems remain insufficiently debated, requiring developments, specifications, arguments, additions and updates, by adapting to current circumstances. Moreover, the higher education institutions display defining particularities and features which differentiate them from other institutions, by referring to the specificity of the field and its regulatory framework. Our research is limited to the relevance of accounting within the economic education and practice, representing a complex research, which cannot include in a single paper all the aspects regarding the approached field. We provide added value by generating new questions within the current research.

In the context of adhering to the Bologna process, the changes within the higher education curricula have contributed to the significant decrease in the number of direct contact hours between the teacher and its students in the case of accounting classes, with negative impacts on the university professional development of the graduating economist. An extremely negative side of the university professional development is represented by the exclusion of disciplines "Financial Accounting", "Management Accounting" and "Company Accounting" within different faculties of the Economic Studies Academy of Moldova (ESAM) (*excepting the Faculty of Accounting*). The main objectives of these courses relate to the development of cognitive competencies.

2. Research methodology

Our research aimed at researching the graduates' perspective on the correlation between the gained knowledge from the accounting courses during their university studies and the requirements of the professional environment, in order to improve the university educational offer, by adapting it to the requirements and realities of the socio-economic environment, in accordance with the labor market requirements. At the same time, the article presents an investigation of the accounting disciplines included in the university curricula for the bachelor studies within the ESAM faculties, which develop competencies in the field of management, finances, international economics affairs, economic law etc.. We mention that the ESAM in Chişinău, as an integral part of the national educational system, is fully engaged in the reformation process, according to the objectives of the Bologna Declaration.

In order to reach this objective, we have tried to find out the following: are the accounting disciplines useful and needful to the professional economic formation? To what extent the level of accounting knowledge gathered in the academic environment eases the access to the professional environment?

To carry out the study, we have used the quantitative research as methodology. The qualitative study based on the survey stands at the basis of a scientific research whose objective is the debate of the deepening proposals of the future economic specialists' knowledge by integrating various issues of accounting in the university curricula.

To this extent, we have issued a survey which included 15 questions. The development of the survey and of the questions is based on the meeting of the main objective of the paper regarding the need of studying the accounting disciplines for the professional formation of non-accountants economists. The first three questions include general identification coordinates of the respondents, such as the faculty, the graduated institution and the gender. As, at this level of research, we do not pursue extrapolations based on the provided answers, we have considered that the anonymous feature of the respondents will ensure a credibility regarding the academic environment's ability to provide the needed training for the successful integration in the professional environment and the requirements of the professional environment. Through 15 questions, both with unique, multiple and mixed answers, we have formulated reference points for the debate of the needs that were identified among the master students, both reported to the provided economic education and the personal experience induced by themselves or employing institutions, in order to develop some coherent integration proposals in the academic curricula of the accounting disciplines.

3. The current status of the superior education system in the Republic of Moldova

The affiliation of RM to the Bologna process shows that our country is an active player in the edification of a Europe of knowledge. The last moment reforms (Erasmus +, 2015, p. 3) especially aim at: *perfecting the academic management system, promoting the academic autonomy, the insurance of academic quality, promoting the mobility of teachers and students, organizing the continuous formation, as well as other aspects that support the reformation of the academic system from the perspective of the Bologna Declaration stipulations.* The implemented reforms since the adherence of our country to the Bologna Process have also taken shape in the implementation of new disciplines, updated curricula, launching new programs, the development of various networks, centers, the development of institutional abilities and human capital, technical equipment etc.

The affiliation of the local educational system to the community standards has taken shape in the elaboration and implementation of a normative document which corresponds to the exigencies of this period – The Code of Education (2014) that emphasizes the competitive development of education and research.

As a result, the state superior education institutions have turned into autonomous entities. From the perspective of the organizational economy, universities have the right to choose their own governance organizations and establish their organizational structure. From the perspective of human resources autonomy, they can select their teaching, research and managerial personnel. The superior education institutions are also to approve their own educational activities and scientific research plans.

The changes regarding the implementation of the Bologna process stipulations come from the reformation of the academic teaching in two cycles – Bachelor studies (cycle 1) and Master studies (cycle 2), the introduction in all the superior education institutions of the transferable credits system (Ministery of Education, 2015), the elaboration and implementation of a new classified list of the professional training fields and specializations (Law 142/2011). In this context, the qualitative academic teaching represents a promoter of human rights, sustainable development, democracy, peace, justice and social equity (Education Code, 2014, art. 75) and becomes a sine qua non condition towards progress.

We must admit that the superior education in RM still continues to be one of the most theoretical ones, and the economic agents are less opened towards collaboration with the academic environment, including related with problems that regard the studies' content and quality (Belostecinic, 2015).

The nowadays problem of universities is the one of the selection that they have to make when teaching economic disciplines. It has become important to establish which economic knowledge is needed, what is relevant, convenient and mandatory to teach. To improve the quality and the efficiency of education, the changing of the educational plan requires a deeper analysis, regarding the formation of valuable specialists and the better insertion on the labor market of the graduating economists.

The universal feature of accounting justifies the presence of the accounting disciplines as a main study discipline among all the economic fields and faculties, as

well as among the teaching programs of other faculties: law, engineering, informatics etc. Accounting represents the history of the economic environment of the entity, described in the financial statements, expressed in significantly relevant numbers within the decision making process and within the appreciation of the performance level. In this context, we consider that the accounting disciplines represent some of the basic components of all the mandatory disciplines required for the formation of non-accountant economic specialists.

4. The synthesis of the survey answers and the research conclusions

The survey, named "The relevance of the accounting disciplines in the economic academic formation of non-accountant specialists and the evaluation of the students teaching in the academic environment" (Appendix 1), has been distributed to 100 graduates, actual master students within different Master programs at ESAM. As a result, the sample included 94 respondents, of which 14 men (14.89%) and 80 women (85.11%). Most of the respondents are non-accountant economic graduates from: Business and Affairs Management, Finances and Banks, International Economic Affairs, Economic Statistics and Forecasting, from the bachelor studies of ESAM and also of some economic field universities, such as State University of Moldova. The results of the study show that the master students in the responding sample have studied accounting disciplines.

The survey among the master students firstly shows that the respondents are aware of the fact that a good theoretical basis only represents the starting point in the business environment. On the turn, the practical basis comes after the graduation. They are also appreciating the opportunities the chosen field might provide.

Most of the respondents declared that they are employed in a field that corresponds to the bachelor studies (46.15%), some of them are employed as accountants, though they graduated other faculty in the economic field (19.15%) and the remaining ones activate in other fields (34.04%).

Research results confirm that a significant part of the respondents see the existence of certain difficulties when inserted in the professional environment, as a result of the differences within the academic professional formation: motivational ones, and also the support provided by the universities to graduates.

In order to respond to the question "do you consider that the accounting disciplines are useful and needed in the economic academic formation", six answers were included:

a) Fundamentals of accounting;

b) Financial accounting;

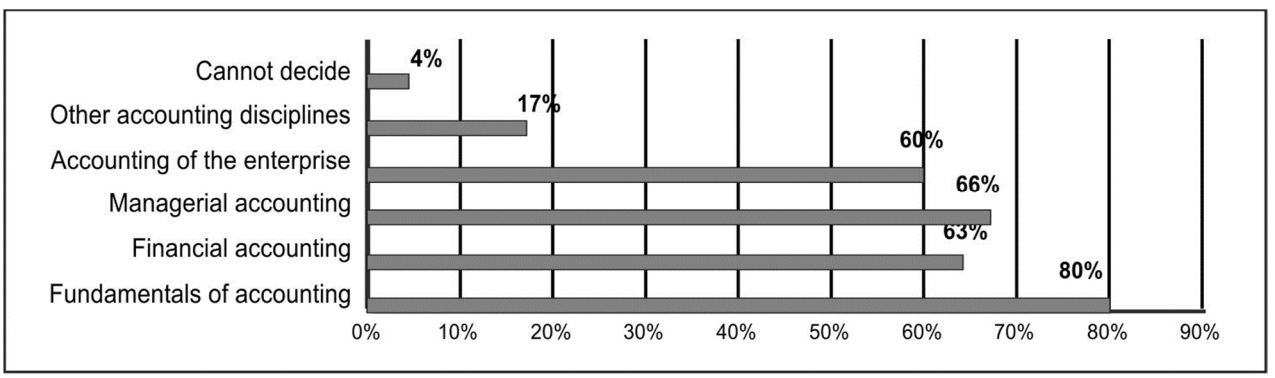
c) Managerial accounting;

d) Accounting of the enterprise;

e) Other accounting disciplines;

f) Cannot decide (**Graphic 1**).

Graphic 1. The need and utility of the accounting disciplines in the academic economic formation

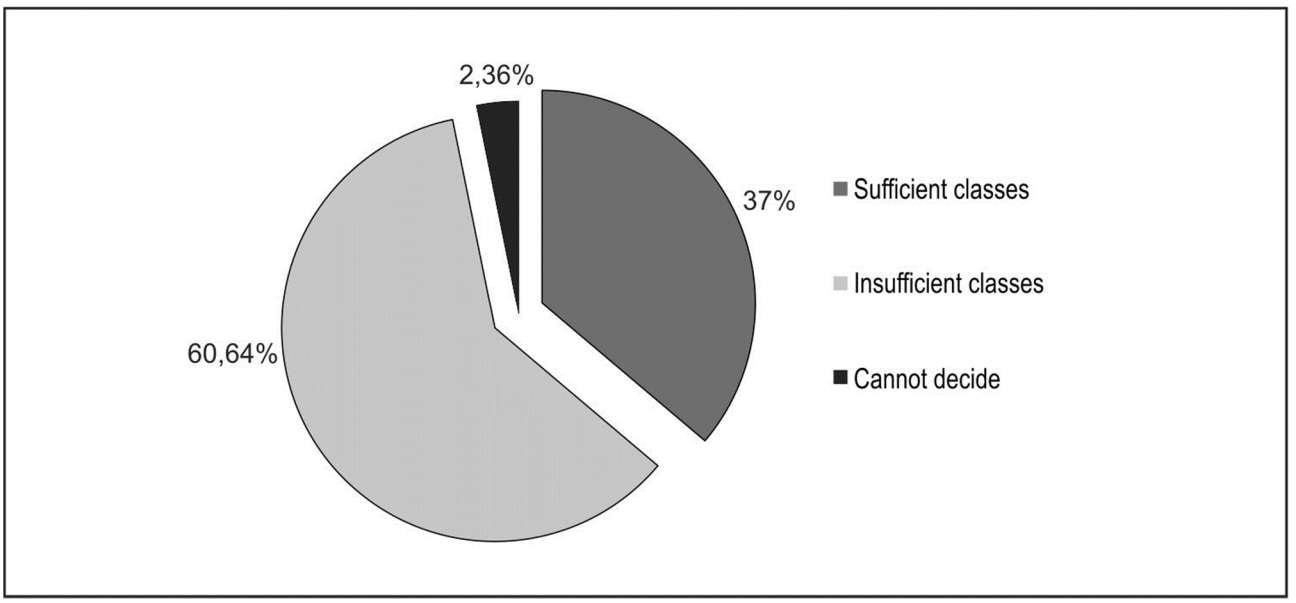


Source: processed by the authors

We must say that the values in the graphic above do not cumulate 100%, as the question had more answer options. Based on the presented results, we notice that all the respondents pledge for the study of accounting disciplines, and not only the theoretical basis of accounting, as it is set in the teaching plans (2015-2016) at the faculties of ESAM, cycle 1. This is due to the relevance of the accounting studies when getting employed. In this context, the academic curricula from the superior economic studies must focus on the student and oriented towards the formation of professional competences. In order to pass over the created situation, we would appreciate a decision regarding the reevaluation of the educational strategy of the academic curricula, which mostly depends on the institutional profile, the opinion of the academic staff and the result of systemic interrelated debates between the academic and the professional environments. We can mention that the decrease of the number of accounting disciplines, by excluding the above mentioned disciplines, impacts on the quality of the students' knowledge of the accounting concepts and principles, which influences the economic professional formation.

As an example, they can serve to the following question that pursues the "set number of hours in the study plan for the accounting disciplines", **Graphic 2**. We reveal the fact that our respondents have studied three accounting disciplines: Fundamentals of accounting, Financial accounting, Enterprise accounting or Managerial accounting.

Graphic 2. Set number of hours in the study plan for the accounting disciplines



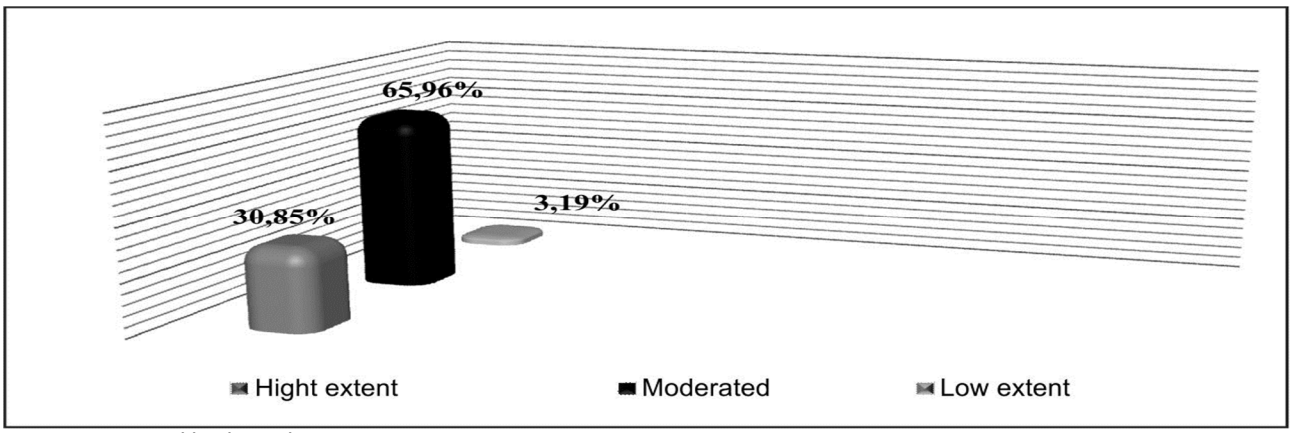
Source: processed by the authors

The respondents' choice (60.64%) for the insufficient number of hours can be explained by the fact that, according to the curricula, within a course, 6-7 subjects are to be studied in 30 hours. Thus, accounting, a discipline with a superior degree of accuracy compared to other disciplines, needs time and effort to analyze, represent and give examples of the phenomena, the elements and the processes the accounting concepts and the national accounting provisions provide. We must say that one of the graduating economists pledge for most classes of accounting compared to other disciplines, which, in their opinion, do not reach a common point with the chosen specialization.

Most of the respondents, 96.81% (30.8% + 65.96%) consider that the academic environment

provides the needed training in accounting in order to activate in the business environment. Only 3.19% of the respondents appreciate the utility of the gained knowledge in the academic environment as being low for the integration in the professional environment (**Graphic 3**).

Graphic 3. The ability of the academic environment to provide the graduating economists with the needed accounting training for the integration in the business environment

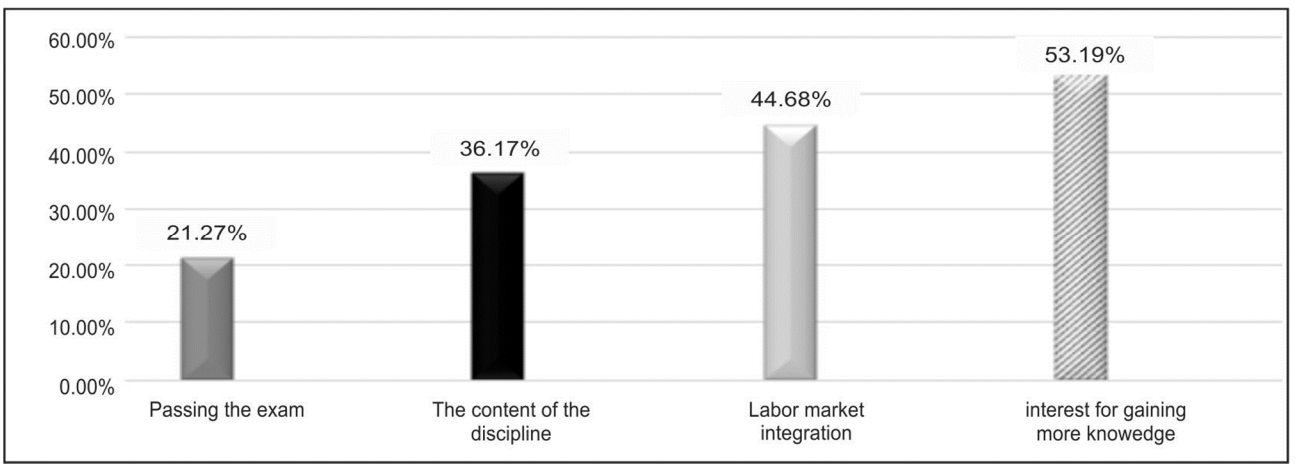


Source: processed by the authors

As for the relevance of the studied accounting disciplines for the employment in the field of work, 40.42% of the respondents claim that they are highly relevant, 57.45% moderated and only 2.13% appreciate the relevance as being low.

The determining factors for the graduates regarding the knowledge accumulation in the field of accounting through the study years in the faculty were ranked by the respondents as follows: labor market integration (44.68%) and the interest to gain more knowledge (53.19%) (**Graphic 4**). We mention that the values in the graphic below do not reach 100% as the question included more answer options.

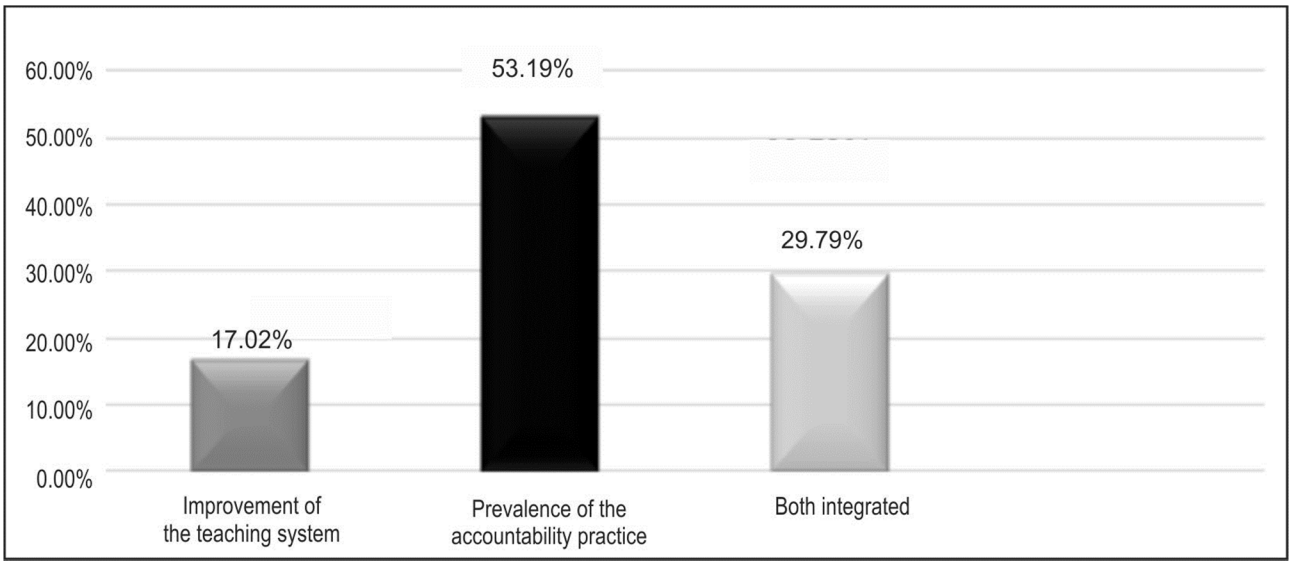
Graphic 4. The reason for accumulating the accounting disciplines in the academic environment



Source: processed by the authors

In this order of ideas, we are aware of the fact and we notice that the study of accounting in the academic economic formation is necessary and useful. Also, the interest of the respondents to accumulate professional experience during the academic studies is reflected by their most opinions regarding the approach method of the accounting disciplines: the prevalence of the accounting practice, the improvement of the teaching system, both integrated (**Graphic 5**).

Graphic 5. The approach method of the accounting disciplines



Source: processed by the authors

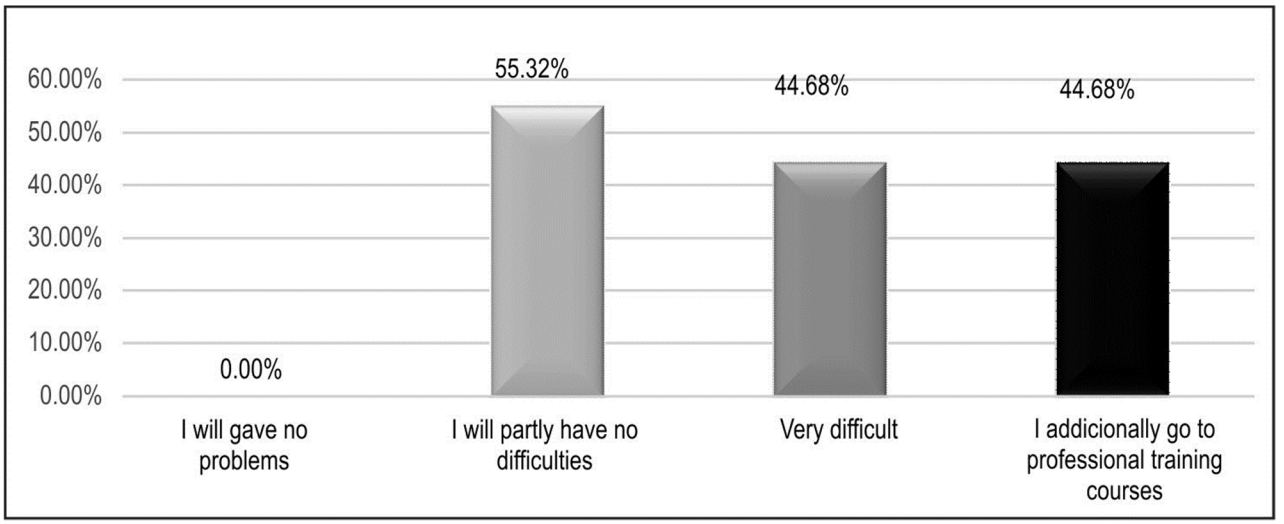
Regarding the *applicability degree of the accounting knowledge gained in the academic environment in the professional environment*, 94.68% of the respondents claim that these are found in practice. A possible explication of the 5.32% result would be that some of the respondents do not operate in the economic field. The provided options allow us to confirm that 36.17% of the respondents consider that the cumulated accounting abilities and knowledge in the economic environment give them higher chances of integration in the work field, 61.70% average chances, and 2.13% have expressed the low degree, regarding the fact that accounting knowledge eases the access to the professional environment.

If, according to the study plan, one would not choose other accounting disciplines, except for Fundamentals of accounting, we asked the respondents what their options would be, giving them the following options: I will have no problems, I will partly have difficulties, very difficult and I additionally go to professional training course. The question had more answer options, which are displayed in **Graphic 5**.

Reached results emphasize the significance of studying the accounting disciplines, claiming that they will partly face difficulties in the professional environment (55.32%), and very difficult, having to go to additional professional training courses (44.68%).

We mention that the sole study of Fundamentals of accounting gives the students the ability to accumulate the needed knowledge just from the general perspective, regarding the basic notions corresponding to the decision making process, as well as the costs, expenditures and revenues accounting models and of the financial results.

Graphic 6. The respondents' options if, according to the study plan, one won't choose other accounting disciplines, than Fundamentals of accounting



Source: processed by the authors.

The training for the activity in the economic field is only recognized based on the competences, which comply with the socio-economic context and with the promotion of the new realizations in the field of economic sciences.

Asked to what extent they appreciate the subsequent development need of the educational competences and the professional training in the field of accounting after the graduation of the bachelor degree (master studies or professional development courses), the respondents have answered: 48.93% of the respondents claim the high participation degree in the master studies programs and 51.07% average degree.

Conclusions

In the end, we claim that the economy of RM has no other development opportunity than the investment in the human potential and education, which will develop a knowledge-based society and will lead to the development of a productive economy.

The research made at a conceptual level emphasizes the significance of the academic environment for the professional one, as well as the need to collaborate between the academic and the professional environment for the cognitive formation and development and the professional thinking of the future graduates according to the trends in the economic field. The study and the reached results are more interesting, as a new element and suggest, at the first sight, eventual future educational policies. Their objective cannot be other than positive in an eventual balance of the demand and offer on the working market.

Given the fact that the study has used available samples, the displayed results are available only for the analyzed respondents' samples. These cannot be though generalized for all the economy graduates in RM. Regarding the structure of the reached sample, most of the graduates that responded the survey came from the ESAM.

On the whole, the sample mandates us to have reserves regarding the reached results. They are useful for the analysis of the evolution of the university economic studies, namely the growth of the educational processes quality. Also, we can conclude regarding the educational policies applied in the evaluation of the way in which the knowledge, the competences and gained abilities are sufficient enough in order to allow the economy graduates to get employed and continue their studies.

An issue is though certain – the challenge of maintaining or giving up on the study of the accounting disciplines, in the formation of the non-accountant professional is certain. If we see the

education programs, they should set what economic knowledge is necessary, what is relevant and mandatory to teach, in order to meet the contemporary requirements of the economic academic education and of the international specialists' training in the economic field. The main problem of universities is to choose which economic disciplines must be taught. Thus, it is mandatory to reevaluate the role of each discipline in the assembly of the specialty disciplines and the adaptation of teaching each discipline to the concrete needs of the future activity of the graduate.

In these circumstances, the perfecting of the teaching plans represents a continuous and complex process. Adapting the academic curricula of the bachelor and master studies depending on the requirements of the professional environment will ensure a relevant level of the economic specialists' training, and, as a result, it will ease their employment process on the labor market. Regarding the graduates, they "must learn during their whole lives, and, next to the development of other abilities, the teaching based on the solving of problems teaches you how to teach. And it counts for all the graduates" (Belostecinic, 2015).

Appendix 1. Survey regarding "The relevance of the accounting disciplines in the economic academic vocational training of non-accountant specialists and the evaluation of the students training quality in the academic environment"

No.	Question	Answer
1.	Graduated faculty	
2.	Specialization	
3.	Gender (male/female)	
4.	Employment methods on the labor market: a) I got employed in a field corresponding to the Bachelor studies (management, finances) b) I got engaged as an accountant, though I graduated from another faculty in the economic field. c) Others, namely…	
5.	Which of the accounting disciplines do you consider that are useful and needed for the economic professional formation: a) Fundamentals of accounting b) Financial accounting c) Management accounting d) Entrepreneurial accounting e) Other accounting disciplines **f)** Cannot decide	
6.	Do you consider the number of class hours set by the study plan for the accounting disciplines? a) Sufficient b) Insufficient c) I cannot decide	
7.	To what extent the teaching – learning methods were used during the accounting disciplines within the graduated study program? a) Great extend b) Moderated c) Low extent	
8.	Do you consider that the economic environment has the ability to provide the economy graduates the needed accounting training to integrate them in the professional environment: a) Great extend b) Moderated c) Low extent	

No.	Question	Answer
9.	Can the studied accounting disciplines be considered relevant for the employment in the labor field? a) To a great extent b) Moderated c) Low extent	
10.	To what extend is the applicability of the accumulated accounting knowledge in the academic environment found in the professional environment? a) To a great extend b) Moderated c) To a low extent	
11.	To which extent the level of the accumulated accounting knowledge in the academic environment eases the access to the professional environment? a) Great extend b) Moderated c) Low extent	
12.	Which is the reason for the gaining of accounting disciplines in the economic environment? a) Passing the exam b) The content of the discipline c) The integration on the labor market d) The interest of gaining more knowledge e) Cannot decide	
13.	If, according to the study plan, no other discipline than Fundamentals of accounting will be studied, then a) I will have no problems b) I will partly face difficulties c) It will be very difficult d) I additionally go to professional training classes	
14.	Your opinion regarding the approaching mode of the accounting disciplines: a) The improvement of the teaching system b) The prevalence of accounting practice c) Both integrated d) Other methods, namely…	
15.	To what extent do you consider useful the subsequent development for your competences, through education and professional training, in the field of accounting after graduation? a) Great extent b) Moderated c) Low extent	

REFERENCES

1. Cabac, V. (2011), Conceptualizarea curriculumului universitar: Logica competențelor şi logica obiectivelor, volumul Abordarea prin competențe a formării universitare: probleme, soluții, perspective, Bălți: Presa universitară bălțeană.
2. Belostecinic, G. (2015), Nu putem vorbi despre rețete de competitivitate pentru universități, Curierul economic, nr. 1-2 (258-259), 20 februarie 2015. p. 8, [pdf] Available at: http://www.ase.md/files/publicatii/curierul/2015/ce_1_2_2015.pdf , [Accesed on June 12, 2016].
3. Codul Educației al Republicii Moldova, Monitorul Oficial nr. 319-324, Cod nr.152/17.07.2014, [online] Available at: http://lex.justice.md/md/355156/, [Accesed on June 12, 2016].
4. Cooperarea dintre mediul universitar şi organismele profesionale: soluții şi oportunități în dezvoltarea durabilă a profesiei contabile.

Materialele Conferinței științifice internaționale din 4 aprilie 2014. Chişinău: ASEM, 2014, 298 p.

5. Legea nr. 142 privind aprobarea Nomenclatorului domeniilor de formar profesională şi al specialităților pentru pregătirea cadrelor în instituțiile de învățământ superior, ciclul I, Monitorul Oficial nr. 101-103/07.07.2015, [online] Available at: http://lex.justice.md/index.php?action=view&view=doc&id=312972, [Accesed on June 12, 2016].
6. Ministerul Educației (2010), Regulamentul de organizare a studiilor în învățământul superior în baza Sistemului Național de Credite de Studiu. Hotărârea Colegiului Ministerului Educației nr.4.2 din 22 octombrie 2015, [pdf] Available at: http://www.ase.md/files/documente/regulamente/regulament_ects.pdf, [Accesed on June 12, 2016].
7. Hotărârea 944 cu privire la aprobarea Strategiei de dezvoltare a educației pentru anii 2014-2020 „Educația-2020" (2014), Monitorul Oficial nr. 345-351/21.11.2014, [online] Available at: http://lex.justice.md/index.php?action=view&view=doc&lang=1&id=355494, [Accesed on June 12, 2016].
8. Erasmus + (2015), Tendințe actuale în învățământul superior din Republica Moldova. Reflecții ale membrilor echipei de Experți Naționali în Reforma Învățământului Superior din cadrul Programului Erasmus+, [pdf] Available at: http://www.erasmusplus.md/sites/default/files/pdf/tendinte_heres.pdf, [Accesed on June 12, 2016].
9. Declarație comună a Miniştrilor Educației din Europa. Domeniul învățământului superior european (1999), [pdf] Available at: http://www.unitbv.ro/Portals/28/Declaratia_de_la_Bologna_19.06.99.pdf, [Accesed on June 12, 2016].

Audit financiar, XIV, Nr. 8(140)/**2016**, *909-917*
ISSN: 1583-5812; ISSN on-line: 1844-8801

Model for dimensioning the audit structures in the public sector

Elena Doina DASCĂLU,
Spiru Haret University of Bucharest,
The Romanian Court of Accounts,
E-mail: doina.dascalu@rcc.ro

Abstract

This article proposes a solution to determine the size of the internal audit departments in public sector organisations. The conceptual model for determining the actual size of an internal audit department, as adopted by the Institute of Internal Auditors (IIA), is presented and the various factors used in dimensioning are analysed.

The article also presents a computational model for the public sector, illustrated by means of a procedure which is based on the size of the organization and uses specific calculation variables and explicit (clearly defined) correction coefficients to determine the final number of internal auditors.

The variables and the coefficients of the described model cover the significant factors that might influence the size of the internal audit department. At the same time, the requirements of adequacy and usefulness of the model for the various entities of the public sector are insured.

The model proposed for the public sector entities constitutes also a supporting tool for the practical implementation of the legal, regulatory and normative requirements with regard to the sizing of the internal audit departments.

Keywords: *Internal audit in the public sector, sizing of the audit departments, critical factors for sizing. calculation model for dimensioning.*

JEL Classification: *M42; M48*

To cite this article:
Dascălu, E.D. (2016), Model for dimensioning the audit structures in the public sector, Audit Financiar, vol. XIV, no. 8(140)/2016, pp. 909-917,
DOI: 10.20869/AUDITF/2016/140/909

To link to this article:
http://dx.doi.org/10.20869/AUDITF/2016/140/909

Introduction

In keeping with the provisions of art. 11 letter a) of *Law no. 672/2002 on internal public audit*, reissued, as subsequently modified and completed, the head of the public institution or, in the instance of other public entities, the collective management body, is under the obligation to ensure the organisation and operation framework required for the conduct of the internal audit activity.

Furthermore, the mentioned normative act provides, under art. 2 letter f) that the name of *internal public audit department* is generic, while the organization structure of internal public audit is established in relation to the activities complexity and volume, as well as with the risks associated to the respective public entity.

Thus, the above-mentioned normative act established the requirement of sizing a generically called internal public audit department, a sizing which would ground the setting of the organization of internal audit in the public entity, respectively general directorate, directorate, service, office or department. Irrespective of the sizing result, the normative provision establishes that the number of auditors in a public entity should be at least two (full-time staff).

Relating to sizing, the *General norms on the conduct of internal public audit activity* approved based on *Government Decision no. 1086/2013* provide the requirement that the following stages should be covered:

a. Identification of all activities conducted both within the public entity, and within the entities subordinated/ coordinated/under the latter's authority, in which the former conducts directly internal public audit missions;
b. Identification of risks associated to activities;
c. Identification of internal control forms attached to each activity;
d. Setting residual risks following conduct of control forms;
e. Setting the time required to conduct internal public audit missions, by considering the following *factors*: budget allotted to the entity; number of entities subordinated/ coordinated/ under its authority; number of employees; specific character of the public entity; complexity and social importance of the activities; observance of periodicity in auditing; activities involving high/ medium risks.

The above-mentioned stages are based on the subjectivity of the person conducting the sizing process, since they provide identification of risks associated to all activities unfold at the level of the public entity, of the control forms established for their management, as well as of residual risks, without building a direct connection between residual risk and the time required to conduct audit missions.

That is the reason why the implementation of the above-mentioned stages by two different persons may lead to significant differences among the results obtained, generated by the number of identified risks, by the assessment of residual risks and the time required to conduct internal public audit missions in a given entity.

Even if, as mentioned before, *Law no. 672/2002* provides the mandatory character of internal audit department sizing at the charge of the public institution head, the latter does not have a model available, adapted to the specific character of the public sector in Romania, so as to fulfil this obligation.

The *Report on internal audit activity in the public sector for 2013* shows that about 73% of internal audit departments have a single internal auditor position, which shows that the sizing process did not consider covering the stages or implementing the criteria provided in the *General norms on the conduct of internal public audit activity,* approved by *Government Decision no. 1086/2013*.

The possible causes of the failure to enforce the stages provided in the *General norms on the conduct of internal public audit activity* to size internal audit departments in the public sector may be the following:

- Difficulties in the implementation of the stages provided by law, especially concerning the identification of residual risks;
- Absence of a model/a methodology to quantify the number of auditor positions in relation to the above-mentioned factors;
- Absence of contravention fines or of other penalties provisions in the Law no. 672/2002 on internal public audit for setting the number of positions;
- Absence of a system assessment regarding the internal public audit situation in Romania, especially with respect to sizing;
- Risk management is insufficiently developed in the public sector in Romania.

1. Literature review

De Koning (2007) considers – relating to the organisation of internal audit at the level of a public entity – that the responsibility to set up the internal audit department lays with its manager. This responsibility also includes the adequate sizing of the internal audit structure, for it to have the capacity to cover the scope of the activities unfold in the public entity.

Furthermore, an adequate sizing involves answering the question: *What percent of the resources of an organisation should be allotted to the internal audit function?* (Anderson et al., 2010a).

In keeping with the study on the internal audit activity conducted by Ernst &Young (2013) at global level, in 2013, over 30% of respondents (internal audit executive managers) mentioned an increase of the audit function in the previous year, while 37% expected an increase in the subsequent 24 months.

With respect to the sizing, the *General norms on the conduct of internal public audit activity*, approved based on *Government Decision no. 1086/2013*, stipulate the necessity of completing well-defined stages and the application of well-defined criteria relating to the sizing of internal audit structures.

2. Research methodology

Given the importance of achieving an appropriate sizing of the *number of auditors (i.e., department sizing) in public entities*, it is important to consider the issue of setting up a *model for internal audit department sizing in public entities*, in order to perform an adequate sizing of internal audit number in the public sector.

The research methodology was based on the study of the specialised literature relating to determinants and models used for internal audit department sizing (Renard, 2004; Spencer Pickett, 2006 a,b; Bal, 2012). In addition, existing analyses on the issue have been studied as well, in order to establish a model for the setting of the number of internal auditors in public entities.

Starting from the specifics of the public sector in Romania, the research methodology aimed at establishing a formula to generate the number of internal auditors, by extrapolating or adjusting the factors resulting from the literature on sizing internal audit departments.

3. The sizing of audit departments in public entities

The approach on establishing a model for audit departments sizing in public entities is based on the *Model on internal audit department sizing,* established by (Anderson et al., 2010), which set the *optimal size of an internal audit department* based on the consideration of seven factors, critical for the internal audit activity.

3.1. Drivers for sizing

Adopting as a condition the establishment of the sizing model based on the critical factors, we herein propose – for the sizing of internal audit departments in the public sector – the following set of *determinants*:

a. Organisation size (number of employees in the organisation);
b. The budget of the public entity;
c. The patrimony (assets) of the entity;
d. The complexity of the activities included in the sphere of internal audit;
e. The experience of auditing staff;
f. The risk level of the entity;
g. The auditing periodicity;
h. The localisation.

Next, we present a short description of the influence and effects of each of these factors.

a. ***The organisation size***: the factor involving the *organisation size*, respectively the number of employees in the entity, aims at establishing a correlation between the number of internal auditors and the number of employees of an organisation. Thus, the starting point of internal audit departments sizing is the number of employees in the institution, a higher number of employees involving an increase in the internal audit department size.
b. ***The budget of the public entity*** represents a factor influencing the impact of the risks associated to the activities conducted by the public entity. In this respect, the increase of an entity budget triggers a

high level of risks associated to the activities being the object of internal audit (by influencing the impact), a reason why it is necessary to allot a larger volume of time for the audit, since the domains displaying risks are audited, as a general rule, on a yearly basis. Consequently, the larger the budget of an organisation as compared to a certain threshold, the higher the number of auditors needs to be, so as to allow for the yearly auditing of risky domains.

c. The same reasoning applies in the instance of the ***entity patrimony*** *(**assets**)*, since exceeding a certain threshold triggers the increase of the number of auditors, so as to conduct audit of risky domains on a yearly basis.

d. The factor involving ***activities complexity*** covered by the scope of internal audit envisages that the duration of a mission depends on the difficulty and number of operations to be audited. That is why a higher complexity supposes a larger time volume allotted to audit missions, which may be attained by increasing the number of internal auditors.

e. The ***auditing staff experience*** is a factor involving the human resources used in the audit. The duration of the internal audit missions is influenced by the competence of internal auditors, which in turn depends on experience, international certification in the field, stability, employment criteria etc.

f. The ***risk level*** of the entity refers to a global assessment of the risk associated to a certain organisation, a higher risk level requiring more frequent audit missions, respectively a larger time volume and, implicitly, a higher number of auditors. This is true, for instance, in the case of two public entities which are similar in size, but have different risk assessments.

g. ***Auditing periodicity*** involves compliance with legal requirements, respectively auditing at least 10 systems/domains at least once every three years, as well as setting a time interval to audit most of the activities unfolding in an organisation, irrespective of risk level.

h. The ***localisation*** factor refers to the increase the number of auditors when the audited entities are located at large distances, in order to consider the travel issues.

3.2. Sizing model and example of its implementation

Based on the determinants listed above, a model may be established to size internal audit departments in the public sector, starting from the following conditions and variables:

- Compliance with auditing periodicity, respectively auditing, at least once every three years, the mandatory domains and systems provided under art. 15 of Law no. 672/2002 (10 domains and systems);
- Ensuring a five-year auditing periodicity, so that the organisation domains of activity be audited at least once every five years (variable V_1);
- Including all activities unfolding by a public entity in the internal audit sphere;
- The time volume allotted to counselling activities would represent 10% of the overall time (variable V_2);
- For ad-hoc audit missions, 5% of the overall time would be allotted (variable V_3);
- The average duration of an assurance audit mission is 160 man-days, respectively 40 working days x 4 auditors (variable V_4);
- A person may conduct audit missions in maximum four activity domains, in a five-year period, that is an auditor may only conduct audit missions in maximum four domains (variable V_5);
- The available time for a person to conduct internal audit is an average of 170 days (variable V_6).

3.2.1. The proposed sizing model

Sizing internal audit departments in the public sector involves – in keeping with the model we propose – covering seven steps, to set the number of internal auditors.

STEP 1. Preliminary setting of the internal auditors number based on the organisation staff number, thus obtaining *the minimum number of internal auditors* (N_1).

A matrix can be used to set the minimum number of internal auditors; the first column would represent the *number of employees* (incremental), and the first line the number of employees for one

internal auditor (incremental). At the intersection of the line with the column, there would result the number of internal auditors, by dividing the number of employees to the number of employees for one internal auditor and rounding it by adding up (See **Table 1** below).

Table 1. Matrix for determining the minimum number of internal auditors

		Number of employees for one auditor										
		30	50	70	100	150	200	250	300	350	400	450
Number of employees	100	3	2	1	1	1	1	0	0	0	0	0
	200	7	4	3	2	1	1	1	1	1	1	0
	500	17	10	7	5	3	3	2	2	1	1	1
	1,000	33	20	14	10	7	5	4	3	3	3	2
	5,000	167	100	71	50	33	25	20	17	14	13	11
	10,000	333	200	143	100	67	50	40	33	29	25	22
	30,000	1,000	600	429	300	200	150	120	100	86	75	67
	50,000	1,667	1,000	714	500	333	250	200	167	143	125	111
	100,000	3,333	2,000	1,429	1,000	667	500	400	333	286	250	222

Source: Author's compilation, 2016

Based on this matrix, intervals depending on the number of employees of the public entity are established, indicating the minimum and maximum number of internal auditors. From the interval, an initial number of internal auditors is selected, an example being presented in **Table 2**.

Table 2. Selection of the initial number of internal auditors

Item no.	Number of employees in the public entity	Interval from which the minimum internal auditors number is established [minimum – maximum]
1.	Less than 100	[2 – 3]
2.	Between 100 and 199	[3 – 4]
3.	Between 200 and 499	[4 – 7]
4.	Between 500 and 999	[5 – 10]
5.	Between 1,000 and 4,999	[7 – 20]
6.	Between 5,000 and 9,999	[15 – 40]
7.	Between 10,000 and 29,999	[25 – 70]
8.	Between 30,000 and 49,999	[50 – 120]
9.	Between 50,000 and 99,000	[100 – 250]
10.	More than 100,000	[More than 250]

Source: Author's compilation, 2016

STEP 2. Setting the required time volume (FdTnec) to conduct internal audit of all the activities unfold by the public entity, considering the conditions mentioned, as well as variables V_1, V_2, V_3, V_4 and V_5.

STEP 3. Setting the time volume available for internal audit (FdTdisp), by multiplying the number of auditors chosen as an (estimated) value to start the calculation procedure with the time available to a person for internal audit, using the formula: $FdTdisp=N_1xV_6$.

STEP 4. A comparison is made of the time available for internal audit (FdTdisp) with the required time (FdTnec). In case FdTdisp<FdTnec increases N_1 until coverage of the necessary time (volume of activity), resulting the new number

of internal auditors (N_2). If FdTdisp>FdTnec N_1 may be subtracted or adjusted in the following steps.

STEP 5. The number of auditors (N_2) is adjusted with the correction coefficients, individually or cumulatively, thus obtaining the *final number of auditors (N_f)*, as follows:

$$N_f = N_2 + N_2 \times k_B \pm N_2 \times k_R + N_2 \times k_p \pm N_2 \times k_c \pm N_2 \times k_e + N_2 \times k_l \quad (1)$$

where:

a. *The budget coefficient (k_B)* involves increasing the number of auditors in case the annual budget allotted to the entity in relation to the number of auditors (N_2) exceeds the threshold P_B (for example, 35,000,000 lei). In this instance, the number of auditors is increased by the budget coefficient (for example, k_B=10%);

b. *The risk coefficient (k_R)* involves supplementing the number of auditors or diminishing it, according to the case, in relation to risk (for example, k_R=±10%). To quantify the risk level, three stages may be used, respectively: *small risk* (the number of auditors is diminished), *average risk* (the number of auditors is maintained in keeping with the assessment), *high risk* (the number of auditors is supplemented). Risk level may be established in relation to a series of risk factors, such as: management quality, penalties and fraud/corruption instances, previous significant errors, staff fluctuation, results of controls by the Court of Accounts or by other bodies etc.

c. *The patrimony coefficient (k_P)* involves increasing the number of auditors in case the annual patrimony being managed by the entity exceeds a certain threshold, marked P_P. In this instance, the number of auditors is supplemented by the patrimony coefficient (for example, k_P=10%);

d. *The complexity coefficient (k_c)* involves increasing the number of auditors in the instance of highly complex activities. Among complex activities are those conducted by main authorising officers, as well as other defined activities (for example, the ones of a nuclear plant). Furthermore, in the instance of activities considered to have a low complexity, the coefficient may trigger the decrease of the number of auditors. Consequently, the complexity coefficient may take values involving the increase or decrease of the number of auditors (for example, k_c=±10%);

e. *Auditing experience coefficient (k_e)* involves increasing the number of auditors in the instance of auditors lacking experience, not using information systems-based audit techniques, or the decreasing the number of auditors in the instance of internationally chartered auditors, having an experience of over three years in the field or who use information systems-based audit techniques (for example, k_c=±10%);

f. *The location coefficient (k_l)* involves increasing the number of auditors in the instance of auditees located in different places, at distances of over 50 km (for example, k_l=5%).

In the end, based on the final number of internal auditors thus set, it is possible to establish the organisation structure of internal audit in the respective organisation.

The model proposed for the sizing of internal audit departments in the public sector is based on the conceptual model drafted by Anderson et al. (2010), on the factors required to set the number of auditors mentioned in the specialised literature, on the requirements of the national normative framework in the field, as well as on the specific characteristics of the public sector in Romania.

This model grants compliance with the provisions of Law no. 672/2002 and of the *General norms on the conduct of internal public audit activity,* approved based on *Government Decision no. 1086/2013,* in the sense that the number of auditors is established in relation to the volume of activity and size of associated risks, the last element being quantified based on risk factors/ coefficients (for example, fraud risk, error risk etc.).

Testing and putting into practice this model in the public sector would minimise the under-sizing risk and subjectivism in setting a number of auditors by grounding it, respectively documenting it based on professional judgement.

3.2.2. Example of implementing the model for sizing audit compartments in the public sector

The following data on a public sector organisation is considered for exemplification:

- Total number of employees: 35,000;
- 4 subordinated or coordinated entities;
- Total budget of the entity (including subordinated or coordinated entities): 10 billion lei.

To continue, the *Model proposed for the sizing of audit departments in the public sector* is implemented, covering the previously mentioned steps.

STEP 1. **Setting the minimum number of internal auditors**. Given that the total number of employees in the entity is 35,000, we set *the minimum number of internal auditors* (N_1) based on the table of correspondence (**Table 1**), between the number of employees and the corresponding interval (line no. 8).

Given that 35,000 is closer to the lower limit of the interval (30,000), we choose the **minimum number of internal auditors as being 60** (N_1=60).

STEP 2. **Setting the time volume required** (FdTnec) to perform the internal audit *of all the activities* conducted by the public entity. In this instance, we consider that the conditions and values awarded to variables V_1, V_2, V_3, V_4 and V_5 are true. To do that, we identify (issues resulting from the multi-annual internal audit plan drafting) the number of public entities where audit is going to be conducted (five entities), respectively the main one, and the four subordinated or coordinated entities.

In keeping with the legislation in the field of internal public audit, auditing periodicity needs to be observed, respectively, at least once every three years, 10 domains or systems need to be audited. That is why, the time required (a first component part) shall be calculated as follows:

$$FdTnec_1 = 5^{\text{entities}} \times 10^{\text{mandatory domains and systems}} \times 160^{\text{duration of one mission (man-days)}} / 3^{\text{years}} = 2.667 \text{ man-days} \quad (2)$$

The conditions set provide that it is mandatory to audit all auditable domains, at least once every five years. If we assume that 50 more domains and systems were identified (which add to the 10 ones which are mandatory by law), applying a similar formula it is possible to identify the necessary time volume $FdTnec_2$. Consequently, the second component of the time required is calculated as follows:

$$FdTnec_2 = 5^{\text{entities}} \times 50^{\text{domains and systems}} \times 160^{\text{duration of one mission (man-days)}} / 5^{\text{years}} = 8.000 \text{ man-days} \quad (3)$$

If ad-hoc missions are allotted 5% of the overall time volume, and the time allotted to counselling activities represents 10% of the overall time, the following result is obtained:

$$FdTnec = (FdTnec_1 + FdTnec_2) \times 1,05 \times 1,1 = (2.667 + 8.000) \times 1,05 \times 1,1 = 12.320 \text{ man-days} \quad (4)$$

STEP 3. **Establishing the time volume available for internal audit** (FdTdisp). The time volume is calculated by multiplying the number of auditors selected as an (estimated) starting value for the calculation procedure, with the time volume available to one person for internal audit, according to the formula:

$$FdTdisp = N_1 x V_6 = 60^{\text{auditors}} \times 170^{\text{time available for audit}} = 10.200 \text{ man-days} \quad (5)$$

STEP 4. Making a comparison between the time available for internal audit (FdTdisp) **and the time required** (FdTnec)**.**

In the above example, FdTdisp= 10,200 man-days < FdTnec =12,320 man-days (see formulas (4) and (5)): in this instance, N_1 is increased until the required time volume is covered (the activity volume), and there results a new number of internal auditors (N_2), according to the following relation:

$$N_2 = FdTnec / 170^{\text{the time available for audit}} = 12.320 \text{ man-days} / 170 = 73 \text{ internal auditors} \quad (6)$$

STEP 5. **Adjusting the number of auditors** (N_2). The updated auditors number, N_2 is adjusted with the correction coefficients, individually or cumulatively, thus resulting *the final number of auditors (N_f)*.

a. *The budget coefficient (k_B).* We establish the threshold:

   P_B=Budget/N_2 = 10,000,000,000/73 ≈ 137,000,000 > 35,000,000 lei.

   In this instance, a *budget coefficient of 10% (k_B=10%) is set*.

b. *The risk coefficient (k_R)*. Three steps are used to quantify the risk level, respectively: small risk (1), medium risk (2) and high risk (3), according to Table 3. Considering that risk was assessed as being low (see **Table 3**), the coefficient applied is k_R= -10%.

c. *The patrimony coefficient (k_P).* It is considered that the patrimony administered does not exceed the set threshold (P_P). In this instance, the coefficient is 0 (k_P=0%);

d. *The complexity coefficient (k_c).* The activities are considered to have a high complexity, in this instance the complexity coefficient being k_c=10%;

e. *The auditing experience coefficient (k_e)*. It is considered that the average seniority of auditors is three years, they are also chartered. In this instance, the experience coefficient is 0 (k_c= 0%);

f. *The location coefficient (k_l)*. All entities being in Bucharest, the location coefficient is 0 (k_l=0%);

Based on the coefficients established, the number of auditors (N_2) is adjusted, and the *final number of auditors (N_f) is obtained*, as follows:

$$N_f = N_2 + N_2 \times k_B \pm N_2 \times k_R + N_2 \times k_p \pm N_2 \times k_c \pm N_2 \times k_e + N_2 \times k_l \quad (7)$$

By replacing the values, we obtain:

$$N_f = 73 + 73 \times 0{,}1 - 73 \times 0{,}1 + 73 \times 0 + 73 \times 0{,}1 + 73 \times 0 = 80 \text{ internal auditors} \quad (8)$$

Thus, the final number of internal auditors is 80, which grounds the setting of the internal audit department organisation structure.

Table 3. Quantifying the risk level

Item no.	Risk factor	Assessment	Risk level
1.	Management quality	Management positions are organised based on competitive examination, by an independent commission. Managers have skills in the specific field of activity. Managerial performances are assessed on a yearly basis.	Low risk (1)
2.	Penalties and fraud/corruption instances	No contravention fines/penalties or corruption/fraud instances were noted.	Low risk (1)
3.	Previous significant errors	No significant errors were noted	Low risk (1)
4.	Staff fluctuation	Under 5%	Low risk (1)
5.	Results of audits or controls performed by the Court of Accounts or by other bodies	No material malfunctions were found following audit missions	Low risk (1)
Average score = 1			**Low risk (1)**

Source: Author's compilation, 2016

Conclusions

Based on the conceptual model drafted by Anderson et al. (2010) and adopted by IIA, the paper proposes a model for sizing audit compartments in the public sector.

The proposed sizing model can be used in the public sector in Romania whereas it takes account of the specifics of the activities provided by public entities. Thus, the model takes into consideration the organisation's size and is based on *variables* and *correction coefficients,* which ensures the necessary adaptation parameters for its application in various fields of activity in the public sector.

The opportunity of the full use of the model for sizing audit departments in the Romanian public sector was exemplified on a hypothetical organization, the model finally providing the optimal number of internal auditors for organizing the internal audit department.

We consider that the use of the model can give rise to two important effects:

a. It will ensure compliance with national legislation in the field of internal audit, on the one hand; and
b. It will ensure a justification as close to the reality as possible of the number of internal auditors, on the basis of mathematical calculations, on the other hand. Thus, there can be avoided the empirical findings and assessments or those which take account only of the resources provided through the budget for similar activities in the past.

Finally, widespread application of the model proposed for the sizing of internal audit departments in the public sector will support increasing the independence and effectiveness of the internal audit, through adequate justification and substantiation of the number of auditors.

REFERENCES

1. Anderson, U.L., Christ, M.H., Johnstone, K.M. and Rittenberg, L. (2010a), *Effective Sizing of Internal Audit Departments*, Altamonte Springs: The IIA Research Foundation.
2. Anderson, U.L., Christ, M.H., Johnstone, K.M. and Rittenberg, L. (2010b), *Effective Sizing of Internal Audit Activities for Colleges and Universities*, Altamonte Springs:The IIA Research Foundation.
3. Bal, S. (2012), *How much internal audit is enough?*, [pdf] Available at: http://auditandrisk.org.uk/features/how-much-internal-audit-is-enough-, [Accessed May 29, 2016].
4. de Koning, R. (2007), *Controlul financiar public intern*, www.pifc.eu.
5. Ernst &Young (2013), *Matching Internal Audit talent to organizational business needs – Key findings from the Global Internal Audit Survey,*, [online] Available at: http://www.ey.com/GL/en/Services/Advisory/MIA-talent-to-business-needs---Key-findings-from-the-Global-Internal-Audit-Survey-2013 [Accessed May 29, 2016].
6. *Hotărârea Guvernului nr. 1086/2013 pentru aprobarea Normelor generale privind exercitarea activității de audit public intern*.
7. IIA (2009), *Internal Audit Capability Model (IA-CM) for the public sector,* Available at: https://na.theiia.org/iiarf/Public%20Documents/Internal%20Audit%20Capability%20Model%20IA-CM%20for%20the%20Public%20Sector%20Overview.pdf [Accessed May 29, 2016].
8. IIA (2013), *Standardele Internaționale pentru Practica Profesională a Auditului Intern* (2013), Altamonte Springs: The IIA Research Foundation.
9. *Legea nr. 672/19.12.2002 privind auditul public intern*, republicată (M.O. nr. 856/ 05.12.2011), cu modificările ulterioare.
10. Ministerul Finanțelor Publice (2013), *Raport privind activitatea de audit intern din sectorul public pe anul 2013*, [pdf] Available at: http://discutii.mfinante.ro/static/10/Mfp/audit/Rapactivitauditintern2013_20ian2015.pdf [Accessed May 29, 2016].
11. Renard, J. (2004), *Teoria and practica auditului intern*, Bucureşti: Editura Arta Grafică.
12. Spencer Pickett, K.H. (2006a), *Audit planning - A Risk-Based Approach*, New Jersey: John Wiley & Sons.
13. Spencer Pickett, K.H. (2006b), *The Internal Auditing Handbook*, New Jersey: John Wiley & Sons.

Audit financiar, XIV, Nr. 8(140)/**2016**, *918-926*
ISSN: 1583-5812; ISSN on-line: 1844-8801

The main causes of corruption in Romania

Silviu DUȚULESCU,
Bucharest University of Economic Studies.
E-mail: silviudemetrius@yahoo.com

Ileana NIŞULESCU-ASHRAFZADEH,
Bucharest University of Economic Studies

Abstract

Corruption is a mass phenomenon which can be almost harmless in small doses, but is able to undermine a country's national economy once it is out of control, generating chaos and, in extreme cases, even civil wars. The phenomenon exists in all countries and all kinds of management regimes (democracy, totalitarism etc.). In Romania, corruption is caused by the low standard of living (compared with citizens of West-European countries), and also by the general mentality of people, which prove to be quite permissive and at large with the existence of the phenomenon.

This research aimed at analysing the main causes of corruption. Since the phenomenon is quite complex, a set of heterogeneous variables was chosen (GDP per capita, the percentage of people who have at least a high school education of the total population of each county, the share of employees in the public sector in total employment, the average time of a trial and the average jail time) that can depict the phenomenon, and especially its evolution over time. Such an analysis was conducted in all counties of Romania, Bucharest also being added for comparability reasons and due to some specific features. Finally, the whole scientific approach was organized in the form of a table that categorizes each territorial unit in an area of higher or lower risk level in terms of corruption size.

Keywords: *Corruption, county charts, Romania, corruption causes.*

JEL Classification: *C31, D11, O11.*

To cite this article:
Duțulescu, S. and Nişulescu-Ashrafzadeh, I. (2016), The main causes of corruption in Romania, Audit Financiar, vol. XIV, no. 8(140)/2016, pp. 918-926,
DOI: 10.20869/AUDITF/2016/140/918

To link to this article:
http://dx.doi.org/10.20869/AUDITF/2016/140/918

Introduction

Corruption can be defined as "an abuse of power, committed in public office by an employee of the government, regardless of status, structure or hierarchical position in order to obtain personal profit, directly or indirectly, for himself or for another natural or legal person" (www.stopcoruptiei.ro, 2016).

Corruption in Romania has started to become a more and more visible issue during recent years. Until now, anti-corruption strategy has been through several stages, represented by the approval of four sets of strategic anti-corruption documents (National Anti-Corruption Strategies in 2001, 2005, 2008 and 2012), as well as the adoption of more than 150 laws in this regard (Păunescu et al., 2012). Since corruption is not a singular phenomenon, existing in all countries, it can be characterized as a transnational phenomenon. In this context, the world's most powerful countries have reacted and tried to take various measures to prevent and combat corruption. The UN General Assembly in December 2000 sent an invitation to all states to develop an international legal instrument against corruption (UN, 2001). The initiative emerged from the conference that took place during 9-11 December 2003, which has led to the UN Convention against Corruption. Following the steps that the United Nations have taken to fight corruption, the European Commission signed the Convention on behalf of the European Community in 2008 (EC, 2008).

According to Rumyantseva (2005), if a country has a high level of corruption, it most likely will spread inside the education system, especially at university level. At first, problems arise in the process of financial resources allocation for the education ministry or for other institutions responsible with the funding of the education system, and the issue will be gradually transferred to the younger generations, who will leave school easily. According to Andrei, Matei and Roşca (2008), the media has an important role in reducing corruption levels, which, in highly corrupt countries, most often tends to misreport the actual size of the corruption. Shah (2006) depicts the manner in which the effect of decentralization can become a favouring factor for the development of corruption. When the powers and responsibilities migrate from central to local systems, corruption becomes increasingly difficult to control, due to the multiple specificities of each sector, as well as the local customs.

Rose-Ackerman (2005) shows the correlation between corruption and government. From his point of view, the higher the level of corruption in a country is, the more investment and economic growth are perturbed, proving the inability and inefficiency of the government to ensure optimal living standards for citizens. Matei (2008), after a set of studies on corruption, concluded there is a strong correlation between this phenomenon and political instability. A relevant theory on corruption cannot be developed only based on statistics, since corruption is a very complex phenomenon. To achieve a greater degree of accuracy, the phenomenon should be analysed following the main types of corruption. For example, public institutions, the employed state officials are both men and women. Although corruption is developed enough that a classification based on sex is not possible, Mihăilă (2011), shows a different behaviour on this phenomenon among the two mentioned categories of civil servants. Also, Alolo (2007) shows that for women, mercy and compassion can be a motivation to adopt corrupt behaviour, while for men, the desire to become rich as fast as possible can be a motivation strong enough to practice a corruptible behaviour.

Corruption, by its nature, creates a climate of instability and significantly reduces foreign investment. However, some foreign investors choose to create partnerships with local companies in their field to gain some "immunity" against corrupt politicians (Ionescu, Lăzăroiu and George, 2012). Heckelman and Powell (2010) studied the correlation between the spread of corruption and the economic development of a country, when corruption in both public institutions and the private sector is at high levels. The results showed that high levels of corruption are an obstacle for both sides, and maintenance of high levels of corruption would harm all the stakeholders, including the population.

Even if corruption brings harm to all, very few of us think about the causal link between low pensions and tax evasion, or the link between a fictitious medical prescription and insufficient funds for covering free medication. The unemployed rarely blames the employer who uses illegal labour for the lack of jobs. And yet, tax evasion is what led to tax increases, thus entailing a decreased supply of jobs and ultimately corruption as result of this process.

1. Methodology

The purpose of this research is a continuation of a previous study (Duțulescu 2016), which analyses the phenomenon of corruption in all counties in Romania. This research aims to research deeper into the main causes and mechanisms that are responsible for the size of high corruption in Romania. In this respect, it is also pursuing the specifics of Romanian society, when compared to other European Union countries, where corruption has a much lower level. Special emphasis is put on the economic side, and the negative effects this phenomenon exhibits.

In order to get a more objective approach, the number of final convictions for acts of corruption within the period 2010-2014, published by National Anticorruption Directorate (NAD), was used as the dependent variable, to which five other independent variables were added. The first and most important variable is related to poverty (*GDP per capita*) and the following variables are the *Level of education*, expressed as the minimum share of the total population of each county having a high school education and the *Share of employees in the public sector in total employment* in the county. The last two variables, the *Average duration of a corruption trial* and the *Average punishment term for corruption* depict an important component of the justice system, which, by its courts, leads the struggle against corruption. Both variables are expressed in months, and depict the amount of time that elapses from the prosecution of a person for corruption until conviction, respectively the length of time for which a convicted person will spend in prison. In this way, corruption is viewed from multiple perspectives, and through the convergence of those perspectives, it can be established with far greater accuracy which are the determinant elements, or incentives for the development of this phenomenon, faced not only by Romanian companies but at a global level as well. The values of all the five independent variables relate to 2014. As sources for the values of the variables, data provided by the National Institute of Statistics, the Academic Society of Romania and the Romaniacurata.ro website was used. The three aforementioned sources published information about the activity of the NAD, along with the analyses provided by the analizeeconomice.ro website.

Empirical correlations between the first pair of variables (*GDP per capita* and the *Level of education*) will be performed, in order to make judgments about the educational component. This, as well as the others, are tightly related to the economic component, in the absence of which no other component could function.

The next set of correlations will focus on the link between the *Duration of a trial* and the *Duration of the penalty*. Although both variables are important indicators for the justice system, the economic component again has an essential role, as the permanent fight against corruption involves consistent allocation of economic resources by the government. Correlation between the last two variables is an attempt to verify the effectiveness of the judicial system. In this regard, a table will be drawn up with counties where corruption is fought effectively, a very important aspect in determining the root causes of corruption.

Using the statistical tools provided by the Microsoft Excel software, the analysed variables will be processed, so as a correlation matrix will result, that will provide the correlation coefficients for each of the five independent variables and the dependent variable. Correlation coefficient values will be applied to the initial values of the independent variables, so each territorial unit under review will receive a score. The 42 territorial units (41 counties + Bucharest) will be grouped into three areas. "*Zone 0*" will include territorial units that record the highest score, which means that they have the most reduced level of corruption; "*zone 1*" will include the territorial units where the estimated size of corruption is average; the counties where corruption is estimated to be at the highest levels will be included in "*zone 2*".

The whole scientific endeavour will be completed with a table that summarizes the research and provides a ranking of each county, based on an estimated level of corruption.

2. Results and discussions

Following the collection, structuring and processing of information for each analysed variable, a database was obtained, that was summarized in **Table 1**:

Table 1. Database with the values of the main variables

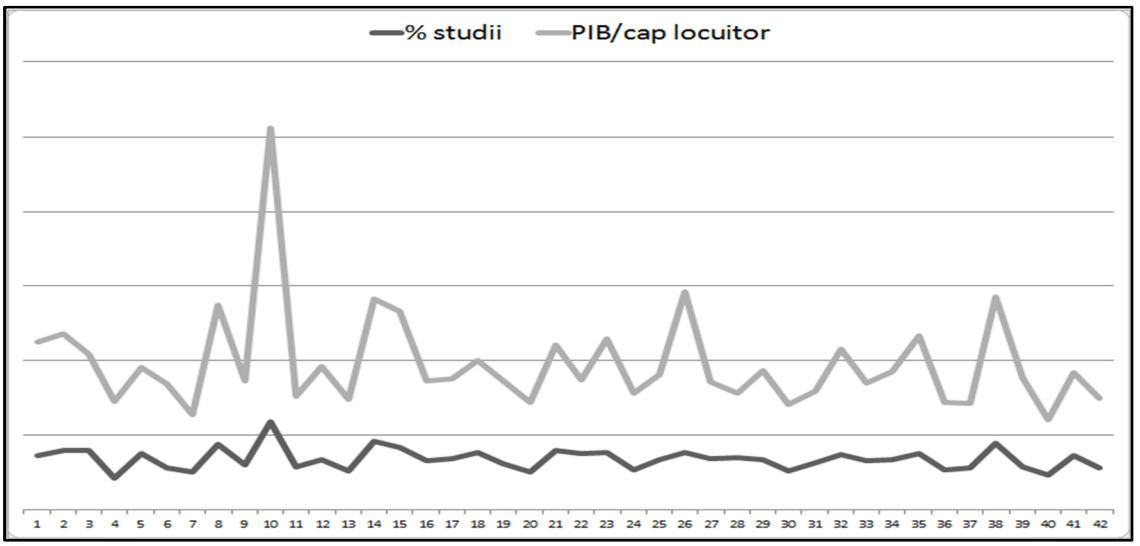
County	Number of convicted persons	GDP/inhabitant	% studies	%state employees in total number employees	Average length of the trial	Average punishment (months)
Alba	36	7,609	36.57	26.4	26.38	30
Arad	65	7,769	40	16.6	39.2	34.34
Argeş	149	6,456	39.68	23	34.63	33.5
Bacău	198	5,096	21.5	28.3	48.59	25.83
Bihor	61	5,727	37.95	20.1	50.19	34.64
Bistrița-Năsăud	9	5,609	28.26	23.9	46.53	35.11
Botoşani	11	3,820	25.49	34.9	41.3	36.18
Braşov	57	9,313	44.05	18.9	33.24	37.46
Brăila	25	5,593	30.3	25.2	34.67	29.52
Bucureşti	887	19,711	59.01	20.7	73.88	32.61
Buzău	24	4,701	29.21	25.9	44.69	38.25
Caraş-Severin	76	6,184	33.95	28.9	30.39	23.46
Călăraşi	29	4,784	26.4	29.7	32.9	34.66
Cluj	90	9,460	46.37	25.3	30.25	30.83
Constanța	108	9,072	42.25	22.8	34.56	40.1
Covasna	18	5,305	33.28	23.9	32.82	30.56
Dâmbovița	42	5,305	34.5	30	36.28	37.48
Dolj	85	6,105	38.78	33.9	43.9	33.24
Harghita	17	4,907	37.7	26.7	22.52	31.12
Ialomița	34	5,110	26.94	27.9	81.38	32.82
Iaşi	64	5,652	33.8	33.3	38.79	36.81
Ilfov	65	10,724	38.71	12.4	38.4	44.09
Maramureş	161	5,165	34.31	24.7	60.98	15.01
Mehedinți	6	4,274	35.16	39.6	47.18	38
Mureş	40	5,962	33.74	26.1	48.59	24.4
Neamț	71	4,462	26.23	26.4	38.59	25.49
Olt	23	4,766	31.89	31	35.23	39.74
Prahova	99	7,100	36.9	21.4	50.81	31.99
Satu Mare	58	5,173	33.13	21.6	44.74	35.34
Sălaj	2	5,853	34.04	28.7	15.65	30
Sibiu	22	7,898	37.7	20.6	18.34	34.86
Suceava	36	4,515	27.17	33.5	41.01	22.69
Teleorman	10	4,320	28.49	29.7	34.29	37.8
Timiş	88	9,764	44.51	19.3	50.68	38.63
Tulcea	19	5,902	29.33	27	29.33	30.11
Vaslui	26	3,640	23.84	37	33.91	24.54
Vâlcea	50	5,562	36.58	30.9	39.13	35.66
Vrancea	39	4,596	28.49	31.7	40.89	27.59

Source: Authors' processing based on the data retrieved from http://www.romaniacurata.ro and http://www.analizeeconomice.ro/

As shown in **Table 1**, the five independent variables largely cover almost all the areas where corruption exists. The first and the most important variable (*GDP per capita*) reveals the economic side of corruption. The percentage of people who have at least graduated from high school (*Level of education*) illustrates the educational side. *Share of public sector in total employment* develops the social side. The last two

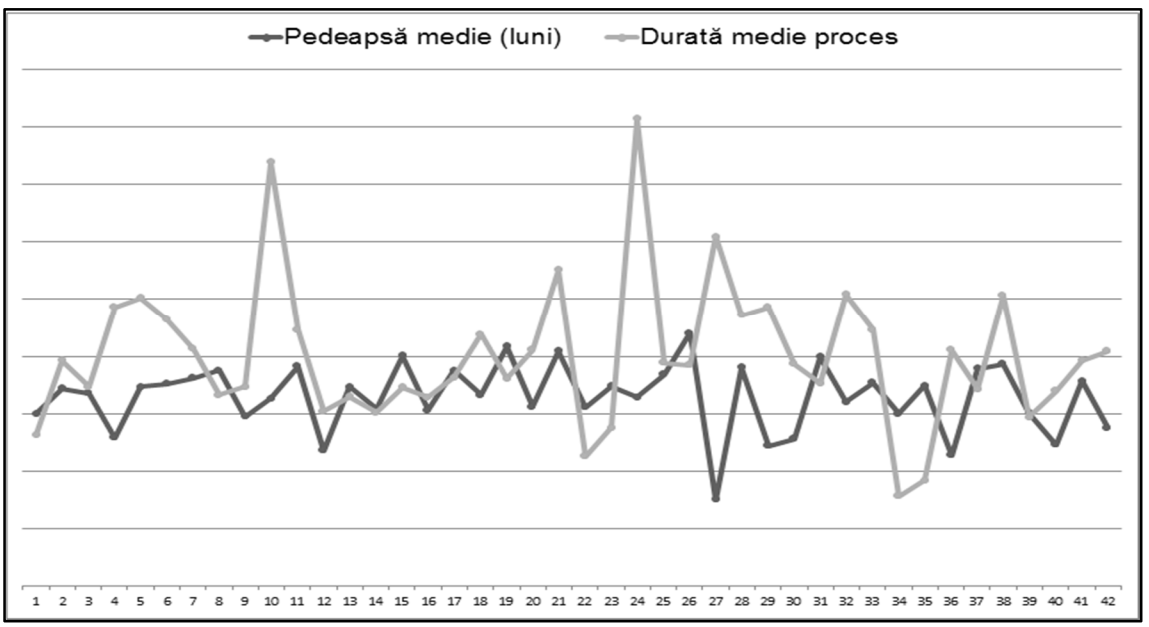
variables (*Average trial duration* and *Average penalty*) depict the activity of courts in fighting this phenomenon. The variable describing the *percentage of people who have at least graduated from high school* is closely related to variable *GDP per capita*, as shown in **Figure 1**.

Figure 1. The correlation between education level and GDP per capita



Source: Authors' processing

Figure 2. The correlation between education level and GDP per capita



Source: Authors' processing

The more a county succeeds in generating a higher standard of living for the population, the more society becomes interested in educating children, given that people with higher education can bring added-value to the community they are part of, more than uneducated people. On the other hand, even a person with high school education can easily understand and better realize the negative effects of corruption, unlike a person with only lower secondary education or less. It is observable how the graph representing education follows, with few exceptions, the graph describing GDP per capita. The highest values of GDP per capita is 19,711 (Bucharest), 10,724 (Ilfov), 9,764 (Timiş), 9,460 (Cluj) and 9,313 (Braşov) while the average percentage of people who have at least a high school education is 46.53%, with 12.22% higher than the national average, which is 34.31%. At the bottom of the table there are five counties having values below 4,500 euro per capita, namely: Neamț (4,462), Teleorman (4,320), Mehedinți (4,274), Botoşani (3,820) and Vaslui (3,640); the average percentage of people who have at least a high school education is 27.84%.

In **Figure 2** there was depicted the correlation between the average duration of a corruption trial and the average length of the received prison time. Unfortunately, the Romanian judicial system has still many aspects to be improved, as evidenced by the fact that the average duration of a trial (40.11 months) is greater than the average length of a sentence (32.92 months). This is basically a waste of resources, which is reflected in people's welfare. From this point of view there are some good examples, like the county of Ialomița, where the difference between the average duration of a trial (81.38 months) and the average length of a sentence (32.82 months) is highest of all the analysed counties: 48.56 months. A particular situation can be found in Maramureş County, where the average length of a trial is 4 times greater than the average length of a sentence (15.01 months). This chart of inefficiency in the allocation of resources to fight corruption is joined by Bucharest, where the average duration of a trial (73.88 months) is more than 2 times higher than the average length of a sentence (32.61 months). However, the capital city is a particular case, although it has the highest GDP per capita in the country and the highest level in terms of education (59.01%), it manages to encounter difficulties in the administration of justice, which can be also blamed on the large number of cases (887).

There are some counties where the average sentence is greater than the average duration of the process. These 15 counties were grouped in **Table 2**.

Table 2. Counties having penalty duration higher than trial duration

County	Favourable differences (months)	County	Favourable differences (months)	County	Favourable differences (months)
Sibiu	16.52	Constanța	5.54	Teleorman	3.51
Sălaj	14.35	Galați	5.48	Călăraşi	1.76
Harghita	8.6	Olt	4.51	Dâmbovița	1.2
Hunedoara	7.27	Braşov	4.22	Tulcea	0.78
Ilfov	5.69	Alba	3.62	Cluj	0.58

Source: Authors' processing

It can be noticed that in this top 15 counties, only one is from Moldova, the county of Galați, which leads to the conclusion that in Moldova there are still serious issues with the fight against corruption, as it is carried out by the courts. The main cause of the low level of corruption in these 15 counties is their economic potential, the average GDP per capita is nearly 500 Euro higher than the national average, while the level of higher education has values 1.52 percent over the national average. These counties also recorded very good results for the share of government employees in total employment, in amount of 25.72%, as opposed to the national average which is 27.29%. In **Figure 3**, the correlation matrix is depicted, which reflects the degree of influence each variable has over the size of corruption, as expressed by the dependent variable "number of convicted persons".

Figure 3. The correlation matrix for the main variables

	Number of convicted persons	GDP/ inhabitant	% studies	% state employees in total number of employees	Average length of the trial	Average punishment (months)
Number of convicted persons	1					
GDP/inhabitant	0.791709163	1				
% studies	0.570440599	0.848695166	1			
% state employees in total number of employees	-0.222710692	-0.479971978	-0.398379334	1		
Average length of the trial	0.489634418	0.243609915	0.10656847	0.019845743	1	
Average punishment (months)	-0.089163106	0.212767228	0.283834771	-0.085416338	-0.055070659	1

Source: Authors' processing using MS Excel, 2016

After building this correlation matrix, one can find that the greatest impact on corruption is inflicted by the GDP per capita component, followed by the education level and the medium duration of a trial. A brief conclusion is that people are encouraged to commit acts of corruption when they have a lower standard of living. They do not fully realize the negative effects that widespread corruption could generate and are also "encouraged" to commit such acts by the weaknesses in the judicial system. The social component, the percentage of total employees in the public sector is not a determining factor in sizing corruption, the social causes able to influence corruption level being behaviour, awareness and education. A high proportion of the employees in the public sector can indirectly foster the development of corruption, in that it will require a higher financial effort from the government, in order to maintain the budgetary system, which would affect the standard of living for the entire population, thus fighting corruption would be carried out with difficulty due to lack of funds. After applying the correlation coefficients on the variables' values, a ranking of the 42 analysed territorial units resulted, summarizing the entire scientific endeavour, as depicted in **Table 3**.

Table 3. The dimensions of corruption at a national level

County (Zone 0)	Score	County (Zone 1)	Score	County (Zone 2)	Score
Bucureşti	64.77	Satu Mare	33.49	Hunedoara	26.6
Ialomița	46.71	Argeş	32.28	Caraş-Severin	26.49
Timiş	43.68	Mehedinți	31.48	Galați	26.42
Maramureş	43.23	Bistrița-Năsăud	31.15	Neamț	26.26
Bihor	39.37	Vâlcea	30.66	Alba	26.17
Prahova	39.19	Buzău	29.95	Olt	25.59
Gorj	36.44	Sălaj	28.53	Giurgiu	24.91
Arad	36.22	Iaşi	28.28	Harghita	24.42
Mureş	35.79	Bacău	28.08	Botoşani	24.24
Ilfov	35.52	Dâmbovița	28.08	Sibiu	23.77
Braşov	35.01	Covasna	27.67	Teleorman	23.59
Cluj	34.05	Vrancea	27.32	Tulcea	23.13
Dolj	33.86	Brăila	26.71	Călăraşi	22.06
Constanța	33.5	Suceava	26.66	Vaslui	20.23

Source: Authors' processing.

With reference to the number of convictions for corruption, Bucharest is in the first position and at the same time it is placed in zone 0. The explanation is that, unlike all the other counties, Bucharest is a metropolis with over two million inhabitants. In the same time, it is a pole of economic development for the whole country, so the main variables that the authors referred to have record levels (like 19,711 Euro for the GDP per capita, and 59.01% of the population having at least a secondary degree, respectively). Another feature of Zone 0 is that it does not include any county in Moldova, the highest rated districts being Iaşi (28.28 points) and Bacău (28.08 points) in positions 22 and 23 of Zone 1. The last position is also taken by a county in Moldova, Vaslui, with a score of 20.23 points, which leads the conclusion that the North-East area of the country has not only a set of issues in the judicial system, but also a level of corruption often located very high. The most likely cause is the high level of poverty in this area, the average *GDP per capita* being over 1,600 Euro less than the national average. The situation is similar for the *Level of education* variable, where the percentage for Moldova is only 27.21%, as compared to a national average of 34.31%.

The maximum amplitude is 44.54 points, the difference between Bucharest's score (64.77 points) and Vaslui (20.23 points), and if we exclude the capital city and refer only to counties, this magnitude is 26.48 points (between Ialomița and Vaslui).

In the future, the authors intend to carry out a study which will include at least two quantitative variables for each dimension of corruption, which will focus on the main geographical areas of Banat, Bucovina, Crişana, Dobrogea, Moldova, Muntenia, Oltenia and Transylvania, so that a more complete picture on the dispersion corruption throughout Romania will result.

Conclusions

The most important reason that stimulates the development of corruption at a national level is poverty, represented in the current research by the GDP per capita variable. Other causes having a determinant role over the scale of corruption, as evidenced by this study, are the level of people's education and the duration of a trial that results in a sentence of imprisonment for corruption.

The main conclusion is that most people commit acts of corruption to be able to secure a decent standard of living, and they do not realize the negative effects of such acts. On the one hand, they hurt themselves because they become exposed to high risks. Also, they hurt the entire society, as a high level of corruption will never ensure prosperity within the community.

Another aggravating factor is the inefficiency of justice which, most often due to objective reasons, is unable to complete a case of corruption in a reasonable timeframe. Once the average duration for completion of a case of corruption would diminish substantially and information about more cases of corruption would reach the public, people would begin to realize the danger of this phenomenon and in the same time they would become more reluctant in manifesting corruption or corruptive behaviour when opportunity arises.

The area most affected by corruption is Moldova, which can be very clearly seen in the living standard and the education level, while the lowest levels of corruption are recorded in the capital and the counties in the western part of the country (Timiş, Cluj, Arad etc.).

The variable describing the share of the public sector in total employment assumes the lowest values for counties in Zone 0 (24.07%), 4.46 percent less than the counties in Zone 1, and 5.19 percent less than the counties in Zone 2.

Aside from the GDP per capita, which has significantly higher values for the territorial units in Zone 0, as opposed to Zones 1 and 2, even for the level of higher education variable, values are quite different. Thus in Zone 0, the percentage of people who have graduated at least high school is 26.54% higher than in Zone 1 and 30.10% higher than in Zone 2.

A solution to discourage corruption could be the tightening of the legislation regarding penalties for corruption, allowing magistrates to convict the guilty to a much higher sentence, so as to discourage them from committing acts of corruption.

The current research shows that only in 4 counties the average sentence is longer than 40 months (Ilfov - 44.09 months, Galați - 41.57 months, Gorj - 40.86 months and Constanța - 40.1 months). This result allows the authors to anticipate that a significant increase of these durations could have a strong and fast impact on corruption.

The most dramatic effect that corruption generates is that an important part of the resources managed by the public authorities, instead of being directed to their intended purposes, go to completely different directions, generating indignation, distrust and a climate of uncertainty among the population that most often commits to corruption for the desire to secure a decent living.

REFERENCES

1. Alolo, N.A. (2007), Fighting public sector corruption in Ghana: does gender matter?, S. Bracking, ed. *Palgrave Studies in Development,* pp. 205-220, New York: Palgrave Macmillan.
2. Analizeeconomice (2015), PIB/cap locuitor – distribuție pe județe [online] Available at: *http://www.analizeeconomice.ro/ 2015/06/unde-au-crescut-mult-pib-ul-si.html*, [Accessed on February 15, 2015].
3. Analizeeconomice (2016), Ponderea numărului bugetarilor în numărul toatal de angajați – bază de date [online], Available at: *http://www.analize-economice.ro/2016/02/topul-judetelor-dupa-ponderea.html*, [Accessed on January 28, 2016].
4. Andrei, T., Matei A. and Roşca, I.G. (2009), *The Corruption: An Economic and Social Analysis*, Bucureşti: Editura Economică.
5. Duțulescu, S. and Nişulescu-Ashrafzadeh, I. (2016), Corruption in Romania, *Audit Financiar*, vol. XIV, no. 6(138)/2016, pp. 680-687, DOI: 10.20869/AUDITF/2016/138/680.
6. EC (2008), *Council Decision 2008/801/EC on the conclusion, on behalf of the European Community, of the United Nations Convention against Corruption*, [online] Available at: http://eur-lex.europa.eu/legal-content/RO/TXT/?uri=URISERV:l33300 [Accessed on July 13, 2015].
7. Heckelman, J.C. and Powell, B. (2010), Corruption and the institutional environment for growth, *Comparative Economic Studies*, vol. 52, no. 3, pp. 351-378, DOI: http://dx.doi.org/10.1057/ces.2010.14.
8. Ionescu, L. Lăzăroiu, G. and Gheorghe, I. (2012), Corruption and bureaucracy in public services, *Amfiteatru Economic*, vol. 14, no. 6, pp. 665-679.
9. Matei, A. (2008), *Corruption, Transparency and Quality. Comparative Approaches and Judiciary Support*, Transformation of the Role of the Judiciary within a European Integrated Context, *European Public Law Series*, vol. 85, pp. 127-142, London: Esperia Publications Ltd.
10. Mihăilă, R. (2011), (Un)Gendered private space in nineteenth-century Romanian society, *Journal of Research in Gender Studies*, vol. 1, no. 1, pp.147-163.
11. NAD (2009), Campanie anticorupție, [online] Available at: *http://www.stopcoruptiei.ro/ index.php?t=10*, [Accessed on December 8, 2015].
12. Păunescu, B., Vrabie, C., Lică, A. and Ciubotariu, B. (2012), *Studiu privind corupția din administratia publică locală* [online] Available at: *http://www.portalbn.ro/cj/Lists/Stiri/Attachments/74/RAPORT%20COMPREHENSIV.pdf*, [Accessed on July 13, 2016].
13. România curată (2014), Harta corupției pe județe [online] Available at: *http://www.romaniacurata.ro/harta-coruptiei/*, [Accessed on February 03, 2016].
14. Rose-Ackerman, S. (2005), *Corruption and Government. Causes, Consequences and Reform*, Cambridge: Cambridge University Press.
15. Rumyantseva, L.N. (2005), Taxonomy of Corruption in Higher Education, *Peabody Journal of Education*, vol. 80, no. 1, pp. 81-92.
16. Shah, A. (2006), *Corruption and Decentralized Public Governance*, World Bank Policy Research Working Papers, no. 3824, [pdf] Available at: https://open-knowledge.worldbank.org/bitstream/handle/10986/8805/wps3824.pdf, [Accessed on July 13, 2016].
17. UN (2001) Resolution adopted by the General Assembly [on the report of the Third Committee (A/55/593)]55/61. An effective international legal instrument against corruption, [pdf] Available at: https://www.unodc.org/documents/commissions/CCPCJ/Crime_Resolutions/2000-2009/2000/General_Assembly/A-RES-55-61.pdf [Accessed on July 13, 2015].

Camera Auditorilor Financiari din România