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Accounting: what balance is there between universality and contingency?

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Accounting: what balance is there between universality and contingency?

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Abstract

The question regarding the universal or contingent character of accounting is essential because it determines one of the dimensions of the governance of organizations. The first part of the article shows the dynamics of universality, that is, the movement towards a single set of global standards. The second part shows the limits of this movement and, conversely, the relevance of standards adjusted to local contingencies and coercions. Finally, the third part deals with the balance between these two concepts of accounting.

Keywords: *accounting; universality; contingency*

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Introduction

Accounting is a technique that dates back to the beginning of time (Degos, 1998). Jean Fourastié was the first to develop a historical theory of accounting. As an economist, but also as a professor, he considered that teaching accounting without historical reference is as illogical and as dangerous as "teaching music where there would be no place for the works of Bach" (Fourastié, 1976, p. 59)[1].

Accounting is inherent to social life. It "was born from the organized activity needed by life in society: the *homo computato*r was part of the *homo faber*" (Cossu, 2008)[2] (the *homo computato*r being, according to the author, an avatar of *homo œconomicus* and *homo socius*).

If at the beginning the main objective of accounting was to memorize quantitative data related to agro-pastoral activities and transactions between traders, the economic development, the necessity of a tool for "reporting" quickly appeared. The division of functions, between those of the agent (the shepherd, the farmer, the trader etc.) and those of the decision-maker, brought about this necessity.

The system was then technically improved. The important step is the publishing of the work of Pacioli, the *Summa de arithmetica, geometria, proportioni et proportionalita*, in 1494.

Then, in the 19th century, accounting made significant progress for the arrival of capitalism. Managers had to be accountable to the capital owners and they wanted to have the necessary information for decision-making and sharing the profit. The State was equally involved in this sharing, which quickly led to the need to set accounting standards. Each country had its own accounting regulations which had been drawn up according to the purpose assigned to accounting, according to the needs of the different users of the information and the material and human resources available in the country.

It was therefore possible to consider that accounting was inherent to capitalism. But, curiously, it was also claimed to be essential for the development of communism. "Accounting, the ideal control and synthesis of the process, becomes the more necessary the more the production takes place on a social scale and loses its purely individual character; therefore, the more necessary it is in the capitalist production, disseminated by craftsmen and peasants, the more necessary it is in the community production than in the capitalist production" (Marx, 1968, p. 573).

We can see that each economic current, and even every ideology, tries to assume the monopoly of accounting and to shape it accordingly to the sought objective and the context. "Accounting is not only a tool ... it is a social phenomenon" (Capron, 1993, p. 9).

But in the age of globalization, capitalism has imposed itself in almost all countries of the world. Therefore, the question of the purpose to be assigned to accounting within this global context has arisen. We are faced with the following alternative: have the accounting needs become universal or should we rather continue to consider that the needs of the users may differ in respect of entities (family-run companies, listed companies, NGOs, public organizations, etc.), countries, cultures or economic areas? We are faced with the following dilemma: universality or contingency?

After examining the fundamentals and contributions of each of these options, we will attempt to answer the question of whether a balance is possible between the two extremes.

1. Universality

Universality is based on the constraints of globalization and financialization, on the fact that the needs of users are identical in all countries, on the necessity to be able to compare financial statements, on the principle of neutrality and transparency of information and the search for the general interest.

1.1. The constraints of globalization and financialization

The globalization of the economy in the latter part of the 20th century was a major change in an extremely short period of time. Thus, the world exports increased from 2,000 billion dollars in 1960 to 16,000 in 2008 (CNUCED, 2009, p. 9). But this globalization is not limited to trade in goods and services; it is accompanied by cross-border investments which represent a new form

[1] The first edition dates back in 1943.

[2] Extract from the foreword of the work "Les origins de la comptabilité" which was not finished in time by C. Cossu

of competition with relocations. Therefore, the global inflows of foreign direct investment have evolved as it follows (Wikipedia, 2017):

- 1985: 50 billion dollars;
- 1989: 200 billion dollars;
- 2007: 2,000 billion dollars;
- 2013: 1,400 billion dollars.

These investments correspond largely to the increase in number of multinational enterprises, from over 37,000 (with 170,000 subsidiaries and 20 million employed people) in 1990 to 70,000 companies (69,000 subsidiaries and 57 million employed people) in 2004 (Becuwe et al., 2007, p. 323). This development of companies is accompanied by the evolution of their manner of financing. Thus, the share issues in total external financing (equity + bonds + bank debts) changed as it follows (Plihon et al., 2013, p. 33):

- 1980: 2.8%;
- 1990: 31.0%;
- 2008: 42.3%.

More than 50% of these securities are held by institutional investors (Plihon et al., 2013, p. 33) illustrating the financialization of the economy.

The most dynamic form of capitalism is that of financial capitalism, which is particularly characterized by stock-exchange nomadism and the search for a rapid profit in the form of dividends or capital gains. It is the reign of shareholder value as opposed to the patrimonial value of the family-run firm whose shareholding is stable and is managed from a perspective of transmission between generations.

The need for financial information is obviously different according to the users, their objectives, their decision-making model. However, the institutional investors, whose portfolio does not know the borders of states, have common needs which can be summarized as comparability, neutrality and transparency of the financial information in order to be able to perform the arbitrations (purchase, maintain or sell the securities) at the best. In this respect, assuming that its unique purpose is to serve the interests of investors, accounting is universal, i.e. the demand is the same regardless of the place or nationality of these investors. This is the reason why the international accounting standards, IFRSs, have been developed. Moreover, it should be noted that they are more precisely standards of financial reporting, since they focus only on one end of the accounting chain, that is, the final product which consists in disclosing financial statements. First and foremost, the process of producing information (codification of accounts, entry of records, control, etc.) is not standardized.

1.2. A user without borders

The IFRS Conceptual framework clearly announces the served interests.

"The objective of general purpose financial reporting is to provide financial information about the reporting entity that is useful to existing and potential investors, lenders and other creditors in making decisions about providing resources to the entity. Those decisions involve buying, selling or holding equity and debt instruments, and providing or settling loans and other forms of credit" (The Conceptual Framework for Financial Reporting, ES/2015/3, 1.2). "Decisions by existing and potential investors about buying, selling or holding equity and debt instruments depend on the returns that they expect from an investment in those instruments, for example dividends, principal and interest payments or market price increases" (The Conceptual Framework for Financial Reporting, ES/2015/3, 1.3). "Other parties, such as regulators and members of the public other than investors, lenders and other creditors, may also find general purpose financial reports useful. However, those reports are not primarily directed to these other groups" (The Conceptual Framework for Financial Reporting, ES/2015/3, 1.10).

The decisions to be made, mainly equity arbitrations, suppose that general information, which can be completed at the request of investors, is comparable, neutral and transparent, so that markets could be efficient.

1.3. Comparability

The IFRS Conceptual Framework defines comparability as: "Users' decisions involve choosing between alternatives, for example, selling or holding an investment, or investing in one reporting entity or another. Consequently, information about a reporting entity is more useful if it can be compared with similar information about other entities and with similar information about the same entity for another period or

another date" (The Conceptual Framework for Financial Reporting, ES/2015/3, 2.23). Therefore, comparability involves two dimensions: space (comparing different entities) and time (for the same entity, comparing financial statements with different dates).

If the spatial dimension is *a priori* relevant for an international and nomadic shareholder, it supposes, however, that there are comparable entities. Yet, the large multinational companies with tens or even hundreds of subsidiaries, are not strategically and operationally comparable. They do not have the same portfolio of activities as a result of corporate growth and do not have the same business model (type of customers, image, R & D, relationships with subcontractors, etc.). Only the financial performance is comparable as the company is considered only as an investment and not an institution and the standards for measuring this performance are the same for all.

Comparability over time is obviously useful, but it does not require identical accounting standards for entities which do not belong to the same group. It merely supposes the consistency of methods, which can be done without the necessity of resorting to standards and, *a fortiori*, to global standards.

In conclusion, it can be noticed that the requirement of comparability in space and time justifies the existence of universal norms only in a limited number of cases: that of entities with very similar activities and business model. In addition, the comparison of financial statements makes sense only for entities competing on the capital market: the investors need to compare in order to arbitrate, the banks in order to finance. It should also be remembered that the comparison can also make sense for suppliers, customers and employees, concerned about the performance and sustainability of the entity.

1.4. Neutrality

The IFRS conceptual framework defines the neutrality as: "A neutral depiction is without bias in the selection or presentation of financial information. A neutral depiction is not slanted, weighted, emphasised, de-emphasised or otherwise manipulated to increase the probability that financial information will be received favourably or unfavourably by users. Neutral information does not mean information with no purpose or no influence on behaviour. On the contrary, relevant financial information is, by definition, capable of making a difference in users' decisions" (The Conceptual Framework for Financial Reporting, ES/2015/3, 2.17).

This definition of neutrality leads to two remarks. If neutrality implies a lack of prejudice in the selection or disclosure of financial information, then it should satisfy all users and, therefore, it should produce financial information of universal value. But in the same definition, the Conceptual Framework states that financial information should have the ability to influence the decisions of users. The nature of the decisions to be made being different from one category of users to another, we cannot see how this financial information could then have a universal value. This qualitative characteristic is thus defined in a contradictory manner.

1.5. Transparency

One of the major characteristics of accounting is to ensure the follow-up of financial flows and, therefore, to contribute to transparency[1] without which there can be no trust, trust that is the bond of the Society as well as the bond of the business world.

Curiously, neither the Constitution of the IASB Foundation, nor the IFRS Conceptual Framework , nor the European Directive of 2013 on annual financial statements, nor the Plan Comptable Général (PCG – the French accounting standards) of 2014, uses, at any time, the word "transparency." This term is no longer mentioned in the Constitution of IFAC. This is the more surprising as transparency implies the need of a common language to make sure that the information is properly produced and interpreted by different users. It is also not mentioned by the codes of ethics of IFAC, the French Chamber of Auditors and the French Institute of Chartered Accountants.

Opposed to opacity, transparency is one of the conditions for the existence of the Rule of Law. This does not mean that everything must be known by everyone. There are, of course, "access rights", as computer scientists say, because otherwise there would be no more privacy or business secrecy, secrecy that may be necessary and does not necessarily cover corrupt behaviour.

Transparency can be "intermediated." Therefore, the auditor has access to all the documents of his client

[1] On the subject of transparency, also see: Burlaud and Colasse (2010a) and Burlaud (2017).

which are useful for the performance of his mission and it is through his intermediary that third parties know that they do not contain any components or elements that reveal criminal acts. It should be added that the access rights are not transmittable. Thus, certain recipients of information also have to respect an obligation of discretion (for example, the elected members of the works council) or professional secrecy (for example, the auditor or chartered accountant).

If the need for transparency is universal, the way in which it is answered depends on the degree of openness to the access rights (secrecy is not protected everywhere in the same way, for example, as in the case of banking secrecy) or the contingent balance between transparency which allows exercising a social control and the trade secret which allows to neutralize possible hostile actions.

1.6. The pursuit of the public interest

The pursuit of the public interest, which can be opposed to the defence of a particular interest, pleads for universality. This is the main argument for the legitimization of the legislator or the standard-setter who is, in a sense, a legislator by delegation. This concept has a very strong evocative power. The Constitution of the IFRS Foundation uses the term "public interest" eight times in 19 pages and that of IFAC 28 times in 17 pages.

None of the standard-setters defines the public interest; they merely provide an institutional response in terms of governance.

For the IFRS Foundation, the 22 trustees undertake to act for the public interest (Constitution, article 6). It is stipulated that:

- "The mix of Trustees shall broadly reflect the world's capital markets and diversity of geographical and professional backgrounds." (art. 6)
- "The Trustees shall comprise individuals that, as a group, provide an appropriate balance of professional backgrounds, including auditors, preparers, users, academics, and officials serving the public interest. Normally, two of the Trustees shall be senior partners of prominent international accounting firms. To achieve such a balance, Trustees should be selected after consultation with national and international organisations of auditors (including the International Federation of Accountants), preparers, users and academics." (art. 7)

This shows that, for the IASB, the public interest summarises more the interest of the financial markets and the trustees are essentially professionals appointed by professionals.

For IFAC, the Constitution provides a Public Interest Oversight Board without further details.

These institutional responses illustrate the difficulty of defining the public interest. To constitute an assembly of technically competent persons whose integrity is beyond doubt is not sufficient to guarantee a good representation of the public interest.[1]

The public interest is by nature a fuzzy and contingent notion. It has mainly a political character. In the absence of an accurate definition, is this concept included in the regulatory framework itself? The IFRS conceptual framework does not mention it once. The same applies to the 2013 Accounting Directive and the French standards. In neither of these documents has the public interest been able to find an operational translation and contribute to the universality of the standard.

In conclusion, we notice that a global financial market logically calls for universal accounting standards to compare the financial performance of entities, considered as simple investment opportunities. As a result, the financial statements must be neutral and contribute to the transparency of the transactions which ensure the trust without which the market cannot function.

Clearly, the IFRSs are produced by a professional and private-sector law institution claiming to be of public interest (IFRS Foundation, Constitution, art. 6). It is obviously paradoxical that a standard-setter whose main concern is to improve the functioning of the financial market can rely on it. This postulates that satisfying investors means satisfying all the stakeholders, which remains to be verified. We will see that contingency factors may invalidate this hypothesis.

2. Contingency

Contingency is based on taking into account the impact of standards (consequentialism), the economic and

[1] On the subject also see: Burlaud and Colasse, 2011.

social environment, the specific needs of users (the relevance of information), and the compliance with the applicable law rules. Moreover, it leaves room for professional judgment and consideration of the business model of the different entities.

2.1. Consequentialism

The set of accounting principles constitutes the basis of the "accounting system." According to the contingency theory, it is necessary to integrate the economic and social consequences resulting from the application of these principles, i.e. beyond the regulatory framework. Accounting is not just a technique; its application has consequences for stakeholders. Considering that the accounting system can contribute to the establishment of a more just society, one can talk about the ethics of accounting.

"It is no longer a question of favouring the pursuit of a (the?) truth that would always be good to say, but of looking for information that does not produce harmful effects" (Burlaud and Baker, 2015, p. 57). Consequently, there is room left to the judgment of the professional accountant.

Compliance with regulations is not enough, accounting has a regulatory function which can only be assured by the implementation of devices acting on conduct. Professional institutions specify the duties of their members in a code of ethics.

2.2. Relevance of financial reporting

The purpose of financial reporting is to provide the user with relevant data at the right time to make enlightened decisions. The problem is that the users are numerous and that, consequently, the decisions to be made are not similar. The users are more or less numerous according to whether there is adopted the partnership approach or the shareholder approach.

According to the partnership approach, the list of stakeholders is abundant. It is customary to distinguish among the stakeholders: internal users, managers, employees, external users, lenders, suppliers and other creditors, the tax administration, and even the society in general. Each of the stakeholders has different needs. Thus, if the employee wants to judge the sustainability of the company, the creditors are more interested in solvency. Naturally, each category is not given particular attention in the regulation. The information is as wide as possible, intended for the general public.

According to the shareholder approach, the agency relationship is limited to the relationship between shareholders and management. The publication of accounting and financial information is relevant as long as it provides a solution to the information asymmetry between the agent (manager) and the principal (the shareholder). It aims to promote optimal decisions in terms of resource allocation.

It should be noted that, in case of a listed company, the information is relevant to investors when helping to make predictions. Numerous studies show changes in stock prices according to the announcement of accounting and financial results.

The expectations of each actor depend, therefore, on the position taken in the company, generally, on the contract that relates it to the company. They also depend on other factors, such as legal status, economic and social context.

Therefore, in France, whose economic environment is mainly composed of small companies, the objective of comparability of information with a foreign company is not primordial. Moreover, for various reasons, these companies do not use external financing. Consequently, if the banker needs information when asked to fill a cash deficit, the banker can always ask it to the managers, as well as information about their personal patrimony. This is not the case of the national or international investment funds, which are not interested in this type of companies.

In terms of the need for information, the economic and social context is particularly important in the developing countries because "the accounting systems are actively involved in the economic and social development of countries. Not only do they allow the management of entities that use them, companies and other organizations [cooperatives, NGOs, etc.] but they are also instruments to help the national economic planning" (Causse, 2009, p. 702). Given the specific objectives of the developing countries and the means at their disposal, it may even be questioned the fact whether the international standards, developed in a very different context, represent rather a barrier to their development[1].

[1] Also see Causse and Ebondo (2015, p. 39).

They widely meet needs which do not exist in the countries under consideration.

To sum up, users do not form a homogeneous category and the needs are not universal.

2.3. The connection to the law

In France the accounting regulations, as developed during the 19th century, resulted in a homogeneous *corpus* called the legal accounting system. "Therefore, in respect of the enterprise and more generally the private sector, the *Lex mercatoria* in the Middle Ages, the royal ordinances, such as those of Colbert in 1673 under the old regime, certify the apprehension of the accounting field by law, regardless of its form. After the Revolution, the codification of the accounting practices of enterprises in a commercial code in 1807, renewed in 1867, certifies this willingness of the public power to govern the private accounting by a restricted and identifiable set of legal norms" (Kott, 2014, p. 40). As the author points out, the 1866 French companies act contains the regulations related to the accounting of merchants, the financial statements and the statutory auditors.

This system includes principles contained in the commercial code (definition of equity, consistency of methods, prudence principle, etc.), it sets out the duties of the accountant and defines the accounting practices (chronological recording, maintenance of documents, etc.). The principle of patrimony, according to which the annual accounts must give a true and fair view of the financial position and the profit or loss of the company, is included in the French code of commerce (article 9).

As it has been noted by many authors (Burlaud, Poitrinal and Salustro, 1998; Raybaub and Teller, 2009), there are strong links between accounting and law, and accounting has even been described as the "algebra of the law" (Garnier, 1947). The particularities of the accounting law in comparison to the commercial law give it a certain autonomy. Thus, in accounting, "the business entity" is considered as an accounting subject. Similarly, in accounting, goods are apprehended in accordance with their economic purpose, that is, according to the intention to own them or not in a sustainable manner. Securities, for example, can be considered either as fixed assets or current assets. Despite the fact that this economic dimension is taken into account, it cannot be described as economic law.

The Ministry of Finance is responsible for drafting legal standards, which apply to the private sector and the public sector. They constitute a homogeneous system[1]. The state is a stakeholder with more than one dimension. "Taxation has a double influence on accounting, a direct influence by the rules that concern the book entries, an indirect influence that influences the management decisions and thus their accounting record" (Rossignol, 1999, p. 6).

The State also intends to play the role of regulator: "The sacred union of law and accounting for the protection of capitalism takes thus the form of accounting offenses and it is only at the beginning of the 20th century when the accounting standardization process started. The transition to a so-called *planned* economy is accompanied by a political objective of state control of accounts both for economic and fiscal reasons" (Muller, 2014, p. 36).

However, in the 70s/80s, the process of international standardization appears to be disconnected from the law. The beginning of financial capitalism has disrupted the system on one hand to the point of splitting the state-controlled accounting system which continues to apply to the non-consolidated financial statements (PCG in France), and on the one hand, the international standardization by a private institution, which applies to the consolidated financial statements. The principle of legal patrimony, which is dominant in the French accounting, runs up against the pre-eminence of the economic substance over legal form in the IFRSs. Accounting is no longer a reflection of the legal position of the company but of its economic situation. The international accounting standards have been liberated from the business law.

The assessment of the economic situation can only be achieved by using more or less sophisticated evaluation methods. The accountant economist has replaced the lawyer. "Previously the accounts were false, and everyone knew, the problem with the international standards is that the accounts are always false but everyone believes they are true"[2].

The objective of the international standard setters, which is to prepare and enforce recognized universal rules, is

[1] The culmination of which is the LOLF (Organic Law on Finance Laws) of 2001

[2] This remark, attributed to W. Nahum, is reported by J. Haas (2014, p. 21).

not however achieved. For many countries, logic remains the respect of contingency.

2.4. Place given to professional judgement

"The professional accountant is critical throughout his mission: he exercises his professional judgment[1] mostly for deciding on the nature, calendar and scope of the procedures to be implemented on the basis of the information gathered" (Professional accounting norm, abrogated in June 20, 2011). The exercise of this judgment, which introduces a degree of freedom in relation to regulation, is justified by several reasons:

- First, because the standard setter could not foresee all situations;
- Then, in certain situations, it is necessary to use the knowledge that the expert can have on the company and its environment in order to assess the consistency and the verisimilitude of the accounts;
- Finally, the texts sometimes call for judgment, for example when the materiality principle is to be applied.

Naturally, in exercising a professional judgment, the fundamental principles intended to ensure the quality of information must be respected. As outlined in a document issued by the Canadian Institute of Chartered Accountants (CICA) from February 2013, entitled "Professional Practice Exercise", "The professional judgment does not allow an accountant to choose a method simply because nothing forbids it". When freedom is dropped in respect of choosing an accounting method, a justification of this choice must be provided.

The place given to professional judgment fills up a larger space in audit. In fact, the exercise of audit, mainly the identification of risks and the planning of interventions involve connecting the facts, the ability to detect anomalies and the ability to judge. "A high-quality audit depends on the ability of auditors to exercise appropriate and relevant professional judgment throughout their engagement" (IAASB, 2016, 6).

As a result of the financial scandals, particularly the bankruptcy of Lehman Brothers, which has accused the auditors more for a lack of risk detection than for a failure to respect the audit process, the professional judgment has been given more importance.

2.5. Taking into account the business model

The business model is a tool for describing and understanding how an organization creates value through the implementation of a set of activities, processes, networks, resources, and the use of key competences. It is based on a systemic vision of the company.

It is a recent concept, and therefore virtually absent from the regulation. However, based on the principle that accounting should be responsible for the transactions relating to the company's business during the past period and should provide information relevant to the decision of the relevant stakeholders, the concept of a business model is important.

Accounting can be considered "as an instrument for modelling the company" (Colasse, 2008, p. 185), which makes it a compulsory tool for building the trust between the economic and social actors.

Taking into account the business model may result in the provision of non-financial information, as well as information on intangible assets or accounting choices, which are often characteristic of the entities profile.

However, "In addition to IFRS 9, there is no explicit reference to the business model in the IFRSs, reflecting the IASB's prudence in respect to this concept. The reasons for this caution are related to the risk of focusing on the use of the accounting of intention (management Intent) rather than the principles of neutrality and comparability of financial statements" (Barneto, Degos and Ouvrard, 2015, p. 14). This probably explains why the few studies on the subject (Disle et al., 2016) indicate that, if the concept is present in the academic literature, it is little integrated into the national and international standards.

To sum up, the ethical dimension of accounting, the heterogeneousness of users and their needs, the necessity to leave room to the exercise of professional judgment and to take into account the business model, mean that accounting is logically contingent to the economic, legal and social context of the countries.

[1] On the concept of professional judgement see Burlaud and Niculescu (2016).

3. The balance between the universality and contingency

Universality tries to stand out as a constraint due to the globalization and financialization of the economy. It does not lack advantages as the foundations on which it is based have shown. But, on the other hand, we have considered that accounting is logically contingent. Consequently, is the solution not a balance between the two extremes?

To try to answer the above question, we first perform an observation of the adoption of international standards at a global level nowadays and we analyse the requirements of the adoption of a global standard.

3.1. The actuality of the adoption of the IFRS standards

To believe the IFRS Foundation, *ite missa est*, the IFRS have conquered the world. One can thus read on the official site (http://www.ifrs.org/Features/Pages/Global-reach-of-IFRS-is-expanding.aspx.): "Nearly all (93%) of the jurisdictions have publicly expressed support for a single set of high-quality global accounting standards. And the relevant authority in nearly all (94%) of the jurisdictions has made a public statement supporting IFRS as the single set of global accounting standards. Even in those few countries that have not publicly supported IFRS, IFRS is commonly used by publicly accountable entities in half of the jurisdictions." But at a closer look, beyond the lack of modesty of the text, the picture is not so glorious. The percentages given above are correct if we consider, for example, that the Fiji Islands or Macedonia weight as much as the US or China! Among the countries that have not adopted the IFRSs, there are still these two enormous countries. Other large countries do not allow or require them than for at least some public interest entities (PIE): India, Japan and Switzerland. France is ranked within the 116 countries that require the application of IFRS for all or most of the PIEs. But the IASB fails to mention that in the latter case, this concerns only the consolidated financial statements. The layout would be totally different if we measured the adoption of IFRSs areas by weighting the responses of different countries, for example by GDP. Finally, these statistics are based on statements, not on observations. So, in some developing countries having formally adopted the IFRSs, and we know that the accounting profession is virtually non-existent and that standards are not actually applied.

Taking into consideration the SMEs, the results are even less unanimous in favour of the IFRSs. Thus, Nobes (2011, p. 43) lists 65 countries that prohibit the use of IFRSs for SMEs, 57 countries that allow them and 6 countries that have made them compulsory. Moreover, when looking at the list of countries in detail, we see that within the group of countries *prohibiting* IFRSs for SMEs there are practically all big countries of the planet: Germany, Canada, China, Spain, the United States, France, India, Italy, Japan, the United Kingdom, Russia, etc. Only three big countries *allow* the use of IFRSs for SMEs: South Africa, Brazil and Turkey. The six countries making them compulsory are Chile, Fiji, Macedonia, Rwanda, Serbia and Venezuela.

These figures show that the reality lies between universality and contingency, i.e. local standards and relevance in respect to the needs expressed locally. It is clear that the financial statements published by PIEs operating on international markets must be standardized according to the international standards, but even this is not accepted everywhere depending on the balance of power. Thus, China and the United States keep their own standards. On the other hand, for the companies with national activity and which are not PIEs, the statements drawn up in compliance with the local standards are the rule.

3.2. Is there a global standard feasible?

The search for a balance between the local standards and the international ones is difficult because we find ourselves between two worlds whose essential characteristics are in opposition:

- A legal accounting as opposed to an economic accounting;
- An accounting for the general public against an accounting for the financial investors;
- An accounting whose standards are set by a public entity in opposition to an accounting whose rules are generated by a private entity.

The project to create a single global set of accounting standards has been the subject of reflections of the highest professional bodies in France. We refer to the writings and speeches of Jérôme Haas, Chairman of the

French Accounting Standards Authority[1], whose main ideas are set out below.

According to him, there is first a common problem of terminology. For being convinced of this, one should make reference to the true and fair view. In the French culture, this means "secure, certified figures, anchored in the law", in the English culture, they are "figures for investors prevalently, varying with the conjuncture, not anchored in the law, ...".

Then, according to Haas, the financing method leads to considering different horizons. When companies are financed mainly by equity, which is the case of France, they have a longer-term vision in comparison with the companies that rely mainly on the financial markets, which is the case of the United States.

Finally, the dominant business model, as well as the degree of sophistication of the economy are very different according to the countries or the geographical areas. Therefore, in the developing countries, most of the economic entities are very small, belonging mainly to the agriculture and craft sector. They cannot be subjected to complex standards which do not meet any of their needs.

On the basis of these findings and the manner in which the international standards were developed and applied, Haas sets the conditions for the introduction of a single international accounting standard.

The following basic conditions must be met:

- The choice "between fair value and historical cost, between relevance and transparency, between the representation of the past or the taking into account of hypotheses on the future", a clear separation must be made and appear between what is safe and what is calculated;
- "The assessment of standards by a public authority according to the procedures controlled by itself and its peers".

It is also necessary to:

- Envisage the relevance of a system of options sustained by the existence of different contexts;
- Test the impact of the introduction of a standard;
- Maintain "a continuous dialogue with the assembly of stakeholders at a global level".

To those conditions, he added that it must:

- "End the convergence policy", as it is currently being carried out and leads to contrary results to the sought objectives, for example, the one of comparability,
- Admit that a "single set of standards developed for the financial markets cannot be the benchmark for the countries where the use of financial markets is virtually non-existent, nor for SMEs".

Consequently, without giving up to the possibility of creating a single global accounting standard, for the moment this project holds to "the adventure of Babel", it seems utopian.

Conclusion

In this paper, we wanted to look for the relevance of a universal accounting versus a contingent accounting in relation to the economic, legal and taxation characteristics of the companies.

It is clear that the accounting standards are essential. They are part of the rule of law because they allow taxation in respecting the equal treatment of taxpayers, natural or legal persons. They ensure the traceability of the financial flows to fight against corruption and tax evasion.

Should these standards be global? We have seen that nowadays, if they are formally adopted by a very large majority of countries, the biggest ones, including the United States and China, they should not. Other large countries express reservations or, like most European countries, limit their use to the consolidated financial statements of PIEs. This means two things:

- The multinational groups, large firms (the *Big Fours*) and analysts need globally recognized rules in order not to have to comply with several reporting standards;

[1] Thus: The speech delivered on April 6, 2011 at the meeting of the French Association of Corporate Treasurers (AFTE), entitled "The wonderful project of creating a single global accounting standard" and the interview published in the Small Posters No. 44, of March 3, 2011, p. 5, entitled "We must strike the right balance between local standards and international standards." What is repeated textually is in quotation marks.

– The other companies and the users of their annual financial statements need standards adapted to local situations.

We observe that the area of local regulatory systems almost always corresponds to the borders of the States because the link between accounting, law and taxation remains very strong. In the absence of a European tax law, there are no very compelling European standards, as the accounting directive is not very detailed and leaves room for 27 or 28 national standards. On the other hand, the 17 countries of the Organization for the Harmonization of Business Law in Africa (OHADA) went further and adopted a common accounting framework: the OHADA Accounting System (SYSCOHADA) (Causse, Gouadain and Mifetou, 2011). It is based on a common business law. Moreover, the taxation rules of the member countries, if not identical, are of common inspiration since they stem from the general French taxation code. Finally, the level of development of these countries is relatively comparable.

But a regulatory system cannot foresee all the present and, *a fortiori*, future scenarios. It is therefore necessary to leave room for the exercise of the professional judgment of the preparers of the financial statements and their auditors[1]. The search for the relevance of financial information also implies the possibility of integrating the features of each entity, its business model, its environment, etc.

In the end, we observe that the setting of accounting standards is an eminently political act[2], therefore, an art of compromise, a compromise between the principle of the universal rule, apparently simple but not necessarily relevant, and national or regional rules better adapted to specific contexts.

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[1] See also Burlaud and Niculescu (2016)

[2] See also Burlaud and Colasse (2010b,c)

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Study on the association

between earnings management and value relevance based on the reporting method used for operating cash flows

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Abstract

This paper analyses the association between earnings management and value relevance of accounting information, for a number of 556 observations from a sample of 65 companies listed on the Bucharest Stock Exchange during a 10 year period: 2006-2015. Sampled companies are classified according to the method used for the reporting of operating cash flows. Findings confirm that entities using the indirect method have a higher level of discretionary accruals and are more tempted to opportunistically increase their earnings. As far as value relevance is concerned, results show that participants on the Romanian capital market place more weight on the information reported by entities experiencing higher levels of discretionary accruals.

Keywords: *accounting quality, earnings management, value relevance, cash flows*

JEL Classification: *M41, M10*

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Introduction

The common saying "information is power" is more accurate than ever in the current economic environment. The annual financial statements represent a crucial source of comprehensive quantitative information that plays an important role in the decision-making process. The quality of information contained in these financial reports influences the quality of current decisions, the perspective of making decisions and, implicitly, the results obtained after the decisions are made.

A central topic of the economic research dealing with accounting quality is the extent to which managers modify the reported earnings for their own benefit (Beneish, 2001). If managers are remunerated on the basis of the reported results, they will be tempted to apply techniques that will allow them to increase their personal benefits. In addition, as accounting rules allow alternatives, estimates and judgments, managers have a degree of flexibility in choosing the reporting solution best suited to the entity or their interests, without breaching any legal regulations. This technique, called *earnings management (EM)*, has been a long-debated topic. Hunton, Libby and Mazza (2006) show that more transparent financial reporting reduces the likelihood that managers engage in EM strategies. Financial statements are considered transparent only when interested parties have access to all relevant information [...] in a timely manner (Vladu, Amat and Cuzdriorean, 2014).

Another important topic investigated in accounting quality literature is related to the usefulness of accounting information to investors. This dimension is known as *value relevance*. From the investors' perspective, accounting information is deemed value relevant when it helps assessing stock prices or returns. A significant number of studies try to answer this question: is accounting information relevant to investors that aim to estimate company value?

Our paper combines the two dimensions of accounting quality: accrual EM and value relevance. First, it investigates whether companies using the indirect calculation method for the cash flows from operations (CFO) are more likely to use EM practices than those applying the direct method. To achieve this, the sampled firms are separated in two groups based on the CFO reporting methods. As CFO is more objective and harder to manipulate if it is determined under the direct method (Mironiuc, 2006), we expect less EM practices at companies applying it. Findings confirm that entities using the indirect method are more tempted to opportunistically increase their earnings.

The second part of the study attempts to identify the association between EM and value relevance of accounting numbers by using the price model. Previous research has shown that opportunistic behaviour of management alter the reporting value of accounting information (Callao, Cimini and Jarne, 2016). Our results contradict it as investors in the Romanian market find information reported by entities which experience high level of discretionary accruals to be more informative.

Our paper differs from others through a series of features: i) it addresses the EM issue in terms of CFO reporting method. Therefore, the study identifies a different setting in which EM may occur; ii) it extends literature about emerging countries, the case of Romania, analysing not only the existence of EM strategies, but also their impact on the usefulness and informative potential of the accounting figures; iii) it does not use the individual year's estimation for the selected EM model as it is based on a small number of observations provided by the Romanian market which could generate contradictory results. To avoid this, it estimates the empirical model by pooling the observations across all 10 years of study.

The rest of the paper is organized as follows: section 1 deals with the literature review and the development of research hypotheses, section 2 presents the research methodology, section 3 describes the data used and the corresponding statistics, while section 4 discusses the results. Section 5 concludes the paper.

1. Literature review and development of hypotheses

The literature review reveals that there many definitions of EM. Healy and Wahlen (1999) assert that EM occurs when managers use judgement in financial reporting and structuring transactions in order to alter financial statements to either mislead investors about the economic performance of the company or to influence the contractual results that are conditional on achieving a certain level of accounting numbers. Roychowdhury (2006) states that EM is the deviation from the usual practices generated by the management's motivation to

give investors the belief that the financial objectives were met in the normal course of business.

All definitions underlie the deliberate change in the company's performance made to achieve predefined profit targets. Generally, EM has a *negative* connotation because only certain users of accounting information benefit from it. Moreover, managers shape financial reporting in ways that allow them to hide the real performance of the company by creating artificial records or by overusing estimates. EM practices are deemed *positive* if and only if they are used by managers to improve the welfare of all stakeholders, increase investor confidence and allow for reliable financial numbers, without breaking any legal requirement.

According to Gunny (2010), EM can be classified into two categories: *accruals management* and *real activities manipulation*. First category involves the selection of certain accounting methods when disclosing accruals in the financial statements, in a deliberate attempt to achieve the desired level of earnings, while real activities manipulation means modifying the timing and structuring of normal activities of the company in an effort to accomplish certain objectives.

There are two types of accrual-based EM: *opportunistic* and *informative* (Obigbemi et al., 2016). Opportunistic EM is driven by management compensation (e.g. increasing incentives such as bonus and commission), therefore it is used by managers to achieve personal objectives rather than organizational ones. The informative type, considered to bring gains to shareholders, is aimed at increasing the value of the company by revealing to investors managers' expectations about the firm's expected cash flows. In a study conducted by Libby and Seybert (2009), it was concluded that stock price and concerns about general reputation are the main drivers behind management' attempts to manipulate earnings. They further stated that other motives such as debt covenants, bonus compensation, and taxes play secondary roles in EM practices.

The central role of accounting accruals is to mitigate cash flow fluctuations so that net income reflects as accurately as possible the financial position of the company at year end (Dechow, 1994). Roychowdhury (2006) states that handling accruals is a convenient form of EM because it does not involve cash flows. Ronen and Yaari (2008) define accruals as non-monetary items that can be manipulated by management such as depreciation, inventories, receivables and payables.

EM literature considers that total accruals include normal accruals (non-discretionary ones) and accruals generated by EM practices (discretionary accruals). *Non-discretionary accruals* are expected accruals according to the firm's conditions, while *discretionary accruals* include distortions induced by the application of accounting rules or EM (Dechow, Meyers and Shakespeare, 2010). Kothari, Leone and Wasley (2005) state that *discretionary accruals are synonymous with EM*.

For the determination of total accruals (TA), the literature mentions two approaches: the cash flow method (where TA are the difference between the operating cash flow (CFO) and the operating income after tax) and the balance sheet method (TA results from variations in some balance sheet structures). The cash flow method has become more known since it has been shown that the other one can lead to measurement errors (Hribar and Collins, 2002). Thus, researchers can erroneously conclude that there is EM in the case of entities affected by mergers, acquisitions or discontinued operations, which have an impact on current assets and liabilities, but not on earnings.

While total accruals are calculated from financial statements, discretionary and non-discretionary accruals are not directly observable. Yoon and Miller (2002, p.399) state that a model is needed to separate the discretionary component from total accruals. There are several models developed, the Jones model and its modified versions being the milestone in the accruals approach.

Literature examines accrual EM in the context of some specific events or incentives, such as (Mostafa, 2017): maximizing management compensation, gaining import relief, avoiding anti-trust or debt covenants violations, etc. In Romania, EM literature is quite scarce. Matiş et al. (2010) argue that Jones model is the most significant EM model for the Romanian economic environment in terms of applicability. Brad et al. (2014) report a decrease in EM strategies in the year of the IFRS adoption by listed Romanian companies. Nechita (2015) does not find enough evidence to argue for EM through income smoothing strategies in the post IFRS adoption period. Nevertheless, the high negative connection between cash flows and items that do not impact cash, when IFRS are applied, might be a proof of EM as these items tend to decrease income volatility.

Due to the lack of information regarding the aforementioned specific events and incentives for the Romanian market, this paper analyses the level and impact of EM in the context of the two reporting methods used for operating cash flows. The direct method works with information about cash receipts and payments corresponding to transactions occurring in the firm during a financial year. The indirect method reconciles from net income to net cash provided by operating activities. It involves some adjustments made to the accrual net income, referring to (Revsine, Collins and Johnson, 2008, p. 957): items included in net income that did not affect cash in the current period and items excluded from the accrual-basis income that did affect operating cash flows in the current period.

There is quite a strong debate about which reporting CFO method provides more useful information. On the one side, the direct cash flow reporting format leads to better prediction of future firm performance and has a stronger association with share prices (Bradbury, 2011). It also lowers information asymmetry and leads to higher quality reporting. Harrison and Horngren (2008, p. 280) consider that direct method provides clearer information about the sources and uses of cash. According to Mironiuc (2006), the direct method is favoured by investors because: it is the starting point in predicting future cash-flows used to determine the firm's value; it provides intelligible and objective information, presenting the facts without leaving room for subjective interpretations; it eliminates the effect of using different accounting treatments for the same transactions and events; it does not take into account operating revenues and expenses that are not cash-related.

On the other side, it is argued that the purpose of the cash flow statement is to explain the difference between profits and operating cash flows, justifying the indirect approach (Bond, Bugeja and Czernkowski, 2012). Moreover, firms may prefer the indirect method if the use of the direct method discloses commercially sensitive information. According to Mironiuc (2006), it is easier to apply and preferred by managers who do not want to present to the external users the real picture of their business in terms of liquidity and solvability.

Even though the rules recommend the direct method, they allow for the indirect one to be used. Researchers have shown that when firms are provided with a choice between reporting formats for OCF, the vast majority of them typically use the indirect one (Clinch, Sidhu and Sin 2002). Romanian companies make no exception, as the majority use the indirect method.

In the context of these two reporting methods, the paper aims at testing the following research hypothesis.

H_1: There are EM practices at companies that determine their operational performance by using the indirect CFO reporting method.

Value relevance researchers believe that accounting information plays a key role in reflecting earnings or the economic value. Therefore, two major models exist: the price model and return model (Barth, Beaver and Landsman, 2001). According to the economic motivation of the research, these studies analyse: i) if a certain piece of accounting information is significantly related to equity market value – i.e. the price model or ii) how much of the change in equity market price is explained by accounting information – i.e. the return model.

As far as the impact of EM on value relevance is concerned, there are two flows of opinions in the literature (Jiraporn et al., 2008). One states the reduction of earnings quality in presence of opportunistic earnings handling (Lev, 1989). The other one argues for the opposite effect, if managers use earnings manipulation strategies to reflect more accurately the company performance.

Callao, Cimini and Jarne (2016) report a low value relevance of earnings of entities engaging in EM strategies. Nonetheless, the study shows an increase in usefulness of book value for entities using EM. Mostafa (2017) finds that earnings of firms involved in opportunistic EM techniques are less value relevant to investors who deem them less informative than the non-managed earnings. In Romania, Filip and Raffournier (2010) document a low quality of earnings reported by listed companies while Mironiuc and Huian (2016) show that other comprehensive income is value relevant.

In this context, considering discretionary accruals as a proxy that captures the existence of EM strategies and stock market price as a function of earnings and book value, we develop the following hypothesis:

H_2: Value relevance of accounting information is reduced in the presence of EM techniques at entities using the indirect CFO reporting method.

2. Research methodology

2.1. Operationalization of discretionary accruals

To evaluate EM, there are several models of discretionary accruals determination. Using the Jones (1991) model, Kothari, Leone and Wasley (2005) introduce an additional control variable that deals with the effect of performance on discretionary accruals: lagged rate of return on asset (ROA) (see equation 1).

$$TA_t/A_{t-1} = \alpha_0 + \alpha_1 (1/A_{t-1}) + \alpha_2 (\Delta REV/A_{t-1}) + \alpha_3 (PPE_t/A_{t-1}) + \alpha_4 ROA_{t-1} + \varepsilon \quad (1)$$

Where, TA_t – total accruals in year t; A_{t-1} – lagged total assets; ΔREV – change in revenues; PPE_t- property, plant and equipment; ROA_{t-1} – lagged return on assets, α_0- intercept, α_1, α_2, α_3 – regression coefficients; ε- residual.

This model is based on the understanding that working capital accruals are related to changes in revenues and depreciation is linked to assets. The coefficient of PPE is expected to be negative because these assets generate depreciation expense. The coefficient of the change in revenues should be positive (Ronen and Yaari, 2008). Return on assets (ROA) is one of the company's main profitability ratios, measuring the efficiency of asset utilization. The error term (ε) represents the discretionary accruals (DA). The higher the DA are, the more evidence of EM exists.

2.2. Value relevance of earnings and book value

The model used to test the value relevance of accounting information in the presence of EM strategies is the one applied by Callao, Cimini and Jarne (2016). It is based on the Ohlson (1995) price model that is modified by adding to the original variables a proxy for EM, DA, which shows the level of discretionary accruals. Moreover, the net income and book value are interacted with a dummy variable for the use of EM (see equation 2).

$$P_{it} = \alpha_0 + \alpha_1 EPS_{it} + \alpha_2 dDA_{it} \times EPS_{it} + \alpha_3 BV_{it} + \alpha_4 dDA \times BV_{it} + a_5 DA_{it} + \varepsilon_{it} \quad (2)$$

Where, P_{it} - stock market price of the firm *i*, 3 months after annual financial statements are released for year *t*; EPS - earnings per share; dDA - a dummy variable that takes the value 1 if the company has high levels of discretionary accruals, i.e. use the indirect CFO method; BV - book value per share; DA - discretionary accruals (residuals of the Kothari, Leone and Wasley, 2005, model).

H_2 is validated if the sum of the regression coefficients ($\alpha_1 + \alpha_2$) is lower and statistically different than the regression coefficient for earnings (α_1) reported by companies using the direct CFO method. According to Callao, Cimini and Jarne (2016), if value relevance of earnings decreases, investors put more weight on book value, due to the stock market value being a convex function of earnings and book value. So H_2 is fully validated if the sum of the regression coefficients ($\alpha_3 + \alpha_4$) is higher than the regression coefficient for book value (α_3) reported by companies using the direct CFO method.

3. Data, sample and descriptive statistics

Sample consists of all Romanian listed companies on the Bucharest Stock Exchange for a 10 year span: 2006-2015. Financial firms are excluded due to their different operations and regulations. Accounting data used to compute all study variables are extracted from the annual financial statements compiled by the Thomson Reuters Eikon database. The initial sample included 980 observations coming from 67 companies. After the eliminations of observations with incomplete data, 556 firm-year observations (from 65 companies) remained.

Based on the statement of cash flows, the CFO reporting method used is identified, which results in a number of 255 observations using the direct method (46% of all observations), whereas 301 apply the indirect method (54%). This confirms the findings of Istrate (2015) that Romanian companies use the direct method much more than entities from other European countries. In some Western European countries, the indirect method is used by approximately 80-90% of entities (Kvaal and Nobes, 2010). Therefore, the sample is divided into two sub-samples, one called DIR for the observations reported according to the direct method, the other one called INDIR.

To analyse the two sub-samples in terms of performance, we calculate three important indicators. As a measure of operational performance (Yoon and Miller, 2002), cash flows from operations over lagged total assets are used. Earnings per share (EPS) and return on assets (ROA) as indicators of stock market performance and profitability are used to show performance based on accrual earnings. **Table no. 1** provides descriptive statistics. It is noticeable that in the case of the INDIR sample, both the cash-based and accrual-based performance are, on average, higher than for the DIR sample.

Table no. 1. Descriptive statistics

Variables	Mean	Median	Std. Deviation	Minimum	Maximum
Direct CFO Method			*N=255*		
ROA	0.0320	0.0349	0.1399	-1.102	0.8268
EPS	0.1158	0.0142	2.6392	-13.5204	31.7545
Cash flows from operations	-0.0235	0.0006	0.0709	-0.3791	0.0399
Indirect CFO Method			*N=301*		
ROA	0.0793	0.0678	0.0903	-0.6468	0.538
EPS	1.4691	0.0479	5.5357	-10.5065	42.6807
Cash flows from operations	0.1228	0.0982	0.0960	0.0400	0.9304
Entire sample			*N=556*		
ROA	0.0576	0.0550	0.1180	-1.1020	0.8268
EPS	0.8484	0.0297	4.4953	-13.5204	42.6807
Cash flows from operations	0.0557	0.0451	0.1123	-0.3791	0.9304

ROA is return on assets; EPS is earnings per share; Cash flows from operations is deflated by total assets; N is the number of firm-year observations for the two sub-samples and the entire sample

Source: Authors' projections

This makes us attempt to determine whether EM techniques could be one of the factors that might explain the superior level of performance for companies using the indirect method. In other words, we test whether the firms in the INDIR sample are more engaged in EM procedures, by using accounting options that increase their earnings, than those in the DIR sample.

4. Empirical results

4.1. Earnings Management

Table no. 2 shows total accruals and discretionary accruals for both sub-samples and the whole sample. Discretionary accruals are the residuals resulting of model described in equation (1).

Table no. 2. Results of EM testing

Variables	Mean	Median	Std. Deviation	Minimum	Maximum
Direct CFO Method				*N=255*	
Total accruals (TA)	0.0432	0.0400	0.1379	-0.7704	0.4785
Discretionary accruals (DA)	-0.00002	-0.00075	0.12602	-0.74009	0.44598
Indirect CFO Method				*N=301*	
Total accruals (TA)	-0.0405	-0.0276	0.1159	-0.8751	0.7499
Discretionary accruals (DA)	0.00015	0.01427	0.10961	-0.62335	0.8618
Entire sample				*N=556*	
Total accruals (TA)	-0.0021	-0.0045	0.1331	-0.8751	0.7499
Discretionary accruals (DA)	0.00007	0.0101	0.1173	-0.7400	0.8618

Total accruals scaled by lagged total assets are computed as operating earnings minus CFO; discretionary accruals scaled by lagged total assets are the residuals of the Kothari, Leone and Wasley (2005) model; N is the number of firm-year observations for the two sub-samples and the entire sample

Source: Authors' projections

Observations prepared under the direct method have a positive mean accrual of 0.0432 whereas those using the indirect method have a negative mean total accruals. But the variable that shows the level of EM is discretionary accruals (DA). The mean values of DA follow a different pattern than total accruals. **Table no. 2** shows that observations from the INDIR sample produce the highest level of discretionary accruals. This means the positive mean DA value indicates evidence of attempts to opportunistically increase earnings. The opposite situation is noticeable at companies using the direct CFO method that have a mean negative value for DA.

H_1 is validated. Results confirm that companies applying the indirect CFO reporting method are more tempted to use earning-increasing techniques that might explain their overall better performance in terms of cash flows and accrual accounting income.

4.2. Value relevance testing

Table no. 3 shows some surprising results. Value relevance of earnings reported by companies from the DIR sample is lower ($\alpha_1 = 2.062$) than that of companies using the indirect CFO method (sum of $\alpha_1 + \alpha_2 = 3.305$). This means, according to the price model, that investors find earnings of entities that manipulate them more useful for their decision-making. This contradicts findings of Mostafa (2017) and Callao, Cimini and Jarne (2016). Nevertheless, it confirms results of Hunton, Libby and Mazza (2006) who argue that in less transparent settings (which is the case of the indirect CFO method) EM strategies are not obvious to investors. Moreover, these strategies improve stock market prices and do not alter management's reputation in terms of financial reporting.

Table no. 3. Results for value relevance testing

Variables	Coefficient	T-statistic	P-value
Constant	1.235	1.741	0.082
EPS_{it}	2.062	5.068	0.000
$dDA_{it}xEPS_{it}$	1.243	2.136	0.033
BV_{it}	0.425	6.554	0.000
$dDA_{it}xBV_{it}$	-0.107	-1.355	0.176
DA_{it}	-9.999	-1.688	0.092
$R^2 = 0.727$	F-statistic = 292.405 (p-value 0.000)		

P_{it} is stock market price of the firm *i*, measured 3 months after annual financial statements are released for year *t*; EPS is earnings per share; dDA is a dummy variable controlling for the levels of discretionary accruals; BV is book value per share; DA is discretionary accruals calculated with the Kothari, Leone and Wasley (2005) model

Source: Authors' projections

Due to the convexity of the function describing the relationship between market price, earnings and book value (Callao, Cimini and Jarne, 2016), results of the model show a transfer of explanatory power from book value to earnings. That is, when earnings have a high value relevance, investors tend to place less weight on book value. This is shown by the fact that, for the INDIR sample, sum of $\alpha_3 + \alpha_4 = 0.318$ is lower than the coefficient displayed by the DIR sample ($\alpha_3 = 0.425$). This means that EM practices are associated with less useful information regarding book value. It is worth mentioning that DA is statistically significant only at 10% which shows investors rather ignore the EM attempts.

As the overall usefulness of accounting information in the determination of stock prices increases in presence of EM strategies, H_2 is not validated.

Conclusions

This paper analyses the association between EM and the value relevance of accounting information for a sample of 556 observations from 65 companies listed on the Bucharest Stock Exchange during 2006-2015. The authors firstly test whether firms using the indirect method in determining operational cash flows (which also report higher performance) are more prone to earnings growth strategies than companies using the

direct method (that have lower performance). After confirming that companies applying the indirect method are tempted to adopt EM strategies (which generate higher performance), the authors assess whether the association between stock market prices and accounting figures is changed by the opportunistic behaviour of these firms.

Findings show that discretionary accruals are positive and significantly higher for firms using the indirect CFO method than for firms that apply the direct method. These results indicate that companies with high operational performance generated by the indirect method use more EM practices to expedite their earnings and mislead investors. However, results show that regression coefficients are higher for the earnings of entities using the indirect CFO reporting method. This suggests that because of the lower transparency of the information provided by the indirect method, investors do not observe manipulative practices and do not penalize managers who show an opportunistic behavior to increase earnings. In other words, earnings of companies that have achieved both operational and market performance or high profitability, due to the opportunistic EM strategies they are involved in, have a higher value relevance than firms providing more transparent CFO information (by using the direct method). Managers of these companies escape with unaltered reputation in terms of financial reporting integrity. Moreover, the discretionary accruals information that captures the level of EM is not, according to the results, a predictor that investors take into account when assessing the value of listed companies.

These findings are relevant to investors who should pay attention to the CFO reporting method that might explain to some extent the reported performance level. They should penalize managers and firms that use the indirect method as an EM technique.

Limitations of the paper refer to the small number of observations used, which is a common problem among studies investigating emergent economies such as Romania and the lack of analysis of specific incentives or events that could shed some light on the reasons behind the opportunistic EM behaviour.

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Audit opinion impact in the investors' perception – empirical evidence on Bucharest Stock Exchange

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Abstract

The integrity and credibility of financial statements are sensitive aspects that significantly influence the investors' confidence in the capital market efficiency. Recent research in the area of (re)establishing effective communication between the auditor and the investors have brought into the attention of audit practitioners the provisions of International Standard on Auditing (ISA) 701 "Communicating Key Audit Matters in the Independent Auditor's Report." This approach proves that investors demand more information that accompanies the audit opinion, when forming a decision to buy, hold or sell equity instruments. Our research is focused on identifying, isolating and analyzing the significant changes in financial asset trading prices, as a consequence of publishing the auditor report. Thus, the overall objective is to assess the impact of the modified opinion, expressed by the auditor in accordance with ISA 705 "Modifications to the Opinion in the Independent Auditor's Report", upon the prices of financial assets. Subsequently, the specific objectives aim to identify quantifiable adjustments in the financial position of the entities and to analyze its impact on trading prices. Research is focused on a sample that consists of 32 listed entities, of which 25 entities are included in the BET-XT index and seven entities are traded on the alternative trading system AeRO, selected in relation to the liquidity degree measured by the BVB market operator. Our observations upon changes in financial asset prices were focused on 2009-2017 period, while the analized audit reports addressed the reporting periods from 2008 to 2016, included.

Keywords: *Audit opinion, misstatement, audit adjustments, financial statements' reliability, investors' perception*

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Research method

The general objective of our research is to identify the significant variations associated with the movement of financial instruments' trading price, as a result of disseminating the audit report. A first research engagement was to observe the variation of the closing price in comparison with the 10 day average price, considering five days before and five days after the notice date of Ordinary General Meeting of Shareholders (AGOA) called for the approval of annual financial statements. The sample consisted of 32 listed entities, from which 25 entities from the BET-XT index, traded on the regulated market and seven entities traded on the AeRO alternative trading system, selected according to liquidity and stock market capitalization criteria. In order to form an opinion regarding the extent to which a significant price movement could be explained by the general market context, we determined the correlation coefficients with the change in the BET stock index. For the selected sample, we reviewed the audit reports published during 2009-2017, related to the reporting periods ended at December 31st 2008-2016.

Our interest aimed to identify modified audit reports (expressing an opinion other than unqualified) and to draw conclusions about the rational or irrational character associated with the investor's perception upon trading prices, as a result of releasing the audit reports. We consider the assumption of an irrational approach the circumstances when: (i) modified audit reports were issued and the price change at the issue date of these reports was positive and higher than 1% related to the 10 trading day average price, or (ii) unmodified audit reports were issued and the price change at the issue date of these reports was negative and higher than 1% related to the 10 trading day average price. Exceptionally, we admit the possibility that a positive price movement might intervene including in the case of disseminating a modified opinion, in the absence of a quantifiable adjustment which may signal to investors a decrease in unitary net assets.

Another important research direction was focused towards the analysis of the modified audit reports, in order to identify relevant aspects that determined the change of the financial auditor's opinion, the impact in the entity's financial position and performance, as well as the type of audit adjustment. For the quantifiable audit adjustments, we reviewed the financial statements that were accompanied by the independent auditor's report in order to determine the expected adjustment in unitary net assets (equity per share) in correlation with the actual change in the trading price. Our attention has been drawn to the circumstances in which, although a reduction of net unitary assets would have been reasonably required, as a result of the audit adjustments pronounced by the independent financial auditor, in fact, trading prices recorded either a significant increase, or a significantly disproportionate correction. These circumstances could confirm the irrational nature of investors' perception relative to aspects communicated in the audit report.

1. Financial statements' reliability in investors' perception

The integrity of the capital markets is conditioned by the free access of investors to financial information that meets the qualitative, fundamental and amplifying requirements, as outlined in the general conceptual framework of financial reporting issued by the IASB in 2010. Good functioning of the capital markets is ensured only when accurate and reliable information is disseminated between stakeholders who have invested in the performance and financial perspectives of a listed entity. This information is designed to outline the economic profile of the business of such an entity and provides a basis for assessing progress in achieving long-term objectives. If the market does not receive high-accuracy information, the confidence in the system is seriously affected, and investors make poor quality decisions, registering losses (Rittenberg and Schwieger, 2005).

Disseminating reliable financial statements supports the user community in allocating resources in an efficient manner (Whittington and Pany, 2008). As regards a stock market, in order for the targeted users to obtain reliable information, it is necessary for the financial statements to undergo an independent audit. In this way, stakeholders will make decisions based on the audited information, assuming that they are, in a reasonable manner, complete, fair and unbiased (Arens, Elder and Beasley, 2008). In other words, the auditor's review of financial information adds credibility and reduces information risk, given the presumed conflict of interest that might exist between management and capital owners, from the perspective of information asymmetry

theory. In this context, one can mention the case of former Enron's chief financial officer, who pleaded guilty to the charge of manipulating results in order to determine a rise in the price of the company's shares, followed by the receipt of consistent financial incentives and the sale of shares at an artificially increased price (Messier, Glover and Prawitt, 2008, p. 6-7).

The credibility of financial statements is the central issue for regulators, in their efforts to protect the public interest. This requirement strengthens the need for audit services and provides an active role for auditors in the context of capital markets. From this perspective, audit missions respond to informational valences, by improving the corporate reporting process and by reducing the possibilities for information to be presented erroneously or in a biased manner, thus contributing to the formation of investors' expectations (Soltani, 2007, p. 45, 51).

2. The influence of misstatements related to financial statements upon price volatility

Enron, HealthSouth, Kmart, Parmalat, Tyco, WorldCom, Waste Management, Sunbeam, Adelphia Communications or Xerox represent just a few examples of companies that were subject to profound debates regarding the dissemination of financial information departed from the regulatory requirements, with undesirable effects in the business community. As a result of the accounting fraud unrevealed within these corporations, investor confidence has been seriously shaken, which has led to the collapse of trading prices. According to sources in the relevant literature (Louwers *et al.*, 2007, p. 2), financial experts have estimated investors' losses to USD 7 trillion, over a period of three years from peak prices recorded in September 2000. For example, Xerox Company has been accused of a variety of accounting manipulation techniques, applied between 1997 and 2000, in order to meet investors' expectations and to disguise the true dimensions of operational performance. According to allegations issued by the Securities Exchange Commission, the company has over-estimated revenues of more than USD 3 billion and pre-tax profits of USD 1.5 billion. The share price, which was above USD 60 per share before the announcement of accounting issues, fell to less than USD 5 per share after controversial accounting practices were revealed. Much more famous in American corporate history was Enron case. On November 8, 2001, the company announced an overestimation of the earnings declared over the last four years by USD 586 million, as well as the fact that it owed an estimated USD 3 billion due to past unreported liabilities. At the time of bankruptcy registration (December 2, 2001), the stock price fell to USD 0.40 per share, from maximum values that exceeded USD 100 per share (Beasley *et al.*, 2009, p. 79, 111, 116). Another case that has been remarked by the magnitude that has hit investor confidence in the capital market was WorldCom. In June 2002, this company announced a rectification of its financial results caused by the capitalization over the most recent two reporting periods of USD 3.8 billion in expenses, although the amount would have impacted upon the accounting result. Thus, many investors made decisions based on information that did not accurately reflect the company's profitability. When the information was corrected, the trading price collapsed and investors lost billions of US dollars (Boynton and Johnson, 2006, p. 3, 16). In fact, at the time, the WorldCom scandal was perceived as "the largest accounting fraud in history, with an overstatement of revenue estimated at USD 11 billion, an overvalued balance sheet of over USD 75 billion, and shareholders' losses estimated at USD 200 billion USD" (Opinion and Order, SEC vs. WorldCom, Inc., United States District Court, Southern District of New York, July 7, 2003 (02 Civ. 49-63), cited by Ricchiute, 2006, p. 41).

Most frequently, the cause of distortions that appear in the financial statements relates to vulnerabilities in internal control over financial reporting. Some studies, centred on the assessment of the costs and benefits associated with internal control, under the Sarbanes-Oxley Act, Section 404, reporting requirements have highlighted the fact that a strong internal control may result in an increase in trading prices. Thus, the Lord & Benoit report (2006) (cited by Arens, Elder and Beasley, p.8) highlighted a 27.7% average increase in trading price between March 31, 2004 and March 31, 2006 for companies that did not report significant vulnerabilities in internal control over 2004 or 2005. In contrast, the share price declined on average by 5.7% for companies reporting vulnerabilities in internal control both in 2004 and 2005. It was also found that entities were "rewarded" for improvements in internal control. Thus, the average price increase was 25.7% for the 264

companies that reported a material vulnerability in 2004, but which was eliminated in 2005 (Lord & Benoit report, 2006). Other researchers (Kothari, Shu and Wysocki, 2009, p. 273) have examined the extent to which management is delaying publication of negative news, as opposed to the publication of positive news. In their view, if management accumulates and delays the publication of negative news, within a materiality threshold, but quickly reveals positive news, even though leakage of private channel information, the magnitude of the negative change in the share price is expected to be higher than the one associated with a positive reaction if good news is published. Evidence of movements in trading prices suggested that, on average, management is delaying the dissemination of bad news to investors.

These insights into the literature supports the hypothesis that underlies our research, namely that the volatility of trading prices, as an expression of investors' perception upon financial statements, may be influenced by the auditor's opinion, particularly in the circumstances in which it is a modified one. The hypothesis is issued in the context of some results obtained from previous research conducted by the authors (Dănescu and Spătăcean, 2017), according to which the usage of different asset valuation basis may cause adjustments of financial performance, "with impact upon investors' perception and implicitly upon trading prices."

3. Empirical results

Investors' perception upon the financial assets' trading prices is influenced by a multitude of factors, both financial and psychological. One cannot identify exact delimitation between the two categories of factors; therefore our observations regarding the volatility of trading prices are subject to limitation in matter of isolating the impact associated with the dissemination of audit reports. We based our research on the assumption that investors' perception related to audit opinion may be faded by other factors with a more profound impact on trading prices, generally measured by the evolution of the stock market index. This may be the case, for example, when a high degree of correlation is established between the variation in the trading price of an issuer and the change in the stock index. In this approach, we have determined the values of the correlation coefficient between the variation of trading prices observed at the notice date of Ordinary General Meeting of Shareholders (AGOA) called for the approval of annual financial statements[1] and the variation of BET index, during the period 2009-2017. In order to capture most of the effects on trading prices, the variation on AGOA notice date was determined in relation to the average closing prices over a period of 10 days, respectively 5 days before and 5 days after the publication of the current report regarding AGOA convocation. From the total of 32 listed entities selected in the sample, we were unable to determine the value of the correlation coefficient in case of 10 entities, either due to lack of relevance associated with a short trading period starting from the listing date (7 issuers) or due to extremely low liquidity on the AeRO market (3 issuers). The synthesis of the empirical results is presented in **Table no. 1**.

Based on the empirical data obtained, we concluded that for six issuers, the correlation coefficient values (less than -0.5) highlighted a medium-strong and indirect dependence between the change in trading price and the stock index variation. From the perspective of the defined research objectives, in such circumstances, we expect that the overall market evolution, measured by the stock index, does not affect the price movement. In other words, for these issuers there is a high probability that the price change to better capture investors' perception upon financial statements, including the audit report, if modified. This segment of issuers holds a weight of 27%. On the opposite side, we observed values in case of two issuers (TBM and SIF3) for which the correlation coefficient values were positioned above 0.40. For a number of three issuers, the correlation coefficient values placed in the range (-0.35; 0) have highlighted

[1] According to article 117[2] from the Company Law no. 31/1990, republished, with subsequent modifications and completions, the annual financial statements [...] are made available to shareholders [...] at the GSM notice date. Provided that the approval of the annual financial statements is based on the reports presented by the Board of Directors, respectively the Directorate and the Supervision Board, including the financial auditor, we presume that the audit reports are published along with the annual financial statements, at the GSM notice date. Therefore, the GSM notice day represents the first time when investors have acces to the type of audit opinion expressed in the audit report that accompanies the annual financial statements published by an issuer.

a low and indirect dependence, which indicates that investors' perceptions may be affected by the dissemination of financial statements, but in a smaller measure than in the case of a strong and indirect dependence. For most issuers in the sample (11 entities, representing 50%), the correlation coefficient values were positive but less than 0.40 without supporting an appreciation on the manner in which the disclosure of the financial statements could influence investors' perceptions upon the trading price.

Table no. 1: Values of correlation coefficient between price movement and stock index change

Industry	Issuer	Correlation coefficient
Asset management	Fondul Proprietatea	0.19
	SIF Banat Crişana	**-0.65**
	SIF Moldova	-0.32
	SIF Transilvania	**0.71**
	SIF Muntenia	0.22
	SIF Oltenia	-0.22
Financial market management	Bursa de Valori Bucureşti	**-0.54**
Banking	Banca Transilvania	-0.21
	BRD - Groupe Societe Generale	0.28
Construction	Impact Developer Contractor	**-0.72**
Energetic	OMV Petrom	0.34
	SNTGN Transgaz	**-0.54**
	CNTEE Transelectrica	0.21
	Conpet	0.02
	Foraj Sonde Videle	**-0.51**
Manufacturing industry	Teraplast	0.39
	Compa	**-0.56**
	Vrancart	0.18
	Iproeb Bistriţa	0.30
	IAR Brasov	0.05
	Turbomecanica	**0.49**
	Electroargeş	0.30

Source: Authors' projection

Another relevant research direction aimed to identify the circumstances in which investors' perception upon the credibility of financial statements is affected by other influences than those that imposed a modification in the audit opinion and which would have required an adjustment in the unitary net assets. These circumstances were highlighted by a positive and over-unitary (> 1%) movement of the trading price in comparison with the ten-day average, under the circumstances of a modified audit report being published on the date when the variation was observed. The empirical results are summarized in **Table no. 2**.

Based on the conducted investigations, consisting of 230 observations upon price movement at the date of dissemination the current report regarding AGOA notice, over the period 2009-2017, we identified a total of 74 circumstances (32%) in which the price change was positive and higher than 1%, respectively 52 circumstances (23%) in which the price change was negative and more than 1%. Related to the daily stock market index evolution over the period 2009-2017, we determined that a 1% change in the trading price may be a material threshold in assessing investors' perception upon the dissemination of the financial statements and the financial independent auditor's report.

Table no. 2: Price movement correlated with audit opinion type			
Positive and over-unitary price movement (%)	**74**	**100%**	**Perception**
Circumstances in which an unqualified audit opinion was issued	51	69%	Rational
Circumstances in which a qualified audit opinion was issued	18	24%	Irrational
Circumstances in which a disclaimer of opinion was pronounced	1	1%	Irrational
Circumstances in which the audit report was not available	4	5%	Unquantifiable
Negative and over-unitary price movement (%)	**52**	**100%**	**Perception**
Circumstances in which an unqualified audit opinion was issued	38	73%	Irrational
Circumstances in which a qualified audit opinion was issued	9	17%	Rational
Circumstances in which a disclaimer of opinion was pronounced	0	0%	Rational
Circumstances in which the audit report was not available	5	10%	Unquantifiable
Overall assessment	**126**	**100%**	**Perception**
Number of investigations	60	48%	Rational
Number of investigations	57	45%	Irrational
Number of investigations	9	7%	Unquantifiable

Source: Authors' projection

Over the analyzed period, we examined a total of 217 audit reports published by the issuers selected in the sample. Among these audit reports, 176 reports (81%) were unmodified audit reports (unqualified opinion), while 41 reports (19%) were modified audit reports. Regarding the modified audit reports, we concluded that a single report expressed a "disclaimer of opinion", the rest of the reports containing qualified opinion. As a result of these findings, we are entitled to appreciate that the financial statements of the issuers selected in the sample reflect a high level of compliance with the requirements of the financial reporting framework, mainly IFRS. However, for the purposes of our research, we have shown interest in modified audit reports, from the perspective of the impact upon investors' perception, measured by the change in the trading price. Corroborating the nature of the price change (positive or negative) with the type of audit opinion, we determined that investors' perception related solely to the type of audit opinion, was irrational: (i) in 19 out of a total 74 cases, meaning that although the audit opinion was qualified, the price movement was positive and higher than 1%; (ii) in 38 out of a total 52 cases, in the sense that although the audit opinion was clean, the price movement was negative and more than 1%. For the purpose of our research, the second type of circumstances is irrelevant, as investors' perception could have been influenced by other factors associated with financial reporting, such as the release of financial statements reflecting a deterioration in financial performance and cash flows or the disclosure of disappointing perspectives for investors in terms of the issuer's intention and ability to distribute dividends. In summary, it can be concluded that, based exclusively on the type of audit opinion, the investors' perception upon the credibility of the financial statements was rational in 48% and irrational in 45% of the investigated circumstances. For a number of nine investigations, the audit report was not available, which did not allow the assessment of investors' perceptions.

After drawing some conclusions regarding the investors' perception about the credibility of financial statements, the analysis targeted the identification of circumstances that led to a modified audit opinion, as well as assessing the impact upon the financial position and performance, by investigating the audit adjustments expressed in the modified audit reports. From the sample subject to our tests, we identified a number of 11 issuers for which we reviewed the modified audit reports to determine possible quantifiable audit adjustments that could have influenced investors' perceptions upon trading prices, at the time when audit reports were released. The results of our investigations are presented in **Table no. 3**.

Table no. 3: Synthesis of anomalies in price change associated with dissemination of a modified audit report

Issuer symbol	Observation date	Price change (%)	BET change(%)	Basis for modified opinion	Impact in position and financial performance	Type of audit adjustment
EL	31.03.2015	1.46	0.13	Lack of sufficient and adequate audit evidence related to investments in other entities.	↑ Overstatement of financial investments, current period result, retained earnings and reserves.	Unquantifiable. The impact upon net assets cannot be measured.
TEL	27.03.2014	2.31	0.26	Incorrect classification of non-current liabilities as a result of non-fulfillment of some financial indicators.	↓ Understatement of current debts.	Quantifiable. No impact upon net assets.
	25.03.2013	1.23	0.16			
	22.03.2012	1.29	-0.75			
	26.03.2010	2.12	0.16			
	26.03.2009	2.42	3.58			
SNN	26.03.2015	1.27	0.18	Lack of sufficient and adequate audit evidence about the allocation of the tangible assets' carrying amount.	↑ Overstatement of fixed assets, current period result and retained earnings. ↓ Understatement of debt related to deferred income tax.	Unquantifiable. The impact upon net assets cannot be measured.
	27.03.2014	1.89	0.26			
FOJE	13.04.2017	9.19	0.49	Signs of impairment related to interests in other entities.	↑ Overstatement of financial investments and current period result.	Unquantifiable. The impact upon net assets cannot be measured.
SIF3	28.02.2014	5.49	0.96	Lack of sufficient and adequate audit evidence about the recoverable amount of certain financial assets.	↑ Overstatement of financial investments, global result and reserves. ↓ Understatement of debt related to deferred income tax.	Unquantifiable. The impact upon net assets cannot be measured.
TRP	29.03.2011	1.83	-1.02	Exceptions found in the process of external confirmation related to receivables.	↑ Overstatement of receivables and current period result.	Quantifiable. The unitary value of net assets should decrease by 0.94%.
VNC	21.03.2014	6.43	-0.83	Lack of sufficient and adequate audit evidence regarding inventory quantities. Misstatements in fair value measurements (revaluation model) of fixed assets.	↑ Overstatement of inventories and tangible assets, revaluation reserves, current period result and retained earnings.	Unquantifiable (inventory). Quantifiable (fixed assets). The unitary value of net assets should decrease by 4.42%.

Issuer symbol	Observation date	Price change (%)	BET change(%)	Basis for modified opinion	Impact in position and financial performance	Type of audit adjustment
TBM	25.03.2015	1.58	-0.03	Lack of sufficient and adequate audit evidence about the recoverable amount of inventories; Selective treatment in asset revaluation; Significant uncertainties about business continuity.	↑Overstatement of inventories and tangible assets, revaluation reserves, current period result and retained earnings.	Unquantifiable. The impact upon net assets cannot be measured.
	24.03.2014	2.11	0.44			
ELGS	20.03.2015	2.77	-0.66	Lack of adjusting certain equity items to inflation; Inconsistent application of consolidation methods.	↓Understatement of equity.	Unquantifiable. The impact upon net assets cannot be measured.
TRVM	29.03.2016	39.36	-0.60	Lack of sufficient and adequate audit evidence about the recoverable amount of inventories.	↑Overstatement of inventories and current period result.	Unquantifiable. The impact upon net assets cannot be measured.
IMP	20.03.2013	1.38	0.26	Lack of lawyer confirmations regarding litigation; Depreciated inventories of finished goods.	↑Overstatement of inventories and current period result. ↓Understatement of litigation provisions.	Unquantifiable. The impact upon net assets cannot be measured.
	19.03.2010	3.09	-0.45	Lack of sufficient and adequate audit evidence regarding debts to local budgets and commercial debts.	↓ Understatement of tax and commercial debts.	Unquantifiable. The impact upon net assets cannot be measured.
	27.03.2009	8.47	-3.55	Receivables not adjusted for impairment; Unrecognized commission expense owed for pre-sale commitments.	↑ Overstatement of trade receivables and current period result.	Quantifiable. The unitary value of net assets should decrease by 0.66%.

Source: Authors' projection

As shown in **Table no. 3**, in most cases, the modification of the audit opinion was imposed by the lack of sufficient and adequate audit evidence regarding the recognition and valuation of certain assets, such as interests, investments in other entities and other financial assets; tangible assets measured at fair value; inventories or receivables. In financial auditors' opinion, these assets could have been overstated, in the absence of appropriate impairment tests and the recognition of appropriate adjustments.

According to facts presented by auditors in the audit reports, the identified misstatements could have a significant impact upon the position and financial performance of issuers, in the sense of overstating assets, equity and the current period result. In this approach, investors should appeal for a measure of circumspection in assessing fair value associated with tradable financial instruments.

Other circumstances that imposed modifications of the audit opinion were: identification of exceptions in the external confirmation process of receivables; lack of

external confirmations from lawyers regarding litigation; significant uncertainties regarding going on concern assumptions or erroneous classification of long-term liabilities under the perspective of non-compliance with certain financial indicator requirements. Usually, these circumstances cannot be associated with quantifiable adjustments in unitary net asset value, in the absence of quantitative disclosures in the financial audit report.

As a result of our research conducted upon a number of 217 audit reports, we found a reduced number of circumstances in which investors could have been able to determine reductions in the unitary net asset value, based on quantifiable audit adjustments. To justify this statement, we affirm that from a total of 35 investigations conducted for the modified audit reports, quantifiable audit adjustments were identified in only 13 cases (37%). Moreover, in eight of these cases, where the audit adjustments were quantifiable, there was no real impact upon the issuer's equity, since the misstatements were associated with some erroneous classifications of current liabilities. These conclusions could explain, to a certain extent, the irrational perception of investors about the credibility of the financial statements, namely that according to which, although a modified opinion was issued, the trading price at the moment of releasing the audit report recorded positive variations, significantly higher than the stock index variation. We exemplify in this context, the case of Foraj Sonde Videle (13.04.2017) and SIF Transilvania (28.02.2014). Moreover, in case of issuers such as Vrancart (21.03.2014), Transcom Bucharest (29.03.2016) or Impact Developer Contractor (27.03.2009), the movement in trading price was positive and unusually high (over 6%), while the stock index recorded reductions.

As presented above, from a total number of 35 examinations regarding the modified audit reports, quantifiable audit adjustments were identified in only five cases (14%), meaning that an expected reduction in the unitary value of the net assets could have been determined in a reasonable manner. The quantitative presentations are conveyed by **Table no. 4**.

Table no. 4: Expected variation of unitary net asset value in correlation with audit adjustments

Issuer symbol	Financial Statement Date	Unadjusted equity (lei)	Audit adjustment (lei)	Accounting value / share		Expected variation (%)	Actual price change (%)
				Unadjusted (lei/share)	Adjusted (lei/share)		
IMP	31.12.2011	296,828,111	17,036,601	1.5001	1.4140	**-5.74**	**-1.05**
IMP	31.12.2008	333,576,000	2,191,860	0.1668	0.1657	**-0.66**	**8.47**
TRP	31.12.2010	152,076,691	1,422,000	0.5105	0.5058	**-0.94**	**1.83**
VNC	31.12.2013	108,525,916	4,800,000	0.1256	0.1201	**-4.42**	**6.43**
SIF1	31.12.2008	413,631,925	25,812,257	0.7536	0.7066	**-6.24**	**-0.69**

Source: Authors' projection

Our investigations were based on the assumption that a modified opinion expressed in the circumstances of an overstated financial position and performance, should determine, in a rational approach, the appropriate adjustment of unitary net assets. To capture these corrections, we determined the accounting value per share, as a ratio between the value of equity and the number of issued and tradable shares. These corrections, also referred to as expected variations, were confronted with the actual change in trading price related to the ten-day average. Analyzing the obtained results we can appreciate that investors were not influenced by the modified opinion expressed by the financial auditors, in their decision-making process. We exemplify the case of Vrancart issuer, which came forward with an increase in the trading price of 6.43% (21.03.2014), while the audit adjustment identified in the auditor's report would have required a decrease of 4.42% in unitary net assets. Also, for the issuer SIF Banat Crişana the expected change in the unitary value of net assets was accounted for (-) 6.24% while the price change was significantly much lower, respectively (-) 0.69%. In case of issuer Impact Developer Contractor we identified two situations in which the investors' reaction to the publication of the audit report was not the one to support the rational assumption. Thus, (i) on March 27, 2009 the trading

price was higher by 8.47% compared to the ten-day average, while the BET index variation registered (-) 3.55% and the expected change in the unitary value of net assets was (-) 0.66%; and (ii) on March 21, 2012 the expected variation in unitary value of net assets was (-) 5.74% while price movement versus ten-day average was significantly disproportionate, respectively (-) 1.05%.

Conclusions and perspectives

The primary objective that governed our research was to evaluate the consequences of publishing a modified audit opinion upon investors' perception regarding the credibility of financial statements, from the perspective of the impact measured by the changes in trading prices. Our research was carried out on a sample of 32 entities listed on the Bucharest Stock Exchange, for financial statements disseminated over the period 2009-2017. The auditor's opinions expressed by the financial auditors were analyzed in correlation with changes in the trading prices, at each date the audit reports were published. Our main concern was to identify anomalies in trading price movements, when the audit reports contained modified opinion and when possible adjustments in the unitary value of net assets could have been quantified. The summary of findings supported by our research is described below.

An isolation of the influence that publication of audit reports might have on trading prices is difficult to achieve. In this regard, it should be specified that a limitation of our studies is the non-use of questionnaires in relation with investors. The use of this investigative tool could add value in quantifying investors' perception about the credibility of financial statements, by analyzing audit reports. This direction is emerging as a future research perspective. Related to the type of audit opinion examined, we determined a high level of issuer compliance with the requirements of the financial reporting framework. This assertion is supported by the fact that only 19% of the audit reports examined have expressed a modified opinion. In the context of observing price movements, strictly depending on the type of audit opinion, we estimate that investors' perception upon the credibility of the financial statements was irrational in 45% of the investigated cases. This finding can be argued by a small number of situations (14%) in which the audit adjustments could have influenced investors' expectations regarding the change in unitary value of net assets. In this context, based on empirical evidence obtained from our research, we appreciate that investors considered, in a general approach, on a reduced scale the impact of modified opinion, in comparison with other matters, when they based their investment decisions. However, recent developments in matter of issuance an audit report for public interest entities could generate additional information value to investors, by describing key audit matters. This research hypothesis outlines another research perspective that we are considering for future research.

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Determinants of employees' psychological ownership on budgetary slack

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Abstract

The existence of budgetary slack permeates every level of private sector organisations. Employees (i.e., budget makers) usually request excessive budgetary resources in the budgeting process. Due to its dysfunctional nature, existing researchers had extensively examined the relationship between budgetary slack and employees' performance. This study adopted a survey questionnaire approach to examine the relationship between determinants of psychological ownership and employees' intention to create slack in budgeting. There were 475 budget makers from private sector organisations in the Klang Valley, Malaysia who participated in this study through a questionnaire survey. Preliminary data analysis was performed using normality, multi-collinearity, variance inflation index (VIF), common method variance, and reliability analysis. Multiple regression analysis was also applied to investigate the relationships of each dimension of employees' psychological ownership on budgetary slack. This paper is considered a pioneer empirical study that investigates the determinants of psychological ownership on budgetary slack among budget makers from the psychological perspective in the context of private sector organisations in Malaysia, where slack activities in budgeting existed.

Keywords: *Budgetary slack, psychological ownership, private sector organisations*

JEL Classification*: C11, D32, M47, O52.*

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Introduction

Private sector organisations accumulate slack resources as a form of contingency plans, regardless the nature of companies. They utilise these resources to cope with unpredictable environmental influences such as economic uncertainty and internal financial issues. In other words, slack building is particularly important in balancing budget estimates at the end of each year. Otherwise, they have little room to adjust their budget structure to meet unforeseen contingency needs (Williams, Macintosh and Moore, 1990). These adjustments usually come with an enormous potential economic and non-economic cost especially when companies are struggling to seek a beneficial public welfare or profitability opportunities (Murwaningsari, 2008).

Budget slack triggers socio-economic pressures from stakeholders as private sector organisations companies are pressured to allocate adequate resources for potential investment opportunities while aggressively pushing for public welfare satisfaction. Such pressures trigger bias in building additional resources for contingencies (Mohamed Yunos et al., 2012).

Private sector organisations usually accumulate budgetary slack resources in several ways. Firstly, employees set a budget estimate whereby expenditure is lower than the anticipated revenue. However, this form of slack building is highly attention grabbing to stakeholders, although it is more accessible by employees in the private sector organisations (Yilmaz, Ozer and Gunluk, 2014). Alternatively, they balance the budget estimate by purposefully underestimating revenues or overestimating expenditure. Lastly, they pre-allocate funds for contingency purposes. The last two forms of slack building are less discretionary to internal parties and less transparent in the eyes of stakeholders.

1. Literature review

1.1. Budgetary slack

Employees are expected to be self-interest-centred when they are incentive-driven and when they have opportunity to do so without superiors' knowledge (Lukka, 1988). In turn, they will have intentions to act against the company's goals. That is the main reason that their performance evaluation is tied with the attainability of company's budgetary goals (Lau and Buckland, 2001). As a result, employees are often concerned with their performance level as they are expected to exceed the budgetary goals that are pre-determined by their superiors, although they negotiated the budgeted target. In other words, employees have the tendency to withhold their valuable resources even though the organizations encourage their active participation in the budget planning process. They are biased towards the building of additional resources and under-perform in achieving targeted productivity level, which is referred to as budgetary slack (Kuvaas, 2003).

Budgetary slack is usually regarded as dysfunctional as it contradicts with a company's interests, regardless of being for a profitable opportunity or for the public welfare. The slack activities are undetectable, as it may happen in all stages of the budgeting process, particularly when employees purposefully act without the knowledge of the company. Although the top management is authorised to accept or reject employees' budget proposals, it is unable to verify the information provided in the proposed budget in spite of the post-mortem budget meeting, as the management team may still be unable to trace the possibility of slack activities as they take into account possible internal and external factors such as error in budget forecasting and environmental uncertainty (Hammer and Stern, 1980).

1.2. Employees' psychological ownership

Employees produce positive or negative or mixed behavioural outcomes through psychologically experienced ownership (Pierce, Kostova and Dirks, 2001). They become emotionally attached to tangible and intangible possessions surrounding them as though they are personally owned. Eventually, they portray such acts of possession in their minds and actions. They become motivated to cultivate a strong feeling of protection towards their possessions, either personal or impersonal. They seek physical and emotional control over this form of possession.

Dimensions of employee's psychological ownership

Building on psychological ownership theory, Pierce, Kostova and Dirks (2001) and Avey et al. (2009) recognised five dimensions of employees' psychological ownership in organisational context. Employees' feeling over psychological ownership draws upon the concepts of self-efficacy, belongingness, self-identity, accountability and territoriality.

Belongingness

Belongingness refers to employees' desire of dwelling into a place, i.e., organisations. It is a fundamental need of employees, as it emphasises on their psychological state of belonging with others. Employees take ownership of possession around them in an effort to fulfil their desire of belonging (Ardrey, 1966). Employees tend to retain possession, such as name cards, as a form of tangible security objects to provide them with a sense of belongingness. Such feeling of psychological ownership through the attachment of objects, tangible or intangible, becomes a place for employees (Pierce, Kostova and Dirks, 2001).

Self-identity

Self-identity is recognised as a major component of the self-concept domain, along with social identity. Employees identity themselves through the groups of people and possessions (Abrams and Hogg, 2004). They create, sustain, replicate and change their self-identity through interaction with these people and tangible possessions (Dittmar, 1992) and even intangible possessions, such as organisations (Rousseau, 1998). For instance, employees may define themselves as a house or even a job title. Such targets of ownership are regularly used as descriptors of their identity. The feeling of psychological state of ownership over people, tangible and intangible objects provide a foundation from which employees identify themselves as being distinctive and therefore contributing to their personal identity.

Accountability

Accountability refers to "the implicit or explicit expectation that one may be called on to justify one's belief, feelings and actions to others" (Lerner and Tetlock, 1999, p. 255). Employees take ownership psychologically through two approaches: (1) their expected right to hold others accountable and (2) the expectation of holding themselves accountable. For instance, employers hold their employees accountable for organisational performance. At the same time, employers themselves are held accountable by investors or stakeholders. Such description of expected rights and responsibilities is described as a form of behaviour that characterise stewardship and self-sacrifice towards the protection of the target of ownership.

Territoriality

Employees tend to become territorial over tangible or intangible objects, such as ideas, roles and relationships as their target of ownership. This is considered as a self-serving act that places great importance for satisfying needs, either personal or organisational interest. When employees establish ownership bonding with the target of possessions, they may mark these possessions as their exclusive belonging. If they anticipate encroachment on their target of possessions, they may prompt to protective territoriality to demonstrate ownership rights.

2. Hypotheses

Self-efficacy and budgetary slack

When employees perform their tasks and responsibilities, they develop a sense of control towards the target of possessions, i.e., budget. They perceive that they are able to control the building of excessive budgetary resources. At the same time, they become efficient in their budgeting skills and therefore control the excessive budgetary resources. It implies that employees are provided with self-efficacy which enables them to control their intention to create budgetary slack. Thus, it is hypothesised that:

H1: There is a negative relationship between self-efficacy and employees' intention to create budgetary slack.

Belongingness and budgetary slack

Employees develop their sense of attachment through the possession of budgets, although it is intangible in nature. Such target of ownership, however, offers employees the feeling of security towards their tasks and responsibilities. They then perceive that they are able to control the building of excessive budgetary resources. When employees desire to attach themselves with budgets, they consider budgets as their personal belonging and therefore they need to control the excessive budgetary resources. It implies that employees are provided with the sense of belongingness that enables them to control their intention to create budgetary slack. Hence, it is hypothesised that:

H2: There is a negative relationship between belongingness and employees' intention to create budgetary slack.

Self-identity and budgetary slack

Employees identify themselves with the possession of budgets in the organisations. They replicate and change

their identity through their budgetary tasks and responsibilities in spite of its intangibility. The possession of budget becomes a self-identity to them in the organisations. They even use such identity to distinguish themselves with others. While employees create an identity of themselves with the possession of budgets, they extend their social self towards such possession. In turn, they may tend to control their actions towards the building of excessive budgetary resources. It implies that the employees are provided with self-identity, which enables them to control their intention to create budgetary slack. Thus, it is hypothesised that:

H3: There is a negative relationship between self-identity and employees' intention to create budgetary slack.

Accountability and budgetary slack

Employees hold themselves accountable for the budgetary task and responsibilities. They tend to justify their actions while meeting the expectation of organisations. They perceive that they have the responsibilities to achieve organisational, including budgetary targets when performing budgeting estimate. Such promotive behaviour encourages employees to control the building of excessive budgetary resources. It implies that when employees feel that they are accountable for their budgetary actions, they may control their intention to create budgetary slack. Thus, it is hypothesised that:

H4: There is a negative relationship between accountability and employees' intention to create budgetary slack.

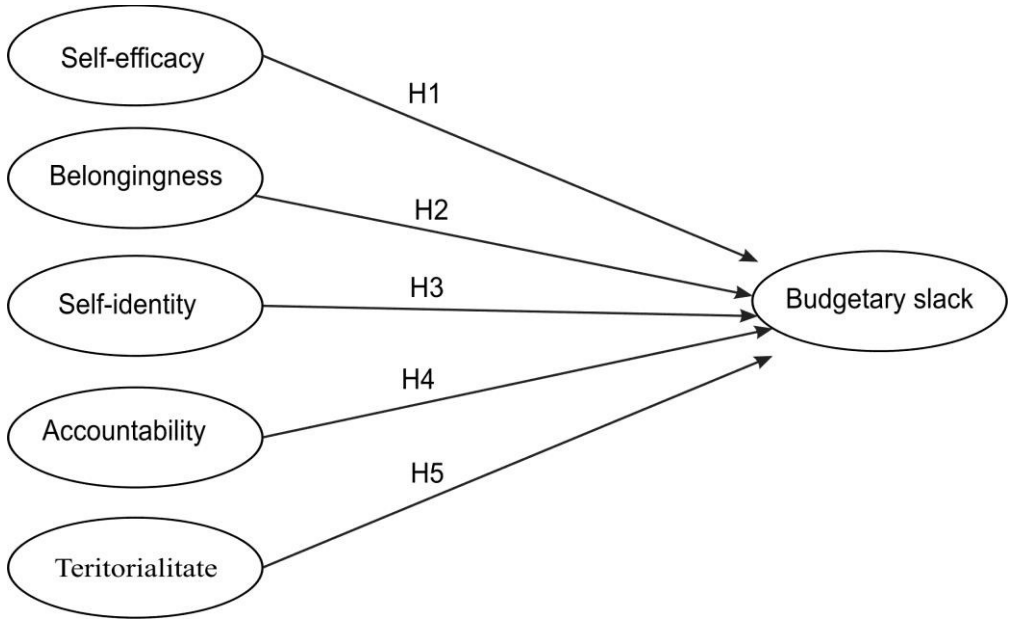
Territoriality and budgetary slack

Employees become territorial over budgetary tasks and responsibilities, as they consider budgeting as their target of ownership. They tend to place great importance in protecting their tasks and responsibilities to sustain the positive side of the possession. When employees establish and sustain the bonding with budgetary tasks and responsibilities, they perceive that they are able to claim exclusive right to such possession. They may then prompt to control the building of excessive budgetary resource. It implies that employees are provided with the territoriality feature which enables them to control their intention to create budgetary slack. Thus, it is hypothesised that:

H5: There is a negative relationship between territoriality and employees' intention to create budgetary slack.

Based on the proposed hypotheses above, the conceptual framework of the model is illustrated in **Figure no. 1**.

Figure no. 1: Conceptual model



3. Research method

Participants

The population of respondents in this study were employees who held lower or higher job designations, who worked in private organisations, with prior experience in budgeting or were involved in the budgeting actively. Sampling techniques such as snowball and quota sampling were used to gain a generalised view on employees' perceptions pertaining to budgetary slack and psychological ownership because these approaches secured positive a response rate of returned questionnaires to perform adequate and relevant statistical analysis. The qualifications of these potential respondents were verified to determine whether they fitted the sample description before receiving the questionnaire.

Budgetary slack measurement

Propensity to slack measures the extent to which the amount budgeted is likely to be purposefully manipulated with the lack of monitoring activity performed on the task assignment. There were eight composited items, which were measured with seen-point semantic differential scale. An example of propensity to create budgetary slack was 'I seek more budgetary resources than absolutely necessary when preparing a budget.

Psychological ownership measurement

The dimension of psychological ownership was measured using six-point Likert scale developed by Avey et al. (2009).

Self-efficacy

Self-efficacy was operationalised as employees who have the ability to control the possessions. It consisted of three items and a sample question for self-efficacy is 'I feel I need to protect my ideas from being used by others in my organisation'.

Belongingness

Belongingness was operationalised as employees who attach their feelings of possessions as their personal belonging. It has three items and a sample question is 'I feel I belong in this organisation.

Self-identity

Self-identity was operationalised as employees who identify their personal identity with the possessions. It consists of three items and a sample question for self-identity is 'I am confident in my ability to contribute to my budgetary task's success.

Accountability

Accountability was operationalised as employees who justify their actions towards the possessions. It has three items and a sample question is 'I would challenge anyone in my organisations if I thought the budget was done wrongly.

Territoriality

Territoriality was operationalised as employees who are territorial towards the possessions. It consists of four items and a sample question for territoriality is 'I feel I need to protect my budgetary idea from being used by others in my organisation.

4. Results

Respondents' profile

Out of 475 respondents, there were 384 females (81%) and 91 males (19%). Besides, a total of 363 respondents (76%) were aged between 31 and 40 years old and followed by 97 respondents (20%) were aged between 21 and 30 years old. There were 279 respondents (59%) who earned between RM4,001 and RM5,000 and followed by 68 respondents (14%) who earned between RM3,001 and 4,000 monthly. There were 281 (59%) respondents who were managerial employees as compared to 194 non-managerial employees (41%). A total of 238 respondents (50%) were employed by their organizations for between 11 and 15 years and followed by 156 respondents (33%) who had work experience of between 6 and 10 years. The descriptive analysis of respondents is illustrated in **Table no. 1**.

Table no. 1: Descriptive analysis of respondents			
Item	**Description**	***f***	**%**
Gender	Male	91	19
	Female	384	81
	Total	**475**	100
Age	Below 21 years old	0	0
	Between 21 and 30 years old	97	20
	Between 31 and 40 years old	363	76
	Between 41 and 50 years old	14	3
	Above 50 years old	1	0
	Total	**475**	100
Monthly income	RM2,000 or below	0	0
	Between RM 2,001 and RM3,000	30	6
	Between RM3,001 and RM4,000	68	14
	Between RM4,001 and RM5,000	279	59
	Between RM5,001 and RM6,000	31	7
	Above RM6,000	67	14
	Total	**475**	100
Current job position	Non-managerial level	194	41
	Managerial level	281	59
	Others	0	0
	Total	**475**	100
Numbers of years working in the current organisation	Less than 1year	0	0
	Between 1 and 5 years	63	13
	Between 6 and 10 years	156	33
	Between 11 and 15 years	238	50
	Between 16 and 20 years	17	4
	More than 20 years	1	0
	Total	**475**	100

The result of social desirability response (SDR)

Recognising the existence of possible bias in the social desirability response (SDR), all variables studied were adjusted using the approach recommended by Anderson, Warner and Spencer (1984, p. 576). The statistical analysis of the sample data using the adjusted measure suggested that SDR bias influenced the proposed relations among the factors in the model (refer to **Table no. 2**).

Table no. 2: The result from social desirability response (SDR)			
Variable	**t value**	**p value**	**Evidence of SDR**
Budgetary slack	1.27	0.02	Yes
Self-efficacy	1.78	0.01	Yes
Belongingness	1.54	0.01	Yes
Self-identity	1.62	0.03	Yes
Territoriality	1.31	0.03	Yes
Accountability	1.82	0.00	Yes

Preliminary data analysis

The data in this study was assumed normally distributed (refer to **Table no. 4**). Besides, the critical χ^2 value for *df* = 4 at α = .05 is 9.49 for any of the cases in the data file (Malhotra, 2010). As the Mahalanobis distance was only 3.56, it indicated that there was no presence of multivariate outlier.

In addition to that, the first factor in the study only accounted for 23.5% of the overall variance when the principal axis factoring with rotation was applied. It indicated that there was no one factor accounted for a majority of the variance. It implied that the result was unlikely affected by common method variance and concluded that multicollinearity was not a concern.

Table no. 4: Mean, standard deviation, skewness & kurtosis

Variable	M	SD	Skewness	Kurtosis
Budgetary slack	3.33	0.91	0.12	-0.19
Self-efficacy	3.94	1.22	-0.23	-0.72
Belongingness	3.56	1.11	0.02	-0.51
Self-identity	3.68	1.11	0.02	-0.51
Territoriality	3.64	0.92	-0.22	0.12
Accountability	3.48	1.11	0.08	-0.50

Reliability and validity

In terms of reliability, all the reflective constructs, such as self-efficacy, belongingness, self-identity, accountability and territoriality, were demonstrated with satisfactory score in internal consistency of 0.70 or above (Nunnally & Bernstein, 1994; Nunnally, 1978, p. 245) (refer to **Table no. 4**). Besides, since budgetary slack was a formative construct, its Tukey's test of non-additivity showed that it was additive (*F* = 1.73, *df* = 1.24, *p* = .19).

Table no. 4: Reliability

Variable	α
Self-efficacy	0.88
Belongingness	0.83
Self-identity	0.84
Territoriality	0.78
Accountability	0.78

Hypotheses results

The overall model was significant (F-value = 26.45, *p*<0.05) and therefore it is fit. The model also explained 22% of the variation in employees' intention to create budgetary slack. Besides, there was no multi-collinearity issue in the model as its variance inflation factor (VIF) value was less than 5 (refer to **Table no. 5**).

Based on the empirical model in **Figure no. 2**, self-efficacy was negatively related to employees' intention to create budgetary slack (t value = -3.35, *p* < 0.05). Belongingness was also negatively significant with employees' intention to create budgetary slack (t value = -2.30, *p* <0 .05). Besides, self-identity was negatively related to employees' intention to create budgetary slack (t-value = -3/01, *p*<0.05) (refer to **Table no. 5**).

Self-efficacy (β = -3.35) was the most important determinant that influenced employee's intention to create budgetary slack, among belongingness (β = 0.30) and self-identity (β =0.30).

However, accountability was not significantly related to employees' intention to create budgetary slack (t value = -0.77, *p* >0.05). Territoriality was also not significantly related to employees' intention to create budgetary slack (t value = -1.80, *p* < 0.05) (refer to **Table no. 5**).

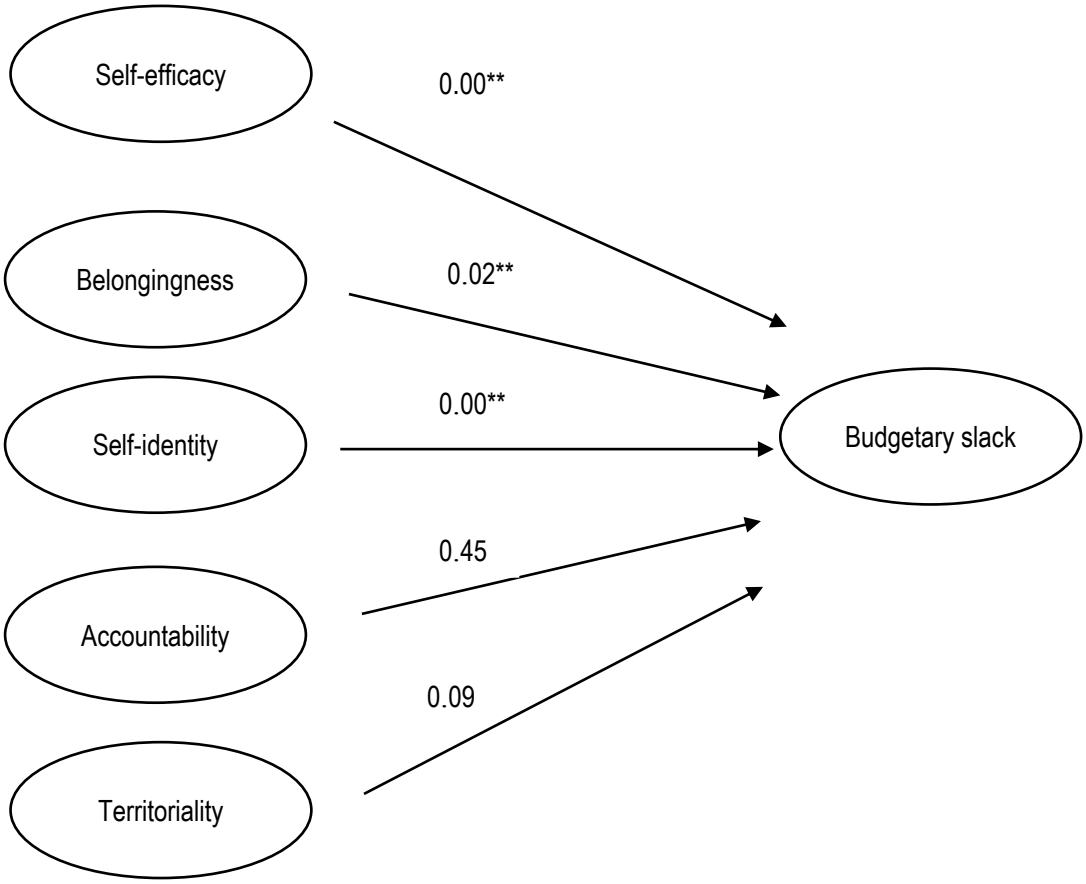
Table no. 5: Model evaluation

Variable	β	t value	p-value
Territoriality	-0.07	-1.70	0.09
Self-efficacy	-0.18	-3.35	0.00**
Accountability	-0.04	-0.77	0.45
Belongingness	-0.13	-0.30	0.02**
Self-identity	-0.18	-0.30	0.00**
Adjusted R^2	0.22		
F value	26.45		
Sig.	0.00**		
Note: **p<0.05			

Empirical model

The empirical model for the relationship between employees' psychological ownership dimensions and budgetary slack was presented in **Figure no. 2**.

Figure no. 2: Empirical model



Conclusion

This paper investigates the determinants of employees' psychological ownership from the psychological perspective. It has concluded that budget makers who were self- efficient, in addition to belongingness and self-identity, may minimise or even avoid the creation of slack resources in budgeting. They may be encouraged to become the persons to manage the distribution of budgetary resources in organisations. To a certain extent, managing employees' ownership towards the possession of budgetary resources may effectively minimise or even avoid the creation of budgetary slack.

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Information security challenges - vulnerabilities brought by ERP applications and cloud platforms

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Abstract

The accounting profession is in a continuous process of change as ERP applications and emerging technologies such as cloud computing continue to bring improvements into the accounting and financial areas. Nevertheless, beside the variety of benefits, these technologies carry specific risks that can affect the fundamental characteristics and security aspects of data.

This paper aims to highlight the most common vulnerabilities of ERP applications and cloud computing platforms in the context of digital accounting. At the same time, in addition to the technical aspects and good practices used to prevent and correct these vulnerabilities, the study focuses on a critical component of data security: the human factor. Moreover, the empirical research conducted has highlighted the fact that young professionals understand the need for sensitive data protection, but they do not always display the best behavior to prevent security incidents.

This article aims to provide an overview of ERP applications and cloud computing platforms that are currently used in the financial and accounting field, focusing on the main technical vulnerabilities and the human factor, which is one of the most important aspects of data security.

***Keywords**: information security, ERP, cloud computing, human factor*

***JEL Classification:** M15, M41, M42*

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Introduction

The constant evolution of IT has contributed to the development of most industries and professions by automating and digitalizing certain elementary activities, to enable professionals to focus more on complex activities that add value to companies. Digitalized and automated processes are not intended to replace the human resource, but rather to support the progress of professionals.

Information is the essence of any organization or individual, as it is what creates a competitive advantage. Ronald Reagan stated that it is "the oxygen of the modern age." In the financial and accounting field, almost everything is limited to information (ACCA, 2013) and in this current digital era, information has become one of the vital resources in the process of value creation. Protecting sensitive data, whether we refer to data stored on a physical or electronic basis, by implementing an effective IT security incident management system, must be an essential concern for any organization, regardless of its size or field of activity. Accidental or deliberate disclosure of confidential information can irremediably damage the companies' operations, by affecting its financial situations and reputation.

Currently, security incidents are one of the most significant concerns in the Internet of Everything era, as technological developments have introduced new concepts in the financial and accounting field such as ERP, cloud computing and mobile technologies that, besides the variety of advantages, carry specific vulnerabilities that can affect the security of sensitive information. In recent years, there has been an increase in security incidents, at both national and global level. According to the latest CERT report, over 110 million cyber security alerts were recorded in Romania in 2016, the increase being more than 60%, compared with the previous year. At international level, according to Breach Level Index, more than 1.3 billion IT security incidents occurred, increasing by over 85%, compared to 2015.

In the accounting field, most of the activities have been digitalized due to the need to have continuous access to relevant information in real time. Whether we are talking about mobile technologies, ERP systems or cloud computing platforms, almost all sensitive information has moved into the electronic environment.

This paper aims to analyze the main challenges of information security in the context of digital accounting and to assess which are the vulnerabilities of the technologies currently used. Moreover, this study investigates the perception and awareness of the impact of security incidents from the perspective of future professional accountants.

1. Literature review – ERP applications and cloud platforms vulnerabilities

The development of ERP (Enterprise Resource Planning) systems had as a starting point the need to automate the core data processing and data input activities, which did not require an increased level of professional judgment. Although the digitalization and automation of certain processes such as inventory and production management began in the 1950s, it was only in the early 1990s that we could identify the first ERP system (Møller, 2005) that incorporated various modules: accounting, human resources, project management and distribution. Currently, the existing applications include the same essential functions, but they are configured according to the needs of each organization. Most recent applications include also financial planning modules, supply chain management and customer relationship management (CRM).

According to the relevant research conducted in this field, the impact of ERP systems was positive, as these applications were built on the idea of aggregating most of the key processes in a company into a single IT system (Klaus, 2000) by using a shared database to eliminate redundant processes (Davenport, 1998). In the financial and accounting fields the main advantages are the following: cost reduction, elimination or automation of simple processes, increased quality of the financial reporting, improved flexibility and competitiveness (Kanellou and Spathis, 2013; Stanciu and Tinca, 2013; Ponorica et al. 2014; Voulgaris et al., 2014).

Lately, ERP systems have begun to adapt to the current needs of the users. Therefore, we can discuss the use of ERP applications in cloud computing platforms, which allow data to be accessed also from mobile devices. It can be observed that the general trend of migrating to cloud to benefit from continuous access to data, without taking into account technological or geographic barriers.

ERP applications are a target of cyber-attacks because they store confidential information, such as organizational secrets, financial data, data about the organizations' customers and suppliers. Nevertheless, ERPs are also targeted to commit various acts of fraud, such as master data modification.

To analyze the vulnerabilities of ERP applications, regarding data stored by systems, we need to understand the architecture and functionalities of ERP applications. Most ERPs share the three levels structure, starting with the base of any ERP: a database where the information is stored and most applications use Microsoft or Oracle databases that use SQL query language. The next component is the application layer where are the implementation, logic and system rules. The last level of ERPs is the user interface (Surjit et al., 2016; Bahssas, 2015). At the same time, besides the simplified architecture of an ERP application, the environment in which this application is implemented is also important: locally or on a cloud computing platform.

Taking into consideration the structure presented, the first vulnerability of an ERP system is due to the existence of the databases used. At the database level there may be inconsistencies that can endanger the fundamental characteristics of the data: privacy, integrity and availability, if the database has not been properly implemented (Bertino, 2005; Swart et al., 2007).

Among the potential vulnerabilities, there are excessive or unauthorized privileges, operating system vulnerabilities, SQL injection, malware, inappropriate passwords or incorrect implementation of the database (Ali and Afzal, 2017; Malik and Patel, 2016; Lodha and Dhande, 2014). All of these vulnerabilities occur both in local ERP applications and cloud platforms. Comparing the level of security between local ERP and cloud ERP, we cannot say that security will be improved or not, because it all depends on the implementation mode and the controls created.

Analyzing the next level of ERP applications, the logic level, as in the case of the database behind the ERP application, if the deployment was not correctly performed, the issue of data security occurs through brute force or SQL injection attacks. At this level, most of the issues arise because of the poor implementation of the database security measures.

ERP users also represent a vulnerability for sensitive data (Evans et al., 2016) because organizations do not always create a culture that is efficient enough to make them aware of the possible theft or exposure of confidential information. The human factor is one of the most important components of data security, whether or not we are talking about an ERP application. It is essential that organizations instruct their employees about the impact of security incidents.

In 2014, some of Sony Pictures Entertainment directors received an email, apparently from Apple, for an email verification. The email they received was a phishing that allowed the attackers to get the password from their Apple accounts, being used to authenticate to the Sony network and stole confidential financial information and Sony service passwords, which were later posted on the Internet. According to the company statements, IT system recovery cost 35 million dollars. This incident is a classic example demonstrating that the human factor is still one of the most important vulnerabilities. At the same time, the fact that the executives who were attacked had the same passwords for corporate and personal accounts indicate that there was not a well-developed culture of risk prevention associated with unauthorized exposure of sensitive data.

As it can be seen from the example presented above, the prevention of loss of sensitive information is essential, especially for ERP systems, which, according to statistics, are used by over 83% of Forbes 500 companies. To prevent security incidents, the risks must be first identified and the potential impact assessed.

Given the fact that each company has its particularities, each ERP application will have differences, depending on the needs of the specific organizations and activities. Therefore, we cannot propose a universal ERP security model, but we can only highlight the best practices that can prevent security incidents.

As previous mentioned, one of the main security concerns is the excessive privileges granted to application users (Horwath, 2012). Database administrators allocate differentiated rights to users, either by using the existing roles in the application or by creating new roles that suit the needs of users in the application (Bruchez, 2012). These customized rules could prevent unauthorized access to data, but only if properly implemented.

Incorrect configuration of the database is also a significant vulnerability. By storing access passwords in the ERP application database, without encrypting data,

gives potential attackers the ability to obtain the users credentials. In the case of SQL Server databases, the user authentication data can be stored encrypted in another database, not even visible to the database administrator. Also, an implementation that does not take account of the vulnerabilities of such application may allow attackers to steal data using SQL injection (Gicev et al., 2013; Bhatia, 2017), which are still one of the most significant databases weaknesses.

Malware infections increase the risk of losing sensitive information. In the last period, it can be observed that more and more types of viruses are created and can remain undetected or their impact is observed only after a significant period. More recently, we can see applications like ransomware whose purpose is to encrypt all user data, and decryption will only be done after the attackers are paid for the information. Programs that can prevent such incidents are currently being developed (Kolodenke et al., 2017), but the progression of malware is more fierce than the development of prevention programs.

Most databases incorporate database audit modules that can prevent confidential information from being exposed, if effective controls that target the applications risk areas are implemented. Database auditing has the role of prevention in determining vulnerabilities, but also a function of detection. For databases, the most efficient audit controls are:

- Analysis of back-up or database restoration activities - to determine which users have performed such activities. As described above, one of the biggest vulnerabilities in an ERP application is the excessive privileges granted to users and if the results of the control indicate that such activities were performed by individuals who should not have the rights to perform these tasks, this must be an alarm signal for the organization.
- Analyzing the actions conducted on the database or its objects - as with the previous control, this control has the role of monitoring and detecting illegal activities. However, given that in an ERP application there are many users that make changes to the database, the amount of information is too vast to be analyzed manually. In this case, it is recommended to use data mining techniques to identify possible inconsistencies.
- System logging analysis - this control is important because it monitors both user access to the application, but also checks unsuccessful login activities. This control can prevent a brute-force attack, but also highlights logins into the system by former employees of the organization, whose credentials have not yet been annulled.

ERP systems are vital components of any organization because they incorporate the companies' most important processes and therefore the proper implementation, in line with good practices, is necessary to prevent potential security incidents. Due to the complexity of ERP systems, we cannot talk about a common security framework that meets the needs of all companies. Therefore the most efficient way to protect sensitive data in ERP applications is to identify risks by using best practices correctly.

The current economic context has created the need for continuous access to information. This new necessity, in the financial field, is what it is called real-time reporting, a process that creates a competitive advantage for organizations (ACCA, 2013b), by improving the agility and transparency of activities. To meet the need of users and businesses, most accounting and financial processes have migrated to cloud computing platforms (Trigo et al., 2014). In this way, the users of a particular application can view or manipulate data regardless of location or devices used as long as they have an Internet connection.

As in the case of ERP applications, to understand the main security vulnerabilities of data stored in cloud computing platforms, we need to have a clear picture of the functionality and architecture of the platforms.

The concept of cloud computing was based on the idea of unlimited access to technology (hardware) to information, according to Giordanelli and Mastroianni (2010). Currently, the cloud computing concept is represented by server networks and data warehouses (Kim, 2013), whose purpose is to provide a broad range of web services (storing and manipulating data, performing queries on the database, etc.).

By analyzing the delivery model, three types of platforms can be differentiated: IaaS - Infrastructure as a Service, PaaS – Platform as a Service and SaaS - Software as a service, according to NIST standard 800-145.

A second classification can be done by following the implementation model used: public, private, community or hybrid. From a security point of view, the lowest level of security is found in the public model, followed by the community, hybrid and private model.

IaaS incorporates all the functions of a cloud, as users have the right to modify the functionalities and security aspects of applications. At the same time, this type of platform allows organizations to have the highest level of IT infrastructure control compared with the other two platform models. Due to these considerations, in the case of IaaS, the security of operating systems and applications rests with the organization, while the cloud provider is only responsible for the safety of the network and servers.

According to the Symantec study from 2015, the most common vulnerabilities in IaaS are the following: loss or disclosure of confidential information, unauthorized access - mostly due to theft of user credentials and inadequate security configurations. However, in the case of IaaS, security issues may also occur due to other cloud users (tenants) when the server is not dedicated - multi-tenancy issues.

To prevent security incidents for this type of platform, it is essential to choose the appropriate model (public, private, community or hybrid) to match the organizations' objectives and to ensure that implementation is properly done, by respecting the best data security practices. Moreover, systems monitoring and auditing are vital processes for preventing cyber-attacks or unintended exposure of confidential information. Furthermore, to improve credentials' security, two or more authentication factors are recommended (Jaiswal and Rohankar, 2014).

The PaaS model does not give organizations the same freedom as the IaaS model, because it is designed to allow organizations to deploy applications. In this model, the company that leased the platform cannot make changes to the network, servers or operating systems. In PaaS, the cloud provider is responsible for the database and network security, while the tenant is in charge of the safety of the applications developed on this platform.

From a security point of view, most PaaS platforms provide tools such as integrity checking, data encryption, access management and firewalls (CSCC, 2015). However, at this level vulnerabilities, that may affect the characteristics of the data fundamentals, can be found, if the application development is not done by using the best practices to maintain data security. Also, effective controls must be implemented for this type of platform to prevent potential security incidents.

The third platform model is SaaS, which is the most common type of cloud, because it has the lowest cost compared to the last two models. Most accounting applications, mainly ERP applications, are embedded in this model. In SaaS users can access some applications, but cannot deploy others. Also, within this model, most data security issues are the responsibility of the cloud provider.

Potential vulnerabilities in the SaaS model identified by the relevant literature are: excessive privileges, unauthorized access, inappropriate configuration of applications that may affect the fundamental characteristics of the data and aspects of the security of virtual machines (Hussein and Khalid, 2016; Ahmed et al., 2017; Sharma et al., 2017).

Because this model is more restrictive regarding the client application implementation and since the needs of each organization have specific particularities, most data security controls are the responsibility of the cloud provider, which must offer an acceptable level of assurance for the security of sensitive information. At the same time, given the fact that the cloud platforms store various information that is subject to special treatments regulated by national and international bodies, it is essential to provide for each type of information the appropriate level of security.

In conclusion, cloud platforms have specific vulnerabilities, depending on each model. As with ERP applications, we cannot talk about an absolute security model that would have the ability to prevent any incident, but we need to understand how the data stored in cloud computing platforms can generate risks that might have the potential to cause a security incident.

Because of the wide range of benefits of cloud computing, more and more companies are considering migrating to a cloud platform to improve performance and become more competitive. Given that this technology is emerging, new types of vulnerabilities are expected to develop, mainly due to the increased use of other technologies, along with cloud platforms, such as mobile technologies, which have begun to be increasingly used, in particular in the financial and accounting fields. These issues can contribute to the

development of new risks, but it is important to understand that cloud migration does not automatically mean a lower security level, but in many cases can improve security compared with local applications.

2. Research methodology

In the first part of the paper, the human factor was presented as being an essential component in ensuring data security, as that the accounting field is vulnerable to security incidents because it stores and generates high-confidential information.

Lately, professional bodies have begun an international dissemination of the impact of information security in the accounting field, with the aim of attracting practitioners' attention to the risks associated with handling confidential data, especially when used along with computer applications. At the same time, ACCA reports from 2014 and 2016 draw attention to the need that the professionals in this field have to improve and develop their capabilities to protect sensitive information, especially if data is associated with emerging technologies such as cloud computing, Big Data and mobile technologies. ACCA studies have further demonstrated that over time, at international level, there has been an increase in the level of awareness of the members.

Considering the ACCA reports as a reference point, an empirical research based on a questionnaire was conducted. This survey has been addressed to students of the Master of Accounting, Audit and Management Information Systems program at the Bucharest University of Economic Studies, in the last year of study. This survey aimed to analyze the perception of the participants regarding the security of data in the financial and accounting fields. The purpose of this research was to find out whether future accountants have acquired sufficient knowledge to understand the impact of security incidents and if they have a sufficiently well-developed culture in the field of sensitive data protection.

The survey was sent to 80 potential respondents, 49 of whom decided to participate, the response rate being of 61.25%. The survey contained 16 different enquiries: questions with one or more possible answers, for situations where an in-depth analysis was not required we used response matrix, evaluation scales, but also open questions for subjects requiring a more thorough review.

All students work in the financial and accounting field and have in average two years of experience, the average age of the respondents being 24 years.

3. Findings and discussions

To analyze the level of familiarity of the respondents with information security concepts, they were asked if they had received enough information on data security during their study programs. At this question, only 17 participants considered that the level of information received was sufficient, while 27 people, representing 55.10% of the total sample, assessed that they had received indeed training on the importance of data security, but considered that the level of information received was not sufficient. The remaining 5 participants said they did not receive such information during their study programs.

The variations of the responses can be justified by the fact that the students might have participated in different bachelor programs. However, given the current need to create a well-defined culture for the financial and accounting professionals in the field of sensitive data protection and prevention of security incidents, it is necessary, in our opinion, for universities to introduce courses in the curriculum that focus on this area in order to make it easier for graduates to integrate into the profession and comply with the needs of the organizations.

The next question of the survey was a 5 point Likert scale question and the participants assessed on a scale of 1 to 5 (1 - total disagreement, 5 - complete agreement) the need for professional accountants to be aware of the impact that security incidents can have on the financial information and operational activities. 43 students stated that they fully agree with this assertion and the rest of the participants were partly in agreement with this statement. The answers are consistent with the results presented by ACCA, which indicates that young professionals possess a significant increase level of awareness of the potential impact of security incidents. However, the sharp rise in security alerts at national level, according to the report released by CERT, highlights the lack of sufficiently developed knowledge that might underpins future cyber incidents.

To analyze whether there is a culture of information security implemented in the companies where the students work, they have been asked if they attended

any course on the maintaining and protecting sensitive data. 79.59% of participants responded affirmative to this question, while the rest of the interviewees stated that they did not attend such training programs. This result is a positive factor, but taking into account the fact that currently the academic environment from Romania does not fully cover the necessary curricula in the field of information security, as prior research has shown (Stanciu and Rîndaşu, 2017), the remaining 20% of the companies for which the participants work, must give a greater importance to information security aspects.

Because the actions of the employees can directly affect the security of data, the participants were asked if their work passwords are safe, depending on the minimum complexity required by the system and the shelf life. Although 95.91% of students answered affirmative to this question, 31 of them confirmed that they keep their password written at the work place. Even if the systems used by the companies in which respondents work involves the use of strong passwords, keeping the written passwords at the workplace is a practice that can lead to malicious exposure of sensitive data, as related literature confirms (Evans et al., 2016; Symantec, 2015).

To analyze whether the organizations for which the respondents work have implemented security controls, such as anti-virus programs, only 75.51% of the interviewees responded affirmatively. This outcome raises a question mark over the prioritization of information protection at the organizational level, mostly because malware infections are among the most significant vulnerabilities of ERP applications (Ali and Afzal, 2017).

Another question of the study focused on scanning attachments received by email. Analyzing the answers provided, only two people confirmed that they always scan email attachments, 20 respondents said they are scanning the attachments only when the sender is unknown and the other 27 reported that they never scan attachments, although most participants stated that they have an anti-virus installed. This practice draws attention to the fact that employees are responsible for increasing the risk of data exposure, although they have almost all of the necessary tools to secure their work.

The responses provided by the participants demonstrate that they are aware of the impact that security incidents could have, but also indicate that the respondents are not always behave appropriately, fact that should be a wake-up call for organizations. Behaviors such as keeping access passwords written at the workplace and opening attachments in emails, without scanning them first, are ways to unintentional expose sensitive data.

Although 80% of participants were trained on information security aspects, most of them still perform actions that are inconsistent with an efficient privacy prevention policy. We believe that this result can be explained in two ways: the training sessions that the employees attended may not have been clear enough or the participants do not understand the significant role they are playing in protecting information.

Conclusions

Currently, security incidents are one of the most significant concerns in the Internet of Everything era, as technological developments have introduced new concepts in the financial and accounting fields such as ERP, cloud computing and mobile technologies that, besides the variety of advantages, bring specific vulnerabilities that threaten the security of sensitive information. In recent years, there has been an increase in security incidents both at national and global level. According to the latest CERT report, over 110 million cyber security alerts were recorded in Romania in 2016, up to 60% more compared with the previous year. At international level, according to Breach Level Index, more than 1.3 billion IT security incidents occurred, the number increasing by over 85% compared to 2015.

In the financial and accounting fields, most of the activities have been digitalized due to the need to have continuous access to relevant information in real time. Whether we are talking about mobile technologies, ERP systems or cloud computing platforms, almost all sensitive information has moved into the digital environment. This paper aimed to analyze the main challenges of information security in the context of digital accounting. This is done by highlighting the main vulnerabilities of the currently used technologies. We have also conducted a survey to determine the perception and awareness level of the impact of security incidents from the perspective of future professional accountants.

Analyzing the data presented, we can say that there are a variety of vulnerabilities, which have an increased potential to affect the security of financial information,

operational activities and the reputation of the organizations as well.

Because both ERP and cloud computing platforms are still under development, new types of vulnerabilities are expected to occur along with the technological progress. The best solution for preventing security incidents is to apply the best practices by using secure systems and applications and implementing effective controls to monitor potential exposures of sensitive information regularly.

Another important conclusion of this study is the need to create a stable culture of risk management and prevention, especially for confidential information exposures. The empirical research has shown that young professionals understand the importance of data protection, but they do not always demonstrate the best behavior to prevent security incidents. Due to these results, we consider the involvement of the academic environment as being important and should provide sufficient support regarding information security in the accounting study programs.

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Risks of cyber attacks on financial audit activity

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Abstract

Simultaneously with increasing the speed and precision of data processing, multiple connectivity, fast transmission over long distances, and their results, the development and generalization of automatic processing, brought many new vulnerabilities and deficiencies, otherwise inevitable, the basis of new risk categories. The risks of cyber attacks on financial auditing involve the risk management of information systems security. Identifying, mitigating or eliminating the effects are mandatory requirements without which a high-quality financial audit can not be achieved in a highly computerized environment. To substantiate specific risk management actions on information systems security, in this study we analyzed the main types and techniques used in cyber attacks by making their radiography, identifying the strengths and weaknesses of new technologies and systems that are or not favoring security systems. At the same time, we analyzed the security system of an information system, organized it in layers, and revealed the specific areas for the security evaluation of the Mehari method. Finally, some of the results of a survey based on a questionnaire made with the support of master students of the "Information Systems Audit and Control" course were revealed, with three of the most common weaknesses identified for each security domain.

Keywords: *risk, financial audit, IT security, risk management, cyber attack.*

JEL Classification: *D83, G32, K24, L86, M15, M41, M42*

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Introduction

The technological evolution of the transmission, processing and storage of financial-accounting data has given rise to new concepts such as cloud computing, real-time accounting or mobile reporting but has also brought new threats to these new concepts. To hide intentions and evil deeds, criminals continue to refine their techniques and methods of computer attacks. Users are caught in the middle, becoming now, not only targets for attackers but also potential facilitators or even accomplices. Users have now become the most vulnerable link in the security system.

Literatura de specialitate relevă faptul că dezvoltarea tehnologică a dus la progresul extrem de rapid al amenințărilor la adresa securității informaționale. Deşi 2014 a fost definit la nivel global drept "anul atacurilor cibernetice", literatura evidențiază o tendință de creştere a numărului şi a impactului atacurilor cibernetice de la un an la altul, cu o dezvoltare acută a atacurilor asupra dispozitivelor mobile. Acest lucru demonstrează încă o dată faptul că problema securității informațiilor, gestionată prin intermediul noilor tehnologii, a devenit o prioritate maximă. Unfortunately, for reasons that are easy to understand, cyber attacks are not sufficiently popular. But when their effects can no longer be hidden, they are shocking by their magnitude. Examples in this sense are the big companies forced to discontinue their activities because their information system has become inoperable, or when the ATMs become inoperable for a period of time to create discontent or even panic. It is necessary to assess the impact of cyber attacks on multiple levels: legislative, technological, economic, social. Data security experts suggest that it is time to change security approach to achieve real security. More sophisticated controls must be implemented to help, providing preventative real protection, but also during and after an attack.

1. Cyber attacks, main types and techniques used

Current information systems are increasingly complex and include very heterogeneous equipment. These equipments are most often structured on a computer network. This is an open structure that can permanently connect new users and new types of equipment (terminals, laptops, workstations, servers, smart phones, personal computers, routers, various connectivity and retellation elements, etc.) virtually extends the circle of users with access to its resources (personal applications, distributed applications, various services, files, databases, shared hardware, various other shared resources). The vulnerability of the network is manifested on two distinct levels: the attack on the physical integrity of information (destruction or modification) and unauthorized use of information (leakage of information to unauthorized third parties to access that information). To counteract, eliminate or mitigate the effects of cyber attacks, these must be well known and analyzed. In the literature, cyber attacks are analyzed from several points of view. For the issue we approached, in accordance with (Tăbuşcă A., 2009) cyber attacks can be considered as passive attacks and active attacks. **Passive** attacks are all those attacks in which the intruder notices the information passing through the communication channel without interfering with the flow or content of the messages. It is basically only analyzing the intercepted traffic, discovering the identities of the communicating entities; the length and frequency of messages are revealed even if their content remains hidden. These attacks do not cause direct damage and do not violate confidentiality rules regarding their "spirit". The purpose of these attacks is to listen to data that is trafficked over the network, and these attacks are often used to identify various possible vulnerabilities.

Active attacks are those in which the intruder engages in stealing messages, modifying them, deleting, running applications, changing content or addresses, redirecting, substituting, refusing a service, repudiating, etc. These are the most serious and dangerous because they can cause massive damage, with the most unpleasant legal consequences. Also included in this category are programs designed for destructive purposes that seriously, sometimes even catastrophically, affect the security of computers and information in general. This category includes: viruses, logical bombs, worms, hatches, Trojan horse programs, etc.

In accordance with (CISCO 2014) radiography reveals current cyber attacks:

a) Characteristics of current attacks

a1. Are more ingenious in taking advantage of existing gaps in the security system: in 2014, 1% of the most common vulnerabilities took advantage;

a2. Security of Java processing has increased by 34% in 2014 and attackers are expected to find new vulnerabilities through JavaScript;

a3. The volume of spam increased by more than 250% in 2014;

a4. A new spam technique (snowshoe spam) has improved, which not only makes it difficult, but sometimes makes it even impossible to detect the source.

b) Users along with IT teams have become part of the security system

b1. Current attackers rely on users to install malware or exploit security gaps;

b2. 56% of the OpenSSL versions are older than 50 months and are therefore still vulnerable;

b3. Uneven internet usage and access to unprotected web pages;

b4. Malware developers use web browser extensions as a means of distributing malware and unwanted applications.

c) There is no consensus on the perception of security among different categories of actors:

c1. 59% of security chiefs (CIOSs) say that it is optimized, as opposed to only 46% of security operators (SecOps);

c2. About 75% of CISOs perceive security tools as highly effective, while 25% consider them only partially and effectively;

c3. 91% of respondents from companies that have implemented a sophisticated security system claim managers give security a high priority;

c4. Only 50% of respondents use patches to repair mistakes or omissions of the systems they use;

c5. Medium and large organizations have more sophisticated security systems than other types of organization.

The most common types of attacks (**Table no. 1**) include: denial of service, viruses, worms and trojans, device theft, phishing and social engineering or web attacks.

Table no. 1: The main categories of cyber attacks

No.	Attack type	
1.	DoS (Denial of Service)	This category includes attacks designed to interrupt the normal operation of hardware and software equipment through the DoS method.
2.	Attacks on web applications	This category includes attacks through web applications.
3.	Cyber-espionage	This category includes attacks conducted with the objective of gaining unauthorized access to classified data for the purpose of espionage.
4.	Abuse in privileged access	This category includes attacks or incidents caused by inappropriate abuse or misuse of logical access rights to the organization's network, systems, data, and equipment.
6.	Payment card skimming	Payment card skimming This category includes attacks or incidents based on the implantation of a device on financial data reading equipment (eg ATMs, PoS terminals, etc.).
7.	Point-of-sale PoS attacks	This category includes attacks from remote access of data and financial transactions read through a card reader (such as PoS terminals), except in the cases included in the previous category.
8.	Cybercrime	This category includes attacks with any objective other than cyber-spying, and includes any techniques that can not be categorized into another category.
9.	Snowshoe spam	Involves sending small volumes of spam from a large set of IP addresses to avoid detection.
10.	Soft malware	Software that aims to damage or deactivate computers and computer systems.
11.	Errors	This category includes incidents whose cause can not be assigned to another category.

The impact of cyber attacks on the victim's organization, although impossible to quantify due to lack of information, most often causes loss of information, disruption of activity, compromise of confidentiality of

information (data most often compromised including identification data such as address or PNP, medical information, phone, financial data, e-mail addresses, usernames and passwords, etc.), equipment damage or theft or potential revenue loss.

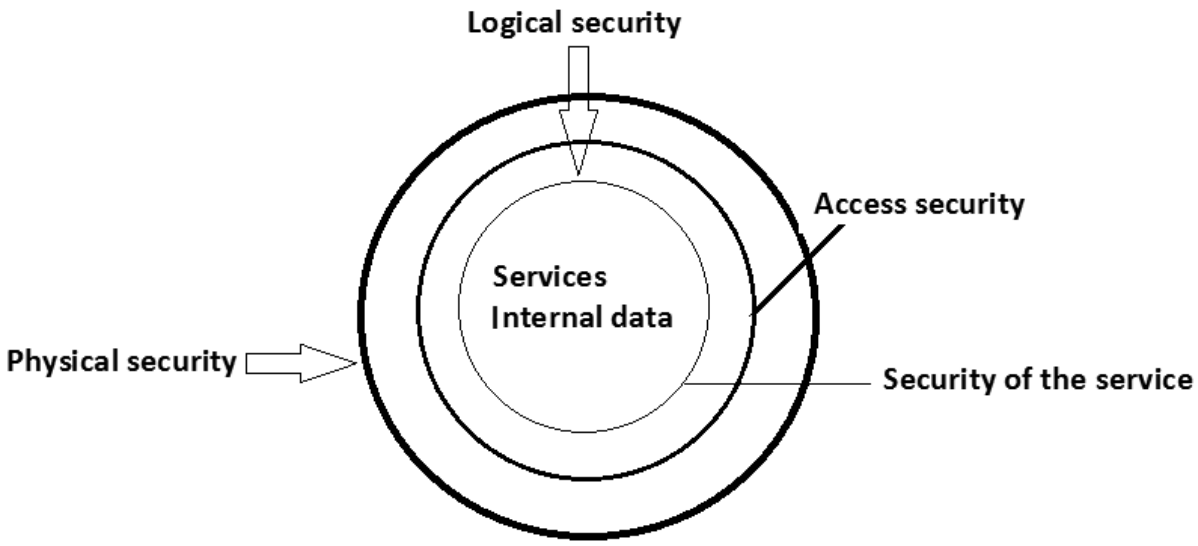
A careful look at the main causes that allow cyber attacks to succeed (Bendovschi, A., 2015) shows that in more than 50% of cases, the success of a cyber attack is only partly due to the attacker's expertise and skill, while allowing vulnerabilities in system frameworks, human error and / or insufficient level of security controls implemented. To support this conclusion, Cenzic detected at least one major vulnerability in over 95% of the systems analyzed in 2013, with an average of 14 vulnerabilities per application (Cenzic, 2014). Another very important result in the current research is that in at least 20% of the cases the attackers are not entirely foreign to the organization, among them business partners, former employees, etc.).

2. Information security

Computer security is now a vital issue for all computer system users, especially in the broader era of the Internet, whether they are service providers or are simple users. The growing need for communication, on the one hand, and information protection, on the other, are two different, if not even opposite, requirements.

The implementation of a modern security system in accordance with (Tăbuşcă, 2009) provides for protection on several levels (**Figure no. 1**).

Figure no. 1: Security levels



The first level is provided by *physical security*. Physical security generally consists of "locking" equipment, placing it in special rooms away from fire, weathering, physical destruction, whether intentional or not. It is a measure applicable to all computing systems, but less feasible in the case of networks, especially those of medium size, and even less of those with large area of spreading. The second level of protection is provided by logical security and includes the schema of methods for controlling access to system resources and services.

Logical security deals both with security of access, as a first sub-level, as well as security of services, sub-level that is "under" security of access in terms of security structure. **Access** security includes: access to the system, responsible for determining whether and when the system is accessible to users, and especially under what conditions. He is responsible for managing the access record. Access to the system can also force forced disconnection in certain cases (account expiration, peak time, etc.); verifying access to an

account at the level of name and password validation; access rights (files, resources, services, etc.) that determine what privileges are available either to a user or group of users.

Service security is concerned with: controlling the services responsible for warning and service status reporting, as well as activating and deactivating the various services provided by the system; service rights that determine how a given service uses a given service (access to files, resources, priority, etc.).

Basically, once the logical connection is established, the access security subsystem validates access or not. The service security subsystem monitors user activity and takes action in cases where its requests exceed the rights specified in the user's profile. Access to a perfectly secure system should be done through these security levels, without being allowed to bypass any of them.

3. Mutations induced by automated data processing on financial accounting management and audit work

The main mutations induced by the use of highly computerized information systems on financial and accounting management (Oprea, D., 2008) refer to:

- Removing the traditional way of keeping documents and managing them - *more people can access the same data*;
- Concentration trend of data processing - *the risk of unauthorized loss or consultation increases*;
- The dominant principle of automatic data processing (P.A.D.) GIGO (garbage at the entrance - garbage at the exit) - *an error in an integrated system propagates rapidly*;
- Additional requirements for those in charge of data protection who: - can not understand the ways in which data can be accessed in secret (for stealing or modifying) *or fail to detect where and who has remote unauthorized access*;
- P.A.D. changes information support and means of work and protection: *increases the density of information* - easy to hide; obs*curity or invisibility of information* - can not be visually notified; *very easy accessibility* - new categories of criminals; *lack of traceability* - modification or addition of new, easy to make and hard to find data; *retention of media* - deleted data can be recovered; *data aggregation* - can reveal vital elements.
- Not knowing the computer - *is overwhelmingly confident*;
- Technological progress in accessing data increases but not in their security;
- Strong integration of systems - has increased appetite for *fraud* and facilitates the proliferation of *errors*;
- Processors are very vulnerable to hardware specialists - *modify* the registry and use privi*l*eged instructions;
- Communication facilities - serve as a means *of fraud* by intercepting the transmitted signals;
- Remote terminals can be *controlled and hijacked* by special devices;
- The more complexity increases, the greater the risks.

4. Risks in financial audit activity and risk attitude in cyber attacks

Professional judgment in the audit is exercised in a context of risk (Gray and Manson, 2005). The idea of risk and insurance has been present in the economy and business since the beginning of the period when man began commodity exchanges. The process of globalization, the economic crisis triggered in 2007 and increasingly frequent cyber attacks have made the risk of gaining new valences, being more diversified in nature, and being approached more by any economic entity. Although the notion of risk is unanimously accepted, it is accepted that the risk relates to unpredictability, decision-making and potential loss. The risk is related to the decision-making process (March and Shapira, 1987), and any decision taken in the economic field in general and in business in particular involves some degree of risk. Faithful image and significant misstatement are assessed in the auditor's professional judgment based on risk. Kendrick (2004)

emphasizes the importance of understanding personal attitudes about risk, and believes that attitudes and risk behaviors are key dimensions in understanding risk. The attitude of risk decision makers in cyber attacks can be assessed by the level of top management involvement in deploying complex security systems.

At the level of an audited economic entity, the audit risk in general is manifested through its basic components: **inherent risk, control risk and non-detection risk**, and can be determined both in quantitative terms (in percentages) and in qualitative terms (*risk low, moderate, high or very high*).

Given the risks of cyber attacks on audited information systems, the quality level of security systems and **the level of security risk** should be assessed.

To assess the quality of security systems and to quantify the level of security risk there are many concerns in the world of specialists. One of these is provided by the Mehari, a registered trademark of CLUSIF (club de sécurité de l'information française), which provides: bets analysis guides, security assessment, and security risk analysis. Among the practical facilities offered, Mehari provides its own knowledge base that allows quantification of the quality level according to the implemented or non-implemented activities (controls). Quality levels defined by the Mehari method in increasing order from 1 to 4 are characterized by the fact that, for example, Quality Level 4 service: will remain active against all aggressions - could be broken in exceptional circumstances by the best code breakers in the world with the best tools. Under these circumstances, the risk is determined by the Mehari method as the difference between the maximum *level of quality 4* and the average level of security quality determined on the basis of a complex investigation of the security system.

Based on a study conducted with the help of 60 master students at the CAIG (Auditing and Management Information Management) in the years 2016-2017 at the companies they worked or worked on, a 2.73 average quality was achieved and therefore an average quality risk level of 1.27.

The main three deficiencies found on each security domain are summarized in **Table no. 2**.

Table no. 2: Three deficiencies noted in each area security

Domain	Incorrect or incomplete activities implemented
1. Organization of security	**No** classification of the information (documents, data, files, databases, etc.) has been performed depending on the impact of a disaster that could affect this enterprise information.
	There is **no** clause in the employment contracts or in the internal regulation which specifies the obligations to observe the set of security rules in force.
	The risks associated with third-party access (suppliers, customers, investors, etc.) have **not** been analyzed in the information system or in the sites containing information and the necessary security measures have not been established.
2. Site security	There is **no** procedure to allow for subsequent detection of irregularities in the management of access authorizations (badge or book not returned, lost, false, etc.).
	There is **no** system in which to ensure that the same badge can not be used by a second person (eg by storing all entries and not allowing an extra entry without a previous exit)
	Not all possible access ways are monitored in addition to normal access control, access via other routes (such as outside accessible windows, emergency exits, false floorings or ceilings).
3. Security areas	There is **no** power control system that includes at least one uninterruptible power supply for the most sensitive equipment.
	Electrical circuits and cables are **not** protected by surge and lightning equipment.
	No inventory or classification of all types of sensitive locations has been made.
4. Extensive networks	It is **not** checked whether the use is made in accordance with the configuration and the need for user use.
	There are **no** sufficiently effective penalizing clauses on the quality of services provided by the service provider.
	Disaster recovery solutions are **under-exercised**.

Domain	Incorrect or incomplete activities implemented
5. Local network	The local network was **not** partitioned into security domains, each requiring a set of security rules, or in trusted areas where controls are specifically tailored.
	There is **no** procedure for handling inter-domain connection requests and a group to deal with the analysis of these requests, with their authorization and the definition of filtering rules to be implemented (firewall, service requests, protocols , etc.).
	No systematic analysis of potential single failure points has been carried out to ensure that service equipment (such as power, air conditioning, etc.) does not affect the planned redundancy of network equipment or network architecture.
6. Network Operations	There is no security policy directed at staff operating on the network covering all aspects of information security (information confidentiality, availability of information and services, integrity of information and configurations, ability to track operations, etc.)
	It is **not** mandatory for all maintenance operations to end with a systematic check of all security parameters (as defined at start of implementation).
	The system configuration integrity is **not** regularly tested according to the expected theoretical configuration requirements (at least weekly, if not every time the system is activated).
7. Systems architecture and logical security	There is **no** regular audit, at least once a year, of the set of rights assigned to each profile and profile management procedures.
	There is **no** systematic updating of the authorization table when changing the function.
	The process of assigning or changing user IDs does **not** comply with a set of rules that ensure their intrinsic validity. In the case of passwords: adequate length (8 characters or more), mandatory mix of different character types, frequent change (at least once a month), the impossibility of reusing old passwords, banal words, nicknames, names anagram, personal data, easy to find, etc.
8. IT Production Environment	These are **not** the same mandatory clauses for entrepreneurs working with operating systems as for internal staff.
	There is **no** routine check to verify if the rights of the personnel managing system operating systems have changed which could trigger an alert if this happens.
	Reference documents are **not** protected by secure methods, against premature or unlawful modification.
9. Security of processing	There is **no** procedure detailing the actions to be taken in the event of an error or alert.
	There is **no** one or more applications capable of analyzing individual data diagnosed with anomalies and triggering an alert to operational personnel.
	There are **no** mechanisms for stopping recording and processing of recordings when an alarm is triggered.
10. IT projects and security development	There are **no** studies and reviews of the new project presenting the risks, the decisions taken on whether or not to accept it, and any additional necessary security measures.
	Upon the purchase of a new application, there is **no** guarantee that the competence and availability of the supplier's maintenance staff allows them to respond satisfactorily to user maintenance requests. This agreement should take into account the weekend and holiday times as well.
	When developing a confidential application, profiles are **not** established to allow confidential information to be shared so that access to them is restricted to people who have a real need.
11. Managing user workstations	Control procedures related to user configuration are **not** subject to periodic auditing.
	The compliance of workstation hardware configurations is **not** regularly checked against authorized options.
	The IT department does **not** manage a reference for each software installed on user workstations (source and executable code).
12. Telecommunications operations	There is **no** regular audit, at least once a year, of the effective implementation of the assessment, signing and resembling procedure by the operational staff (directly or indirectly employed by a service company) of the security obligations.
	Security measures designed to counteract the identified new risks are **not** formally reviewed before implementation.

Domain	Incorrect or incomplete activities implemented
	Service contracts do **not** detail the required time intervals and days of intervention that are compatible with availability requirements.
13. Management processes	The **PPI** (Personal Information Protection) Directives do not cover all legal obligations, including those relating to the collection, access, communication, use, storage and destruction of such information.
	There is **no** committee attached to government bodies responsible for developing financial data communication and regularly studying and solving different issues.
	Nu se realizează evaluări periodice care vizează nivelul de cunoaştere a personalului cu privire la protecția sistemelor informatice şi a mecanismelor de securitate.

Conclusions

Given that cyber attacks have increased year by year and computer system users have become facilitators or accomplices from targets, the popularization of the main mechanisms to make these attacks is not only necessary but even mandatory. The auditor, when auditing the activity of a highly computerized entity, in the audit risk assessment, along with its core components: i**nherent risk, control risk and non-detection risk** must introduce a new component **specifying the level of security risk**, without which a quality audit can not be achieved. În condițiile în care atacurile cibernetice au crescut an de an şi utilizatorii sistemelor informatice, din ținte au devenit facilitatori sau complici, popularizarea principalelor mecanisme de realizarea a acestor atacuri este nu doar necesară ci chiar obligatorie.

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The diversification of income sources in the higher education public institutions budgets

Abstract

The formation of public institutions income has been approached nationally and internationally alike. In concrete terms, the dependence on a single financing source can cause financial instability at the level of public universities. That is the reason why strategic management in education institutions needs to focus on attracting revenue sources, other than subsidies from state budget, and their use in the context of financial autonomy can ensure the achievement of goals in the institutional strategy.

This research is based on literature review on the need to diversify universities' financing sources and the means to achieve that. The identification of complementary sources for financing education – a real challenge for universities – can lead to an increase of their competitiveness nationally and internationally.

Our research highlights the relevance and the problematic of diversifying financing sources of public universities. To this end, it centralizes types of extra-budgetary revenue sources: revenues from educational taxes, from registration and enrolment taxes, from resits taxes, from services taxes, etc. Various policies on educational taxes are also analysed, in the context of the competition among universities, as well as ways of ensuring provisions in the case of a decrease in the attractiveness of programs.

***Keywords**: Public sector, education, financing education, budget, higher education*

***JEL Classification**: I22, G32*

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Introduction

The diversification of financing sources in public higher education institutions' budgets is a problem that is debated internationally, an aspect highlighted by stakeholder organizations' preoccupations. Among them, the European University Association (E.U.A.) offers its members the opportunity to influence those policies which can support the development of higher education and research in European universities.

The leaders of higher education system have important responsibilities in ensuring the proper environment for developing teaching and research activities, despite barriers created by excessive regulations and bureaucratic demands. That is the reason why Estermann and Pruvot (2015) underline the role of educational management in maintaining the balance between public responsibility, society and institutional autonomy.

Supported by a competent team and clearly defined strategic objectives, any modern university can manage the two extremely important management instruments: the Institutional development strategy and the University's budget. The Institutional development strategy correlates university autonomy with the university's financial and administrative management, allowing the creation of a value system at the level of the organisation and the creation of a single Budget, an instrument for applying the strategy and for ensuring financial balance (Stancu et al., 2011). In this way, the elaboration of the revenue budget involves various resources for attaining performance.

1. Literature review

The essence of budget design is represented by the allocation of resources and the identification of adequate expenses. At the same time, budgeting involves finding the balance between revenue and expenses, which requires decision-making (Rubin, 2016), a process that correlates the opportunities, resources and objectives of the university for long-term development, qualitatively and quantitatively.

Rabin (1992) asserts that the budget becomes an important landmark that reflects the degree of the state's involvement in economy and social life, as well as the capacity of the national economy to contribute to raising financial resources and managing them.

At first sight, designing a revenue budget does not seem to raise too many problems. At a closer look, the grounding of each sum transforms into a challenge. Gibson (2009) asserts that the design of a budget is a relatively easy task conceptually, but its elaboration becomes difficult, when the interests of stakeholders involved in attaining this objective do not coincide with management's objectives.

Taking into consideration budget autonomy, Stancu et al. (2011) state that the new financial strategy of higher education institutions, based on global financing, allows flexibility in management, and as a consequence institutions have the freedom to design, approve, execute and report their own budget in conformity with legislation and own objectives. On the other hand, Jongblo (2010) considers that institutional performance can be obtained through two methods, which can be used individually or can be correlated: budget based on previous results or budgets based on projects.

At national level, in conformity with Law of education no. 1/2011, art. 223, public higher education institutions function as institutions financed through state budget funds, extra budgetary revenue and other sources. All these revenues are considered the institution's own revenues and are used by higher education institutions in the context of university autonomy, in view of achieving the objectives that fall into their field, according to state policy on higher education teaching and research.

At the same time, the study conducted by Estermann and Pruvot (2011) highlights that the students' financial contribution represents a valuable source of revenue for universities that adds to state financing, offering them a high degree predictability and the possibility for long-term investment. Still, Warner, quoted by Stancu et al. (2011) considers that each university needs to diversify financing sources by the development of activities that can generate revenue.

The decrease in the number of tax-paying students (see CNFIS's annual public report 2015) and the insufficiency of funds allotted from the state budget due to major budget cuts for education throughout Europe in recent years (see the studies of Estermann, Pruvot and Kulik, 2015), increase the pressure for responsible public expenses and focus management on diversifying financing sources in public higher education.

2. Research methodology

Our research is based on literature review as well as the analysis of reports that treat the theme of interest. We are making a synthesis of specific elements published nationally and internationally and we are underlining the relevance of diversifying financing sources in higher education public institutions.

3. The identification and grounding of financing sources at the level of higher education public institutions

All financing sources of higher education institutions in Romania are considered own revenue according to Law of education no. 1/2011, and the grounding of the revenues of higher education institutions takes into consideration the following dimensions:

a) State-budget financing

b) Income from other sources.

On the one hand, state budget financing is divided into institutional financing and complementary financing. Institutional financing is divided in turn into body grants, supplementary financing and institutional development grants – dimensions that are mainly determined by the number of enrolled students, on the basis of enrolment data received from each university, and allotted proportionally with the number of students (equivalent unit). The university's number of students (equivalent unit) per field is determined by calculating percentages, equivalent coefficients and cost coefficients per field. The distribution of budget funds takes into consideration competitive criteria based on international standards, as well as the compliance with quality and cost criteria.

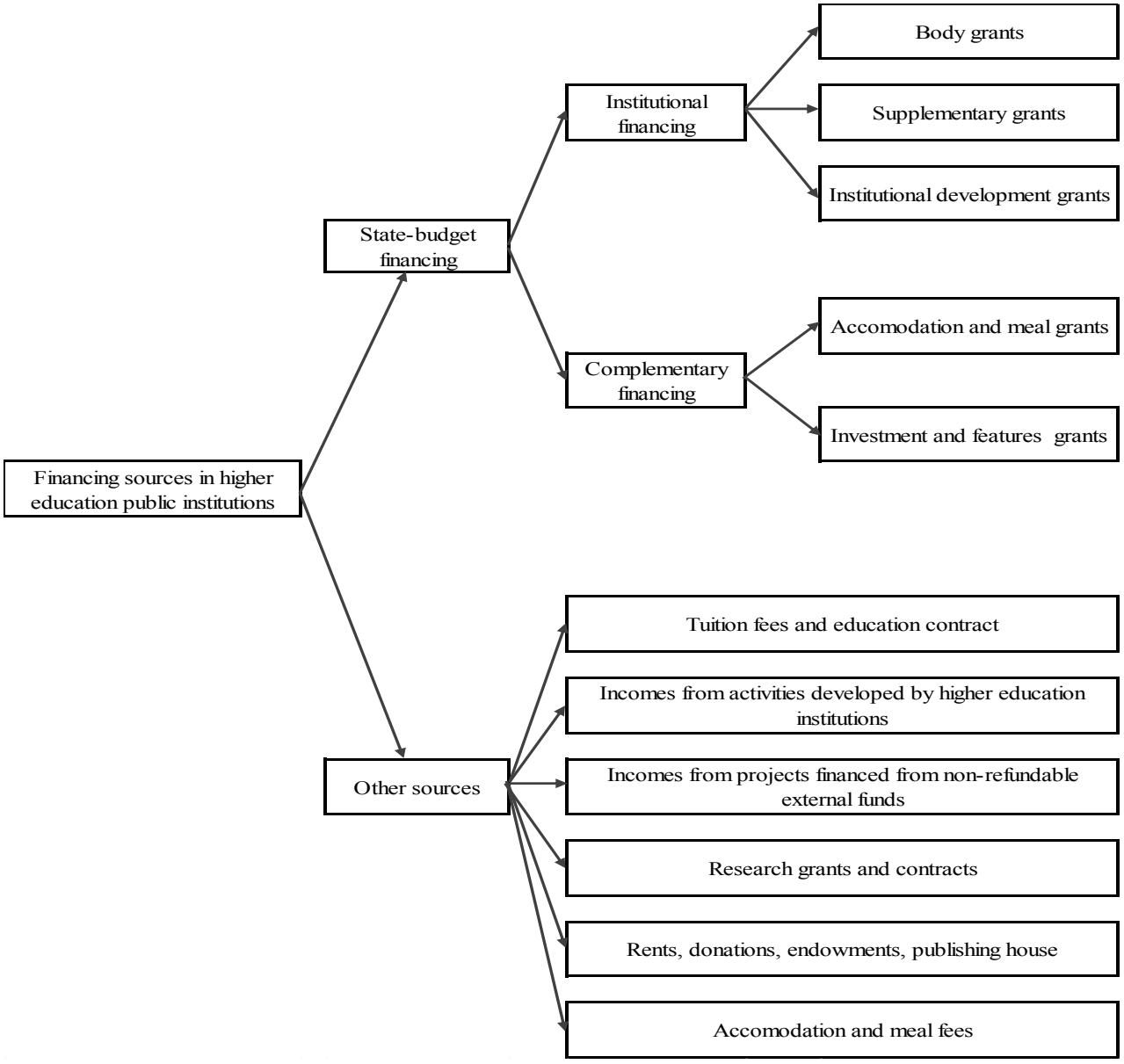
On the other hand, incomes from other sources are constituted from tuition fees and activities developed by higher education institutions, as follows: projects financed from non-refundable external funds, research grants and contracts, projects, consultancy and expertise, accommodation and meal fees, incomes from services, rents, donations, endowments and publishing houses. All these components are established by authorising officers of public institutions, with the approval of the superior authorising officer, through grounding based on provisions on revenue sources and the possibility to use them, by considering a series of criteria such as: the existence of the legal basis for obtaining revenue, preliminary execution for the reference year, corrected by probable influences provisioned for the future, as well as the analysis and comparative study of total revenue and expenses, in their dynamic, for each structure (Moşteanu, Vuță and Câmpeanu, 2002).

Rabin (1992) states that the budget becomes an important milestone in reflecting the state's involvement in the economy and social life, as well as the ability of the national economy to contribute to the constitution of financial resources and how they are managed.

For incomes from tuition fees, provisions are made mainly by taking into consideration the number of positions opened to students and the amount of the tax, along with the following factors:

- The number of students from the current year, enrolled in various programs (regular day program, part-time program, long-distance program);
- The number of students from previous years, enrolled in various programs;
- The accreditation of new undergraduate and graduate programs;
- The interest the students in previous years have shown towards programs;
- The existence of a competing university in the same geographic area;
- The university's decision to drop those programs that are not attractive etc.

Figure no. 1. Financing sources



Source: Authors' projection, 2017

To be able to make predictions about revenues from taxes, the university needs to research the annual dynamic of the number of students enrolled in various programs, correlated with the degree of attractiveness of similar programs from competing universities. Another extremely important factor that needs to be taken into consideration in the current social context is the dynamic of the drop-out rate of the university's programs.

These managerial efforts lead to an increase in the university's economic and administrative dimension, on which teaching, research and institutional dimensions are dependant. The university has been the place of creativity and knowledge-transfer, and has become the place of economic innovation and entrepreneurship.

To revenue from taxes is added revenue from registration taxes, which can be provisioned based on

the evolution of the number of candidates from previous years, as well as revenue from enrolment taxes, which can be provisioned based on the number of positions opened and the amount of the tax.

In the case of revenue from resit taxes and finals taxes, which are harder to estimate, one can opt for an extrapolation of revenue from the previous year, equally taking into consideration any change in the amount.

In this context, one needs to analyse carefully the possibility to increase taxes, by anticipating the decrease in the number of students, a policy that is justified by an increase in the quality of education, or to decrease taxes, with negative effects on the quality of students' education.

The educational taxes of public higher education institutions are an accessible financing resource, whose choice depends on public authorities, and fiscal policies, and reflects at the same time an openness towards choosing how to finance education (Estermann and Pruvot, 2011).

Although the main financing source in European universities is public subventions, the diversification of revenues in public education institutions has become a topic of debate and analysis in recent years. Reports show that the activity of EUA focuses on opportunities and challenges in the activity of attracting financing sources for the educational process, as well as on the development of financial management instruments (Estermann, Pruvot and Kulik, 2015).

In Guțu's opinion (2008), universities have to face the following challenges: the demography problem, the financing problem, the structure and organisation problem, the entrepreneurial environment problem, and the quality of the university products. The author quotes Harvey and Green (1993), who postulated the existence of five perspectives on the quality of university processes: excellence, standards, relevance, financial efficiency and adaptability. All these need to be obeyed under the umbrella of honesty, social responsibility and academic integrity. The university should not become a predominantly economic organisation, and needs to preserve its condition as a promoter of culture and science, but also adapt to the demands of current times.

Initiative and competition in higher education need to be encouraged, which involves adequate financial support (Stancu et al., 2011). The promotion of entrepreneurial initiatives in universities may represent a sure development mean, including financially.

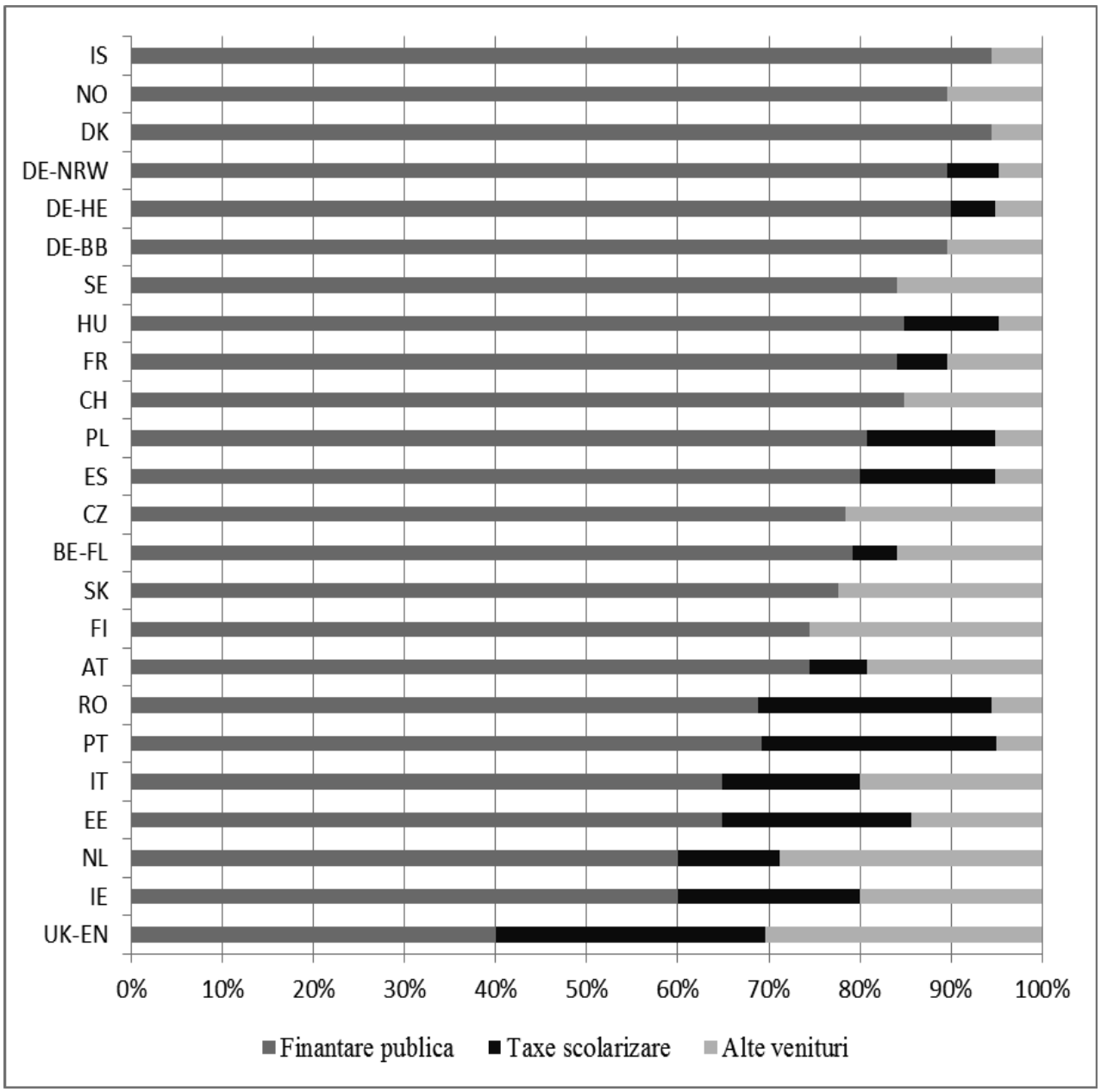
The continuous increase in the need for funds and the mounting pressure on using efficiently the limited resources of universities has become a reality through the development of various systems of financing for higher education (Teixeira, Biscaia and Rocha, 2014).

EUA studies, through EUA Public Funding Observatory, founded in order to monitor financing tendencies in public education institutions in Europe (Estermann, Pruvot and Kulik, 2015) show that the public higher education system is financed differently from one country to another, which leads to considerable differences depending on financing policies that exist in various European states. One needs to remark that in certain European countries public financing can be as high as 90% of the total revenue of universities, while other universities' public financing is lower than 50%, as shown in **Figure no. 2**.

From the analysis of the **Figure no. 2**, one can notice that for covering financing necessities, the most important source of revenue, apart from governmental financing, is represented by the educational taxes, whose variation can affect considerably the financial structure of a university and, implicitly, the means to attain the strategic objectives proposed by management (Estermann, Pruvot and Kulik, 2015).

At national level, legislative provisions become restrictive when the budgetary execution of revenue over the last two years imposes limits in grounding the budget project. If the percentage of own revenue projected in the budgets of public institutions over the last two years is lower than 97% every year, these institutions document own revenues for the current year no higher than the limit achieved in the previous year, in conformity to Law no. 500/2002 on public finances.

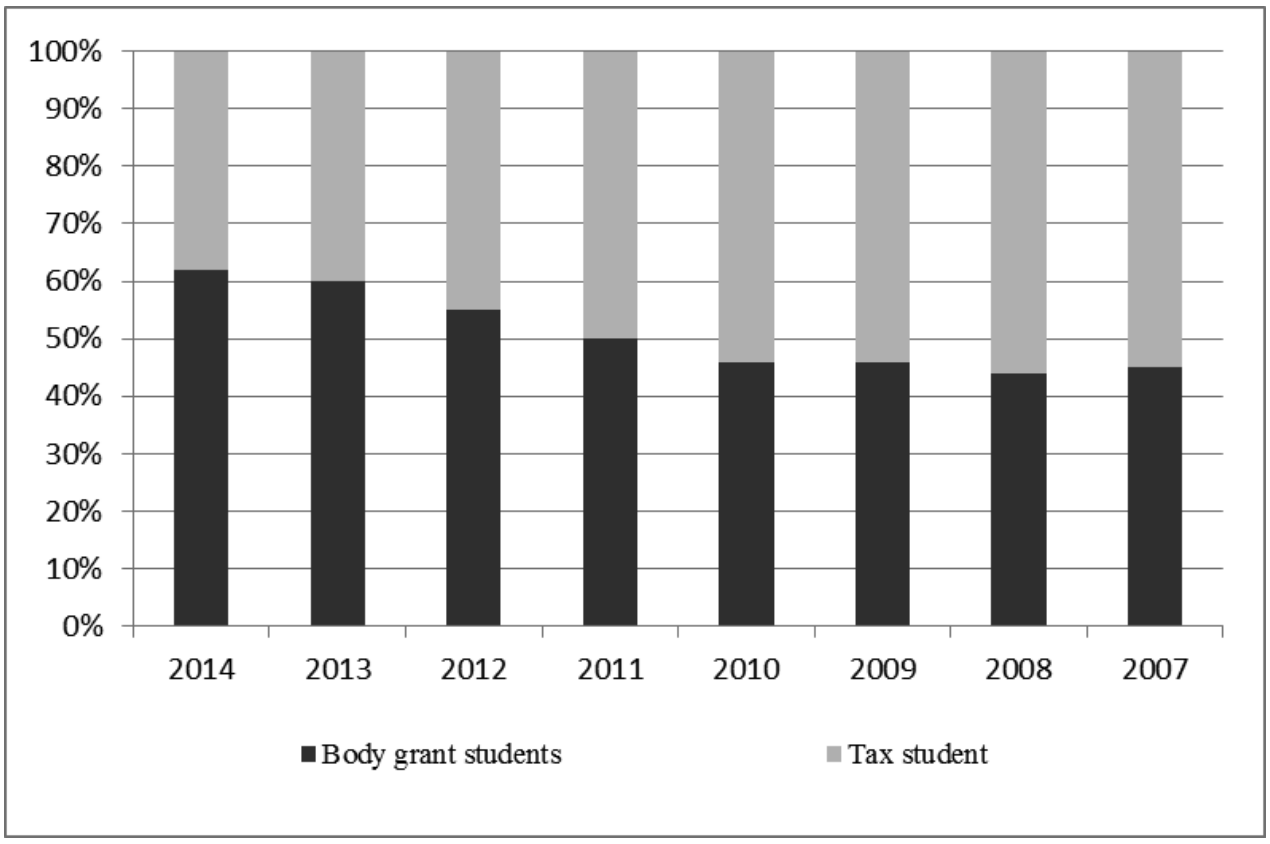
Figure no. 2: The average revenue in public universities in Europe



Source : Estermann, Bennetot and Kulik, 2015

One important difficulty in grounding the budget is the decrease in student population for some programs, which renders them unsustainable. On the other hand, national quality standards require universities to create provisions that allow studies or programs in difficulty to continue, for students to be able to finish their studies. In the report elaborated by the Ministry of National Education (2016) it is mentioned that we are witnessing a significant decrease of tax-paying student numbers, as shown in **Figure no. 3**.

Figure no. 3. The percentage of tax students in Romania



Source: National Education Minister, 2016

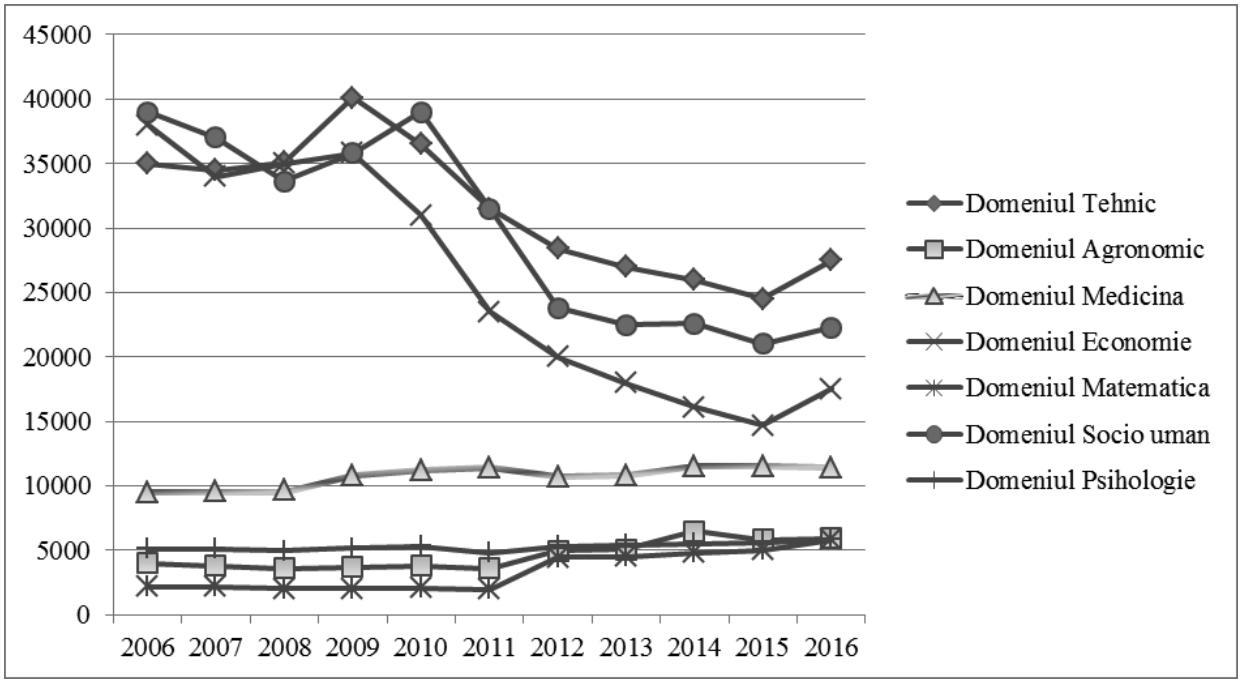
The decrease in the tax-paying student numbers leads implicitly to the decrease in revenue obtained by universities from extra-budgetary sources.

In the UEFISCDI-CNFIS report (2016), the organization presents the evolution of tax-paying students' enrolment in higher education in fields of study in the period 2006-2015. One can notice a steep decrease in the tax-paying students' enrolment in recent years, with a slight improvement in 2015. The peak was reached in 2009, and afterwards the evolution of enrolment decreased dramatically because of the economic crisis. See data in **Figure no. 4**. UEFISCDI – CNFIS (2016) identifies the following supplementary sources for financing higher education institutions: extending the recruitment of foreign students, financing by the private economic agents interested in supporting some programs and European financing.

As regards financing, a strong instrument for monitoring academic structure, two situations are known: the first, where the state favours the development of diversified, comprehensive academic structures, which results in lower subsidies and the second, where the state subsidises higher education through designing financing programs that can stimulate successful universities (Stanciu, 2013). This reality raises the theme of the universities hierarchies.

One way of maintaining a university's sustainability can be to drop unsuccessful programs, which at first sight means a decrease in fundamental financing. However, an improvement can be obtained by approaching professional educational marketing policies, which can lead to an increase in the number of candidates for truly attractive programs.

Figure 4. The evolution of enrolment in the period 2009-2015



Source: UEFISCDI – CNFIS, 2016

Conclusions

Maintaining a balance between public responsibility and institutional autonomy assumed by university management can be obtained by correlating dynamically the development opportunities, the identification of necessary financing resources and the establishment of objectives in view of obtaining high performance academically.

Institutional financial instability, which can be generated by the dependence on a single financing resources at the level of public higher education institutions – a variable resource itself, dependent on context – can be counteracted by the diversification of revenue sources, by attracting external funds as well as by developing internal activities that can generate financial resources. This aspect can be a challenge for the institution's management, but can also lead to an increase of competitiveness locally and internationally.

To conclude, attracting extra-budgetary financial resources for long-term development becomes a crucial strategic objective in universities.

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On hedge effectiveness assessment under IFRS 9

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Abstract

IFRS 9 has introduced certain radical changes to the hedge effectiveness assessment criteria of IAS 39 for entities desirous of availing hedge accounting. It is necessary for business entities contemplating the use of financial derivatives for hedging purposes to appreciate the nuances associated with the upstaged provisions of hedge accounting of IFRS 9 in context of hedge effectiveness requirements envisaged therein. The present article addresses this issue and provides a threadbare analysis of the fundamental model on which the IFRS 9 hedge effectiveness assessment is premised.

***Keywords**: IAS 39, IFRS 9, hedge accounting, hedge effectiveness, risk management.*

***JEI Classification**: M41; M42*

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Introduction

Phase wise pronouncement of a new International Financial Reporting Standard (IFRS hereinafter) entitled IFRS 9: Financial Instruments was made by the International Accounting Standards Board (IASB hereinafter) in three phases with the first phase being notified in November, 2009. Provisions on hedge accounting are contained in the third and final phase of IFRS 9 which was pronounced in November 2013. The extant directives of IASB on hedge accounting contained in International Accounting Standard (IAS hereinafter) 39 are proposed to be replaced by the provisions of IFRS 9. Entities following IFRS based accounting shall be mandatorily required to implement the provisions of IFRS 9 with effect from January 1, 2018 (IASB, 2008, 2012).

The philosophy underlying IFRS 9 is to rationalize the accounting provisions in relation to financial hedges in a manner to better reflect the nexus between the risk management strategies adopted by accounting entities and the accounting framework followed for the reporting of such practices. This would enable a precise depiction of the management's practices relating to the mitigation of risk by the reported financials. An overall simplification of the hedge accounting procedures and disclosures is also envisaged. Empirical studies point to difficulties in comprehending and applying the present accounting and reporting processes for derivatives (Chang et al, 2016).

Serious concern was voiced by stakeholders associated with the IFRS accounting framework about the lack of alignment between the provisions of IAS 39 and the risk management strategies of the hedging entities. For instance, many entities adopt hedging strategies in relation to forecasted purchase or sale of commodities or other non-financial assets that are aimed to hedge a particular constituent of the total price. However, IAS 39 based hedge accounting provisions require that the hedged risk be designated as the variability in total price. This causes the recognition of hedge ineffectiveness and may, in some instances, result in the hedge failing to qualify for hedge accounting altogether. It seemed that the accounting treatment prescribed for various risk management practices strongly influenced the choice of the practice. Ideally, the role of the accounting should be confined purely and solely to an unbiased reporting of the economic impact of the strategy pursued by the entity for risk mitigation and should be completely extraneous to the choice of the strategy. Stated otherwise, the financial reporting of a strategy should be based on its economic impact on the entity. The economic optimality of the strategy should not be impacted in any manner whatsoever by the accounting and reporting procedures in the given decision making scenario. However, it was observed by various interest groups that, in efforts to rope in hedge accounting under IAS 39, entities implemented sub-optimal risk management strategies or else, strategies perceived by the entities to be optimal failed to qualify for hedge accounting under IAS 39, causing reporting of non-existent enhanced, economically unjustifiable, earnings volatility (IFRS Foundation, 2013; Kalban, 2014; McCarroll and Khatri, 2014; Panaretou et al., 2013).

1. The backdrop: testing hedge effectiveness under IAS 39

Mandatory periodic testing of hedge effectiveness is prescribed for hedge accounting under IAS 39. In this context, hedge effectiveness is the extent to which fair value or cash flow variations of the hedging instrument are able to offset variations in the fair value or cash flows of the hedged item. This offsetting of the designated risk exposure by the derivative or the ability to do so needs to be established by the accounting entity through an appropriate methodology, statistical or otherwise, to be documented at the initiation stage. Importantly, the standard setters are conspicuously silent on the issue of prescribing specific methodologies for assessing hedge effectiveness. It is left to the entities and their auditors to determine the appropriate methodology and the corresponding inferences. Nevertheless, high hedge effectiveness needs, initially, to be established on a prospective basis. Thereafter, the fact that the hedge has been highly effective must also be testified retrospectively. Failure to qualify the effectiveness test would mandate discontinuance of hedge accounting. Such discontinuance shall commence from the latest date till which the hedge had been shown as effective. Fair value changes after such discontinuance are required to be taken to the income statement forthwith. If an event or a change in circumstances is responsible for precipitating the hedge ineffectiveness, discontinuance of hedge accounting shall commence from the timing of such event or change

in circumstances provided that the entity can establish effectiveness prior thereto. IAS 39 does not provide for rebalancing of a hedging relationship that has once become ineffective. Furthermore, the standard also does not allow for adjustments to the hedge not documented at the inception stage. The original relationship has to be discontinued in case of an ineffective hedge. A fresh hedging relationship is created on the rebalancing of a hedge that needs to be re-designated as such. Numerical tests are usually required to establish that the amount of offsetting achieved by the hedge is in the permitted range. This makes the process of effectiveness testing under IAS 39 extremely tedious and time consuming. If the hedge effectiveness tests fail to meet the prescribed criteria, the entity cannot adopt hedge accounting.

1.1. Methods of hedge effectiveness testing

Lack of specificity in the standards has led to the evolution of a variety of approaches for assessing hedge effectiveness, even though the basic requirement remains that gains or losses in derivatives should offset changes in fair values or cash flows of the hedged item. The issue of methodology surfaces at the point in time when it needs to be assessed whether a particular hedge is effective. A critical review of the following commonly adopted methods for effectiveness testing is consigned to the Appendix to retain the flow and continuity of this article viz. (a) Dollar Offset Method; (b) Relative Difference Method; (c) Variability Reduction Method and (d) Regression Analysis (Althoff and Finnerty, 2001; Kawaller and Koch, 2000).

1.2. Interpretation of "high effectiveness"

Neither IAS 39 nor IFRS 9 specify any bright line test for identifying highly effective hedging relationships from the ineffective ones. It, thus, follows that what is to be construed as "highly effective" is left to the judgment of the entity's risk managers subject to the audit requirements. However, the standard does seem to link "high effectiveness" to "high correlation" among the price processes of the hedged item and the hedging instrument. "High correlation" is generally interpreted as the 80/125 rule in medicine and other applied and social sciences. In the current context, this rule requires that the cumulative changes in the value of the hedging instrument should offset between 80% and 125% of the cumulative value changes in the fair value or the cash flows of the hedged item (Swad, 1995; Lipe, 1996).

1.3. Prospective and retrospective testing

IAS 39 requires hedge effectiveness testing on a prospective as well as a retrospective basis. Both such testing exercises need to be conducted with a quarterly periodicity or each time the financials are reported until the liquidation of the hedge. Retrospective testing should be on the basis of data that includes actuals since hedge inception, although other historical data may also be included. Retrospective assessment may be achieved on the basis of either (i) the changes in fair value or cash flow that occurred during the assessment period, or (ii) the cumulative changes in fair value or cash flow from the hedge's inception to date. The hedge achieves high effectiveness retrospectively if the ratio lies in the critical range in either of the two cases (Finnerty and Dwight, 2002). For prospective testing, the number of past periods' data to be considered needs to be decided. If data of only one prior period is used to calculate a test statistic, then the hedge either passes or fails the test. On the other hand, if the test statistics are calculated for more than one prior period, then effectiveness may be assessed either by requiring that (i) the hedge should satisfy the test in every period or (ii) the hedge must satisfy the test in a high proportion of the periods e.g. 80% or 90%.

2. The foreground: testing hedge effectiveness under IFRS 9

Several revolutionary changes have been introduced in the effectiveness testing philosophy and methodology by IFRS 9. These are, perhaps, the cardinal advancements over IAS 39 that would facilitate better alignment between the entity's risk management strategies and the financial reporting thereof. The significant changes to the effectiveness testing requirements introduced in IFRS 9 include (Althoff et al., 2014; BDO, 2014; Deloitte, 2013; Du Plooy et al., 2014; KPMG, 2013; PwC, 2013):

(a) The removal of the 80/125 percent offset requirement and replacement with a principles based effectiveness test;

(b) The removal of retrospective effectiveness testing requirement leaving only a prospective assessment to be done at the beginning of each hedged period; and

(c) Increased flexibility in how hedge effectiveness is demonstrated.

However, the need to measure and recognize hedge ineffectiveness is not altered under IFRS 9.

2.1. Assessment and measurement

The assessment of hedge effectiveness needs to be differentiated from its measurement. The assessment aspect ascertains the eligibility of the hedging relationship for hedge accounting. If the hedging relationship is found eligible for hedge accounting and if the entity chooses to adopt such accounting procedure, then the hedge ineffectiveness (except for a cash flow under-hedge) needs to be measured and recognized to the income statement forthwith. While the requirements of IAS 39 and IFRS 9 are significantly different with respect to the former, both require that hedge ineffectiveness be measured and dealt with identically.

2.2. Effectiveness criteria under IFRS 9

The effectiveness requirement under IFRS 9 comprises of the following: (i) there should be an underlying economic relationship between the hedged item and the hedging instrument that should be vindicated either by qualitative or quantitative means; (ii) credit risk should not be the dominant factor contributing to the value changes that result from the economic relationship; (iii) the hedge ratio calculated from the physical volume of hedged item that the entity actually hedges and that of the hedging instrument that the entity actually uses to hedge the said volume of the hedged item shall also be used for the hedging relationship in context of hedge accounting. However, that designated hedge ratio shall not reflect an imbalance between the weightings of the hedged item and the hedging instrument that would create hedge ineffectiveness (irrespective of whether recognized or not) that would be such that it could result in an accounting outcome that would be inconsistent with the purpose of hedge accounting. Thus, IFRS 9 does not prescribe any numerical range of effectiveness that needs to be met by the hedging relationship to achieve eligibility for hedge accounting. All that is required is the subsistence of an economic relationship, not dominated by credit risk, and the designation of the appropriate hedge ratio. It follows that if a hedging relationship persistently returns some ineffectiveness, the onus of establishing existence of continued economic relationship as well as the appropriateness of the hedge ratio would lie on the entity's management.

IFRS 9 has also introduced substantial modifications in the provisions underlying the treatment of ineffective hedges. Rebalancing of ineffective hedges is provided for in IFRS 9, thereby not requiring such hedges to be discontinued forthwith. Entities may discontinue ineffective hedges only when such rebalancing attempts fail. IFRS 9, however, retains the methodology of IAS 39 for measuring and dealing with hedge ineffectiveness (Deloitte, 2012; Ernst & Young, 2011, 2014a,b,c).

2.3. Existence of economic relationship

The existence of an "economic" relationship between the hedging instrument and the hedged item implies that the two must be expected to move in opposite directions as a consequence of a causal economic influence of the risk stimulus being hedged. A mere statistical correlation does not, of itself, provide conclusive evidence of the existence of such causal relationship although it would definitely corroborate evidence vindicating such an inference.

As in IAS 39, the standard setters have chosen to leave open the choice of methodology to be adopted by the entity for demonstrating the existence of economic relationship between the hedged item and the hedging instrument. The important point here is that the method should capture all the relevant characteristics of the hedging relationship. Among the quantitative approaches, correlation and regression analysis are immensely popular, although any of the other methods cited above may be adopted. Such quantitative results would serve as powerful corroborations to rationale and logical economic flows in cases where unambiguous inferences are not forthcoming on the basis of qualitative reasoning alone. It needs to be emphasized here that in a vast majority of hedging relationships, risk managers would, by default, use hedging instruments having some explicit "economic" relationship with the hedged item to hedge an exposure since such choice may result in an increased chance to meet hedge accounting criteria as well as enhance the prospects of the hedge achieving the desired economic results. An instance where a mere qualitative assessment would suffice is presented below:

Consider an entity that has foreign currency exposures in both US Dollars (USD) and Canadian Dollars (CAD). The entity observes that the CAD shows strong association with the USD as evidenced by the CAD/USD rate moving in an extremely narrow band over a sustained time frame. In view of this, the entity infers

that an economic relationship exists between USD linked derivatives (with the USD as the underlying) and CAD exposures. It, therefore, adopts the strategy of aggregating exposures in both these currencies and thereafter using USD linked derivatives for hedging. All variations of the CAD against the USD in the band are accounted for as a source of ineffectiveness for all hedges in which the hedged item relates to amounts denominated in CAD.

2.4. Non-domination of credit risk

As the second requirement for hedge effectiveness, IFRS 9 mandates that the effect of credit risk should not dominate the value changes that result from the economic relationship between the hedged item and the hedging instrument. The credit risk referred to herein would include the credit risk on the hedged item as well as the hedging instrument. Further, credit risk could relate to that of the counterparty or the hedging entity itself. The issue of credit risk and financial stability in context of IFRS 9 has been conceptually examined (Novotny-Farcas, 2016).

2.4.1. Interpretation of "Dominate"

Due exercise of judgment and discretion is warranted by the entity's management on two counts. Firstly, in ascertaining the impact of (quantifying) the value changes due to the credit risk and thereafter in assessing whether such impact "dominates" the value changes due to the hedged risk or otherwise. For this purpose, "dominate" in context of the current provision would mean that the price changes (of the hedged item or the hedging instrument) due to the credit risk would significantly exceed the price changes due to the hedged risk factor.

It is pertinent here to emphasize that the assessment of the impact of credit risk on value changes for the purposes of hedge effectiveness needs to be differentiated from the accounting prescription to measure and recognize the impact of credit risk on the hedged item and the hedging instrument. This is required to ascertain the quantum of hedge ineffectiveness, if any, to be carried to the income statement.

However, the standard does explicitly provide for the ignoring of small changes in spite of such changes being due to credit risk and exceeding the changes due to the hedged risk in a particular period. Thus, the standard provides for both, a relative and an absolute assessment.

More likely than not, the assessment of the effect of credit risk would be qualitatively achieved. It is usual for the risk management policies of entities to define counterparty risk limits ab initio. Regular monitoring of the credit standing of these counterparties would, then, be prescribed. In the event of a significant decline in creditworthiness, the policy may provide for initiation of appropriate corrective measures e.g. of closing out derivative positions with this party and novating it to another party (in which case, the hedging relationship would need to be discontinued), or calling for collateral or other credit enhancements (which would significantly improve the hedging relationship). Occasionally, however, regression or other statistical methods may be adopted e.g. for identifying factors that are contributing to a low offset in a particular relationship and to assess the magnitude of their influence.

2.4.2. Hedged item credit risk

Credit risk does not exist for all types of hedged items. Current assets like inventories etc. are devoid of credit risk. Even forecast transactions do not carry credit risk since the transactions are only anticipated but not committed. Credit risk may be construed as the risk of a financial loss to a party to a financial commitment / instrument in the event of the other party failing to discharge its obligation. It follows that credit risk can only subsist in situations where the entity has a contractual involvement. Thus, the entity's lendings would normally have counterparty credit risk, while its financial borrowings and liabilities would bear the entity's own credit risk.

It is mentioned above that forecast transactions do not carry any credit risk. Nevertheless, the credit risk affecting the counterparties involved could significantly influence the assessment of whether a forecast transaction is highly probable, as is required under other provisions of IFRS 9. A very simple example illustrates the point. Consider a US entity selling a product to only one customer in Germany. The sales are denominated in Euros. The US entity does not have alternative customers for the product in Germany. In this situation, the credit risk of the German customer would definitely influence the probability of the US entity's forecast sales

in Euros. The converse may also hold i.e. if the US entity has a wide German customer base for its product sales (in Euros), the potential loss of a particular customer may not significantly affect the probability of the entity's forecast sales in Euros.

It seems opportune to illustrate here, the process usually adopted by banks for identifying the appropriate economic hedges for hedging of interest rate risk of their lending portfolios. For this purpose, we consider a bank desirous of hedging the interest rate risk of a portfolio of loans possessing similar credit risk characteristics. We, further, assume that the bank expects to collect 98% of the cash flows in this loan portfolio. Accordingly, the bank designates the first 98% of the cash flows only since the hedging should be confined to the cash flows the entity expects to collect. In fact, if the bank designates more than 98%, an economic over-hedge would result which would also increase the risk of credit risk dominating the value changes of the hedging relationship.

In contrast to IAS 39 that prohibited such designation of nominal components (usually referred to as the bottom layer), IFRS 9 allows such designation subject to the condition that all items included in the layer are exposed to the same hedged risk. This is necessary to ensure that the measurement of the hedged layer is not significantly affected by items that constitute the 98% layer from the overall 100% of the portfolio. It follows that the same kind of benchmark interest rate risk component of each loan has to be designated to make up the bottom layer. If the economic relationship of a particular loan with the benchmark interest rate gets dominated by the credit risk of such loan due to deterioration in its credit standing, so that its benchmark interest rate risk component no longer qualifies to be designated as a hedged item, then the loan will no longer be a part of the bottom layer until and unless loans with such a deterioration in credit risk exceed 2% of the portfolio.

2.4.3. Hedging instrument credit risk

The fair value of an account must necessarily reflect and incorporate the impact of counterparty's credit risk and the entity's own credit risk in accordance with the measurement scheme envisaged by IFRS 13: Fair Value Measurement. Changes in value of the hedging instrument due to the credit risk are likely to contribute to hedge ineffectiveness. Thus, the current provision requires that the expected impact of that ineffectiveness should not be substantial enough to nullify the offsetting effect of a significant change in the values of the hedged item by the hedging instrument.

Most over-the-counter derivative contracts between financial institutions are cash collateralized and, as a consequence, carry little credit risk for either party. Exchange traded contracts also have well developed settlement mechanisms in place to eliminate any credit risk. It follows that credit risk is unlikely to dominate the change in fair value of such hedging instruments.

2.5. The issue of "hedge ratio"

The ratio of the amount of hedged item and the amount of hedging instrument is termed as the hedge ratio. Usually, but not necessarily, it is the ratio that corresponds to minimum projected variance of the hedging relationship and depends on the correlation between the projected time series of price changes of the hedged item and that of the hedging instrument as well as the variances of the two series. In cases where the underlying of the hedging instrument coincides with the designated hedged risk, this ratio is 1:1.

The third effectiveness requirement is that the hedge ratio used for accounting should be the same as that used for risk management purposes. However, this does not imply that an entity must designate hedging relationships to the same extent as it hedges for risk management purposes. To illustrate, consider an entity that hedges 100 units of a commodity with a hedge ratio of 1.25 for risk management. It would, thus, require a notional amount of 125 units of the hedging instrument for the purpose of full hedging. The standard, then, (i) requires that the same hedge ratio (i.e. 1.25) be adopted in accounting for the hedge (ii) but leaves it open to the entity to designate the full 100 units of the commodity (hedged item) or less (e.g. 80 units of the commodity with a notional amount of 100 units of the hedging instrument) in the hedging relationship, while maintaining the same hedge ratio of 1.25. Furthermore, it needs to be emphasized here that the standard (i) requires only that the entity uses the same hedge ratio for accounting that it actually uses for risk management purposes; (ii) but does not require that the hedge ratio be such as to minimize ineffectiveness. Besides, in line with the spirit underlying these standards, IFRS 9 is silent on the use of any specific method for calculating

the hedge ratio. It follows by implication that the standard acknowledges the existence of no 'right' answer to this issue and, as such, feels that the matter be best left to the entity's management and the auditors. Furthermore, the fluctuation of the actual discount around any designated hedge ratio will give rise to some ineffectiveness.

To illustrate the computational nuances of the hedge ratio, we consider an entity that desires to hedge the price risk in relation to its raw material purchase requirements. The entity finds that derivatives on the raw material do not trade in accessible markets. It identifies a benchmark commodity with a well entrenched derivatives market. Although the price of the raw material is at a discount to the benchmark commodity's price, their ratio varies in a narrow band. A rolling 12-month regression at each month end is run between the commodity benchmark price and raw material price. This regression show that commodity futures price and the raw material price remain highly correlated and the regression slope varies between 1.084 and 1.122 over the recent months. This regression slope indicates that, on average, the commodity trades at about 10% premium to the raw material price which is consistent with the entity's long term perception. Therefore, to hedge its raw material price risk, the entity takes a long position in a notional amount of 1 tonne of futures on the benchmark commodity to hedge highly probable forecast purchases of 1.10 tonnes of the raw material.

Two points emanate from an analysis of the above illustration viz. (i) the hedge ratio being used by the entity need not necessarily be the one obtained from the most recent monthly regression, the standard requires only that the hedge ratio actually used for risk management purposes be also used for hedge accounting, not necessarily the one that minimizes effectiveness and (ii) that various entities may come up with different hedge ratios due to running different regression analyses (e.g., in terms of frequency and data inputs).

In an effort to deal with cases of deliberate under-hedging with the objective of either reducing the (i) creation of additional fair value adjustments to the hedged item in fair value hedges or (ii) recognition of ineffectiveness in cash flow hedges, the IASB has listed an exception to the general rule of identical hedge ratio for risk management and accounting purposes by providing that the "hedge ratio for accounting purposes be different from the hedge ratio used for risk management if the hedge ratio reflects an imbalance that would create hedge ineffectiveness that could result in an accounting outcome that would be inconsistent with the purpose of hedge accounting." The important point here is that under-hedging must be "deliberate" in order that this provision be invoked.

To illustrate the case of under-hedging in context of a cash flow hedge, we consider an entity that has a highly probable forecast purchases of a raw material of the average value of CXP 100 million per month. Desirous of hedging its raw material price risk, the entity looks for appropriate derivatives but finds that derivatives on the raw material are not traded. Futures with the closest underlying match have a slope in a linear regression analysis of 0.90, which indicates the appropriate hedge ratio. In an attempt to avoid recognition of accounting ineffectiveness, the entity longs futures with a notional amount of only CXP 70 million per month. It sets up cash flow hedges by designating the CXP 70 million of futures as hedging instruments of highly probable forecast purchases of CXP 100 million, using a hedge ratio of 0.7:1.

The above facts may invite the above under-hedging provision and the hedge ratio would be considered unbalanced and entered into only to avoid recognition of accounting ineffectiveness. Accordingly, the above actual hedge ratio may be superseded by the hedge ratio based on the expected sensitivity between the hedged item and the hedging instrument e.g. 0.90 based on regression analysis, for the purposes of hedge accounting.

As in IAS 39, it is mandated under IFRS 9 that the cash flow hedge reserve is to be adjusted for the lower of (a) the cumulative gain or loss on the hedging instrument or (b) the cumulative change in fair value of the hedged item. If (a) exceeds (b), the difference is recognized in profit or loss as ineffectiveness. On the other hand, no ineffectiveness is recognized if (b) exceeds (a).

Thus, in the above illustration, if the relative change in the fair value of the hedging instrument exceeds that of the hedged item due to the change in the relationship between the underlyings, recognition of some ineffectiveness will have to be accorded.

A "perfect hedge" is not envisaged by the standard. For instance, if the imbalance emanates due to the hedging instrument being available only in standardized contract

sizes and it thereby becomes impracticable to exactly meet its nominal quantity requirement, leading to some under-hedging, the hedging relationship would not be regarded as resulting in an outcome 'that would be inconsistent with the purpose of hedge accounting' and so would meet the qualifying criteria.

2.6. Prospective hedge effectiveness under IFRS 9

IFRS 9 has done away with the retrospective testing of hedge effectiveness and retained only the prospective testing. It, therefore, requires the entity to establish that the hedging relationship meets the three pronged criteria of hedge effectiveness at inception of the hedge and at each reporting date thereafter, in relation to the immediately following reporting period.

2.7. Fair value and cash flow hedges under IFRS 9

Using the 80/125 bright line for IAS 39, we provide a comparison of the provisions of IAS 39 and IFRS 9 with regard to the percentage change in fair value (FV) of hedging instrument recognized in income. In the absence of hedge accounting, 100 per cent of the change in fair value of the hedging instrument is recognized in the income statement with no offsetting amounts from re-measuring of hedged item (in the case of a fair value hedge). This procedure holds under IAS 39 as well as IFRS 9.

2.7.1. Fair value hedges

In the following, we assume that the Y coordinate represents percent changes in fair value (FV) of hedging instrument recognized in income net of any fair value hedge adjustments on hedged items in a fair value hedge and the X coordinate represents (in percent) the negative ratio of the fair value changes of the hedged item and the hedging instrument i.e. $-\frac{\Delta FV\left(hedged\ item\right)}{\Delta FV\left(hedging\ instrument\right)}$. Then, under IAS 39, we have $Y=\begin{cases}100\ for\ -\infty<X<80\\ -X+100\ for\ 80\le X\le 125\\ 100\ for\ 125<X<\infty\end{cases}$ while IFRS 9 provides that, if the hedge is assessed as highly effective on the basis of the three pronged criteria: $Y=-X+100$ without any numerical bright line limits.

2.7.2. Cash flow hedges

IAS 39 defines a cash flow hedge by the following equation: $Y=\begin{cases}100\ for\ -\infty<X<80\\ -X+100\ for\ 80\le X\le 100\\ 0\ for\ 100<X\le 125\\ 100\ for\ 125<X<\infty\end{cases}$.

When a cash flow hedge is assessed as effective, IFRS 9 provides that $Y=\begin{cases}-X+100\ for\ 0\le X\le 100\\ 0\ for\ 100<X\end{cases}$.

In circumstances, where the amounts deferred in reserves is the lower of (i) the cumulative gain or loss on the hedging instrument from inception of the hedge; and (ii) the cumulative change in present value of the expected future cash flows on the hedged item from inception of the hedge, both IAS 39 and IFRS 9 provide identical treatment of cash flow hedges. No ineffectiveness is carried to income for an effective cash flow hedge in circumstances where the cumulative change in value of the hedging instrument is less than that of the hedged item. Deliberate under-hedging in the case of cash flow hedges is not permitted under either standard.

2.8. Matched and mismatched hedging instruments

2.8.1. Matched hedging instruments

In cases where the critical terms of the hedged item and hedging instrument match and the hedging instrument has zero fair value at inception of the hedge, the existence of an economic relationship would prime facie stand established besides supporting a 1:1 hedge ratio. However, if hedge ineffectiveness arises, an analysis of the sources therefor, such as credit risk, would need to be carried out. In most cases, a qualitative evaluation would suffice.

2.8.2. Closely matched hedging instruments

If the critical terms of the accounts in the hedging relationship are closely but not fully matched, a

qualitative assessment of compliance with the hedge effectiveness conditions may need to be corroborated by some quantitative or statistical inferences. Whether such quantitative backing is actually required is a matter of judgment. Quantitative analysis may prove immensely valuable in demonstrating that the critical terms mismatch does not negate the underlying economic relationship as well as providing strong justification for the hedge ratio used. Analysis that identifies the potential causes of hedge ineffectiveness should be documented.

2.8.3. Significantly mismatched hedging instruments

If there is significant mismatch of the critical terms of the hedged item and hedging instrument but underlyings of each are the same or related, a mere qualitative justification of economic relationship may not suffice and a comprehensive quantitative analysis on the same lines as required under IAS 39 would be necessary to authenticate the existence of economic relationship and compliance with the hedge ratio requirements. However, compliance with the bright line 80/125 offset requirement is not mandatory, and a lesser offset level may also provide sufficient justification, if adequately explained. This issue requires exercise of judgment and discretion by the entity's management. Analysis that captures the potential causes of hedge ineffectiveness, such as credit risk and basis risk, should be documented.

2.9. Effectiveness testing of aggregated exposures

For effectiveness testing of hedges in relation to aggregated exposures, it is necessary to consider the outcomes emanating from the aggregate of the constituents of such exposure. The hedged item and the hedging instrument may not be perfectly matched at the individual level e.g. basis risk may exist. Any ineffectiveness at the first level gets carried to the second level. Compliance of effectiveness criteria at the first-level relationship is not mandated under IFRS 9 for hedge accounting in the case of an aggregated exposure. Nevertheless, it becomes a much more complex situation if the first level relationship does not exist.

Nevertheless, the accounting for the constituents of the aggregated exposure is to be done separately by adopting the normal requirements of hedge accounting. Thus, the aggregated exposure is not to be treated as a 'synthetic' single item for accounting purposes. It is only in assessing the effectiveness and measuring the ineffectiveness that the combined effect of the items in the aggregated exposure needs to be considered.

Aggregated exposures generally assume relevance in context of hedging of purchase or sales of goods or commodities. Entities may need and decide to hedge for several risk exposures in such situations, although each risk may not be hedged for the same time period. An illustration explains the hedging implications of IFRS 9 and its predecessor in relation to aggregated exposures. For this purpose, we consider an entity (ABC) that manufactures aluminum tubings for which it plans to import raw material as aluminum pellets from the United States (US) for the next six months. The aluminum price is denominated in US Dollars (USD). As such, ABC is exposed to the aluminum price risk as well as foreign exchange risk. Thus firm initially hedges the aluminum price risk through aluminum futures contracts, thereby ensuring a fixed USD price for its requirements of aluminum raw material. After two months, the firm decides to cover its exchange risk as well through a forward purchase of a fixed amount of USDs. Thus, ABC has, now, hedged its aggregated exposure comprising of the original exposure to aluminum price (in USD) fluctuations and the foreign exchange exposure to the USD, arising from the aluminum futures contract.

Since derivatives are precluded from being designated as part of a hedged item under IAS 39 for accounting purposes, ABC could either (i) terminate the first hedging relationship viz. the aluminum price (in USD) hedge with aluminum futures and re-designate a fresh hedging relationship comprising of the joint designation of the aluminum price (in USD) hedge with aluminum futures together with USD exchange risk hedge with USD forward or (ii) continue the aluminum price (in USD) hedge and designate the USD forward in a second hedging relationship to hedge the USD exchange risk. In the former case, some ineffectiveness could emanate due to the aluminum futures contract not having a zero fair value on designation of the new relationship while the latter course of action would result in a constant change in the volume of the hedged item (USD) of the second hedge as the aluminum futures (in USD) are hedged for foreign exchange risk. This will, again, adversely affect the hedge effectiveness.

However, under IFRS 9 aggregated exposures that comprise of an exposure that could qualify as a hedged item and a derivative are allowed to be designated as a hedged items. As such, ABC could designate the foreign exchange forward in a cash flow hedge of the aggregated exposure comprising of the aluminum price (in USD) risk and the aluminum futures contract without affecting the first hedging relationship. Thus, the discontinuance and re-designation of the first hedging relationship is done away with.

Summary and conclusions

The feedback from stakeholders to IFRS 9, once it gets completely operational, will be immensely educative. The standard has several novelties with far reaching implications. Till such time that this information is received and dissected, we need to make the most of the reactions to the Exposure Draft (ED 2010/13) preceding the pronouncements of IFRS 9 on the issue of hedge effectiveness. An analysis of the cardinal viewpoints made by various stakeholder groups viz. preparers, auditors, users, regulators and consulting groups make very interesting reading. The views clearly reflect the vantage points of the particular interest group. Users were vociferous in opposing the apparent shift from a well-defined "bright line" to relatively subjective criteria for assessing hedge effectiveness. It was felt that an open ended effectiveness criterion would impair the comparability of the effectiveness of risk management strategies across firms and across different time periods, particularly if the effectiveness related disclosures were not adequate. Technically, while the subjectivity of the hedge effectiveness criteria may reduce the number of effective economic hedges that would not be hedge accounting compliant, it would increase the number of ineffective hedges that may meet compliance. In the latter situation, a cash flow hedge could cause an inappropriate deferral of derivative gains and losses.

Auditors and preparers, on the other hand, welcomed this transition to a qualitative assessment, in general. The overwhelming sentiment was that the ensuing simplification of accounting and reporting processes would make hedge accounting significantly more economical to implement. Notwithstanding this, the need for additional guidance (and/or examples) from the regulators on (i) situations in which a qualitative assessment of effectiveness would be adequate and (ii) criteria to determine when augmenting such qualitative assessment by corroborating quantitative evidence would be necessary to establish hedge effectiveness, was also strongly voiced. The need for clear demarcation was precipitated by a general feeling among preparers that auditors may insist on quantitative support by way of abundant caution, even in situations where the spirit of the standards seemed to allow qualitative assessments. Auditors would interpret the new criteria to their perceived level of rigor. This could lead to erosion of the benefits to the preparers of the envisaged simplification by way of permitting qualitative assessments on a standalone basis. Furthermore, the absence of such guidance could also lend itself to possible interpretation of a higher threshold than the existing 80/125 requirement e.g. of a 100% effectiveness requirement. Similarly, the requirement to minimize ineffectiveness may be construed as prescribing the use of only perfect derivatives rather than the most economical derivatives which meet the risk management objectives.

Some comment letters desired the standard setters to provide clear guidance on the criteria that needs to be fulfilled for the inference of the existence of an economic relationship together with further elaboration of the factors to be considered in determining whether there is an adequate economic relationship.

To summarize, IFRS 9 does enable easing of several hedge effectiveness requirements although a few areas still require refinement. While IAS 39 allows hedge accounting only on the prospective and retrospective satisfaction of the effectiveness test, IFRS 9 dispenses with the latter and only a prospective effectiveness test will be required with effectiveness close to 100%. IAS 39 requires discontinuance of hedge accounting on failure of the effectiveness test, although, in the event of rebalancing, the rebalanced hedge may be re-designated as a fresh hedging relationship. IFRS 9 allows for the continuance of hedge accounting on such rebalancing, and if such rebalancing also fails, then hedge accounting needs to be discontinued. Nevertheless, the hedge effectiveness testing process continues to be inherently arduous requiring acquaintance with and application of complex statistical techniques and valuation models. At a macro level, studies of the taxonomical aspects of IFRS 9 have also spelt out some issues that need redressal.

IASB pronouncements generally focus on industry non-specific financial reporting targeted to provide useful information to investor groups. There could, therefore, be situations in which these standards could be at variance with the recommendations of supervisory bodies overseeing specific industries (Beerbaum and Piechocki, 2017). Efforts should be made to ensure maximal harmonization with optimal level of disclosures.

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Appendix

Popular Quantitative Methods of Assessing Hedge Effectiveness
(Ederington, 1979; Finnerty and Grant, 2002; Franckle, 1980)

(A) The Dollar Offset Method

This method computes the negative ratio of the cumulative changes in the fair value or cash flow of the hedging instrument and the hedged item from a particular date. The ratio can be computed on a period by period basis or cumulatively. Thus, the Dollar Offset Ratio (DOR) is given by

$DOR = -\left(\sum_{i=1}^{n} X_i \Big/ \sum_{i=1}^{n} Y_i\right)$ where $\sum_{i=1}^{n} X_i$ is the cumulative sum of the periodic changes in the value of the hedging instrument and $\sum_{i=1}^{n} Y_i$ is the cumulative sum of the periodic changes in the value of the hedged item from the chosen date. The negative sign is retained since the numerator and denominator would invariably carry opposite signs in the context of a hedging relationship, so that the DOR will return a positive value. In the case of a perfect hedge, $DOR = 1$ since the changes in the value of the hedging instrument exactly offset the changes in value of the hedged item.

The 80/125 bright line rule for high hedge effectiveness under IAS 39 is articulated with respect to the Dollar Offset Method, so that this rule requires that the hedging instrument's change in fair value or cash flow should offset at least 80% and not exceeding 125% of the fair value changes or cash flows of the hedged item i.e. we must have $0.80 \le -\left(\sum_{i=1}^{n} X_i \Big/ \sum_{i=1}^{n} Y_i\right) \le 1.25$.

"High effectiveness" is linked to "High correlation" which is generally interpreted as the 80/125 rule in medicine and other applied and social sciences. The articulation of this rule as representing "high correlation" in relation to SFAS 80, informally, is attributed to the speech of a member of the SEC's Office of the Chief Accountant at the SEC's 1995 Annual Accounting Conference (Swad, 1995; Lipe, 1996), whence its adoption in SFAS 133 followed and spilled over to IAS 39.

A major shortcoming of this method is its sensitiveness to small changes in the value of the hedging instrument or the hedged item (Canabarro, 1999). To illustrate, we consider a hedged item whose initial value is $1.00 million. If its value changes by $ 50 and that of the hedging instrument (derivative) changes by $ 100, the DOR works out to 2.00 or 200% which is well beyond the 80/125 bright line. Since the price changes here are negligible, disallowance of hedge accounting would not make a significant impact to the financials of the entity in this period. However, if a large price change occurs in the next period and hedge accounting continues to be denied, then the financial impact could be massive. Due to the extreme sensitivity of this method to price changes, hedges that are performing very well can quickly get out of favor and be denied hedge accounting.

(B) Relative Difference Method

As mentioned above, a massive shortcoming of the Dollar Offset Method is that the DOR is extremely sensitive to small changes in the value of the hedging instrument or the hedged item. An improvement to eliminate this flaw is to use percentage changes in lieu of absolute changes. This method is called the Relative Difference Method and defines the effectiveness test statistic as: $RD_n = \dfrac{\sum_{i=1}^{n} X_i + \sum_{i=1}^{n} Y_i}{V_0}$ where V_0 is the initial value of the hedged item and $\sum_{i=1}^{n} X_i$ and $\sum_{i=1}^{n} Y_i$ have the same meaning as in (A) above. A perfect hedge will return $RD_n = 0$ and high effectiveness would be indicated by $|RD_n|$ values close to zero.

However, a correspondence with the 80/125 bright line would depend on the initial value of the hedged item and hence, vary on a case to case basis. Before documenting a hedging relationship, an entity must set a critical value (α) "sufficiently close" to zero such that

$|RD_n| \leq \alpha$ signifies hedge acceptability. Needless to say, the entity's auditors must concur with the method of testing and the choice of critical value.

(C) Variability Reduction Method

The Variability Ratio (VR) is defined as unity minus the ratio of the cumulation of the square of aggregate changes in the fair value or cash flow of the hedging instrument and the hedged item to the cumulation of the squared changes in the fair value or cash flows of the hedged item from a particular date. The ratio can be computed on a period by period basis or cumulatively. Thus, the Variability Ratio (VR) is given by $VR = 1 - \left[\sum_{i=1}^{n} (X_i + Y_i)^2 \Big/ \sum_{i=1}^{n} Y_i^2 \right]$. The Variability-Reduction Method represents the variability of the fair value or cash flow of the hedged (combined) position to the variability of the fair value or cash flow of the hedged item alone. Since this method uses squared deviations, a greater emphasis results on the larger deviations than smaller ones. Variants of this method use standard deviations or variances or the proportion of mean squared deviations from zero of the hedged item that are eliminated by the hedge (Althoff and Finnerty, 2001; Kalotay and Abreo, 2001).

A perfect hedge will return $VR = 1$ and high effectiveness would be indicated by VR values close to one. However, a correspondence with the 80/125 bright line norm of the Dollar Offset Method would depend on a case to case basis. For instance, if we have (as a trivial example) $X_i = -0.80 Y_i \; for \; all \; i = 1, 2, ..., n$, then, $VR = 1 - (0.2)^2 = 0.96$ whereas if $X_i = -1.25 Y_i \; for \; all \; i = 1, 2, ..., n$, then, $VR = 1 - (-0.25)^2 = 0.9375$. Thus, it may seem that a critical value in the proximity of these figures may be an appropriate cutoff. However, it is strongly emphasized that the critical value standards for different methods, when applied, may not yield consistent results. As in case (B), it is necessary for entities adopting this method to set a critical value (β) "sufficiently close" to one for identifying hedge acceptability. It is cardinally important that the entity's auditors must also agree with the method of testing and the choice of critical value.

(D) Regression Analysis

It can be shown that the hedge ratio that minimizes the variance of the price of the combined hedged position is equal to the estimated slope coefficient of the regression run between the change in value of the hedged item (dependent variable) and change in value of the hedging instrument (independent variable) (Royall, 2001). We can, thus, write $Y_i = \hat{a} + \hat{b}(-X_i) + e_i$. Prospective hedge effectiveness would, then, be captured by the estimated (i) intercept term $\hat{a}$ (ii) slope coefficient $\hat{b}$ and (iii) adjusted coefficient of determination R^2 with a perfect hedge requiring $\hat{a} = 0$, $\hat{b} = R^2 = 1$ as these parameter values would imply $\rho_{hedged, deriavtive} = 1$, $\sigma_{hedged} = \sigma_{derivative}$ and a zero initial value of the hedging relationship. A high hedge effectiveness would be testified by the intercept $\hat{a}$ being close to zero and the slope $\hat{b}$ and adjusted R^2 both being near unity. A test statistic that encapsulates this three pronged prescription is given by the Regression Method Reduction of Variability i.e. $RVR = 1 - \left[\sum_{i=1}^{n} (\hat{b} X_i + Y_i)^2 \Big/ \sum_{i=1}^{n} Y_i^2 \right]$. For retrospective testing, we need to substitute the actual hedge ratio in the aforesaid expression for RVR

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