Financial Reporting Harmonization - Measurement Models

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Abstract: This paper analyses financial reporting harmonization, more precisely its development, effects of globalization on financial reporting harmonization and how financial reporting harmonization is measured. During last decades financial reporting faces major changes that affects many parties interested in financial reporting. Since 2005, all listed companies in the European Union have to apply the International Financial Reporting Standards to prepare their consolidated financial statements. Different measurement methods have been developed so far and they can be classified according to their similarities in three different measurement models: indices, measurement models based on the concept of Euclidean distances and association and correlation coefficients. The implementation of International Financial Reporting Standards around the world has not eliminated the need for further research in the field of financial reporting harmonization.

Key-Words: globalization, de jure harmonization, de facto harmonization, measurement of financial reporting harmonization

1 Introduction
In the world of today the problem of financial statements comparability is becoming more expressed because business and capital flows are more international than ever and users of financial statements can be found worldwide. Accounting in the history was qualified as the language of business but as the volume of international business activities and investments continues to increase, there is a need for a common international language of business. The communication of financial information across country borders would be easier with the use of the same set of accounting standards. Financial reporting harmonization has been seen as an important way for achieving more reliable, credible and comparable financial information at an international level. International companies operate on a global scale and are listed on several financial markets. Thus they find new investors on foreign financial markets that finance the expansion and modernization needed to keep pace with competition. On the other hand, investors and financial analysts must understand the financial statements of foreign companies whose shares they want to buy. In the existing literature there is no single definition of financial reporting harmonization. Tay and Parker [18] define harmonization as a movement away from total diversity of practice towards harmony of accounting methods and is seen to be essential for improving international comparability in financial statements, thereby enhancing international capital flows and reducing the cost of preparing financial statements for multinational corporations [4]. Nobes and Parker [14] define harmonization as a process of increasing the compatibility of accounting practices by setting bounds to their degree of variation. Its main objective is to enhance the comparability of accounting data and to facilitate smooth and efficient international business activities. Walton et al. [22] define harmonization as a jargon used in international accounting to designate the reduction of reporting differences between different countries. Van der Tas [19] pointed out that financial statements are a target of harmonization and the one way to harmonize financial statements is to
formulate standards, thus setting limits to the difference between financial statements. Accounting standards are also an object of harmonization themselves. Therefore, the existing literature makes a distinction between two types of harmonization, namely material or de facto harmonization and formal or de jure harmonization. According to [18] formal or de jure harmonization refers to harmonization of accounting regulations (laws and/or accounting standards) and material or de facto harmonization refers to harmonization in the actual practice of companies.

The two types of harmonization are interrelated, respectively formal harmonization would normally be a first step towards the material harmonization, but this is not necessarily the case [3]. Material harmonization might take place without being furthered by formal harmonization. This different form of harmonization, known as the spontaneous harmonization, was found at the level of accounting practices of the so-called global players [3], [8]. The spontaneous harmonization results as a consequence of the market influences and not as an effect of accounting regulations.

2 Incentives for financial reporting harmonization in globalized economy

There are many interested parties in harmonization, including multinational companies, stock exchanges, shareholders (especially investors), accounting and auditing firms. The pressure for international harmonization comes from those who regulate, prepare and use financial statements [14]. The United States of America and European Union have the most important capital markets in the world, so the objective of their institutions which have been issuing standards, namely Financial Accounting Standards Board (FASB) and International Accounting Standards Board (IASB) is to harmonize the accounting standards which are in the use in the United States and in the European Union. IASB is the institution which has been issuing accounting standards (International Accounting Standards - IAS, also referred to as International Financial Reporting Standards- IFRS) since 1973 when it was formed under the name International Accounting Standards Commission (IASC). IASC’s mission was to improve the comparability of financial statements even though in that time they were prepared under various sets of national accounting standards. The intention was to facilitate trading and free movement of capital between different countries by reducing the differences between the IAS and national accounting standards. The growing world-wide trend towards deregulation of markets and privatization of public sector companies, in many developing countries, has opened up new opportunities for international investment [14] and cross-border mergers and acquisitions.

The increase of foreign direct investment, the development of multinational companies, the growth of financial markets and the influence of such organizations as the World Bank, the Organization for Economic Co-operation and Development (OECD), the European Union (EU), the International Organization of Securities Commission (IASCO) and the IASB all assist in supporting harmonization and the concept of having a single accounting system. Between 1980 and 1990 cross-border transactions in equity securities increased from $120 billion to $1.4 trillion per year [12]. More and more companies were listing their shares on stock markets outside the home country in order to raise capital. Companies which were listed on several stock markets were obliged to produce several financial statements, all depending on the accounting regulations of the different countries in which they operated. Multinational companies as the information providers had to adapt to a global environment in order to reduce restatement of financial information. On the other hand, investors as the information users had problems in comparing financial data because of the use of different accounting standards. They were uncertain about the credibility of financial statements. Companies which raised capital outside national boundaries were required to bear the cost of reconciling financial statements prepared using national standards. European companies (so-called global players) which were listed on the New York Stock Exchange or which were preparing for such cross-border listing, had to prepare two sets of accounts, one set which is in conformity with the national accounting rules and another set which is required by the New York Stock Exchange.

Different standards also made transactions result in a profit in one country and a loss in another, as was the case for Daimler-Chrysler when they had their first listing on the New York Stock Exchange in 1993 [6]. The company was obliged to prepare a reconciliation statement that presented equity and profits according to US GAAP and after that it reported a loss of DM 1,839 million under US GAAP rules, while there was a profit of DM 602 million under German accounting rules. Investors were confused by these differences between the figures for profit and for equity reported under the
two sets of accounting rules. The harmonization of financial reporting standards enables the users to correctly interpret the financial information and thus make better decisions based on that information. Multinational companies can realize significant cost savings if all their subsidiaries could use the same accounting standards as parent company. Performance figures would be the same regardless of the countries in which company operates and that would facilitate the access to main financial markets.

In order to improve transparency and to achieve harmonization of financial reporting standards the EU requires listed companies to prepare their consolidated financial statement in compliance with the IFRS from 2005. As Ball [2] pointed out “IFRS promise more accurate, comprehensive and timely financial statement information, relative to the national standards they replace for public financial reporting”. Convergence of IFRS and U.S.GAAP is seen as the main activity of the IASB today. Nowadays, more than 120 countries permit or require IFRS for domestic listed companies.

3 Harmonization measurement models

3.1 Measurement models - Indices
The value of an index indicates how comparable the financial statements are at a given point in time while changes in the values measure harmonization. Comparability can be considered as an increase in the degree of consensus concerning the choice between the alternative methods of accounting for an item in the financial reports [19]. Van der Tas was one of the first researches who used indices to measure the comparability of financial statements. He developed three indices, namely H, C and I index, which were used in his studies [20], [21]. These indices are based on measuring options’ concentration and are used for measuring the level of de facto harmonization of financial reporting.

Van der Tas developed a Herfindahl index (H index) to measure the harmonization degree of a certain national accounting system. The H index is calculated as the square of relative frequencies of each of the alternative accounting methods for a particular sort of transaction or event, applied by companies [20]. It is calculated as follows [13]:

\[ H = \sum_{i=1}^{n} p_i^2 \]  

Where: H is Herfindahl Index, \( p_i \) the relative frequency of method \( i \).

The values H index can take are between 1/n to 1 (all companies are using the same method). The H index equals the probability that two randomly selected companies from the sample use the same accounting method. The restriction of the H index is that it can be applied when companies only use one alternative accounting method because it does not allow the analysis of multiple financial reporting or of that offering supplementary information through the notes to the financial statements [13]. Another restriction is that it only measures harmonization in one country at the time and international comparison is not possible. Companies may provide a reconciliation statement or other information which allows the user to see the effects of more than one accounting method. In these cases the H index would be based upon the method used in the main financial statements and would ignore the supplementary disclosures. This will have the effect of underestimating the comparability of the financial statements [16]. The existence of such multiple reporting led Van der Tas to develop the C index.

The C index is calculated by comparing the number of compatible pairs of companies with the total number of pairs of companies. The financial statements of two companies are compatible if both companies apply the same accounting method or if one or both companies give additional information to enable comparison [19]. The value of the index vary from 0 (no harmony, none of the pairs of financial reports is comparable with respect to the particular sort of transaction or event surveyed because they all apply a different accounting method) to 1 (maximum harmony, all pairs of financial reports are comparable with respect to this sort of transaction or event because all companies apply the same accounting method under the same circumstances). The C index is a simple ratio with a natural zero point, where no pair of financial reports is comparable with respect to this sort of transaction or event because all companies apply the same accounting method under the same circumstances. The C index was criticized as the number of companies studied affects the index, so in comparative studies there would be desirable to have equal numbers of companies [10]. It is calculated as follows [13]:

\[ C = \frac{\sum_{i=1}^{n} a_i^2 - n}{n^2 - n} \]
Where: $C$ is the Comparability index (C index), $m$ the number of alternative accounting methods, $n$ the number of considered financial reporting and $a_t$ the number of entities applying the $t$ accounting method.

Archer et al. [1] decomposed the $C$ index into within-country and between-country components in order to assess the impact of harmonization on interfirm comparison within individual countries and the effects of harmonization on international interfirm comparison. Within-country comparability index is calculated as follows [1]:

$$\frac{\sum (X_{ij} - X_{ij})}{\sum (X_{i+} - X_{i+})}$$  \hspace{1cm} (3)

Between-country comparability index is calculated as follows [1]:

$$\frac{\sum (X_{ij} - X_{ij})}{\sum (X_{i+} - X_{i+})}$$  \hspace{1cm} (4)

and the Total comparability index is given by [1]:

$$\frac{\sum (X_{ij} - X_{ij})}{X_{++} - X_{++}}$$  \hspace{1cm} (5)

Where: $X_{ij}$ is the number of cases in which the accounting method $j$ is selected, $X_{i}$ is the number of companies in country (i) using accounting method (j), $X_{++}$ is the grand total of companies across countries and $X_{i+}$ is the number of companies in country (i).

In order to facilitate the measurement of international harmonization, i.e., harmonization of accounting practices among two or more countries Van der Tas introduced the $I$ index. The $I$ index is computed by multiplying across countries the proportion of companies practicing a particular accounting alternative and then summing over all alternative practices. The correction factor in the exponent is used when more than two countries are examined. The $I$ index is not meant to give an indication of the statistical significance of harmonization, but rather a scale upon which to quantify harmonization for comparative purposes [9]. The formula for the $I$ index is given below [13]:

$$I = \left[ \frac{\sum_{m=1}^{M} \prod_{n=1}^{N} p_{mn}}{p_{mn}} \right]^{1/n}$$  \hspace{1cm} (6)

Where: $I$ is $I$ Index, $m$ the alternative accounting method $m$, $n$ country number $n$, $p_{mn}$ the relative frequency of the utilization of method $m$ within country $n$.

The $I$ index also ranges from 0 to 1 but, due to the multiplication involved, the $I$ index is sensitive to zero proportions. The potential sensitivity increases as the number of countries surveyed increases. To control for this sensitivity, [9] proposed an alternative —the adjusted $I$ index. In cases where all of the companies in a particular country chose one of the two alternative methods, the proportions are recorded as 0.99 for the unanimous method and 0.01 for the non-practiced method (instead of 1 and 0, respectively). Morris and Parker [11] presented statistical properties of Van der Tas’ $I$ index and Archer et al's between - country $C$ index. The latter was found to be more stable when the number of countries increased.

The $T$ index was introduced by R. H. Taplin to quantify the degree to which the financial statements of companies are comparable. It is easily interpreted as the probability that two randomly selected companies have statements that are comparable, or as the average comparability of pairs of companies. The $T$ index is a generalization of the $H$, $I$ and $C$ indices introduced by Van der Tas and is a framework containing countless individual indices [17]. The general formula for $T$ index is given below [17]:

$$T = \frac{\sum_{k=1}^{m} \sum_{j=1}^{m} \sum_{i=1}^{n} \sum_{k=1}^{n} \alpha_{kl} \beta_{ij} p_{ki} p_{lj}}{\sum_{k=1}^{m} \sum_{j=1}^{m} \sum_{i=1}^{n} \sum_{k=1}^{n} \alpha_{kl} \beta_{ij}}$$  \hspace{1cm} (7)

Where: $\alpha_{kl}$ is the coefficient of comparability between accounting methods $k$ and $l$, $\beta_{ij}$ is the weighting for the comparison between companies in countries $i$ and $j$, $p_{ki}$ is the proportion of companies $k$ country $i$ that use accounting method $k$, $p_{lj}$ is the proportion of companies in country $j$ that use accounting method $i$, $m$ is the number of countries and $n$ is the number of alternative accounting methods.

Value of the $T$ index is between 0 (no two companies are comparable) and 1 (all companies are comparable with each other) as long as $\alpha_{kl}$ and $\beta_{ij}$ are between 0 and 1 (inclusive) and that the $\beta_{ij}$ sum to 1. According to [17] the researcher can choose from several options for the $T$ index under four criteria: a) the weighting given to companies and countries (companies can be weighted equally, countries can be weighted equally or countries can be weighted according to the total number of companies in each country), b) international focus: overall, within country, or between countries, c) the
treatment of multiple accounting policies, d) the treatment of non-disclosure.

3.2 Measurement models based on the concept of Euclidean distances
Euclidean distances was used as a measure for assessing and comparing the success achieved in converging any two sets of accounting regulations [7], [8]. It is using to measure advances in de jure harmonization of financial reporting. Fontes et al. [7] used the following formula for the computation of Euclidian Distance in the field of accounting:

\[
D^{IC/NC}_{m} = \sum_{i=1}^{n} d^{IC/NC}_{k,m}
\]  

(8)

Where: \( D^{IC/NC}_{m} \) is a convergence measure between Phases IC and NC, \( m \) is the development phases which are the analyzed period, \( k \) represents four strengths of accounting method and \( n \) is the number of accounting issues in the sample.

The lower the value of Euclidian Distance the highest is the degree of harmonization between the two sets of accounting regulations. Measures based on Euclidean distances have serious shortcomings [7]. They are sensitive in quantitative terms but not in qualitative terms. They do not express which particular method is adopted, nor the strength of the method adopted. It only recognizes the number of methods but does not recognize which method of accounting it is. Such measures are weak so they need to be supported by other measures.

3.3 Measurement models – association and correlation coefficients
Fontes et al. [7] proposed Jaccard’s coefficient and Spearman’s coefficient to measure the similarity between two sets of accounting regulations in order to gain insight in the progress of de jure harmonization. Jaccard’s coefficient is able to measure the degree of likeness between two sets of binary observations. The formula for the computation of Jaccard’s coefficient is given below [7]:

\[
S_{ij} = \frac{a}{a + b + c}
\]  

(9)

Where: \( S_{ij} \) represents the similarity degree between the two sets of analyzed accounting regulations, \( a \) is the number of elements which take the 1 value for both sets of regulations, \( b \) is the number of elements which take the 1 value within the i set of regulations, \( c \) is the number of elements which take the 1 value within the j set of regulations and the 0 value for the i set of regulations. The closer Jaccard’s coefficient is to 1 (or 100%), the greater is a degree of de jure harmonization of financial reporting. Rahman et al. [15] used Jaccard’s coefficients to measure de facto harmonization between two countries. They measured the extent of likeness between the disclosure and accounting methods that were adopted by companies and the degree of likeness for items that were not adopted by companies in the two countries. [15] used Match coefficients for comparing the accounting regulations because they are based on similar principles as Jaccard’s coefficients. Fontes et al. [7] used Spearman’s correlation coefficient as a measure of correlation between a set on national accounting regulation and IFRS. The results of their research [7] proved that association and correlation coefficients are better methods for measuring de jure harmonization of financial reporting than Euclidian distances. These coefficients can be used as a measure of convergence between different regulations at different points in time or among different countries.

4 Conclusion
Financial statements provide investors with information about companies’ economic and financial performance, thus enabling investors to make comparison of information published by a target company with its competitors, whether based on the same country or abroad. Comparable, transparent and reliable financial information as a result of financial reporting harmonization are fundamental for an efficient and integrated capital market. Harmonization of financial reporting is an outcome of the globalization of financial markets and of economic integration. Financial reporting harmonization has many benefits, namely it facilitates cross-border investments, reduces the costs of capital, facilitates data collection and decreases its costs, decreases the audit costs, and increases the efficiency of the audit. Countries all around the world permit or require IFRS for domestic listed companies because they are aware that using IFRS contributes to further development of local capital markets and attracting of foreign investors.

It is important to examine and measure de jure harmonization of financial reporting because of the increasing influence of accounting regulations on accounting practice. Nowadays, when the numbers of studies on de jure and de facto harmonization
have significantly increased, there is little evidence of the relationship between both types of harmonization. Most of the researchers measured each type of harmonization separately. A good method for measuring financial reporting harmonization should be able to take into account both national and international harmonization, should not be sensitive to zero frequencies and should not depend on the number of companies studies. The implementation of IFRS around the world has not eliminated the need for further research in the field of financial reporting harmonization.

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