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The Efficiency of Sustainability Engagement Reported by Banks in Poland, Croatia and Romania

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ABSTRACT

Purpose: This study aims to verify the efficiency of economic, organisational, social and environmental dimensions of sustainability performance.

Methodology: Disclosure analysis and 2-stage data envelopment analysis (DEA) examining the efficiency of sustainability engagement of listed banks in Poland, Croatia, and Romania disclosed in the annual and CSR/sustainability reports for 2015–2018.

Findings: There are apparent differences between the efficiency of sustainability engagement in the banking sectors of the three countries examined in the study. Banking sectors in all these countries are on different stages of their paths to value creation via the efficiency of sustainability engagement.

Practical implications: The results of this study may help compare sustainability engagement and understanding of the further directions of sustainable development in the banking sector in both the analysed and other countries, as well as in other institutions from other sectors. These results may be important for the decision-makers in determining the actions focused on improving efficiency on the way to value creation.



Originality/value: Since only a limited number of studies examine the efficiency of sustainability engagement, especially in CEE countries, little is known about value creation, understood as the efficient use of the resources and activities concerning sustainability. This paper contributes to filling in this gap. It also proposes an alternative approach, analysing the relationship between sustainability engagement and value creation based on efficiency rather than on the direct impact on financial results giving ambiguous results. This approach may be extended to different sectors and other countries.

Key words: CSR/sustainability, efficiency, banks, value, CEE, 2-stage DEA

Introduction

De Villiers and Maroun (2018) argue for a future where the integration of sustainability and socially and environmentally responsible action are taken-for-granted prerequisites for any successful organisation. In the light of this, organisations have to legitimise their actions and the use of their resources; they are expected to consider their stakeholders' information needs and better explain the value they create over time for the societies in which they operate. Corporate sustainability reporting is a clear signal and manifesto of enterprises' achievements in implementing sustainable development principles as their core mission and approach to value creation. Sustainability/CSR reporting influences a company's value (Cahan et al., 2016). Moreover, sustainability reporting discloses the information that allows for the analysis of the resources use and activities efficiency; therefore, it may help understand value creation. Value creation is determined by the efficiency of resource utilisation and the organisations' activities (Penrose, 1959; Prahalad & Hamel, 1990). Stakeholder confidence is based on the three pillars of efficiency concerning sustainability: economic and organisational, social, and environmental ones.

This paper presents the results of an empirical study of corporate sustainability reporting regarding efficiency, conducted in the banking sector. As the

results of previous research concerning the relationship between corporate social performance (CSP) and corporate financial performance (CFP) give ambiguous results (e.g. Griffin & Mahon, 1997; Wang et al., 2016), this paper proposes an alternative approach to the understanding of the impact of CSP on value creation. The main thesis of this work is that instead of the analysis concerning the direct impact of CSP on financial results, it may be worth understanding the efficiency of sustainable engagement following the notion that in order to create value, the activities and resources' consumption must be efficient. Therefore, in this paper it is assumed that to 'judge' the organisations and to take decisions based on the stakeholders' perspective, it is crucial to analyse and understand the efficiency that translates into value creation. Following this notion, the research question of this study is:

RQ: What is the efficiency of the sustainability engagement reported by the banks in three CEE counties?

In this study, the financial inputs and economic and organisational, as well as social and environmental performance of the public banks in Poland, Croatia and Romania have been analysed. The period of research is 2015–2018. This study is based on the information provided by the banks in Poland, Croatia and Romania in their annual reports, as well as in their sustainability/CSR reports, whenever they were available. The website content of these banks was also analysed. As the main research method, the 2-stage version of DEA approach was applied, a globally recognised tool for measuring enterprise involvement in sustainability practices (Belu, 2009; Mardani et al., 2017). The data for the study were collected based on the content analysis regarding disclosures in banks' documents and their websites, referring to aspects determined according to Directive 2014/95/EU, GRI and ISO 26000.

Banks were selected as the subject of this research because of their active engagement in sustainable actions, followed by the widely disseminated sustainability reporting practices. CSR disclosure by banks stems from institutional and strategic legitimacy processes (Oliveira et al., 2019). To the authors' best knowledge, empirical studies on sustainability reporting in the banking sector



in CEE countries with a data envelopment analysis (DEA) approach are non-existent. Moreover, there is a lack of studies on the CSP efficiency in CEE banks.

This paper makes three contributions to the existing literature. Firstly, the findings are important for a better understanding of the importance of sustainability reporting in the light of efficiency measurement in terms of economic-organisational, social and environmental performance in the chosen CEE countries. Secondly, this paper contributes to the literature by answering the need for greater clarity and knowledge on the sustainability performance efficiency in the banking sector in Poland, Croatia, and Romania in the light of corporate value creation. This research contributes to the existing literature by providing a more extensive view of the efficiency of sustainable engagement of banks in three CEE countries. Thirdly, this study proposes an alternative approach to understanding the relationship between sustainability engagement and value creation.

The conclusions may lead to improved decision-making processes for achieving sustainable development goals and their disclosures in corporate reporting. They may also help evaluate and compare the business sectors (in this case, the banking sector) or individual organisations (banks) internationally. The proposed approach may be extended to other sectors and countries.

The paper is structured as follows: The following section provides the background for the research study examining the existing research on sustainability/CSR reporting in the banking sector in Poland, Croatia and Romania. The third section of this paper explains the empirical research, and the fourth part presents a discussion of the results of this study. In the last part of the paper, the research conclusions are outlined.

Literature review – Sustainability reporting in banks in Poland, Croatia and Romania

Social and environmental accounting or sustainability accounting and reporting have become one of the major issues that organisations grapple with on a daily basis (Lodhia & Sharma, 2019; Raczkowski et al., 2016; Fijałkowska, 2015). Transitional

and newly industrialised or emerging economies undergo many political, structural, social and economic changes, including the growing public awareness of the need for corporate sustainability (Zyznarska-Dworczak, 2018) and sustainability reporting. Sustainability reporting is mostly voluntary (Buhr et al., 2014; Massa et al., 2015); however, some elements of non-financial disclosure are increasingly mandated and encouraged in more and more jurisdictions (De Villiers, 1999; Stubbs & Higgins, 2015; De Villiers et al., 2018). The literature review results reveal that research in sustainability reporting practices by companies in emerging countries remains low (Md Zaini et al., 2018). The concept of corporate sustainability itself in CEE countries is relatively new; however, it is rapidly gaining acceptance, in particular as part of the countries' integration within the European Union.

The vast majority of prior studies concerning social and environmental issues in the banking sector have been conducted in developed capital markets, and studies carried out in other markets are sparse (Simpson & Kohers, 2002; Wu & Schen, 2013). While international research concerning accounting on social and sustainability issues has grown significantly over the last decade, there is a shortage of research investigating the nature and extent of this topic in CEE countries as compared to more developed countries; therefore, more research in this field is needed (Albu et al., 2013). Moreover, research conclusions from developed capital markets are not considered applicable to emerging or developing countries because of political, economic, and social differences (Belal et al., 2013; Elsayed & Hoque, 2010). CEE countries try to transform their economy and business practices bearing the legacy of socialism to join the developed and mature markets which are aware of the need for sustainable development. The banking industry has a higher level of social interaction in comparison with other financial intuitions; therefore, banks are expected to be socially responsible (Rehman et al., 2020) and report on that to their stakeholders.

Scientific research in each analysed country observes growing interest in sustainability reporting in Poland (Fijałkowska & Macuda, 2019), also in the banking sector. There is considerable research in the area of CSR and sustainability disclosure by banks in Poland (e.g. Fijałkowska & Zyznarska-Dworczak, 2018; Korzeb & Samaniego-Medina, 2019; Krasodomska, 2015; Sułkowski & Fijałkowska, 2019), as several Polish banks, especially the largest one, are actively involved



both in the sustainability activities and the reporting of their results. Nevertheless, the empirical research conducted by Fijałkowska et al. (2017) confirmed that the Polish market and the public were, by that time, reluctant to consider the importance of social and environmental engagement. In 2018 the same researchers analysed the interrelation between corporate social performance and corporate financial performance in the biggest CEE banks (Fijałkowska et al., 2018). The results obtained showed that in the case of banks in the CEE region, being socially responsible was not reflected in the bottom line, nor did the banks' financial condition impact the CSR engagement. However, in the same year, a study by Paluszak and Wiśniewska-Paluszak (2018) indicated that the leading CSR banks in Poland increasingly better understand the role of corporate involvement in society as a modern strategic approach that leverages capabilities to improve salient areas of competitive context and transforms value chains activities to the benefit of the society while reinforcing corporate strategy. The sustainability performance of banks in Poland exclusively was also analysed by Korzeb and Samaniego-Medina (2019). The authors concluded that the government-owned and national banks showed a greater commitment to sustainability performance than the banks with foreign capital. Matuszak and Różańska (2020), analysing online CSR disclosure in the banking industry, observed that that accessibility to CSR information disclosed by banks is relatively good.

The literature review confirms that corporate sustainability reporting in banks is also the subject of scientific research in Croatia; however, it is limited to several articles only. Kundid and Rogošić (2011) analysed the CSR website reporting of the banks in Croatia and revealed that "large banks publish more information on their CSR activities compared to small-sized banks". Moreover, they concluded that banks' profitability positively impacted the corporate social practices disclosure. Rogošić (2014) conducted empirical research on corporate social reporting in 31 banks of Croatia and found that 28 of the banks did not publish information on social engagement as standalone reports, whereas only 3 of the investigated banks published a separate report on the banks' websites. In the study by Cosma et al. (2020) it is emphasized that the scope of contribution to the sustainable development goals from the European banks is narrow. The authors add that this scope is larger in emerging countries, such as

Estonia, Croatia and Poland, with significant differences when comparing banks operating in the same country.

The recent literature on sustainability in the Romanian banking sector is not vast, as most studies focused on reporting by non-financial companies. The examples of studies concerning CSR/sustainability issues in the banking sector in Romania include the one by Tamas-Szora and Socol (2015), who investigated the reporting practices of foreign banks operating in Romania in 2015. They concluded that most of the foreign bank branches active in Romania did not disclose information on social engagement. In a study conducted by Frecea (2017), the author analysed the CSR visibility in the Romanian banking sector, identifying the main reasons behind the CSR decisions, trying to distinguish between different CSR dimensions through a coding process that would reveal the dominant theme of CSR engagement in this sector. In one of the latest studies, Dinu and Bunea (2019) proved that what can be noticed is “the preoccupation of the banks to promote the importance of CSR in Romania and to raise awareness on this concept in the business environment and the society”, intended to proceed towards sustainable development. The authors were also testing the possible correlations between the CSR index and the financial performances of the Romanian banks; however, their results did not bring into light a direct relationship between the two variables. The latest study, conducted by Marcu et al. (2022), focuses on the pandemic context of CSR disclosure by Romanian banks, and it was concluded that the banks have done much to rehabilitate their reputation impacted by the previous economic crisis. Additionally, the authors noticed that the results of their study could help the banking system learn to be more empathetic and understanding towards customers and to enhance its presence in the community.

The banking sector and its financial and reputational situation strongly determine the quality and prospects of the financial services market that condition the economy’s stability. At the same time, the reputation of banks depends on many factors — to a high degree on their social reception. Therefore, many banks engage in activities concerning sustainability, and they report on that. However, the question remains: how efficient their activities are, and how effective the use of resources in the field of the realisation of sustainable goals is; in other words, whether value is created.



Empirical research

In order to create value, banks engage in sustainability activities and attempt to manage business efficiency at various levels. The study's basic premise is that in the first stage of sustainability engagement, banks are trying to implement economic goals bringing quickly visible effects of the organisational improvement. It may also be assumed that a more efficient institution will be the one that achieves the economic goals while using fewer resources, both financial and in the form of human work. Therefore, in the first stage, this study presents an analysis of the efficiency of value creation via achieving a sustainable position in the context of banks' financial and human resources engagement translated into economic and organisational efficiency. In the next stage, the analysis refers to banks' social and environmental efficiency resulting from their economic and organisational standing. The assessment of the bank's sustainability should include all these dimensions of the institutions' development.

Sample

The sample contains the data concerning all banks in Poland, Croatia and Romania, listed on the Stock Exchanges in Warsaw, Zagreb and Bucharest, respectively. They account for 12 banks quoted on the Warsaw Stock Exchange, 9 on the Zagreb Stock Exchange, and 3 on the Bucharest Stock Exchange. The period analysed is 2015–2018. Consequently, the resulting study sample consists of 96 observations.

Variables

CSP Variables

CSP is problematic to define and measure. An economic unit may be understood as operating sustainably when it is engaged in economic, social and environmental activities simultaneously, and when it communicates them in the annual report or in a separate sustainability/CSR report. In this

study, two kinds of variables signalling the company's sustainability have been adopted. One is a dummy variable equal to 1 if the bank publishes its sustainability/CSR report. The second variable concerns the intensity of sustainability disclosure that is calculated by creating indexes concerning three dimensions of sustainable engagement: economic and organisational, social, and environmental ones. These three indexes comprised the aggregation of indicators calculated based on the information retrieved from the content analysis. Content analysis is a basic research method applied in a semi-objective approach, following the division of research methods that are applied to the analysis of narratives in annual reports proposed by Beattie et al. (2004). The indicators that are proposed in this study refer to the data accessible in the entire period of analysis, i.e. 2015–2018, for all of the 24 publicly listed banks in the three countries analysed.

While carrying out the content analysis, the information disclosed by the banks in the sample was analysed in reference to 21 different areas. The items to be analysed were determined according to Directive 2014/95/EU, GRI, and ISO 26000, comprising:

1. Corporate organisational governance
2. Human rights
3. Labour practices
4. Environmental activities
5. Fair operating practices
6. Customers' issues
7. Community involvement
8. Business model
9. Risk management
10. Efficiency in energy use/use of renewable energy
11. CO₂ emission
12. Water use
13. Air pollution
14. Gender equality/diversity
15. Working conditions



16. Health and safety at work
17. Dialogue with local communities/stakeholders
18. Corruption and bribery issues
19. Codes of ethics
20. Values

Procedures against money laundering and terrorism financing (AML/CTF).

Following the approach proposed by Dumitru et al. (2017), the content analysis was conducted, based on the following scoring system:

- 0 – no presentation;
- 1 – narrative presentation;
- 2 – presentation using KPIs or other numerical data; and,
- 3 (1 + 2) – narrative and numerical presentation simultaneously.

In order to gather the necessary information, the analysis embraced the sustainability/CSR reports (whenever available), annual reports, and the websites of banks in the sample. Altogether, 96 annual bank reports were analysed: 48 reports of banks from Poland, 36 reports of banks from Croatia, and 12 reports of banks from Romania, available for the period 2015–2018. Every year, the banks disclose sustainability information in their annual reports (directly in the notes to the financial statement or in the management commentary), or in the form of separate sustainability/CSR documents. The content of the websites tags regarding sustainability activities, performance and outcomes of the banks was also analysed. It was also checked whether the banks in the sample received any awards concerning outstanding achievements in the field of sustainability or socially responsible behaviour. Moreover, it was verified if the banks were quoted on a special index of the stock exchanges including highly socially responsible companies.

Based on the approach described above, the three main dimensions of the sustainability engagement of banks were created. Within all the dimensions, the indicators enabling the evaluation of sustainability engagement were calculated

through assigning weights according to the way/intensity of the information disclosure. In this way, the following indexes were created:

- economic and organisational index, composed of the indicators defining the organisation itself, e.g. its corporate governance, risk management, business model, procedures against money laundering and terrorists;
- social index, composed of the indicators related to social issues, e.g. human rights, labour practices, fair operating practices, community involvement, consumer issues, community involvement, gender equality, working conditions, health and safety at work, dialogue with local communities, corruption and bribery, ethical code and values;
- environmental index, composed of indicators concerning the environment e.g. environmental activities, efficiency in energy use/use of renewable energy, CO₂ emission, water use, air pollution.

The indexes listed assess the overall extent and quality of social and environmental disclosures. All the information necessary to create indicators and indexes was collected manually; the same information was always gathered by two scholars independently, followed by the discussion of any discrepancies revealed after the completion of a codification process with the participation of all members of the research team.

Financial data

The financial data was obtained from audited consolidated financial statements that were derived from the EMIS database. To a great extent, the accounting-based measures have been used since the audited accounting data is likely to be authentic and credible, and it is not influenced by market perceptions or speculations.

Methodology

The two-stage data envelope analysis (DEA) approach was used in the study to evaluate the economic and organisational, social, and environmental performance. In order to carry on DEA, it was necessary to perform a disclosure analysis.

DEA is a method that measures efficiency, introduced by A. Charnes, W. Cooper and E. Rhodes (Charnes et al., 1978). It is a data-driven tool for performance evaluation, benchmarking, and multiple-criteria decision-making (Li et al., 2019). The DEA approach can be used to measure relative efficiency and gauge productivity without requiring the production function to take a specific mathematical form (Chang et al., 2013). This nonparametric method was proposed to evaluate the efficiency of the conversion of examined objects (decision-making units – DMUs) inputs into outputs. The evaluation of the objects' efficiency is carried out by measuring the distance of the object from the so-called efficiency frontier, which is created on the basis of the best objects in the group (benchmarks).

DEA is mentioned in the literature as an appropriate method for measuring sustainability in terms of efficiency (e.g. Belu, 2009; Chang et al., 2013; Zhou et al., 2018). This method was also used as an efficiency measurement tool in the banking sector, e.g. in Canada (Asmild et al., 2004), China (Xiaogang et al., 2005; Wang et al., 2014) and Italy (Piatti & Cincinelli, 2015).

It has been noted that DMUs may have 2-stage network structures with intermediate measures (e.g. Cook et al.; 2010; Chen et al. 2009; Halkos et al., 2014). Models for evaluating efficiencies of such DMUs are called two-stage network DEA models. These models have a variety of applications, for example in schools, banks or factories (Chang et al., 2013; Mardani et al. 2017), because they allow their users to take into consideration multiple variables and balance multiple objectives in the evaluation process.

One of the merits of 2-stage network DEA models is that the estimated sub-stage efficiencies help decision-makers establish the inefficient areas and understand the improvement directions for each DMU under evaluation. To apply the 2-stage approach of DEA, the following notation is used:

$j \in J = 1, 2, \dots, n$ – the index of n DMUs,

$j_0 \in J$ – denotes the evaluated DMU,

$\mathbf{X}_j = (x_{ij}, i=1, 2, \dots, m)$ – the vector of the initial inputs used by DMU_j ,

$\mathbf{Z}_j = (z_{pj}, p=1, 2, \dots, q)$ – the vector of the intermediate measures for DMU_j ,

$\mathbf{Y}_j = (y_{rj}, r=1, 2, \dots, s)$ – the vector of the final outputs produced by DMU_j ,

$\mathbf{v} = (v_1, v_2, \dots, v_m)$ – the vector of weights for the initial inputs,

$\mathbf{w} = (w_1, w_2, \dots, w_q)$ – the vector of weights for the intermediate measures,

$\mathbf{u} = (u_1, u_2, \dots, u_s)$ – the vector of weights for the final outputs,

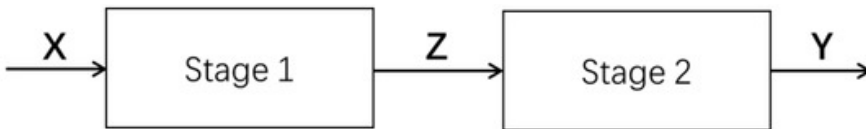
e_{j_0} – the overall efficiency of DMU_{j_0} ,

$e_{j_0}^1$ – the stage 1 efficiency for DMU_{j_0} ,

$e_{j_0}^2$ – the stage 2 efficiency for DMU_{j_0} .

The elementary two-stage system 1, with each DMU transforming external inputs X into final outputs Y via intermediate measures Z using a two-stage process, is represented in Figure 1. In this basic setting, only external inputs of the first stage enter the system, and only second stage outputs leave the system.

Figure 1. Two-stage system



Source: Own elaboration

Supposing there are n DMUs in the system, the definition of the first stage and the second stage of efficiency is as follows:

$$(1) \quad e_j^1 = \frac{wZ_j}{vX_j}, \quad e_j^2 = \frac{uY_j}{\tilde{w}Z_j}$$

Theoretically, the multipliers \mathbf{w} and $\tilde{\mathbf{w}}$ for the intermediate measures do not have to be equal in efficiency evaluation. However, DEA researchers have broadly agreed that the same intermediate product \mathbf{Z} has the same multipliers associated with it. Therefore, in this article it is assumed that $\mathbf{w} = \tilde{\mathbf{w}}$.

The overall efficiency of the two-stage process is defined by the following relational model (Li et al., 2019), which is the product of the stage efficiencies:

$$(2) \text{ Max } e_{j_0} = e^1_{j_0} \cdot e^2_{j_0} = \frac{uY_{j_0}}{vX_{j_0}}$$

s.t.

$$\frac{wZ_j}{vX_j} \leq 1; \frac{uY_j}{wZ_j} \leq 1, j=1,2,\dots,n$$

$$\mathbf{v, w, u} \geq \varepsilon$$

where ε is a non-Archimedean constant.

Equation (2) represents fractional programming and can be transformed into linear programming by applying the Charnes and Cooper (1962) transformation.

After the overall efficiency is achieved, the stage efficiencies can be calculated using Equation (1). Due to the existence of multiple optimal solutions in a linear program, it may lead to non-uniqueness for sub-stage efficiencies when decomposing the overall efficiency into stage efficiencies. By applying the standard two-stage DEA model, the efficiency score of each stage and its corresponding rank can be obtained. It is meaningless to compare the efficiency scores between the two stages. Although the efficiency of stage 1 for DMU_{j_0} is greater than that of stage 2, it does not mean that stage 1 performs better than stage 2. However, the relative advantages for each stage by rank can be estimated. For example, the efficiency score of stage 2 is higher than that of stage 1, thus we can judge that stage 2 has advantages relative to stage 1.

For a given DMU_{j_0} , the relative rate of increase of the efficiency rank for stage 1 and stage 2 is possible to be calculated following Li et al. (2019):

$$(3) \alpha\% = \frac{\text{rank (stage 2)} - \text{rank (stage 1)}}{\text{rank (stage 2)}}, \text{rank (stage 2)} \geq \text{rank (stage 1)}$$

$$\frac{\text{rank (stage 1)} - \text{rank (stage 2)}}{\text{rank (stage 1)}}, \text{rank (stage 1)} > \text{rank (stage 2)}$$

The model presented in equation (3) has been applied in this research in relation to the effectiveness of sustainability results in the banking sector. In order to calculate the efficiency rank, the CCR output-oriented model was used.

Discussion of the results

Applying the DEA model (equation 3) allowed us to present information on assessing banks' efficiency concerning sustainability engagement disclosed by banks in selected CEE countries, obtained in individual stages of the 2-stage DEA approach (see Appendix).

Input data for the first stage included financial ratios: total revenue, total value of deposits in Euro, and the data concerning the employment rate. These three indicators were used to determine the size and the financial position of the analysed banks, as well as their potential to engage in sustainability activities. This approach follows the previous research results confirming that better financial performing organisations are more intensively involved in social/environmental actions and reporting on them (Murray et al., 2006).

As the output data, the assessment of the degree of sustainable development objectives achievements was used: it was expressed as the sum of social indicators (social index) and the sum of environmental indicators (environmental index) analysed separately.

As the intermediate measures, the following measures were used: net profit (net loss), the sum of economic-organisational indicators, the level of information on sustainability policy (the presence of the sustainability/CSR report published and/or the existence of the sustainability tab on the banks' website), and the appreciation of sustainable engagement recognised by the business and institutional environment (sustainability/CSR awards and prizes, being listed on the CSR index).

Such prioritisation of input data, together with the output data and intermediate measures are intended to reflect the organisation's development. This study

assumes that it is easier for banks to achieve their economic-organisational goals first, and only then to achieve their social and environmental goals.

In the empirical study, in both stages of the 2-stage DEA approach, the CCR – DEA output-oriented model was used. Moreover, the efficiency obtained from the CCR – DEA output-oriented model directly on the input and output data without the intermediate stage was also estimated. This result was marked as e^{direct} . According to formula (2), the overall efficiency was also analysed. It was estimated as the multiplication of the efficiency of stage one and stage two and the $\alpha\%$ growth rate of the efficiency rank given by the formula (3).

At the first stage of this research, the efficiency of e^1 that refers to the efficiency of the financial and economic and organisational goals achievement was analysed. The higher the result, the better the efficiency. Following the data presented in the Appendix, it can be concluded that Croatian banks obtained the highest efficiency scores in the first stage in all the years of the analysis, as well as the Polish bank BOŚ S.A in 2015, 2017 and 2018. Usually (except for one case) these banks were above median efficiency ratings of stage one. As a rule, the banks' efficiency assessment was also higher in stage one than in stage two (except for Zagrebacka Banka and Podravska Banka). This confirms the efficiency of banks from Croatia in transforming their inputs into high results concerning their economic and organisational effects. It can also be observed that Romanian banks evolve and increase the efficiency of their economic and organisational outcomes. It is especially visible in 2017. Polish banks have surprisingly low efficiency of e^1 in the entire period analysed. Polish banks are among the largest banks in Central and Eastern Europe. However, in the case of the largest of them, it does not translate into higher efficiency in achieving economic and organisational goals. The fact of obtaining sustainability/CSR awards by Polish banks, or being listed on the CSR Index, does not distinguish these banks from the rest of those financial institutions. Hence, the assessment of the efficiency of Polish banks in stage one is very low. There is only one bank in the Polish sample (BOŚ) that in 2017 and 2018 got the highest possible score for efficiency in this stage. However, it can be observed that smaller Polish banks achieve slightly better efficiency at stage one compared to large Polish banks. A good example here is Getin Noble Bank and BOŚ.

The second stage of the analysis refers to the efficiency of e^2 that explains the efficiency of social and environmental engagement. The results of the second stage of the applied method prove that the leaders of CSR and sustainability engagement efficiency are large Polish banks. It is especially true for 2015. These banks had the best scores in the first year of the analysis, then in the following year their scores deteriorated, to achieve very good level again in the last two years of the research. In 2016, better-ranking places were taken by medium-sized Polish banks and some Croatian banks. General improvements in efficiency at this stage may be also observed in Croatian banks – except for the two smallest Croatian banks (Karlovacka Banka and Slatinska Banka) In 2017 and 2018, Polish banks again got very high results arriving at or getting the maximum score (with only a few examples of banks getting the low level of efficiency – this is the case of Millennium Bank as well as Idea Bank in 2017 and 2018). All Romanian banks achieved equally very low ranks in 2015 and 2016; it seems that by that time they did not care much about sustainability engagement, and the efficiency of their activities in this area was very poor. However, in the two following years, they all got the maximum possible efficiency scores in stage two. It is a signal of a significant improvement in the efficiency of Romanian banks in the field of social and environmental engagement. Throughout the whole analysis, it happened only twice that a bank was assessed as getting the maximum efficiency in both steps of the 2-stage DEA. It was the case of IKB Umag in 2016 and of Zagrebacka Banka in 2017. However, Zagrebacka Banka was the only bank in the whole sample to achieve the maximum values of both intermediate and final ratios as well as direct efficiency. In the case of IKB Umag, in the period between 2017 and 2018 its efficiency slightly declined (*inter alia* due to other banks catching up in the sample), yet these two banks should still be assessed as the most efficient banks among all the institutions analysed in this study.

The interesting results are also obtained when comparing e^1 and e^2 ranks. Banks whose efficiency rank in stage 1 was higher than in stage 2 were marked in bold (see Appendix). These are banks that more effectively transform their resources into the achievement of economic and organisational objectives, and are generally more effective in signalling their CSR policy concerning the



economic and organisational dimension of sustainable development than the other dimensions referring to social and environmental engagement. This was the case of 3 out of 12 Polish banks in 2015, 2 Polish banks in 2016, 1 bank in 2017, and 4 banks in 2018. There is one bank in Poland (BOŚ) that in all the years of analysis had the efficiency rank in stage 1 higher than in stage 2. In the case of Croatian banks, in 2015 most of them got the rank in stage 1 higher than in stage 2 (except for 3 cases); in 2016, there were 4 banks with such a result, and in 2017 and 2018 there were 6 and 4 such banks, respectively, out of 9 cases analysed. In Romanian banks, the situation of the first rank being higher than the second one took place in 2 cases in 2015 and in 1 case in 2016. Such results prove that the organisation with e^1 higher than e^2 proceeds on the path of development from the economic and organisational targets towards the new engagement directions concerning the social and environmental objectives.

Banks that are not bolded (see Appendix) are those that have the first stage rank score lower than the second one. It means that even though they do not acquire high efficiency of the intermediate goals, they have higher results regarding the efficiency of social and environmental dimensions. They should reconsider managing intermediate goals concerning the internal part of their organisation. It seems that these banks skipped the critical step in their development and focused directly on meeting the objectives concerning social and environmental issues without considering much the internal needs of sustainability development of a sound organisation.

In this study, e^{direct} has also been analysed. This value provides information on the efficiency of the initial inputs directly on the efficiency of social and environmental goals achievement. This efficiency proved to be generally very low in all Polish banks in all the years analysed. The value of e^{direct} was usually very high in Croatian banks – often (10 times in the whole Croatian sample) reaching very close to or precisely the maximum possible score. In the case of the two smallest Croatian banks, its e^{direct} efficiency was very low. In Romanian banks, e^{direct} was always very low, except for one bank (Patria Bank SA) that obtained the maximum score in 2017 and 2018. In the cases of e^{direct} efficiency, high score means that high efficiency in the social and environmental dimension was

achieved directly using the initial input and it was not dependent on the business and organisational structure of the entity.

The value of the $\alpha\%$ parameter indicates the extent to which the disproportion in the obtained e^1 and e^2 rankings is noticeable - i.e. how much a bank has changed its position in the ranking when comparing e^1 to e^2 . The bigger the change, the higher the improvement, and the higher the level of the $\alpha\%$ parameter. The efficiency of large Polish banks is very low in stage 1 and is assessed much better in stage 2. This improvement is also evidenced by the high value of $\alpha\%$, confirming that the efficiency assessment in both stages was definitely different. One of the effectiveness objectives of the analysis is to identify improvement areas. Generally, the high value of $\alpha\%$ indicates a large disproportion between the ranks obtained at particular stages. It also indicates a possible high potential of the organisation. As a rule, banks with high $\alpha\%$ are (in a given year) at a stage of the organisational development where intermediate objectives are already achieved, but there is still a great potential for enhancing the final objectives. Romanian banks are an excellent example of such a development already carried out (especially in 2016) and they may constitute a good benchmark for Croatian banks.

Conclusions

This study aimed to analyse the efficiency of sustainability engagement of the banks in selected CEE countries, assuming that the efficiency should be treated as a necessary condition for value creation. When analysing banks from Poland, Croatia and Romania, the important and clear differences between the banks and their level of development in the field of sustainability that is disclosed by them may be observed. It should be noted here that Polish banks are among the largest banks in Central and Eastern Europe. In this study sample, they have the highest representation, as out of all the 24 banks examined 12 banks are from Poland. What may be observed in Polish banks is that they have generally high efficiency of the social and environmental dimensions of the sustainability



engagement that they disclose. This is also confirmed by the observation of the raw data that was collected during the content analysis. On that basis, it may be concluded that the social and environmental outcomes of Polish banks are high. Interesting effects are obtained when 2-stage efficiency is run. When the input expressed in terms of the size and financial position of the banks in Poland was analysed, the results indicated that the efficiency concerning economic and organisational outcomes was low. The efficiency of the social and environmental outcomes based on the initial input (the direct efficiency) was also very low in the entire sample of banks from Poland, much lower than in other countries. However, at the same time efficiency of the social and economic engagement of the second stage of DEA model, where the economic and organisational index was taken as the input, proves to be high. Therefore, the intermedia efficiency is high, while the efficiency of stage one and the direct efficiency provided contrary results. The explanation may be that the Polish banks are huge organisations. They have large deposits, very high employment level, very high revenues (these categories are the initial inputs of the first stage of DEA model), and it is a challenge to make them efficient. It is much easier for smaller organisations to prove that with a limited number of resources they gain high outcomes (and thus high efficiency). In the case of the Polish banks, the outcomes are impressive; however, the resources that these banks have at their disposal (inputs) are also huge. The practical implication of this observation is the notice to these banks that apart from the advantages of the huge potential that they may use for their sustainability development, it is crucial for them to keep a very conscious and effective control over it. Such big dimensions of business may create organisational and other types of difficulties for the management. Therefore, the management of these organisations should constantly control banks' activities and their outcomes development.

It is also important to note that the efficiency of the Polish banks concerning the social and environmental dimensions decreased in 2016. This might have been caused by the changes in the political environment concerning banks in Poland. However, a positive change in the improvement of efficiency in the following years may be observed. It is obviously the effect of the introduction of the new EU Directive concerning the extended non-financial disclosure.

In reference to the Croatian banks, it may be observed that the efficiency of the first stage of the analysis is generally high. It means that the banks in Croatia use their resources (people and financial resources) to create the economic and organisational dimension of their development in a highly efficient way. These resources are also important for the achievement of the social and economic goals. Nevertheless, these banks do not have high efficiency in the second stage, meaning that the efficiency of the economic and organisational resources (treated as an input in the second stage) in the context of the social and environmental goals achievement is still not high. Moreover, the overall effects of Croatian banks' engagement as far as social and environmental outcomes are concerned are not very high, but they have been increasing significantly since 2017. Similarly as in Poland, in the case of Croatia it may be also caused by the reaction of the Croatian banks to the requirements introduced by the new EU Directive. It may be also concluded that these banks have important potential expressed in a sound business structure and economic and organisational standing that permit them to carry on towards the new dimensions of sustainability development concerning social and environmental goals. This should be a direction for them in the development towards value creation.

The Romanian banks did not prove to have high efficiency in the first two years of the analysed period. In both stages the efficiency was low in all the banks in the sample. The significant change took place in 2017 and 2018. All banks in the sample received the highest possible results as far as social and environmental efficiency in those years is concerned. It may be also observed that for all of them the first stage efficiency, the economic and organisational one, improved significantly, and this change was the main reason for the overall success in the social and environmental dimension. Therefore, it may be concluded that those banks made a rapid but also very sustainable improvement in their overall development, and they may be treated as a benchmark for other institutions.

This study makes several contributions. In this research, it is presented how the analysis of the sustainability engagement based on the two-stage DEA approach may be helpful in the efficiency analysis of the resources and activities engaged in the achievement of the sustainable goals that bring to the



increase in the value. As part of this research, the examples of financial institutions representing the banking sector in three CEE countries were analysed, and it may be clearly observed how different the ranks are, as well as the levels of the sustainability development achieved by the banks from the analysed countries, and what paths they followed to get to the point they currently are. Based on this analysis, the decision-makers can monitor the efficiency of the resources used and activities taken and diagnose the areas for improvement. They may take appropriate decisions as well. The results may be also useful in the analysis and comparison of different units and entities.

The approach presented in this study may be extended to different organisations and various countries. Moreover, this study may serve as an alternative approach to the analysis of value creation that focuses on the efficiency and not on the direct impact of the CSP on CFP that is extensively discussed in the literature and, since no homogenous results have been obtained, it may be a subject of criticism and certain limitations.

The main limitation of this study is that all the results and the diagnosis presented are based on the information provided, in great majority, by the banks used in the sample in voluntary bases. The quality and extent of the information that the organisation decided to publish influence the results obtained and conclusions derived from the analysis. Therefore, the extent and content of the information disclosed are highly important for the proper analysis, understanding and decision-making processes based on the approach presented in this paper.

Appendix A

Table 1. Efficiency scores for banks

Bank	2015					2016				
	e^1	e^2	e^{direct}	$e^1_0 \cdot e^2_0$	$\alpha\%$	e^1	e^2	e^{direct}	$e^1_0 \cdot e^2_0$	$\alpha\%$
Poland										
PKO BP S.A.	0.0143	1.0000	0.0205	0.0143	95.5%	0.0150	0.4711	0.0083	0.0071	33.3%
Santander Bank Polska S.A.	0.2015	1.0000	0.1687	0.2015	92.3%	0.0498	0.9689	0.1115	0.0482	63.2%
Bank Pekao S.A.	0.0235	1.0000	0.0351	0.0235	95.0%	0.0242	0.6860	0.0239	0.0166	45.5%
Mbank S.A.	0.2357	0.6735	0.1685	0.1587	21.4%	0.0892	0.5590	0.1124	0.0499	0.0%
ING BSK S.A.	0.1560	1.0000	0.2458	0.1560	93.8%	0.0765	0.8437	0.1098	0.0645	31.3%
Allior Bank S.A.	0.0322	1.0000	0.0658	0.0322	94.7%	0.0220	0.9374	0.0154	0.0206	65.2%
BGŻ BNP Paribas S.A.	0.0231	1.0000	0.2194	0.0231	95.2%	0.0451	1.0000	0.3556	0.0451	95.2%
Bank Handlowy w Warszawie S.A.	0.2072	1.0000	0.3389	0.2072	91.7%	0.1183	1.0000	0.3773	0.1183	91.7%
Bank Millennium S.A.	0.0397	0.3389	0.0134	0.0135	0.0%	0.0488	0.1905	0.0072	0.0093	5.0%
Bank Noble Bank S.A. (Warsaw)	0.2624	1.0000	0.2989	0.2624	90.0%	0.1129	0.6509	0.1923	0.0735	0.0%
BOŚ S.A.	0.7701	0.4968	0.5501	0.3826	75.0%	0.3879	0.4639	0.4124	0.1800	64.7%
Idea Bank S.A.	0.0590	0.0050	0.0008	0.0003	22.7%	0.1175	0.0133	0.0007	0.0016	43.5%
Zagrebacka Banka d.d.	0.5848	1.0000	0.4177	0.5848	85.7%	0.1486	1.0000	0.3749	0.1486	90.9%
Privredna Banka Zagreb d.d.	0.5080	1.0000	0.3628	0.5080	87.5%	0.1806	0.9319	0.3646	0.1683	10.0%
Erste & Steiermakiische Bank d.d.	0.3593	0.6901	0.1444	0.2479	30.8%	0.1757	0.9329	0.5143	0.1639	10.0%
Croatian Postal Bank d.d.	1.0000	0.8704	1.0000	0.8704	91.7%	0.3146	0.9767	1.0000	0.3073	25.0%
Kreditna Banka Zagreb d.d.	0.9521	0.3148	0.4494	0.2997	84.2%	0.09316	0.1659	0.1003	0.1545	80.0%
IKB Umag d.d.	0.7143	0.5394	1.0000	0.3853	60.0%	1.0000	1.0000	0.8961	1.0000	0.0%
Podravska Banka d.d.	0.7257	1.0000	1.0000	0.7257	80.0%	0.7819	1.0000	1.0000	0.7819	80.0%
Karlovacka Banka d.d.	0.9716	0.0054	0.0179	0.0052	90.5%	0.9721	0.0977	0.0134	0.0949	85.7%
Slatinska Banka d.d.	1.0000	0.0011	0.0251	0.0011	95.7%	1.0000	0.0018	0.0211	0.0018	95.8%
Banca Transilvania SA	0.1981	0.2500	0.0003	0.0495	30.0%	0.0587	0.6565	0.1094	0.0385	23.5%
Brd – Groupe Societe Generale SA	0.1803	0.3759	0.1026	0.0678	11.8%	0.0553	0.3907	0.1032	0.0228	0.0%
Patria Bank SA	-	-	-	-	-	0.3303	0.0977	0.0070	0.0323	68.2%
Romania										

Table 2. Efficiency scores for banks, cont

Bank	2017					2018				
	e^1	e^2	e^{direct}	$e^1_0 \cdot e^2_0$	$\alpha\%$	e^1	e^2	e^{direct}	$e^1_0 \cdot e^2_0$	$\alpha\%$
PKO BP S.A.	0.0745	0.9803	0.0438	0.0730	47.8%	0.0666	1.0000	0.0662	0.0666	95.5%
Santander Bank Polska S.A.	0.2124	0.9152	0.0898	0.1944	16.7%	0.1526	0.7264	0.0769	0.1108	10.5%
Bank Pekao S.A.	0.1117	0.5058	0.0134	0.0565	9.1%	0.1048	1.0000	0.0934	0.1048	95.2%
Mbank S.A.	0.2036	0.8847	0.1385	0.1802	15.8%	0.1497	1.0000	0.1313	0.1497	94.4%
ING BSK S.A.	0.2428	0.8383	0.1786	0.2035	0.0%	0.2222	0.8312	0.2479	0.1847	11.8%
Alior Bank S.A.	0.1421	1.0000	0.0986	0.1421	95.2%	0.1283	1.0000	0.1572	0.1283	94.7%
BGŻ BNP Paribas S.A.	0.2758	1.0000	0.2112	0.2758	93.8%	0.1729	1.0000	0.1927	0.1729	93.8%
Bank Handlowy w Warszawie S.A.	0.4366	0.9534	0.3460	0.4162	7.1%	0.3585	0.9531	0.3989	0.3417	13.3%
Bank Millennium S.A.	0.0468	0.2330	0.0032	0.0109	12.5%	0.0507	0.2573	0.0037	0.0130	13.0%
Getin Noble Bank S.A. (Warsaw)	0.7230	1.0000	0.3951	0.7230	90.0%	0.5866	1.0000	0.5233	0.5866	88.9%
BOŚ S.A.	1.0000	0.5382	0.6757	0.5382	94.7%	1.0000	0.7891	1.0000	0.7891	94.4%
Idea Bank S.A.	0.1961	1.0000	1.0000	0.1961	95.0%	0.1078	1.0000	0.0543	0.1078	95.0%
Zagrebacka Banka d.d.	1.0000	1.0000	1.0000	1.0000	0.0%	0.4164	1.0000	0.4719	0.4164	90.9%
Privredna Banka Zagreb d.d.	0.9227	0.9829	0.4096	0.9069	45.5%	0.6892	1.0000	0.4767	0.6892	87.5%
Erste & Steiermärkische Bank d.d.	0.9174	0.9171	0.6129	0.8413	50.0%	-	-	-	-	-
Croatian Postal Bank d.d.	0.3032	0.7851	1.0000	0.2380	16.7%	1.0000	0.8758	1.0000	0.8758	93.8%
Kreditna Banka Zagreb d.d.	0.9253	0.0840	0.0908	0.0778	77.3%	1.0000	0.0819	0.0953	0.0819	95.5%
IKB Umag d.d.	0.7326	1.0000	0.9406	0.7326	88.9%	0.7326	1.0000	0.9108	0.7326	85.7%
Podravska Banka d.d.	0.8098	1.0000	1.0000	0.8098	87.5%	0.8148	1.0000	1.0000	0.8148	83.3%
Karlovacka Banka d.d.	1.0000	0.0100	0.0145	0.0100	95.7%	1.0000	0.0164	0.0133	0.0164	95.7%
Slatinska Banka d.d.	1.0000	0.0013	0.0168	0.0013	95.8%	1.0000	0.1503	0.4300	0.1503	95.2%
Banca Transilvania SA	0.4609	1.0000	0.1237	0.4609	92.3%	0.3594	1.0000	0.1174	0.3594	91.7%
Brd – Groupe Societe Generale SA	0.4791	1.0000	0.3174	0.4791	90.9%	0.2447	1.0000	0.2989	0.2447	92.9%
Patria Bank SA	0.4713	1.0000	1.0000	0.4713	91.7%	0.5447	1.0000	1.0000	0.5447	90.0%

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