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Jakub BRZOSTOWSKI¹, Ewa ROSZKOWSKA², Tomasz WACHOWICZ³

USING MULTIPLE CRITERIA DECISION MAKING METHODS IN NEGOTIATION SUPPORT⁴

SUMMARY

The multiple criteria decision making [MCDM] methodology provides decision makers [DM] with a set of universal methods and models that may also be applied for supporting negotiation processes.

In this paper we discuss the usability of various classic MCDA techniques taking into account decision maker's subjective preferences for evaluating the negotiation template and building the scoring system for negotiation offers evaluation in the well-structured negotiation problems. This scoring system allows for evaluation of the negotiation offers, ranking and comparing them and therefore makes it easier for negotiators to decide on accepting or rejecting of different contract alternatives proposed by their counterparts.

The main goal of the paper is to present a comparative analysis of four multiple criteria decision making methods such as: SAW, MAUT, AHP, TOPSIS, the fundamental assumptions of which are different, but allow for using them in the negotiation support. All presented procedures make it possible to evaluate the negotiation offers [full packages] and build a ranking of them [an ordering them from the best to the worst one], to determine the alternative offers, to evaluate and compare the extent size of potential concessions. Those procedures also allow for conducting postnegotiation analysis in order to find the improvements of the compromise negotiated by the parties themselves by implementing some arbitration procedures derived directly from the game theory. We present the fundamental notions as well as the formal algorithms of each procedure discussing both their advantages and disadvantages. Furthermore we describe some modifications of these methods that make them more applicable for solving negotiation problems.

An example of application in the negotiation context is also presented in the case of problem where the space of feasible alternatives is continues. We show in the example how some of the discussed methods are chosen that fit the specific problem, namely the construction of a continuous scoring functions allowing for the evaluation of any feasible alternative.

Key words: multiple criteria decision making, AHP, SAW, MAUT, TOPSIS, negotiation support

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1. Introduction

Negotiation is the process of interaction between parties including the exchange of offers, concessions and argumentation where conflicting issues need to be evaluated and trade-offs need to be measured. The foundations of negotiation theory are theories such as decision analysis, behavioral decision making, game theory, and negotiation analysis [Bazerman, 1998; Pruitt, 1981; Raiffa, 1982; Schelling, 1963; Nash 1950, 1953; Osborn and Rubinstein, 1990; Kersten 2001; Fisher, Ury and Patton, 1991; Thompson, 2001; Spector, 1978]. For multi-issues negotiation, that are usually perceived as the integrative negotiation problems, the MCDM methods are most commonly applied [Raiffa et al., 2002]. In general, multiple criteria decision analysis [MCDA] refers to the problem of choice, sorting prioritizing, ranking or selecting the alternatives based on human judgment from among a finite set of actions described in terms of the multiple [usually conflicting] criteria, which must be solved according to the decision maker's judgments or preferences. The main steps of multiple-criteria decision making are the following [see Hammond et al. 1998, Jahanshahloo et al. 2006]:

- a) establishing system evaluation criteria that relate system capabilities to goals;
- b) developing alternative systems for attaining the goals [generating alternatives];
- c) evaluating alternatives in terms of criteria [the values of the criterion functions];
- d) applying a normative multiple criteria analysis method;
- e) accepting one alternative as "optimal" [preferred];
- f) if the final solution is not accepted, gathering new information and going into the next iteration of multiple criteria optimization is conducted

In the steps a), b) and e) decision makers have the central role, and the other steps are mostly technical [procedural] tasks. For step d), a decision maker should express his/her preferences in terms of the relative importance of criteria and should apply one of the aggregating functions. Most of MCDM methodologies share similar steps of organization and decision matrix construction, but each of them synthesizes information differently.

The negotiation MCDM problems may be divided into two categories. One is the classical MCDM problem where the ratings and criteria weights are measured by means of crisp numbers that makes it applicable for well structured negotiation problems. Another one, is the fuzzy multiple criteria decision-making [FMCDM], where the ratings and criteria weights are usually expressed imprecisely, subjectively and vaguely by means of linguistic terms, fuzzy numbers or intuition fuzzy numbers [Chen and Hwang 1992], that makes it applicable for ill-structured negotiation problems.

There is a variety of MCDM methods, but none of them is considered the best for all kinds of negotiation situations [as well, generally in decision making situations] [Guitouni and Martel, 1998]. There are no better or worse techniques, but techniques that fit better to a certain negotiation situation and or not. We can observe also that different methods, when applied to the same negotiation problem described by similar data, may produce differing results. The main question is, therefore, how to choose an appropriate MCDM technique for the support of negotia-

tion process with defined structure and context. This article tries to address this question by developing a methodological framework that includes different multiple criteria decision making methods and their modifications required for supporting negotiation problems.

This paper discusses the use of classical MCDA technique based on decision maker's preferences for ranking negotiation offers in the well-structured negotiation problems. We presented a class of MCDM methods which can be useful for the evaluation and ranking or selection of different negotiation packages.

Three separate steps are proposed to obtain the ranking of alternatives [packages]:

- 1) determining the relevant criteria [issue] and alternatives [packages],
- 2) assigning the weights to the criteria and forming the numerical measures of the impacts of the alternatives on these criteria and finally
- 3) analyzing the numerical values for determining the ranking score of each alternative.

We discuss four multiple criteria techniques: SAW⁵, MAUT⁶, AHP⁷ and TOPSIS⁸, which differ in the way they elicit the negotiator's preferences as well as in technical complication but all of them may be useful for ranking and selecting negotiation packages. We discuss the advantages and disadvantages of those techniques, as well as propose some modification to make them applicable for solving some negotiation problems. It is worth to note that proposed techniques can be useful not only for simple ordering negotiation packages from the best to the worst one, but also for determining the alternative offers, for evaluating and comparing the size of potential concessions as well as for improvement of the compromise by searching for the Pareto optimal solutions.

The paper is organized as follows. In the next section we formulate formally the negotiation problem. In the third section we discuss the problem of the negotiation issues and their evaluation. We present some methods the negotiators may use to determine the weight of all predefined negotiation issues. In section four the problem of normalization of issue's resolution levels is considered, since it may strongly influence the scorings of negotiation offers. In the fifth section we address the problem of handling the qualitative issues. The sixth section presents different methods of deriving the scoring functions and building the scoring systems for the evaluation of the negotiation offers. In the seventh section we compare the methods presented in the sixth section. In the eighth section we illustrate the negotiation process with an example. Finally, the conclusions are given in the ninth section.

⁵ Simple Additive Weighting

⁶ Multiple Attribute Utility Theory

⁷ Analytic Hierarchical Process

⁸ Technique for Ordering Preferences by Similarity to Ideal Solution

2. The formulation of negotiation problem

To formalize the negotiation problem using the classical MCDM methods we start with the following definitions [Roszkowska 2012, Roszkowska and Wachowicz 2012]:

- a *negotiation package* is an offer, which negotiator may send to or receive from their opponent,
- an *issue* is a criterion negotiators use to evaluate the offers,
- an *option* is the criterion potential resolution level.

We assume that negotiator has to choose one of [or to rank] m feasible packages P_i ($i = 1, 2, \dots, m$) taking into consideration the issue set $Z = \{Z_1, Z_2, \dots, Z_n\}$. We assume that all packages' scores with respect to all issues are known or has been estimated by the decision maker. Every package P_i is represented by a vector $P_i [x_{i1}, \dots, x_{in}]$, where x_{ij} is the value of the j -the issue's resolution level in the i -th package ($i = 1, 2, \dots, m$). We also define the lowest acceptable target value [reservation level] $-x_j^{res}$ as well as an ideal value [aspiration level] x_j^{asp} for each criterion $[j = 1, 2, \dots, n]$. Those values give the maximum limit of demands as well as the minimum limit of concessions and define the negotiation space for each issue. Next we define two additional packages based on aspiration and reservation levels: $P_i [x_1^{asp}, \dots, x_n^{asp}]$, $P_{AI} [x_1^{res}, \dots, x_n^{res}]$. The negotiation issues may be grouped into two categories: benefit issues and cost issues. Let I be the set of benefit criteria, J the set of cost criteria. The benefit issues are those for maximization [whose values always satisfy the rule – the larger the better]. The cost issues are those for minimization [whose values satisfy the rule – the smaller the better]. For n issues, we have weight vector $w = [w_1, w_2, \dots, w_n]$, which satisfies

$$w_1 + w_2 + \dots + w_n = 1 \quad [1]$$

where w_j represents the weight of j -th issue, $w_j \geq 0, j = 1, 2, \dots, n$. The decision matrix $D = (x_{ij})_{m \times n}$ ($i = 1, 2, \dots, m; j = 1, 2, \dots, n$) represents the performance rating or evaluation score x_{ij} of each package P_i with respect to each issue Z_j . The multiple criteria negotiation problem with finite set of m packages $P = \{P_1, P_2, \dots, P_m\}$ and set of n issues $Z = \{Z_1, Z_2, \dots, Z_n\}$ may be concisely expressed using the matrix form $D = (x_{ij})_{m \times n}$ and the weights vector $[w_1, w_2, \dots, w_n]$. The general multiple criteria negotiation problem is represented by

$$(P, Z, I, J, D, w) \quad [2]$$

Next, we use the weights representing the relative importance of criteria and combine the criteria to produce an aggregate score for each package. Scores computation involves the determination of the performance of packages with respect to all negotiation issues and the aggregation of these performances into an overall score.

Traditionally, MCDA method takes the set of alternatives [the set of predefined offers] and the set of criteria as given, and focuses on preference elicitation and aggregation. However in negotiation context another problem appears: what is an impact of a new package included to negotiation problem defined initially as [2] to the scoring system determined before the additional offer was considered. From this

point of view some of the classical MCDM methods have to be modified to take into account this problem.

3. The technique of issues' weights determination

A very significant role in MCDM negotiation models is played by the weights of criteria which usually provide the information about the relative importance of the considered issues. Several different methods were developed to take the criteria priorities into account in MCDM problems. For a comparison of weighting techniques, see Tzeng et al. [1998], Belton and Stewart [2002], Borchering, Eppel and Winterfeldt [1991]. Tzeng et al. [1998] classify weighting methods into objective or subjective ones. The criteria weights determined by the subjective weighting methods depend only on the preferences of the decision-maker [DM]. The subjective preferences are usually assigned by the DM based on their own experience, knowledge and perception of the problem using a selected preference elicitation technique. Contrarily, the objective weights are obtained with the use of mathematical methods based on the analysis of the decision matrix data D . **We have to point out that** there is no single method that can guarantee more accurate results, and the same negotiator may obtain different weights using different methods. This may mainly be due to the fact that decision maker cannot always give consistent judgment under different weighting schemes and the weighting process itself is essentially context dependent. Moreover, none of the two approaches is perfect. Some of the researches suggested that an integrated method could be the most appropriate for determining the criteria weights. A number of combinations or optimal weighting methods have been proposed and developed [Xu, 2004, Wang and Lee, 2009].

Some of weights elicitation methods involve asking the negotiator simple questions about the relative importance of the issue and using the responses to identify weights that are intended to approximate the decision maker's 'true' weights. The most useful approaches for the weights elicitation from the negotiation context perspective seem to be the subjective techniques which are outlined below.

The first one is the **direct rating method** proposed by von Winterfeldt and Edwards [1986]. This method uses direct numerical ratio judgments of relative issue importance which can be implemented in different ways. The popular technique is simple multiple attribute rating methods [**SMART**] proposed by Edwards in 1977 [Edwards 1977, see also Edwards and Barron 1994]. The negotiator is asked to rank the importance of the changes in the issue assign 10 points to the least important issue, and increasing the number of points [without explicit upper limit] that are assigned to other issues to address their importance relatively to the least important one. Next the weights are calculated by normalizing the sum of the points to one. In the other algorithm, the **SWING** weighting method [Winterfeldt and Edwards, 1986] the negotiator also begins by ordering the criteria in terms of their importance. However first he assign 100 points to this most important issue, and next he reduces the pool of 100 points and assigns the reduced points to the second most important issue. Proceeding in this way he ranks all issues and assigns relative importance points to their ranges. Finally the given points are normalized to sum up to

one to get the criteria weights. In the point allocation method the negotiator has a ‘budget’ of points to allocate between the issues in a way that reflects their relative importance. Doyle et al [1997] and Jia et al. [1998] pointed out, that although such methods of determining weights seem to be variants of this same methods, in practice they can produce different weights.

The Simos way of assigning the weights [Simos 1990] is based on procedure named “**playing card**” with issues. The negotiator is asked to rank these colored cards [or issues] from the least important to the most important. If the two issues are found to be equally important, these are given the same rank position. In order to allow the negotiator to express strong preference between criteria, another set of cards [white cards] is introduced. The negotiator puts white cards between two colored cards, while the number of white cards is proportional to the difference between the importances of the considered criteria. Next, the issue weights are calculated using the rank positions in the previous step in such a way that the rank positions are divided by the total sum of the positions of the considered issues. Finally, the vector of weights is normalized to obtain 1 while adding up the weights. In the pair-wise comparison method the negotiator compares the importance of each of two issues, next the relative importance is scored and the results are then normalized to a total of one. This weighting method provides a framework for comparing each issue against all others, however we may obtain the inconsistency of negotiator’s preferences, if the transitivity in preference structure does not hold.

For determining issue weights the **Analytic Hierarchy Process** [AHP] approach proposed by Saaty [Saaty, 1980] may also be used. Saaty builds a model using the pair-wise comparisons for determining the weight for every unique issue and recommends an ordinal 9-level score with the equivalent numerical evaluations [Saaty 1980, 2005]. If two criteria are of equal importance, a value of 1 is assigned to the compared pair, whereas a value of 9 indicates the absolute importance of one criterion over the other [see Table 1].

TABLE 1.

Intensity of importance	Definition
1	Equal importance
3	Moderate importance
5	Strong importance
7	Very strong importance
9	Extreme importance
2,4,6,8	can be used to express intermediate values

Source: Saaty 1980.

The judgments are put into the matrix $A=[a_{ij}]$, which contains the pairwise comparison elements

$$a_{ij} = \frac{w_i}{w_j} \quad [3]$$

where w_i and w_j are the relative importances of criteria i and j , respectively ($i = 1, 2, \dots, m, j = 1, 2, \dots, n$), their reciprocals, $a_{ji} = \frac{1}{a_{ij}}$ and unity as its diagonal elements $a_{ij} = 1$.

For calculating the relative weights the eigenvector approach is used. The weight can be obtained by using the formula:

$$w_i = \frac{1}{n} \sum_{j=1}^n \frac{a_{ij}}{\sum_{i=1}^n a_{ij}} \quad (i = 1, 2, \dots, m). \quad [4]$$

The weights of criteria are calculated in the process of averaging over the normalized columns. Because the negotiator's judgments may be not perfect, Saaty [1980] established also a Consistency Index [CI] of the square matrix \mathcal{A} . This measure can be used to verify to what extent the supplied judgments are consistent.

$$CI = \frac{(\lambda_{\max} - n)}{n - 1} \quad [5]$$

where λ_{\max} is the highest eigen value of the matrix \mathcal{A} .

To decide whether the CI is acceptable or not, Saaty [1980] also provided the Random Consistency Index [RI], which is the average CI of a randomly generated reciprocal matrices with dimension n [Saaty 1980]. The degree of inconsistency of the square matrix \mathcal{A} can be measured by the ratio of CI to RI , which is called the Consistency Ratio [CR].

$$CR = \frac{CI}{RI} .100\% \quad [6]$$

We can conclude that the matrix is sufficiently consistent and accept the matrix when $CR \leq 10\%$. In other cases it can be concluded that the inconsistency is too large and unacceptable, so that decision makers must revise their judgments.

In the case, where negotiator has a list of n prioritized [ranked] issues, he can use one of the rank-ordering function for assigning weight w_j to j -th issue taking into account his ranks r_j , where $j = 1, 2, \dots, n$. Let us assume that each issue j ($j = 1, 2, \dots, n$) has a rank r_j , where the rank is inversely related to weight [rank $r_1 = 1$ denotes the highest weight, rank $m = n$ the lowest weight]. Some authors suggested specific functions for assigning weights w_j to n criteria with ranks r_j , Stillwell et al. [1981] propose three functions:

1) **rank reciprocal** [inverse]

$$w_j(RR) = \frac{1/r_j}{\sum_{k=1}^n (1/r_k)} \quad [7]$$

2) **rank sum** [linear]

$$w_j(RS) = \frac{n - r_j + 1}{\sum_{k=1}^n (n - r_k + 1)} = \frac{2(n - r_j + 1)}{n(n + 1)} \quad [8]$$

3) **rank exponent weights**

$$w_j(RE) = \frac{(n - r_j + 1)^p}{\sum_{k=1}^n (n - r_k + 1)^p} \quad [9]$$

where r_j is the rank of the j -th criterion, p -parameter, $j = 1, 2, \dots, n$.

The parameter p may be estimated by a decision maker using the weight of the most important criterion or through interactive scrolling. For $p = 0$ results in equal weights, for $p = 1$ rank sum weight. As p increases, the weights distribution becomes steeper. Solymosi, and Dompi [1985] propose rank order **centroid weights function** which is used in SMARTER negotiation procedure:

$$w_j(ROC) = \frac{1}{n} \sum_{k=j}^n \frac{1}{r_k} \quad [10]$$

where r_k is the rank of the k -th criterion, $k = 1, 2, \dots, n$.

There have been a lot of studies on comparing the decision quality of weighting methods [for details see Olson and Dorai 1992, Edwards and Barron 1994, Barron and Barrett 1996a; 1996b; Srivastava et al. 1995, Jia et al. 1998; Bottomley, Doyle 2001; Noh and Lee 2003].

4. The problem of issue normalization in negotiation context

The MCDM methods usually require the issue resolution levels to be normalized since they want to operate with commensurable units. Because usually various criteria are measured on different scales and by different units, the scores in the evaluation matrix D have to be normalized, which allows comparisons across them. The normalization of values can be performed by one of the several known standardized

formulas. The examples of the most frequently used methods of calculating the normalized value n_{ij} are the following [Kahraman 2007; Wysocki 2011]:

- Type 1 – vector normalization

$$n_{ij} = \begin{cases} \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}} & \text{if } Z_i \text{ is a benefit criterion} \\ 1 - \frac{x_{ij}}{\sqrt{\sum_{i=1}^m x_{ij}^2}} & \text{if } Z_i \text{ is a cost criterion} \end{cases} \quad [11]$$

- Type 2 – the sum-based linear normalization:

$$n_{ij} = \begin{cases} \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} & \text{if } Z_i \text{ is a benefit criterion} \\ 1 - \frac{x_{ij}}{\sum_{i=1}^m x_{ij}} & \text{if } Z_i \text{ is a cost criterion} \end{cases} \quad [12]$$

- Type 3 – the min–max linear normalization:

$$n_{ij} = \begin{cases} \frac{x_{ij}}{\max_i x_{ij}} & \text{if } Z_i \text{ is a benefit criterion} \\ \frac{\min_i x_{ij}}{x_{ij}} & \text{or } 1 - \frac{x_{ij}}{\max_i x_{ij}} \text{ if } Z_i \text{ is a cost criterion} \end{cases} \quad [13]$$

- Type 4 – the linear normalization:

$$n_{ij} = \begin{cases} \frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} & \text{if } Z_i \text{ is a benefit criterion} \\ \frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} & \text{if } Z_i \text{ is a cost criterion} \end{cases} \quad [14]$$

for $i = 1, \dots, m, j = 1, \dots, n$.

To obtain non-linear normalization procedure we can modify the transformation formula introducing parameter p , which can be used to modeled curve of normalization function.

The non-linear normalization [type 5] has the form:

$$n_{ij} = \begin{cases} \left(\frac{x_{ij} - \min_i x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \right)^p & \text{if } Z_i \text{ is a benefit criterion} \\ \left(\frac{\max_i x_{ij} - x_{ij}}{\max_i x_{ij} - \min_i x_{ij}} \right)^p & \text{if } Z_i \text{ is a cost criterion} \end{cases} \quad [15]$$

While choosing the normalization procedure we have to take into account the fact that during the negotiation process new offers may appear that will require the evaluation. In other cases we can consider a continuous negotiation space for quantitative issues therefore we cannot take into consideration all feasible options when the scoring system is being built, but the salient ones. It may make our negotiation problem to appear unstable later on during the actual negotiation process.

The **stable negotiation problem** means that the new offer that is going to be evaluated after scoring system was determined does not change the scorings previously defined for other offers as well as does not lead to the rank reversal. To obtain stable problem the vector normalization [type 1] as well as sum-based linear normalization [type 2] is not acceptable. In the other normalization procedures we introduced some modifications. Instead of $\max_i x_{ij}$ put x_j^{asp} and instead of $\min_i x_{ij}$ we put x_j^{res} . For instance, for the benefit issue the value in the modified linear normalization [modified type 4] will be calculated using the following formula [Roszkowska 2012; Wachowicz and Błaszczyk 2012]:

$$n_{ij} = \frac{x_{ij} - x_j^{res}}{x_j^{asp} - x_j^{res}} \quad [16]$$

and for the cost issue will be calculated using the following formula

$$n_{ij} = \frac{x_j^{asp} - x_{ij}}{x_j^{asp} - x_j^{res}} \quad [17]$$

where x_{ij} is the score of i -th alternative with respect to j -th criterion before normalization, x_j^{asp} is an aspiration level of j -th issue, x_j^{res} is a reservation level of j -th issue ($i = 1, 2, \dots, m; j = 1, 2, \dots, n$).

After this normalization all criteria become the benefit criteria where the higher the value of n_{ij} the more preferred the alternative is with respect to the considered criterion. Let us denote by $N = (n_{ij})_{m \times n}$ the normalized decision matrix. In some cases we can follow the modified min-max linear normalization [modified type 3] as well. However in the negotiation context the formulas [16], [17] which take into account the reservation and the aspiration level seem to be more applicable. Especially in the case of small difference between the value with respect to some issue the modified min-max linear normalization [modified type 3] can result in very close values

which can be unconformable [small differences between packages] after obtaining the scoring system.

5. The quantitative and qualitative criteria in MCDM methods. Weights expressed by linguistic variable

In MCDM algorithms the quantitative criteria are scaled using the numbers. For representation of the imprecision of spatial data, and human cognition over the criteria the theory of linguistic variables can be used. A linguistic variable is a variable where values are words or sentences expressed in a natural or artificial language. Especially, when traditional quantification methods are difficult to reasonably express negotiation situations with respect to their complexity or qualitative nature, the notion of a linguistic variable can be useful. We can use this kind of expression for rating qualitative criteria as well as to compare two evaluation criteria. The qualitative criterion can be described using linguistic variables and next the criteria ratings are converted into 1-9 number scale [Table 2] [Jadidi at el. 2008].

TABLE 2.

The scale of alternative ratings for ratings qualitative criterion in the case of classical MCDM method

Scale	Rating
Poor [P]	1
Medium poor [MP]	3
Fair [F]	5
Medium good [MG]	7
Good [G]	9
Intermediate values between the two adjacent judgments	2,4,6,8

Source: [Jadidi at el. 2008].

If the criteria weights are considered as linguistic variables, the weights can also be expressed by the 1–9 numerical scale shown in Table 3 [Jadidi at el. 2008].

TABLE 3.

The scale of criterion weights

Scale	Weight
Very very low [VVL]	0,050
Very low [VL]	0,125
Low [L]	0,175
Medium low [ML]	0,225
Medium [M]	0,275
Medium high [MH]	0,325
High [H]	0,375
Very High [VH]	0,425
Very Very High [VVH]	0,475

Source: [Jadidi et al. 2008].

6. The scoring function based on multiple criteria techniques

6.1. The SAW and the MAUT [MAVT] technique

The simple and most frequently used multiple criteria decision technique is the *Simple Additive Weighting* [SAW] which is also known as weighted linear combination of criteria scores [Keeney and Raiffa 1976; see also Hwang and Yoon 1981]. This method is based on the weighted average. An evaluation score is calculated for each alternative by multiplying the scaled criterion value given to the alternative by the weight corresponding to the relative importance directly assigned by decision maker followed by summing the products obtained for all criteria. The advantage of this method is that it is a proportional linear transformation of the raw data which means that the relative order of magnitude of the standardized scores remains equal. To use this method, we first must express values of decision-making matrix as linear non-scaled values, so we have to use one of the normalization procedures [type 2-4]. SAW consists of three basic steps: scaling the scores to make them comparable, weighting the criteria, and adding up the values along rows and selecting the best [top ranked] alternative. In SAW technique, final score of each alternative is calculated as follow

$$S_i = \sum_{j=1}^n n_{ij} w_j \quad [18]$$

where S_i is the score for i -th alternative, and n_{ij} is the normalized score of i -th alternative with respect to j -th issue and w_j is the weight of criterion j as before ($i=1,2,\dots,m$; $j=1,2,\dots,n$). Next the alternatives are ranked according to the final scores. It implies that the higher the value of S_i the higher is the rank.

As was mentioned before, the most applicable normalization procedure here seems to be the modified linear normalization [modified type 4] or non-linear modified transformation [modified type 5], which allow for scoring new offer in the actual negotiation phase without the necessity of rescaling the whole system determined before, as well as it is possible to implement this procedure easily in the negotiation problem in which the continuous issues are considered. The main advantage of this method is the simplicity of calculations and easiness of use, however linear representation of the scoring systems may be not convenient for some negotiation preference structures. In this case a non-linear modified normalization type 5 may be used or the single-issue scoring functions may be defined without the assumption of linearity, namely the issue range can be split into subintervals by selecting some resolution levels and specifying the issue scores for such levels. Such a partially defined issues scoring function can be completed by linear interpolation between the specified points. Such a procedure assumes the scoring function to be linear over the subintervals but not linear in the whole issue range. If we denote by $x_{ij} \in Z_j$ the non-normalized i -th resolution level of j -th issue the interpolation results in the single-issue function v_j for which the following holds [benefit issue]:

$$x_j \in [x_{ij}, x_{(i+1)j}] \subset Z_j \Rightarrow v_j(x_j) = n_{ij} + \frac{n_{(i+1)j} - n_{ij}}{x_{(i+1)j} - x_{ij}} (x_j - x_{ij}) \quad [19]$$

In the case of cost issue the formula takes the following form:

$$x_j \in [x_{ij}, x_{(i+1)j}] \subset Z_j \Rightarrow v_j(x_j) = n_{(i+1)j} + \frac{n_{ij} - n_{(i+1)j}}{x_{(i+1)j} - x_{ij}} (x_j - x_{ij}) \quad [20]$$

The same generalization of SAW methods can be methods base on the *Multiple Attribute Utility Theory* [MAUT] or *Multiple Attribute Value Theory* [MAVT] [Keeney and Raiffa 1976]. The goal of techniques based on MAUT is to find a simple expression for the score of negotiation package taking into account utility or value functions. Similarly as in the SAW, the MAUT method transforms diverse issue into one common scale of utility or value. However, this method relies on the assumptions that the decision-maker is rational [preferring more utility to less utility, for example], that the negotiator has perfect knowledge, and he is consistent in his judgments. The goal of negotiator in this process is to maximize utility or value. In such meaning MAUT technique is a “compensatory” method, because poor scores on one issue can be compensated for by high scores on other issue.

The MAVT approach allows for constructing a value function over the set of all feasible [continuous as well] alternatives. The elicited value function can be treated as the scoring function for the evaluation of any package that occurs during the negotiation process. In the most general case the value function of the party can be described as follows:

$$v(x_1, x_2, \dots, x_m) = f[v_1(x_1), v_2(x_2), \dots, v_m(x_m)] \quad [21]$$

where the function f is the aggregation function of the single-issue value functions v_j . In a case where the single-issue value functions are obtained using normalization presented in previous section and the aggregating function is a sum we obtain the Simple Additive Weighting method. However, more sophisticated methods of deriving the single-issue functions and the aggregation method can be used that result in richer description of preferences [than in SAW]. If we assume the additive form of value function without restricting the shape of single-issue value functions we obtain the following form of scoring function:

$$v(x_1, x_2, \dots, x_n) = f[v_1(x_1), v_2(x_2), \dots, v_m(x_m)] = \sum_{j=1}^m v_j(x_j). \quad [22]$$

Although such a form assumes a simple aggregation procedure, it covers a broad spectrum of the preferences' types since the single-value functions v_j can take any form. In practical applications, these functions can be obtained by linear interpolation between the selected points partially describing the preferences with respect to the particular issue resulting in the piecewise linear functions describing the preferences over single issues. The main feature of the additive value function is the possibility to describe only preferences satisfying the mutual preferential independence of all issues. A pair of issues will be preferentially independent from all other issues if for any values of these issues and values of other issues held constant the preferences do not depend on the constant values of other issues. Different aggregation techniques would allow for modeling the preferences not satisfying such an assumption. However, such techniques are rather rare since the process of determining the aggregation function may be very difficult and time-consuming. The existing Negotiation Support Systems usually assume the additive structure of preferences [Inspire, SmartSettle, Negoisst] [Kersten and Noronha 1999, Schoop et al. 2003, Thiesen et al., 2003].

6.2. The Analytical Hierarchy Process [AHP] method

Similar to MAUT, AHP [Saaty, 1980, 1994] aggregates various facets of the decision problem using a single optimization function known as the objective function. The goal of AHP is to select the package that results in the greatest value of the objective function. Like MAUT, AHP is a compensatory procedure. However, AHP uses a quantitative comparison method that is based on pair-wise comparisons of decision criteria, rather than utility and weighting functions. All negotiation issues must be paired against all others and the results compiled in matrix form. The user uses a numerical scale [Table 1] to compare the choices and the AHP method moves systematically through all pairwise comparisons of issue and packages. The AHP technique thus relies on the supposition that humans are more capable of making relative judgments than absolute judgments. Consequently, the rationality assumption in AHP is more relaxed than in MAUT. The AHP may be used mainly in the case of finite and limited number of criteria or possible options. The advanta-

ge of this method is the possibility of using it in case of qualitative as well as quantitative criteria.

From the perspective of applicability the AHP can not be directly applied to form a full scoring system. The reason for that is the limitation of the number of compared alternatives which should not exceed 9 and this is related to the number of scale levels used in AHP. However, it is always a useful tool for determining indirectly the issue weights, and therefore it can be used as a complement of other techniques used for the formation of scoring function. If we consider P_j selected options for the j -th issue the number of alternatives obtained would be $p_1 p_2 \dots p_m$ in the case of m issues. Even if the number of options is low for each issue the number of alternatives will be too high to consider it for the pairwise comparison. In the simplified approach the AHP can be used to make pairwise comparisons of options separately for each issue. The use of AHP for a set of options of selected issue results in partial [single-issue] scoring function. The aggregation procedure such as sum can be used to derive the scoring function. Such an approach again assumes the additive structure of preferences which unfortunately limits the preferences type to problems where the issues are mutually preferentially independent.

There is always a possibility of using AHP to rank a selected set of packages occurring during the negotiation process without forming the full scoring system. Analogously as in the case of weights determination the AHP assumes that the negotiator performs pairwise comparison of alternatives with respect to each of issue. For a selected k -th issue this procedure results in a matrix $C^k = [c_{ij}^k]$ for which each element is a ratio level corresponding to one pairwise comparison of i -th and j -th package:

$$c_{ij}^k = \frac{n_{ik}}{n_{jk}} \quad [23]$$

where the values n_{ik} and n_{jk} correspond to the single-issue score of i -th and j -th alternative. The same consistency assumption as in the case of weights determination for the reciprocals and diagonal elements holds. Analogously, as in the case of weights determination the i -th alternative score with respect to the k -th criterion is calculated as follows:

$$x_{ik} = \frac{1}{n} \sum_{j=1}^n \left(\frac{c_{ij}^k}{\sum_{i=1}^n c_{ij}^k} \right) \quad [24]$$

The above vector derived from matrix C^k describes single-criterion scores of each alternative with respect to the k -th issue:

$$c^k = [n_{1k}, n_{2k}, \dots, n_{nk}] \quad [25]$$

Considering now a single i -th alternative from each vector c^k the score of i -th alternative is taken, and the weighted sum is used to determine the overall i -th alternative score:

$$v^i = \sum_{j=1}^m w_j n_{ij} \quad [26]$$

where m is the number of criteria/issues. All consistency measures presented in the third section apply in the same way.

The above mentioned simplified AHP procedure applicable for constructing the scoring function would be based on similar procedure. The difference is that instead of full packages the negotiator compares selected options [resolution levels] of the same issue that results in the vectors of single-issue scores assigned to issue options [see Wachowicz 2008]. The interpretation of the obtained vector: $c^k = [s_{1k}, s_{2k}, \dots, s_{nk}]$ is different here since s_{ik} is the score of the i -th option of the k -th issue, and therefore these scores are assigned to the resolution levels taken for comparison: $[x_{1k}, x_{2k}, \dots, x_{nk}] \in Z_k$. The partially elicited single-issue function corresponding to the k -th issue would than satisfy:

$$\forall i \in \{1, \dots, p_k\} v_k(o_{ik}) = s_{ik} \quad [27]$$

where p_k is the number of considered options for the k -th issue. Analogously as in some of the MAVT realizations, in the case of continuous issues the linear interpolation can be used to build for each issue scoring function using the calculated vector of scores $\{v_j\}_{j \in \{1, \dots, m\}}$ set of resolution levels that results in a set of single-issue functions that are further aggregated to form the full scoring function:

$$v(x_1, x_2, \dots, x_m) = \sum_{j=1}^m w_j v_j(x_j) \quad [28]$$

6.3. The TOPSIS method

The Technique for Order Preference by Similarity to an Ideal Solution [TOPSIS] method was proposed by Hwang and Yoon [Hwang and Yoon 1981]⁹. The basic principle is that the chosen alternative should have the shortest distance from the ideal solution and the farthest distance from the negative ideal solution. Some of the advantages of TOPSIS methods are the following: simplicity, rationality, comprehensible concept, good computational efficiency and ability to measure the relative performance for each alternative in a simple mathematical form [Hung, Cheng, 2009]. The idea of classical TOPSIS procedure can be expressed in a series of following steps [Hwang and Yoon 1981].

⁹ It is worth noting that the TOPSIS method corresponds with Hellwig taxonomic method of ordering objects [Hellwig 1968].

Step 1. Construct the decision matrix and determine the weights of criteria.

Let $D=(x_{ij})$ be a decision matrix and $w=[w_1, w_2, \dots, w_n]$ a weight vector, where $x_{ij} \in \mathfrak{R}$, $w_j \in \mathfrak{R}$ and $w_1 + w_2 + \dots + w_n = 1$. The criteria of the functions can be: benefit functions [more is better] or cost functions [less is better].

Step 2. Calculate the normalized decision matrix.

The normalized decision matrix N is calculated using one of the formulas [11-14]

Step 3. Calculate the weighted normalized decision matrix.

The weighted normalized value v_{ij} is calculated in the following way:

$$v_{ij} = w_j n_{ij} \text{ for } i = 1, \dots, m, j = 1, \dots, n. \quad [30]$$

where w_j is the weight of the j -th criterion, $\sum_{j=1}^n w_j = 1$.

Step 4. Determine the positive ideal and negative ideal solutions.

In the classical TOPSIS procedure the ideal positive solution is the solution that maximizes the benefit criteria and minimizes the cost criteria whereas the negative ideal solution maximizes the cost criteria and minimizes the benefit criteria. Positive ideal solution A^+ has the form:

$$A^+ = (v_1^+, v_2^+, \dots, v_n^+) = \left(\max_i v_{i1}, \dots, \max_i v_{in} \right) \quad [31]$$

Negative ideal solution A^- has the form:

$$A^- = (v_1^-, v_2^-, \dots, v_n^-) = \left(\min_i v_{i1}, \dots, \min_i v_{in} \right) \quad [32]$$

Step 5. Calculate the separation measures from the positive ideal solution and the negative ideal solution.

In the TOPSIS a number of distance metrics can be applied¹⁰.

The separation of each alternative from the positive ideal solution is given as

$$d_i^+ = \left(\sum_{j=1}^n (v_{ij} - v_j^+)^p \right)^{1/p}, \quad i=1,2,\dots,m \quad [33]$$

The separation of each alternative from the negative ideal solution is given as

$$d_i^- = \left(\sum_{j=1}^n (v_{ij} - v_j^-)^p \right)^{1/p}, \quad i=1,2,\dots,m \quad [34]$$

¹⁰ Possible metrics the first power metric [the least absolute value terms], Tchebychev metric or others [see Kahraman, et al., 2007].

Where $p \geq 1$. For $p=2$ we have the most used traditional n -dimensional Euclidean metric.

$$d_i^+ = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^+)^2}, \quad i=1,2,\dots,m \quad [35]$$

$$d_i^- = \sqrt{\sum_{j=1}^n (v_{ij} - v_j^-)^2}, \quad i=1,2,\dots,m \quad [36]$$

Step 6. Calculate the relative closeness to the positive ideal solution.

The relative closeness of the i -th alternative A_i with respect to A^+ is defined as

$$R_i = \frac{d_i^-}{d_i^- + d_i^+} \quad [37]$$

where $0 \leq R_i \leq 1$, $i=1,2,\dots,m$.

To obtain stable negotiation problem some modification of the classical TOPSIS procedure has been proposed [Roszkowska 2012, Roszkowska and Wachowicz 2012; Wachowicz and Błazarczyk 2012]. First at all the modified linear normalization procedure need to be used [16 and 17] and the negative ideal solution A^- and positive ideal solution need to be defined as follows: $A^- = (v_1^-, v_2^-, \dots, v_n^-) = (0, 0, \dots, 0)$ and $A^+ = (v_1^+, v_2^+, \dots, v_n^+) = (w_1, w_2, \dots, w_n)$. We can easily check that modified TOPSIS procedure is equivalent to classical TOPSIS procedure with the matrix $\bar{D} = (x_{ij})_{(m+2) \times n}$, where we add two packages to matrix D , $x_{m+1j} = x_j^{res}$ and $x_{m+2j} = x_j^{asp}$ for $j=1,2,\dots,n$. In the series of papers [Roszkowska 2009, 2011, 2012; Wachowicz 2011; Roszkowska and Wachowicz 2012; Wachowicz and Błazarczyk 2012] the practical applications of the TOPSIS technique for supporting negotiation process were discussed.

7. The comparison of MCDM techniques

The described MCDM techniques are the practical tools for supporting negotiation problems especially to select, prioritize, and rank a finite number of packages, however the selection of MCDM methods itself is a complicated problem. Sometimes it is difficult to select the most appropriate method for solving the negotiation problem under consideration. To answer the question how to choose the most suitable method for solving the negotiation problem we have to consider its different features, which include: the computational complexity, the applicability in the con-

text of the number of issues, options and alternatives, and its general strengths and weaknesses.

TABLE 4.

The overview properties SAW, MAUT, AHP and TOPSIS technique

Method	Properties
SAW	<p>Core process: summing single-issue scores <i>Type of data:</i> qualitative/quantitative <i>No. of issues or packages:</i> unlimited <i>No of options:</i> discrete or continuous <i>Compensation:</i> compensatory operation <i>Technical complication:</i> simplicity of calculations <i>Advantages:</i> easy to understood and to apply, logic, simple computation <i>Disadvantages:</i> influence of normalization formula to final ranking, possible rank-reversal, the assumption of the additive structure of preferences</p>
MAUT [MAVT]	<p>Core process: aggregation utility or value functions <i>Type of data:</i> qualitative/quantitative <i>No. of issues or packages:</i> unlimited <i>No of options:</i> discrete or continuous <i>Compensation:</i> compensatory operation <i>Technical complication:</i> simple procedure <i>Advantages:</i> easy to understood and to apply, logic <i>Disadvantages:</i> this method relies on the assumptions that the decision-maker is rational, has perfect knowledge, and he is consistent in his judgments</p>
AHP	<p>Core process: pairwise comparison <i>Type of data:</i> qualitative/quantitative <i>No. of issues or packages:</i> limited [7 ± 2] <i>No of options:</i> discrete <i>Compensation:</i> compensatory operation <i>Technical complication:</i> easy to understood, complicated computation <i>Advantages:</i> applicable for qualitative as well quantitative issue, based on simple structure pair-wise preference <i>Disadvantages:</i> complex computation, pair-wise comparison can be time consuming in case of may issues or options, bounded scale of point scores [usually 9], possible rank reversal</p>
TOPSIS	<p>Core process: the distances from ideal [PIS] and anty-ideal [NIS] solution <i>Type of data:</i> qualitative/quantitative <i>No. of issues:</i> limited <i>No. of packages:</i> unlimited <i>No of options:</i> discrete or continuous <i>Compensation:</i> compensatory operation <i>Technical complication:</i> simple procedure <i>Advantages:</i> easy to understood and to apply, logic computation, <i>Disadvantages:</i> influence normalization and distance formula for final ranking, possible rank reversal</p>

Source: Own study.

The one of important properties of the MCDM technique is the simplicity of calculations and logical interpretation. The reason for that is the fact that the negotiator who is going to use the selected method has no advanced mathematical knowledge in most of cases where the method is used. He may feel being manipulated by a “black-box” methodology when he is unable to understand the idea or different calculations stages. It is worth to note that all presented techniques are easy to understand and have simple and logical interpretation. Albeit, SAW technique looks the slightly easier to use than TOPSIS or AHP.

The presented MCDM techniques classically are associated with the problems of discrete set of packages; however some of them [for instance SAW, TOPSIS] can be modified to continuous negotiation issue domains. The AHP and SAW are based on the additive weighting process, where options are represented thought their relative importance.

The disadvantage of the AHP method, as well as the MAUT approach is relatively high time consumption of the process of pairwise comparisons of all options or issues when the number of compare concepts is high [AHP], and the process of partial utility functions [MAUT] assessment. The AHP is a powerful method for providing a decision making framework [for both qualitative as well quantitative issues] but only in the case of limited issues or packages. However, the AHP is very popular method for determining subjective weights of negotiation issues. In negotiation problem with a large number of issues and packages [especially for objectives with quantitative data] the TOPSIS procedure is more suitable.

The one of weaknesses of SAW and TOPSIS methods is the fact, that the normalization formula [in SAW] or normalization formula as well as the distance measure [in TOPSIS] might have an effect on the final results of aggregations and rank-ordering of packages. In Table 4 an overview of the main properties of the proposed techniques is presented.

8. An example

In this section we demonstrate the calculation process for the proposed MCDM techniques. Let us consider a Buyer and a Seller, bargaining about the conditions of the potential contract. The parties agreed on three issues [criteria]: price [EURO], delivery time [days] and payment time [days]. The issues: price, delivery time are benefit criteria, the greater values being better, for Seller and cost criteria, the smaller values are better, for Buyer. The payment time is cost criterion for Seller and benefit criterion for Buyer.

The Buyer decided on the reservation value and aspiration level of all issues and obtained following set of feasible solutions:

$$Z_1^B \times Z_2^B \times Z_3^B = [800,3000] \times [1,8] \times [6,15]$$

For the determination of issue weights the Buyer used AHP method. In the case of relatively low number [which is three in the case of our problem] of negotiation issues the pairwise comparison process is not difficult and time-consuming. Mo-

reover, the decision-maker does not express the issue weights directly but instead the decision-maker expresses the relationship between the issues which may be easier in the case of low number of compared concepts [negotiation issues] that the direct assignment of weights.

The pairwise comparison matrix has the following form:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} = \begin{bmatrix} 1 & 4 & 2 \\ 0.25 & 1 & 2 \\ 0.5 & 0.5 & 1 \end{bmatrix}$$

The resulting weights vector is of the following form:

$$[w_1^B, w_2^B, w_3^B] = [0.6, 0.19, 0.21]$$

The Seller on the other hand decided on the reservation values and aspiration levels and obtained the set of feasible solutions of the following form:

$$Z_1^S \times Z_2^S \times Z_3^S = [1000, 5000] \times [5, 10] \times [10, 20]$$

The Seller also derived his weights for the three issues by the pairwise comparison of issues:

$$\begin{bmatrix} a_{11} & a_{12} & a_{13} \\ a_{21} & a_{22} & a_{23} \\ a_{31} & a_{32} & a_{33} \end{bmatrix} = \begin{bmatrix} 1 & 0.5 & 0.25 \\ 2 & 1 & 0.5 \\ 4 & 2 & 1 \end{bmatrix}$$

The resulting weights vector is of the following form:

$$[w_1^S, w_2^S, w_3^S] = [0.14, 0.29, 0.57]$$

Since the space of feasible alternatives is continues the methods SAW and TOPSIS are employed for forming the scoring systems for both parties. The AHP method as well MAUT are not appropriate in this situation. The number of considered alternatives is infinite and the reduction of the space of alternatives to a number of alternatives that would allow for the pairwise comparison of all alternatives is impossible since the AHP is applicable for a very low number of alternatives. The MAUT approach in its general form does not assume preferential independence of considered issues that requires the forming of the scoring function considering the interdependencies of issues. However, the elicitation of such dependencies is a very difficult problem and a method taking into account such dependencies would be complicated.

In the case of both approaches the linear modified normalization technique is used [16 and 17]. Next, those two scoring systems based on SAW and TOPSIS are used in the process of simulating the negotiations process. We assume that parties

conceded in the space of overall score: $[0,1]$ using following rule [see Faratin et al. 1998]:

$$c_{t_i}^P = 1 - \left(\frac{t}{t_{max}^P} \right)^{\beta_P}$$

where β_P describes the speed of conceding for party P and t_{max}^P is the deadline for party P set to 20 in this experiment. The values of β_P for two parties were set to 0.5 and 1 giving the higher bargaining power to the first party [Buyer] since it is conceding slower than the second party. At each i -th round [at time point t_i] of negotiation the negotiator has at its disposal a set of alternatives not lower in terms of overall score from the value of $c_{t_i}^B$ [which is the concession at the i -th round for party B [Buyer]]:

$$O_{t_i}^B = \{ \bar{o} \in Z_1 \times Z_2 \times Z_3 \mid v^B(\bar{o}) \geq c_{t_i}^B \}$$

The party S [Seller] selects as the next proposal an alternative from this set which minimizes the Euclidean distance from the last offer of its counterpart [see Faratin et al. 2002]:

$$\bar{o}_{t_{i+1}}^S = \arg \min d(\bar{o}, O_{t_i}^B)$$

The negotiation threads are presented in Tables 5 and Table 6.

TABLE 5.

Negotiation thread with SAW-based scoring system

Offering	Package	Price	Delivery time	Payment time	Score of Buyer	Score of Seller
B	PC_1^B	800	1	20	1.0000	0.0000
S	PC_1^S	3740	10	9	0.0700	0.9559
B	PC_2^B	1640	3	14	0.6932	0.3644
S	PC_2^S	1640	10	10	0.4642	0.8824
B	PC_3^B	1640	7	13	0.5613	0.5374
S	PC_4^S	1640	8	10	0.4642	0.7664
B	PC_4^B	1640	8	10	Agreement	

Source: Own study.

TABLE 6.

Negotiation thread with TOPSIS-based scoring system

Offering	Package	Price	Delivery time	Payment time	Score of Buyer	Score of Seller
B	PC_1^B	800	1	20	1.0000	0.0000
S	PC_1^S	4160	10	10	0.0933	0.9706
B	PC_2^B	1220	10	13	0.6487	0.6967
S	PC_2^S	2060	10	10	0.3496	0.8971
B	PC_3^B	1640	10	11	0.5109	0.7684
S	PC_3^B	1640	10	11	Agreement	

Source: Own study.

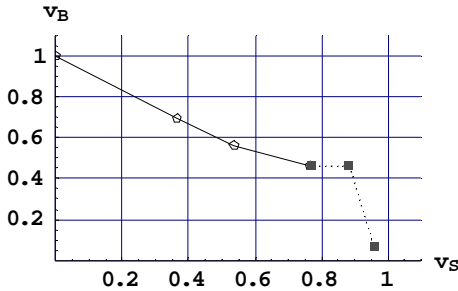
Let us describe more precisely the bargaining process between Seller and Buyer taking into account the scoring system based on SAW procedure [see Table 5]. The Buyer starts the negotiation process by offering its best alternative which is in the same time the worst solution for the Seller. In the next negotiation round the Seller proposes an offer which is worth to him 0.9559 points of overall score. Such an offer has a low score from the Buyers perspective which is 0.07 points meaning that it can not be accepted. In the third round the Buyer responds with the counteroffer worth to him a score of 0.6932 meaning that he performs a concession of 0.3068 points of overall score. In the fourth round the Seller proposes a counteroffer by conceding up to 0.8824 points. The response of Buyer is the offer worth to him 0.5613 and from the partner's point of view it is worth 0.5374 meaning that the parties are close to agreement. The offer proposed by the Buyer in the next round is scored by Buyer with 0.4642 and 0.7664 by the Seller that finally becomes acceptable for the Buyer.

The negotiation dances in case of two scoring systems based on SAW and TOPSIS procedure are also presented on the Figure 1.

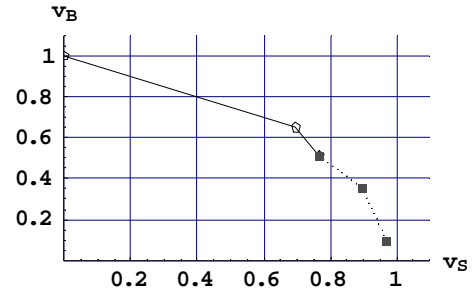
This example shows the practical application of the presented multiple criteria techniques not only for creating the scoring system but also for the evaluation and comparison of the extent of potential concessions, for the preparation of the negotiation strategies used to search for compromise solutions, ie. supporting negotiation process.

FIGURE 1.

**The illustration of negotiation dance in cases of two scoring systems:
SAW and TOPSIS procedure**



The SAW procedure



The TOPSIS procedure

Source: Own study.

9. Conclusion

The multiple criteria methods are useful tools for supporting the negotiation processes. In this paper we focused mainly on the application of selected classical multiple criteria techniques [AHP, SAW, MAUT, TOPSIS] for evaluating and ordering negotiation packages. Those techniques were chosen because of their simplicity, rationality, as well as good computational efficiency. The algorithms of those methods were presented, advantages as well as disadvantages of its usage in negotiation problems were discussed and the modifications for the direct application in the negotiation context were proposed. It is worth noting that the scoring system obtained by one of the multiple criteria methods is useful for planning and controlling the whole negotiation process.

The multiple criteria methods are useful tools for supporting the negotiation processes. In this paper we focused mainly on the application of selected classical multiple criteria techniques [AHP, SAW, MAUT, TOPSIS] for evaluating and ordering negotiation packages. Those techniques were chosen because of their simplicity, rationality, as well as good computational efficiency. The algorithms of those methods were presented, advantages as well as disadvantages of usage in negotiation problems were discussed and proposition of modification to be directly applicable to negotiation support were proposed. It is worth noting that the scoring system obtained by one of the multiple criteria method is useful for planning and controlling all negotiation process.

Since the usual number of negotiation issues is relatively low the AHP method is suitable for deriving the issue weights, especially in problems with qualitative issues. Also this procedure can be suitable for the derivation of scoring systems in problems where the number of alternatives is low. In situations with large number of alternatives, quantitative issues and continuous alternatives' spaces the SAW and TOPSIS methods are more suitable for the construction of the scoring systems.

However, we have to remember that both SAW and TOPSIS are sensitive to the selection of normalization method [SAW] and the selection of distance measure [TOPSIS]. In order to avoid the rank reversal that may occur in the case where one of these methods is used the computational procedures should take into account the reservation and aspiration levels of the negotiators.

The classical multiple criteria methods can help solving negotiation problems in which all decision data is known and represented by crisp numbers. Some real-negotiation problems however have more complicated structure. In such scenarios the fuzzy extension of described multiple criteria methods such as Fuzzy SAW, Fuzzy AHP, Fuzzy TOPSIS may be proposed to model imprecision, uncertainty, lack of information or vagueness occurring in the negotiation process.

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Grzegorz KORONKIEWICZ¹

THE CONCEPT OF BLACK AND SCHOLES MODEL AND THE ANALYSIS OF WIG20 IMPLIED VOLATILITY

Summary

The purpose of this article is to present the concept of Black and Scholes option pricing formula, with special emphasis on the three key economic and mathematical ideas that made it possible to develop the framework. An additional aim is to conduct an analysis of the WIG20 index implied volatility in order to determine whether the Polish financial options market functions accordingly to the assumptions of Black and Scholes model or rather in a way that has been observed on bigger more liquid derivatives market. The article describes the classical way of deriving the Black and Scholes partial differential equation and presents some possible applications of the Black Scholes model outside of straight-forward option pricing. In the empirical part of the article an estimation of WIG20 index implied volatility for a three year period ranging from 2009 to 2011 is conducted based on the daily quotes of options, futures and the index itself. Results suggest that WIG20 implied volatility follows patterns observed on other markets, what indicates that the assumptions of the model are not fully met on the Warsaw Stock Exchange.

Key words: Black and Scholes model, option pricing, implied volatility

1. Introduction

Black-Scholes option pricing formula is without a doubt, one of the biggest breakthroughs in the field of quantitative finance. For the first time proposed in the year 1973 by economists Fisher Black and Myron Scholes [Black Scholes 1973] and further developed by Robert Merton [Merton 1973], its creators were awarded a Nobel Prize in Economics in the year 1997. Since it went into public domain to this day it still remains as one of the central paradigms for pricing financial options and has found many practical applications outside of the field of derivatives pricing. The assumption of constant volatility of the underlying asset is one of the biggest limitations of the formula; however it also allows its users to derive the volatility of the underlying asset implied by the market prices of options contracts. Black-Scholes implied volatility has become an important tool in risk analysis and analysis of market prices. Although the amount of option contracts traded on regulated Polish markets is quite limited, the liquidity of that market can be sufficient so that the prices of derivatives would adequately reflect current moods of the investors.

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The characteristics of implied volatility of the WIG20 index are similar to those present in regulated markets that offer bigger liquidity and diversity of derivative instruments.

The article consists of two parts, the theoretical part in chapters 2 and 3 and the empirical part in chapter 4. Chapter 2 of this paper presents the classical way of deriving the Black and Scholes formula placing a lot of emphasis on the three key mathematical and economic ideas underlying the process: the use of Brownian Motion, the application of Itô's Lemma, and the principle of no-arbitrage pricing. Chapter 3 contains a description of a set of less obvious possible applications of the formula outside of the straightforward option pricing (those include: pricing of corporate debt and corporate equity, pricing of national debt, and estimation of implied market volatility), also in chapter 3 one possible way of deriving market volatility implied by the prices of options contracts that simplifies the issue of dividend yields is presented. In chapter 4 the methodology described in chapter 3 is used to derive the implied volatility of the WIG20 index using the prices of options and futures traded at the Warsaw Stock Exchange for a 3 year period ranging from 2009 to 2011. The results are then compared with volatility estimated by a standard GARCH (1,1) model. We show that the implied volatility of WIG20 index follows the well described patterns of volatility smile and volatility smirk, what illustrates that contrary to the assumptions of the model, market volatility is not perceived as constant by the market participants.

2. Black and Scholes Model

The derivation of the formula presented in this paper emphasizes the three main mathematical and economic pillars of the Black-Scholes formula: The use of Brownian Motion for modeling stock prices, the no-arbitrage pricing principle and the application of Itô Calculus (specifically Itô's Lemma). Combination of those three quite distant ideas allowed the authors of the formula to develop a technique called dynamic delta hedging, which (at least in theory) allows one to cancel out the risk of an option contract by trading in the underlying stock and the riskless asset, what in turn allowed to determine a fair price for any option contract from only easily observable inputs and the volatility of the underlying asset.

2.1. Brownian Motion-based stock price model.

Brownian Motion is a naturally occurring phenomenon of apparently random movement of small particles suspended in gas or liquid. It was first observed by a biologist Robert Brown in the year 1827. The mathematical (stochastic) process describing the movement is often referred to as Wiener process². A process W_t is a Brownian Motion if and only if [Baxter, Rennie 1996 p. 48]:

² Named in honor of the American mathematician Norbert Wiener. This process is also often referred to as Standard Brownian Motion.

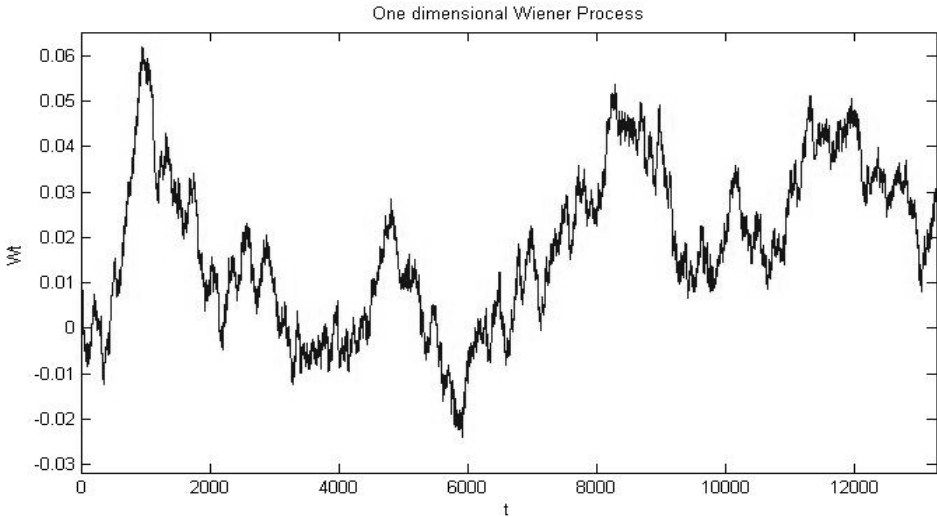
$$\begin{aligned} W_t \text{ is continuous} \\ W_0=0 \end{aligned} \quad (1)$$

Increments of W_t , are independently and normally distributed: $W_{t+s} - W_t \sim N(0, s)$

Graph 1 shows a simulated one-dimensional Brownian Motion.

GRAPH 1

Simulated one-dimensional Brownian Motion



Source: own elaboration with MATLAB R2011a

Brownian Motion has many properties that make it useful for simulating stock price dynamics. First of all it is a Markov Chain (a not path-dependent process), which means that future outcomes cannot be determined from its past realizations (what is in line with the so called Efficient Market Hypothesis [Fama 1970 pp. 384–386]). It is also a martingale³ which means that the expectation of any future outcome is always equal to the current position of the process; this and the normally distributed increments make it quite easy to use for complex simulations. However normality also means that market models based on Brownian Motion are likely to understate the probability of extreme market movements (tails of stock market returns tend to be fatter than those of normal distribution). It is also worth noting that Brownian Motion is a non-mean reverting process which means that (much as the stock prices) in the long term it is not fixed around one particular value.

³ For more information on Markov Chains and Martingales see [Jakubowski, Sztencel 2001 chap. 11 and 12].

The idea of using Brownian Motion to model the behavior of stock market prices was far from new at the time when Black-Scholes model was being developed. In fact it was first proposed in the year 1900 by the French mathematician Louis Bachelier in his PhD thesis [Bachelier 1900]. This revolutionary approach went quite unnoticed until the late forties when the rise of computing allowed for the utilization of the idea through computer simulations. The Brownian Motion by itself is not a sufficient model of stock price movements as its expected returns are always equal to zero. In reality we usually observe a long-term upward trend in stock prices. This is well captured by a process called Geometric Brownian Motion (GBM) (which can be described as a Brownian Motion with a drift):

$$dS_t = \mu S_t dt + \sigma S_t dW_t \quad (2)$$

where: S_t is the GBM (in this case the stock price at time t), μ and σ are constant parameters representing respectively the drift and volatility of the stock, and W_t is the standard (one dimensional) Brownian Motion.

In this framework we can describe the return on the stock as:

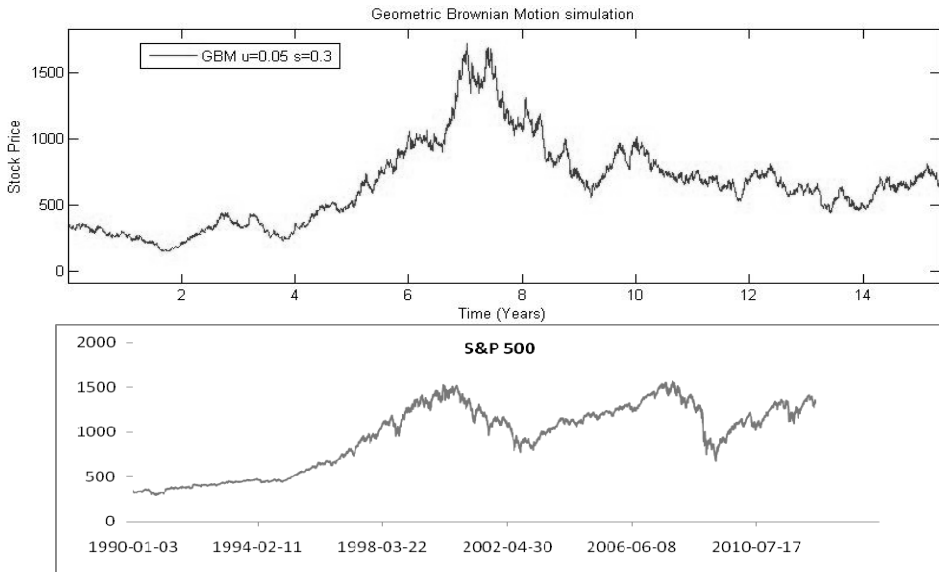
$$\frac{dS/S_t}{S_t} = \mu dt + \sigma dW_t \quad (3)$$

Graph 2 shows a simulation of a GBM and the price of an S&P500 index.

The similarities are most apparent locally, but the global process seems also pretty similar in nature to the dynamics of the stock market. However apart from the before mentioned thin tails with respect to the stock market, there are other important discrepancies between the stock price model and reality. First of all there is nothing preventing GMB from falling below zero, what is impossible in the case of the stock prices. As an immediate consequence of the normally distributed increments, GBM does not allow for big jumps in the stock price which do occur in real life situations.

GRAPH 2

Simulation of GBM with $\mu = 0.05$ and $\sigma = 0.3$ and a starting point at 350; and the price of S&P500 index (January 1990 – June 2012)



Source: own elaboration with MATLAB R2011a (GBM simulation) and Yahoo! Finance

2.2. No arbitrage pricing

No arbitrage pricing (not to be confused with the related Arbitrage Pricing Theory of Ross [Ross 1976]) is a very powerful tool in finance that allow to determine the 'fair' price of a security using only the prices of different assets currently traded in the market. The no arbitrage argument was first use by Modigliani and Miller in their classic work on the debt structure of an enterprise⁴ [Modigliani Miller 1958]. The concept states that any two otherwise identical assets cannot trade at different prices. If this did not hold true then any person could make an infinitely big riskless profit by buying the cheaper asset and selling the more expensive one. In real markets such a mispricing can happen, but all that is required for it to disappear is one agent to spot the mispricing. By conducting increasingly larger transactions to exploit the pricing difference he would exert enough demand and supply pressure on the prices of both assets to close the mispricing. The immediate corollary of that is the fact that all riskless assets (or portfolios of assets which result in a riskless non negative payoff) must earn exactly the same riskless rate of return. We can describe the price dynamics of such a riskless asset as follows:

⁴ For an in-depth description of the no arbitrage pricing see [Varian 1987].

$$\begin{aligned} dB_t &= rB_t dt \\ B_t &= e^{rt} \end{aligned} \quad (4)$$

where: B_t is the price of a riskless asset at time t and r is the riskless rate of return⁵ and $B_0 = 1$.

2.3. Itô calculus

The third pillar of the Black-Scholes option pricing formula is the field of mathematics called Itô Calculus. Itô calculus extends the methods of calculus to stochastic processes allowing us to find integrals and derivatives of some of such processes most notably processes described with Brownian Motion. One piece of Itô calculus called the Itô's Lemma allows us to quickly find the dynamics of processes which depend on GBM:

Suppose X is an Itô process with $dX_t = \mu_t dt + \sigma_t dW_t$ where W_t is a Brownian Motion, and let $f: R^2 \rightarrow R$ be twice continuously differentiable. Then the process Y , defined by $Y_t = f(X_t, t)$ is an Itô process with:

$$\begin{aligned} dY_t &= \frac{\partial f}{\partial t} dt + \frac{\partial f}{\partial X_t} dX_t + \frac{1}{2} \frac{\partial^2 f}{\partial X_t^2} (dX_t)^2 \\ &= \left[\frac{\partial f}{\partial t} + \frac{\partial f}{\partial X_t} \mu_t + \frac{1}{2} \frac{\partial^2 f}{\partial X_t^2} \sigma_t^2 \right] dt + \frac{\partial f}{\partial X_t} \sigma_t dW_t \end{aligned} \quad (5)$$

It is worth noting that Itô's Lemma is the second order expansion of the Taylor series (up to the second derivative of the function hence the term: $\frac{1}{2} \frac{\partial^2 f}{\partial X_t^2} (dX_t)^2$), the transition to equation (5) is possible due to the process called quadratic variation which allow to establish that: $(dW_t)^2 = dt$, $(dt)^c = 0$, and $dt * dW_t = 0$.

2.4. Derivation of the formula

In this part we will derive the Black-Scholes formula for the European call option on a non-dividend-paying stock. The derivation of Black-Scholes partial differential equation presented here is the variant of the original derivation, which is described in detail in: [Hull 2009 pp. 287–289], [Wilmott, Howison, Dewynne 1995 pp. 41–44] and [Jakubowski 2006 pp. 111–118] among others. An alternative way of deriving the model can be found in [Harrison, Kreps 1979] and [Duffie 2001 Chapter 6]. First we assume that the price of a call option C_t is a twice continuously differentiable⁶ function of the price of the stock and time:

$$C_t = C(S_t, t) \quad (6)$$

⁵ Interest rate r is assumed constant and continuously compounded.

⁶ C_t is not differentiable at t equal to maturity but at that point the price of the call is fully determined by its payoff.

Now we want to construct a riskless portfolio which price is equal to Π_t consisting of: one call option, some (negative) amount a_t of the underlying asset, and some (negative) amount b_t of the riskless asset⁷:

$$\Pi_t = C_t - a_t S_t - b_t B_t \quad (7)$$

To make sure that the portfolio is riskless we must know its dynamics $d\Pi_t$, this is simply the sum of the dynamics of the components of the portfolio. We know the dynamics of B_t and S_t from equations (4) and (2) respectively. In order to determine the dynamics of C_t we can use Itô's Lemma (equation (5)) to find:

$$dC_t = \left[\frac{\partial C}{\partial t} + \frac{\partial C}{\partial S_t} \mu S_t + \frac{1}{2} \frac{\partial^2 C}{\partial S_t^2} \sigma^2 S_t^2 \right] dt + \frac{\partial C}{\partial S_t} \sigma S_t dW_t \quad (8)$$

Hence the dynamics of the portfolio is equal to:

$$d\Pi_t = \alpha C_t dt + \frac{\partial C}{\partial S_t} \sigma S_t dW_t - a_t \mu S_t dt - a_t \sigma S_t dW_t - b_t r B_t dt$$

where:

$$\alpha C_t = \left[\frac{\partial C}{\partial t} + \frac{\partial C}{\partial S_t} + \frac{1}{2} \frac{\partial^2 C}{\partial S_t^2} \sigma^2 S_t^2 \right] \quad (9)$$

After grouping all the terms with dt and dW_t we obtain:

$$d\Pi_t = [\alpha C_t - a_t \mu S_t - b_t B_t r] dt + \left[\frac{\partial C}{\partial S_t} - a_t \right] \sigma S_t dW_t \quad (10)$$

Since the whole unpredictability of the price of the portfolio at time t comes from dW_t we can cancel out the risk of the portfolio by setting the amount of stock a_t to $\frac{\partial C}{\partial S_t}$. This results in a portfolio that is locally riskless⁸. This is called dynamic delta hedging from the name delta usually given to the first derivative of the price of the option with respect to the price of the underlying asset:

$$\Delta = \frac{\partial C}{\partial S_t} \quad (11)$$

⁷ It is worth noting that both a_t and b_t as well as Π_t are not constant in time.

⁸ Since the portfolio is riskless only locally the amount of the stock a_t needs to be adjusted dynamically with every change of the price of the stock.

From the no-arbitrage argument we know that a riskless portfolio must earn exactly the riskless rate of return what corresponds to:

$$d\Pi_t = r\Pi_t dt \quad (12)$$

From equation (7) we substitute $b_t B_t = C_t - a_t S_t - \Pi_t$ in equation (10), set $-a_t = \frac{\partial C}{\partial S_t}$ and replace αC_t with its expression to obtain:

$$d\Pi_t = \left[-rC_t + \frac{\partial C}{\partial t} + rS_t \frac{\partial C}{\partial S_t} + \frac{1}{2} \frac{\partial^2 C}{\partial S_t^2} \sigma^2 S_t^2 + r\Pi_t \right] dt \quad (13)$$

After using the relation in (12) we arrive at the famous Black-Scholes partial differential equation (Black-Scholes PDE):

$$-rC_t + \frac{\partial C}{\partial t} + rS_t \frac{\partial C}{\partial S_t} + \frac{1}{2} \sigma^2 S_t^2 \frac{\partial^2 C}{\partial S_t^2} = 0 \quad (14)$$

It is worth noting that up to this point we have in no way used the fact that the derivative that is being priced is a call option, what means that the Black-Scholes PDE expresses the price of any derivative whose price can be expressed as a function of time and a stock (or a different asset with GBM-driven price). The parameter r is not present in the Black-Scholes PDE hence, the value of the option is not affected by the rate at which the price of the underlying asset is growing, it is however affected by the volatility of the stock's price σ . In order to find an explicit formula for the price of the call option we must solve the Black-Scholes PDE with appropriate boundary conditions:

$$\begin{aligned} S_t &\in (0, \infty) \\ t &\in (0, T) \\ C(S_t, T) &= (S_T - K)^+ \end{aligned} \quad (15)$$

where: T is the maturity time of the call option, K is the strike price and $(X)^+ \equiv \max(X, 0)$

Solving the Black-Scholes PDE requires transforming it into a heat equation which has a standard solution⁹. This yields an explicit formula for the value of the European call on a non-dividend-paying stock:

$$C(S_t, t) = S_t \Phi(d_1) - e^{-r(T-t)} K \Phi(d_2) \quad (16)$$

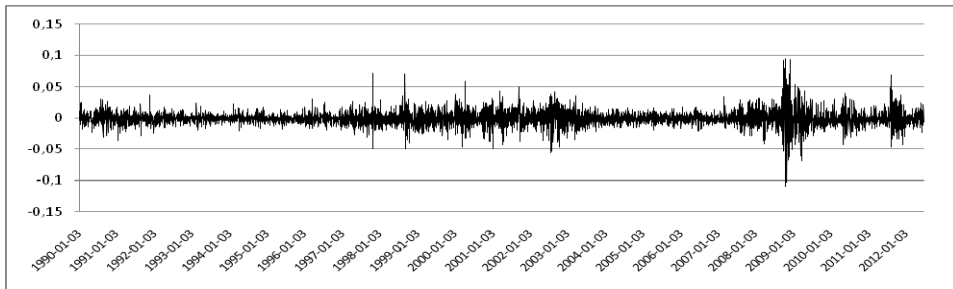
where: $d_1 = \frac{\ln\left(\frac{S_t}{K}\right) + \left(r + \frac{\sigma^2}{2}\right)(r-t)}{\sigma\sqrt{T-t}}$, $d_2 = \frac{\ln\left(\frac{S_t}{K}\right) + \left(r - \frac{\sigma^2}{2}\right)(r-t)}{\sigma\sqrt{T-t}}$ and Φ is the cumulative standard normal distribution function.

We can obtain similar results for different type of options by simply applying different boundary conditions to the Black-Scholes PDE.

Black-Scholes PDE is a system for pricing a whole array of securities and different assets, however one should always keep in mind the limitations of this approach, among which probably the most notorious one is the assumption of constant volatility of the underlying asset. Graph 3 shows daily returns of the S&P500 index from January 1990 until June 2011.

GRAPH 3

Daily logarithmic returns of the S&P 500 index (January 1990 – June 2012)



Source: Own elaboration based on Yahoo! Finance

Changes in stock market volatility are easily observable. It is however worth noting that periods of low and high volatility tend to be extended in time, a well-documented property of volatility clustering first observed by Mandelbrot [Mandelbrot 1963], so to some extent local variations in market volatility are limited. Later option pricing models allow for stochastic volatility, but rarely do they provide a close ended formula like the Black-Scholes model. Models with stochastic volatility that provide approximate solutions include: [Hull and White 1987] and [Heston 1993].

⁹ For an in depth description of this process see [Wilmott, Howison, Dewynne 1995 p. 71-83].

3. Applications of the model

Apart from the straight-forward pricing of financial options, Black and Scholes model have a whole array of different applications. First of all, what was foreseen by the authors of the formula, we can use it for pricing corporate liabilities. This is possible because corporate debt is an asset quite closely resembling an option (long call) on the value of the company's assets. In a similar fashion company's equity can be expressed as a long call option on the value of the assets minus debt. To use this approach we simply need to change the inputs in the formula for pricing a standard European call option in the following fashion¹⁰: stock price value – value of company's assets exercise price – face value of debt volatility of stock – volatility of the value of the company's assets time to maturity – life of the company's long term debt.

This approach to equity valuation is especially useful when dealing with non-standard companies that don't have a clear source of cash-flows and therefore are hard to value through standard NPV methods, additionally it allows for valuation of companies with negative equity assuming that there exist a possibility that a company going through financial hardships can improve its situation in the future. It is however important to keep in mind that although this approach is quick and easy to apply it is based on very unrealistic assumptions. First of all we assume that the value of company's assets is determined by a stochastic process what is quite hard to accept even as a simplification of reality. Second as most companies are not fixed time projects, we are forced to choose the maturity time of an 'option' rather arbitrarily, whereas in most other approaches to equity valuation we assume that the company will exist indefinitely.

A somewhat related application of Black-Scholes formula was proposed by Clark [Bouchet, Clark, Gros Lambert 2003 pp. 137-139]. The author proposes to treat country's debt as an option on its international market value. This approach allows for an estimation of the fair market value of a country's debt. What is perhaps more interesting, one can also use this framework to estimate the implied market volatility of the economy of a country, by plugging the observed market value of the debt into the formula and working backwards, obtaining the implied value of the volatility parameter. Implied volatility might be a good indicator of the riskiness of a country as perceived by the country's debt holders. This approach although interesting is quite hard to implement, as some required inputs to the model are not freely publicly available or are unobservable and have to be estimated altogether¹¹.

Another application of the formula, called real options analysis¹², can be found in the field of capital budgeting. Black and Scholes model can be used to aid standard methods based on discounted cash flows, by allowing the analysts to determine a values of possible development options that a project manager may or may not

¹⁰ http://pages.stern.nyu.edu/~adamodar/New_Home_Page/lectures/opt.html [retrived on 18.12.2012].

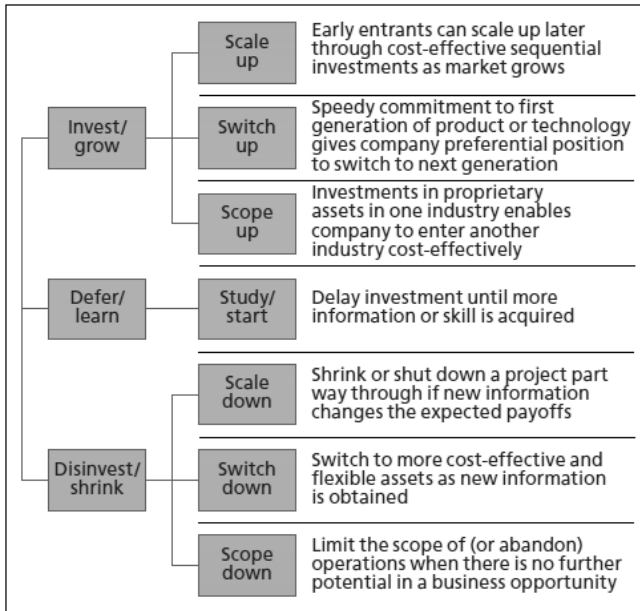
¹¹ Those include: the duration of national debt, global riskless rate, and the international market value of the economy.

¹² For an in depth description of real option analysis see [Copeland, Antikarov 2003].

choose to undertake in the future. This allows for more flexibility in the forecasts required for the application of NPV method. Figure 1 shows the standard classification of 7 real options that can be considered in real option analysis.

FIGURE 1

Standard classification of real options in capital budgeting



Source: [Copeland Keenan 1998 p. 48]

Although Black and Scholes model can be used for real options analysis, quite often practitioners prefer to rely on a less complex options pricing approach like the binominal model of Cox, Ross, and Rubinstein [Cox, Ross, Rubinstein 1979], due to simplicity and the discrete characteristics of real options.

The biggest limitation of Black-Scholes model is the assumption of constant volatility of the underlying, this however created a possibility for a new way of analyzing market volatility. Market volatility measurements can generally be classified into three categories: historical volatility, future volatility and implied volatility. Historical or realized volatility refers to the volatility of past prices which can be crudely estimated as the historical standard deviation (over a specific period). Similarly future or forward volatility refers to the volatility of future prices of an asset and can be estimated with various econometric models. Implied volatility is the volatility that is implied by a certain asset pricing formula that takes volatility as an input, we use the current market price of that asset and work backwards to obtain the estimate of volatility from the given model, implied volatility may be interpreted as the markets participants' expectation of the future volatility. The most common type of implied

volatility discussed in the literature, is the volatility implied by the Black-Scholes model.

An explicit closed end formula for Black-Scholes implied volatility cannot be obtained from equation (16). We can find many close-ended formulas for an approximate value of implied volatility in literature, those proposed in: [Brenner, Subrahmanya 1988], [Chance 1996] and [Chambers, Nawalkha 2001] are among the most popular ones. Such formulas are useful in situations where quick decisions are necessary (such as day-trading); however for most application one can easily obtain a more accurate estimate by iterative computer methods.

One problem often encountered when estimating implied volatility is the handling of dividends. In order to apply the Black-Scholes formula to dividend-paying stocks we need to first establish the dividend yield of the underlying stock. This can get especially cumbersome when the underlying is a stock market index consisting of a large number of stock quotes. One way to deal with this problem is to use the prices of corresponding futures contracts. From no-arbitrage argument we have [Hull 2009 p.107]:

$$F_t = S_t e^{(r-d)(T-t)} \quad (17)$$

where: F_t is the price of the futures contract at time t , d is the dividend yield, and T is the maturity of the contract¹³.

Since the dividend yield is already taken into account in the price of the futures we can obtain the implied volatility from the following formula:

$$\begin{aligned} C(S_t, t) &= e^{-r(T-t)} [F_t \Phi(q_1) - K \Phi(q_2)] \\ P(S_t, t) &= e^{-r(T-t)} [F_t \Phi(-q_1) - F_t \Phi(-q_2)] \end{aligned} \quad (18)$$

where: $q_1 = \frac{\ln\left(\frac{F_t}{K}\right) + \left(\frac{\sigma^2}{2}\right)(r-t)}{\sigma\sqrt{T-t}}$, $q_2 = \frac{\ln\left(\frac{F_t}{K}\right) - \left(\frac{\sigma^2}{2}\right)(r-t)}{\sigma\sqrt{T-t}}$ and P is the price of a put option.

This variant of the Black-Scholes formula is known as the Black model [Black 1976] and was primarily developed to tackle the problem of non-randomness of some price changes, by substituting the spot prices with forward prices.

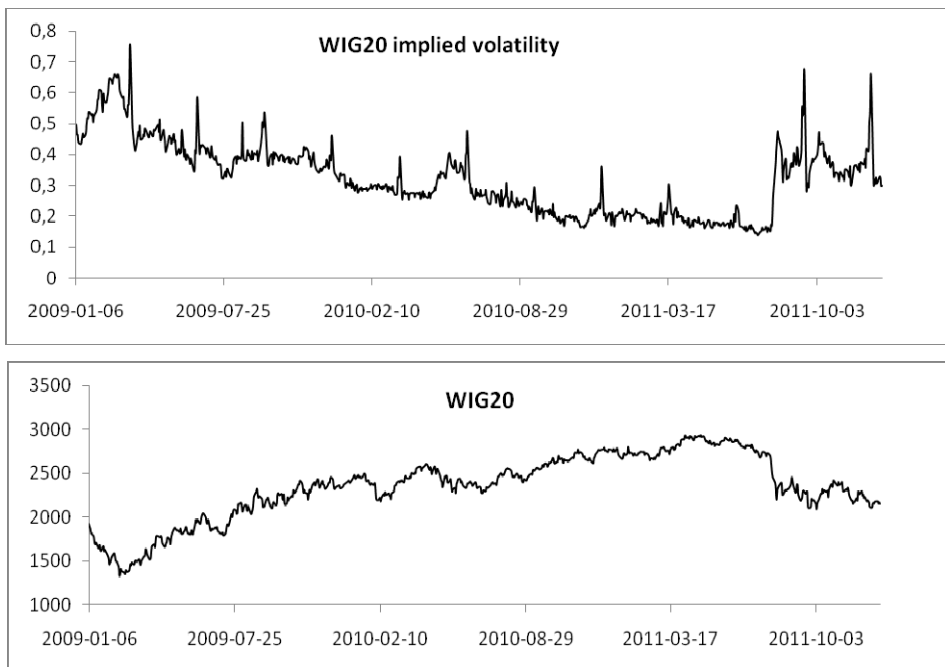
4. Implied volatility of the WIG20 index

¹³ This approach is only possible when futures contracts with the same maturity as options are available.

In order to obtain the implied volatility of the WIG20 index of the Warsaw Stock Exchange we follow the methodology presented in the previous chapter. We used an algorithm (part of the MATLAB financial toolbox), that changes the value of σ in q_1 and q_2 of equation (18) until the obtained value of call or put matches the actual price of the option contract. The volatility was calculated using all the available option prices for every trading day between January 2009 and December 2011 and the prices of corresponding futures contracts, yield of the 52-week treasury bills was used as the proxy for the riskless rate. The final result is the volume-weighted average of individual implied volatilities of all the option contracts available at any given day. The volatility is annualized.

GRAPH 4

WIG20 index implied volatility (January 2009 – December 2011)



Source: own elaboration based on bossa.pl

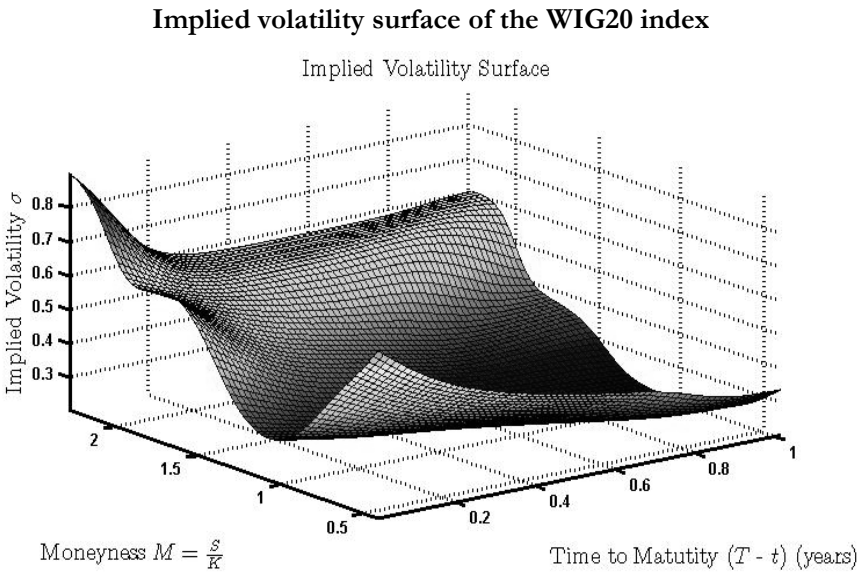
A very apparent feature in graph 4 is the regularly occurring volatility spikes. This is a typical pattern in most derivatives markets, the implied volatility tend to increase dramatically for contracts which are close to maturity¹⁴. These is in a small part due to the normality assumed in Black-Scholes model, but also to a much greater extend

¹⁴ At WSE option contracts mature 4 times a year, on the third Friday of each of the following months: March, June, September, and December.

shows that investors behavior becomes increasingly irrational near the maturity date of contracts that they are holding. Options change hands much more often when they are very close to maturity, hence the increase in volatility

Although the volume of derivative contracts traded on the WSE is very small, the behavior of implied volatility seems quite similar to that observed in more liquid markets. Graph 5 shows the implied volatility surface of the contracts (Gaussian smoothing was applied to the data to increase readability).

GRAPH 5



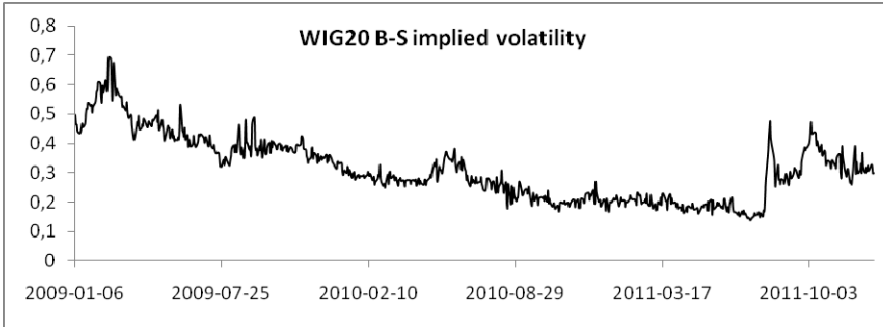
Source: own elaboration with MATLAB R2011a based on bossa.pl

It is quite apparent that the volatility surface includes well documented patterns of volatility smile and volatility smirk [Derman, Kani 1994] [Rubinstein 1994]. For contracts that are close to maturity, implied volatility of at the money options (corresponding to the moneyness of 1) is lowest and the volatility of deep out of the money and deep in the money options is significantly higher, thus creating a smile-like shape in a volatility-moneyness space what can be observed at graph 5, especially at low values of time to maturity. If the assumptions of the model were true for the WIG20 index we would expect to observe a flat volatility surface. One common explanation for this type of phenomenon is the mismatch between the actual probability distribution of stock price returns and the normal distribution assumed in the model [Hull 2009 pp. 384–386]. Tails of stock market returns tend to be heavier than those of normal distribution thus making the large movements in stock prices more likely than those predicted by the model, as indicated in chapter 2.1.

Graph 6 presents the implied volatility without taking into account the option contracts that are close to maturity.

GRAPH 6

**WIG20 index implied volatility without close to maturity options
(January 2009 – December 2011)**

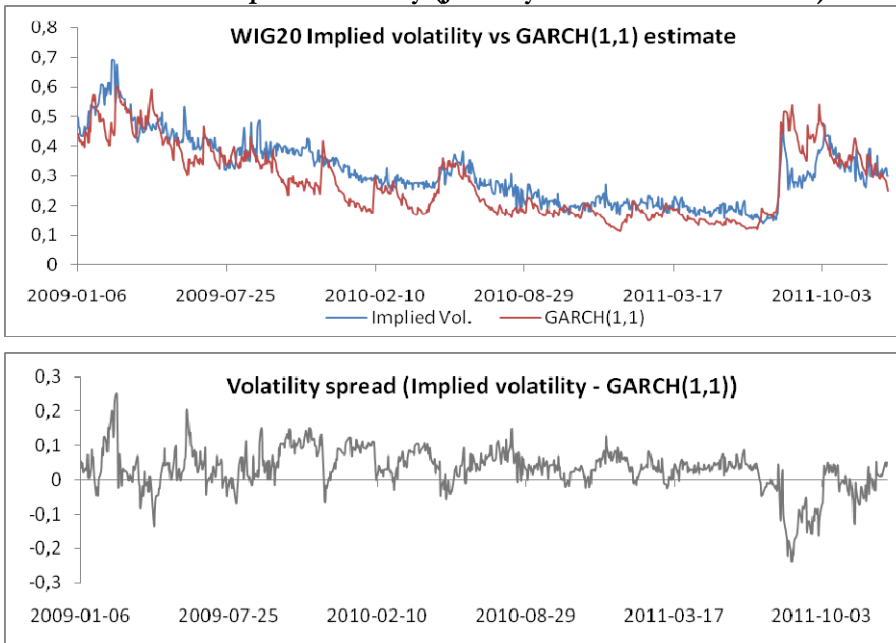


Source: own elaboration based on bossa.pl

The volatility is increasing during big price drops and tends to fall back when the price is rising. This is in most cases true for all types of market volatility. During recession and crises markets become more volatile.

GRAPH 7

WIG20 implied volatility (January 2009 – December 2011)



Source: own elaboration based on bossa.pl.

One of the most common ways of estimating and forecasting volatility for stock market returns is to use the GARCH model of Bollerslev [Bollerslev 1986]¹⁵, therefore it can be considered as a rational way of estimating market volatility. Graph 7 shows that implied volatility tend to be higher than the volatility estimate of a standard GARCH(1,1) model¹⁶. These results are similar with some studies conducted on the relation between implied and realized volatility [Fleming 1998].

Implied volatility spikes tend to occur more often than in the case of GARCH volatility, what shows that investors do have a tendency to overreact to some price drops. Market participants trading in options tend to have a more pessimistic outlook on the underlying then what is suggested by standard volatility estimates, this however does not always hold true what is most apparent.

5. Conclusions

Black-Scholes model to this day remains not only an important piece of financial theory, but also a tool with many practical applications. Although many new models for pricing options were developed in later years, closed end formulas such as Black-Scholes model remain rare. Increased complexity of newer models often results in a need to rely on intensive numerical methods such as Monte Carlo simulations, to obtain a final price estimate. This is one of the reasons why the Black-Scholes formula to this day often remains a central paradigm in options valuation. When using it, one should always remember about its limitations, among which the most important ones are the assumptions of constant volatility of the underlying asset and of normality. Black-Scholes model can be used outside of derivatives pricing in the fields of capital budgeting and equity and corporate debt valuation. Because Black-Scholes model assumes constant volatility of the underlying asset it is possible to use market values of option contracts to derive the Black-Scholes implied volatility which became an important practical and theoretical tool for analyzing market volatility. Studies show that implied volatility tend to be higher then realized volatility estimated with standard methods, however this can change during extended periods of high volatility and sudden price drops.

Analysis conducted in this paper proves that the behavior of implied volatility is different from what would be expected if all assumptions of the Black and Scholes framework were true for the WIG20 index. Most notably the volatility on Warsaw Stock Exchange is not constant and furthermore is not perceived as constant by the investors, this and higher probability of big moves in stock prices than predicted by the normal distribution results in the smile-like pattern in the implied volatility surface of the WIG20 index. Regularly occurring implied volatility spikes at the dates of maturity of option contracts indicates that the behavior of option investors on the polish markets becomes increasingly agitated as the date of maturity of their contracts approaches, this can be interpreted as irrational behavior. Comparison of implied volatility and volatility estimate of a GARCH(1,1) model shows that on aver-

¹⁵ For more information on GARCH see [Osińska 2006 pp. 84-89].

¹⁶ Daily volatility estimates annualized by the square root of time rule.

age option traders tend to overestimate the volatility of stock prices with respect to what can be inferred from the market returns with standard econometric tools, this can be interpreted as a rather pessimistic outlook on the prices of stocks. The results are similar to those obtained in other studies of market implied volatility conducted on bigger markets with much greater volumes of traded option contracts, those include: [Fleming 1998], [Derman, Kani 1994] and [Rubinstein 1994].

The results show that implied volatility can be used to a certain extent to analyze the moods of option traders on WSE, but also indicate that one should be particularly cautious when applying the Black and Scholes model to option valuation as the assumptions of the framework do not hold true at WSE to a similar extent as on other markets.

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Renata BUDLEWSKA³

TAX EXPENDITURE BUDGET: THE POLISH EXPERIENCE⁴

Summary

Seeking the solutions which increases fiscal discipline, is the subject of particular interest in last years. It's such more remarkable in terms of global financial crisis conditions, when possibilities of gaining revenues are significantly limited and, on the other hand, public debts of most countries are growing rapidly. Therefore all public spending, even indirect ones – including tax expenditures, should be monitored. It allows governments to compare the real costs of various public programs, also makes possible appropriate management of public finance and eventually, to seek more effective solutions.

This paper presents the theory behind the concept of tax expenditures, as well as the different definitions of the notion employed by countries which produce tax expenditure reports. The authors discuss the need for a common definition of „benchmark tax” – a reference point for identification of tax expenditures and international comparisons. Another purpose of the article is to present the way in which the idea of tax expenditures was implemented in the Polish report on tax preferences and to assess the budgetary effects of tax expenditures.

Key words: Tax Expenditures, Fiscal Policy, Poland

1. Introduction

According to the Code of Good Practices on Fiscal Transparency [IMF, 2007], budget documentation should include reports which describe the nature and fiscal significance of central government tax expenditures. Not all countries follow this recommendation. Therefore, it is worth emphasizing the usefulness of tax expenditure reports, also known as tax expenditure budgets, which some countries publish on an annual basis. The first such document was prepared in 1968 in the USA. Since 1974, tax expenditure reports have been an integral part of the US budget. Germany followed the American example in the 1970s, while Australia, Austria, Canada, France and Spain in the 1980s. Nowadays, many other countries publish information on tax expenditures, although it is not incorporated in the state budget. In 2010, Poland joined the group of countries which prepare annual tax expenditure

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reports⁵. In spite of Poland's relatively short experience in this area, the two already published reports are an important step on the road to complete transparency of fiscal policy and reflection on the budgetary effects of tax expenditures, and the risks they entail. It is even more important in view of the fact that Poland, which is striving to reduce its budget deficit and public debt⁶, should strengthen and consolidated public finances.

This paper presents the theory behind the concept of tax expenditures, as well as the different definitions of the notion employed by countries which produce tax expenditure reports. The authors discuss the need for a common definition of 'benchmark tax' – a reference point for identification of tax expenditures and international comparisons. Another purpose of the article is to present the way in which the idea of tax expenditures was implemented in the Polish report on tax preferences and to assess the budgetary effect of tax expenditures. Sections 3 and 4 focus principally on practical application of theoretical models for identification and estimation of tax expenditures in the Polish tax system.

2. Tax expenditure: definition and the problem of tax benchmark

Not all public spending is direct and strictly controlled. Some of it, is done off-budget, and is not recorded in any reports. One type of such unreported and uncontrolled spending is what the literature refers to as 'tax expenditures', expenses which result from reductions in the basic tax burden. The English-language authors use the term 'tax expenditures' interchangeably with tax incentives, tax subsidies, and tax loopholes. All these phrases denote special preferences in the tax code which lead to bringing the tax burden below the baseline prescribed by the law [Baumol, Blinder, 1988, p. 336]. In this way, the state can offer preferential treatment to limited groups of taxpayers (e.g. parents, farmers, entrepreneurs), sectors of economy (e.g. building industry, agricultural production) or types of activity (e.g. investment, innovation, accumulation of savings). However, as a consequence of this policy, the direct budget expenditure may have to be increased and the other taxpayers may have to pay higher taxes [James, Nobes, 1987, p. 43].

The term 'tax expenditures' was first used by Stanley S. Surrey at the beginning of the 1970s. His intention was to emphasize that certain tax allowances, reliefs and exemptions were, in fact, budget expenditures in disguise. He noticed that the majority of tax reliefs that existed in the tax system were of general nature, depended on a taxpayer's personal situation (e.g. the number of children, level of income, health condition, etc.) and did not serve any specific purpose. Meanwhile, Surrey argued, the nature of tax expenditures is entirely different. They only occur in specific circumstances and apply to particular social or professional groups, supporting them indirectly [Surrey, McDaniel, 1985, p. 3].

A general idea about tax expenditures can be gathered from theory of taxation textbooks. For James and Nobes the term signifies fiscal benefits accorded to se-

⁵ Poland is the only Eastern-European country that prepares tax expenditure budgets.

⁶ In 2010, general government sector deficit in Poland was 7.8%; public debt was 54.9% GDP.

lected groups of taxpayers or types of economic activity. These benefits, however, do not take the form of direct subsidies to the beneficiaries, but are instruments which allow them to reduce tax liabilities [James, Nobes, 1987, p. 42]. A similar definition is provided by Willis and Hardwick [Collier, Luther, 2003, p. 159-184], who believe that tax expenditures are tax exemptions or reliefs, which do not constitute a part of the basic tax structure, and which are used to attain non-fiscal goals. Wilkinson [Wilkinson, 1992, p. 95] believes that, by conferring tax advantages on specific groups of taxpayers, tax expenditures are supposed to encourage them to undertake certain actions. He also underlines that the main reason for deviations from the tax code requirements is usually the desire to pursue economic and social objectives. This results in a smaller tax base and, consequently, higher income for eligible taxpayers.

According to the OECD, tax expenditures are a departure from the generally accepted rules or from the basic structure of a tax, which allows some types of business activity or taxpayer groups to obtain tax benefits. In other words, tax expenditures are a deviation from 'normality'. Since this 'normality' is usually understood as the tax system of a given country, international comparisons are extremely difficult.

In view of the above, it can be concluded that the authors who explore the issue of tax expenditures typically use the approach first proposed by S. Surrey. He equates tax expenditures with direct spending programs and the two distinct elements of a tax system⁷, which he described in his analysis [Surrey, McDaniel, 1985, p. 1, 3]. The first one consists of structural provisions indispensable for proper implementation of a tax (so called *tax norm, normative tax structure, baseline, benchmark tax*), namely a definition of income, methods of income calculation (e.g. accounting conventions), type of tax scale, international tax code, and many others. Generally speaking, they constitute the legal framework of taxes, which specify tax obligations imposed on taxpayers. All tax systems should include [CoA, 2011, p. 21]:

- tax base, i.e. the activities which are subject to tax,
- tax rate, which apply to the established base,
- tax unit – the entity liable to pay the tax,
- tax period – the period in which the activities or transactions are undertaken.

It is the complexity of this element of tax systems that makes international comparisons so problematic [Polackova, Valenduc, Li Swift, 2004, p. 3].

The other element comprises various tax preferences that cause a divergence from the normal income tax norm and give privileged status to selected groups of taxpayers or to businesses that undertake certain types of activity. This is why the concept of tax expenditures is sometimes viewed in the context of the above-described division, and is defined as concessions that fall outside a tax norm and are designed to favour some persons or industries [Burman, 2003, p. 3].

Tax expenditures usually take the form of [OECD, 2010, p. 10]:

- allowances: amounts deducted from the benchmark to arrive at the tax base;
- exemptions: amounts excluded from the tax base;

⁷ At first, tax expenditure analysis was conducted in terms of those taxes which have the greatest significance for state budget, i.e. income taxes. At present, the entire tax system is analyzed, as are other fiscal obligations, such as social security payments.

- rate relief: a reduced rate of tax applied to a class of taxpayer or taxable transactions;
- tax deferral: a delay in paying tax;
- credits: amounts deducted from tax liability.

Tax credits can be divided into two categories: *wasteable* and *non-wasteable*. In the case of the former, if the amount of credit exceeds the level of tax liability, the rest is forfeited and not refunded. In the case of non-wasteable credit, the unused portion of the credit is paid to the taxpayer⁸.

As a result of cross-national differences, three general approaches have evolved to define benchmark taxes and tax expenditures [Villela, Lemgruber, Jorratt, 2010, p. 23]:

- *conceptual approach*, which consists in linking the benchmark tax to a “normative tax structure.” According to the authors, many countries use the Haig-Simons income concept to define the benchmark for income taxes⁹. Thus, whenever the real tax is not applied to the conceptual income, a tax expenditure appears;
- *legal approach*, which uses the current tax legislation as a basis for establishing the benchmark tax;
- *analogous approach*, where only those tax concessions which are analogous to direct subsidies are considered to be tax expenditures.

To sum up, it must be said that finding an accurate definition of tax expenditures seems to be of key importance for proper understanding of this phenomenon, and in particular a definition of the benchmark tax system. How is the term ‘tax expenditures’ interpreted in various countries? What is the correlation between the theoretical models of tax expenditures and their practical application? Part 3 of the paper attempts to answer these questions by looking at several solutions used in various countries.

3. Tax expenditure budgets: international experience

The concept of tax expenditures is based on the premise that tax regulations can be divided into two categories, namely: (i) the benchmark tax system, i.e. a set of regular tax arrangements and regulations, and (ii) preferential provisions deviating from the benchmark tax system. In theory, this distinction seems straightforward enough. In practice, however there is a great diversity in definitions of ‘benchmark tax’ across countries. Below there are presented several approaches to defining tax expenditures, as regards both the identification of benchmark standard used in various countries and the estimation of the tax concessions which function there.

In the United States, definition of tax expenditures was first provided by the Congressional Budget Act of 1974. According to that document, a tax expenditure is a loss in revenue resulting from special provisions of the Federal tax laws which allow an exclusion, exemption, or deduction from gross income or provide a special credit, a preferential rate of tax, or a deferral of tax liability. This definition refers

⁸ In a sense, non-wasteable credit can be regarded as a negative tax.

⁹ More on the subject in: Surrey, McDaniel, 1985 or Polackova, Valencuc, Li Swift, 2004, p. 53.

exclusively to federal taxes (mainly income tax), imposed by central government; only such taxes are centrally controlled [OECD, 2010, p. 132]¹⁰.

The cited OECD report stresses that the aforementioned 1974 definition of tax expenditures does not specify the reference point of a benchmark tax system. However, the choice of Schanz-Haig-Simons income baseline is most often disputed. It is emphasized that it is a theoretical concept which could not be used to measure income in a simple and accurate way [OECD, 2010, p. 133].

Canada adopted a different, wider approach to defining tax expenditures. Since 1994, Canadians have been reporting all deviations from the narrowly defined tax structure. Under that system, it is therefore easy to decide whether or not a particular tax concession qualifies as a tax expenditure¹¹.

Among the attributes regarded as part of the benchmark are “the existing tax rates and brackets, the unit of taxation, the time frame of taxation, the treatment of inflation in calculating income, and those measures designed to reduce or eliminate double taxation (of corporate-source income). As far as personal income tax is concerned, the individual is considered to be the tax unit, the calendar year is the time frame of taxation; the tax base is partially adjusted for inflation. Whereas in the case of corporate income tax, corporation is the tax unit, the fiscal year is the time frame, and the tax base is not adjusted for inflation [OECD, 2010, p. 133].

As a consequence of this approach, reporting on departures from the benchmark tax is divided into two parts. The first one comprises a list of all the items that could be considered genuine tax expenditures under a very broad (according to the Canadian Ministry of Science, even unrealistic¹²) definition. The second part encompasses the remaining tax preferences (memorandum items), which seem to be an integral component the benchmark tax system.

The Canadian take on tax expenditures is very useful for cross-country comparisons as it accounts for all the concessions of a given system. All tax preferences are taken into consideration and only then it is determined whether a specific provision is or is not a tax expenditure.

The United Kingdom has a slightly different approach to tax expenditures. There, tax concessions are divided into three groups. First, there are tax expenditures in the strict sense, understood as those reliefs which can be regarded as alternative to direct public spending. The second category consists of so-called structural reliefs, i.e. the forms of tax relief that are either an integral part of the tax structure or that clarify tax obligations. The third group includes the kinds of tax reliefs that combine the characteristic features of both tax expenditures and structural reliefs and thus cannot be classified as either type.

In Australia, the definition of tax expenditure benchmark is based on two premises [CoA, 2011, p. 20-21]:

- tax expenditure benchmark should represent the standard taxation that applies to similar taxpayers or types of activity. Consequently, a benchmark taxation treatment should neither favour nor disadvantage similar taxpayers or activities;

¹⁰ Additionally, each state prepares its own report on local taxes.

¹¹ http://www.fin.gc.ca/taxexp-depfisc/1999/taxexp99_1-eng.asp#Interpreting, [01.02.2012].

¹² http://www.fin.gc.ca/taxexp-depfisc/1999/taxexp99_1-eng.asp#Interpreting, [01.02.2012].

- the benchmark may incorporate certain elements of tax policy which depart from the principle of uniform treatment of taxpayers; the progressive income tax rate scale for individual taxpayers is frequently cited as an example of such a privilege.

In order to facilitate the reporting of tax expenditures, Australia distinguishes three types of benchmarks: the income tax benchmark, the consumption tax benchmark and the externalities taxation benchmark (the last one was first introduced for 2010). Moreover, detailed definitions of tax benchmark are provided for each type of tax [CoA, 2011, p. 20-21].

The following principles apply to particular taxes:

The above classification serves as a basis for comprehensive tax expenditure reports, which provide information on previous years, but also contain predictions for the years to come. Such reports are a good analytical tool not only for governments but also for researchers interested in this field.

The above data indicate considerable complexity and diversity of approaches to the pivotal element of tax expenditure analysis (see Table 1).

TABLE 1.

Selected definitions of tax expenditures

Country	Definition
Australia	Tax expenditures are defined as provision of the tax law that provides a benefit to specified type of economic activity or groups of taxpayers. These groups are offered preferential terms in relation to those used under the normal tax system. Negative tax expenditure occurs if a taxpayer is forced to bear additional tax burden instead of obtaining benefits.
USA	Tax expenditures <i>are understood as</i> tax revenue <i>forgone</i> through deductions, exemptions, exclusions, credits, deferrals, <i>preferential</i> rates and other provisions in tax federal laws.
United Kingdom	Three categories of tax reliefs are distinguished: <ul style="list-style-type: none"> – tax expenditures, reliefs alternative to direct public spending, bringing similar effects; – structural reliefs, i.e. the forms of tax concessions that are an integral part of the tax structure and simplify administration and compliance (e.g. instruments used to prevent double taxation of dividends); – tax reliefs which combine the characteristic features of both above categories or those not included there (e.g. <i>age-related tax benefits</i> or <i>disability tax credits</i>)
Canada	Tax expenditures are defined as deviation from the benchmark tax, which comprises tax rates and, widely understood, tax base.

Source: *authors' own analysis*.

It is frequently emphasized in the literature that the inherent ambiguity of tax expenditures is their major drawback [Bartlett, 2001, p. 2]. According to the authors of studies on the subject, the absence of an objective homogeneous benchmark tax is one of the obstacles to international comparisons. J. Craig and W. Allan mention four other impediments to cross-national research [Craig, Allan, 2002, p. 3]. First

and foremost, the available data on tax expenditures are very scarce. Only about 10% of the OECD countries measure tax expenditures, so it is not common for governments to report their extra-budgetary spending activity (see Table 2). Secondly, governments adopt different definitions of tax expenditures, as well as different estimation methods¹³.

Thirdly, there is the problem of the range of taxes taken into consideration, as tax expenditures can also be made through quasi-fiscal measures, notably through social insurance spending. The authors [Craig, Allan, 2002. p. 3] also stress that very few states make assessment of tax expenditures in minor indirect taxes, while those resulting from taxes on international trade remain unreported in all the OECD countries.

Still another barrier is related to administrative difficulties as the data usually prepared do not cover spending of the total general government sector of a country. Data produced by subnational governments are frequently not included in central government reports.

Not only do the above barriers effectively prevent international comparisons, but also seriously hinder tax expenditure estimates within particular countries.

What makes an agreement on a universal tax expenditures definition even more difficult to reach is the fact that tax systems and structures vary widely across countries. Brummerhof even goes as far as to claim that it is virtually impossible to define tax expenditures in a single, unambiguous way. This is particularly difficult under the current legal regulations pertaining to government spending [Brummerhof, 2000]. It seems, therefore, that a certain amount of arbitrariness is inevitable here. The necessity to tailor the definition of tax expenditures to the conditions of specific countries stems from a number of reasons, the most important one being the fact that tax system of particular country has its own peculiarities.

TABLE 2.

Reporting off-budget fiscal activity in selected countries

Country ¹⁾	Tax Expenditures	Contingent Liabilities	Quasi-fiscal Activities
<i>Developing Economies</i>			
Cameroon	No	No	No
Honduras	No	No	No but small
Mozambique	No	No	No but small
Papua New Guinea	No	No	No and sizeable
Tunisia	No	No	No; unknown
Uganda	No	No	No; unknown
Zambia	No	No	No and sizeable

¹³ There are roughly three methods of estimation: (i) revenue foregone method, (ii) revenue gain method, and (iii) outlay equivalent method. Each of them can yield different results, which makes it difficult or even impossible to make any international comparison. For this reason, the assessment of the effects of tax expenditures on a budget varies from author to author. More in: B. Davie, *Tax Expenditure in the Federal Excise Tax System*, National Tax Journal, Vol. 47, Nr 1, March 1994.

Country ¹⁾	Tax Expenditures	Contingent Liabilities	Quasi-fiscal Activities
<i>Transition Economies</i>			
Azerbaijan	No	No*	No and sizeable
Armenia	No	No	No and sizeable
Bulgaria	No ²⁾	No ²⁾	No ²⁾ ; unknown
Estonia	No	No	No but small
Kyrgyz Republic	No	No*	No and sizeable
Latvia	No	Partial	Partial
Mongolia	No	No	No and sizeable
Russia	No	No	No and sizeable
Slovenia	No	No	No but small
Ukraine	No	No	No; possibly sizeable
<i>Emerging Market Economies</i>			
Brazil	Yes	Yes	No but small
Czech Republic	No	Yes ⁴⁾	No
Egypt	No	No	No
Hungary	Partial	Partial	Partial
India	No	No	No and sizeable
Korea	Partial	No	No and sizeable
Pakistan	No	No	No and sizeable
Philippines	Limited	No	No
Poland	No	No	No
Turkey	No	Yes	No and sizeable
Uruguay	No	No	No and sizeable
<i>Advanced Economies</i>			
Australia ³⁾	Yes	Yes	No but small
Canada	Yes	Yes with a lag	No but small
France	Yes	Yes	No; possibly sizeable
Greece	Yes	Yes	No; possibly sizeable
Japan	No	Partial	No and sizeable
Sweden	Yes	Yes	No but small
United Kingdom ³⁾	Yes	Yes	No but small
United States ³⁾	Yes	Yes	No but small
Source: Unless otherwise indicated, published fiscal ROSCs on IMF website			
¹⁾ Central government level			
²⁾ Data not published but available to the National Assembly			
³⁾ Based on responses to self-assessment questionnaire			
⁴⁾ Under the new budget law (as per ROSC update of July 2001) a comprehensive statement of contingent liabilities is presented with the budget			
* Records are kept, but not reported to the legislature or published			

Source: J. Craig, W. Allan, *Fiscal Transparency, Tax Expenditures, and Budget Processes: An International Perspective*, 2002.

4. Implementation of the concept of tax expenditures in Poland: identification and estimation methods

In 2010, Poland joined the group of countries which identify and estimate tax expenditures. The first Polish report, titled *Preferencje podatkowe w Polsce* [MF, 2010], published in 2010 and containing 2009 data, does not provide a concrete definition of tax expenditures. Instead, it uses a list of features which characterize the provisions in question:

- they usually take the form of tax deductions, exemptions, preferential rates, deferrals or joint taxation of taxpayers' income,
- they result in a reduction of tax liability, and, consequently, a loss of state revenue,
- they are an alternative to public expenditure,
- they are included in legislation¹⁴.

The 2011 report does adopt a definition of tax expenditures. It is modeled on that proposed by the OECD, which states that the term denotes a transfer of public resources happening as a result of reduction in tax liability relative to a benchmark tax.

This approach does not differ in any significant way from the solutions used in other OECD countries. The report indicates the difficulty in the classification of particular tax concessions as tax expenditures. Particular attention is focused on defining the central aspect of tax expenditure analysis, that is the establishment of the benchmark tax (referred to as 'tax standard'), which is a necessary tool for the identification of tax expenditures.

The report states that a tax standard should be characterized by following principles: principle of universality, completeness and equity of taxation [MF, 2010, p. 12].

Additionally, under the Polish approach, tax exemptions designed to ensure proper specification of subject and scope of tax, basic tax rates, amortization rules, deductions of mandatory contributions and those provisions that stem from international agreements, are all regarded as part of the tax standard. However, some exemptions (e.g. exemption of income from agricultural activity) are not treated as part of the benchmark tax system, mainly because they are not subject to any other income taxes [MF, 2010, p. 12].

Using the tax principles as the basis for tax standard can lead to interpretation difficulties. Particularly as the authors of the report failed to provide detailed clarification of certain notions (e.g. the principle of equality and the reasons for treating some exemptions as part of benchmark, while others as tax expenditures).

For the purposes of identification of tax preferences, the Polish report proposes separate benchmarks for income taxes, consumption taxes and capital taxes. In the case of income taxes, additional principles were included, namely:

¹⁴ It was assumed that tax expenditures are abstract and general, i.e. applicable to an indefinite number of taxpayers. This condition is met by tax preferences (exemptions, deductions etc.) provided in the tax code, or tax waivers granted by the Ministry of Finance. The assumption is not valid in for, e.g. personal allowances granted to individual taxpayers.

- uniformity of taxation – all revenue/income, regardless of source, allocation or category of taxpayer, is subject to tax;
- taxation of real income – all income that can be spent on consumption or leads to an increase in the value of assets is regarded as taxable income
- taxation of individuals – only persons who obtain income can be taxed, no joint assessment is allowed;
- taxation is applied on an annual basis;
- appropriate tax rates (PIT and CIT) and the progressive tax scale (PIT) are applied.

All the provisions of income tax law which comply with the above criteria are deemed as the tax standard, and are a reference point against which to establish tax expenditures. Thus the tax standard includes: deductible expenses, with such an exception as flat-rate deductions, and all kinds of mechanisms which are used to prevent double taxation, i.e. dividend exemption and other methods, regulated by international agreements. In view of the premise that real income is used as the tax base, all reliefs on previously incurred expenses, inputs, shares, etc. are included in the benchmark tax [MF, 2010, p. 13].

In the case of consumption taxes, the European Union regulations, mandatory for all member states, are regarded as the benchmark tax. All the provisions which fall outside the scope of EU legislation are classified as tax expenditures. Consequently, for instance the basic VAT rate is included in the benchmark tax system, while lower rates are considered to be deviations from the standard [MF, 2010, p. 14].

At the core of the Polish approach to capital duties is the principle of universality of taxation. Accordingly, the exemptions provided by these regulations are regarded as clarification of the subjective and objective scope of taxation. Whereas those reliefs which are included in capital tax legislation are interpreted as departures from the benchmark and thus classified as tax expenditures [MF, 2010, p. 15].

TABLE 3.
Number of tax expenditures in Polish tax system in years 2009-2010

Type of tax	Number of preferences	
	2009	2010
Federal taxes overall	402	416
PIT and CIT	192	205
VAT	195	195
Excise duties	15	16
Local taxes	71	73
Total	473	489

Source: *Preferencje podatkowe*, Ministerstwo Finansów, Warszawa 2010; *Preferencje podatkowe*, Ministerstwo Finansów, Raport Nr 2, Warszawa 2011.

Basing on these criteria, in 2010 the Polish Ministry of Finance identified a total of 489 tax concessions (in 2009 there were 478), 416 of which concerned central government taxes, while 73 – local government ones. The number of income tax

concessions was 2005. The majority of them concerned personal income tax (145). For VAT and excise duties these figures stood at 195 and 16 respectively.

TABLE 4.

Tax expenditures in selected OECD states

Specification	Canada (2004)	Germany (2006)	Korea (2006)	Netherlands (2006)	Spain (2008)	United Kingdom (2006)	USA (2008)
Number of tax expenditures in system:	181	86	218	100	139	381	164
PIT	141	53	134	52	68	187	153
CIT	7	3	1	0	2	18	7

Source: own compilation based on *Tax Expenditures in OECD Countries*, OECD, Paris 2010.

Analysis of reports published by other OECD countries reveals that the number of tax expenditures in Poland vastly exceeds that recorded in other jurisdictions. For example, in 2006 in the United Kingdom, 381 tax expenditures were identified, 139 in Spain (2008), 100 in the Netherlands (in 2006), and only 86 in Germany (2006) [OECD, 2010, p. 225-228]. Of course, it is difficult to conclude whether the data are comparable, unless a detailed analysis of the benchmark tax system used in those countries is performed. Nevertheless, the large number of tax expenditures in Poland clearly demonstrates the complex nature of our tax legislature. Not only is this situation detrimental to the fiscal efficiency of taxes, but it also has a dampening effect on economic growth and hence future state revenue.

The quantification of the actual magnitude of public spending and the assessment of tax expenditures efficiency is an essential condition for appropriate allocation of public resources. No method has been devised as yet for an objective measurement of tax privileges in a given system. In practice, tax expenditures are estimated by means of cash accounting (*ex-post* evaluation) or accrual accounting (*ex-ante* evaluation) [Polackova, Valenduc, Li Swift, 2004, p. 7]. The most frequently used estimation methods for tax expenditure take into account [Kraan, 2004, p. 136-138]:

- revenue forgone method – *ex-post* evaluation of the benefits to economic entities, i.e. effectively a reflection of the revenue lost as a result of the introduction of a tax expenditure;
- potential final revenue gain method – *ex-ante* evaluation of revenue obtained as a consequence of the abolition of a tax expenditure;
- outlay equivalence method – estimation of direct expenditure that would be required to replace an existing tax expenditure with another instrument.

Initial revenue loss reflects actual revenue foregone as a result of deviations from the benchmark tax. It is the easiest and most frequently used method to assess tax expenditures. It does not account for changes in taxpayers' behavior (e.g. higher demand for the tax-subsidized good or decreased demand if a tax expenditure is

abolished), but presents the current effect of particular tax provisions. Moreover, this method does not take into consideration the influence of tax measures on the development of economic sectors.

On the other hand the final revenue gain method is usually applied *ex-ante*. Its purpose is to evaluate the potential increase in state revenue if special tax preferences were abolished. This method does take into account the way in which the introduction or abolition of a tax concession affects taxpayers' behaviour, as well as its consequences on various branches of the economy. For this reason, this method is fairly difficult and requires additional surveys.

Outlay equivalence method requires the estimation of alternative expenses that would benefit taxpayers to a similar extent as the tax provisions in question. This method should take into consideration the tax that is typically levied on direct budget transfers, which are used instead of special tax provisions [Kraan, 2004, p. 138].

In Poland, the value of tax expenditures was estimated using the lost revenue method, with no regard for behavioural changes caused by the abolition of certain tax structures. The calculations were mainly based on data from tax returns and other tax forms available in the Ministry of Finance, as well as on data collected by the Main Statistical Office (GUS), and, in some cases, on information provided by other institutions. Since data were often unavailable, not all tax expenditures were estimated. The scarcity of current data also prevented a microstimulation experiment that could help determine the value of all tax expenditures identified in the Polish tax system.

5. Budgetary implications of tax expenditures in Poland

The overall value of Polish tax expenditures in 2010 was estimated to be PLN 73.8 billion (€18.5 bln¹⁵), which accounted for 5.2% of the GDP. In 2009, this figure was PLN 69.9 bln (€17.5 bln), i.e. 4.9% GDP (see Figure 1). Estimated central government tax expenditures amounted to PLN 67.3 bln (€16.8 bln), i.e. 4.8% of the GDP (in 2009 it was PLN 59.5 bln (€14.9 bln) i.e.4.4% of the GDP and 24.1% of total tax revenue). Reduced VAT rates were the tax expenditures with highest estimated value and accounted for ca. 35% of the state VAT revenue. The figure for corporate income tax was similar. As regards PIT, the indicator stood at 30%. The share of tax expenditures for excise duties was the lowest and accounted for 3.4%. Relative to 2009, the value of tax concessions had risen by 12% (PLN 7.9 bln – €2 bln). The greatest increase, by 29.7%, was recorded for corporate income tax and amounted to PLN 2.3 billion (€0.6 bln); for personal income tax it had grown by 15.8% (PLN 2.5 bln – €0.6 bln); in the case of VAT – by 7.9% (PLN 2.7 bln – €0.7 bln).

¹⁵ In original report, Polish Ministry of Finance has estimated the value of tax expenditures in Polish national currency (PLN). To enable international comparisons, the authors adopted the exchange rate of EUR to PLN in 2010 on 3,9946.

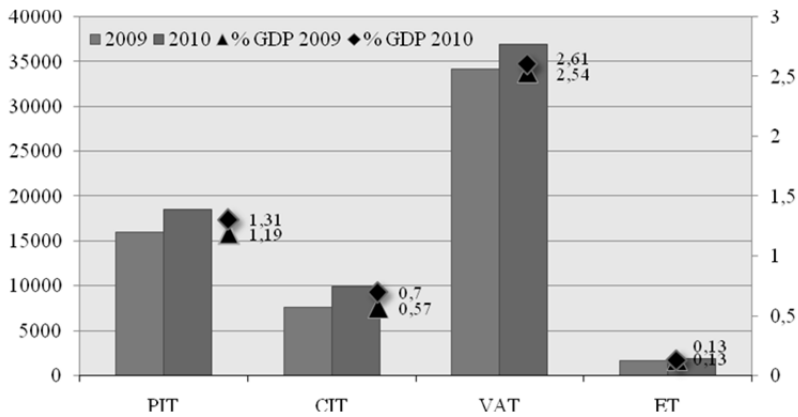
TABLE 5.

Tax expenditure estimates in Poland (in PLN bln)

Type of tax	2009	2010
PIT	16 015	18 552
CIT	7 620	9 886
VAT	34 192	36 902
Excise duties	1 690	1 901

Source: *Preferencje podatkowe*, Ministerstwo Finansów, Warszawa 2010; *Preferencje podatkowe*, Ministerstwo Finansów, Raport Nr 2, Warszawa 2011.

FIGURE 1.

State tax expenditure in Poland (in PLN bln, % GDP)

Source: *Preferencje podatkowe*, Ministerstwo Finansów, Warszawa 2010; *Preferencje podatkowe*, Ministerstwo Finansów, Raport Nr 2, Warszawa 2011.

The report distinguishes nine types of tax assistance. In 2010 and 2009, the largest share of aid was extended in the form of family and social benefits – ca. 48% of all identified tax expenditures (in 2009 – 44,4%). In this field, tax assistance amounted to ca. PLN 31.0 billion – €7.8 bln (i.e. 2.3% GDP). Most tax concessions in this group related to personal income tax (ca. PLN 11.7 bln – €2.9 bln). They principally included child tax allowances, joint assessment of spouses, exempt social benefits (Tables 6, 7, 8). Most of these indirect transfers could easily be replaced with direct public schemes, which should be more targeted and income related and thus available to the less well-off taxpayers. Such measures would definitely reduce the so-called 'leaky bucket' effect, resulting from non-market redistribution. They would also increase the efficiency of public spending. L. Morawski [Horacio, Morawski, Myck, 2009, p. 91-114] points out that although, admittedly, the introduction of child allowance in 2007 improved the financial situation of many families, it did not make any significant difference to the welfare of the most disadvantaged social groups,

as they are often unlikely to benefit from this kind of assistance. This is because the child allowance is non-refundable, which means that it cannot bring total payable tax to below zero, and so cannot be used to obtain a refund. Thus it does not improve the situation of those persons whose income is so low that they do not have an income tax liability or pay very little tax.

TABLE 6.

Tax expenditures in Poland by category in 2009 (in PLN mln, % GDP)

Category	PIT		CIT		VAT		Excise duties		Total (PLN mln)
	PLN mln	% GDP	PLN mln	% GDP	PLN mln	% GDP	PLN mln	% GDP	
Economy	494	0.04	5879	0.44	2442	0.18	15	-	8830
Agriculture	2012	0.15	96	0,01	5111	0.38	-	-	7219
Employment	122	0.01	-	-	-	-	-	-	122
Education, science, culture, sport	2	-	150	0.01	1891	0.14	-	-	2043
Public benefit institutions, churches, social and civic organizations	164	0.01	1384	0.10	-	-	-	-	1548
Health	432	0.03	-	-	4101	0.31	110	0.01	4643
Family and social support	10333	0.77	-	-	18800	1.40	-	-	29133
Transport and environment	-	-	-	-	1821	0.14	1357	0.10	3178
Other	2456	0.18	111	0.01	26	-	208	0.02	2801
Total	16015	1.19	7620	0.57	34192	2.54	1690	0.13	59517

Source: *Preferencje podatkowe*, Ministerstwo Finansów, Warszawa 2010; *Preferencje podatkowe*, Ministerstwo Finansów, Raport Nr 2, Warszawa 2011.

According to Morawski, it would be possible to find a far more effective solution without adding extra costs to the budget. Studies by R.M. Blank [Blank, 2002, p. 25-26] confirm this claim. She believes that assistance targeted at selected groups and the implementation of well-designed social transfer schemes would enhance the efficiency of social spending, and, moreover, enforce positive changes in the behavior of recipients, making the attainment of intended objectives much easier. Thanks to these measures it will also be possible to minimize fiscal costs and allocate more resources to direct public expenditure, which could additionally contribute to an improvement in the standard of living of the economically disadvantaged.

TABLE 7.

Tax expenditures in Poland by category in 2010 (in PLN mln, % GDP)

Category	PIT		CIT		VAT		Excise duties		Total (PLN mln)
	PLN mln	% GDP	PLN mln	% GDP	PLN mln	% GDP	PLN mln	% GDP	
Economy	523	0.04	7921	0.56	2556	0.18	16	-	11017
Agriculture	2079	0.15	126	0.01	5602	0.39	-	-	7808
Employment	147	0.01	-	-	-	-	-	-	147
Education, science, culture, sport	26	-	175	0.01	2084	0.15	-	-	2285
Public benefit institutions, churches, social and civic organizations	131	0.01	1523	0.11	-	-	-	-	1654
Health	1201	0.08	0	-	4354	0.31	121	0.01	5676
Family and social support	11718	0.83	0	-	20219	1.43	-	-	31939
Transport and environment	-	-	-	-	2055	0.15	1612	0.11	3667
Other	2727	0.20	141	0.01	32	-	152	0.01	3052
Total	18552	1.31	9886	0.70	36902	2.61	1901	0.13	67246

Source: *Preferencje podatkowe*, Ministerstwo Finansów, Warszawa 2010; *Preferencje podatkowe*, Ministerstwo Finansów, Raport Nr 2, Warszawa 2011.

In 2010, economy and agriculture strongly benefited from tax concessions: ca. PLN 11.0 bln – €2.8 bln and ca. PLN 7.8 bln – €2.0 bln respectively. Regrettably, the report fails to address the question whether the expenses incurred within the above-mentioned areas were efficient and effective. It should also be noted that tax expenditure support for the agricultural sector is probably much higher than the report indicates. Due to unavailability of relevant data, the report ignored the fact that income from agricultural activity is tax-exempt. This is an evident violation of the principle of universality of taxation, which served as the basis for the identification of tax expenditures in Poland. What is more, as a result of this omission, agriculture receives additional aid, which is not officially classified as limited public assistance, and as such is rarely subject to formal control. Of course, this situation is very favourable to state agriculture policy. Such high direct subsidies are not *available under the Common Agricultural Policy* of the European Union, so the analyzed tax provisions enable the state to find a loophole in the imposed regulations and offer additional assistance to national agriculture. *Official subsidies for European agriculture* are strictly controlled. Meanwhile tax expenditures, which are not part of any statistical records, can be used as a means of extra support and help to boost the competitive capacity of a country's agricultural sector.

TABLE 8.

**Value of selected personal income tax expenditures
in Poland in years 2009-2010**

Type of tax concession	Value of tax expenditure (PLN mln)		Share of tax expenditure in tax (%)		Share of receipts (%)		% GDP	
	2009	2010	2009	2010	2009	2010	2009	2010
Child allowance	5633	5684	35.17	30.60	8.98	9.10	0.42	0.40
Joint taxation of spouses	2693	2880	16.80	15.50	4.29	4.61	0.20	0.20
Agricultural subsidies	1947	2008	12.60	10.80	3.10	3.21	0.14	0.14
<i>Exemption of family benefits, etc.</i>	1478	1557	9.23	8.40	2.36	2.49	0.11	0.11
Social benefits	-	820	-	4.40	-	1.31		0.06

Source: *Preferencje podatkowe*, Ministerstwo Finansów, Warszawa 2010; *Preferencje podatkowe*, Ministerstwo Finansów, Raport Nr 2, Warszawa 2011.

Since there are significant differences in the nature and purpose of particular taxes, the tax expenditures included in each type of tax vary accordingly. In the case of the *individual income tax*, the vast majority of tax preferences are granted to families with children. Parents are entitled to tax support irrespective of the financial status of the family. In 2009, expenditures relating to this allowance amounted to PLN 5.6 bln (€1.4 bln), which made up ca. 35% of all personal income tax expenditures. In 2010, this figure grew by PLN 51 million (€12.8 mln), which made child allowance the third biggest tax expenditure in the Polish tax system (ca. 0.26% of the GDP). The concessions resulting from joint taxation of spouses are another major tax expenditure. As in the previous case, there is no income criterion for this relief. Hence the consistent popularity of this form of taxation: in 2009, nearly ten million taxpayers took advantage of the possibility (i.e. 40% of all the persons taxed on a progressive scale basis). In 2010, this led to a PLN 2.9 bln (€0.7 bln) decrease in state revenue (and ca. PLN 2.7 bln in 2009 – €0.7 bln). These two tax preferences, along with another family support instrument, namely the family benefit, add up to ca. 4.5% of tax income in Poland.

The Polish tax system offers an interesting type of tax expenditure in the personal income tax. Entrepreneurs with liquidity problems are entitled to a tax credit which allows them to pay their annual tax liability in installments within five years. However, because it is conditioned with a number of strict stipulations (e.g. obligation to maintain employment of at least 5 persons or the requirement of average monthly income of minimum €1,000), according to data by the Ministry of Finance, in the years 2009-2010 no one qualified for this kind of assistance.

Among corporate tax expenditures, the most numerous are those which affect the financial condition of economic entities. In 2009, the largest tax expenditure (PLN 1.2 bln – €0.3 bln) was related to deductions for losses sustained in previous taxable years. In 2010, the amount of these deductions grew by over 75%, which cost the state budget approximately PLN 2.1 bln (€0.5 bln). In the same year, the costly preferential policy of tax exemption for special economic zones generated PLN 1,448 mln – €0.36 mln losses (PLN 1,172 mln – €0.29 mln in 2009).

But it is the consumption tax expenditures that constitute the largest part of revenue foregone by the Polish state. This includes the VAT tax. In 2010, the total value of preferential VAT policies was PLN 38.9 bln – €9.7 bln (2.6% GDP), and was PLN 3 bln higher than the value for the previous year. This kind of expenditure is usually related to preferential VAT tax rates (lower than the standard 23% rate). The largest amount of revenue was lost due to preferential tax rates for housing development services (e.g. construction, renovation or maintenance). The Ministry of Finance estimates that in the years 2009 and 2010 those expenditures were PLN 8.9 bln – €2.2 bln and PLN 9.9 bln – €2.5 bln respectively, which accounts for around 13.5% of total tax expenditure in Poland. If we take into account preferential tax treatment of, among others, medicinal products (PLN 3.7 bln in 2010 – €0.9 bln), bakery, meat and dairy products (PLN 4.5 bln – €1.1 bln), the overall amount of expenditure is as high as PLN 22 bln – €5.5 bln, i.e. two thirds of total VAT expenditure. As a result, the state budget loses 1.62% of the annual GDP.

The other consumption tax, excise duties, generated far less tax expenditure: PLN 1.7 bln (€0.4 bln) in 2009 and PLN 1.9 bln (€0.5 bln) in 2010. Here the tax preferences applied mainly to reduced excise duty for biofuels, and – to a lesser extent – to support for renewable energy and cogeneration. Due to the unsatisfactory effects of environmental tax incentives on the behavior of consumers and producers, the excise tax expenditures will probably be abolished.

Apart from central government tax expenditures, the report also discusses local tax expenditures (property tax, transport vehicles tax). In this case, preferential rates, exemptions or reliefs can be introduced by local self-government (NUTS 5), which enjoy a degree of autonomy in terms of tax policy. In 2010, the overall value of local tax expenditures amounted to PLN 6.5 bln – €1.6 bln (0.5% GDP), while the year before it stood at PLN 6.3 bln (€1.6 bln). Following the decision by local councils to introduce object exemptions, the 2010 tax revenue was reduced by 0.6 bln. The budgets of territorial governments were principally affected by property tax expenditures (0.14% GDP). The most substantial expenditures included, among other things: farm buildings exemption (PLN 1.6 bln – €0.4 bln) and vacant and wooded land exemptions (PLN 1.5 bln – €0.38 bln), which jointly added up to 48% of local tax expenditure in 2010.

Obviously, one should not assume the above-mentioned amounts of money are identical with the potential revenue that central or local budgets would gain if tax expenditures were abolished. As was emphasized earlier, estimation based on the so-called foregone revenue does not take into account possible changes in the behaviour of taxpayers and is therefore flawed. Nevertheless, given the present scale of tax concessions identified in the Polish tax code, both in quantitative and qualitative terms, it seems that further studies are immediately required to determine whether

direct budget expenditure on specific policy goals would not be more efficient than the current system of special tax exemptions, reliefs and deductions.

6. Conclusion

Transparency is a necessary prerequisite for efficient fiscal policy. It involves publishing information on the structure of public sector income and expenditure, including off-budget spending, e.g. revenue forgone as a result of tax concessions. Tax expenditures can be considered from two perspectives: that of a taxpayer and that of the state. The assumption behind tax incentives is that the beneficiaries (tax-payers) will be motivated to undertake certain actions which the government expects of them. Whereas from the point of view of the state, the financial effect of tax expenditures is identical with that of direct government spending. Tax expenditures entail lower tax receipts, and thus lower tax income, which, in consequence, can have a detrimental effect on budget balance, or even deepen the budget deficit.

The Polish experience proves that the proliferation of tax expenditures is a costly solution. In 2010, the overall value of tax expenditures in Poland was as high as PLN 73.8 bln, i.e. 26.5% of all tax receipts and 5.2 of the GDP. One could assume that the resultant revenue losses were substantial. This is particularly disadvantageous as in 2010 the general government sector deficit amounted to 7.8% of the GDP, while public debt was dangerously close to the prudence threshold laid down in public finance legislation (54.9% GDP). Admittedly, the Polish report adopted the most straightforward definition of tax expenditures, interpreting them as every departure from the tax standard resulting in a reduction in the tax liability of the beneficiaries, which might mean that the value of lost revenue is probably overestimated. Nevertheless, this does not change the fact that rigorous control of tax expenditures is as highly advisable as careful monitoring of direct expenditures.

The monitoring of tax expenditures should involve not only value estimation. Reports ought to, in addition, include assessment of the efficiency of tax expenditures in relation to direct budget subsidies, as well as evaluation of the fiscal risks inherent in these instruments. This would make it possible to consider alternative solutions which can be more efficient without increasing budgetary outlays, and which would be conducive to greater fiscal discipline.

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Henryk WNOROWSKI¹

EXCISE TAX REVENUE ON SPIRITS IN POLAND. AN ATTEMPT FOR LAFFER CURVE THEORY VERIFICATION

SUMMARY

The excise tax policy with respect to the spirit industry in Poland, at the turn of the century, was very expansive with frequent tax rate rise. In the effect, we witnessed a total collapse of the revenue from excise tax accompanied by other negative economic and social phenomena deriving from fiscal consequences. Historic decision to lower the excise tax from 1st October, 2002 stopped those unfavorable tendencies and initiated 'normalization' within the trade. The study shows that it is recommended that a big caution in the ambitions of the government to raise excise tax, otherwise the resulting effects can be completely counterproductive. Polish experiences in 1995-2008 period with the excise on spirits, undoubtedly, verify positively the Laffer Curve.

Keywords: excise tax, Laffer Curve, spirit goods, demand

1. Introduction

The objective of this article is to show a correlation between the excise tax rates on spirits in Poland and the revenues raised from this tax. Although such correlation is quite obvious, constant repetition of the fact, hopefully, preserves this useful canon in the minds of those who decide on tax burdens. As early as in 1974 Arthur B. Laffer formulated the correlation as a kind of advisable warning to those in power against the temptation to raise tax rates in any country; regardless of the kind of tax. Generally, everybody realizes that fiscal policy brings certain consequences. However, it is those who are privileged and have decision making responsibility regarding actual fiscal system solutions in their countries, who often seem to ignore the fact. Why?

Already in the nineteenth century, Adolf Wagner formulated the law of increasing state activity and expenditures. If expenses are to be raised, taxes must behave in the same way, as the state can have only as much as it takes from its tax payers. Considering the above, it can be stated that a tax system has to accomplish cer-

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tain tasks, subject to numerous factors – economic, political but also social ones. Governments, realizing the economic correlations, often use tax systems for different aims. Taking advantage of tax systems to influence economy has been most visible in the past few decades.

Undoubtedly, a tax system not only ought to collect revenue, but also facilitate, or at least not to interfere with entrepreneurship and economic growth [Bieńkowski, 1995, p.99-120]. When taxes are used as an instrument for redistribution of the national revenue, there are always certain doubts as to the means of gaining optimal economic results. Using economic account for defining tax systems needs to be accompanied by the appreciation of the fact that economic growth is beneficial to everybody. Hence, economy plays a crucial role when thinking about taxes. With flat or even decreasing tax rates, higher revenue can be generated, providing that particular economy shows respectively high rate of economic growth. In opposition, a defective tax system often slows down economic growth rate. The examples of such relation can be found among countries of different development levels [Barro, Sala-i-Martin, 1992].

Consequently, the author of this article formulates a hypothesis that the excise tax policy with respect to the spirit industry, at the turn of the century, was very expansive with frequent tax rate rise. In the effect, we witnessed a total collapse of the revenue from excise tax accompanied by other negative economic and social phenomena deriving from fiscal consequences. Historic decision to lower the excise tax from 1st October, 2002 stopped those unfavorable tendencies and initiated ‘normalization’ within the trade. Regrettably, successively created ‘recessionary’ budgets, again, encouraged Polish government to reach for the excise revenues on strong drink through increasing tax rates.

2. Excise Tax and its Meaning to the Polish Budget

Excise tax has been known since the ancient times. It was the first tax levied on the consumption of basic food commodities such as salt, sugar, tea, tobacco, cigarettes, and alcoholic beverages. Subsequently, the tax was extended to luxury goods. Low or, in some cases, even no elasticity of demand is characteristic for goods and services subject to excise tax. Consequently, excise tax is regarded a very efficient source of public funds. [Krajewska, 2010, p. 163]

Excise tax, being an indirect tax imposed on consumption, has a much longer tradition than the VAT. In the last twenty five years, excise tax has become the most popular and profitable, in terms of national revenues, indirect levy. Historically, this tax was imposed on the commodities of a high fiscal importance such as salt, beer, tobacco, coffee, tea, but also luxury goods such as boats, yachts, fur coats. Recently, the highest excise revenues have been gained from taxation of such goods as fuel, tobacco and alcohol.

Excise tax was introduced into the current Polish tax system in 1993 along with the VAT, which was reasonable since the new tax was to replace, for instance, high turnover tax rates on certain goods. This particular tax strongly influences prices of the taxable goods, as it has to be paid regardless of the VAT and other obligatory

taxes.[Owsiak 2005, p.510] As a consequence of our membership in the EU and to fulfill the requirement of harmonizing Polish law with the EU standards, on 23rd Jan, 2004, a new act on excise duty was introduced. Further adjustment of Polish regulations initiated on 1st March, 2009 when the act on excise duty became effective.

However, since the unification of excise tax rates among the UE countries has turned out to be impossible, the EU resolutions define only minimum tax rates for particular goods. In the countries, where the excise tax rates were adjusted to that minimum, the only possible move is to increase the rates. Yet, it is vital to keep in mind the UE members are not obliged to undertake such actions. Nonetheless, the national tax services of each country have always been tempted to do so *Centem for European Policy...*, 1999].

Excise tax diversity among the EU members is considerable, not only in terms of the scope (base) of taxation but also the rates with the differences of up to multiple. The EU attempts to unify taxes is limited since, on the one hand, any crucial tax modification requires unanimity, on the other hand, both economic and non-economic (social, moral, etc) factors diversify governments' attitude towards the issue. Another fundamental difficulty in unifying the EU excise tax policy is almost traditional perception of excise taxes as fixed and basic sources of the state budget revenue. In consequence, despite a general requirement to synchronize tax policy within the EU, the process is much slower in the case of excise taxes than with e.g. the VAT policy. [Wnorowski 2002, p. 88].

Table 1 illustrates excise tax against other sources of the tax revenue in the Polish budget. It is worth remembering that till 1998 inclusive, the percentage share of excise tax was less than 20% of all taxes, in the years 1999-2008 the excise revenues were gradually becoming a more significant source of budget income. Moreover, it has to be pointed out that, at the same time, the excise tax revenues surpassed the personal income tax revenues and the discrepancy was becoming more visible each year. In 2005, the excise tax revenues were only slightly lower than the revenues from the total of direct taxes.

In turn, within the period referred to, the excise revenues were higher than those from corporate income tax. The difference was broadening year by year. Only the VAT revenues excessively surpassed the excise tax revenues throughout the whole period referred to. This, however, does not undermine the fact that excise tax is currently a vital source of the national revenue and constitutes $\frac{1}{4}$ of the total budget income derived from taxation.

Figure 1 illustrates growing significance of excise tax for the Polish budget.

TABLE 1

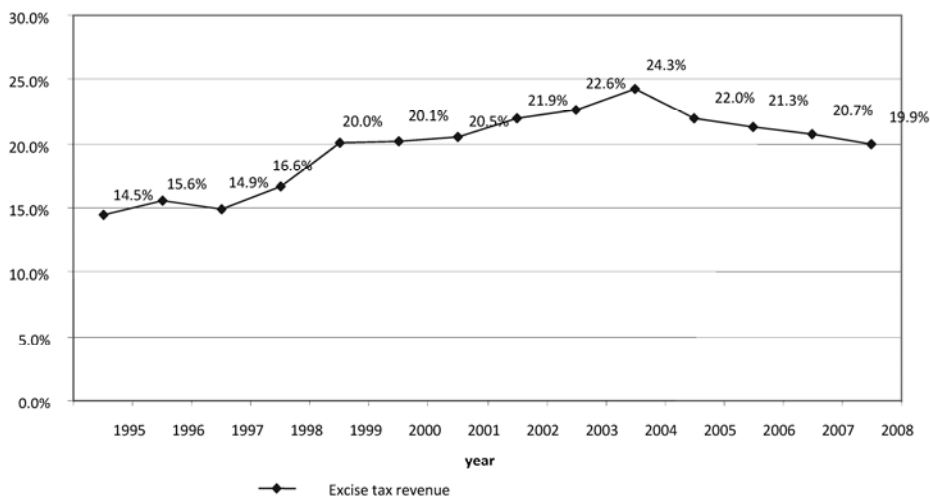
Excise Tax Against Other Sources of Revenue Between 1995-2008

Year	1995	1996	1997	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Excise tax share in revenues (%)	17.6	18.5	18.2	18.5	20.5	22.8	24.2	24.5	25.2	28.0	25.3	24,1	23.8	23.0
Excise tax revenues in millions PLN	12139.9	15524.0	17890.2	21068.5	25208.1	27312.0	28860.5	31489,8	34387.7	37964,0	39479.1	42078,0	49025.5	50490.1
Corporate income tax revenues in millions PLN	8837.0	10730.3	13264.0	14809.0	15060.4	16867.7	13219.7	15008,4	14108.0	13071,7	15762.4	19337,5	24540,2	27159.7
Personal income tax revenues in millions PLN	23511.8	26171.9	29941.5	34664.0	23115.2	23088.6	23444.2	24139.0	25674.9	21506,2	24423.0	28125.3	35358.5	38658,5
Direct tax revenues in millions PLN	32343.8	37061.4	43205.5	49473.0	38175.6	39956.3	36663.9	39147.4	39782.8	34577.7	40185.4	47462,8	59898.7	65818.2
Indirect tax revenues in millions PLN	36314.8	46803.2	55252.4	64432.3	74567.2	79670.5	82422.9	89604.0	95443.3	100991.5	115671.8	127412.4	146482,1	153677.7
Revenues in millions PLN	68975.2	83864.5	98688.5	113949.5	122776.9	119643.9	119101.3	128750.9	135227.6	135571.3	155859.5	174876.0	206380.8	219495.9

Source: own work, based on: S. Kańdula, *Wybrane zagadnienia finansów publicznych*, Wydawnictwo Akademii Ekonomicznej w Poznaniu, Poznań 2005, p. 26, W. Misiąg (red.), *Finanse publiczne w Polsce 1989-2001*, Instytut Badań nad Gospodarką Rynkową, Warszawa 2001, p. 194 www.mf.gov.pl, www.bip.nik.gov.pl, Statistical Yearbooks 1996-2008.

FIGURE 1

The Share of Excise Tax In the State's Revenues between 1995-2008



Source: own work, based on: S. Kańdula, *Wybrane...* op. cit., p. 26; W. Misiąg (red.), *Finanse...*, op. cit., p. 194, www.mf.gov.pl, www.bip.nik.gov.pl, Statistical Yearbooks 1996-2008.

3. Excise Tax on Spirits in Poland since 2002

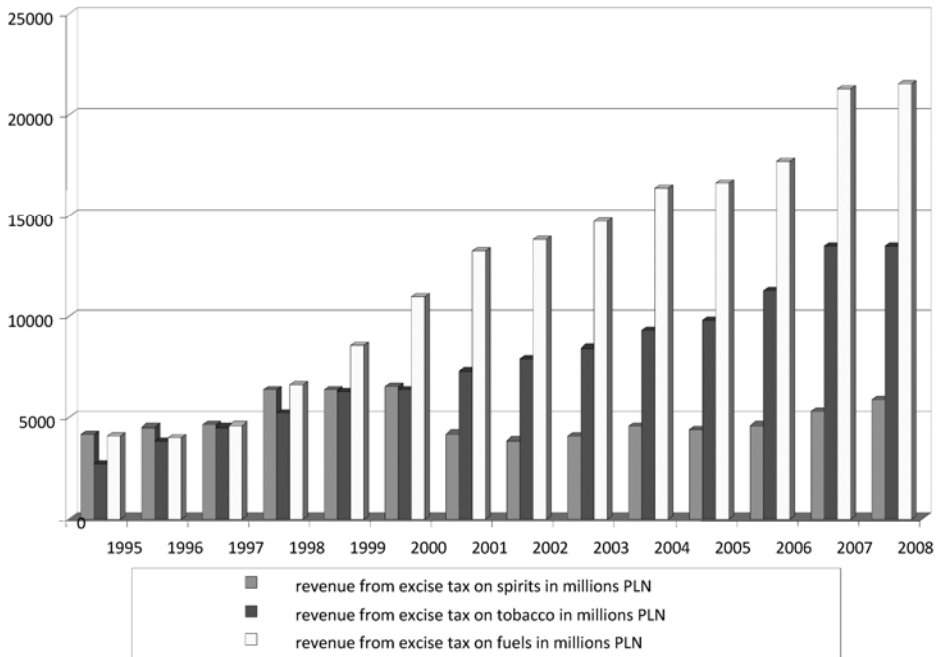
At the turn of the century, the excise tax on alcohol was in third position in terms of revenue among the goods on which excise tax was imposed. (Figure 2). Traditionally, in Poland, strong alcoholic beverages were in the lead and, consequently, constituted the main source of budget income. Traditionally, the spirit industry was treated as a permanent source of national income.

The described above attitude towards the trade also continued at the beginning of the system transformation when the level of economic openness in Poland was growing significantly. Unfortunately, till 2002 the policy of particular governments, with respect to the spirit industry, was characterized by almost absolute concentration on securing particular income stream from excise, in the first place, but also VAT, royalties, and similar taxes levied on the trade and other cooperating business entities.

The concentration seemed obvious, since the economic significance of spirit industry is calculated by taking into account its share in the total of the income. Consequently, e. g. in 1993 and 1994 the trade's share in the total of the income was only about 1,6% whereas, the participation of spirit industry in the indirect tax revenues was 27%, and between 3%-3.3% in the total of the budget income in the period given.

FIGURE 2

Structure of Excise Tax Revenue between 1995-2008



Source: own work, based on: S. Kańdula, *Wybrane...* op. cit., p. 26.; W. Misiąg (red.), *Finanse...*, op. cit., p. 194, www.mf.gov.pl, www.bip.nik.gov.pl, Statistical Yearbooks 1996-2008.

Such figures were strong encouragement for successive governments to raise the excise tax rates, which they did. On average, we experienced such increases twice a year. National budget was acquiring higher and higher income. One could easily trust that everything was the way it should be. Only in 1999, it was noted that revenues on spirits were lower than in the preceding year. The tendency was intensifying in the following years.

And so, lower revenues in the effect of increasing tax rates – earlier anticipated by A Laffer – became a fact with respect to the excise on spirits in Poland. Figure 3 shows exactly the same relationship A. Laffer presented as a warning to the economic and governing politicians. Our estimation of the Laffer curve is based on actual figures referring to the spirit industry in Poland in the period 1994-2001² and describing the average excise rate as well as budget revenues from this tax year by year. (table 2).

² The year 2002 has been intentionally omitted in our analysis because the excise tax rate in Q1-Q3 2002 was 62.78PLN/L100%, whereas in Q4, – October 1, 2002 – the excise tax rate was lowered to 44.00PLN/L100%. Therefore, introducing average excise rate would falsify our model.

TABLE 2

Excise Tax Rate and Budget Revenue between 1994-2001

Specification	1994	1995	1996	1997	1998	1999	2000	2001
Excise In PLN / litre of 100% alc. (L100%) (yearly average)	25.20	35.30	42.40	47.70	51.74	55.55	59.05	62.78
Excise tax revenue in millions PLN	3 662	4 139.7	4 529	4 639	4 730	4 520.9	4 307.3	4 200

Source: GUS (Poland's Central Statistical Office), relevant Statistical Yearbooks.

The function describing the Laffer curve below is a quadratic equation of the following form:

$$y = -1,8982x^2 + 183,3526x + 181,4999$$

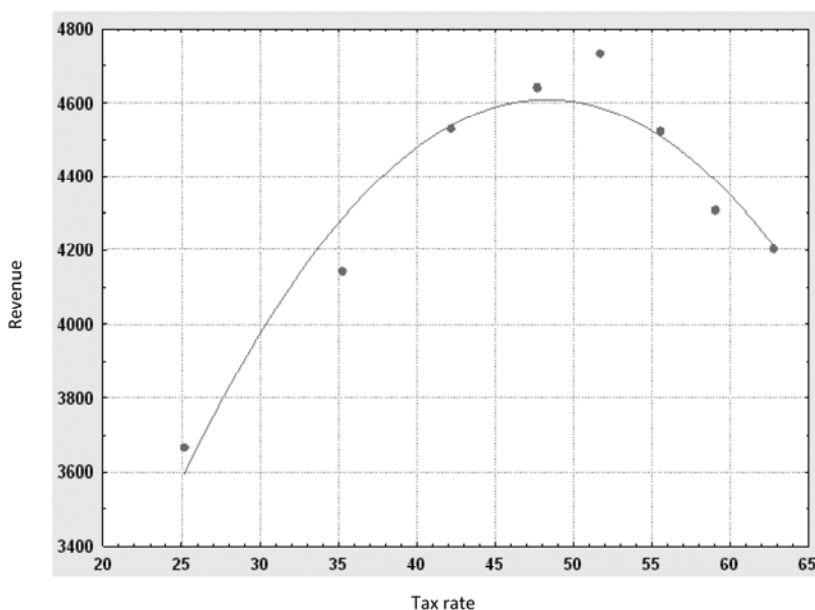
where:

Y represents excise tax revenues in millions of PLN

X represents excise tax rate per unit in PLN/L100%

FIGURE 3

The Laffer Curve between 1994-2001
(correlation between excise tax rate and excise tax revenue) [mln PLN]



Source: own calculations based on data In table 2.

The correlation coefficient of the function describing the curve $r = 0.5635$, means that correlation strength is medium, and so, allows generalization.

By computing the first derivative of the function we can set a revenue-maximizing excise tax rate:

$$Y' = -3,7964x + 183,3526$$

Next, we solve the equation

$$-3,7964 x = -183,3526$$

And compute X_{\max}

$$x_{\max} = 48,30$$

The above figure is, at the same time, an epitaph to the politicians responsible for the excise tax policy with regards to the spirit industry. As it was proved above, such policy causes the situation, where its main objective i.e. securing appropriate revenue, becomes no longer accessible. In accordance with the Laffer curve and the theory of supply, the only way to go back to the revenue level previously obtained is to change the government's actions. This would mean decreasing excise taxes rates, which, in consequence might lead to lowering the prices of legally obtained spirits, increase of demand and production, improvement of profitability of the spirit industry and in consequence decrease of the meaning of grey market, due to its lower economic attractiveness, and many other phenomena. [Wnorowski, 2010, s. 184-190].

In other words, the excise tax policy of Polish governments between 1998-2002 reached its critical point. Undoubtedly, the solution to the situation is tightly connected with the need to change the excise tax policy in the direction of lowering excise taxes, rather than keeping their current levels, not to mention increasing them.

4. Spirit Industry in Poland after 2002

The situation described above forced Polish government to lower excise tax on spirit on 1st August, 2002. The Minister of Finance signed resolution on excise duty, which modified the previously governing law. With the effect on 1st Oct, 2002, the document introduced lowering the excise tax on spirits by 30%; from 6.278 PLN to 4.400 PLN per 100 liters of pure alcohol (L100%). The modification complied with the postulates of the spirit industry and the revenue services. Lowering the excise tax was anticipated to:

- Reduce illegal production of spirit goods through minimizing the demand for products of unknown source,
- Significantly reduce smuggling through lowering its profitability and, in consequence increase national revenue.
- Fiscal effects of the decision of The Minister of Finance were positive, slight raise on the excise revenue was noted. Already in 2003, i.e. in the first full year of new excise tax rate operation, the increase on revenues from this tax was observed. Much higher sales of alcohol in 2003 contributed to a significant growth of the excise revenue giving the total of 4092.6 million PLN i.e. 216.6 million PLN more than in the preceding year.

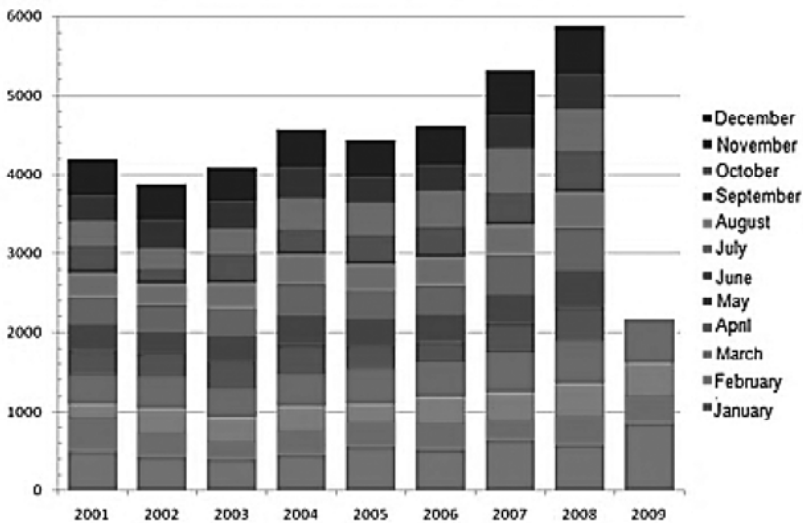
Even higher revenue growth rate was noted in 2004, with 4561.7 million PLN i.e. 469.1 million PLN more than in 2003. The excise tax cut in 2002 had also many other positive effects. First of all, the increase in sales from legal source, improvement of financial condition of spirit industry as well as quite radical reduction of smuggled alcohol.

The first two years of operation of lower excise tax rate on spirit as well as increasing revenue encouraged Polish government to plan excise tax raise in the budget of 2005; to 45.50 PLN/L100%. Moreover, at the beginning of 2009 the spirit industry had to face another increase of excise tax by 9.5% i.e. 49.60 PLN/L100%. This was first increase after four years of a very lucrative, for both the spirit industry and national budget, excise tax standstill period. In December 2008, due to the restraints caused by a recessionary budget, and for the need to secure higher revenue, the government had decided upon increasing excise tax.

What will the budget consequences of the increase be?

FIGURE 4

Excise tax revenue (according to The Ministry of Finance) [mln PLN]



Source: Ministry of Finance.

Complete and credible answer is not to be given, yet. Drawing 4 shows the impact of the decrease of excise tax in 2002 and increase in 2005 and 2009 on the revenue collected; with a rising level of revenue after 2002. Even the minimum excise increase in 2005 restrained the revenue for one year. With reference to the latest excise tax rise it is already well visible that the revenue of the period Jan-May 2009 in comparison with the same period of 2008 increased by 302.8 million, PLN i.e. over 13%. However, 271.4 million PLN (90% of the total revenue) constitute January's revenue only, when the higher December excise was paid. This had been, with no

doubt, the market's reaction to the announced excise tax increase. Most likely, from the whole year perspective excise tax revenue will be slightly higher than in 2008. However, remarkable excise tax rise (9.5%) will be a source of sales decrease and, in consequence, cause disadvantageous situation for the spirit producers and expansion of grey market. The described above phenomenon proves that the excise rate of 48.30 PLN/L100% estimated herein is optimal for securing maximum revenues from the excise on spirits.

5. Conclusion

Tax system modifications executed by politicians, in most cases, are the outcome of social, not economic prerequisites. The reasoning behind it is quite simple – politicians often use tax systems for their own benefit aiming at possible election gains. In consequence, despite general knowledge of the fact that a tax system is a crucial element in economy, it is constantly undergoing frequent modifications subject to short-term political aspirations.

The need for security as the biggest revenue very often becomes a huge temptation to raise excise tax on spirits. The study shows that it is recommended that a big caution here, otherwise the resulting effects can be completely counterproductive. Polish experiences in 1995-2008 period with the excise on spirits, undoubtedly, verify positively the Laffer Curve.

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Marzanna PONIATOWICZ¹

IS THERE A LOCAL FINANCIAL CRISIS IN POLAND?²

ABSTRACT

This article aims to identify the specific features of local financial crisis (stress). As an example for analysis, the author uses the Polish local government sector. The analysis relates to changes in the sector's budgetary revenue and expenditure, limitation of local authorities' financial autonomy, the deepening fiscal imbalance experienced by them, and their rapidly growing level of debt and its consequences. Comparisons are made with the situation in other European Union member states.

Key words: local financial crisis, local government sector, fiscal imbalance, local public debt

1. Introduction

The local government sector is a component part of the general government sector.³ In conditions where a public financial crisis is observed in certain countries, a natural consequence is a worsening of the financial situation of local authorities. Naturally this process has certain specific features, if only because local authorities have a statutorily guaranteed share in public revenue, and in many cases in spite of the observed signs of crisis they still enjoy a real increase in revenue, while problems in local authority budgets often occur after a certain delay (a high level of inertia in local financial systems).

The purpose of the present article is to establish whether Poland is experiencing a local financial crisis, and what its symptoms or effects are in relation to changes in levels of budgetary revenue and expenditure in the local government sector, limitation of local authorities' financial autonomy, the deepening fiscal imbalance affecting those authorities, and their rapidly growing level of debt and its consequences. The analysis includes comparisons with other European Union member states.

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³ The European system of national and regional accounts (ESA 95) divides the general government sector into four sectors: central government, state government (present only in federal countries), local government, and social security funds.

2. The concept of local financial crisis (stress)

The concept of local financial crisis became “fashionable” in the second half of the 1970s. At that time there was a significant worsening in the financial position of many large cities, particularly in the United States. It began with the fiscal crisis suffered by the city of New York, which in 1975 found itself close to bankruptcy. Other examples of American cities which have suffered serious financial problems include Cleveland (1979), Philadelphia (1990), Bridgeport (1991), Orange County (1994), Washington D.C. (1995), Miami (1996), Camden (1999), and Pittsburgh (2004) [Kimhi, 2008, p. 634].

According to the definition put forward by two American economists, W. Hirsch and A. Rufolo, a financial crisis is experienced by a unit in the public sector when the authority reaches a state in which normal budgetary flexibility no longer exists. If there does not exist any combination of acceptable expenditure cuts, income growth or borrowing, the authority finds itself in a crisis situation [Hirsch, Rufolo 1990, p. 484].

In turn, H. Wollman and B. Davis propose the following definition of financial crisis (stress) experienced by a local authority – it is a situation where the local authority, in order to maintain the balance between levels of expenditure and income, is forced to choose between: 1) raising taxes by changing the tax rate or structure; 2) reducing the level of expenditure relative to the previous year; or 3) applying some combination of actions of type 1 and 2 [Wolman, 1980, p.1].

Yet another approach to local authority financial crisis is that of R.P. Inman. In his view a crisis can be said to exist when the city’s potential to generate current revenue and current expenditure is insufficient to cover the expenditure required by law [Inman, 1995, pp. 378–383].

P.E. Mouritzen uses the following indicator to determine the level of local financial stress [Mouritzen, 1993, p. 19]:

$$FSI = \frac{100 \times \frac{I(t)}{I(t-x)}}{PC}$$

where:

FSI is an indicator of the change in financial situation in the period from $t-x$ to t ,

$I(t)$ is the total revenue in year t which the local authority would obtain by applying the same tax rate as in year $t-x$,

$I(t-x)$ is the total revenue in year $t-x$ according to year t prices,

PC is the change in the population in the period from $t-x$ to t .

If the indicator takes the value 100, this signifies that the local authority has a neutral position, namely that its financial situation is unchanged. A value above 100 indicates improvement in the financial situation, while a value below 100 signifies that the local system is experiencing financial stress. According to P.E. Mouritzen the key decision problem for local authorities is the choice between political and financial capital. An authority can increase political capital through higher local

public expenditure, whereas an increase in financial capital requires low taxes and a low level of debt. The two types of capital are, to some extent, alternatives. Financial stress denotes a situation where, due to unfavourable external conditions, it becomes impossible to maintain simultaneously past levels of political capital and financial capital [Mouritzen, 1993, p. 19; Wiewióra, 2009, p. 20; Swianiewicz, 2011, p. 292]. According to research carried out by P.E. Mouritzen, financial stress understood in this way occurs much more frequently in large cities than in small settlement units. This is confirmed in the Polish case: the author's studies have shown that signs of crisis have been felt most acutely by the largest Polish cities (Warsaw, Kraków, Łódź, Wrocław, Poznań, Gdańsk, Szczecin).

In the literature one can frequently find attempts to systematize the typical reactions of local authorities to financial stresses and tensions [Swianiewicz, 2011, pp. 303–312; Wolman, 1983, pp. 245–263; Midwinter, 1988, pp. 21–29]. For example, H. Wolman distinguishes the following stages of action: 1) a local authority draws on available financial reserves and plays for time; 2) assistance is demanded from central government; 3) budgetary revenue is increased by raising charges for local public services, and later also local tax rates; 4) local public expenditure is reduced. The first three of these stages have already been visibly reached by Polish local authorities, although in the present author's opinion their actions have been concentrated on the second and third stages, while the action taken by local authorities to reduce public expenditure remains too limited to be satisfactory.⁴

3. The local financial crisis in relation to the revenue, expenditure and problem of autonomy of Polish local authorities

Independent Polish local government is a relatively young institution, reactivated at the start of the 1990s, following forty years of the communist system. The local government reforms enacted at that time are undoubtedly among the most spectacular and successful reforms to have been carried out in Poland in the era of the market economy. They resulted in the present three-level system of local government, in which the three types of unit are the district or *gmina* (of which there are 2479), the county or *powiat* (of which there are 314 “land counties” and 65 cities with county status, also functioning as urban districts), and the province or *województwo* (of which there are 16).⁵ These units of local government have become a permanent feature of the Polish economic landscape, serving as key providers of

⁴ A lack of sufficient determination here can be seen in, among other things, the rapidly rising (in spite of the crisis) level of employment in Polish local administration; it currently employs 255 000 people, and the rise in employment in 2010 was around 4.5%, this being 10 times [*sic*] as high as in central administration.

⁵ The local government sector in the 27 EU member states currently consists of more than 92 000 units, in structures with one, two or three levels. Eight countries have a single-level local government structure (Bulgaria, Cyprus, Estonia, Finland, Lithuania, Luxembourg, Malta and Slovenia), twelve have a two-level structure (Austria, the Czech Republic, Denmark, Greece, the Netherlands, Ireland, Latvia, Portugal, Romania, Slovakia, Sweden and Hungary), and seven have a three-level structure (Belgium, France, Spain, Germany, Poland, the UK and Italy).

local public goods and services, significant beneficiaries of European Union assistance funding, the most important public-sector investors, and active players in the real-estate market and financial markets.

TABLE 1.

Total revenue and expenditure of the local government sector in Poland compared with other EU member states in 2007–2010 as % of GDP

Specification	Total revenue of the local government as % of GDP				Total expenditure of the local government as % of GDP			
	2007	2008	2009	2010	2007	2008	2009	2010
EU-27	11,3	11,4	12,1	11,9	11,3	11,6	12,4	12,2
Belgium	6,6	6,7	7,0	6,9	6,7	6,8	7,2	7,1
Bulgaria	6,6	6,9	7,3	6,9	6,7	7,3	8,2	6,9
Czech Republic	11,2	10,8	11,5	11,4	10,8	10,9	12,1	11,9
Denmark	32,1	33,1	36,8	37,4	32,4	33,5	37,5	37,5
Germany	7,7	7,8	8,0	7,8	7,3	7,4	8,1	8,0
Estonia	9,0	10,2	10,9	10,3	9,5	10,9	11,4	10,0
Ireland	7,1	7,4	7,3	6,9	7,3	7,8	7,4	6,9
Greece	2,6	2,8	3,3	2,6	2,7	2,9	3,3	2,8
Spain	6,3	6,1	6,7	6,5	6,6	6,6	7,3	7,2
France	10,9	11,0	11,8	11,7	11,3	11,5	12,2	11,8
Italy	14,8	15,0	16,2	15,2	14,9	15,4	16,6	15,7
Cyprus	1,9	1,8	2,1	2,2	1,9	1,9	2,2	2,2
Latvia	10,4	11,3	11,1	10,8	11,1	12,6	12,7	11,4
Lithuania	8,0	9,1	10,4	11,4	8,3	9,3	10,8	11,3
Luxembourg	5,0	5,2	5,4	5,3	4,7	4,8	5,6	5,3
Hungary	11,8	11,6	11,9	11,8	11,9	11,6	12,3	12,7
Malta	0,6	0,5	0,7	0,7	0,6	0,5	0,7	0,7
Netherlands	15,2	15,3	16,9	16,4	15,4	15,8	17,6	17,2
Austria	7,5	7,7	7,9	7,7	7,4	7,6	8,2	8,2
Poland	13,4	13,9	13,6	13,8	13,3	14,1	14,7	15,0
Portugal	6,4	6,5	6,6	6,4	6,7	7,0	7,4	7,2
Romania	9,5	8,8	9,3	9,7	9,8	9,9	10,1	9,8
Slovenia	8,3	8,4	9,5	9,8	8,4	9,1	10,1	10,2
Slovakia	6,0	6,0	6,5	6,4	6,0	6,0	7,2	7,3
Finland	19,0	20,0	22,0	22,2	19,2	20,5	22,7	22,5
Sweden	24,1	24,7	26,1	25,5	24,0	24,8	26,4	25,3
United Kingdom	12,7	13,2	14,0	14,0	12,8	13,5	14,3	14,0

Source: Statistics Database, Eurostat, www.epp.eurostat.ec.europa.eu, 10.10.2012.

Current EU statistics from the European system of national and regional accounts (ESA 95) enable precise comparison of the economic position of the Polish local government sector with that of the EU as a whole and of particular member states. The comparisons presented in the following table show that Poland is among

the countries recording a middling value for the indicator of local government revenue relative to GDP. In 2010 the value of this indicator was 13.8% for Poland, slightly higher than the EU-27 average of 11.9% (the highest values were recorded by the Scandinavian countries – 37.4% by Denmark, 25.5% by Sweden and 22.2% by Finland – while the lowest values were 0.7% for Malta 2.2% for Cyprus and 2.6% for Greece).

Poland's position among EU member states is very similar as regards the indicator of local government expenditure as a percentage of GDP. The EU-27 average value for this indicator in 2010 was 12.2% of GDP, while in Poland it was 15% (the highest and lowest values of this indicator were recorded by exactly the same countries as in the case of the indicator presented above).

It is appropriate at this point to give a wider commentary on the effects of the observed crisis situation on the system of local authority revenue in Poland. A visible reduction in revenue applies particularly to those sources which are directly dependent on the overall economy. This applies primarily to the local government shares of personal and corporate income tax (PIT and CIT). In Polish budgetary reporting these shares have been treated since 2000 as categories of local authorities' direct ("own") income – in the author's opinion this is a mistake, primarily because of the negligible or non-existent local control over these taxes. The importance of this category of income in the system of local finances grew markedly with the entry into force of the *Act of 13 November 2003 on the income of local authorities* [Act, 2003], under which a significant increase was made as from 2004 in the local government shares of national income taxes.⁶ This was done at the cost of reductions in specific-purpose grants from the national budget. By this means the Polish system of local finances was made more sensitive to changes in the overall economic situation, and local authorities took on a significant proportion of the risk associated with cyclical changes in the economy. It should be noted that similar "tax sharing" measures are applied in many other European countries. For example, the Spanish regions enjoy a 35% share in VAT revenue and a 40% share in excise tax, the German *Länder* have a 50% share in income tax (their shares are the subject of periodic negotiation with the central government), and the Swiss cantons have a 17% share in receipts from federal personal income tax (calculated according to taxpayers' place of residence) [Blöchliger, Petzold, 2009, p. 8].

Unfavourable changes in the revenue potential of local authorities have also resulted from the observed stagnation in the Polish real-estate market, which has meant significantly lower revenue for local authorities from real-estate taxation, lower receipts from municipal property (such as revenue from rent, leases, etc.), and significant reductions in receipts from sales of such property. There have also been falls in local authorities' income from the tax payable on civil-law acts.

⁶ District authorities are currently entitled to a 36.72% share in personal income tax revenue and 6.71% in corporate income tax revenue. Counties' respective shares are 10.25% and 1.40%, and provinces' shares are 1.6% and 14.75%. It should be emphasized that another negative factor affecting local government finances was the reform of personal income tax, whereby from 2009 the tax rates were reduced to 18% and 32% (previously the rates had been 19%, 30% and 40%). Unfortunately this was not accompanied by any systemic changes to compensate local authorities for their lost income.

There has been a worrying reduction in the financial autonomy of Polish local authorities, as is confirmed by trends in values of the indicator of direct income (“own income”) as a percentage of total income. The highest value of this indicator, as an average for all local authorities, was recorded in 2007 (56.4%) [Report, 2008, p. 16]; since then it has continuously decreased, reaching 48.3% in 2010 [Report, 2011, p. 16].⁷

It should be remembered that there are significant differences in financial potential within the Polish local government sector. The strongest category of local authorities, in spite of a certain slowing in the rate of revenue growth, resulting from the high baseline set in previous years, is the 65 cities with county status. Their total revenue in 2010 came to 54 billion zloty, which was one third of the revenue of the entire local government sector. Decidedly the weakest categories are the “land counties” and the provinces.

In the context of the difficult situation of both the whole public financial sector and the national budget (in 2010 the Polish public financial deficit reached 7.9% of GDP, while the public debt stood at 55% of GDP), there has been a tendency to use the local government sector to make savings, with local authorities being burdened by central government with extra tasks without statutory specification of their sources of financing. This not only violates the constitutional principle that local authorities must be given a share in public revenue corresponding to the tasks assigned to them (Article 167(1) of the Polish Constitution), but also breaches the terms of the European Charter of Local Self-Government (Article 9(2)), according to which local authorities’ financial resources should be commensurate with the responsibilities provided for by the constitution and the law. The effect of the described phenomena and processes is a marked worsening in relations between central and local government in Poland. In the opinion of the present author, the principle of trust and partnership between these two levels of government has been shaken and weakened.⁸

4. The problem of the deepening fiscal imbalance in the Polish local government sector

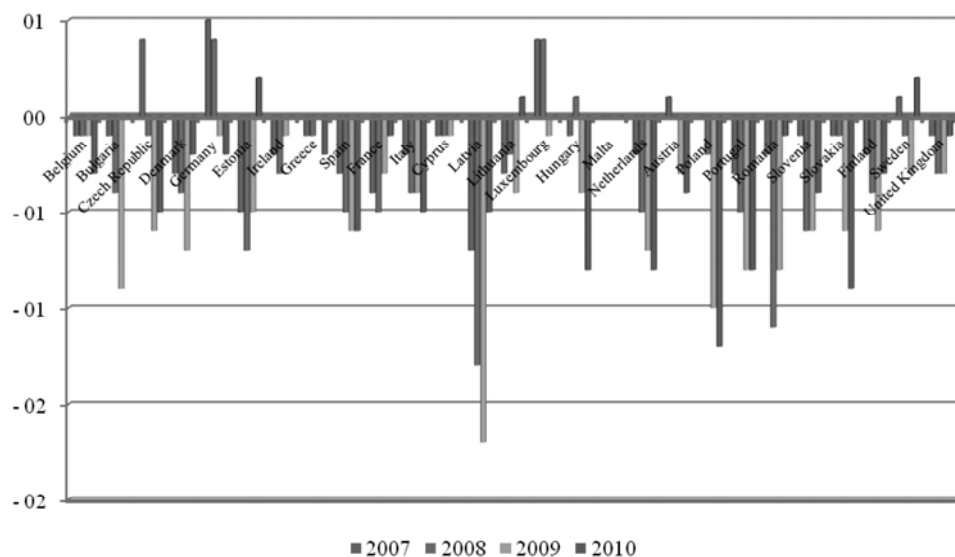
One of the key symptoms of local financial crisis (stress) is the deepening fiscal imbalance in the local government sector. It is interesting here to compare the case of Poland with that of other EU member states (Figure 1).

⁷ It should be noted that this is a percentage indicator of direct income (“own income”) defined broadly, in accordance with the Polish budgetary reporting system, so as to include local authorities’ shares of revenue from national personal and corporate income tax. At present around 40% of local authorities’ direct income comes from these taxes, which distorts the picture of their financial autonomy, chiefly because they have little opportunity to influence the amount of income they receive in these categories.

⁸ An example of these worsening relations is provided by the joint lawsuit currently (January 2012) being prepared by the Union of Polish Cities against the Minister of Finance as a result of the ministry’s decision last year to reduce the level of subsidy for fixed and health-related welfare benefits, which cost local authorities several million zloty.

FIGURE 1.

Result for the local government sector (net lending/net borrowing) in Poland compared with other EU-27 countries in 2007–2010 (as % of GDP)



Source: Statistics Database, Eurostat, www.epp.eurostat.ec.europa.eu, 10.10.2012.

The data presented in Figure 1 indicate that in 2007–2010 there was a significant increase in the imbalance between revenue and expenditure in local financial systems. This process affected in particular the new EU member states, such as Latvia, Poland, Romania and Slovakia. In 2010 Poland had the highest figure in the whole of the EU for the ratio of local government debt to GDP, at 1.2% (this is four times higher than the EU-27 average, which was 0.3% in the same year). In absolute value terms the overall deficit of local authorities in Poland reached a record level in 2010, exceeding 15 billion zloty⁹, equivalent to about €3.5bn at the current exchange rate (for comparison, the figure was €0.6bn in 2008, and €3.0bn in 2009) [Report, 2011, p. 26]. The highest level of budgetary imbalance among Polish local authorities was recorded for the districts and the cities with county status; the lowest was that of the provinces and the land counties. Work is currently under way in Poland on legislation to reduce the permissible level of local government deficit. The Ministry of Finance plans to introduce an expenditure rule as from 2012, setting an upper limit on the deficits provided in local authorities' budgets. According to the draft proposal, the deficit of the local government sector will be limited to a maximum of 10bn zloty (about €2.3bn at the current exchange rate) in 2012, to 9bn zloty (about €2.1bn) in 2013, and not more than 8bn zloty (about €1.9bn) from 2014 onwards. Many researchers studying issues of Polish local finance (including the present author)

⁹ In the short scale – 1 billion is 1 000 000 000.

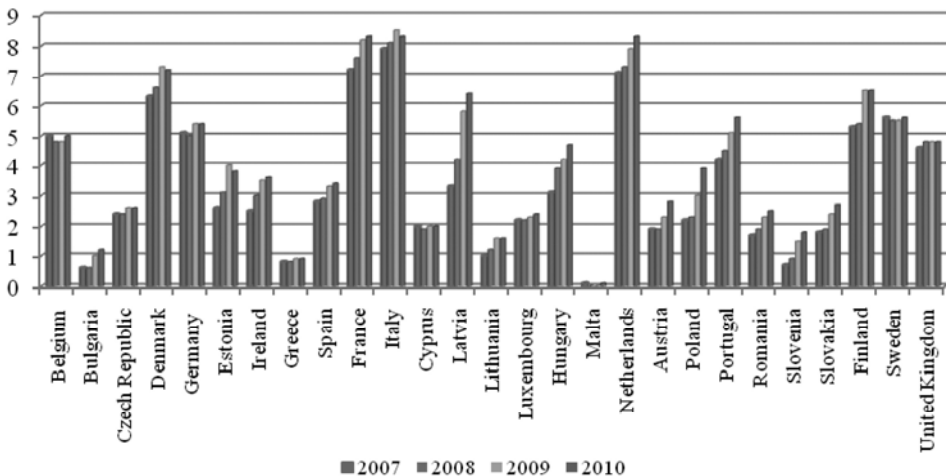
believe that such imposed limits may cause an excessive slowing in investment by Polish local authorities, particularly with regard to investment projects partly financed out of EU funds. In 2009, in spite of the crisis, Poland recorded a marked growth in investment expenditure, by 35.0% compared with 2008 and by 180.5% compared with 2004 [Report, 2010, p. 157]. In 2010, although the rise in investment expenditure slowed down (the increase relative to 2009 was just 4%), this was mainly due to changes made in the Polish system for the flow of EU funds. Local government remains the chief investor in the Polish public sector, with record investment of more than 43.3bn zloty (around €10.9bn) in 2010 [Report, 2011, p. 13]. This high level of local government investment (in spite of the financial crisis) was chiefly due to the intensive use of EU assistance funding as a source of financing for local investment projects. It should be noted that for several years there has been a continuous increase in the part played in Polish local authorities' budgets by non-returnable foreign funding: in 2004 it accounted for just 1% of total revenue, while by 2010 the figure had risen to almost 8% [Report, 2011, p. 26].

5. The local financial crisis and problems of local government debt in Poland

A natural consequence of the deepening fiscal imbalance is a rapidly growing level of debt in the local government sector. Poland's status in this regard, in comparison with other EU member states, is shown in Figure 2.

FIGURE 2.

Debt of the local government sector (after consolidation) in Poland compared with other EU-27 countries in 2007-2010 (as % GDP)



The figure for local government debt as a percentage of GDP was approximately 3.9% in Poland, which is low compared with the EU as a whole (the average figure for the 27 EU members is was 5.8%, and the highest values, exceeding 8%, were recorded in countries such as France, Italy and the Netherlands). On the other hand, Poland's figure is relatively high when compared with the other new EU members – of these, the only ones where the level of local government debt is higher than in Poland are Latvia, Hungary and Estonia.

Based on the data shown in Table 2 we can observe changes in local government debt compared with the central government sector in Poland in 1999–2010. The local government debt in Poland accounts for only a small proportion of the total debt in the public financial sector (7.7% in 2010 – debt before consolidation), as the central government sector remains the main generator of public debt.

TABLE 2.

Changes in local government debt compared with the central government sector in Poland in 1999–2010 (debt before consolidation, current prices in billion zloty)

YEAR	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010
General government debt	278,2	288,3	314,7	365,4	415,9	440,5	477,1	518,2	537,4	609,4	693,6	778,7
Central government debt	264,9	267,6	285,6	330,7	381,8	405,2	442,3	482,2	503,6	572,7	635,9	705,9
Local government debt	6,2	9,4	14,9	18,5	21,8	24,5	27,3	30,9	31,1	33,9	45,3	59,9
Local government debt as % of general government debt	2,2	3,2	4,7	5,1	5,2	5,6	5,7	6,0	5,8	5,6	6,5	7,7

Source: The Public Sector Debt Statistics database, Ministry of Finance, <http://www.finanse.mf.gov.pl/szeregi-czasowe>, 10.10.2012.

The observed growth in the borrowing needs of the Polish local government sector has been mainly due to the low rate of growth in direct revenue caused by the economic downturn, as well as the high rate of investment stimulated primarily by the EU assistance flowing into Poland. In the latter case, debt plays the role of an instrument increasing local authorities' ability to absorb EU assistance, allowing them to obtain necessary funding to provide their own contributions to project financing.

The question arises whether Poland is at risk of a local government debt crisis [Poniatowicz, 2011, pp. 83–86]. Academic research shows that there is a natural tendency for such a crisis to appear as the next stage after economic and financial

crisis [C. M. Reinhart, K. S. Rogoff, 2010; C. M. Reinhart, 2010]. It would be appropriate to explain this concept at this point. A debt crisis refers to a situation in which an entity (a local authority in this case) is not able to service its debt. If this is only a temporary situation, we speak of a crisis of liquidity, while if it is of a permanent nature it is called a crisis of solvency. A local debt crisis arises in a situation where, as a consequence of the accumulation of local government sector deficits from previous years, there is an escalation of local government debt, and in effect a crisis of liquidity occurs in the sector – namely, entities in that sector (districts, counties, cities with county status, provinces, and organizational units associated with them) have difficulties in servicing their debt in timely fashion. These difficulties relate both to repayments of debt instalments, this being an element of outgoings (but not expenditure), and the current costs of debt servicing (being a part of current expenditure), consisting of interest, commission, etc. In effect there is an increase in the overdue liabilities (those whose payment date has already passed) of the local government sector.¹⁰ In the private sector a natural consequence of a serious debt crisis would be a firm's bankruptcy. In Polish law there is no provision for declaring a local authority bankrupt – such authorities continue to operate irrespective of their financial condition, and even insolvency cannot result in their liquidation. In some situations this may be the cause of a kind of moral gambling, with excessive liabilities being incurred in the hope that they will be paid off (in case of the local authority's insolvency) by the state, and in effect by taxpayers. The susceptibility of public finances to the danger of moral gambling was accurately described by British economic journalist Martin Wolf, who described public finances as an area particularly burdened by a “talent for privatising gains and socialising losses” [Wolf, 2008].

It should be noted that Polish law provides relatively tight regulations aimed at limiting local authority debt, through the *Act of 27 August 2009 on public finances* [Act, 2009], and in this regard it would be a misunderstanding to speak of a threatened debt crisis. The Act's restrictiveness on debt is composed of several measures. Firstly, credit and loans obtained by a local authority, as well as securities issued to cover a transitional budget deficit, must be repayable or redeemable in the same year. Secondly, a local authority may take on only financial liabilities for which servicing costs are incurred at least once a year, and the discount on municipal securities issued may not exceed 5% of the nominal value, with interest capitalization being prohibited. Thirdly, up to the end of 2013 Polish law lays down unified and restrictive limits on debt: a 15% limit on permissible debt servicing costs relative to planned budgetary revenue, and a 60% limit on a local authority's total year-end debt relative to total revenue, and also on the debt at the end of a quarter of a given budgetary year relative to planned revenue. Fourthly, since 2011 a rule of balanced local authority budgeting has been in force, according to which planned and actual current expenditure must not exceed planned and actual current income plus the budget surplus from previous years and free funds. Fifthly, as from 2014 every local authority will be subject to a new individual debt limit (Article 243 of the aforementioned Act on public finances), based on the amount of the computed operating surplus (the dif-

¹⁰ In Poland, overdue liabilities of local authorities remain at the relatively low level of around 0.5% of total liabilities (2010 figures).

ference between current income and current expenditure) for the three years preceding a given budget year. Sixthly, the Act introduces a number of measures in the Polish local financial system aimed at increasing the effectiveness of the use of debt instruments by the local government sector [Poniatowicz, Salachna, Perlo, 2010, pp. 68–73, 161–184]. Examples include long-term financial forecasting, management controls and internal auditing (intended to provide auditing of effectiveness).

6. Conclusions

Polish local authorities have felt acutely the effects of the current economic and financial crisis, and have experienced typical symptoms of local financial crisis (stress). There has been significant reduction in their direct income, and thus a worsening in indicators of their financial autonomy; growth in budget deficits has intensified; and in consequence there has been a marked increase in local government debt. However, due to EU assistance funding, which serves as a kind of buffer against the described crisis phenomena, there has not been such a radical slowdown in investment by local authorities.

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LESEN50PLUS – EINE STUDIE ÜBER PERIODISCHE SENIENZEITSCHRIFTEN UND -ZEITUNGEN IN DEUTSCHLAND

ZUSAMMENFASSUNG

In dieser wirtschaftsgerontologischen Abhandlung wird ein quantitativer Zugang zu den periodischen Seniorenpublikationen in der Bundesrepublik Deutschland gelegt. Dabei fokussiert die hier beschriebene Studie auf das Forschungsgebiet »Ältere Menschen und Medien«, ein nach Ursula Lehr [2009 p. 9] [...] *sonohl in der Gerontologie als auch in den Medienwissenschaften vernachlässigtes Gebiet* [...]. Die Arbeit bringt Licht in dieses für die Wissenschaft kaum beachtete Forschungsfeld. Denn das Thema »Periodischen Seniorenpublikationen« hat als Gegenstand medienorientierter und gerontologischer Forschungsszenarien bisher kaum eine Rolle gespielt. Konkret werden die Ergebnisse einer schriftlichen Erhebung vorgestellt, wonach die bundesdeutschen Zeitschriften- und Zeitungsredaktionen sowie Seniorenorganisationen, Verbände der Freien Wohlfahrtspflege, Landkreis- und Städtetage, das Presse- und Informationsamt der Bundesregierung und die Landesvolkshochschulverbände angeschrieben und nach aktuellen Informationen zu diesem Forschungsfeld befragt worden sind. Im Ergebnis konnten für Deutschland insgesamt 178 kommerzielle, nichtkommerzielle und verbandseigene Seniorenzeitschriften sowie -zeitungen ermittelt werden, die sich jedoch hinsichtlich Auflage, Verbreitungsgebiet, Erscheinungsweise, Lesereteiligung, Seitenumfang zum Teil sehr unterscheiden. Die Ausführungen zeigen, dass aktuelle Forschungen im Bereich »Periodischen Seniorenpublikationen« nicht nur wünschenswert, sondern aus Sicht alter Menschen und weiterer Interessengruppen (Verlagsmanager, Redaktionen, Medien- und Werbefachleute, Journalisten usw.) zwingend notwendig sind. Das dieses Dunkelfeld in der Wissenschaft nicht weiter haltbar ist, bedarf eigentlich keiner weiteren Begründung.

Schlüsselwörter Wirtschaftsgerontologie, Seniorenzeitschrift, Seniorenzeitung, Demografische Entwicklung, Alter, Seniorenmarketing

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READING AT 50-PLUS – A STUDY ON PERIODICALS AND NEWSPAPERS FOR SENIOR CITIZENS IN GERMANY

SUMMARY

In this paper a quantitative approach is used when regarding periodicals and newspapers for senior citizens in Germany. The focus, however, is on »Senior Citizens and the Media« which according to Ursula Lehr [2009 p. 9] [...] *is a field of research neglected by both gerontology and the media studies* [...]. This paper sheds light on a field of research which the scientific world has paid little attention to. To date, periodic publications for senior citizens have hardly played a role in media-orientated and gerontological research. More specifically, results have been documented in a survey where the national magazine and newspaper editorial offices, senior citizen organizations, voluntary welfare services, city and district councils, the Press and Information Office of the Federal Government and adult education centers were approached and asked to give up-to-date information to questions regarding this field of research. Resulting from this, a total of 178 commercial, non-commercial and independent senior citizen publications and newspapers could be ascertained for Germany. There were, however, significant differences regarding circulation, distribution, publication, reader participation, and number of pages, etc. The undertaking showed that current research in the field of periodic senior citizens publications is not only desirable but from the perspective of the older generation and other special interest groups (publishing house managers, editors, advertising experts and journalists) is imperative. It goes without saying, that this neglected field of research should no longer be ignored.

Key Words economics of aging, magazine for elderly, newspaper for elderly, demographic change, age, marketing for elderly

1. Hintergrund

Sie heißen »Alt? Na und!«, »Mitten im Leben«, »Rostfrei« oder ganz einfach »Senioren-Zeitschrift«. Die Titel der deutschsprachigen Publikationen für Senioren könnten unterschiedlicher nicht sein. Ebenso verschieden sind die Formate: Sie reichen von DIN A 5 bis Zeitungsgröße, schwarz-weiß fotokopiert bis Vierfarb-Hochglanzdruck. Kaum eine Seniorenzeitschrift gleicht der anderen. Auch inhaltlich sind die Themen breit und heterogen gefächert [Galliwoda 2009 p. 32]. Ein Blick in die internationale Zeitschriftenlandschaft zeigt das Spektrum der Möglichkeiten. So ist in Frankreich beispielsweise die Bayard-Verlagsgruppe mit drei Titel auf dem Markt der Seniorenzeitschriften vertreten: »Côté Femme«, »Notre Temps« und »Pèlerin«. Côté Femme richtet sich an Frauen über 50 Jahren und ähnelt im Erscheinungsbild der Zeitschrift »Cosmopolitan«. Sie hat eine Auflage rund 160.000. Notre Temps hingegen hat eine Auflage von fast einer Million und will mit den vier Rubriken Aktuelles, Gesundheit, Lifestyle und Recht ein Ratgeber für die modernen Senioren sein. Pèlerin versteht sich hingegen als generationsübergreifende Publikation und setzt sich unter anderem mit gesellschaftskritischen Themen auseinander. Die Auflage beträgt knapp 300.000. In Australien ist »The Australien Senior« mit einer Auflage von 800.000 die wichtigste Seniorenzeitung. Es gibt drei regionale Ausgaben und eine überregionale Ausgabe. Das Kennzeichen des Schweizer Magazins »50plus« ist der regionale Fokus. Das offizielle Organ des schweizerischen Seniorenverbandes erschien erstmalig im Jahr 2003 in der Nordwestschweiz mit einer

Auflage von 15.000 Exemplaren. Innerhalb nur weniger Jahre konnte das Magazin seine Auflage auf gegenwärtig knapp 100.000 erhöhen. Zielgruppe sind aktive Senioren und ältere Berufstätige. Neben Finanzierungstipps werden unter anderem auch Urlaubsreisen für Senioren vorgeschlagen. In den USA erscheint unter anderem mit einer Gesamtauflage von 22 Millionen Exemplaren das Verbandsmagazin »AARP – The Magazin« des Seniorenverbandes AARP (American Association of Retired Persons). Das weltweit auflagenstärkste Magazin ist nur einer von 400 Titeln, die allein in den USA den Senioren gewidmet sind. Es ist aufwendig produziert und umfasst zwischen 80 und 140 Seiten. Es wird in drei Versionen, jeweils maßgeschneidert für die Generationen 50plus, 60plus und 70plus, angeboten und deckt die Rubriken Finanzen, Arbeit, Rente, Gesundheit und Reisen ab. Seit 2002 trägt die AARP der wachsenden spanisch-sprachigen Bevölkerung in den USA Rechnung. So wird »AARP Secunda Juventud« zweisprachig aufgelegt – in Englisch und Spanisch – und hat eine Auflage von 600.000 Exemplaren. Auch in Deutschland gibt es zahlreiche Zeitschriften und Zeitungen für ältere Personen, allerdings in bedeutend geringerem Umfang und mit deutlich geringen Auflagen wie in den USA [Steinel 2006 p. 15, Eugster, Weise 2006 without page number].

Wie diese Beispiele bereits erkennen lassen, und wie auch von Reidl [2007 p. 238] bestätigt wird, präsentiert sich der Blätterwald für die ältere Generation äußerst bunt. Doch weiß heute niemand genau, wie viele Seniorenzeitschriften und -zeitungen es tatsächlich gibt, denn die Forschungslage auf dem Gebiet »Periodischer Seniorenpublikationen« ist denkbar schlecht [Galliwođa 2009 p. 32]. Ziel dieser Arbeit war daher, im Rahmen einer schriftlicher Befragung zu erforschen, welche kommerziellen, nichtkommerziellen und verbandseigenen Seniorenpublikationen es aktuell in der Bundesrepublik Deutschland gibt und welche Gemeinsamkeiten wie auch Unterschiede sie hinsichtlich Auflage, Seitenumfang, Format, Erscheinungshäufigkeit, Zielgruppe, Lesereteiligung etc. haben. Mit dieser Arbeit wird beabsichtigt, die medialen Herausforderungen des demografischen Wandels offensiv anzunehmen. Zudem tragen die aktuellen Informationen zu mehr Markttransparenz bei, was gerade den Anbietern von Seniorenpublikationen bei der Entwicklung individueller Absatzstrategien hilft, interessante Nischen zur erfolgreichen Platzierung marktorientierter Angebote aufzeigt und bei der Ideengenerierung sowie Konzeption eigener Produkte unterstützt. Durch diese Analyse und vergleichende Bewertung aktueller Angebote vereinfacht sich somit für die Anbieter von Seniorenpublikationen die strategische Programmplanung und die Sortimentspolitik erheblich.

Bevor nun im Folgenden der Stand der Forschung, die Forschungsfrage und der Forschungsprozess beschrieben werden, soll zunächst eine kurze Begriffsbestimmung erfolgen, um den Rahmen bzw. den Untersuchungsgegenstand dieser Arbeit eindeutig abzustecken.

2. Begriffsabgrenzung

Der Terminus »Seniorenzeitschrift/-zeitung« setzt sich aus den beiden Begriffen »Senior« und »Zeitschrift« respektive »Zeitung« zusammen. Laut Definition ist das Wort »Senior« lateinischen Ursprungs und seit dem ausgehenden 17. Jahrhundert in der deutschen Sprache bekannt. Senior bezeichnet einen älteren Menschen, eine Person über 65 Jahre [Bedürftig 2005 p. 502]. Als gesellschaftliche Gruppe sind Senioren unter anderem als Zielgruppe des Marketings relevant, die mit Schlagworten wie Best Ager, Generation Gold, Silver Surfer, Future Seniors, Busy-Fit-Oldies oder Baby Boomer belegt werden [TNS/Commerzbank 2009 p. 10]. Inzwischen definieren viele Autoren bereits Menschen ab 50 Jahren als Senioren mit der Begründung der marktseitigen Neuorientierung. Eine »Zeitschrift« bzw. »Zeitung« ist eine Publikation, welche sowohl in gedruckter wie auch elektronischer Form in regelmäßigen, meist kurzen periodischen Abständen öffentlich erscheint. Häufig unterscheidet man zwischen Tageszeitungen und Wochenzeitungen. Zeitschriften und Zeitungen sind statuarische (zeitpunktunabhängige) Medien, bei denen im Prinzip weder die Dauer noch die Geschwindigkeit der Nutzung begrenzt sind und ausschließlich von den Nutzern nach ihren individuellen und spezifischen Bedürfnissen bestimmt wird [Medialine 2011 without page number]. Dabei ist es zunächst unerheblich, ob der Leser dafür Geld zahlen muss oder ob er die Publikation unentgeltlich erhält. Unter dem Begriff »Seniorenzeitschrift/-zeitung« soll demnach eine gedruckte oder elektronische Publikation verstanden werden, die regelmäßig erscheint und sich als Zielgruppe primär an Senioren richtet. Im Übergang in den Ruhestand als auch später können gerade [...] *periodisch erscheinende und zeitlich fixierte Medien helfen, Zeit zu strukturieren und dem Alltag einen gewissen Rhythmus zu geben, der feste und ausgedehnte Nutzungszeiten stabilisiert* [Kübler 2009 p. 99]. Zwar spielen nach Eugster/Weise [2006 without page number] periodische Seniorenzeitschriften und -zeitungen in der Mediennutzung älterer Menschen nur eine ergänzende Funktion; dies schon deshalb, weil sie häufig bloß monatlich oder mehrmonatlich erscheinen. Dennoch leisten derartige Publikationen laut Kübler [2009 p. 108] einen wertvollen Beitrag zur Information und Beratung älterer Menschen in der heutigen Zeit: *Sie bieten viele Geschichten, Informationen und Tipps, die Ältere in ihrem engeren Umfeld brauchen und goutieren.*

3. Stand der Forschung

In dieser wirtschaftsgerontologischen Abhandlung wird ein quantitativer Zugang zu den »Periodischen Seniorenpublikationen« in der Bundesrepublik Deutschland gelegt. Damit fokussiert das hier beschriebene Projekt auf das Forschungsgebiet »Ältere Menschen und Medien«, ein nach Ursula Lehr [2009 p. 9]. [...] *sowohl in der Gerontologie als auch in den Medienwissenschaften vernachlässigtes Gebiet* [...]. Die Feststellung von Ursula Lehr wird von anderen Wissenschaftlern zahlreich bestätigt, unter anderem von Bonfadelli [2009 p. 149], der sagt: *Nicht nur die Medienpraxis, auch die Kommunikationswissenschaft hat den Forschungsbereich 'Medien und Alter' bislang vernachlässigt.*

sigt, dies gilt sowohl für den englischsprachigen Bereich [...] als auch für Deutschland [...]. Laut Schorb/Hartung/ Reißmann [2009 p. 11] findet man ein hier Forschungsfeld vor, [...] *das von einigen wenigen unter spezifischen Fragestellungen angerissen wurde, aber weit davon entfernt ist, angemessen kartografiert oder gar annähernd erschlossen zu sein.* Die vorliegende Studie soll daher Licht in dieses für die Wissenschaft kaum beachtete Forschungsfeld bringen.

Einschlägige Studien zum Thema »Periodischen Seniorenpublikationen« gibt es trotz mehrfacher Aufrufe und Appelle ganz wenige. Wer etwas über »Periodischen Seniorenpublikationen« erfahren möchte, hat es entsprechend nicht leicht. So ist die bis dato jüngste Vollerhebung aller Seniorenzeitschriften und -zeitungen in Deutschland bereits mehr als zehn Jahre alt. Sie stammt aus dem Jahr 1999 und wurde vom Kuratorium Deutsche Altershilfe (KDA) als umfassende Neuauflage der von ihnen erstmals im Jahr 1992 erstellten Bestandsaufnahme deutscher Seniorenzeitschriften vorgelegt [KDA 1999 p. 4]. Ende der 1990er-Jahre wurden für Deutschland insgesamt 115 Seniorenpublikationen ermittelt [1992 p. 79]. Zwischenzeitlich wurden einige Titel eingestellt, es kamen aber auch neue hinzu. Nach 1999 gab es in Deutschland bislang keine weitere Vollerhebung zu den »Periodischen Seniorenpublikationen«, denn nach wie vor sind Seniorenprintmedien für die Wissenschaft kaum von Interesse. Auch sind die in Deutschland periodisch erscheinenden Seniorenzeitschriften und -zeitung [...] *nicht repräsentativ registriert [...]*, wie Kübler [2009 p. 108] kritisch konstatiert. Eine senioren- und damit menschengerechte Online-Plattform mit strukturierten Informationen zu allen periodischen Seniorenprintmedien sucht man im Internet vergebens. Schließlich geraten die klassischen Medien durch die Diskussion der Anwendung »neuer Medien« immer weiter in den Hintergrund, was auch die Bewilligung von Forschungsgeldern betrifft. Doch gerade in Bezug auf die noch eher gemäßigte Verbreitung des Internets innerhalb der älteren Zielgruppe wird deutlich, dass insbesondere Printmedien noch lange nicht ersetzt werden können. [Ridder, Engel 2010 p. 526].

Die wissenschaftliche Konzentration auf die »neuen Medien« ist umso erstaunlicher, wenn man bedenkt, dass gerade Druckmedien von alten Menschen sehr häufig genutzt werden, da sie dem Informationsbedürfnis dieser Bevölkerungsgruppe gut entsprechen. So lesen laut aktueller Studie 90,3% der 60 bis 69-Jährigen und immerhin noch 88,9% der über 70-Jährigen regelmäßig Zeitung [Media Perspektiven Basisdaten 2007]. Ihrer Meinung nach können die Informationen hier nach dem individuellen Bedarf und der gewünschten Geschwindigkeit aufgenommen werden, so dass eine Überforderung unwahrscheinlicher wird. Ferner werden die Informationen in gedruckten Medien von älteren Menschen häufig als verständlicher und übersichtlicher empfunden. Wenngleich sich das Internet auch bei der älteren Bevölkerungsgruppe mittlerweile zum Massenmedium entwickelt hat, waren im Jahr 2007 nur 25,1% der Personengruppe »60 Jahre und älter« online [Bauer Media 2007 p. 51].

Forschungen zum Gebiet »Ältere Menschen und Medien« und speziell zum Thema »Periodische Seniorenpublikationen« sind somit hochaktuell und zugleich wichtig, um die medialen Herausforderungen des demografischen Wandels offensiv anzunehmen. Durch eine aktuelle Bestandsaufnahme aller periodischen Senioren-

publikationen ließe sich deutlich mehr Transparenz in den bundesdeutschen Zeitschriften- bzw. Zeitungsmarkt bringen, was konkret dazu beitragen würde, die Position der älteren Menschen in der Medienlandschaft weiter zu stärken. Für die Produzenten bzw. Anbieter von Seniorenzeitschriften und -zeitungen ergäben sich konkrete Hinweise zur wettbewerbsorientierten Platzierung eigener Angebote am bundesdeutschen Markt; Gemeinsamkeiten sowie Unterschiede der periodischen Seniorenpublikationen würden strukturiert aufgezeigt und Differenzierungspotentiale somit erkennbar.

4. Forschungsfrage

Aus den theoretischen Vorüberlegungen und den bereits vorliegenden Untersuchungen heraus ergab sich folgende forschungsleitende Fragestellung: Welche kommerziellen, nichtkommerziellen und verbandseigenen Seniorenzeitschriften sowie -zeitungen gibt es aktuell in Deutschland und welche Gemeinsamkeiten sowie Unterschiede zeichnen diese Publikationen aus? Die forschungsleitende Fragestellung soll am Ende dieser Abhandlung beantwortet werden, um damit die vorhandene Wissenslücke im Bereich »Periodische Seniorenpublikationen« zu schließen. Um dieses Ziel zu erreichen, wurden insgesamt 29 Einzelfragen formuliert und in einen standardisierten Fragebogen zusammengefasst. Dadurch wurde das Forschungsinteresse auf eine stärker fokussierte Perspektive herunter gebrochen. Durch die Beantwortung der Einzelfragen können dann Rückschlüsse auf die forschungsleitende Fragestellung gezogen werden.

5. Methodik und Datenerhebung

5.1 Forschungsfeld

Das Forschungsfeld dieser Untersuchung waren periodische Zeitschriften und Zeitungen für ältere Menschen in der Bundesrepublik Deutschland. Dabei wurde der Untersuchungsrahmen auf diejenigen Titel beschränkt, die sich erkennbar und ausdrücklich – auch nach Auskunft der Herausgeber und Redaktionen – an ältere Menschen als Zielgruppe wenden. Publikationen, die nur für die Beschäftigten in Alteneinrichtungen konzipiert sind, wurden demnach nicht berücksichtigt. Nicht mit in die Auswertung aufgenommen wurden zudem diejenigen Titel, die weniger als einmal im Jahr erscheinen, die nicht mindestens kommunal vertrieben werden, die nicht gedruckt, sondern nur online verlegt werden und die nicht in der BRD vertrieben werden. Damit wurde seitens der Autoren ein gewisser Mindeststandard für die periodischen Seniorenpublikationen definiert. Auch wurden in dieser Erhebung auflagenstarke Titel wie beispielsweise „Bunte“, „Bild und Funk“, „Neue Post“ „Das neue Blatt“ oder „Apotheken Umschau“ nicht berücksichtigt, da sie sich selbst – trotz der großen Anzahl älterer Leser – nicht als Seniorenzeitschrift sehen. Mit diesen Einschränkungen lehnen sich die Verfasser an die KDA-Studie aus dem Jahr 1999 an [KDA 1999 p. 3ff.].

5.2 Erhebungsmethode

Um mehr über die »Periodischen Seniorenpublikationen« in Deutschland zu erfahren, wurden im März 2011 die bundesdeutschen Zeitschriften- sowie Zeitungsredaktionen angeschrieben und mittels eines standardisierten Fragebogens nach aktuellen Informationen zu diesem Forschungsfeld befragt. Darüber hinaus wurden auch der Deutsche Seniorenpresse Arbeitsgemeinschaft e.V. (dsp), die Bundesarbeitsgemeinschaft der Senioren-Organisationen (BAGSO), Verbände der Freien Wohlfahrtspflege, Landkreis- und Städtetage, das Presse- und Informationsamt der Bundesregierung und die Landesvolkshochschulverbände gefragt, ob und welche Titel von periodischen Seniorenpublikationen dort bekannt sind beziehungsweise von ihnen selbst herausgegeben werden. Schließlich wurden die Zeitschriften der letzten KDA-Studie [1999 p. 41ff.] durch Internet- und Telefonrecherche auf Aktualität überprüft. Auf diese Weise wurden insgesamt 786 Redaktionen, Organisationen, Behörden sowie Institutionen per Brief oder Email angeschrieben und darum gebeten, an der Befragung teilzunehmen.

Der eingesetzte Fragebogen bestand aus einem Einstiegs- und einem Hauptteil und wurde vorab mittels eines Pre-Tests in Bezug auf korrekte Frageformulierungen, plausible Reihenfolgen und sinnvolle Antwortkategorien überprüft [Kirchhoff, Kuhnt, Lipp, Schlawin 2010 p. 24]. Insgesamt wurden 29 Fragen zur Beantwortung gestellt. Im Einstiegsteil wurden vornehmlich klassische Mediadaten zur Seniorenzeitschrift bzw. -zeitung verlangt (Name, Herausgeber, Kategorie, Erscheinungsort, Erscheinungsart, Verbreitungsgebiet usw.), im Hauptteil wurden anschließend Fragen zum Inhalt, zu den Informationsquellen, zur Lesereteiligung, zu den redaktionellen MitarbeiterInnen, zur Altersstruktur der Leserschaft usw. gestellt. Am Ende des Fragebogens wurden die Redaktionen und Institutionen zudem darum gebeten, eine auf 10 Zeilen beschränkte Selbstdarstellung zu ihrer periodischen Seniorenpublikation zu verfassen sowie das Besondere beziehungsweise Einzigartige der Zeitschrift kurz und prägnant zu beschreiben. Der gesamte Fragebogen konnte alternativ auch online beantwortet werden.

5.3 Auswertungsverfahren

Die Auswertung des Datenmaterials erfolgte von Mai bis Juni 2011 mittels deskriptiver Statistik. Obwohl sich alle erfassten Seniorenpublikationen an (zumindest) eine gemeinsame Zielgruppe wenden, haben sie doch sehr unterschiedliche Ansprüche, die sich unter anderem in der Gestaltung und Themenwahl sowie der Herausgeberschaft widerspiegeln. Daher wurden die Seniorenprintmedien in unterschiedliche Kategorien eingeteilt. In Anlehnung an die jüngste KDA-Studie aus dem Jahr 1999 wurden folgende fünf Kategorien in der Auswertung berücksichtigt: *Kategorie 1*: Zeitschriften und Zeitungen von Verlagen, Unternehmen oder PR-Büros. *Kategorie 2*: Zeitschriften und Zeitungen von Verlagen, Unternehmen oder PR-Büros, die als Kundenzeitschrift herausgegeben werden. *Kategorie 3*: Verbands- oder institutionsgebundene Zeitschriften und Zeitungen. *Kategorie 4*: Publikationen von Kommunen oder Landesbehörden. *Kategorie 5*: Heimzeitschriften [KDA 1999 p. 8f.].

6. Ergebnisse

Die Antworten der Befragten wurden nach Frageblöcken sortiert und die Gemeinsamkeiten sowie Unterschiede herausgearbeitet. Zudem interessierte die Häufigkeit der Aussagen. Angesichts der notwendigen Kürze von Journalbeiträgen werden im Folgenden die Ergebnisse nur auf der Gesamtebene präsentiert. Detailergebnisse zu den einzelnen Kategorien werden an dieser Stelle nicht dargestellt.

Anzahl: Waren es 1999 noch 115, so konnten aktuell insgesamt 178 kommerzielle, nichtkommerzielle und verbandseigene Seniorenpublikationen für Deutschland ermittelt werden, wovon 89 in die statistische Auswertung einbezogen wurden. Die übrigen Titel konnten nicht in die Auswertung mit einbezogen werden, da die versendeten Fragebögen – trotz Nachfassaktion – nicht beantwortet bzw. termingerech zurückgeschickt worden waren. *Kategorie:* Mit 38% werden die meisten Zeitschriften und Zeitungen von Verbänden oder Institutionen herausgegeben, 26% von Kommunen oder Landesbehörden, 16% von Verlagen, Unternehmen oder PR-Büros und weitere 13% von Seniorenheimen. Mit 7% werden die wenigsten Seniorenpublikationen von Verlagen, Unternehmen oder PR-Büros als Kundenzeitschrift herausgegeben. *Erscheinungsweise:* Im Zeitalter des Internets ist etwas mehr als die Hälfte aller Zeitungen und Zeitschriften (51%) auch komplett online abrufbar, 13% nur zum Teil. 36% der Seniorenpublikationen sind lediglich in gedruckter Form erhältlich. *Verbreitungsgebiet:* Mit 37% werden die meisten Publikationen bundesweit herausgegeben. Kommunal vertrieben werden 33%, regional 24% und landesweit nur 6%. *Verbreitungsweg* (hier waren Mehrfachnennungen möglich): 78% der Zeitungen und Zeitschriften werden per Post verschickt, 51% über Altenheime und 47% über kommunale Behörden verteilt. Weitere 45% werden über Altenbegegnungsstätten und 40% über Arztpraxen verbreitet. Lediglich 14% aller Seniorenzeitungen und -zeitschriften werden über den freien Verkauf angeboten. *Erscheinungshäufigkeit:* Mit 63% erscheinen die meisten periodischen Zeitschriften und Zeitungen 2 bis 4mal im Jahr. 5 bis 8mal im Jahr erscheinen 12% und 9 bis 12mal im Jahr 11% aller Seniorenpublikation. Mehr als 12mal im Jahr erscheinen 11% der Zeitungen und Zeitschriften. Nur 3% erscheinen 1mal im Jahr. *Auflage:* Knapp ein Viertel (27%) und damit die meisten der Seniorenpublikationen hat eine Auflage von 5.001 bis 10.000 Exemplare, 20% sogar über 50.000 Exemplare. Weitere 17% haben eine Auflage von 2.001 bis 5.000, 16% zwischen 10.001 bis 20.000, 13% weniger als 2.000 und 7% von 20.001 und 50.000 Exemplare. *Seitenumfang:* Die durchschnittliche Seitenzahl der meisten Zeitschriften und Zeitungen liegt mit 39% zwischen 21 bis 40 Seiten. 19% der Publikationen haben zwischen 8 bis 20 Seiten, 17% zwischen 41 bis 60 Seiten, 16% zwischen 61 und 80 Seiten und 7% weniger als 8 Seiten. Über 80 Seiten haben nur 2% aller Seniorenzeitschriften und -zeitungen. *Format:* Mit 73% hat sich DIN A4 als Standardformat für die Seniorenzeitungen und -zeitschriften herauskristallisiert. 4% aller Publikationen verwenden das Berliner Format, 2% DIN A5 und 1% B4. Ganze 20% benutzen ein anderes, nicht definiertes Format. *Farbgebung:* Mit 83% werden die meisten Zeitungen und Zeitschriften in Farbe gedruckt, 17% nur in schwarz/weiß. *Gestaltung:* 76% der Publikationen legen Wert auf eine

seniorenrechtliche Gestaltung. Verwunderlich ist, dass 24% der Befragten Zeitungen und Zeitschriften angaben, keinen expliziten Wert auf eine derartige Gestaltung zu legen, obwohl sie sich auf die Zielgruppe der Senioren ausgerichtet haben. *Preis:* Fast dreiviertel (74%) der Seniorenzeitungen und -zeitschriften sind kostenlos erhältlich, die übrigen 26% werden gegen Gebühr verkauft. *Inhaltliche Zusammensetzung:* An dieser Stelle wurde im Fragebogen ein Katalog von möglichen Inhalten einer Seniorenpublikation vorgegeben, zu denen die Häufigkeit mit „Immer“, „Häufig“, „Selten“ und „Nie“ beurteilt werden sollte. Abb.1 zeigt die Auswertung dieser Frage. Demnach sind Berichte, Veranstaltungshinweise und wichtige Adressen die häufigsten Inhalte der Zeitung und Zeitschriften. Demgegenüber sind meditative Texte, Kochrezepte und Features nie bzw. selten Inhalt der Publikationen für Senioren.

ABB. 1



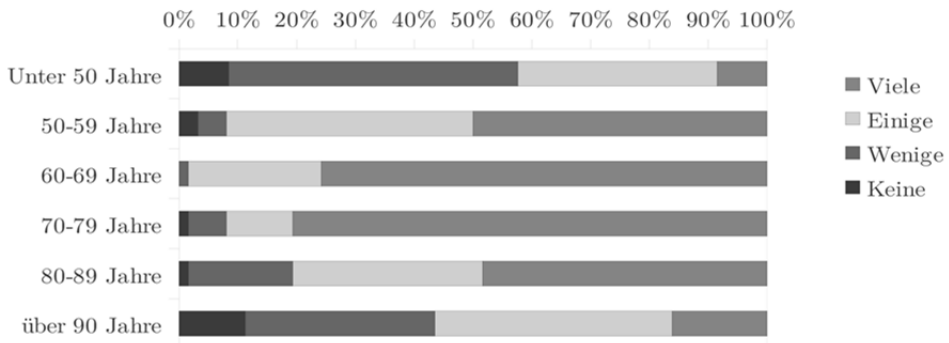
Leserbeteiligung (hier waren Mehrfachnennungen möglich): 63% der Zeitungen und Zeitschriften beziehen ihre Leser über Erfahrungsberichte mit ein, 62% über Fotos und Bilder, 48% über Leserbriefe, 43% über Anregungen und Impulse, 40% über Geschichten und 37% über Gedichte. 9% der Seniorenpublikationen veröffentlichen sogar Kontaktanzeigen. Jede sechste Seniorenzeitung und -zeitschrift (17%) gab an, ihre Leser nicht zu beteiligen. *Werbung* (hier waren Mehrfachnennungen möglich): In 43% aller Seniorenpublikationen wird regionale, in 25% bundesweite und in 9% landesweite Werbung geschaltet. Gar keine Werbung schalten 30%

aller Zeitungen und Zeitschriften. Die meiste Werbung stammt dabei aus der Branche Gesundheit und Pflege (37%), gefolgt von Freizeit (17%), Finanzen (8%) und Mode (6%). Die übrigen 32% verteilen sich auf die Branchen Handel, Automobil, Technik, Wohnen, Veranstaltungen und soziale Dienstleistungen. *Altersstruktur:* Die Altersgruppe der 60-69 Jährigen nimmt bei den befragten Publikationen den größten Teil der Leserschaft ein, die 70-79 Jährigen bilden die zweitgrößte Gruppe. 60-79 Jährige sind demnach die Hauptansprechgruppe für Seniorenpublikationen. Die Gruppe mit dem geringsten Teil der Leserschaft bilden die unter 50-Jährigen.

ABB. 2

Altersstruktur (eigene Darstellung)

Wie schätzen Sie die Altersstruktur Ihrer Leserschaft ein?



Geschlechterverteilung: 56% der Zeitungen und Zeitschriften gaben an, dass die Leserschaft aus ungefähr gleich vielen Männern und Frauen besteht. Bei 38% zählen hauptsächlich Frauen und bei 6% hauptsächlich Männer zur Leserschaft. *Mitarbeit in Redaktion:* In jeder zweiten Redaktion (50%) sind Senioren als freie Mitarbeiter beschäftigt, in 3% aller Fälle sogar als Festangestellte. 47% der Redaktionen beschäftigen jedoch gar keine Senioren. Bezüglich des Alters der redaktionellen Mitarbeiter gaben die befragten Zeitungen und Zeitschriften an, dass 9% zwischen 31 und 40 Jahre alt sind, 41% zwischen 41 und 50 Jahre, 16% zwischen 51 und 60 Jahre und 34% sind älter als 60 Jahre. Damit ist zwei Drittel der redaktionellen Mitarbeiter (66%) jünger als die oben genannte Hauptansprechgruppe für Seniorenpublikationen.

7. Beantwortung der Forschungsfrage

Die Abhandlung gibt einen strukturierten Überblick zu den »Periodischen Seniorenpublikationen« in Deutschland und bringt aus Sicht alter Menschen und weiterer Interessengruppen (Verlagsmanager, Redaktionen, Medien- und Werbefachleute, Journalisten usw.) Licht in dieses für die Wissenschaft bisher kaum beachtete For-

schungsfeld. Die forschungsleitende Frage kann nun wie folgt beantwortet werden: Für Deutschland konnten insgesamt 178 kommerzielle, nichtkommerzielle und verbandseigene Seniorenzeitschriften sowie -zeitungen ermittelt werden. Das sind 63 Seniorenpublikationen mehr als im Jahr 1999 bzw. 99 mehr als im Jahr 1992. Dies entspricht einem Plus in Höhe von 54,8% bzw. 125,3%. Große Ähnlichkeiten zeigen die eruierten Seniorenpublikationen bei Format, Farbgebung, Erscheinungshäufigkeit, Verbreitungsweg, Gestaltung, Preis und Altersstruktur der Leserschaft. Hinsichtlich Seitenumfang, Auflage, Erscheinungsweise, Werbung, Leserbeteiligung, Verbreitungsgebiet, Geschlechterverteilung und Mitarbeit in Redaktion sind die Zeitungen und Zeitschriften jedoch sehr unterschiedlich. Trotz umfangreicher und langwieriger Recherche kann jedoch nicht behauptet werden, dass alle Seniorenpublikationen, die es in Deutschland gibt, erfasst werden konnten, da davon auszugehen ist, dass nicht alle Zeitschriften und Zeitungen auch tatsächlich bei den befragten Stellen erfasst sind.

8. Diskussion

Sind Seniorenzeitschriften und -zeitungen ein lukrativer Wachstumsmarkt und somit interessant für die Verlage bzw. das Verlagsmanagement? Und sind periodischen Seniorenpublikationen das, was ältere Menschen wirklich brauchen? Die stark zunehmende Anzahl an Titeln und die zum Teil hohen Auflagen sowie Leserzahlen scheinen eine klare Sprache zu sprechen [Eugster, Weise 2006 without page number]. Wenngleich das große Angebot und die hohe Nachfrage nach periodischen Seniorenpublikationen noch keine eindeutigen Belege für deren tatsächliche Nutzung sind, so lässt sich diesbezüglich doch ein gewisses Interesse an derartigen Medien bei der älteren Leserschaft konstatieren. Die fehlende Berücksichtigung der Seniorenperspektive erlaubt jedoch keinen höheren Generalisierungsgrad der Ergebnisse. Daher wäre es nach Meinung der Autoren sinnvoll, im Rahmen der Triangulation ergänzend eine qualitative Seniorenbefragung durchzuführen, um über die reinen quantitativen Daten dieser Studie hinauszukommen und die Befunde aus Nutzerbeziehungswise Lesersicht zu konkretisieren und zu individualisieren. Hierbei sollte sich unter anderem folgender Forschungsfragen gewidmet werden: Wie bewerten ältere Menschen die periodisch erscheinenden Seniorenzeitungen und -zeitschriften (Form, Inhalt, Themenwahl, Erscheinungshäufigkeit usw.)? Für wie nützlich halten sie die Seniorenpublikationen? Und welche konkreten Ansatzpunkte zur altersgerechten Optimierung sehen sie diesbezüglich? Aus der Beantwortung dieser Fragen ließen sich dann für die Anbieter von periodischen Seniorenpublikationen konkrete Handlungsempfehlungen für die seniorengerechte Entwicklung und Gestaltung ableiten. Damit trüge die qualitative Seniorenbefragung dazu dabei, die Wünsche und Bedürfnisse der Senioren an die periodischen Seniorenpublikationen zu präzisieren und die Position der älteren Menschen in der Medienlandschaft weiter zu stärken. Darüber hinaus wäre es zu empfehlen, ein alters- und damit menschengerechtes Internetportal einzurichten, welches dynamisch sämtliche periodischen Seniorenzeitschriften und -zeitungen der Bundesrepublik Deutschland repräsentativ regi-

striert und übersichtlich beschreibt. Damit könnten sich sowohl ältere Menschen als auch Forscher, Verlagsmanager, Medien- und Werbefachleuten, Journalisten, Redaktionen von Seniorenzeitschriften sowie Publizistik-, Journalistik- und Gerontologie-studierenden einfach, aktuell und fortlaufend über den sich ständig verändernden Markt der Seniorenpublikationen informieren.

9. Fazit

Die vorliegende Studie stellt eine aktuelle Übersicht zu den »Periodischen Seniorenpublikationen« in der Bundesrepublik Deutschland dar und enthält für alle Interessierte wertvolle Hinweise. Die Arbeit versteht sich als Beitrag der Wirtschaftsgerontologie, die medienorientierten Herausforderungen des demografischen Wandels offensiv anzunehmen. Abschließend kann gesagt werden, dass dieses Forschungsprojekt eine bedeutende Erweiterung der wissenschaftlichen Erkenntnisse im Bereich »Periodische Seniorenpublikationen« darstellt. Die Forschungsergebnisse tragen somit zur Weiterentwicklung der Forschung auf diesem Gebiet maßgeblich bei. Wie ältere Menschen die periodisch erscheinenden Seniorenpublikationen bewerten, für wie nützlich sie diese wirklich halten und welche konkreten Ansatzpunkte zur altersgerechten Optimierung sie diesbezüglich sehen, bleibt jedoch zu klären und ist weiteren empirischen Analysen vorbehalten.

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РАЗВИТИЕ АУТСОРСИНГА ИНФОРМАЦИОННЫХ ТЕХНОЛОГИЙ В МИРОВОЙ ЭКОНОМИКЕ

DEVELOPMENT OF OUTSOURCING OF INFORMATION TECHNOLOGIES IN THE WORLD ECONOMY

АННОТАЦИЯ

Услуги в сфере информационных технологий являются одним из немногих секторов белорусской экономики, показавшим хорошие результаты даже в кризисные годы: баланс торговли характеризуется положительным сальдо, а перспективы видятся оптимистичными. Задачей данной статьи было проанализировать международный рынок IT-услуг, выявить основные тенденции его развития и определить место Республики Беларусь в нем. Несмотря на очевидные достижения, ситуация пока не является совершенной, и поэтому одной из целей исследования было определение существующих проблем и направлений их решения, так как этот сектор является весьма важным для белорусской экономики в условиях необходимости преодоления отрицательного сальдо торгового баланса.

Ключевые слова: информационные технологии, аутсорсинг, компьютерные и информационные услуги (IT-services), IT-компании, экспортно-ориентированное программирование, экспорт IT-услуг Республики Беларусь, валютные поступления, сальдо торгового баланса

SUMMARY

IT-services is one of the few sectors of Belarusian economy that has shown positive results even during the crisis years: its balance is in the black and prospects are considered to be good. The article aims to analyze the global market of IT-services, describe the current situation, reveal the main tendencies and then to assess the place of Belarus on it. Despite some obvious achievement the situation is not ideal yet, and therefore one of the goals is to reveal the existing shortcomings and to pinpoint the strengths, as the field is vital to Belarusian economy under the conditions of the trade balance deficit.

Keywords: information technologies, outsourcing, computer and information services (IT-services), the IT-companies, the export-focused programming, export of IT-services of the Republic of Belarus, currency receipts, balance of trading balance

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1. Введение

Одной из самых актуальных тенденций развития международного рынка услуг является аутсорсинг информационных технологий. Это явление выступает продуктом развития информационного общества и экономики знаний, зародившимся в конце XX века и переживающим свой расцвет в настоящее время. Аутсорсинг информационных технологий происходит в условиях стирания пространственных и временных границ между разными странами мира, позволяя использовать ресурсы из самых удаленных уголков Земли. Аутсорсинг информационных технологий дает возможность развивающимся странам принимать активное участие в торговле на мировом рынке компьютерных и информационных услуг (IT-services) и сотрудничать с развитыми странами на основе взаимных выгод и обмена опытом. Для развивающихся стран аутсорсинг информационных технологий может стать двигателем прогресса, поднимая общий уровень экономического развития национальной экономики и содействуя распространению знаний во все сферы общества.

Республика Беларусь также не выпадает из мировых тенденций устойчивого роста сектора компьютерных и информационных услуг. Так, за последние 7 лет доля белорусских программистов в мировом экспорте IT-services увеличилась в пять раз – с 0,02% до 0,1% [*Доля Беларуси...2011*]. Однако в нашей республике еще полностью не реализован потенциал в данной сфере, которая в настоящее время является одним из источников положительного сальдо торговли услугами, компенсирующих огромный дефицит торгового баланса страны.

Теме аутсорсинга информационных технологий и развития сектора IT-services уделяют внимание экономисты во всем мире. Среди западных специалистов можно выделить Джулию Котларски и Ллана Ошри, которые акцентируют свое внимание на тенденции к аутсорсингу IT-services, а также Майкла Энгмана, изучающего сектор IT-services в развивающихся странах [Oshri, Kotlarsky, Willcocks 2012]. Среди белорусских исследователей необходимо отметить Михаила Ковалева и Ольгу Лаврову [2010, С. 21-25], которые определяют место Республики Беларусь на мировом рынке IT-services. В связи с этим целью статьи является выявление современных тенденций развития международного рынка компьютерных и информационных услуг, а также определение конкурентных преимуществ и проблем Республики Беларусь в этой сфере, предложение путей их решения для динамичного развития сектора IT-services национальной экономики и роста валютных поступлений в национальную экономику от их экспорта.

2. Анализ современного рынка аутсорсинга информационных технологий в мировой экономике

В мировой практике зачастую термин «торговля IT-services» заменяют понятием «оффшоринг IT-services» (см. рис. 1):

РИСУНОК 1

Составные элементы понятия оффшоринга IT-services



[*International Trade in Services...*, с. 221].

Согласно данным Всемирного Банка две трети всего международного рынка оффшоринга имеет отношение к IT-сфере. Оставшаяся треть относится к оффшорингу всех остальных производственных процессов (рис. 2). При этом, тенденция к оффшорингу будет только усиливаться как географически, так и по различным секторам экономики, а также распространяться на все новые бизнес-функции [Ковалев, С.21-25].

РИСУНОК 2

Мировой рынок оффшоринговых услуг, 2004-2009 (в млрд долл. США)



International Trade in Services..., 2010

Следует отметить, что экономический кризис положительно повлиял на оффшоринг – ИТ услуг: даже в 2009 количество услуг продолжило расти, хотя и в медленном темпе. Таким способом компании пытались получить конкурентные преимущества, снижая издержки. Как видно из рисунка 2, в целом, за пять лет этот сектор вырос почти в три раза. Правда, данный график не отражает международный аутсорсинг, происходящий между развитыми странами, поэтому он недооценивает полную стоимость оффшоринга ИТ-услуг в мире.

В 2010 г. объем мирового экспорта услуг составил 3695 млрд долл. США. На долю экспорта компьютерных и информационных услуг пришлось 5,82% мирового экспорта услуг, т.е. 215 млрд USD по статистике ВТО [*International Trade Statistics...*, 2011]. Согласно таблице 1, мировой экспорт ИТ-услуг вырос в 2010 г. на 13% по сравнению с 2009 г., причем наибольший прирост экспорта ИТ-услуг в общем объеме экспорта всех стран мира приходится на страны Азии (33%), Южной и Центральной Америки (29%), СНГ (13%). Это свидетельствует о том, что на международном рынке ИТ-услуг важную роль играют развивающиеся страны (см. табл. 1).

ТАБЛИЦА 1

Главные мировые экспортеры ИТ – services, 2010 год, млн долл. США

Место	Экспортеры	Объем экспорта	Доля в 10 экономиках	Годовое процентное изменение
1	ЕС (27)	107226	58,5	4
2	Индия	...	19,2	...
3	США	13830	7,6	3
4	Израиль	7700	4,4	0
5	Китай	9256	3,7	42
6	Канада	4893	2,4	16
7	Норвегия	2192	1,5	-16
8	Филиппины	2151	1,0	23
9	Сингапур	1788	0,9	13
10	Малайзия	...	0,8	...
	Итого по 10:	...	100,0	-

Источник – ВТО, International trade statistics 2011.

Необходимо отметить, что официальные источники данных – такие как МВФ или ВТО – широко критикуются и считаются недостоверными, так как, по мнению многих исследователей, реальные размеры рынка значительно их превосходят. Например, по мнению некоторых экономистов, в 2010 году мировой рынок ИТ-услуг составил от 220 до 270 млрд долл. США. Так же там делается прогноз, что в последующие пять лет рынок будет расти в среднем на 6-9% в год [13]. Но между тем, нельзя полностью пренебрегать статистикой ВТО, ввиду того, что это самые полные официальные данные авторитетной международной организации. Глядя на представленные данные, можно

сделать два главных вывода: в списке лишь половина стран относится к развитым странам: ЕС, США, Израиль, Канада, Норвегия. И второе: среди остальных только Индия занимает значительную долю (19,2%) на мировом рынке. Оба явления свидетельствуют о том, что в мировой торговле ИТ-услугами все большее значение начинают играть развивающиеся страны. А наибольших успехов в этой области добилась Индия (с 2006 г. доля Индии увеличилась с 18,5% до 21,9% в 2008 г., несколько снизившись в 2010 г. до 19,2%) [*International Trade Statistics 2011...*].

В таблице 2 представлены 10 крупнейших мировых импортеров:

ТАБЛИЦА 2

Главные мировые импортеры ИТ-services, 2010 год, млн долл. США

Место	Импортеры	Объем импорта	Доля в 10 экономиках	Годовое процентное изменение
1	ЕС (27)	52132	58,8	1
2	США	19032	19,6	11
3	Япония	3575	4,3	-5
4	Китай	2965	3,7	-8
5	Бразилия	3505	3,2	25
6	Канада	2904	3,1	8
7	Индия	2531	2,6	12
8	Норвегия	1691	1,8	8
9	Россия	1884	1,6	32
10	Австралия	1460	1,4	18
	Итого по 10:	91679	100,0	-

Источник – WTO, International trade statistics 2011.

Как видно из таблицы 2, первые 3 места в импорте занимают развитые страны, что еще раз подтверждает утверждение, что поток ИТ-услуг преимущественно направлен из развивающихся в развитые страны. В 2010 г. к списку основных импортеров добавился Китай, развитие, модернизация и рост экономики которого приводят к потребности в ИТ-услугах. В списке импортеров также присутствуют Индия и Россия. Однако их доли составляют 1-2% в мировом импорте ИТ-услуг, следовательно, на их примере нельзя говорить о каких-то очевидных тенденциях в данной сфере.

Торговля ИТ-услугами представляет интерес для развивающихся экономик по ряду причин:

1. Сектор ИТ-услуг активно использует человеческий капитал, но не особенно нуждается в физическом капитале. Поэтому экспортноориентированный сектор ИТ-услуг может с легкостью процветать в стране, которая в состоянии предоставить хорошее техническое образование, но ограничена в инфраструктуре.

2. Возможность широкого доступа к информации и коммуникационным сетям, а также недорогие технические решения для осуществления он-лайн сотрудничества и связи позволяют компаниям, предоставляющим ИТ-услуги, соперничать за бизнес-предложения вне зависимости от их географического расположения.
3. Отечественный динамично развивающийся рынок, хоть и может быть полезен, не является обязательным условием успеха. Это подтверждает и индийский опыт: рынок ИТ-услуг может быть создан и может преуспевать и без значительного внутреннего спроса. Компании, обладающие специалистами должного уровня, могут существовать исключительно за счет иностранного спроса.
4. Программное обеспечение включает в себя большое разнообразие продуктов и технологий, а также создается с использованием всевозможных технических приемов, которые включают в себя языки программирования, скриптовые языки и наборы микрокоманд. Как следствие, рынок ИТ-услуг состоит из многочисленных подсекторов и рыночных ниш, которые ИТ-компании из развивающихся стран могут без проблем занять.
5. Международный спрос на ИТ-услуги постоянно растет. В то время как большинство компаний, входящих в список Fortune 500, уже давно приобретают ИТ-услуги в развивающихся странах, средние и малые компании, а также большие фирмы из неанглоязычных стран (и членов ОЭСР, и развивающихся стран), только начинают внедрять эту практику у себя [*International Trade in Services ... 2011, С. 323*].

Нельзя не упомянуть и о том, что развитый ИТ-сектор производит значительный положительный сопутствующий эффект, который приводит к выигрышу внутренней экономики. Достаточно часто происходит так, что развитие этого сектора приводит к распространению информационных технологий в другие сектора экономики. Что в свою очередь способствует повышению производительности, внедрению бизнес-инноваций и, следовательно, интенсивному экономическому росту.

Не удивительно, что к этому процессу подключается все больше развивающихся стран. При этом, это как большие страны с многочисленным населением, такие как Бразилия, Китай, Египет, Вьетнам, так и малые, например, Сингапур и Малайзия [*International Trade Statistics 2011*].

Развитию международной торговли ИТ-услугами способствует и то, что в этой сфере пока существует мало барьеров, имеющих политическую подоплеку. Необходимо также отметить, что это один из самых открытых секторов для международной торговли [*International Trade in Services...2011, р. 221*].

Спрос на импорт ИТ-услуг подогревается растущей конкуренцией на зреющих и развивающихся внутренних рынках, которая вынуждает компании повышать производительность и снижать издержки в ИТ-сфере. Оффшоринг предлагает значительную экономию в расходах за счет разницы в затратах на рабочую силу и экономии масштаба. Но иногда решающим фактором являются новые, более гибкие услуги, а зачастую и лучшего качества – за счет того, что аутсорсинг позволяет компаниям концентрироваться на том, что они

делают лучше всего. Плюс, за счет экономии, он высвобождает часть денежных средств, которые инвестируются в научные исследования и опытно-конструкторские разработки, и налаживание более эффективной деятельности.

Предложение, в свою очередь, подогревается многими развивающимися странами, которые вложили большие средства в образование и сейчас в состоянии предложить множество молодых, мотивированных, и сведущих в технике специалистов. Развитию оффшоринга способствовала и экономическая интеграция – особенно благодаря либерализации прямых иностранных инвестиций – а также благодаря диаспорам. Например, китайские или индийские специалисты, которые работали в качестве временных или постоянных мигрантов в США, при возвращении в свою страну привезли с собой лучшую практику, реинвестировали в экономику Индии или Китая, и тем самым поспособствовали привлечению американских инвестиций в отечественный IT-сектор. Другой случай: некоторые страны выбрали определенную рыночную нишу и извлекли выгоду от местного производства, связанного с информационными технологиями. Например, Израиль построил передовой и сложный сектор IT-услуг благодаря национальной оборонной промышленности [*International Trade Statistics 2011...*, p. 225].

Однако, несмотря на большой спрос, далеко не все развивающиеся страны обладают способностью его удовлетворить. Это объясняется как количественными, так и качественными показателями человеческих ресурсов, а также неспособностью местных компаний создать значительный по размерам рынок IT-услуг за короткий или средний промежуток времени. Даже Китай и восточноевропейские страны, которые достаточно хорошо наделены инженерами сталкиваются с серьезной нехваткой менеджеров, обладающих опытом работы в схожем производстве, которые бы могли руководить комплексным процессом доставки и быть вовлеченными в клиентоориентированные операции. Большинство стран с динамично развивающимися IT-секторами, включая Индию, вынуждены бороться с естественным сокращением кадров и ростом заработной платы из-за ограниченного числа квалифицированных и опытных работников [*International Trade in Services...2011*, p. 226].

Некоторые консалтинговые компании составляют рейтинги привлекательности стран как мест расположения оффшоринговых услуг. К таким рейтингам относится A.T. Kearney's Global Services Location Index – это ранжирование 50 стран мира по уровню привлекательности для аутсорсинга в области IT, которое публикуется два раза в год.

Топ-15 стран согласно рейтингу 2011 года представлены в таблице 3.

Республика Беларусь никогда не попадала в Топ-50, однако все наши соседи постоянно включаются в этот список: Россия располагается на 20 месте, Украина – на 38, Польша – на 24, Литва – на 14. Стоит также отметить, что в то время, как Индия уже несколько лет остается неизменным лидером этого рейтинга по общей сумме баллов за все факторы, Вьетнам получил больше всего очков за финансовую привлекательность, Сингапур постоянно лидирует в категории бизнес-среды, а США – в профессиональном уровне и количестве работников [Kearney, 2011].

ТАБЛИЦА 3

Рейтинг А.Т. Kearney's, ранжирующий страны по уровню привлекательности для аутсорсинга в области ИТ

Место	Страна	Финансовая привлекательность	Профессиональный уровень и количество работников	Бизнес-среда	Сумма баллов
1	Индия	3,11	2,76	1,14	7,01
2	Китай	2,62	2,55	1,31	6,49
3	Малайзия	2,78	1,38	1,83	5,99
4	Египет	3,10	1,36	1,35	5,81
5	Индонезия	3,24	1,53	1,01	5,78
6	Мексика	2,68	1,60	1,44	5,72
7	Таиланд	3,05	1,38	1,29	5,72
8	Вьетнам	3,27	1,19	1,24	5,69
9	Филиппины	3,18	1,31	1,16	5,65
10	Чили	2,44	1,27	1,82	5,52
11	Эстония	2,31	0,95	2,24	5,51
12	Бразилия	2,02	2,07	1,38	5,48
13	Латвия	2,56	0,93	1,96	5,46
14	Литва	2,48	0,93	2,02	5,43
15	ОАЭ	2,41	0,94	2,05	5,41

Источник – [Kearney, 2011].

Однако важными являются не только экономические, но и технические показатели развития страны, особенно показатели, связанные с Интернетом. Одним из источников такой информации может служить Information and Communication Technology Performance Indicator, рассчитываемый и публикуемый Международным Союзом Электросвязи, одной из самых авторитетных организаций по стандартизации в области телекоммуникаций.

Стоимость месячного подключения превосходит отметку в 100 долларов по ППС в 39 из 171 стран. В Китае, Египте, Индии, России, на Филиппинах, в Сингапуре и Тайване оно стоит меньше 24 долларов. Само собой разумеется, что нереально высокие цены не позволят развиваться экспортноориентированному сектору ИТ-услуг, а их достаточно низкий уровень, наоборот, может оказать положительное воздействие, что и демонстрирует опыт Индии, где наблюдаются самые низкие цены в мире [Information..., 2012].

При этом все остальные показатели имеют не меньшее значение, особенно скорость и надежность подключения. Доступность по всей стране играет также большую роль, потому что в мире достаточно много стран, в которых хорошие показатели есть только в столице и нескольких урбанизированных зонах.

Однако недостатки, выявленные как в рейтинге А.Т. Kearney's, так и Международным союзом электросвязи, а это помимо всего прочего и недостаточное

электроснабжение, отсутствие повсеместного широкополосного интернета, проблемы с недвижимостью, слабость местной бизнес-среды как следствие обременительных ограничений, – могут быть преодолены. Решение, используемое в большинстве стран, – это парки высоких технологий. Экспортноориентированные предприятия IT-сектора могут пользоваться там удобной, подстроенной под их нужды, инфраструктурой и модернизированным управлением. Они также помогают избегать волокиты и бюрократизма, которая зачастую процветает в стране за пределами парка. Этот опыт оказался удачным в Китае, Египте, Индии и на Филиппинах [*International Trade in Services...*, 2011, p. 235].

3. Торговля IT-services Республики Беларусь

Экспорт IT-услуг Республики Беларусь непрерывно растет уже в течение многих лет, что видно из таблицы 4. За одиннадцать лет он вырос более чем в 52 раза, что, безусловно, является выдающимся результатом не только в рамках отечественной экономики, но даже в мировых масштабах. Следует также отметить, что неизменно возрастала их доля и в общем объеме экспорта: с 2000 до 2011 гг. она увеличилась с 0,53% до 5,3% – то есть в 10 раз (см. табл. 4).

ТАБЛИЦА 4

Экспорт компьютерных и информационных услуг в 2000-2011 гг., млн долл. США

Статья \ Год	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011
Экспорт услуг	993,3	1142,3	1340,8	1499,9	1749,6	2060,7	2401,1	3248,4	4260,4	3490,4	4478,2	5260,9
Экспорт компьютерных и информационных услуг	5,3	6,7	12,3	17,4	17,5	26,4	49,4	95,5	154,7	159,1	221,4	279,1
Импорт компьютерных и информационных услуг	-4,5	-5,8	-9,6	-7,0	-11,3	-12,3	-15,8	-17,1	-35,4	-42,3	-37,0	-51,0
Доля экспорта компьютерных и информационных услуг в структуре экспорта услуг, %	0,53	0,59	0,92	1,16	1,00	1,28	2,06	2,93	3,63	4,54	4,92	5,3

Источник: Платежный баланс Республики Беларусь, 2000-2011 гг.

В 2010 г. компьютерные услуги заняли третье место в платежном балансе в общем списке экспорта услуг, уступив только транспортным услугам

и поездкам. А если анализировать сальдо по торговле услугами, то здесь они и вовсе вышли на второе место (первое заняли транспортные услуги) [*Платежный баланс*, 2012]. В 2011 г. данная положительная тенденция продолжала сохраняться. Так, в 2011 г. по данным платежного баланса Республики Беларусь темпы роста компьютерных и информационных услуг составили 125,2%, а положительное сальдо по данной группе выросло в 1,3 раза по сравнению с аналогичным периодом прошлого года.

Одна из ведущих мировых аналитических и консалтинговых компаний, специализирующихся на рынках ИТ, – Gartner – выделяет 45 стран, которые в той или иной степени привлекательны для ИТ-аутсорсинга. 30 стран входят в группу, которая называется «Лидер и его основные конкуренты». При этом еще выделяются 15 быстрорастущих стран, которые, по словам Gartner, едва уступают первым 30. Во второй группе находится и Беларусь. Прогноз для нашей страны положительный: у нас есть все шансы переместиться вверх [*Gartner Says Worldwide...*, 2009].

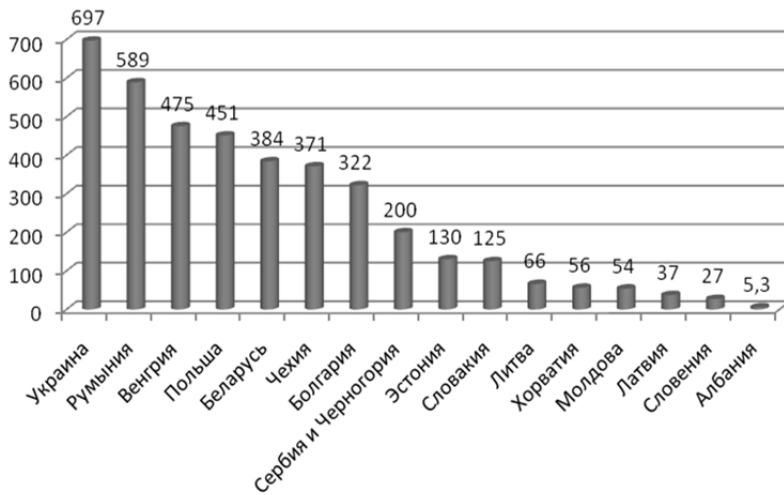
Доля Республики Беларусь в мировом экспорте ИТ-услуг составляет на данный момент 0,1%. По данным отраслевой организации «Руссофт», объем услуг оффшорного программирования Республики Беларусь в пересчете на душу населения вдвое превышает российский и втрое – украинский. Большинство крупных ИТ-компаний в нашей стране ориентировано на экспорт своих услуг [*Платежный баланс*, 2012]. По оценке белорусских экспертов, на рынке Республики Беларусь более 250 организаций в настоящее время оказывают услуги в области информационных технологий, в том числе около 80% – в области экспортно-ориентированного программирования. Среди них 5 являются лидерами рынка с численностью более 300 человек, а две – более 1500. Количество ИТ-специалистов на рынке экспортно-ориентированного программирования страны оценивается в 12-15 тысяч человек [Ковалев, 2010].

На основе данных «Central and Eastern Europe Outsourcing Review 2010» европейской аутсорсинговой ассоциации, Республика Беларусь является одним из лидеров в ИТ-сфере среди стран Центральной и Восточной Европы [*Central and Eastern Europe...*, 2010]. Общий объем экспорта ИТ-услуг в 2009 г. равнялся 4 млрд долл США. Объем рынка ИТ-услуг Республики Беларусь составлял 384 млн долл США. Это в 1,8 раза меньше объема рынка несомненного лидера в этом регионе – Украины, но во много раз превышает объемы рынков других стран Центральной и Восточной Европы (см. рисунок 3).

Согласно данным «Central and Eastern Europe Outsourcing Review 2010», поставщики ИТ-услуг Центральной и Восточной Европы успешно преодолели последствия кризиса 2008 г. и вернулись к прежним траекториям роста, благодаря увеличивающемуся спросу на ИТ-услуги. В начале 2009 г. падение ставок заработной платы специалистов в сфере информационных технологий было приостановлено. Во второй половине 2009 г. темпы роста возобновились впервые после мирового финансово-экономического кризиса. Основной причиной увеличения темпов роста заработной платы в ИТ-сфере является рост спроса на услуги аутсорсинга информационных технологий.

РИСУНОК 3

**Емкость рынка ИТ-аутсорсинга стран Центральной
и Восточной Европы, млн долл США**



Central and Eastern Europe, 2010, p. 8.

ТАБЛИЦА 5

**Средняя ставка заработной платы в ИТ-сфере в странах
Центральной и Восточной Европы, долл США/час**

Страна	Средняя ставка з/п (долл США/час)
Словения	32,58
Польша	31,29
Венгрия	30,95
Чехия	30,17
Эстония	30,00
Словакия	28,06
Литва	27,81
Латвия	27,25
Румыния	26,76
Украина	24,24
Сербия и Черногория	24,06
Хорватия	24,01
Беларусь	22,95
Болгария	22,87
Молдова	20,10
Албания	18,00

Источник: [*Central and Eastern Europe...*, 2010, p. 37].

Тем не менее, средняя ставка заработной платы (долл США/час) белорусского IT-специалиста гораздо ниже в сравнении с остальными странами-лидерами региона. Из таблицы 5 видно, что по показателю заработной платы Республика Беларусь находится в самом конце списка. В связи с этим возникает проблема эмиграции высококвалифицированных программистов из Республики Беларусь в другие страны с более высоким уровнем оплаты труда.

4. Современные тенденции в сфере аутсорсинга информационных технологий в странах Центральной и Восточной Европы

Европейской аутсорсинговой ассоциацией было проведено исследование, направленное на выявление современных тенденций в сфере аутсорсинга информационных технологий в странах Центральной и Восточной Европы, в том числе в Республике Беларусь. Данные о преобладающих тенденциях основаны на результатах онлайн-опроса. Оценки были сделаны на основе 220 ответов. При определении тенденций, опрошенные выбрали произвольное количество элементов из вариантов, предложенных в электронной форме опроса. Исходя из результатов (рисунок 4), основными тенденциями развития аутсорсинга информационных технологий в странах Центральной и Восточной Европы являются рост экспорта IT-услуг, внедрение систем управления качеством и увеличение государственной поддержки развития IT-сферы.

Национальная стратегия устойчивого социально-экономического развития Республики Беларусь на период до 2020 года предусматривает, что развитие информационного общества является одним из национальных приоритетов страны. При этом информационно-коммуникационным технологиям отводится роль необходимого инструмента социально-экономического прогресса, одного из ключевых факторов инновационного развития экономики.

В контексте данной стратегии приняты две программы, регулирующие направления развития сектора IT-услуг: Стратегия развития информационного общества до 2015 г. и Национальная программа ускоренного развития услуг в сфере информационно-коммуникационных технологий на 2011-2015 гг. [*Национальная программа...*, 2012]. Кроме того, IT-сектор Беларуси получил серьезную государственную поддержку, когда в 2005 г. Президент Республики Беларусь А.Г. Лукашенко подписал Декрет № 12 «О Парке высоких технологий», созданном с целью формирования благоприятных условий для разработки в Республике Беларусь программного обеспечения, информационно-коммуникационных технологий, направленных на повышение конкурентоспособности национальной экономики. Парк высоких технологий (ПВТ) наделен правом предоставления налоговых льгот на систематической основе. В отличие от большинства европейских и азиатских Парков, ПВТ Беларуси – виртуальный Парк. Это означает, что правовой режим ПВТ действует на всей территории Республики Беларусь. Здесь можно зарегистрироваться в качестве резидента и использовать все преимущества ПВТ независимо от того, где размещается офис белорусской компании: от областного центра до неболь-

шого населенного пункта. Это позволяет в полной мере использовать образовательный, научно-исследовательский, профессиональный и инфраструктурный потенциал всей страны. Заказчиками Парка высоких технологий являются компании из 50 стран мира. 80% производимого в ПВТ программного обеспечения идет на экспорт, причем 45% поставляется в США и Канаду, 30% – в страны Европы, 20% – в Россию и страны СНГ [What is HTP?...2012].

РИСУНОК 4

Современные тенденции развития аутсорсинга информационных технологий в странах ЦВЕ (на основе данных онлайн-опроса)



Central and Eastern Europe, 2010, p. 44.

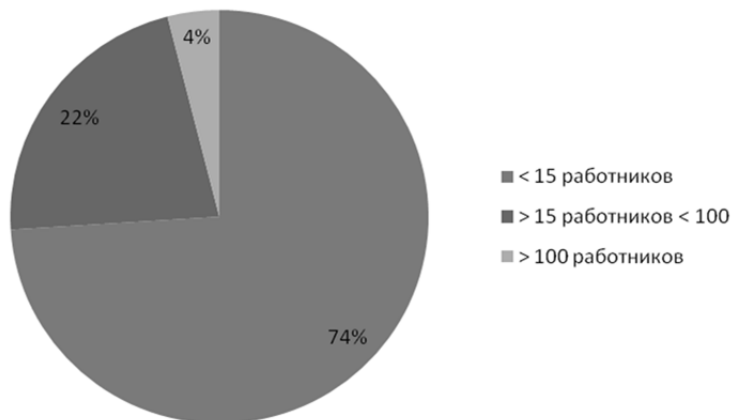
По данным одного из крупнейших ИТ-изданий «Global Services», в 2011 г. шесть компаний-резидентов ПВТ Беларуси вошли в сотню лучших мировых поставщиков ИТ-услуг. В престижный рейтинг попали «EPAM Systems», «IT park», «IBA-Gomel» (Группа IBA), «Itransition», «Exigen Services», «Intetics». В процентном отношении в рейтинге большинство компаний из США и Канады – 37%, из Индии – 33%, из Европы и Латинской Америки – по 9%, из Китая – 6%, из других стран Азии – 5%. Республика Беларусь вошла в двадцатку стран-лидеров аутсорсинга, заняв 13-е место в 2011 г. [Беларусь..., 2012].

Основное преимущество, которое имеет белорусская отрасль информационных технологий, отличающее ее от большинства конкурентов, является потенциал ее ведущих аутсорсинговых компаний и условия их развития. С населением 9,5 млн. человек, Беларусь является страной, в которой расположены наиболее крупные и устоявшиеся европейские поставщики ИТ-услуг. Пять крупнейших ИТ-аутсорсеров имеют возраст 10 лет, что значительно превышает средний показатель для частного бизнеса в Беларуси. Две основные компании – «ЕРАМ Systems» и «IWA Group» – имеют 1200 и 1500 сотрудников в Беларуси соответственно, тогда как следующий аутсорсер региона – «Luxoft» из России – имеет около 850 сотрудников. Кроме того, ведущая компания, резидент и основатель ПВТ – «ЕРАМ Systems» имеет представительства в 31 стране, объем годовых продаж, превышающий 160 млн долл. США. Белорусский центр ЕРАМ по разработке программного обеспечения имеет сертификацию уровня 4 в соответствии с моделью зрелости процессов, а также сертификацию в соответствии с ISO 9001:2000 [Всмирный банк... 2012].

Однако ограниченный внутренний спрос на ИТ-специалистов и на ИТ-услуги можно отметить как фактор, вызвавший раннюю ориентацию на оффшорный аутсорсинг и высокую долю нового бизнеса. Именно поэтому в общем объеме ИТ-рынка Беларуси доля по-настоящему солидных компаний очень мала – около 4%. При этом количество мелких ИТ-компаний с количеством работающих до 15 человек является преобладающим – 74% (рисунок 5).

РИСУНОК 5

Распределение ИТ-компаний в Минске



Всмирный банк... 2012.

Необходимо также отметить, что общий рынок для компаний белорусской отрасли информационных технологий можно разделить на два основных сегмента. Во-первых, это западный рынок, где компании в основном предо-

ставляют базовые аутсорсинговые ИТ-услуги. Во-вторых, местный белорусский рынок и страны СНГ, на который ИТ-компании все чаще пытаются войти с собственной ИТ-продукцией и решениями. Объем передачи знаний через аутсорсинг на западных рынках является минимальным и недостаточным для развития навыков, необходимых для выхода на уровень ИТ-рынка с более высокой добавленной стоимостью. С другой стороны, существуют определенные возможности развития в странах СНГ, особенно в Казахстане и Азербайджане с богатой нефтегазовой промышленностью. Российский рынок, несмотря на свою привлекательность, защищен и поэтому вход для него затруднен для белорусских ИТ-компаний. Местный белорусский рынок является небольшим, спрос не развит из-за низкого уровня менеджмента и неготовности компаний инвестировать в информационные технологии. В то же время эксперты Всемирного Банка на основе опроса менеджеров компаний отмечают крайнюю необходимость развития местного спроса на ИТ-продукцию, а также дальнейшего повышения конкурентоспособности белорусской отрасли информационных технологий.

К конкурентным преимуществам Беларуси можно отнести следующее:

1. Высокий уровень профессиональной подготовки специалистов, а также их достаточное количество. В Беларуси действует 55 университетов, которые ежегодно выпускают около 16000 молодых специалистов в сфере ИКТ.
2. Сравнительно более дешевая рабочая сила.
3. Выгодное географическое положение. В этом контексте следует также отметить, что в каждой стране на выбор направления экспорта оказывают влияние уже существующие социальные и экономические связи. Например, китайский ИТ-сектор экспортирует услуги, как правило, в Японию, чешский – в страны ЕС, мавританский – во Францию, Филиппины ориентированы на рынок США, а индийские фирмы экспортируют свои услуги в Соединенное Королевство и США.
4. Представительство крупнейших компаний в отрасли.
5. Государство активно поддерживает сектор ИТ-услуг в Беларуси.

5. Заключение

Анализ сектора информационных и коммуникационных технологий (ИКТ) Всемирным Банком за 2010 год в Беларуси, впрочем, выявил ряд недостатков сектора ИТ-услуг. Несмотря на положительную оценку, он высказывает определенные опасения, касающиеся будущего сектора. В первую очередь отмечается чувство напряженности и неуверенности частного капитала. Во-вторых, негативным фактором является отсутствие венчурного капитала. Хотя и существует несколько интересных инициатив в этой области: например, проводимые в Минске стартап-уикенды. Но нельзя сказать, что они принесли значительный успех, так как носит разовый характер. В-третьих, широко критикуется правовая защита частной собственности в Беларуси. В частности, отмечается, что 80% используемого в Беларуси программного обеспечения

является нелицензионным. Негативным фактором является полное отсутствие внутреннего спроса, так как он не стимулирует и не поддерживает изменений в ассортименте продукции сектора в сторону инновации собственной продукции и решений.

Для дальнейшего развития отрасли специалистами Всемирного Банка предлагается шесть инициатив: развитие навыков (подготовка квалифицированных кадров), развитие предпринимательских навыков (внедрение предпринимательских стратегий в IT-сферу), доступ к венчурному капиталу, развитие местного спроса, продолжение совершенствования технологической инфраструктуры мирового уровня, брендинг белорусского IT-кластера.

По прогнозам аналитиков Gartner сектор IT-услуг Республики Беларусь будет расти благодаря увеличению спроса, как со стороны государственных организаций, так и частных лиц. Темпы его роста, как минимум, на 6 процентных пунктов превысят положительную динамику национальной экономики.

Таким образом, будущее этой отрасли в Беларуси видится достаточно позитивным – для этого у нас есть все предпосылки. Но еще предстоит проделать большую работу, так как сложившиеся условия для ведения бизнеса в сфере IT-услуг еще не являются совершенными, а также не реализованы все сравнительные преимущества, существующие в стране. Развитие сферы услуг Республики Беларусь, в том числе экспортно-ориентированного программирования, представляется весьма актуальным в настоящее время, как с точки зрения увеличения валютных поступлений в национальную экономику, когда эффект от проведенной девальвации национальной валюты в 2011 г. постепенно будет нивелирован, так и с точки зрения формирования «новой» экономики, в которой информационные технологии выступают двигателем прогресса, поднимая общий уровень экономического развития и содействуя распространению знаний во все сферы общества.

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Dorota WYSZKOWSKA¹

REGIONAL DIVERGENCE IN POLAND AS COMPARED WITH SELECTED EUROPEAN COUNTRIES

SUMMARY

Internal disparities are a characteristic feature of modern economies. The existing considerable developmental differences among regions or states hamper co-operation and lead to social tensions. Therefore, for many years efforts have been undertaken to accelerate the convergence of regional and national economies. Since the 1990s, these efforts have been supported by the European Union's cohesion policy.

The purpose of this paper is to explore the degree of inter-regional disparity in Poland in comparison with other EU countries. It is this degree that determines current cohesion policy and the eligibility for non-repayable financial aid from the EU.

Key words: NUTS II region, Cohesion Policy, regional convergence

1. Introduction

The European Union is one of the world's wealthiest regions. And yet, serious disproportions as regards economic development and living standards can be observed within the EU. The wealthiest country, Luxembourg, is seven times richer than Romania or Bulgaria, the poorest and the newest EU members. When one compares particular regions of the Union, the disparities become even more apparent.

The European Union is aware of the problem and takes steps to counteract the disparities and their implications through the implementation of European cohesion policy. The primary objective of cohesion policy is to assist the harmonious development of the entire Union, including all the regions, and to reduce the disparities in development levels across the EU's regions (Article 174 of the Treaty on the Functioning of the European Union). The undertaken activities aim at the strengthening of economic, social and territorial cohesion of the Union. Particular support is offered to the least developed, underprivileged regions (agricultural, peripheral, under populated).

In the 2007-2013 agenda, cohesion policy has gained even more importance, which is reflected in the amount of budget resources allocated for its implementa-

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tion. For the first time in the EU's history, the cohesion resources have exceeded one third of the total budget, leaving behind Common Agricultural Policy.

The greater emphasis on the EU's territorial agenda results from the inadequate effects of the efforts to promote the external and internal convergence of Europe. The European Commission evaluates the efficiency of convergence policy on the basis of cohesion reports *published periodically by Eurostat*. The latest of those reports, published in 2010, indicates that there is an urgent need to support and co-ordinate efforts towards the harmonious development of all regions of the European Union.

Excessive disparities make co-operation difficult and contribute to social unrest. Therefore, nearly all the member states strive to reduce regional inequality. This is especially true about the less well-off countries, such as Poland. For this reason, it is a strategic aim of our regional policy to stimulate the endogenous factors of growth by boosting the competitive capacity of particular voivodeships, and of Poland as a whole, as well as by actively *working towards convergence*.²

In view of the above, the purpose of this paper is to demonstrate the extent of regional disparities in Poland against those that can be observed in other countries of the European Union. Bearing in mind that the proposed way of presenting regional comparisons (regions with highest and lowest indicators in a given category) does not fully reflect the developmental disproportions, this article should be regarded as a contribution to the discussion on European cohesion.³ This is of particular significance now that the new financial framework for cohesion policy, as well as the Union's development priorities for the next seven years are to be discussed soon.

The present comparison of convergence performance of the analysed countries uses statistical data obtained from Polish (Main Statistical Office) and European (Eurostat) sources. The analysis comprises both economic and social data. The selection of data was mainly based on data availability on a regional level.

2. Poland as compared with other EU countries – benchmark selection criteria

Before analysing regional disparities, the definition of *region* must be specified. This paper will adopt the NUTS nomenclature, used by the EU for cohesion policy purposes since 1988. In Poland, a voivodeship corresponds to a NUTS II unit.

When selecting countries for comparison of degrees of economic convergence on a regional level, basic information on particular EU states should be taken into account. Table 1 contains data concerning the area, population, GDP per capita, public debt and capital accumulation in relation to GDP, for each included country.

² Ministry of Regional Development, *Identyfikacja i delimitacja obszarów problemowych i strategicznej interwencji w Polsce*, Warszawa 2009, p. 18.

³ The mode of presentation adopted for this paper has numerous weaknesses resulting from the size and importance of regions on the extreme ends of the scale, or from the fact that capital cities usually have far better indicators of socio-economic development. Because of these simplifications, the picture presented here should be regarded as merely a preliminary attempt to present the level of divergence. A more precise assessment of regional disparities would require application of statistical dispersion measures, e.g. standard deviations or differences between extreme deciles.

TABLE 1.

Basic information on EU member states

Specification	Area (in 1000 km ²)	Population (in 1000 ^a)	GDP per capita (in USD)		Share of public debt in GDP (in %)	Capital accumulation to GDP (in %)	
	2009	2009	2000	2009	2008	2000	2009
Poland	312.7	38135.9	4590	12190	47.1	24.8	20.4
Austria	83.9	8355.3	25840	46410	63.8	24.3	21.2
Belgium	30.5	10753.1	25400	45250	8.3	22.5	20.2
Bulgaria	111	7606.6	1640	6080	13.7	18.3	26.2
Cyprus	9.3	796.9	13440	30480	48.9	18.3	17.2
Czech Republic	78.9	10467.5	5800	17400	28.7	29.5	25.7
Denmark	43.1	5511.5	31850	58370	34.5	21.2	17.7
Estonia	45.2	1340.4	4220	14080	4.5	28.4	19.4
Finland	338.4	5326.3	25420	46670	33.9	20.9	18.3
France	544	64369.1	24350	42610	68.2	20.5	19
Germany	357.1	82002.4	25500	42410	66.7	21.8	16.5
Greece	132	11260.4	12560	28760	113	23.3	18.1
Hungary	93	10031.0	4700	13080	72.9	29.4	18.5
Ireland	70.2	4450.0	23200	44460	44.3	23.9	13.9
Italy	301.3	60045.1	20890	35130	105.8	20.7	18.9
Latvia	64.6	2261.3	3220	12390	19.8	23.7	20.4
Lithuania	65.3	3349.9	3200	11620	15.5	18.9	11
Luxembourg	2.6	493.5	43660	76890	13.7	23.2	15.9
Malta	0.3	413.6	10110	18430	62.2	26.2	12.2
Netherlands	41.5	16485.8	26580	48380	58.5	22	18.4
Portugal	92.1	10627.3	12070	21830	71.6	28.5	19.8
Romania	238.4	21498.6	1690	8320	13.4	19.4	25.1
Slovakia	49	5412.3	5370	16120	27.8	26	20.6
Slovenia	20.3	2032.4	11090	23820	21.9	27.3	23.5
Spain	506	45828.2	15420	32060	40.1	26.3	24.4
Sweden	450.3	9256.3	29500	48590	38.8	18.6	16.6
United Kingdom	243.1	61595.1	25910	41080	54.8	17.7	13.7

a as of 1st January 2012

Source: Eurostat – population, GUS (Main Statistical Office), *Rocznik Statystyczny Rzeczypospolitej Polskiej*, Warszawa 2010, The World Bank – PKB per capita, <http://data.worldbank.org/> 23.01.2012.

Bearing in mind that the degree of disparity can be, to a large extent, determined by the size of country (area and population), the following countries have been chosen for comparison purposes: Finland, France, Germany, Great Britain, Greece, Italy, Romania, Spain and Sweden, that is the largest member states of the Union. This is so because the size of a country determines the division into NUTS II units, which are to be compared. Six of the EU member states do not have such regions at all, and so they cannot be included in the present study⁴.

Besides, the Czech Republic and Hungary have been taken into account, as countries which have similar GDP per capita as Poland.

3. Regional economic disparities

As was already mentioned, regions differ from one another not only in terms of area or population, but also in terms of economic and social conditions. The observed differences regard natural resources, capital (including human capital), number and structure of enterprises, technical infrastructure. All these factors have an impact on the level of regional development, as well as on the indicators which determine living standards (to be discussed later). Regional disparities of selected relevant countries are presented in Table 2.

Data from Table 2 reveal considerable variations within particular categories. Compared with other countries, the variations observed in Poland are not so steep. The GDP per capita of Poland's richest region is slightly more than twice as high as that of the poorest region, whereas in Great Britain this ratio is nearly five-fold higher and in Romania it is four-fold higher (Chart 1). In France or in Spain, the best-performing regions generate more than one hundred times more gross value added than those with the lowest GVA. In Poland, this gap is far narrower – only ten-fold.

Nowadays, the condition and competitive capacity of regional economies is largely dependent on the R&D sector, which determines innovation success, accomplished as a result of commercialisation of research output. In this respect, Poland is among the most diversified countries in the EU. R&D expenditure in Mazowieckie Voivodeship is 23 times as high as that in Lubuskie Voivodeship. Only Great Britain, the Czech Republic and Finland exhibit greater discrepancies in this category. In Italy, the ratio is similar to that reported in Poland. As far as R&D employment is concerned (see Chart 2), the regional differences are much less pronounced.

⁴ Countries which do not have NUTS II regions include: Estonia, Cyprus, Latvia, Lithuania, Luxembourg and Malta.

TABLE 2.

Level of regional economic disparities in selected EU countries*

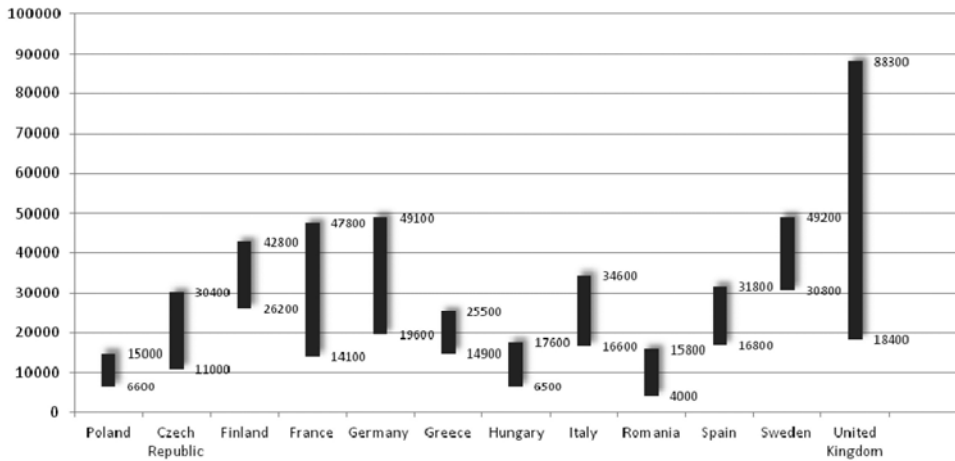
Specification	GDP per capita ^{a)}	Gross value added ^{a)}	R&D expenditure per inhabitant ^{a)}	Employment in R&D ^{b)}	Professional activity rate ^{b)}	Employment ratio ^{b)}	Unemployment rate ^{b)}
	2008	2008	2009	2009	2010	2010	2010
Poland	2.3	9.5	23.5	1.1	5.9	8.0	4.9
Czech Republic	2.8	3.0	26.1	4.2	6.0	9.0	7.4
Finland	1.6	90.6	23.6	3.6	9.0	9.7	7.0
France	3.4	177.5	19.7	.	16.8	16.2	22.7
Germany	2.5	14.4	14.7	3.6	7.9	10.0	9.6
Greece	1.7	28.9	.	.	8.5	8.5	6.5
Hungary	2.7	7.4	8.7	1.8	7.3	9.9	7.1
Italy	2.3	9.5	23.5	1.8	21.6	25.2	12.0
Romania	4.0	3.1	18.5	1.7	8.0	9.9	5.9
Spain	1.9	134.6	18.5	0.9	14.0	14.6	16.9
Sweden	1.6	7.8	6.8	2.3	7.6	8.8	3.1
United Kingdom	4.8	26.5	53.7	5.8	11.8	14.6	7.4

* The difference between best – and worst-performing regions in a given category. In the case of absolute values – maximum /minimum value, marked with ^{a)}, whereas in the case of relative values expressed in percent – maximum-minimum value, marked with ^{b)}.

Source: calculations based on Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2010.

CHART 1.

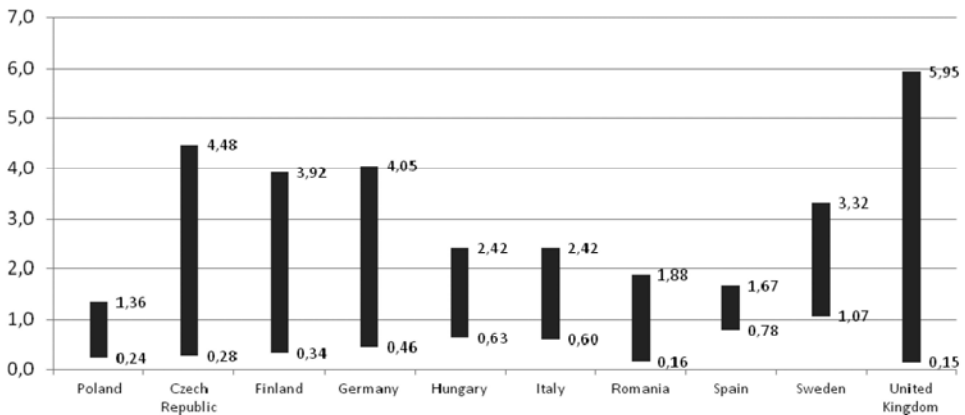
Regional GDP disparities in selected EU states in 2008 (in euros)



Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

CHART 2.

Disparities in R&D employment in selected EU states in 2009



* No data available for France and Greece

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

The level of R&D expenditure and employment is reflected in the number of applications to the European Patent Office. In 2008, the best results as regards the number of patents per million inhabitants were recorded in Germany, Sweden and

Finland. However, strong regional differences were observed in those countries. In Germany, the best-performing region produced 372.6 patents per million inhabitants, while the worst result was 24.6. The corresponding figures for Sweden were 196.1 and 19.8; for Finland – 145.9 and 18.4. The Polish statistics were modest: 8.9 and 0.2 respectively.

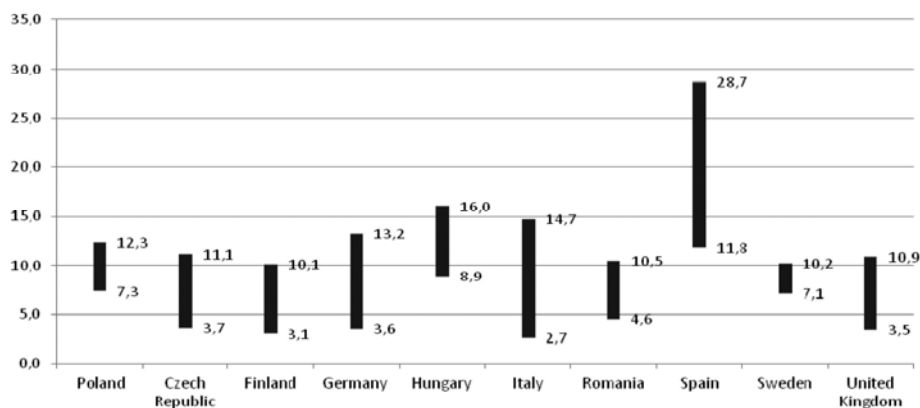
Due to unavailability of data, it is not possible to establish how R&D activity and the number of registered patents affect innovation performance. It can only be surmised that they are all interconnected and have a direct bearing on GDP per capita and gross value added.

The analysed countries also vary considerably in terms of labour market situation. In Poland, the employment disparity, measured by employment ratio, amounts to 8 percentage points, while for unemployment rate this disparity is as low as 5 percentage points. Meanwhile in Italy these indicators are 25.2 pp and 12 pp respectively, and in France – 16.2 pp and 22.7 pp respectively (Chart 3).

The above figures are, of course only part of the overall picture and do not suffice for a comprehensive analysis. They do, however, allow one to gain a general understanding of the magnitude of the disparities within countries. On this basis, it can be concluded that economic disproportions in Poland are relatively minor.

CHART 3.

Unemployment rate disparity (in %) in selected EU states in 2010



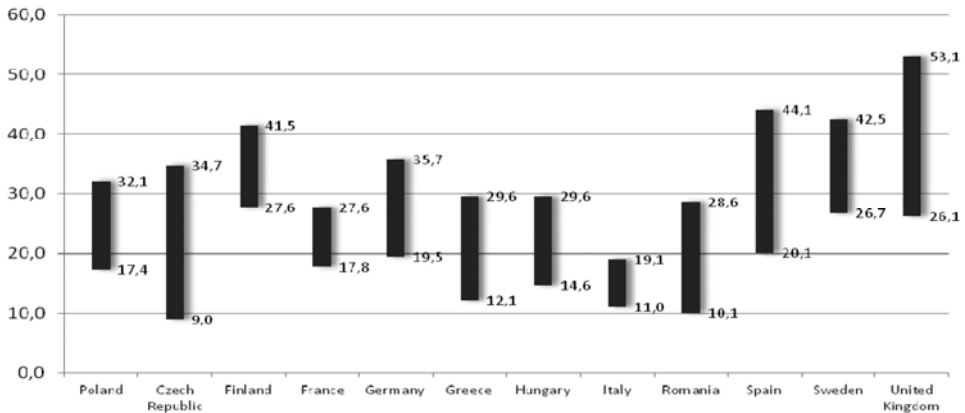
Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

4. Regional social disparities

The economic condition of a region affects the living standards of the population since it directly influences the quality of local social infrastructure, as well as income levels. On the other hand, it should be noticed that social factors can have a feedback effect on the economic growth, e.g. through the size of demand for goods and services.

CHART 4.

Share of persons with university degrees (in%) in total population aged 25-64 in selected EU countries in 2010



Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

A region's competitive capacity is largely determined by its human capital, whose quality can be measured by the percentage of persons with university degrees. Chart 4 illustrates the disparities in terms of education.

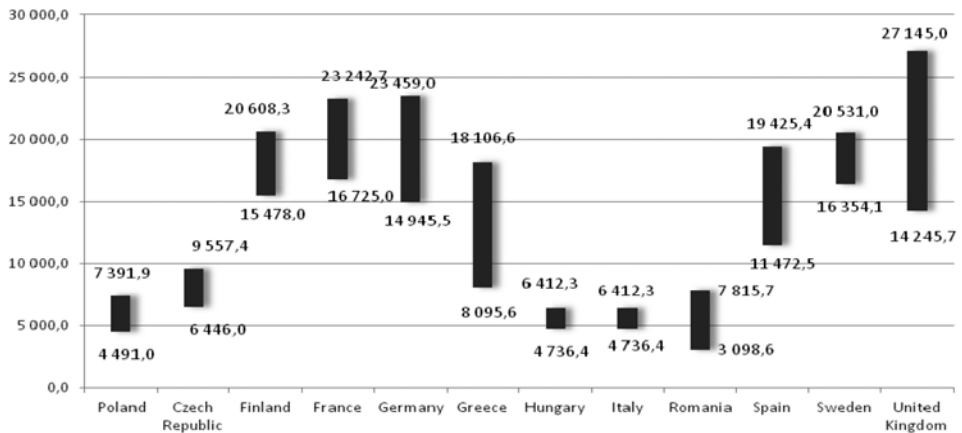
From the above data it is apparent that the most striking disparities as regards the number of university educated people can be observed in Great Britain, Czech Republic, Spain and France. Poland, where the maximum inter-regional difference is less than 15%, ranks at the bottom of the list.

Household income per person is another welfare indicator. Chart 5 shows regional disparities in this field. It is worth noting not only the inter-regional income gaps but also the substantial income inequalities among EU member states.

Among the analysed countries, Great Britain has the highest level of income, but also the largest income gaps. The richest regions generate twice as much income as the poorest ones. Wider income inequalities can be found only in Romania (2.5-fold difference) and Greece (2.2-fold difference). It should be remembered, however, that these two countries, alongside Poland, Hungary and the Czech Republic, rank lowest in terms of household income per person. In Poland, Mazowieckie Voivodeship generates 165% of the income of Podkarpackie Voivodeship, the most economically disadvantaged Polish region.

CHART 5.

**Household income disparities (in euros per person)
in selected EU countries in 2008**



Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

Additional data which reflect regional disparities in the social development are presented in Table 3.

It should be remembered that the disparities shown in Table 3 are heavily dependent on the analysed phenomenon. As regards household Internet access, smaller regional inequalities can be observed in those countries which have higher Internet access rates (with the exception of Great Britain). Finland and Sweden stand out in this category; even their worst-performing regions have higher Internet access indicators than Poland's leading Mazowieckie Voivodeship (Chart 6).

Other noteworthy data from Table 3 are those concerning accommodation capacity in lodging facilities, particularly in Greece and Spain. These differences stem from the nature of tourism industry in those countries, where certain regions, such as the south of Spain or Greek islands, are more attractive than others.

TABLE 3.

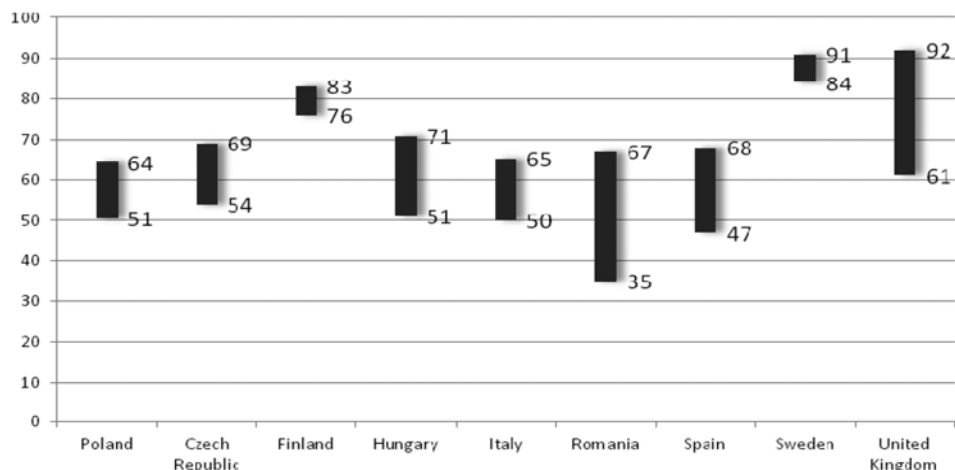
Regional social disparities in selected EU countries

Specification	Persons aged 25-64 and 20-24 with upper secondary or tertiary education attainment ^{b)}	Percentage of households with free-of-charge Internet access ^{b)}	Accommodation capacity of lodging facilities – number of bed places per 100,000 inhabitants ^{a)}	Hospital beds per 100,000 inhabitants ^{a)}	Number of doctors ^{a)}	Number of doctors per 100,000 inhabitants ^{a)}
	2010	2010	2010	2009	2009	2009
Poland	10.3	13.4 ^{c)}	8.4	2.12	7.2	1.7
Czech Republic	11.7	15	3.5	1.60	2.7	2.7
Finland	4.1	7	10.2	1.47	134.9	2.1
France	22.1	.	.	2.54	119.4	2.3
Germany	16.9	.	11.7	.	.	.
Greece	26.1	.	39.7	3.08	46.1	3.0
Hungary	12.0	20	3.2	1.22	5.7	2.2
Italy	20.9	15	12.7	1.55	76.1	3.1
Romania	18.2	32	8.5	1.94	2.5	3.7
Spain	31.7	21	35.9	.	55.6	2.7
Sweden	6.8	7	4.0	1.44	.	.
United Kingdom	15.8	31	37.2	2.35	6.9	1.7

*The difference between best- and worst-performing regions in a given category. In the case of absolute values – maximum /minimum value, marked with ^{a)}; in the case of relative values expressed in percent – maximum-minimum value, marked with ^{b)}. ^{c)} Households with computers connected to the Internet, GUS, *Budżety gospodarstw domowych w 2010r.*, Warszawa 2011.

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

CHART 6.
Household Internet access disparities (in %) in selected EU countries in 2010



* no available data for France, Greece and Germany.

Source: Eurostat, http://epp.eurostat.ec.europa.eu/portal/page/portal/region_cities/introduction 21.01.2012.

5. Conclusion

It is a common belief that Poland is strongly diversified territorially. However, a closer inspection of the differences between highest- and lowest-ranked regions reveals that the differences are relatively insignificant when compared with those observed in other EU member states. Considering the presented data, it is clear that the greatest disparities – both in economic and social spheres – can be observed in Great Britain. Also Spain, Italy, France and the Czech Republic are highly diversified in terms of regional development. Against this background, Poland's inter-regional disparities appear to be moderate. Importantly, however, the overall level of the analysed values is worryingly low, as compared with other countries. In some fields, the highest-ranked Polish regions are only slightly better, or even weaker, than the worst-performing regions in other countries. Nevertheless, before any conclusions are drawn about the Polish disparities presented in this paper, it should be remembered that the methods of presentation selected by the author contain important elements of simplification.

The problem of development inequalities is even more striking when smaller territorial units, e.g. NUTS III or NUTS IV (equivalent of Polish *powiaty*), are taken into account. In 2009, the GDP ratio between Poland's richest and poorest NUTS III regions stood at 5.5:1. In other EU countries, the situation is broadly similar.

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Grażyna MICHALCZUK¹

DISCLOSED INTANGIBLE ASSETS IN VALUE CREATION OF COMPANIES LISTED ON THE WARSAW STOCK EXCHANGE IN POLAND

SUMMARY

Intangible assets due to their immaterial form are a particular resource, and one of the most difficult areas the contemporary accounting is facing. Eligibility criteria adopted by regulations cause such a situation that most of them constitute “hidden intangible assets”. As a result, the recipients of information arising from financial statements can only observe these investments in intangible assets, which conceptually correspond to disclosed intangible assets.

The purpose of the paper is to present from the theoretical point of view a dual perception of the issue of intangible assets in accounting and what that entails the existence of the information gap in the area of financial reporting of intangible value generators, whereas, from the empirical point of view the conclusions were supported by the research results conducted on companies listed on the Warsaw Stock Exchange in the area of intangible value generators, in particular, the emphasis was placed on the examination of the level at which disclosed intangible assets create company value. The research covered the period 2009-2010 and the analysis was conducted using the GIFT™ methodology.

Key words: intangible assets, disclosed intangible assets, accounting, GIFT™ methodology

1. Introduction

In the current operating conditions of enterprises, intangible value creators become the base for the assessment of the level of companies’ development, the way of their management, as well as a major determinant of decision-making in all key areas of their activities. Such concentration of attention on intangible generators is determined by the fact that today the nature and pace of economic development is conditioned by knowledge. The issue of the importance of knowledge and its impact on economic development is not a new concept. But it was only in the concept of KBE where the importance of knowledge was emphasized as the main, endogenous growth factor, which can be extracted and developed in the process of learning. Intangible assets, such as patents, licenses, copyrights, know-how, organizational culture, IT resources, contacts with customers, customer lists, trademarks, organizational structures, knowledge and employees’ skills, are the result of the transfor-

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mation of knowledge, but also knowledge itself, which helps to generate future economic benefits. They represent significant potential of enterprises, determining their real value as a market partner and the ability to participate effectively in the market competition and to become successful in this field. It is indicated that the value generated by companies comes from intangible assets in between 50% and 90% [Guthrie, Petty, Yongvanich, Ricceri, pp. 282 – 293; Unni 2010, p. 62].

Intangible assets due to their immaterial form are a particular resource, and one of the most difficult problem areas the contemporary accounting is facing. Their essence and economic nature limits the possibility of presenting them in a comprehensive way as an asset. Eligibility criteria adopted by regulations cause such a situation that most of them constitute “hidden intangible assets”. Only a part of them fulfilling the definition criteria, is recognized as an asset and is presented in corporate financial reporting. This leads to the existence of the information gap in the reporting of intangible value generators. As a result, the recipients of information arising from financial statements do not have the full picture of intangible assets which are located in enterprises. They can only observe these investments in intangible assets which conceptually correspond to disclosed intangible assets.

The purpose of the paper is to present from the theoretical point of view a dual perception of the issue of intangible assets in accounting and what that entails the existence of the information gap in the area of financial reporting of intangible value generators, whereas, from the empirical point of view is to analyze the participation of Disclosed Intangible Assets in the value creation of companies listed on the Warsaw Stock Exchange in Poland, using the GIFT™ methodology.

2. Disclosed Intangible Assets as the dimension of a dual perception of intangible assets in accounting

Intangible assets are a special resource. This specificity causes that the essence, their economic nature and recognition are one of the most difficult issues the contemporary accounting is facing. Accounting theories, despite the growing importance of intangible assets in companies' operations, still treat the problem marginally [Michalczuk 2011 p.327]. According to the adopted solutions in accordance with IAS/ IFRS (IAS 38 – "Intangible Assets"), intangible assets represent identifiable non-monetary assets without physical substance, which reflect the expenditure or incurring liabilities on the acquisition, development, maintenance and improvement of intangible resources such as, inter alia, scientific or technical knowledge, design and implementation of new processes or systems, licenses, intellectual property, market knowledge and trademarks including brand names and publishing titles, computer software, patents, copyrights, motion pictures, customer lists, mortgage servicing rights, relationships with customers or suppliers, customer loyalty, market share [*International Accounting...* 2010].

The adoption of such a broad understanding of intangible assets relates to the enterprise's intangible resources which are the source of future economic benefits. Thus, IAS 38 implies the existence of many intangible assets, with the reservation

that it introduces criteria for recognition as an asset of the balance sheet, namely [IAS 38 *Intangible ...* 2012]:

- an asset is identifiable, that is separable or results from contractual or other legal rights,
- there is a possibility to control it, that is to obtain the benefits out of it,
- there is probability that an entity gains expected future economic benefits attributable to the particular asset,
- there is a possibility to determine the purchase price or production cost of an asset reliably.

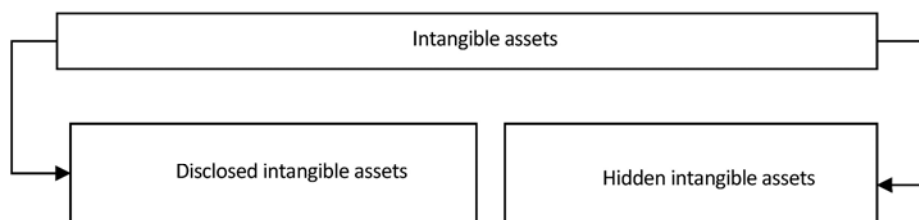
In the light of the applicable provisions, intangible assets that meet the conceptual framework are, among others: property rights to trademarks, patents, copyrights, software, or acquired goodwill. They are legally defined intellectual property and a group of intangible resources that are distinguished in accounting explicitly.

Analyzing the conceptual assumptions it can be noted that a significant impact on the recognition of intangible resources has the way of their acquisition². The one acquired in a separate transaction may be recognized as an intangible asset without major restrictions. However, internally generated intangible assets, such as brand, culture of an organization, IT resources, customer lists, the organization's ability to learn and adapt, reputation, can be optionally recognized, but only in the event of an operation of the exchange which takes place in a merger of entities.³ It should be emphasized, however, that only a few of them, such as brand or customer lists are distinguished as a separate item of property. Others are recognized under the collective category of company value. However, in the absence of an operation of the exchange, intangible resources internally generated by the entity during its operation, are not practically recognized due to the limited ability to meet the criteria for their recognition. The exception are those that are the result of development work and are subject to compliance with the criteria set out in the standards.

This arbitrary approach causes that accounting perceives intangible assets dually, as shown in Figure 1.

FIGURE 1.

Dual recognition of intangible assets from the perspective of accounting



Source: Author's own elaboration.

² This is particularly important in the case of companies whose value and financial results are determined to a large extent by the potential of the portfolio of intangible assets (such as pharmaceutical companies).

³ Specific issues related to the problem are regulated by IFRS 3 (For more: Business combinations and consolidation – revised IFRS 3 and IAS 27, 'IFRS ALERT', No. 23, ERNST & YOUNG 2008).

Disclosed intangible assets represent those resources which due to the ability to meet the criteria for recognition are capitalized as assets. Intangible assets that meet the conceptual frameworks and are presented in a financial statement include for example ownership of trademarks, patents and copyrights. They constitute "hard" intangible assets, which are directly reflected in the carrying amount of the company and are presented in their financial reporting. However, they represent only a part of intangible value generators of enterprises. The second group, which is much larger, are hidden intangible assets. They constitute "soft" intangible assets that do not meet the criteria for their capitalization as an asset. Expenditures related to the generation of such intangible resources are related as costs of operating activity.

This dual approach of accounting to intangible assets causes that the recipients of information arising from accounting does not have the full picture of the intangible value generators. They can only observe investments in disclosed intangible assets that are acquired through market transactions, whereas the resources that the company generates internally, are not quantified systematically. As a result, companies acquiring intangible assets in external transactions reveal their "more complete" picture and have better short-term financial results than companies that generate these resources on their own. In the case of the latter, limited possibility to capitalize internally generated intangible assets (as an asset), have an impact not only on reducing the value of assets, but also on the level of a financial result, which is very often reduced due to direct recognition of outlays to generate intangible resources as costs. However, this conservative and restrictive approach in accounting in the field of intangible value generators is certainly justified. Most of the items constituting the 'soft' intangible assets do not have a permanent character, as exemplified by the organizational structure, which is subject to change. Also, not all intangible assets constituting intellectual capital can be expressed in value.

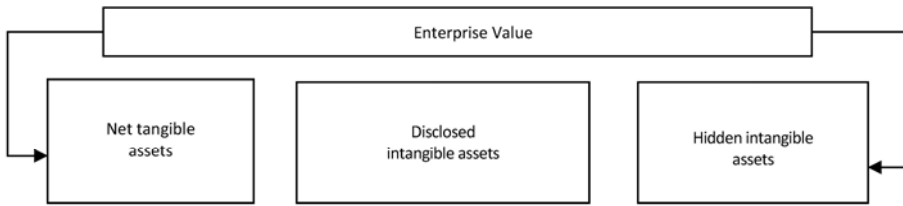
3. Disclosed Intangible Assets in companies listed on the Warsaw Stock Exchange (WSE) in 2009-2010⁴

Disclosed Intangible Assets reflect intangible value generators capitalized by accounting. Because of their individual and often unique features, such as the lack of material (physical) form, non-linearity, or domination, they contribute to gaining additional, above-average economic benefits which increase the company's value.

Since it is indicated that intangible assets increasingly determine the value of today's enterprises, the empirical verification is of great importance. For this purpose, the methodology applied to the GIFT™ (Global Intangible Finance Tracker)⁵ research was used to analyze the share of Disclosed Intangible Assets in the creation of companies' value listed on the Warsaw Stock Exchange. The adopted research methodology is based on the assumption that the company value is determined by both tangible and intangible assets, as illustrated in Figure 2.

⁴ Results presented in this paper are a part of wider author's own research on value generators, which intangible assets represent.

⁵ These are the annual survey conducted by Brand Finance.

FIGURE 2.**The structure of the enterprise value according to the methodology GIFT™**

Source: Author's own elaboration based on the methodology of Brand Finance, Global Intangible Finance Tracker 2009.

This approach to company value enables to identify two main groups of value generators. The first one are material factors, whose level reflects the net tangible assets. The second one are intangible factors, whose level reflects intangible assets, both disclosed in the reporting (as disclosed intangible assets) and undisclosed intangible assets. This approach allows to show the full potential of generators creating company value, especially in the area of intangible generators through a comprehensive approach to intangible assets.

The research was focused on disclosed intangible assets and their share in the creation of value in companies listed on the WSE. The study covers 222 companies that have met three criteria: they were listed on the Warsaw Stock Exchange in 2009 and 2010; they published their reports for these years; they had the ratio C / BV over unity. Financial reports of companies for years 2009 and 2010 were used as analytical data.

Conducted research within a given area has shown that in analyzed companies listed on WSE disclosed intangible assets, which are those capitalized in the balance sheet, represented on average 10.2% of the value of surveyed companies in 2009, and more than 10.5% in 2010⁶, as shown in Table 1.

This means that in the analyzed period on average more than 10% of the value of surveyed companies was generated by intangible assets. However, companies are not uniform in terms of the share of disclosed intangible assets in the creation of their value. There are such companies that did not invest in intangible assets, as well as the ones in which these assets generated over 98% of their value in 2009, and a year later, just over 83%. Even a very strong diversity of companies in this area can be indicated. It is reflected by the high level of the coefficient of variability (over

⁶ The level of average share of disclosed intangible assets in the creation of companies' value is slightly higher than that observed in the study conducted by Brand Finance for the years 2009–2010. During this period, the share stood at an average rate of 9% in 2009 and 8% in 2010. A similar level of 9% was observed in 2011. These are the results of research carried out for 56,000 companies, covering 53 national stock markets and representing 99% of total global market capitalization. (For more: The Brand Finance. Top 100 Singapore Brands Report – 2012)

150%) and a significant difference between the maximum and the minimum value of the feature. This is illustrated by histograms created for intangible assets. (Figure 3)

TABLE 1.

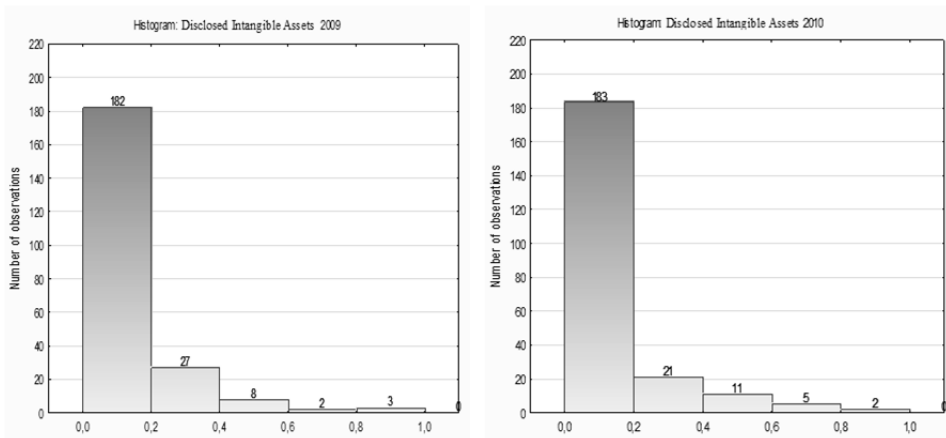
**Basic descriptive statistics of the share of intangible assets
in companies of WSE in 2009-2010**

Year	Mean	Median	Min.	Max.	Lower quartile	Upper quartile	St. Dev.	Coeff. of Variation	Skewness
2009	0.1018	0.0272	0.00	0.9808	0.0045	0.1427	0.1619	158.96	2.5585
2010	0.1047	0.0289	0.00	0.8303	0.0050	0.1338	0.1656	158.17	2.3297

Source: Author's own elaboration using the program "Statistica".

FIGURE 3.

**Disclosed intangible assets in the value of surveyed companies
of WSE in 2009-2010**



Source: Author's own elaboration using the program "Statistica".

In more than half of the surveyed companies the share of intangible assets in the balance sheet did not exceed 2.7% of their value in 2009 (in 2010 – 2.9%). The vast majority of them were also characterized by the lower share of these assets than the industry on average, as indicated by the positive and high value of skewness ratio. The low share of intangible assets in the balance sheet in value creation can result from, on one hand, low investment in these resources, on the other hand, the limited possibility of their capitalization as an asset. Undoubtedly, an important limitation is the latter aspect.

Examined companies in terms of the share of disclosed intangible assets in the creation of their value are characterized by high diversity and extreme asymmetry. Therefore, the limitation to the analysis carried out for all companies together is of low interpretative value. For research purposes, it was elaborated into sub-groups of enterprises (sectors, industries) more uniform due to the analyzed characteristic.

From sectoral perspective analyzed companies are characterized by diversity in terms of the share of disclosed intangible assets in the creation of their value, as shown in Table 2.

TABLE 2.

**Basic descriptive statistics of the share of disclosed intangible assets
in the value of companies in 2009-2010 by sector**

Year	Mean	Median	Min.	Max.	Lower quartile	Upper quartile	St. Dev.	Coeff. of Variation	Skewness
Industry									
2009	0.0644	0.0148	0.00	0.8192	0.0042	0.0779	0.1174	182.281	3.5209
2010	0.0613	0.0151	0.00	0.8303	0.0043	0.0730	0.1162	189.386	4.0977
Services									
2009	0.1748	0.1038	0.00	0.9808	0.0187	0.2391	0.2024	117.246	1.6731
2010	0.1803	0.0970	0.00	0.8096	0.0203	0.2529	0.2062	114.344	1.3503
Finance									
2009	0.0302	0.0110	0.00	0.2027	0.0020	0.0313	0.0482	159.379	2.3300
2010	0.0479	0.0085	0.00	0.4708	0.0022	0.0324	0.1020	212.826	3.1936

Source: Author's own elaboration using the program "Statistica".

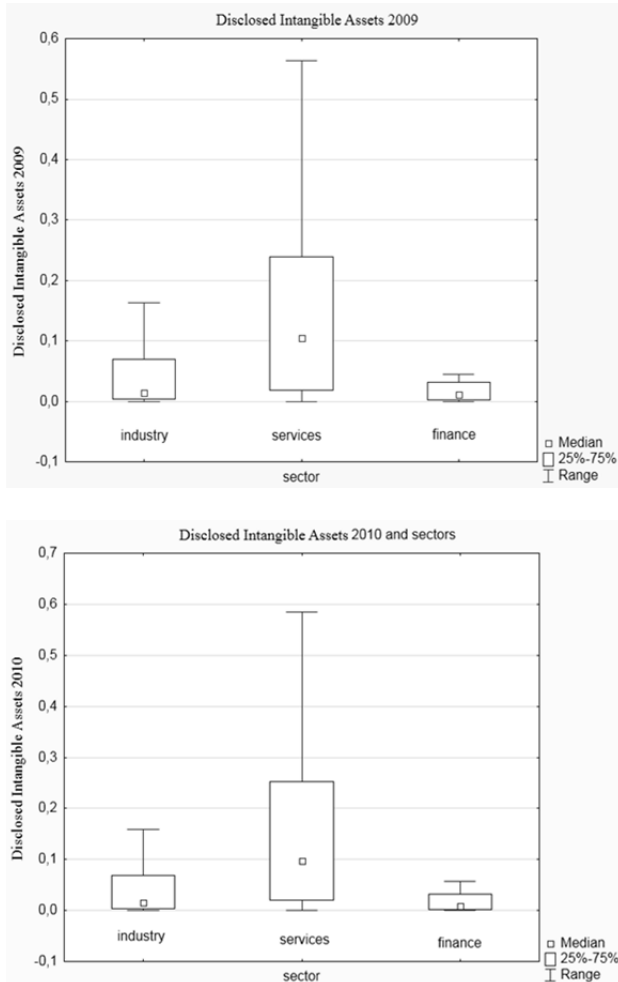
Existing differences are indicated by high levels of volatility and skewness coefficients. It can be also observed that the average share is the highest in the service sector. This situation is confirmed by box plot graphs. (Figure 4).

The average share in the services sector in 2009-2010 stood within 17.5% and 18.0%, whereas the lowest average share was characteristic for the financial sector (in 2009 intangible assets generated mere 3.0% of the company value, a year later approximately 4.7%). It is also the sector in which intangible assets of the balance sheet generated at the most approximately 20% of the company value, and in 2010 approximately 47%. The industry, however, was characterized by the average share of recorded intangible assets at the level of approximately 6%. But in this sector, there were companies in which disclosed intangible assets generated in the analyzed period more than 80% of their value. However, these are a few examples, because in 75% of surveyed companies the share of disclosed intangible assets in the analyzed period did not exceed 8%. The best situation was in the service sector. It contains companies where disclosed intangible assets generated over 98% of their value in 2009 and over 80% in 2010. Also the share of disclosed intangible assets in the ana-

lyzed period exceeded 24% in 25% of surveyed companies. It is also a sector in which there is a high diversity in the share of disclosed intangible assets in the creation of company value. There is far less diversity in companies of the financial sector.

FIGURE 4.

Disclosed intangible assets in the various sectors in 2009-2010



Source: Author's own elaboration using the program "Statistica".

Because of observed strong diversity in the share of disclosed intangible assets in generating value of surveyed companies in various sectors, the analysis has been further elaborated to the level of industries.

The highest average share of disclosed intangible assets in the value creation of surveyed companies in 2009 was reported in the IT services and amounted to 32%. (Table 3)

TABLE 3.

Basic descriptive statistics of the share of disclosed intangible assets in the value of companies in 2009-2010 by industry

Year	Mean	Median	Min.	Max.	Lower quartile	Upper quartile	St. Dev.	Coeff. of Variation	Skewness
Information Technology (32)									
2009	0.320	0.206	0.001	0.981	0.138	0.486	0.296	92.58	1.029
2010	0.275	0.159	0.002	0.810	0.065	0.538	0.263	95.530	0.720
Telecommunication services (33)									
2009	0.197	0.183	0.040	0.379	0.069	0.315	0.149	75.25	0.211
2010	0.236	0.236	0.096	0.329	0.201	0.320	0.096	40.500	0.682
Commercial services (31)									
2009	0.187	0.163	0.000	0.564	0.062	0.247	0.166	88.92	0.854
2010	0.239	0.171	0.001	0.744	0.059	0.403	0.226	94.378	1.005
Media (34)									
2009	0.093	0.054	0.000	0.314	0.042	0.099	0.101	108.09	1.619
2010	0.120	0.071	0.000	0.310	0.061	0.238	0.114	94.349	0.709
Other services (35)									
2009	0.093	0.030	0.000	0.656	0.002	0.085	0.2	178.8	2.5
2010	0.062	0.025	0.000	0.443	0.001	0.056	0.109	175.551	2.499
Banking (21)									
2009	0.039	0.016	0.000	0.203	0.011	0.045	0.054	136.22	2.369
2010	0.068	0.017	0.000	0.471	0.006	0.057	0.125	182.688	2.786
Other industries (23)									
2009	0.021	0.003	0.000	0.133	0.001	0.011	0.042	208.80	2.294
2010	0.026	0.003	0.000	0.235	0.002	0.011	0.067	259.981	3.531
Insurance (22)									
2009	0.004	0.004	0.004	0.004	0.004	0.004	x	X	X
2010	0.009	0.009	0.009	0.009	0.009	0.009	x	X	X
Building materials industry(16)									
2009	0.136	0.011	0.000	0.819	0.001	0.121	0.283	208.5	2.601
2010	0.137	0.012	0.000	0.830	0.001	0.120	0.286	208.968	2.603
Food industry (11)									
2009	0.130	0.047	0.000	0.514	0.011	0.238	0.155	118.8	1.259
2010	0.131	0.052	0.001	0.615	0.008	0.206	0.164	125.053	1.869

Year	Mean	Median	Min.	Max.	Lower quartile	Upper quartile	St. Dev.	Coeff. of Variation	Skewness
Wood industry (13)									
2009	0.099	0.083	0.001	0.214	0.003	0.209	0.107	108.3	0.108
2010	0.061	0.049	0.001	0.142	0.004	0.119	0.065	107.226	0.206
Construction industry (17)									
2009	0.058	0.025	0.000	0.329	0.005	0.081	0.089	154.6	2.102
2010	0.062	0.029	0.000	0.360	0.001	0.083	0.092	147.802	2.240
Electroengineering (18)									
2009	0.051	0.027	0.000	0.238	0.008	0.079	0.060	116.26	1.959
2010	0.044	0.030	0.000	0.116	0.009	0.078	0.041	93.207	0.508
Chemicals (14)									
2009	0.045	0.007	0.000	0.190	0.006	0.086	0.071	158.9	1.904
2010	0.029	0.007	0.001	0.158	0.004	0.013	0.057	200.967	2.616
Metals (19)									
2009	0.021	0.012	0.000	0.109	0.003	0.018	0.033	154.12	2.545
2010	0.013	0.012	0.000	0.037	0.004	0.020	0.012	86.889	0.864
Other industries: Basic materials. Energetics. Automobiles (10)									
2009	0.014	0.008	0.003	0.054	0.003	0.015	0.016	115.5	2.119
2010	0.015	0.011	0.003	0.057	0.005	0.015	0.017	108.011	2.119
Light industry (12)									
2009	0.012	0.006	0.000	0.053	0.001	0.015	0.018	150.9	2.312
2010	0.039	0.014	0.000	0.152	0.007	0.068	0.055	142.329	1.897
Pharmaceutical industry (15)									
2009	0.010	0.001	0.000	0.038	0.000	0.020	0.019	183.9	1.984
2010	0.004	0.004	0.000	0.010	0.000	0.008	0.005	114.462	0.341

Source: Author's own elaboration using the program "Statistica".

It is also a sector where disclosed intangible assets have contributed to the generation of value in each of the surveyed companies, but with the reservation that the degree was varied. There were companies where they created only 1% of their value, and also those where they generated more than 98% of their value. The share in value creation between 10% and 20% was characteristic for such industries as telecommunications, commercial services, construction materials industry and food industry. The smallest average share was characteristic for companies in sectors such as pharmaceutical industry, light industry and other industry, metal industry, chemical industry, banking, insurance and finance. In these groups of the surveyed companies, the average share of disclosed intangible assets in value creation did not exceed 5%.

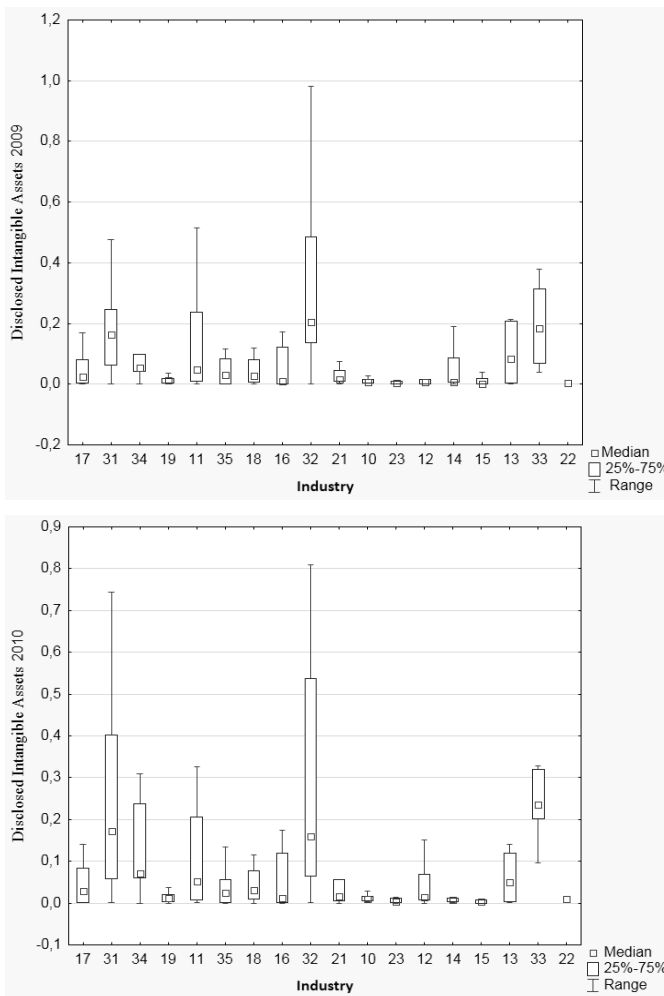
Comparing the average share of disclosed intangible assets in the value of surveyed companies in 2010, it can be observed that, as in the previous year, the highest was characteristic for the industry of IT services. The share increased in indus-

tries such as commercial services and telecommunications services (average above 20%). The average share between 10% and 20% was observed in the media industry, building materials industry and food industry. This indicates a decrease in the number of industries in which intangible assets generated on average of more than 10% of the company value. However, the situation was similar for industries where the average share of disclosed intangible assets did not exceed 5%.

The examined industries were characterized in the period analyzed by strong diversity of companies in terms of the share of disclosed intangible assets in the creation of their value, as shown in Figure 5.

FIGURE 5.

Disclosed intangible assets in particular industries in 2009-2010



Source: Author’s own elaboration using the program “Statistica”.

In particular, this concerned sectors such as other financing services, other services, construction materials industry, construction industry, or chemical industry, where coefficients of variation exceeded 159%. Furthermore, in all industries, most surveyed companies were characterized by the share of disclosed intangible assets in the company's value lower than average. It is indicated by positive skewness ratios. The least diverse industries are IT services, telecommunications and commercial services.

In 2010, similarly as in the previous year, the diversity of the share of disclosed intangible assets in the creation of companies' value was very strong. Only the telecommunications industry was characterized by a relatively moderate diversity, indicated by a coefficient of variation of 40%. Moreover, the industry, as opposed to the others, had a negative skewness ratio, which means that most companies in the industry have the share of disclosed intangible assets above average.

4. Conclusions

Intangible assets through their individual and often unique characteristics determine the possibility of gaining additional, above-average economic benefits leading to an increase in the company's value. On the other hand, these distinctive features make them to be perceived in the dual manner by accounting as disclosed intangible assets which are capitalized as an asset and undisclosed intangible assets which are recognized in operating costs.

This dual approach of accounting to intangible assets causes that the recipients of information arising from accounting do not have the full picture of intangible value generators. They can only observe investments in disclosed intangible assets that are acquired through market transactions.

The analysis conducted in the area of disclosed intangible assets leads to the conclusion that they generate more than 10% of the value of surveyed companies listed on the WSE. It was also noted, admittedly small, but the increase in their share in the value creation. This is not a high percentage, but it should be remembered that they represent only a part of intangible value generators, which are capitalized as an asset.

Examined companies in terms of the share of disclosed intangible assets in the creation of their value are characterized by high diversity and extreme asymmetry. The aspect is particularly evident in terms of industry and sectoral analysis of these companies. The sector with the highest average share of these intangible generators is the services sector, while the lowest finance. And industries where disclosed intangible assets were involved to the largest extent in the creation of company value are industries in the service sector: IT, telecommunications and commercial services. The smallest average share of disclosed intangible assets in the value of companies was characteristic for the industry: the pharmaceutical industry, light industry and other industry, metal industry, chemical industry, banking, insurance and other financial services. It should be noted, however, that examined companies in spite of belonging to the sector or industry were not uniform in terms of the share of disclosed intangible assets in the creation of value. It was observed that there were

companies that did not invest in this asset group at all, and those which generated more than 90% of their value.

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Alicja GOŁĘBIEWSKA¹

ANALYSIS AND EVALUATION OF MEASUREMENT METHODS OF INVESTMENT EFFICIENCY OF OPEN PENSION FUNDS IN POLAND

SUMMARY

The article concerns the issues of investment policy increasingly discussed efficiency of the Open Pension Funds (OPFs). There are many methods elaborated in the literature on evaluation of the efficiency of the funds, but unfortunately the basic ones are dominant in practice. Less well-known measures are still not implemented. It is therefore necessary to create a specific measure, representing the efficiency and whose widespread use will help to accurately assess the funds.

The purpose of the paper is to present and evaluate measurement methods of investment efficiency of the Open Pension Funds. It contains characteristics of an investment policy and its efficiency, as well as the presentation of the methods of its measurement, their advantages and disadvantages. There were discussed both well-known and commonly used, as well as those still not well-known measurements referred to as alternative and belonging to methods of the extended analysis of investment efficiency.

Keywords: Open Pension Funds, investment efficiency, evaluation methods of the efficiency of the OPFs

1. Introduction

The Open Pension Funds were established in 1999 as the result of the launch of the social security system reform in Poland. One of the basic principles of the reform was to increase the security of the pension system by providing payment of benefits from various sources, three at the most. The reformed system is to create the three-pillar pension system and the introduction of a mixed method of financing, so a fully funded pension scheme appears next to a pay-as-you-go scheme. The Open Pension Funds, as entities which invest a part of the pension contributions, managed by private companies, that is General Pension Fund Companies, represent the second pillar and are fully funded. In the role of third-party investors, funds should pursue an investment policy in such a way as to demonstrate the adequate efficiency and achieve profits.

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The basic principles of an investment policy of the funds are regulated and determined in Chapter 15 of the Act, entitled "Investment Activities of Pension Funds" [The Act of 28 August, 1997].

The issues concerning both investments of the funds, as well as evaluating their efficiency have been the subject of many studies and discussions. The effects of an investment policy conducted by the Open Pension Funds can be described by different measures of profitability and risk. In the literature on the subject there are many methods to assess the efficiency of the investment of pension funds discussed, indicating their advantages and disadvantages. But in practice only a few of them are used. Also rates of return are analyzed, types of assets the fund may invest in and investment limits. Measurement methods are usually divided according to the different criteria and principles, adopted by the authors.

The purpose of the paper is to present and evaluate measurement methods of investment efficiency of the Open Pension Funds in Poland. The article contains the characteristics of an investment policy and its effectiveness, as well as an overview of well-known and commonly used measures and alternative tools that are still little known and belong to the methods of the extended analysis of investment efficiency. It also has discussed the advantages and disadvantages of measures used, indicating the need for further research on the construction of measures allowing evaluate thoroughly the investment efficiency of the pension funds.

2. The essence of the investment policy and efficiency of the Open Pension Funds

The concept of efficiency is a complex notion and used in various fields. It means the result of actions taken, described by the relationship of obtained outcomes in reference to their expenses [Encyklopedia PWN, 2009], that is, the degree of achievement of the objectives related to the costs incurred. Economic efficiency is defined as the result of the business activity, described by the relationship determined by obtained effects to the outlays of the factors of production or a combination of these factors [Encyklopedia PWN, 2009], that is, the degree of achievement of the objectives related to the costs incurred. It should therefore be understood as the ratio between the sum of expenses, i.e. the investment, and the value of effects that could be achieved through the outlays, which is the return on investment.

Investment efficiency is a type of management efficiency. It is a measurable characteristic of activities that involve the investment of funds in financial instruments [M. Dybał, 2008, p. 57].

Investing activity primarily consists in involving cash resources in order to obtain future benefits. With regard to the Open Pension Funds, pursuant to the Act, the object of their activity is to collect funds and invest them with the intention for payment to the funds' members who have attained retirement age and the payment of funded pensions [Act of 28 August, 1997, Article 2]. The Fund invests its assets in accordance with the applicable regulations, with a view to ensure the maximum degree of security and profitability of investments made [Act of 28 August, 1997, Article 139].

The primary source of funding for the OPFs are insurance premiums extended by the income from investments, i.e. funds from their investment policy. How effective investment decisions made by the fund are, it is shown by the efficiency of investment. It is extremely important, because the way of increasing the funds has a huge impact on the value of future benefits.

The investment objective of pension funds is a steady growth in net assets value achieved by an increase in the value of investments. A guarantee to achieve intended investment objectives is an optimally structured and diversified portfolio of assets, and properly marked directions of investment activity. The structure of the portfolio of assets affect the performance of investment policy of funds. The criteria the OPFs take into account when creating a portfolio of investments, are the rate of return and risk. This portfolio is a combination of different financial instruments. When creating it, the fund must apply the principle of diversification in order to eliminate a specific risk from investing activities of the OPF. The funds seek to create an effective investment portfolio, that is, with the lowest level of risk at a specified rate of return.

The responsibility of the pension fund specified in the Act, is to invest contributions not only in an effective, but also a safe way. Therefore, to ensure the safety of resources, restrictions were introduced, that is limits that specify the type and amount of financial instruments in which the funds may invest collected funds. The provisions of the Act regulate which instruments can be used. The quantitative investment limits were imposed on the OPFs which concern categories of investments funds held in the accounts can be invested in, but also their maximum share in the portfolio, due to the requirement to diversify risk. The investment limits were designed to ensure the safety of the funds in the accounts of the OPFs, but as a result they create a significant barrier to their increase [E. Ociepa-Kicińska, 2010, pp.335 and 339].

Undoubtedly, the introduction of multi-funds and allocation dependent on age in the second pillar will have an impact on the higher investment efficiency of a fully funded system. It is necessary to create two or more funds with heterogeneous investment policy, with varying risk, as shown by the experience of other countries that have introduced multi-funds. This would be a significant, positive change in the Polish system, increasing its investment efficiency. The creation of sub-funds within pension funds, engaged in diversified investment policy, that is a different risk profile of the investment, is expected to bring additional, measurable in the amount of pension, benefits for the insured. An important task is to introduce funds whose risk would be adjusted to the phase of the life of the insured. There are funds needed whose assets in a period of about 10 years before reaching retirement age, could be safely invested, to a greater extent in instruments with fixed income rate such as corporate bonds, so long-term profits would be less vulnerable to fluctuations in the financial market.

Studying the OPFs' investment activity in Poland, their conditions should be concerned. There is among them a group of restrictions, or barriers to efficiency, dependent on and independent from the fund. [M. Dybal, 2009, p. 85]

Barriers independent of the OPF are the following:

- mechanism for calculating rates of return;

- investment restrictions;
 - the impact of the financial market.
- Dependent restrictions include the following:
- used investment policy;
 - an acceptable level of the risk;
 - an impact on the financial market.

Analyzing the issue of the efficiency of pension funds, the ways to evaluate their performance and conducted investment policy should be considered. Therefore, it becomes necessary to identify, discuss and evaluate methods for measuring the investment efficiency of funds.

3. Methods for measuring the investment efficiency of pension funds

Methods to examine efficiency can be defined as the analysis of outcomes to be obtained as a result of certain capital expenditures incurred. [P. Pabianiak, 2011]

The theoretical bases for the research of the methods were developed by economists in the 19th century and the beginning of the 20th century, and the development of research was dated to the '30s of the 20th century [M. Dybal, 2008, p. 59].

The choice of modern methods of evaluating the efficiency was influenced by certain factors. The most important are [W. Rogowski, 2008, p. 61]:

- the increase in the importance of inflation processes and the need to take them into account in the process of efficiency assessment;
- the increase in the level of uncertainty and risk in conducting business activity;
- the need to take into account the dominant importance of external effects of investment activities for the economy and efforts to include them in the methodology of efficiency evaluation;
- the internationalization of investment processes and the need to take into account its impact on the assessment of various investment projects;
- comprehensive investment programs developed by individual business entities and the need for synthetic efficiency evaluation;
- the change and continuous diversification of investment forms and the need to adapt algorithms and formulas of efficiency evaluation;
- the development of theoretical bases for assessing the efficiency and computational techniques.

In the literature, there are different classifications of methods for measuring the investment efficiency. Authors who examine the issue usually divide its measures on the bases of an adopted criterion into groups. The important, according to the author, should include the division of the methods presented in Table 1.

TABLE 1.

**The division of methods for measuring the investment efficiency
due to the duration of their use**

Specification	Types of methods
Classical methods	<ul style="list-style-type: none"> • the analysis of rates of return; • investment performance indicators: the Sharpe ratio, the Treynor and Jensen ratio; • the Information Ratio IR which is used in the portfolio analysis; • ratios based on linear programming; • profit and loss ratios: the Sortino ratio, the Fouse index.
Non-classical methods	<ul style="list-style-type: none"> • extended methods of the analysis: the risk-return profile Return Grade (Risk Metrics), additional indicators of investment efficiency, profit and loss ratios based on partial moments of rates of return, profit and loss ratios based on the maximum drop of the rate of return, the methods used in the absence of normal distribution of rates of return; • the Stutzer index based on the theory of large deviations; • the DEA method; • the Hurst exponent; • an average rate of return of a group of funds; • stochastic generalization of measures NPV, PI; • an assessment of the funds' dynamics: the ADF and PDF measures.

Source: Author's own elaboration based on: *Nieklasyczne metody oceny efektywności i ryzyka. Otwarte Fundusze Emerytalne [Non-classical methods for efficiency and risks evaluation. Open Pension Funds]*, 2011, Cz. Domański (ed.), Polskie Wydawnictwo Ekonomiczne, Warszawa, pp. 53-79 i 166-228.

This division distinguishes classical and non-classical methods. Wherein the first of them are those which are commonly used since the '60s to the '90s of the 20th century. Among the non-classical methods are listed those which are proposed in the literature after 2000. Some of these measures can be used in the evaluation of the efficiency of pension funds [*Non-classical methods for efficiency...*, 2011, p.10].

The measurement of the efficiency is performed using partial, synthetic indicators. The author of another classification of the methods, presented in Table 2, makes a division into statutory and alternative measures, guided by their transparency. To the first group of methods are included those which are most commonly used because of the mandatory statutory provision. The alternative measures are considered those that are less common and reveal defects of the former ones.

Generally speaking, the measurements of the results of investing activity of the Open Pension Funds can be divided into three groups [F Chybalski, 2006, pp. 1-8]:

- profitability measures;
- risk measures;
- efficiency measures.

The measures of profitability are used to assess changes in capital value as a result of the investments that can be applied to the Open Pension Funds. These include the rate of return based on the unit of account and the internal rate of return.

TABLE 2.

The basic division of methods for measuring the investment efficiency

Specification	Types of methods
Statutory methods	<ul style="list-style-type: none"> • unit of account; • 3-year rate of return; • weighted average rate of return; • minimum rate of return.
Alternative methods	<ul style="list-style-type: none"> • the IRR method; • the Sharpe ratio; • the tracking measure; • an analysis based on the financial statements; • an analysis of a hypothetical account balance of the OPF's member; • a multi-criteria analysis of pension funds; • the Data Envelopment Analysis.

Source: Author's own elaboration based on: M. Dybał *Efektywność inwestycyjna funduszy emerytalnych [Investment efficiency of pension funds]*, 2008, Ce De Wu, Warszawa, pp. 62-82.

The risk measures that can be applied to pension funds include measures of dispersion based on deviations from the expected rate of return and measures of the probability the fund does not achieve a pre-specified rate of return. The variance of the rate of return and its standard deviation are among the most common measures of dispersion.

The efficiency measures allow for comparison of the financial results to the profitability of risk-free investments. These measures include the Sharpe ratio, the Jensen and Treynor ratio.

The evaluation of the investment efficiency is a process that allows to compare the efficiency of the entity or portfolios that have obtained different rates of return for a different level of risk [K. Dowd, 2003, p. 210]. The process involves two stages:

- the measurement of result;
- their assessment in the context of possible alternatives.

As it is clear from the above presented review of methods for measuring the investment efficiency of OPFs, there are many methods described in the literature. But only a few are used practically. The most commonly used in practice include the following:

- the investment efficiency measured by the rate of return;
- the investment efficiency measured by the value of a unit of account;
- the investment efficiency measured by risk;
- the investment efficiency measured by taking into account the fee structure of the fund;
- the efficiency of portfolio management (CAPM and indicators).

The basic, commonly used measure of the efficiency of the investment policy is the rate of return, calculated by each OPF at the end of March and September each year for the last 36 months. This value is calculated based on the change in value of the unit of account. The information on the value of the funds' rates of return are

submitted to the Polish Financial Supervision Authority and presented to the public website [Act of 28 August 1997, art. 170 and 172].

At the level of the market a weighted average rate of return of all pension funds is calculated which is the sum of the products of rates of return and the average market share of the fund's measured by its net assets [Act of 28 August, 1997 Art. 173 Paragraph 1]. Based on the weighted average rate of return, the minimum required rate of return is calculated as an essential element of a financial security system of the second pillar of the pension system. The minimum required rate of return is the value of the half of the weighted average or the average reduced by 4 percentage points, whichever is lower [Act of August 28, 1997 Art. 175 paragraph 2].

The investment efficiency can be also examined with the IRR method. It is estimated for two variants of cash flows: after the deduction of fees from premium and without deductions. Another method of measuring the investment efficiency used is the value of a unit of account, for which the customers' contributions are converted into. It is calculated by dividing the fund's net asset value on the conversion date by the number of units of account entered on that date on the accounts maintained by the fund [Art. 100 paragraph 1a]. It is defined by the Polish Financial Supervision Authority as a unit of the share of the capital managed by the investment fund.

Studying the efficiency using risk depends on the diversification of the portfolio of assets. In the case of little diversified portfolios, the most appropriate measure of OPFs investment risk is total risk. It consists of systematic and unsystematic risk. The specificity of the pension funds, which are investment products, requires the risk to be quantified in accounting of the OPFs investment efficiency.

Until recently, as a method for measuring the investment efficiency of the pension funds was used only the efficiency measured by using described rates of return and risk. Currently, attention is paid to other methods, indicating the use of measures assessing the efficiency of portfolio management for the evaluation of investment activity of the OPFs. Such a measure is the capital asset pricing model CAPM, used to evaluate the efficiency of the investment portfolio. This model can be used to evaluate the performance of portfolios of different institutions, including pension funds. It describes the dependence of the rate of return and risk. The CAPM allows to set certain indicators, which enable to compare the portfolio efficiency. These indicators include [*Investment Policy ...*, 2004, pp.14-16]:

- the Sharpe ratio – it indicates the relationship of the excess rate of return generated by the fund to the risks incurred by the fund;
- the Jansen ratio – it represents the excess of the rate of return achieved by the fund over the average rate of return obtained during the period in the market from an investment with the same level of market risk;
- the Treynor ratio – it says that the Open Pension Fund with its higher value is characterized by higher investment efficiency;

The evaluation of the efficiency of the Open Pension Funds is not an easy task, because of their nature, and above all because of:

- a long-term nature of the investment;
- growing assets;
- investment limits;
- legal regulations.

3. Evaluation of investment efficiency measures of pension funds

The system of evaluation of the investment efficiency of pension funds used in Poland is similar to those in other countries, but the methods of accounting are different from each other. It is a mechanism that determines the minimum required rate of return and investment limits. Investment limits are determined, however, in not entirely clear way and are too rigorous. They are also a significant barrier to the increase of collected funds. The entire system consists in determining twice a year, that is at the end of March and September in the three-year period, the minimum required rate of return for a period of 36 months and covering a possible shortage by funds from their own resources. The minimum required rate of return is calculated based on the weighted average rate of return, which is determined as a weighted average of rates obtained during the period by individual funds. The shares of funds in the market averaged in a certain way are taken into account. The rate of return is defined as the relative increase in the value of the unit of account for a period of three years.

This concept, however, is increasingly criticized, because in determining a benchmark for investment efficiency the principle of comparing all the funds together is accepted. A situation in the market in which they operate is not taken into account, that is investment opportunities and possibilities of pension funds' managers are not taken into consideration. As a result, also the minimum rate of return, which determines a minimum threshold below which the results obtained by the fund means a need to cover shortage, depends on the fact how efficiently a fund invested as compared to the others. This method has some drawbacks, since it is important only that the outcome of any fund is not lower than the minimum required rate of return, even if all funds obtain bad investment results, which is below the rate of return on risk-free investments, or even below inflation. Such results are unfavorable from the point of view of the members of the funds. However, in a situation when all funds have very good investment results, i.e. those that considerably exceed the average rate of return on the stock market, but one gets the result below the minimum required rate of return, which means it must cover the resulting shortage, the situation is very good from the point of view of the members of the fund, but the fund will be punished.

The whole mechanism of evaluating investment efficiency of pension funds is criticized, as well as the individual, basic measures are [Open Funds ..., 2009, pp. 65-70]. According to the division of measures presented in Table 2, mainly statutory measures have many drawbacks, which is visible when alternative methods are used.

Commonly used measure which is the rate of return raises a lot of doubts. As it results from the deeper analysis, this method is not excellent. This measure does not include the costs of the fund and the risk of its investment activities. It is not always possible to make a real assessment on its basis. It does not show the full picture because it does not account for the inflow of new premiums into a fund's accounts. In addition, calculated on the basis of changes in the accounting units, it does not include fees charged by the OPF on the premium. These fees currently ranging up to 3.5% are charged before the conversion of premiums into accounting units.

The advantage of this measure is that it can be calculated for different periods of time and the method of calculation of the value is simple.

The minimum rate of return, calculated on a weighted average rate, includes only information about the pension fund market, not taking into account some external components, which include inflation, or the situation on the financial market. The minimum rate of return is calculated in the short term, so it must be assessed in the same way. Therefore, it is difficult to assess the funds for their long-term investment policy. An appropriate analysis of rates of return is of great importance for assessing the efficiency of pension funds. The dependence of their results on the stock exchange situation is a consequence of investment policy of funds. In times of slump valuation of the OFE shares are falling and it reflects negatively on rates of return. During the decline valuation of the OPF's shares is falling and it is reflected negatively on rates of return. During the bull market an increase in share prices pushes up rates of return above bank deposits interest rates, bonds and other instruments. In the long term the capital market provides higher returns than the money market and taking into account the purpose of the funds involving an increase in resources, this is very important [A. Zimny, 2011, p. 176].

A weighted average rate of return is increasingly criticized, which does not take into account the risk associated with the investment. Therefore, it encourages to reproduce an investment strategy of largest OPFs. As a result, they do not compete in gains for retirees. The impact on a clearer assessment of the funds would have its replacement by a new measure of efficiency. The measure should [Investment Policy 2004, p.14]:

- have a simple design;
- be transparent and understandable to the market;
- not be subject to any manipulation;
- be easy to put it into practice.

In the first period of the funds' functioning the internal rate of return was considered to be the best measure, which takes into account the change in the value of the unit of account, but also the fees charged, and the time and volume of all flows to the account of the member. This rate allows assess the investment efficiency of the fund more accurately, but it is not perfect. Its major drawback is a quite complicated mathematically and based on many of necessary data method of calculation and it does not take into account the investment risk.

The value of the accounting unit as a method of measuring the investment efficiency is not the best way to compare funds. The conviction that cheap units are better is wrong, because it is possible to buy more of them. It should be remembered that since they are cheap at the moment, they certainly will become more expensive in the future. Using a large simplification, it can be said that the fund whose value of the unit of account is higher, in the past achieved better results, which means it invested more effectively. All OPFs started operations in mid-1999 and the initial value of their units was the same and amounted to 10 PLN. Now these values are different and it is a result of the investment policy run by the funds.

Assessing the Sharpe, Treynor and Jensen ratios, their advantage should be emphasized, namely the fact that they allow to refer the investment performance of the pension funds to the profitability of risk-free investments, combining measurement

of return on investment and its risks. Estimating their value allow to compare the performance of individual funds and the reference to the whole capital market [Open Funds ..., 2009, p 71]. It allows to create a ranking of pension funds, on the basis of which funds with the best results in terms of efficiency of investment portfolio management throughout the period considered will be selected. In the case that the funds will perform worse than the market and a negative Jensen's ratio, it will mean that the portfolio management of these funds was not effective. The Sharpe ratio is calculated for a single period in which the rate of investment in risk-free assets is constant. It shows the value of compensation per unit of risk incurred. Higher ratio values indicate better asset management. The Treynor ratio is a measure which takes into account the effect of portfolio diversification. Unfortunately, efficiency indicators have some drawbacks. There is a problem to determine the risk-free rate in their calculation. Moreover, they are not clear for the members of the fund, do not provide information on the value of the return on investment made and do not show an approximate increase or decrease in their invested resources.

The current mechanism assumes that the reference point, i.e. the benchmark to evaluate the investment performance of the OPFs is the average rate of return earned by all pension funds. This measure, however, does not encourage funds to achieve any other investment results than that of the market. This method is more often the subject of criticism. According to experts' opinion, an external benchmark is needed, which will consist of an index of stocks and bonds. It is about creating an objective measure (e.g. the results of other entities in the market), to which the results of the OPFs could be compared. Its features include the following [E. Ociepa-Kicińska, 2011, p. 44 after: Rybiński, 2010]:

- enabling free investments in all asset classes included in the benchmark;
- independence from political pressures;
- enabling the achievement of the highest possible investment performance within acceptable risk and elimination of the problem of 'investing below the average'.

The Polish Financial Supervision Authority is considering the introduction of new solutions, presented in the "Plan for the development and consolidation of finances 2010-2011". The new benchmark is called the reference rate by the supervision experts. It would be composed not only of the indexes of stocks and bonds, but also inflation. According to the supervision authority it would be beneficial for customers of the OPFs, as it would allow to maintain at least the real value of accumulated capital of the Polish in the funds. Currently, the OPFs must earn the minimum required rate of return. The evaluation of investment policy would take place on a quarterly basis for a period of five years, while currently OPFs are assessed for three years, but every six months. Thus, the averaged rate of return of the OPFs for five years would be compared with the benchmark and the volatility margin.

4. Conclusions

Investment activity of the Open Pension Funds is the main purpose for which they have been established. The way how the money of their participants will be invested, i.e. the efficiency of the adopted investment strategies will affect pension

payments to funds' members in future. Therefore, the efficiency of conducted investment policy of open pension funds should be carefully analyzed and evaluated, as well as their performance presented. Evaluation of the efficiency helps to shape, analyze, and improve the investment portfolio on an ongoing basis, and to identify the source of the investment result. Assessment of the funds activity and the investment performance allows to demonstrate the impact of the investment policy on the functioning of pension funds.

An introduction of an external benchmark to evaluate funds, extending the period of time for evaluation of their results, as well as the implementation of the exit strategy of investment limits and the introduction of funds of different risk profile focused on investing in safer instruments for people in age of retirement would influence an increase in the level of investment efficiency achieved by pension funds. It is important due to the fact that assets should be invested to a larger extent in instruments with a fixed rate of return. This change would have an impact on improving the investment efficiency. The advantages of this solution are indicated by simulations and experiences of other countries. However, it must be preceded by minimizing the investment restrictions, increasing investment flexibility of pension funds, opening the opportunity to diversify into new classes of assets and the removal of barriers to reduce the risk of the country through international investment. Taking into consideration increasing the efficiency, it is necessary to take steps consisting in:

- minimizing the investment restrictions;
- increasing investment flexibility of OPFs;
- creating opportunities of diversification into new asset classes;
- removal of barriers to reduce the risk of the country for international investment;
- preparation of solutions increasing the efficiency of the pension funds, which will lead to the differentiation of investment portfolios depending on the life cycle of future retirees.

The investment efficiency of the OPFs should be systematically examined. Measures listed in Paragraph 2 are not the only ways of evaluation presented in the literature. The authors who examine this issue constantly look for new measures, trying to adapt some of the measures of the financial market to the needs of pension funds.

In theory, as it is clear from the survey, there are many methods to assess the efficiency of the funds, but in practice basic ones are dominant. In addition, the presented evaluation of measures shows that the simple, commonly used ones also are not without drawbacks. Despite the shortcomings indicated, still basic measure published by the Polish Financial Supervision Authority is the rate of return. However, it should be remembered that it is a measure of the investment profitability. In order to make a deeper assessment of pension funds, it should be supplemented by a measure characterizing the risk and investment performance indicators: Sharpe, Jensen and Treynor ratios.

The issue of examination of the investment efficiency requires devoting much attention. Its measurement and information about investment results of the fund are important for management of pension funds, as well as for their members. The management use the efficiency indicator as a basis for comparison of financial re-

sults with other entities operating on the financial market. They are also important for members of the funds, since they influence on the decision to stay in the fund or about a change for another one. The divisions and the types of measures found in the literature are not important from the point of view of a participant, the most important matter is the development and selection of such tools as a basis to make a proper assessment of their activities. An extremely important and necessary task is to continue the research on the construction of measures which would represent efficiency and whose widespread use will thoroughly evaluate the efficiency of open pension funds' investments.

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