TRANSACTIONS OF THE UNIVERSITIES OF KOŠICE

Mr. E. K.'s Family House in Košice

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Abstract

Social changes elicit reactions in numerous fields of human activities, which subsequently affect the creation of material environs. It concerns not only the production of the new works, but also the transformation of the existing ones, including the architecture of the remote as well as the near past. Numbers of buildings have been losing life. Their original functional purpose and their future existence have been verified by the ability, or rather precondition for adopting new functions, different way of operation and use, as well as the new social and cultural status. This transformation intervenes to a certain extent in the architectural core of a building as well. For an architect, it represents especially interesting, but also demanding and complicated task. [1] One of the few positive, local examples documenting a sensitive approach to the former values of the building is the creative solution to the reconstruction of a modern villa built at the end of the thirties of the last century in the town of Košice.

In the *Slovenský staviteľ* (The Slovak Builder) journal from 1937 [2], which was largely dedicated to Košice, family houses and villas can also be found among several other published buildings. The author wrote on page 87: "*There are preconditions in Čermeľské údolie valley in the north part of the town for developing a garden town. The proximity of water and vastness of the forests nearby create favourable climatic conditions for family housing. The advantageous connection of this rather remote part with the town by means of a street-car (tram) has caused intense construction activities lately. A new modern public school of twenty classrooms is being built in this area* [3]. *The house for E. K, designed by architect Ľ. Oelschläger, is the only family house in this locality for the time being.*" [4]

The citation is not quite exact; for we know of at least one bigger house, which originated in 1929 from the reconstruction of two older semi-detached houses [5]. A smaller residential building of the family house type also existed in the present-day school grounds of the so-called North Public School, including flats for the school principal, the caretaker and the custodian. In the 1930's, this peaceful northern locality was gradually losing its garden-like character. Closer to the town, on Letná Street, modern residential houses were built at the beginning of the 1930's [6]. A significant representative of an innovative team of architects from Brno, architect Josef Polášek, carried out his weightiest work in Slovakia, right here in Košice. This was a housing complex for bank clerks in the north-west part of the town [7]. The whole complex consists of modern, four-storey buildings of functionalistic appearance, with centrally situated staircases. Little older, inter-war housing

development preceded this entry by high-quality Czech modernism. There were two building complexes with large courtyards, built in the second half of the 1920's: the "Malá Praha" (Little Prague) housing estate on Letná Street [8] and a building complex on Havlíčkova Street [9] in the north-west part of the town. New development of housing association residential blocks gradually filled the empty places along Komenského Street, approaching the north part of the town.

Fig. 1. View of the villa corner. G&B Studio, VSM (The East Slovak Museum) Košice, Historical Photographs Fund

Fig. 2. View of the villa south facade and entrance from the Watsonova St. G&B Studio, VSM Košice, Historical Photographs Fund

Relatively early, at the beginning of the 1930's, architect Oelschläger designed his first works reflecting the current formal, structural and dispositional preferences of functionalist architecture. His individual implementations sensitively responded to the location and type of structure, as well as the requirements of each client. This also probably applied in the case of accepting the commission for the design of the E. K. family house in Košice.

Fig. 3. View of the original villa entry door, current state. Photo by Ing. arch. A. Priatková
Fig. 4. View of the space in front of the villa entrance. Photo by Ing. arch. A. Priatková
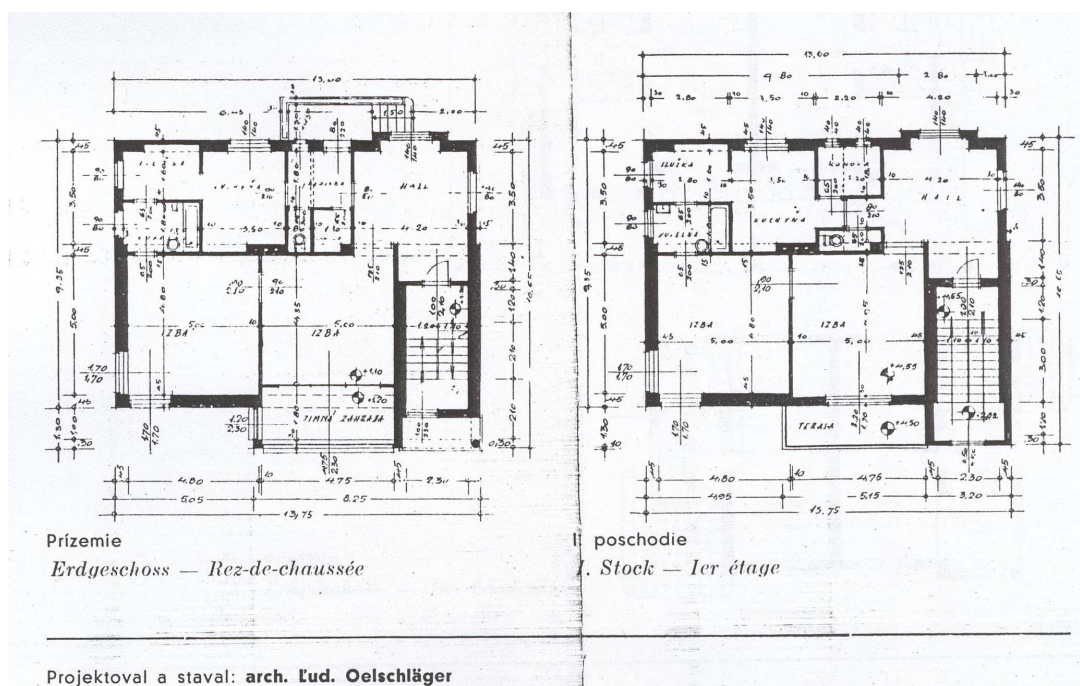
Fig. 5. Floor plans of the villa. Source: Slovenský staviteľ (The Slovak Builder, year 6, 1936, p.72)

The house consists of two, almost equivalently large two-bedroom flats with a living room, situated on two floors one above the other. The asymmetrical façade, with the vertical quadratic prism of the staircase projecting above the entrance, faces south. A conservatory, situated above the whole width of the ground-floor living room, creates a terrace for the flat on the first floor. There is a metal banner post attached to a simple metal balustrade. The elevated attic, partially covering the sloping

roof construction, creates an illusion of a flat roof from the pedestrians' perspective. The rooms are spacious; there is a bathroom attached to a bedroom from one side and to a housemaid's small room from the other side. The kitchen, the pantry and the exit to the garden of the ground floor flat get their light from the north. The hall faces southeast, the bedroom looks southwest, and the living room is orientated to the street on the south side.

Fig. 6. Mr. E. K.'s family house in Košice, Watsonova 25. Photo by Ing. arch. A. Priatková

Fig. 7. Mrs. Terézia Vajová's villa, Verbocziho St. No. 3, currently No. 7. View from the Watsonova St. Photo by Ing. arch. A. Priatková

This two-storey family house or villa, with a comfortable conservatory as part of the street façade, attracts the attention of passing-by Košice residents even these days [10]. Being a representative of modern, exclusive housing of the villa type, it affected the character of the development of several family houses especially in the newly emerging garden suburb. Another two-storey family house, erected on the same street a year later, can be an illustrative example of such an influence [11]. With regard to the general conception of its spatial arrangements, as well as the house morphology, we assume that architect Oelschläger was the creator of this design. This two-storey house with its asymmetrical, slightly more dynamic façade does not have a conservatory; it has a second balcony as a substitute. The period documentation does not state any architect's name, only the name of the builder, G. Martončík.

References

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[5] Košice, Komenského Street 54. Previously Komenského Street 42, 44. Design: architect Ľudovít Oelschläger, 1929

[6] The housing complex for bank clerks in Košice. Design: architect Josef Polášek, implementation by Košice engineer and builder Alois Novák, 1930-1931. In: Slovenský staviteľ 1932, p. 287-292

[7] Košice, Letná Str. 21, 23, 25, Jarná Str. 10, 12, 14, Jesenná Str. 1, 3. National Cultural Monument

[8] Letná Str. 16,18,20 24 26,28,30, Zimná Str. 1,3,5, Jarná Str. 13,15,17,19, Jesenná Str. 2,4,6,8. The second enclosed complex: Letná Str. 32,34,36,38, Pajorova Str. 9,11,13, Jarná Str. 1,3,5,7, 9, Zimná Str. 2,4,6,8

[9] Havlíčkova Str. 25,27,29,31,33,35, the corner of Hurbanova Str. 7. The first half of the 1920's

[10] Košice, street Verbõciho, now Watsonova 25

[11] Košice, Verbõciho Str. 3, currently Watsonova Str. "Design for the house construction for Mrs. Terézia Vajdová, on Verbõciho Str. No P. 2557 in Košice". 26th June 1937. Source: The Archives of the Town of Košice, Kováčska 20. Technical Department, unedited collection

Fig. 8. Villa interior, detail of the original floor tiles.
Photo by Ing. arch. A. Priatková

Structural Elements of Legal Persons' Corporate Tax and their Impact on Corporate Tax Revenues

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Abstract

The aim of the contribution is to characterize structural elements of legal persons' corporate tax and to assess their impact on corporate tax revenues in EU member states from a qualitative and quantitative point of view. Based on quantitative indicators (tax quota, statutory and effective tax rate), corporate tax revenues are compared in EU member states in the 2002-2018 period. The research part of the contribution is complemented by a qualitative analysis of specific structural elements (depreciation of tangible assets, amortization of intangible assets, tax treatment of loss and valuation of inventories) in order to assess the taxation of LP and to reveal the extent of changes in tax systems. It can be assumed that the fall in tax rates and a slight increase in corporate tax revenues is the result of expanding tax bases in individual EU-28 countries, as evidenced by a growing number of factors affecting the qualitative aspect of LP taxation in particular.

Keywords: *corporate tax, corporate tax revenues, structural elements, statutory tax rate*

Introduction

The period of the last century was accompanied by the introduction of simple rules for determining the tax base and higher statutory tax rates (average STR 45 % in 1982 in OECD countries). At present, declining tax rates (the current lowest level of 12.5 % in Ireland or 9 % in Hungary) are currently accompanied by the introduction of a larger number of tax elements extending the tax base. The increase in the tax quota (by an average of 26 % in the OECD countries compared to 1965) and the increase in revenues to the national budgets (by 2.9 % of GDP in OECD countries compared to 1965) are, for the sake of achieving the stability of the economy, perceived positively by the public. The influence of the introduction of the internal market in the EU, raised some negative views on this tax particularly in order to establish its unambiguous impact on the economy, and to influence behaviour and the transfer of company profits. The aim of the contribution is to characterize structural elements of legal persons' corporate tax and to assess their impact on corporate tax revenues in EU member states from a qualitative and quantitative point of view.

1. Structural elements of legal persons' corporate tax

The importance of this economic-legal institute is devoted to the professional, legal and economic literature. The tax as a *financial-legal institution* consists of several elements regulated by

the Tax Act, in which the conditions for its creation and *basic structural elements* are defined in the form of the subject and the object of the tax, the tax base and the tax rate, and the *additional structural elements* in the form of attributable and deductible items, the duration of the tax-legal relationship, and special requirements such as tax exemption, tax rebates and tax reliefs [Mrkývka *et al.,* 2004].

From the *tax-legal point of view*, tax is a tax obligation that drives the private sector out of revenue in order to increase public budget revenues [Musgrave and Musgrave, 1994]. The definition agrees with the tax characteristic of transnational organizations, OECD (2018), or from the economic literature point of view, e.g. Široký [2018], Medveď *et al*. [2009], Kubátová [2010] and Schultzová *et al*. [2015].

Legal persons' corporate income tax is also known as a company corporation tax or corporation tax of legal persons'. The meaning of terms is considered to be the same, yet conceptual ambiguity is observed in economic theory due to legal differences between states in the field of collective investment. An example is Estonia, where a "distribution tax" is applied, including the taxation of transactions considered as hidden profits, as well as Malta, where the LP taxation system does not exist, but the subject of the tax is defined similarly to the NP. The derivation of the uniform definition is influenced by the institutional, legal, economic, political and cultural-historical factors.

Within the framework of the basic and the literature of the recognized structural elements of this tax, the following are distinguished:

1. **A tax entity** is a business entity. According to the tax link to the income of the LP, this tax is classified as direct tax. Therefore, the LP's ability to transfer this tax to the state budget is assumed. Tax theory allows a NP to be considered a taxpayer if there are several owners of companies. Access is in practice unrealistic due to high administrative costs [Auerbach, Devereux and Simpson, 2008].

2. **The taxable object** is the taxable income of the company. There is no possibility to transfer the tax liability to another entity. Tax theory applies the concept of income tax on profits. The basis of the tax is derived from substantially modified financial accounting. The unused way of determining net profit of the LP is its deduction based on the net cash flow.

3. **The tax base** is the net income of the company. This is determined from the gross profit after deducting tax concessions. The tax is also levied from capital gains. From a legal point of view, the European Union (EU) member states, as OECD members regulating this tax in their laws, respect and follow the OECD procedures and principles [PWC, 2016].

4. The strategic structural element is the **nominal tax rate**. Legislatively determined value does not take into account the structure of the tax base, the efficiency of the tax system and the development of the economic cycle. In general, this rate does not have a comprehensive disclosure capability due to the fact that the revenues of LP set in accordance with the accounting procedures can be reduced by specific measures. The rate of interest is above all a psychological aspect.

EU member states have approximately the same structure of direct tax and legal persons' corporate tax in tax systems. Methods of structure the basis of this tax differ in the way of applying deductible items and implementing other legislative provisions. Determining taxable income making the tax base requires to take into consideration the specificities of country-specific legislation in the form of exempt income, tax deductible expenses, tax concessions, including the inclusion of losses and other exemptions, taking into account capital expenditures, and taking into account the principles of accounting - depreciation and asset pricing [Griffith and Klemm, 2002].

The most often, during the reform period of the developed countries, the process of changing structural elements is considered the 80s and 90s of the last century. Based on financial accounting standards and International Financial Reporting Standards, additional structural elements of the tax base, such as depreciation of buildings, amortization of intangible assets, depreciation of tangible fixed assets, inventory valuation, bad debt provisions, and tax treatment of losses are identified. Under the effects of both harmonization and the provision of EC incentives, countries allow for the possibility of group taxation, thereby taxing companies' tax outcomes on only one entity.

If the overall objective of each member state is very similar - increasing tax revenue for the state budget - there is the question: why is there a diversity of approaches to LP taxation? Relevant reasons in the form of established traditions, specific political consensus, and redistribution processes, for which the LP system of taxation in individual countries evolved separately and differently, now cease to be justified.

2. Target, methodology and database

The aim of the contribution is to characterize structural elements of legal persons' corporate tax and to assess their impact on corporate tax revenues in EU member states. The research part of the contribution examines the development of measurable quantitative tax indicators that are projected to the level of total tax revenues over the short and long term:

1. **Tax quota indicator II** - sum of tax revenue from LP tax, including the capital tax on TR, expressed in % (CTR_TR);
2. **Tax quota indicator II** - sum of the tax revenue from the LP tax, including capital taxes on GDP, expressed in % (CTR_GDP);
3. **Nominal tax rate in %** (STR);
4. **Effective tax rate in %** (EATR).

EU member states are observed in the period 2002-2018. The period is divided into four stages:

1. **1982 - 2004:** decrease in STR in most OECD countries, with no decrease in CTR_GDP (similar development observed between 1995 and 2005); in 2004 10 new member countries became members of EU (Cyprus, Czech Republic, Estonia, Lithuania, Latvia, Hungary, Malta, Poland, Slovakia and Slovenia);
2. **2005-2008:** linked to the impact of the changes in economic expansion, two new member states (Bulgaria and Romania) joined the EU in 2007;
3. **2009 - 2012**: in 2008, there was a significant interference with EU tax revenues, which is evidenced by a similar development trend influenced by the economic and financial crisis. Member states' interest in coordinated and comprehensive response to the economic crisis is still ongoing, with the implementation of structural reforms in 2011 in most countries contributing to the resumption of stability;
4. **2013 to the present:** it is an expression of the stabilization of tax revenues in individual countries; Croatia became part of the member countries in 2013.

The analysis is aimed at assessing CTR based on measurable quantitative tax indicators that are projected to the level of total tax revenues both in the short and long term. A qualitative approach reveals the extent of changes in tax systems and serves as an additional element in assessing the issue of corporate tax revenues. The database is obtained from the Eurostat databases, EC [2001; 2017] and OECD [2018] databases. The method of synthesis and analysis is used.

3. Results

3.1. *A quantitative approach to examining corporate tax revenue*

In the context of the development of the CTR through two indicators, tax quota II in relation to GDP (CTR_GDP) and in relation to TR (CTR_TR), year 2004 was chosen to be compared to 2008, when the impact of the economic crisis first appeared in tax revenues and with the year 2018 as well.

The average CTR_GDP reached a level of 2.6 % of GDP in 2004, rising to 2.9 % of GDP in 2008 and falling to 2.6 % of GDP in 2018. Developments (EU-28 average) did not show any significant fluctuations in values. The increase in the indicator over the previous period was observed

throughout the three old member states (Belgium, Germany and the Netherlands) and Malta. In addition, Luxembourg and Portugal (old member states), and the Czech Republic and Cyprus (new member countries), all reached values over the EU-28 average. The fluctuating trend (a difference of more than 1 % of GDP over the previous period) was recorded as increase in Hungary (1.1 % of GDP), Cyprus (3.0 % of GDP) and Lithuania (2.4 % of GDP), and decrease in Latvia (-1.1 % of GDP) and Finland (-1.1 % of GDP). The largest spread was observed in Luxembourg (5.6 % of GDP) and Latvia (1.7 % of GDP) in 2004, in Cyprus (6.4 % of GDP) and Estonia (1.6 % of GDP) and in Malta in 2018 (6.5 % of GDP) and in Latvia (1.6 % of GDP). From the indicator dispersion point of view, there was an uneven development recorded in the new member states.

The average CTR_TR was 6.8 % of TR in 2004, in 2008 it increased to 7.4 % of TR, and in 2018 it decreased to 6.6 % of TR. The values above the EU-28 average over the whole period reached Bulgaria, the Czech Republic, Ireland, Spain, Cyprus, Luxembourg, the Netherlands, Portugal, Romania, Slovakia and the United Kingdom. The above-average increase over the previous period was observed only for Malta. The downward trend throughout the period was observed more markedly in Estonia, Greece, Luxembourg, Romania and the United Kingdom.
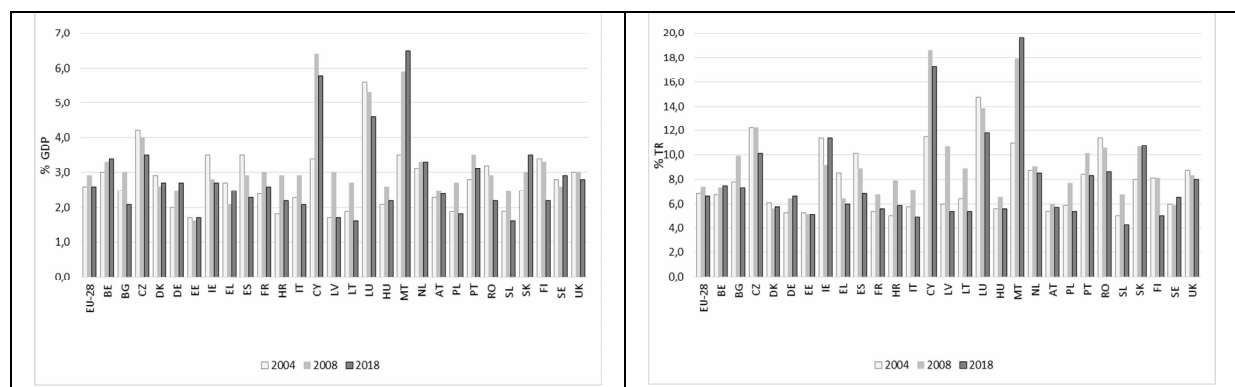
Figure 1. Tax quota II in % of GDP and % of TR in EU-28 member states
[Source: Authors' own elaboration based on data available from Eurostat (2018)]

The CTR determinant, which affects the LP decision on the placement of variable capital, is considered as STR. According to the literature, it provides scope for cross-country comparisons of tax burden [Spengel, Caron & Stevens and Baker & McKenzie, 1999].

The Table 1 shows STR in % in three periods. The average STR level reached 29 % in 2002, dropped to 24 % in 2008, and decreased to 23 % in 2016. During the period there was a decrease in STR in most countries. An exception was made up of three member states with an increase (Cyprus, Slovakia, and Portugal). Countries with the lowest STR (up to average of 24 %) in 2008 and 2016 included the new EU-28 (with the exception of Malta). The lower STRs are important in the process of competitiveness.

The legally determined value of the tax rate STR does not take into an account the structure of the tax base. An alternative is the effective average tax rate (EATR). The indicator is determined by applying basic tax rules to actual aggregate taxable income in order to derive taxable bases. Methodology is explained by Devereux *et al.* [2009]. The average EATR rate reached 26.3 % in 2002, decreased to 21.4 % in 2008, and to 20.9 % in 2016 (EU-28 average). The period could be divided into two groups. Between 2002 and 2008, the rate has fallen in all states. Between 2009 and 2016, the fluctuating trend of the indicator was already observed. While in 2002 the maximum was 36.5 % in Spain and a minimum of 12.3 % in Ireland (the difference of 24.2 %), more than 25 % range of different tax rates was present in next observed periods, in 2008 between France (34.6 %) and Bulgaria (8.9 %), similarly in 2016 between France (38.4 %) and Bulgaria (9 %). States with the lowest EATR (up to the average of 21.3 %) in 2008 and 2016 consisted of the new EU-28 states

(except Malta). In the context of tax competitiveness and in LP taxation in the EATR point of view, the new EU-28 member states are stronger.

Table 1. Statutory tax rate in % of LP income tax in EU-28 member states
[Source: Authors' own elaboration based on data available from EC (2001) and EC (2017)]

State	2002	2008	2016	State	2002	2008	2016	State	2002	2008	2016
BE	40	34	34	HR	20	20	20	**PL**	**28**	**19**	**19**
BG	**24**	**10**	**10**	IT	40	31	31	PT	33	27	30
CZ	**31**	**21**	**19**	**CY**	**28**	**10**	**13**	**RO**	**25**	**16**	**16**
DK	30	25	22	**LV**	**22**	**15**	**15**	**SL**	**25**	**22**	**17**
DE	38	30	30	**LT**	**15**	**15**	**15**	**SK**	**25**	**19**	**22**
EE	**26**	**21**	20	LU	30	30	29	FI	29	26	20
IE	16	13	13	**HU**	**20**	**21**	**21**	SE	28	28	22
EL	35	35	29	**MT**	**35**	**35**	**35**	UK	30	28	20
ES	35	30	25	NL	35	26	25	EU-28	29	24	23
FR	35	34	34	AT	34	25	25				

Note: Bold font refers to the new EU-28 member states. Dark highlighted are states where the nominal tax rate has increased during the observed periods.

Table 2. Effective average tax rate in % of LP income tax in EU-28 member states
[Source: Authors' own elaboration based on data available from EC (2001) and EC (2017)]

State	2002	2008	2016	State	2002	2008	2016	State	2002	2008	2016
BE	34.5	24.9	28.3	**HR**	:	**16.5**	**16.5**	**PL**	**25.3**	**17.4**	**17.5**
BG	**20.4**	**8.9**	**9**	IT	34.3	27.3	23.6	PT	29.5	23.7	26.6
CZ	**23.6**	**18.4**	**16.7**	**CY**	**26.9**	**10.6**	**13.1**	**RO**	**22.9**	**14.8**	**14.7**
DK	26.8	22.6	20	**LV**	**20.2**	**13.8**	**14.3**	**SL**	**20.9**	**20**	**15.5**
DE	35.8	28.2	28.2	**LT**	**12.7**	**12.7**	**13.6**	**SK**	**22.3**	**16.8**	**19.6**
EE	**20.4**	**16.5**	**15.7**	LU	26.5	25.9	25.5	FI	27.2	24.5	19.1
IE	12.3	14.4	14.1	**HU**	**19.7**	**19.5**	**19.3**	SE	23.1	24.6	19.4
EL	30.4	21.8	27.6	**MT**	**32.2**	**32.2**	**32.2**	UK	29.3	28	21.5
ES	36.5	32.8	30.1	NL	31.9	23.1	22.5	EU-28	26.3	21.4	20.9
FR	34.9	34.6	38.4	AT	31	23	23				

Notes: Bold font refers to the new EU-28 member states. Dark highlighted are the states where the effective average tax rate has increased for LPs during the observed period, the indication ":" means "unlisted value".

3.2. A qualitative approach to examining corporate tax revenues

The specific elements affecting the taxation of LP in the EU-28 states in 2017 are given in the Table 3. Selected aspects of LP taxation inspired by classification of EC (2001) are *STR, EATR, depreciation of tangible assets, amortization of intangible assets, tax treatment of loss (Back and Forward) and valuation of inventories*. Grey colour marks state that offer group LP taxation.

Statutory tax rate (STR) is a structural element using to compare LP tax systems. The lowest STR level in 2017 is observed in Bulgaria (10 %), followed by Hungary (11 %) and Cyprus (13 %). States with the highest tax rates include Malta (35 %), Belgium (34 %) and France (33 ¼ %). States also include other applicable tax rates applicable to LP, for example in Germany (except for the STR, LP also pays the solidarity tax in amount of 5.5 %). The implementation of additional rates is intended to influence the economic behaviour of the LP. Some member states make advantageous for LPs granting an individual reduced tax rate according to the level of turnover, e.g. Belgium (in the 24.25 %

category by turnover up to EUR 25,000 up to category of 34.5 % above EUR 322,500), according to business activities, e.g. Ireland (the oil industry applies 25 %, insurance industry applies 20 %), Greece (20 %) and Luxembourg (20 %), Slovenia (0 % for investment pension funds and insurance companies), according to size of companies, e.g. Latvia (5 % for companies up to 10 employees). On the contrary, some states add specific types of surcharges to tax rate, or more precisely licenses or minimum mandatory tax to the tax rate, such as Austria or the Slovak Republic (payment of the tax license).

Table 3. Selected structural elements affecting taxation of LP in EU-28 states
[Source: Authors' own elaboration based on data available from EC (2001), EC (2017), and OECD (2018)]

2017	STR	EATR	Depreciation of tangible assets	Amortization of intangible assets	Forward	Back	Valuation of inventories
AT	25.0	23.1	even	intangible asset goodwill: depreciation over 15 years in the same amount	1	n.a.	FIFO, LIFO
BE	33.9	29.3	even, declining balance method	even	1	n.a.	FIFO, LIFO, PN
BG	10.0	9.0	even	even	1	n.a.	:
HR	18.0	14.8	even	even	1	n.a.	:
CY	12.5	13.0	even	impaired during their economic life	1	n.a.	FIFO
CZ	19.0	16.7	even, accelerated (declining balance method)	impaired during their economic life	up to 5 years	n.a.	VPN
DK	22.0	20.0	even, declining balance method, 100% for low-value assets	uniform and up to 14.28 % (7 years), know-how and patents 100 %	up to 5 years	n.a.	FIFO
EE	20.0	15.7	IFRS	IFRS	IFRS	n.a.	IFRS
FI	20.0	19.5	even, declining balance method, long-term items	even with max. at 10 years, the value of goodwill charged to costs	up to 10 years	n.a.	FIFO, PN
FR	33.3	33.4	even, declining balance method	only intangible fixed assets with a limited life may be depreciated	up to 5 years	3 years	FIFO, PN
DE	30.0	28.8	even, declining balance method, production method, additional depreciation	uniform throughout its useful life (excluding goodwill)	1	n.a.	LIFO
EL	29.0	27.6	even, declining balance method	even, R & R costs in the years of their creation	up to 5 years	n.a.	FIFO, LIFO, PN
HU	10.8	11.1	even	impaired during their economic life	1	n.a.	LIFO
IE	12.5	14.1	even, declining balance method for motor vehicles	patents during their existence (max. 17 years)	1	1 year	FIFO, LIFO, PN
IT	24.0	23.5	even	goodwill from third parties may be depreciated over a period of at least 10 years	up to 5 years	n.a.	FIFO, LIFO, VPN
LT	15.0	14.3	even, declining balance method	even, max 5 years	1	n.a.	VPN
LV	15.0	13.6	declining balance method	rate 67 % based on declining balance method	1	n.a.	FIFO
LU	27.0	23.7	even, declining balance method	value to the extent that it is lower than the acquisition cost. Realized goodwill depreciation is 10 years	1	n.a.	FIFO, LIFO, VPN
MT	35.0	32.2	even	impaired during their economic life	1	n.a.	FIFO
NL	25.0	22.5	even, declining balance method, combined, accelerated for certain assets	all depreciation methods	up to 9 years	up to 1 year	FIFO, LIFO

2017	STR	EATR	Depreciation of tangible assets	Amortization of intangible assets	Forward	Back	Valuation of inventories
PL	19.0	17.5	even	even	up to 5 years	n.a.	LIFO
PT	30.0	20.0	even, declining balance method	based on the number of years of expected use with min. of 3 years	up to 5 years	n.a.	FIFO, LIFO, VPN
RO	16.0	14.7	even, declining balance method, regressive	:	:	n.a.	:
SK	21.0	18.7	even, accelerated	even, 5 years	up to 5 years	n.a.	VPN
SI	19.0	17.3	even	even, 5 years	1	n.a.	LIFO
ES	25.0	30.1	even, declining balance method	annual maximum limit 1/10 of the total amount	up to 10 years	n.a.	all methods
SE	22.0	19.4	even, declining balance method, exhaustion of national sources method	depreciable as machinery and equipment	1		FIFO
UK	19.0	20.5	even, declining balance method	patents and know-how: 25 % value reduction	1	1 – 3 years	all methods

Notes: Statutory tax rate (STR), Effective average tax rate (EATR), Tax treatment of loss (Back – applicable retrospectively, Forward – applicable in advance), valuation of inventories: average cost method (PN), weighted average cost method (VPN), "First in first out" (FIFO), "Last in first out" (LIFO), unlimited (1) incomplete data (:), not applicable (n.a.). Grey colour marks states that offer group company taxation.

Differences between financial accounting rules and tax accounting policies in the form of depreciation of tangible assets have a significant impact on the development of corporate tax revenues. The meaning of the rules on tax depreciation varies depending on the assets. If the actual economic depreciation rate is higher and is allowed for tax deduction, it is one of the tax incentives for investments in the state. The most commonly used depreciation methods are a straightforward method, a declining balance method, or a combination of these two methods, alternatively depreciation under IFRS standards. However, the same methods cannot be used for any type of property. Given the range of methods, rates and asset categories, it is difficult to compare the depreciation rules among states.

Member States have different approaches to the depreciation of intangible assets. For non-depreciated property, the land is considered, and in some countries it is also patents and trademarks. The biggest contrast is goodwill. Most member states allow some form of depreciation of intangible assets, some countries do not allow any depreciation, for instance France and Ireland with some exceptions, and only patents and know-how are depreciable in the UK.

The possibility of transferring a loss to the concession on tax in advance profits (Forward) is especially important for new start-ups. Thirteen member states retain the time limits for the implementation of this loss and they are divided into "up to ten years" (Finland and Spain) and „up to five years" (the Czech Republic, Denmark, France, Greece, Italy, Latvia, Lithuania, Poland, Slovakia, Slovenia and Portugal).

The possibility of transferring a loss backwards (Back) is as follows: in most states, the option is not granted; in three countries, the loss can be transferred back to „three years" (France, the Netherlands and the United Kingdom) and in one member state (Ireland) „within one year". Countries access to losses shows how structural elements of the tax system can change. Over the past years, losses in several member states have been a reason to a time limit. At present, the observed trend is to allow for more favourable rules in this area too, what states offer some space to deduct the losses associated with longer periods from the tax base. Unlimited loss could be the equivalent of a tax incentive for new businesses.

Taxation of a capital income is largely similar between states. With some exceptions, they all respect the implementation principle. However, the number of countries that exempt profits from tax or apply a reduced tax rate to profits grows. The justification of inventory valuation has a decisive influence on the development of the LP corporate tax income, especially at the time of higher

inflation, when value of inventory changes. The most commonly used method among countries is LIFO and FIFO. Most member states accept this approach.

The implementation of the additional structural tax elements into the tax base is partially assessed by EATR, which expresses the share of tax paid to taxable income. The range of tax rates among states varies from 9 % in Bulgaria to 32.5 % in Malta or 33¼ % in France.

At the time of growing multinational companies, which have more subsidiaries in different countries, cooperation should also take place in the tax area, in particular by reducing aggressive planning and tax evasion.

Countries with a long-term level of corporate tax revenue above the average in relation to GDP over the whole period were Belgium, the Czech Republic, Cyprus, Luxembourg and Malta, and in terms of the corporate tax revenue indicator in relation to total tax revenues, were the Czech Republic, Cyprus and Malta (similarly to previous case), followed by Ireland, Portugal, Romania, Slovakia and the United Kingdom. These countries were on the basis of the two mentioned indicators considered as states that compared with the other EU-28 member states, these put more emphasis on the LPs taxation and income to the state budget from these taxes. Countries with a long-term level of the nominal tax rate above the average for the whole period were Belgium, Germany, Spain, France, Luxembourg, Malta, the Netherlands, Austria and Portugal, and Belgium, Germany, Spain, France, Malta, the Netherlands, Austria, Portugal (similarly to the previous case), also Greece, Italy and the United Kingdom. Countries with a long-term level of the nominal tax rate below the average for the whole period were Bulgaria, Estonia, Ireland, Cyprus, Latvia, Lithuania, Hungary, Romania, Slovenia and Slovakia, and Estonia, Ireland, Lithuania, Hungary, Romania, Slovenia and Slovakia (as in the previous case), also the Czech Republic, Croatia and Poland.

It can be assumed that the decrease in tax rates and the stability (or moderate increase) of corporate tax revenues is the result of expanding tax bases in individual EU-28 states, as evidenced by a growing number of factors affecting, in particular, the qualitative aspect of LP taxation, either positive or negative way. On the basis of these findings, the decrease in tax rates associated with the increase in corporate tax revenues (in terms of GDP or TR) was observed in the Czech Republic, Cyprus, Ireland, Romania and Slovakia.

4. Discussion

The field of corporate tax is not directly regulated by European legislation, and the process of harmonization in the field of direct taxation in the EU is not intense, particularly because of the need of unanimous agreement of all member states. EU action in the field of legal persons' corporate income tax focuses primarily on measures relating to the principles of the single market, the harmonization of standards for the taxation of LP and the specification of objectives, for example in the form of tax evasion prevention and elimination of double taxation. A certain degree of tax harmonization for LPs may be necessary precisely to avoid distortions in economic competition and to narrow the scope of manipulative accounting and aggressive tax planning.

If there are differences between STR and EATR, it is important to identify the causes of these differences and to compare the additional structural elements that determine the LP corporate tax revenue. EC (2001) identifies the additional structural elements of this tax based on the member states' tax legislation, concentrated in the International Bureau of Fiscal Documentation (IBFD) database, which significantly affect the differences between EATR and STR.

In EU-28 states, direct taxes are the least harmonized. This fact is underlined by the fact that the range of tax revenues between the highest and the lowest values of the indicator is more than 28 percentage points. Qualitative findings point to the desirability of differences between the level of corporate tax revenues in member states and the circumstances affecting the approximation of current tax systems. Devereux, Lockwood and Redoano [2008] state that 80s of the last century, the assumed idea of the necessity to transfer the higher part of the tax burden to direct taxes has been put forward.

According to last period, the importance of corporate tax is growing in which member states have undertaken to transfer the tax burden from consumption taxation to income tax.

The development of CTR in terms of rate development has been called "race to the bottom" since the early 80's of the last century. The trend in the development of rates was their decline, which did not reflect in the change of CTR. It is possible to assume that the fall in rates and the stability of CTR are the result of expanding the tax bases.

On the one hand, in terms of achieving the stability of macroeconomic objectives, also in the form of rising economic growth rates, the attempt to increase the volume of corporate tax revenues in individual countries is perceived by the public as positive. In particular, higher volumes of corporate tax revenues were important during the period of the public finance crisis, when countries tried to adhere established rules of budget deficits and ensure the economic recovery as soon as possible [Macek, 2015]. On the other hand, in view of the justification of the existence of an LP corporate tax, there are observed disturbing perceptions as well, especially in conjunction with the inefficient increase in government revenues [Godar, Paetz and Truger, 2014; Zuluaga, 2016], in conjunction with the territorial taxation of the majority [Toder a Viard, 2016; Clausing, 2016], with the necessity to reform the taxation of intangible assets underlying current globalisation [Dharmapala, 2016], with the need to focus on moving away from the possibility of transferring the tax burden on employees [Fuest, 2013], the issue of lowering nominal tax rates [Devereux and Vella, 2014; Cozmei, 2015], or on a series of questions regarding changes in the level of taxation and the development of the economy in the context of political decision-making [Romer and Romer, 2010, Ljung and Smolyansky, 2015; EC, 2017].

Conclusion

From the synthesis of knowledge results that the current adjustments of the tax structures of the EU member states respond to the justification of direct tax revenues, not deducting corporate tax revenues. Structural elements of this tax are important determinants of corporate tax revenues. In addition to traditional, quantitative elements, the importance of qualitative elements implemented in tax structures is increasing. Changing the nominal tax rate affects the change in corporate tax revenues. However, the tax rate cannot be considered as proportional and linearly affecting corporate tax revenues. A qualitative approach reveals the scale and complexity of tax systems across countries and serves as an additional element in assessing corporate tax revenues. It is not possible to unambiguously state that higher corporate tax revenues are exclusively in states with higher tax rates. However, it can be said that corporate tax revenues are affected by tax variables, economic performance in the form of GDP, by new variables examining the tax system and the structural elements of this tax.

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Trading with Option Strategies

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Abstract

Today derivative trading plays a major role in the financial markets. Specifically, trading with options offers traders the ability to create new business strategies. There are currently a huge number of different types of exotic options on the market, or option strategies employing a combination of different positions on vanilla options. The paper presents examples of option strategies, namely call vertical spreads and long strangle and straddle strategies where back-testing and forward-testing were processed on these strategies. By testing option strategies, the trader can avoid unnecessary losses.

Key words: *option strategy, trading, back-testing, forward-testing*

Introduction

Recently, in the financial sector, growth in the derivatives market has been recorded. These tools have become an important financial instrument in traders and investors' portfolios, as well as companies and corporations. Today, the derivative market is larger than the stock market in terms of the volume of annual transactions executed. Before entering on the financial market, any reasonable trader or the investor should predetermine the strategy which he will apply and strictly adhere its. In the case of trading, we know some options.

Options are derivatives tools that enable you to create sophisticated business strategies to provide risk management or create highly speculative deals. Financial engineering is dealing by options and option strategies. Beder and Marshall [2011] have characterized financial engineering as an application of technical methods, especially in the fields of financial mathematics and computational finance in financial practice. The use of engineering tools (such as various software) and mathematical methods helps solve financial problems. The aim of the financial engineer is to create a system that uses models and optimization methods to help the trader in the decision making process [Iba and Aranha, 2012].

In the paper, based on the theoretical valuation of options, we will determine the value of portfolios of option strategies and examine their development and average returns. Because we use historical data of underlying asset prices, we are talking about the back-testing strategies. By comparing the results of average returns, we determine the most profitable strategies. Option strategies, such as call vertical spread, long strangle and straddle were analyzed. Based on back-testing of strategies, we will identify the most powerful option strategies. Following these results, the forward-testing is applied by using demo account (Trader Workstation software) opened in Interactive Brokers company. The aim is to find out how the strategy's performance varies between theoretical option pricing and real options market valuation. After processing data from the financial market and

their subsequent analysis, we have judged the real returns of option strategies in the financial market. Based on the results of the analysis, we have put recommendations to investors.

Research methodology

The methodology of this work is based on options and option strategies and their subsequent evaluation. *Vanilla options* are the most common form of options with a clear maturity date, the strike price and no other special features. Payoff function of the vanilla option is the difference between the strike price and the price of the underlying asset at the maturity date. We know both buy (call) options and sales (put) options. On the other hand, *exotic options*, also called second generation options, or tailor-made options, have evolved from the original vanilla options. Exotic options include path dependent options, correlation options, and others. The best known are *barrier options*. We know "knock-in" and "knock-out" barrier options. The difference between them determines the position of the so-called barrier prices in the contract, where the barrier may be above (up) or below (down) the current price of the underlying asset. Reaching / not reaching this price, causes it's activation (in) or deactivation (out). In case of *Asian options*, payout depends on the average price of the underlying asset during a pre-agreed expiration period and at a predetermined frequency of observation of those prices, where we distinguish between arithmetic and geometric Asian options. *Binary options*, also called digital options, feature a simple payoff function. Payoff may be either a fixed amount of money Q, a single asset or the difference between the price of the underlying asset and a predetermined level of the strike price. Based on these criteria, we classify binary options as CON (cash-or-nothing) options, AON (asset-or-nothing) options and gap options. The characteristics and use of options strategies are addressed in several publications. Publications with high quality are from Salib [2010a, 2010b] and Nations [2014]. From the Slovak authors, the option strategies are processed by Šoltés [2002] and Ižip [2014], which deal with special forex options strategies.

Several approaches and models can be used to evaluate options. The most well-known model is the Black-Scholes model [1973]. Another way of options evaluation is to use the Monte-Carlo method of Boyl [1977], where the author evaluated the European call option as the dividend-based share by simulating a large number of possible price developments of the underlying asset until maturity date.

The analysis of option strategies as well as option pricing was carried out in the R software, where we have defined the functions that generated the average returns of strategies according to the type of underlying assets. The "fOptions" and "fExoticOptions" packages were used to calculate option prices. For example, Apple's stock options prices for the first quarter of 2016 are 95, 100, 105, 110 and 115. Below is part of the "CallOption" function (1) that calculates the option premium for the assigned parameters of the option.

```
call[i, 5+j] <- GBSCharacteristics(TypeFlag = "c",
                             S = call[i, 2],
                             X = strike_prices[j],
                             Time = days_to_maturity / 252,        (1)
                             r = r,
                             b = r,
                           sigma = call[i, 3])$premium
```

During back-testing of the performance of our option strategies, we focused on quarterly periods in which we reviewed the performance of selected strategies. This means that for each day of a quarter we have evaluated an option with the maturity date on the last business day of that quarter (for example, for the first quarter of 2016, the maturity date was set for 31st March 2016). Then, for each day of the quarter, we determined the value of the strategy portfolio, and the profitability of the strategy in the quarter was then determined by the relation (2):

$$yield = \frac{V_T - V_0}{V_0} \tag{2}$$

where: V_T – the value of the strategy's portfolio at maturity date,
       V_0 – the value of the strategy's portfolio at the beginning of the examined period.

In program R, we have created a function that has served us to calculate the performance of option strategies. Below is the part of this function (3) where the profitability of the strategy was calculated during the cycle.

```
for (j in 5 : temp2_col){
    temp_return <- c(temp_return,
                    (temp2[1, j] - temp2[temp2_row, j]) / ) }        (3)
```

Option testing strategies were based on back-testing. Akansu and Torun [2015] in their publication state that the back-testing process consists of the following steps:

1. obtain historical market data (prices of assets, traded volumes) from a reliable source,
2. analyze the strategy for finding trade signals,
3. calculate the performance of our strategy,
4. calibrate the parameters of the strategy and repeat the test of adjusted strategy.

Consequently, we will implement the option strategy on the trading platform with the final recommendation for investors. Based on back-testing of strategies, we have identified the most powerful option strategies and we have carried out the so-called forward-testing. This is a time-consuming test because we cannot accurately predict how the asset's price will develop in the future and we have to wait for this development [Akansu and Torun, 2015]. The most common form of forward-testing is trading on a brokerage account through a trading platform and trading on these demo accounts for a few days. These demo accounts can be used to test business strategies on real-time data. It is just a partial acknowledgement of your emotions, as we are still not dealing with real capital. In our work, we used for forward-testing services of the American brokerage company Interactive Brokers.

Data

Before we analyze the profitability of option strategies, we will evaluate the vanilla options. Evaluation of vanilla options will serve us to create the portfolios of specific option strategies. For the purposes of our work, we have theoretically evaluated the call and put options of selected underlying assets. We chose as underlying assets:

- four US stock titles with the highest weight in the S&P 500 index,
- four German stock titles that have the highest weight in the DAX 30 index,
- indexes S&P 500 and DAX 30.

We determined the share of companies in the indices by market capitalization as of 31st March 2016. The main reason for the selection of these underlying assets was to use the liquid financial assets, and at the same time we compared European stock options against American stock options. In addition, index options are very often used on the market, which has led us to add two index titles. Shares of companies with high market capitalization belong to liquid assets, as well as the world-wide known S&P 500 and DAX 30 indexes. The most valuable trading titles in the S&P 500 and DAX 30 indices are shown in Tab. 1. Then, based on historical data, we tested the performance of the strategies.

Due to the unavailability of historical data of options, these prices were theoretically calculated using statistical software (eg. MS Excel, R, etc.). The difference between these approaches is the relevancy of back-testing of option strategies because theoretical option pricing is different from

actual prices of options. The reason for the difference between the theoretical and the actual price of the option is the existence of a spread between the buying and selling price on the real market. In the theoretical calculation of the price, we did not assume the existence of spread, i.e. the buying and selling price of option have the same values. Another reason for the price difference is that in case of real prices of options on the market, the price of the underlying asset includes the so-called implied volatility, i.e. volatility expected by the market, while in our theoretical calculation of the price, we calculated the historical volatility on the underlying asset.

Tab. 1. The most valuable American and German titles
[Source: own design based on Deutsche Börse a slickcharts.com]

S&P 500			DAX 30		
Company	Trading symbol	Weight in index	Company	Trading symbol	Weight in index
Apple	AAPL	3.38 %	Bayer	BAYN	9.13 %
Microsoft	MSFT	2.42 %	Siemens	SIE	9.06 %
Exxon Mobil	XOM	1.92 %	SAP	SAP	8.15 %
Johnson&Johnson	JNJ	1.69 %	Daimler	DAI	8.11 %

Back-testing was performed between 1st January 2006 and 31st March 2016, which represents 41 quarter periods. We recognize every option strategy as a portfolio of option positions that differ in the realization price, maturity, and so on. For the test period, we chose the period from 1 January 2006 to 31st March 2016, i.e. 41 quarters. For a given time period, we needed to calculate the options prices. Option prices that we calculated assume quarterly maturities. For example, the AAPL share prices from the first quarter of 2016 have assigned the price of their options with the date of expiration as of 31.3.2016. The days of quarterly maturities can be found in the trade calendars of individual stock exchanges or on trading websites on the stock exchanges (in our case, we used the marketwatch.com page). The time period until the option expires is expressed in years and the expiration date of the option is measured by the number of business days, not the calendar days. One calendar year has approximately 252 business days, and therefore Δt is calculated according to the relation (4) [Hull, 2012]:

$$\Delta t = \frac{(T-t)}{252},\qquad\qquad(4)$$

where (T-t) - the number of remaining business days until the expiration of the option.

The interest rate of the options for US titles (S&P 500, AAPL, MSFT, XOM, JNJ) was determined as interest rate of 1-year US government bonds as of 31st March 2016. Its value at that time was 0.59%. The interest rate of options for German titles (DAX 30, BAYN, SIE, SAP, DAI) was determined as the interest rate on 1-year German government bonds as of 31 March 2016. Its value at that time was -0.46%. In the functions that we used to calculate the option pricing, we also entered parameter b, which represents the costs of purchasing the option. If we do not considered these costs in the cost model, which is also true in our case, then the cost of procurement of this option is equal to the interest rate, b = r. Historical prices of underlying assets were obtained from the Yahoo Finance web application. From historical price development, we have calculated historical volatility.

Analysis of portfolio performance

Back-testing of option strategies

In our analysis we will focus on 3 option strategies, namely vertical spreads, strangle and straddle strategies.

The portfolio of *vertical spreads* consists of two call, or two put options with one long and one short position in the option so that their expiration time is the same but they differ in the strike prices.

We talk about long or short spreads depending on whether the option premiums that we pay for buying an option is higher or lower than the option premiums which we get for selling. The difference between the option premiums is also called the spread. We distinguish four vertical spreads [Nations, 2014], namely a long and short call / put vertical spread.

The spread profitability function is a combination of the profit function of options that are part of the portfolio of that spread. Profit and loss are limited, and this is also the main reason why it is considered as conservative strategy. The spot price level of the underlying asset when the strategy achieves zero profit (the Breakeven Point - BEP), then call vertical spread strategy is the sum of the lower strike price and the spread. A long call vertical spread is used when the trader expects the price of the underlying asset to increase. With a short vertical spread, the trader simply needs in order the underlying asset's price to do not change or fall. The strike price of an ATM option is characterized in our case as the nearest value to the underlying asset's price on the first trading day of a quarter that is divided by five. We have marked this price as ATMprice. The strike price of OTM options is shifted by ExpStep and 2 * ExpStep compared to the ATM strike price. If the underlying asset was a share, the ExpStep variable was equal to 5, the index S&P 500 as underlying asset was the ExpStep variable equal to 50, and finally for the DAX 30 the ExpStep variable was 100.

As part of the vertical spread strategies, we considered 4 combinations of parameters according to options types and the strike prices:

- Long Call 1:
  - a long call option with the strike price ATM_{price},
  - a short call option with the strike price $ATM_{price} + ExpStep$.

- Long Call 2:
  - a long call option with the strike price ATM_{price},
  - a short call option with the strike price $ATM_{price} + 2 * ExpStep$.

From Tab. 2 we considered that in the case of long call vertical spreads, the average yield was positive regardless of the underlying asset. The best average profitability of this investment was the combination of the "Long Call 2" vertical spread strategy where the underlying assets were Apple's shares. In this case the average yield was about 607%.

Tab. 2. Average profitability of vertical spread strategies [Source: own calculations]

Underlying asset	Long Call 1	Long Call 2
AAPL	5.692	6.069
MSFT	1.914	2.089
XOM	1.375	1.992
JNJ	1.908	2.328
SP500	0.703	1.141
BAYN	1.864	2.153
SIE	1.254	1.800
SAP	1.132	1.503
DAI	0.864	1.336
DAX	0.591	0.732

If the trader fails to accurately estimate future price developments but hopes to predict future volatility, the straddle and strangle strategies are very often used. In this case, we also talk about volatility trading. Straddle is traded in most cases with ATM options, and strangles use OTM options. The portfolio of strangle strategies consists of the following options [Ižip, 2014]:

- Long strangle:

     o   the long call option with higher strike price (OTM option),

     o   the long put option with lower strike price (OTM option).

In the case of strangle strategy, we have always set a combination of OTM options so that their strike prices would be approximately the same distance from ATMprice.

Depending on the chosen strike prices, we have distinguished these types of straddle and strangle strategies:

- Long Straddle:
  - the long call option with the strike price ATM_{price},
  - the long put option with the strike price ATM_{price}.

- Long Strangle 1:
  - the long call option with a realization price $ATM_{price} + ExpStep$,
  - the long put option with the realization price $ATM_{price} - ExpStep$.

- Long Strangle 2:
  - the long call option with the strike price $ATM_{price} + 2 * ExpStep$,
  - the long put option with the strike price $ATM_{price} - 2 * ExpStep$.

Tab. 3 shows the interesting fact that, except for one case, the average profitability of straddle and strangle strategies was profitable in each case. We can also notice that the straddle strategies have revealed cases where the average profitability was unusually high. The main reason was the initial cost of OTM options, which are near to zero, but during the ten-year period under review at least one such situation occurred that the price of the underlying asset at the expiration date changed so significantly that the value of one options in the portfolio was at the money. Subsequently, the value of the strategy's return in that quarter reached enormous values, which also affected the average return on the strategy.

Tab. 3. Average profitability of straddle and strangle strategies [Source: own calculations]

Underlying asset	Long Straddle	Long Strangle 1	Long Strangle 2
AAPL	1.27	124.13	43.16
MSFT	0.87	2285.21	0.38
XOM	0.68	21.28	40750.75
JNJ	0.97	149.29	-0.35
SP500	0.96	4.10	26.97
BAYN	0.82	12.63	24.31
SIE	1.07	7.10	45.48
SAP	0.93	11.40	476.71
DAI	1.41	30.67	9946.34
DAX	1.14	1.66	2.47

Forward-testing of option strategies

For forward-testing purposes, we chose 2 option strategies using vanilla options for different underlying assets. Selected options strategies were tested at historical option prices for selected underlying assets where the option strategy reached the highest average yield while maintaining the diversity of underlying assets is used. For example, strangle strategies were the highest yield for Exxon Mobil's stock options. Through the TWS platform, we have determined the sales and purchase

prices of our OTC market options. Option premiums are defined for one share of options on the TWS platform. The combination of the purchase and the sale of options, we created the portfolios needed to create options strategies. All our options positions were created on 12th April 2016 with the maturity date 29th April 2016.

We defined the profit function that we had when options opening. On the candle chart, we showed the development of the underlying asset price during the expiration period of 14 business days. The graphs also described the important limits resulting from the profit function. In the candle chart, the upper and lower wings indicate the maximum, respectively the minimum cost of the underlying asset on a business day. The candle body reflects the opening and closing price of the underlying asset on the stock market. If the body of the candle is filled, the opening price is higher than the closing price. Otherwise, this means that the price of the underlying asset has risen during the day and therefore the opening price is lower than the closing price [Forman, 2006].

From the results of the back-testing of vertical spread strategies, we can conclude that the highest yield was achieved in the long call vertical spread using Apple's stock options. For the purposes of forward-testing, we have decided to use the share option for this company on the trading platform.

The long call vertical spread portfolio consists a long position on the ATM call option and a short position on the OTM call option. Apple's share price was around 110$ at the time of the created strategy. That's why we bought a call option with the strike price in the amount of 110$ with option premium of 3.3$, and at the same time we sold a call option with the strike price in the amount of 115 $ with option premium of 1.26$. This strategy is created with cost in amount of 2.04$ at the time of issue. The payout function is needed to define how right combination of the strike prices in order our strategy would be profitable. The option premiums have been obtained from the trading platform. Based on that we have defined the profit function by the relation (5) [Šoltés, 2002]:

$$profit = \begin{cases} -2,04 & if \ S_T < 110 \\ S_T - 110 - 2,04 & if \ 110 \leq S_T < 115 \\ 2,96 & if \ S_T \geq 115 \end{cases} \tag{5}$$

where S_T is the underlying asset's price at the maturity time.

The investor is successful in the case of a long call vertical spread strategy if the price of the underlying asset increases in the future. Fig. 1 shows Apple's shares development between 12th April 2016 to 29th April 2016. At the beginning of trading with this strategy we found the following facts:

- the maximum loss in amount of 2.04$ is achieved if Apple's share price does not exceed 110$; in Fig. 1, this line is highlighted in red,
- The profitability of the strategy will be positive if the Apple share price is higher than 112.04$; in Fig. 1 this line is highlighted in green,
- the maximum profit in amount of 2.96$ will be reached if Apple's share price is equal to or above 115$; in Fig. 1 this line is highlighted in blue.

Due to this fact, that Apple's share price was 93.74$ at maturity, the long call vertical spread strategy reached a maximum loss of 2.04$.

After back-testing of two similar strategies, straddle and strangle, which are mainly used to increase the volatility of the underlying asset, we have found that the highest yield achieves strangle strategy for Exxon Mobil shares (see Table 3). For this reason, we used the forward-testing for strangle strategy by use of Exxon Mobil shares.

Using strangle option strategy, the trader is always buying two types of options, specifically call (OTM) option and put (OTM) option. Exxon Mobil's share price was around 84$ at the strategy' issue time. Because we used the OTM options to create the strategy, the strike price of the call option was 86$ and put option 82$. The call option option premium was 0.75$ and the put option premium was

0.7$. It means that the total cost of the strangle strategy was 1.45$. Long strangle strategy is traded when is expecting either sharply underlying asset's rising or falling. In other words, the volatility of the underlying asset price will increase in the future and the trader will profit from it. The prices of the underlying asset can be determined by the profit function when the yield of the strategy is obtained in positive numbers. The profit function of strangle strategy is given by the relation (46) [Šoltés, 2002]:

$$profit = \begin{cases} -S_T + 82 - 1{,}45 & if \ S_T < 82 \\ -1{,}45 & if \ 82 \le S_T < 86 \\ S_T - 86 - 1{,}45 & if \ S_T \ge 86 \end{cases} \quad (6)$$

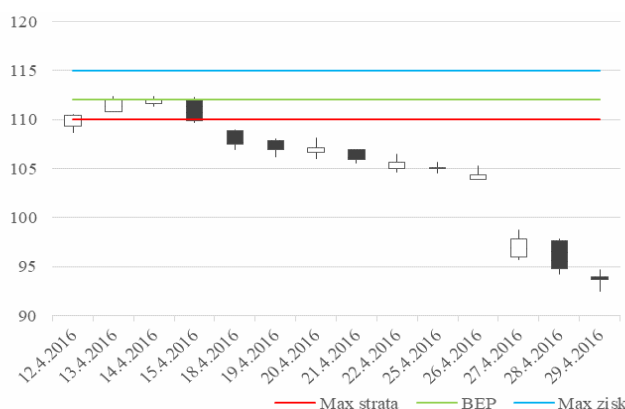where S_T is the underlying asset's price at the maturity time.

Fig. 1. AAPL share price development during the expiration of the options [Source: own design]

From the profit function (6) we can conclude the following facts that characterize our strategy strangle:

- the maximum loss of $ 1.45 is reached if Exxon Mobil's share price is between 82-86$ at the expiration date; in Fig. 2 it is an area between red lines,
- the strategy will be profitable if the XOM share price is less than 80.55$ or more than 87.45$ at the expiration time; in Fig. 2, the profit margins are represented by green lines,
- also, the profit is unlimited in the case of strangle strategy.

At the time of the expiration, Exxon Mobil's share price was 88.40$, which means our strangle strategy was profitable and at the time of the expiration we got 0.95$ payout. The profitability of the strangle strategy was approximately 34.5%.
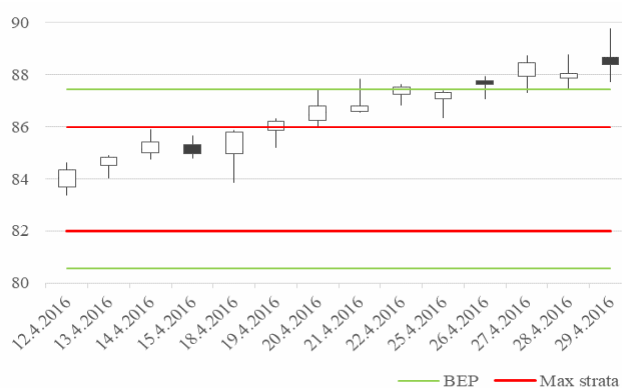

Fig. 2. XOM share price development during the expiration of the options [Source: own design]

Discussion

The success of forward-testing was varied with the option strategies. We summarized the results in Tab. 4. Long strangle strategies (yield 34.5%) were positive strategies. Maximum loss was achieved with a long vertical spread (yield -100%). Given that the price of the underlying asset went through expiration to the party, our loss from this strategy was equal to the initial cost.

Tab. 4. Comparison of the forward-testing results [Source: own calculations]

Strategy	Position	Underlying asset	Price movement during expiration	Final profit/loss	Yield
Vertical spread	long	AAPL	drop	-2.04$	-100%
Strangle	long	XOM	growth	0.95$	34.5%

During the expiration period, the prices of the underlying assets moved in different directions and, depending on that, the success of the strategies varied. The success rate of the option strategies depends on the trader's success in correctly estimating the price development of the underlying asset. In the case of a vertical spread, we needed an increase in the price of the underlying asset during the expiration time in order to achieve a positive return. For strangle strategies, we needed to increase the volatility (of whether this change was up or down) to generate a positive return. If trader wants to speculate on the volatility change of option strategy, then he should create a delta neutral portfolio. For the delta neutral portfolio, the profitability of the strategy depends only on minimal changes in the price of the underlying asset.

From the forward-testing results, the trader should use an option strategy for his trading either on the assumed direction of the underlying asset price development or on the assumed future volatility trend.

Conclusion

The aim of the paper was to introduce trading with options and option strategies on the financial markets. Options are classified as vanilla and exotic options. With these options, pricing models are significantly different, and we know some approaches to evaluating vanilla or exotic options. These approaches were showed in the paper. By using R software we have defined the functions that are used to calculate the vanilla option premiums and also asian, barrier and binary options. We have valuated selected underlying assets for the period from 1st January 2006 to 31st March 2016. Theoretical price of options are differ from its real market prices. It is due to that we do not consider the difference between the buying and selling price (spread), use historical volatility compared to implied volatility and also there are effect bids and asks that determine the price of the options on the market. Successful option traders use several option strategies to achieve positive returns. We described three basic options strategies (vertical spread, straddle and strangle). We calculated historical option prices, therefore we tested the performance of strategies for quarterly period. From the back-testing results, the conclusion is that some strategies provide very high average returns. It is valid that some strategies were created without initial cost and as long as the price of the underlying asset sharply changed during the expiration period, the profitability of the examined period reached a high value, which also affected the calculation of the average return. The average returns for some strategies, regardless of the type of underlying asset, show positive values. On the other hand, there were also strategies that had negative average returns on all the underlying assets.

Another part of the analysis of option strategies was the testing of strategies on the trading platform. There were 14 business days for testing selected option strategies. The results were variable. We were profited in case of long strangle strategies. The long strangle achieved a yield of 34.5%. The vertical spread strategy were lossy where we have reached a maximum loss of $ 2.04.

The contribution of the paper shows that there are important two options parameters for the option trader, i.e. the price of the underlying asset and volatility. It would be interesting for each trader to find out what option strategy to use for a given market situation. As an extension of this paper, we propose to use the technical and fundamental analysis for options trading.

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Innovative Activity as an Object of Modern Management in the Enterprise

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Abstract

Necessity of innovative development of production imposes new requirements to contents, organization, forms and methods of management activity. It dictates the emergence of a special type of management aimed at managing the processes of updating all elements of organizational systems. Innovations become the key to increasing the competitiveness of the firm. The modern management paradigm assigns innovation to one of the most important role. Innovation management concept is built on the basis of three main aspects of innovative activity: as areas of conflict of interests in the innovation market, as the driving motive for the development of the pure competition market and as one of the main sources of improvement of labour market.

Keywords: *innovation, innovative management, renovation, production, modernization, innovative systems, innovative activity, project team*

Introduction

At the basis of the qualitative changes taking place in the modern economy lays the innovative orientation of the strategy and tactics of production development. The innovative activity of the economy has acquired the character of a central social and economic process in developed countries. Changes in factors of production are expressed in the increase of their information, intellectual and innovative components.

The modern organization has a leading role in the renewal of products and technology. Enterprises provide the necessary concentration of financial, material, technical and human resources. Large firms have the ability to implement a long-term strategy of innovative development, focused on a variety of market needs.

Economic development in conditions of innovations

Qualitative changes in the modern economy indicate the fact that there has been a significant regrouping of factors and sources that determine economic development. The shrinking capacities of economic growth based on traditional resources are related, both with the approximation of the physical limits of their use, and with the declining efficiency and increased costs of environment protection measures. This means that the dominant in the formation of the model of economic growth

of the XXI century becomes a system of innovative processes, scientific knowledge, new technologies, products and services.

The main components of innovation systems are technological, scientific and scientific-technical, social-organizational, managerial, and cognitive innovations embodied in scientific knowledge, inventions, know-how and various material carriers.

Innovative activity is not a single act of introducing any innovation, but a purposeful system of measures of developing, implementing, mastering, producing, diffusing and commercialising innovations. Innovative activity is presented as a creativity process of elaboration of new things.

In the management of innovation activities, it is necessary not only to identify the interrelationships of various innovations, but also to support the continuous evolution of innovation systems. This is due to the expansion of the boundaries of self-development and self-organization of economic systems and demonstrates the increased opportunities for improving the economy and its structural transformation. Therefore, under the influence of innovation, structural transformations of the economy are also involved in the system of innovative management objects.

Innovative activity as a basis for company's competitiveness

Increasing the role of innovative processes in the economy leads to an increase in the dynamism of economic systems and the entire reproduction cycle. This entails the erosion of cross-sectoral boundaries, the diversification of supply and demand, and guides innovation firms to penetrate new industries and new markets. Being an object of innovation management, innovations not only force the manager to look for new forms and methods of influence, but also fill the content of the management process, providing it a new strategic direction. Innovative transformations, which increase uncertainty and risk, at the same time increase the multivariate approach in the management of production activities and, in fact, provide the manager with economic freedom of choice.

Innovative activity is not just an object of management, beside high qualification of personnel and specific professional orientation; it requires a special type of perception and motivation, as well as the ability to take risks.

Production novelties, new technologies and new methods of influence are based on deep cognitive, socio-psychological and cultural-ethical roots. As the innovative orientation of the economy develops, economic expediency of innovations increases and the feasibility of technical and technological scientific ideas amplifies, innovative management acquires the features of the most important social and economic institution that influences various spheres of human activity.

The evolution of innovative management as a social institution takes place much faster than other elements of the institutional system, since the sources of evolution here are the accumulation of new knowledge and skills by mankind, that lead to changes in value orientations.

By creating, introducing and promoting radical innovations that determine technological progress, a company strengthens and expands its influence in the market.

A well-considered system of production renewal, based on the effect of diversity, represents the main direction of production development. The updating model implemented by enterprise has a purely individual nature and is the result of a thorough analysis of the company's internal capabilities. Choose the optimal upgrade model that takes into account the specifics and capabilities of the company and is focused on satisfying the entire variety of market needs, only the manufacturer itself is capable.

The renewal strategy, designed for a long-term period, should be based on the company's business strategy, which provides the necessary concentration of material, human and financial resources. The business strategy of the company is focused on the use of scientific development stocks, the company's accumulated experience of rationalization, improvement of techniques and

know-how. It is aimed primarily at meeting market needs through the creation of a variety of multifunctional goods and services, while not being subjected to the destabilizing effect of short-term fluctuations in market conditions and demand. Therefore, the focus of the company today is the achievements of scientific progress.

Professionalism and quality of work, in the first place, relate to scientific developments, perfection of the technological process, high marketing efficiency, service maintenance, i.e. all that is related to the competitiveness of production. Professionalism and efficiency of such functional units are the main advantage of the company, since they represent an alloy of specific work experience, acquired skills and knowledge of personnel, unique properties of products that competitors do not possess.

Today, it is necessary to expand the studied issues and increase expenditures on scientific developments, introduce new technologies and modernize equipment, promote the formation of promising innovative projects, search for investors and new sources of financing. Business strategy requires situational and simulation approaches. Each firm has different business strategies in innovation, which is explained by the uniqueness of solutions, the unexpectedness of emergent situations and the different type of reaction of the innovative manager to the changing external and internal environment.

To implement innovative activities, the firm needs to identify key functional subsystems, develop their strategic and tactical goals, tasks and activities for their implementation.

The innovative activity of the main functional subsystems should be focused on the following tasks:

- conducting research and development work on the elaboration of new products including laboratory research and the manufacture of laboratory samples of new products;
- selection of new types of raw materials for manufacturing products;
- development of new technologies, know-how and creation on their basis of a technological process for the manufacturing of new products;
- designing, manufacturing, testing and mastering samples of new equipment, machines, mechanisms, instruments;
- designing, planning, implementation of new organizational and management solutions aimed at the implementation of innovations;
- professional formation, training, retraining and recruitment of personnel;
- information support of innovation activity;
- organization and implementation of marketing research and organization of marketing channels for innovations.

The impact of innovations on social management

We should also pay attention to innovations in social management. The technical and organizational side of social management consists of developing criteria for success, selecting the necessary technologies and procedures for operational management. The most important condition for the success of innovation is the procedure for the formation of a project "team" and social management. The selection of the "project team" is based on informal socio-psychological approaches. Everything is important here: the problems of communication and leadership; staff motivation and flexible response; management of people's behaviour and resolution of unexpected problems and conflict situations.

The "project team" is formed on a semi-permanent basis, where an important component is the permanent "core", specialists working only on this problem, and additional technical personnel who can temporarily attach themselves to the "team". A maneuver of resources, laboratory and

experimental equipment is widely practiced, which is transferred to the "team" to work on this project, it can be leased, temporarily provided from centralized funds.

Naturally, the functions of the "core" of the staff, its head, temporary staff and technical specialists vary considerably. The most important principles for the functioning of such a "team" are unity of purpose, professional and human solidarity, confidence in the necessity and usefulness of their activities, regardless of the results. On the basis of such principles, further interpersonal communication, the maintenance of a favourable moral climate and, of course, the creativity of innovators are possible.

The multidimensional nature of the tasks arising in the process of innovation involves the inclusion of different categories of workers in it, which can be divided into three groups. The first group consists of highly qualified innovators, capable of showing creative initiative, putting forth original ideas and actively participating in the innovation process. The second group of specialists is made up of innovators-managers, able to manage innovations, as a process, to ensure the advancement of innovation from idea to concrete commercial result. They must make decisions in conditions of uncertainty, go for financial and business risk, and be able to overcome organizational and psychological difficulties in managing innovation.

That is why in the innovative firms, venture departments, innovative organizations, the authoritarian style of leadership is simply impossible. In the work of research groups, it is necessary to follow rational approaches to problem solving and to assessing the behaviour of group members and of the effectiveness of their work as a whole. On a completely rational basis, a formal operational goal-setting, project planning and decision-making system is created, that should optimally integrate creative individuals, informal methods and non-standard approaches. Planning, management decisions and control create the basis within which takes place the role distribution of the "team" members. For effective work of the group it is necessary to create an atmosphere of trust and participation, to stimulate employees to creativity.

Effective functioning and high level of results depend on the social interaction of the members of the group. Distinctive features of the social group are considered a special set of goals and social norms governing the interaction and role structure of the group. Important features of social interaction are the alternative ways of behaviour, on the one hand, and the expectation of approval or reward, on the other. In social interaction, individuals seek to realize their own goals, have different incentives and motives. The most important condition for project implementation is positive interaction within the group.

All innovative activity is a multi-criteria non-equilibrium process under conditions of uncertainty, generated by both external and internal environment. It is the joint creation, as the basis of innovative development, that is built primarily on the need for cognition and transformation of the world and itself, is based on the eternal dissatisfaction of the creative personality with the achieved, on its inability to fully realize oneself alone in the fullness of social being. Creativity represents not only a joint action, but also is the strongest motivation and at the same time the cause of satisfaction with the labour process.

The managerial position of a modern leader can be characterized as strong if it embodies the necessary signs of a successful development of the firm. There are six such signs:
- ability to predict the emergence of demand for the most unexpected goods and services;
- the ability to risk, beforehand transfer firm's resources to a new, potentially promising area;
- the ability to use resources to solve critical problems in critical moments;
- ability to minimize costs through the use of intermediary services and specialized agencies;
- the ability to flexibly move personnel to critical points;
- the ability to create an efficient "working" incentive system for creativity (initiative proposals of employees).

Recently, the importance of strategic behaviour has also increased, allowing the organization to survive in the competitive struggle in the long term. All enterprises, functioning in tough conditions of

competitive environment and rapidly changing conjuncture should focus not only on the internal state of affairs in the firm itself, but also develop a long-term strategy that would allow them to keep up with the changes occurring in the surrounding reality. The emergence of new requests and changing position of the consumer, increasing competition for resources, internationalisation and globalisation of business, as well as the emergence of new unexpected business opportunities, the development of information networks that make it possible to instantly receive and disseminate information, the wide access to modern technologies, the changing role of human resources, as well as a number of other reasons, led to a sharp increase in the importance of strategic management.

Today, new demands are also imposed to human resources. A potential worker should not simply accumulate knowledge, the most important thing is that he must be able to introduce this knowledge into his activities, be able to systematize already accumulated knowledge and generate on their basis new methods and know-how.

For a range of product types, most of the value is created not at the stage of material production, but at the stage of marketing, marketing, R & D and service. In many organizations, a growing part of the effect is created as a result of the application of special knowledge, intensive staff training and cooperation with partners and contractors.

Nowadays, knowledge penetrates into all spheres and stages of the economic process; these already difficult can be separated from the product or service. At the same time, the innovation cycle is shrinking, the flow of innovation is strengthening.

Human capital - a term, which means the accumulated creativity, knowledge and skills that an employee has and which are acquired by means of general and special education, vocational training, work experience. The concept of human capital was first put forward by American economist G. Becker in 1960. Human capital is a specific type of capital.

The qualitative renewal of human capital entails an increase in the level of knowledge and practical skills of individuals and is accompanied by the development of opportunities for their practical realization. The new knowledge finds application in the practice of everyday life:

- it increases the productivity of human work, therefore, the individual is better paid;
- it develops creativity / ingenuity and entrepreneurial skills of people, generating rational decisions;
- it increases sensitivity to the perception of new scientific developments, reducing their implementation time in production and stimulating the development of new ideas;
- it develops individual intellect and skills to generate new technological ideas and rationalize the production process according to specific management conditions.

Therefore, in view of these key factors of progress, it is possible to create a new economic basis for sustainable (economic, environmental and social) development, which can be maintained for a long time.

Conclusion

Intellectual work, special knowledge and communication become factors not only for creating added value, but also for competitiveness, the economic development of organizations. The upbuilding of innovational potential represents one of the most important trends in the development of modern management.

The innovative activity of the firm is the main factor in adapting the company to the changes occurring in economic and social life, in scientific and technical progress.

The innovational potential of the firm is formed on the basis of training of the human resources, good communication and a dynamical management. The main priorities of the modern management, in these conditions, are research and development activities, strategic planning, the motivation of

innovative attitude and behaviour of the personnel, a good structuring of the company's resources and accumulation of human capital.

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The Process of Preparing Financial Statements of the Czech Republic, Including the Analysis of Financial Statements Results for the Year 2016

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Abstract

This paper deals with the process of preparing financial statements of the Czech Republic, which completes the state accounting reformed that was officially launched in 2010. The accounting reform introduced new methods into the state accounting, such as accounting for adjusting items, provisions, accruals or depreciation of assets. An element of the accrual principle was so introduced into the state accounting, and the accrual-based bookkeeping provides users with more reliable and relevant information about the financial position and financial performance. The paper defines the legislative framework for the preparation of financial statements for the whole Czech Republic, the consolidation unit of the Czech Republic. The paper also presents the structure of financial statements of the Czech Republic, which consists of Summary Statement of State Assets and Liabilities, Summary Statement of State Expenditures and Revenues and the notes for the Czech Republic, including an analysis of the main outputs from these financial statements prepared for the accounting period of 2016. Outputs from accounting consolidation of the state are an extensive source of information on the use of public funds and show the state of assets and liabilities of the Czech Republic for a wide range of users.

Key words: *consolidation, consolidation unit, state accounting, accounting statements, financial statements*

1. Introduction

The preparation of the consolidated financial statements of the Czech Republic completed the accounting reform of public finances, the main purpose of which was to create conditions for the effective provision of correct, complete and timely information on the economic situation of the state. As a result of this reform, the state has become a consolidating accounting entity, to which all subordinate accounting entities are obliged to collect and transfer accounting records in the specified structure and deadlines, as well as in the specified way. The same procedure is also set at the level of individual departments, and it is necessary to ensure aggregation and consolidation of the transferred data. According to the original timetable of the state accounting reform, the consolidated financial statements of the state should have already been prepared in 2013 for the accounting period of 2012. The reason for postponing the deadline for the first preparation of the financial statements was the ongoing reform of public finances, which imposed many requirements on the entities concerned,

mainly in relation to the introduction of new accounting methods and procedures that until then had not been applied in the public administration [Kryšková, Hakalová, 2017].

The first preparation of consolidated financial statement of the Czech Republic happened in 2015. These statements included information for a limited number of accounting entities, including municipalities, regions, state organisational components, state funds, Regional Councils of Cohesion Regions and voluntary associations of municipalities. For the accounting period of 2016, the consolidated financial statements of the Czech Republic were prepared in full manner. The accounting consolidation included also state-funded organisations, health insurance companies, state-owned enterprises, commercial corporations, and public research institutions. The disclosure of the consolidated financial statements for 2016 took place in December 2017.

2. Legislative Framework of the Consolidation Process

The legislative framework for the preparation of financial statements of the Czech Republic consists of three legal norms, namely:

o   Act No. 563/1991 Sb., on Accounting, as amended,

o   regulation No. 312/2014 Sb., on the Conditions of Preparation and Presentation of the Financial Statements of the Czech Republic (consolidation regulation of the state),

o   regulation No. 383/2009 Sb., on Accounting Records in Technical Form for Selected Accounting Entities and Their Transfer to the Central State Accounting Information System, and on the Requirements for the Technical and Mixed Forms of Accounting Records, as amended (technical regulation on accounting records).

The obligation to prepare financial statements of the Czech Republic is set in the Act On Accounting No. 563/1991 Sb. Pursuant to Section 23b, the financial statements of the Czech Republic are the statements shown in Figure 1.
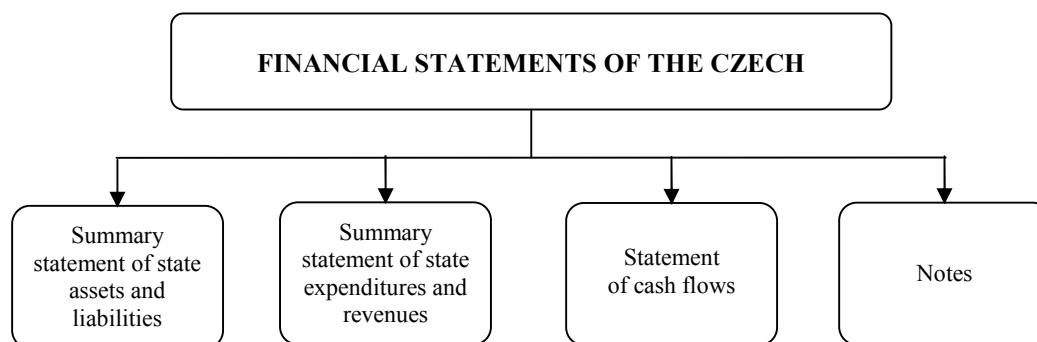

Figure 1. Structure of Financial Statements of the Czech Republic
[Source: own processing in accordance with Sec 23 of the Act No. 563/1991 Sb., on Accounting]

The regulation No. 312/2014 Sb., the consolidation regulation of the state contains the conditions for the preparation of the annual financial statements, the definition of the consolidation unit, the determination of the consolidation rules and the scope of consolidation methods use. Furthermore, the regulation also defines the process of including entities in the consolidation unit of the state, including the organization, designation and definition of items of property and other assets, payables and other liabilities, items of expenditures and revenues, cash flows in the financial statements, and explanatory and supplementary information in the notes. Pursuant to Section 14 (1) and (2) of the consolidation regulation, a Consolidation Manual, which represents a basic methodical material for the accounting entities concerned, is issued. It mainly contains the recommended way to fill in the Auxiliary Consolidation Overview and determines the extent of the information reported in the overview. The consolidation manual is available on the Czech website of the Ministry of Finance in the section of "Účetní výkaznictví státu". The Auxiliary Consolidation Overview is a new statement

created for the purpose of obtaining the information needed for the preparation of financial statements of the Czech Republic. This statement is used to obtain data from important accounting entities on the state of synthetic accounts, to identify partners for the purposes of eliminating mutual relationships, to provide information on capital consolidation, and to explain material information for the specified accounting period.

The regulation No. 383/2009 Sb., the technical regulation on accounting records sets out the rules for the format, structure, transfer and security of accounting records, the scope and frequency of transferring the accounting records to the central state accounting information system. It specifies the selected accounting entities that transfer the accounting records necessary for the preparation of the financial statements of the Czech Republic and sub-consolidation units of the state to the central state accounting information system. It also sets out the methods, deadlines and scope of the information submitted for the evaluation of budgets of selected accounting entities and the requirements for technical and mixed form of accounting records. This regulation also contains binding templates of the financial statements such as the Auxiliary Analytical Overview, the Auxiliary Consolidation Overview and the list of accounting entities included in the sub-consolidation unit of the state.

3. Consolidation unit of the Czech Republic

Pursuant to Section 7 of the regulation No. 312/2014 Sb., (consolidation regulation), the consolidation unit of the Czech Republic consists of upper sub-consolidation unit governmental part; upper sub-consolidation unit of the state municipal part; controlled entity, where the controlling entity consists of jointly administering entities and city districts of the capital city of Prague; entity in which the administering entities and city districts of the capital city of Prague exercise substantial influence; health insurance companies and commercial corporations in which the administering entities and city districts of the capital city of Prague except for administering entity pursuant to Section 5 (7) have more than 20% of the voting rights.

For the accounting period of 2016, the consolidation unit of the Czech Republic consisted of 18.103 consolidation unit of the state, that is by 10.805 more than in 2015. The consolidation unit of the Czech Republic included, just as in 2015:
- state organisational components,
- state funds,
- regions,
- municipalities and city districts of the capital city of Prague,
- voluntary associations of municipalities and
- Regional Councils of the Cohesion Region.

From 2016, the following entities were newly included in the consolidation unit of the Czech Republic:
- state-funded organisations,
- health insurance companies,
- entities, which have met the conditions of materiality pursuant to Section 9 of the consolidation regulation of the state (such as commercial corporations, state enterprises, state organizations, national enterprise or public research institutions).

Entities where a state or a territorial self-government unit has an influence on management and control are considered as significant economic entities; an entity that exceeds 100 million CZK in at least one of the following criteria is being considered as significant:
- o net assets value,
- o liabilities value,
- o total costs value,
- o total revenue value.

The Table 1 lists consolidated units of the state in the consolidation unit of the Czech Republic in 2015 and 2016.

Table 1. Number of consolidation units of the state in the consolidation unit of the Czech Republic
[Source: own processing in accordance with the Ministry of Finance of the Czech Republic (2017).
Zpráva o účetních výkazech za Českou republiku za 2016.]

Accounting entity type	Number of accounting entities	
	2015	2016
Governmental part	282	635
Municipal part	7.016	17.461
Health insurance companies	-	7
Total	7.298	18.103

Table 1 shows that, compared to 2015, the number of consolidated units of the state increased by 10,805, which was due to the enlargement of the consolidation unit of the Czech Republic with state-funded organisations and commercial corporations.

Table 2. Number of consolidation unit of the state in the governmental part in 2016
[Source: own processing in accordance with the Ministry of Finance of the Czech Republic (2017).
Zpráva o účetních výkazech za Českou republiku za 2016.]

Accounting entity type	Number of accounting entities	Non-consolidated net assets	
		in million CZK	in %
State organisational components – chapter administrator	38	912,257.4	29.7
State organisational component	238	243,978.8	7.9
State fund	6	42,443.6	1.4
State-funded organisations,	207	605,386.8	19.7
National enterprise	1	5,095.3	0.2
State organization	1	72,746.5	2.4
State-owned enterprise	23	156,490.0	5.1
Public research institution	46	42,200.3	1.4
Commercial Corporation	75	986,817.2	32.2
Total	**635**	**3,067,416.0**	**100**

The total number of consolidation units of the state in the governmental part in 2016 is 635, as shown in Tables 1 and 2. The largest group consists of state organizational components including budget chapter administrators (43.5%), which account for 37.6% of total net assets for the governmental part. A significant share of net assets is reported by commercial corporations – 32.2%.

The consolidated units of the state governmental part with the highest net assets are:
- ČEZ with net assets of 630 841,0 million CZK, i.e. 20.6 % from total net assets of the governmental part,
- Ředitelství silnic a dálnic ČR with net assets of 446,394.56 million CZK, i.e. 14.6 % from total net assets of the governmental part,
- The Ministry of Finance of the Czech Republic with net assets of 360,039.54 million CZK, i.e. 11.7 % from total net assets of the governmental part, (MF České republiky, *Zpráva o účetních výkazech za Českou republiku 2016*).

It is clear from Table 3 that out of the total of 17,461 consolidation units of the state in the municipal part, the state-funded organisations established by territorial self-governing units have the largest representation. Their share is 58.2%. Municipalities are the second largest group, including volunteer associations of municipalities, whose share in the total number of consolidation units in the municipal part is 39.8%. However, their net asset value is much significant – at the amount of 1,632,037.9 million CZK, i.e. 63.8 % from total net assets of the municipal part.

Accounting entity type	Number of accounting entities	Non-consolidated net assets	
		in million CZK	in %
Region	13	128,952.1	5.0
Municipality	6,247	1,579,675.4	61.7
City districts of the capital city of Prague,	57	113,047.0	4.4
Voluntary association of municipalities	702	52,362.5	2.1
Regional council of the cohesion regions	7	2,351.9	0.1
State-funded organisations,	10,160	442,638.0	17.3
Commercial corporations	274	239,263.5	9.4
Other legal entity (foundation)	1	148.7	0
Total	**17,461**	**2,558,439.0**	**100**

4. Consolidated Financial Statements of the Czech Republic for 2016

From the disclosed financial statements of the state (Summary Statement of State Assets and Liabilities, Summary Statement of State Expenditures and Revenues, Notes – Book of Off-balance Sheet Accounts) as to 31 December 2016 and the report "Zprávy o účetních výkazech za Českou republiku za rok 2016" compiled by the Ministry of Finance of the Czech Republic in the range of 93 pages (including notes) follows interesting information on the state of assets and liabilities of the Czech Republic, its expenditures and revenues, including the consolidated profit or loss.

The financial statements of the Czech Republic for 2016 reflect the expansion of the consolidation unit by almost 11,000 entities and correspond to the target state of the structure and scope of the consolidation unit of the Czech Republic. The method of full consolidation, which resulted in a consolidation gap and minority interests, and the method of equity have been applied for the first time. For these reasons, the comparison of values from 2016 with prior accounting period is difficult and less explanatory. It will be possible to compare the data from the state summary statements for the two accounting periods for the first time after the preparation of the consolidated financial statements of the state for the year 2017.

The Table 4 shows the basic structure of assets and liabilities of the Czech Republic as at 31 December 2016.

Total net assets as at 31 December 2016 are reported at the amount of 5,132,630.1 million CZK, while the non-current assets account for 79 % and current assets for 21 % of the total assets. The tangible fixed assets account for most of the total net value of non-current assets, namely 93.3 %. Intangible fixed assets show a negative amount, causing a negative consolidation difference. This is a new item in the accounting of commercial corporations consolidation. A passive consolidation difference means that the carrying amount of the trading shares at the acquisition date was lower than the share in equity at the same date. Within current assets, short-term receivables (52.6 %) and short-term financial assets (37.9 %) have the largest representation.

Total liabilities are, of course, reported at the same value as total net assets, with liabilities accounting for 59.4 % and a share of equity capital of only 40.6 %. The largest share in equity is recorded in registered capital and adjusting items at the amount of 1,984,312.5 million CZK. The amount of equity is reduced by the negative consolidated economic result, which represents the cumulative value for the current and prior accounting periods. Long-term liabilities accounted for 70.3% of liabilities. Long-term liabilities show the largest proportion of liabilities arising from issued bonds with maturity of over one year.

The overview of costs and revenues structure of the Czech Republic for the year 2016 is presented in Table 5.

Table 4. Overview of assets and liabilities of the state as to 31. 12. 2016 (in million CZK)
[Source: Summary Statement of State Assets and Liabilities as to 31 December 2016]

	Balance sheet item	Gross	Adjustment	Net
	Total ASSETS	**7,448,957.1**	**2,316,327,0**	**5,132,630.1**
A.	Non-current assets	6,217,650.8	2,163,633.4	4,054,017.4
A.I.	Intangible fixed assets	- 44,835.8	96,333.1	- 141,168.9
A.II.	Tangible fixed assets	5,813,880.7	2,028,946.6	3,784,934.1
A.III.	Long-term financial assets	309,596.1	9,018.1	300,578.0
A.IV.	Long-term receivables	139,009.9	29,335.6	109,674.3
B	Current assets	1,231,306.3	152,693.6	1,078,612.7
B.I.	Inventories	104,624.1	2,693.6	101,930.5
B.II.	Short-term receivables	558,702.2	149,900.6	408,801.5
B.III.	Short-term financial assets	567,980.0	99.3	567,880.7
	Total LIABILITIES	-	-	**5,132,630.1**
C.	Equity	-	-	2,085,721.3
C.I.	Registered capital and adjustments	-	-	1,984,312.5
C.II.	Funds	-	-	95,082.3
C.III.	Consolidated profit or loss	-	-	- 79,887.8
C.IV.	Revenue and expenditure account	-	-	- 7,925.9
C.V.	Minority equity capital	-	-	94,140.2
D.	Liabilities	-	-	3,046,908.8
D.I.	Provisions	-	-	113,635.8
D.II.	Long-term liabilities	-	-	2,142,994.5
D.III.	Short-term liabilities	-	-	790,278.5

Table 5. Overview of state costs and revenues as to 31 December 2016 (in million CZK)
[Source: Summary statement of state expenditures and revenues as to 31 December 2016]

			million CZK
A.		**Total COSTS**	**2,196,211.0**
	A.I.	Cost arising from operation	1,341,928.5
	A.II.	Financial costs	111,707.2
	A.III.	Transfer costs	742,575.2
	A.IV.	Costs from shared taxes and fees	0
	A.V.	Income tax	0
B		**Total REVENUES**	**2,329,162.4**
	B.I.	Revenue from activities	781,430.6
	B.II.	Financial revenues	69,126.8
	B.III.	Revenues from taxes and fees	1,032,838.7
	B.IV.	Revenues from transfers	191,818.0
	B.V.	Revenues from shared taxes and fees	253,948.4
	C.I.2	**Profit or loss for current accounting period**	**132,951.5**
	C.I.A	Minority profit or loss for current accounting period	6,040.0
	C.I.B	Profit or loss for current accounting period without equity	126,911.5
	C.I.C	Share in profit/loss by equity method	210.1
C.		**Consolidate profit or loss for current accounting period**	**127,121.5**

The total costs of the consolidation unit of the Czech Republic for accounting period of 2016 amounted to 2,196,211 million CZK. Operating costs (such as labour cost, material consumption,

depreciation of fixed assets) amounting to 1,341,928.5 million CZK show the highest share in total costs of 61.1%. The second most significant cost item is the cost of transfers, which accounts for 33.8% of the total cost.

The total revenues of the consolidation unit of the Czech Republic for the accounting period of 2016 amounted to 2,329,162.4 million CZK. The highest value is reported revenues from taxes and fees, which account for 44.3% of total revenues and revenue from activities (such as revenues from public health insurance, revenues from the sale of own products and services), which account for 33,5% of total revenues.

For the accounting period of 2016, the consolidation unit of the Czech Republic reported a profit of CZK 127,121.5 million CZK. The governmental part contributed to the economic result with a profit of 50,269.7 million CZK and the municipal part with a profit of 76,851.9 million CZK [MF České republiky, *Zpráva o účetních výkazech za Českou republiku 2016*].

5. Conclusion

The preparation of the consolidated financial statements for the Czech Republic in full for the accounting period of 2016 completed the state accounting reform, which started in 2010. The consolidated financial statements of the Czech Republic together with the report on the Czech Republic's financial statements prepared by the Ministry of Finance of the Czech Republic are an important source of information on the state of assets and liabilities, revenues and costs, economic activity of the state and management of public funds. This information contributes to increasing the credibility and transparency of reporting in the public sector. It will be used in the process of financial and budgetary planning as a part of the rationalization of public funds use and in the development of public administration management and control systems [Klaban, 2018]. Users of this information may also include investors in government bonds, domestic and international financial institutions, credit rating agencies, EU institutions and bodies.

It can be assumed that the importance of the consolidated financial statements of the Czech Republic will also have an international dimension. The Czech Republic will then rank among countries such as Great Britain, Sweden, Switzerland or Slovakia, which have been preparing consolidated accounting statements for many years now [Terziev, 2016].

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Social and Health Insurance Deductions' Evolution and Possible Improvement in the Future

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Abstract

The article is dedicated to the phenomena of wages and deductions obligation of an entrepreneur and not entrepreneur subject. The goal of this article is to serve as a guide for the professional community as well as the unprofessional. First part is focused on the evolution of deductions of social and health insurance institutions. Another aim of this article is to take a look from a position of the institutions responsible for collecting deductions and analysing the current situation. In the hypothetical part, the possible improvement of the current state of these phenomena is given.

Key words: *social and health insurance, deductions, Sociálna poisťovňa, health institutions, brutto, correction, netto*

Introduction

Main objective of the article is to summarise brutto, correction and netto receivables of deduction on social and health insurance in a condition of Slovak Republic and to suggest the possible outcome and improvement in the future.

Therefore it is needed to define brutto, correction and netto. Brutto receivables of deduction are total amount that the institution expects to receive. Correction is allowance – the sum of receivables that institutions do not expect to be paid. Netto receivables represent a difference of brutto and correction. Thus, netto is an amount of EUR that we expect to be paid. The analysis of these indicators is focused in chapter

Second chapter is dedicated to a hypothesis of possible future state of social and health insurance deductions. Hypothesis summarised a situation when all subjects with a duty to pay deductions fulfil their obligation and institutions would have greater income that could lead to a change of the deductions' ratio and to the better social and health care provided from the state.
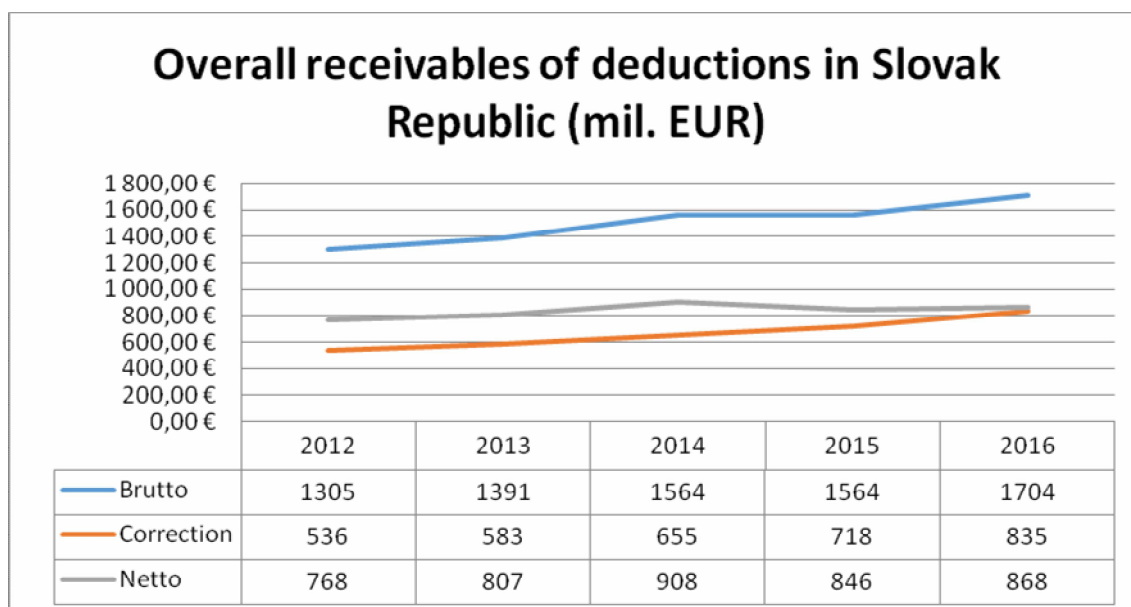
1. Evolution of receivables on deduction

The period of years 2012 – 2016 is shown in the following chart that summarises brutto, correction and netto receivables of deduction on social and health insurance. Data of each institution is available at the register of financial statements.

Chart 1. Overall evolution of receivables on deduction of a period 2012-2016
[Source: Authors' own elaboration based on relevant Acts]

Text/year	2012	2013	2014	2015	2016
Brutto EUR)	1.305.722.235	1.391.071.605	1.564.080.880	1.564.924.236	1.704.519.582
Correction (EUR)	536.979.557	583.137.809	655.276.982	718.193.337	835.775.892
Netto (EUR)	768.742.678	807.933.791	908.803.898	846.730.899	868.743.690
Correction (%)	41.13%	41.92%	41.90%	45.89%	49.03%
Netto (%)	58.87%	58.08%	58.10%	54.11%	50.97%

According to the data shown in the chart. It is possible to observe that receivables of deduction have a rising tendency. Unfortunately. correction belongs to the receivables with a rising trend as well. Therefore, from the overall spectrum in the Slovak Republic, it is evident that the quantity of debts towards to the institutions is rising. The query of this issue is if the quantity of debtors has a rising trend or an amount of debts of each debtor has a rising trend.

Overall, since 2012 till 2016 brutto receivables of each institution have grown 30.54%, but correction receivables have grown even more – 55.64%, while netto only 13.00%. This significant disproportion can be observed in the following chart.


Graph 1. Overall evolution of receivables on deductions of a period 2012-2016
[Source: Authors' own elaboration based on relevant Acts]

To conclude, graph 1 shows the growing character of the overall sum of receivables on deductions. It is possible to expect brutto receivables of 2 billion EUR in 2017. Graph 1 presents negative phenomena as well. The negative phenomenon is a correction that could reach higher sums than netto in 2017. To sum it up, in 2017 it is possible that in the condition of Slovak Republic there will we be more debtors than subjects paying deductions towards institutions.

This trend offers two hypotheses. Our first hypothesis calculates that reason of debtors' increasing number is that these subjects expect adequate services from the Government in social and health insurance, which are not fulfilled. The second hypothesis is that due to the high burden of deductions, subjects are unable to pay the deductions.

Despite the hypothesis presented above, another question is if many debtors are in small debts towards institutions or if there is a small group of debtors that are in immense debt. To explain this question, the following graph demonstrates some debtors in evidence of each institution.
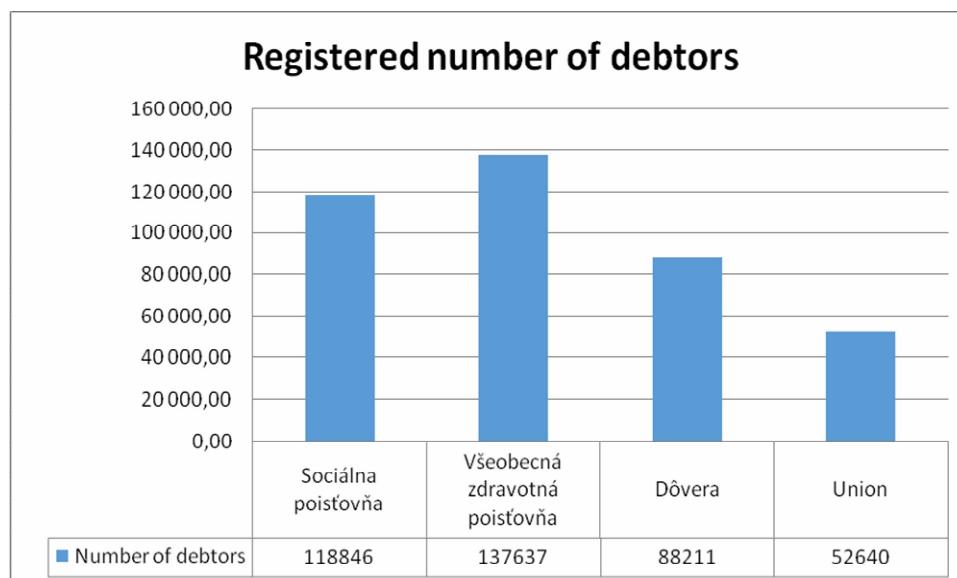
Graph 2. Number of debtors in evidence of each institution
[Source: Authors' own elaboration based on relevant Acts]

Sociálna poisťovňa and the rest of the health institutions public their evidence of debtors. Till 2018 March 18th Sociálna poisťovňa states that first 15 biggest debtors are subjects in administration of Government.

Together these 15 subjects are in debt of 271 640 716.16 EUR towards Sociálna poisťovňa. When comparing this amount of EUR with correction of the year 2016, the debt of those 15 subjects represents 58.57% of correction. To summarise the fact that 15 subjects should pay almost 60% of Sociálna poisťovňa's correction, we can conclude that in a condition of Sociálna poisťovňa, there is a small group of subjects with an essential ratio of correction. Another important fact is that all of these subjects are administrated by Government, as we already mentioned. In other words, the biggest debtor of social insurance is the state.

Všeobecná zdravotná poisťovňa - the biggest health insurance institution in the Slovak Republic registers that there are significant number of subjects in private ownership, which debt of each of these subjects is approximately 150 000 EUR. A similar situation is noticeable in a case of DÔVERA - second biggest health insurance institution. The only difference is that the average debt is 55 000 EUR. Third and last health insurance institution is Union. In this case their register does not offer an overall view of subjects that are in debt of this institution.

Data presented above claims that in a situation of social insurance the biggest debtor is state. In the situation of health insurance, there is a big group of debtors in private ownership.

2. The hypothesis of the current state's possible improvement

Thinking in the way of a possibility to decrease institutions' ratio of deductions without changing the amount of income from deductions a third hypothesis emerges. Social and health insurance institutions record brutto, correction and netto receivables on deductions, as we already mentioned. Institutions' crucial indicator is netto, i.e. receivables that are expected to be paid. Therefore operations of institutions are realised according to netto. Our third hypothesis is a condition when every subject in government administration or private ownership with an obligation to pay deductions to fulfil its duty. This would lead to a situation when no receivables would be registered by institutions, in another way there would not be a correction. Thank this, the higher income institutions would have, in certain cases, more than half of nowadays income, e.g. Sociálna poisťovňa.

Consequently, social and health care could be more efficient, e.g. better health care or higher pensions. This is just one possible outcome.

Another possible outcome could be noticed in a reduction of deductions' ratio. For instance, the ratio of social insurance deductions could be decreased even in one half, considering speculations above when Sociálna poisťovňa would receive more than 59.06% of its nowadays income. Thus, the employee would contribute 4.70% instead of 9.40% on social insurance and employer 11.25% instead of the current ratio of 22.50%. This scenario exclusively calculates that every subject would pay its deductions regularly. At the same time, this would lead to a significant diminution of employee's costs for an employer that could help the economy, the growth of employment - workforce would be cheaper, and therefore these factors would bring additional income to Sociálna poisťovňa. The analogical scenario would be suitable for health insurance institutions as well. In other words, if the average correction of deductions on health insurance of the year 2016 is approximately 43.67% - that is almost one-half of the total receivables. Therefore the ratio of health insurance's deduction could be cut in one half. The employee would contribute only 2.00% instead of today's 4.00%, and the employer would contribute 5.00% instead of 10.00%.

Conclusion

Emphasizing the scenarios above are hypothetical, that is surreal at the current condition of Slovak Republic and we would not incline to any of this scenarios but to their intersection. To sum it up, the economy would benefit if the deductions would be slightly decreased (e.g. 20.00% - 30.00%) and state represented by social and health institutions would invest more towards its citizen in the way of better health care, higher pensions that are negligible compared with other EU countries.

From the practical point of view, very possible outcome of the deductions' future in a condition of the Slovak Republic would be without the change in the ratio and overall system of social and health insurance system as well as we predict that in the year 2017 it is possible that correction will be bigger than netto. That means there will be more debtors than those who fulfil their duty to contribute their deductions to the institution commissioned from the Government collecting the social and health insurance deductions. Even more there would not be change in provided quality of social and health insurance.

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English text that briefly shows ideas and conclusions of presented work. The abstract should be structured, but this is not the *condition sine qua non*. English abstract with key words is always the first in non-English articles; the second abstract with key words follows in the same form. *Structured abstracts.* If you use structured abstract, every paragraph begins with the use of not bold 11 points high italics. The text always starts from the left margin, no tabulator is used. It is recommended not to use unexplained or uncommon abbreviations and numbered citations [3] in abstracts. Abstracts usually should not exceed approx. 10 lines.   **11 p** <u>bold</u>

11 p space

Key words: *all key words in English (resp. in the other language) -- italic type -- words and expressions are separated with two adjacent short dashes -- usually no more than 4 lines 11 p italic*

11 p space (2 x)

11 p space

Headlines *(from the left margin, no full stop)*   **12 p** <u>bold</u>

11 p space

Continuous text 11 points high, divided appropriately in paragraphs; tabulator 1 cm. The entire article, starting from the title and ending with references, must be written with the use of the font Times New Roman. Mathematical equations are written in italics, centered and numbered, e.g.:

11 p space

$$c^2 = a^2 + b^2 \hspace{4cm} (1)$$

11 p space

Pictures, graphs and tables must be included in the text at the appropriate places, separated minimally with two 11 p space lines (from the object's text resp. object's top or bottom).   11 p
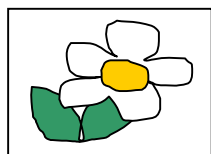
11 p space

11 p space

Fig. 1. The 9 to 11 p text should be upon the tables or under the pictures and graphs, separated with one 9 p space line. Or the text may be in the left or right side of a table, graph or picture, like this text. If the article is not in English, the text in the other worldwide language must be situated at the second place, after English version. The picture numbering and description are voluntary, but must be uniform in the entire article.

11 p space (2 x)

11 p space

References *or* References and notes *(full form with article names, alphabetical order)* **12 p** <u>bold</u>

11 p space etc.

[1]   Author B.A.von, Writer J.K.L.: **Article name**. *Our J Transactions, 1999, **127**, 122-136*
[2]   Van Loon J.C.: *Selected methods of trace metals analysis*. J. Wiley, New York, 1991
[3]   * **note:** *The citations and notes are numbered in the same fashion and may be mutually mixed. Also you can add all notes collected at the end of the citation list, continuing it's numbering.*