CONCENTRATION OF THE AUDIT MARKET: EVIDENCE FROM SERBIA

Kristina Mijić

University of Novi Sad, Faculty of Economics Subotica, Serbia
✉ *mijick@ef.uns.ac.rs*

Dejan Jakšić

University of Novi Sad, Faculty of Economics Subotica, Serbia
✉ *jaksicd@ef.uns.ac.rs*

Bojana Vuković

University of Novi Sad, Faculty of Economics Subotica, Serbia
✉ *bojanavuk@ef.uns.ac.rs*

Abstract: This paper presents a research on market concentration of audit services in the Republic of Serbia during the 2008-2011 period. Market concentration was measured by Herfindahl-Hirschman index (HHI) and concentration ratio CR4, based on four independent variables: operating revenue, net earnings, number of employees and number of audit clients. The research of market concentration based on operating revenue as the most referential variable indicated that the market for audit services in the Republic of Serbia has a moderate concentration and that it has the characteristics of an oligopoly of four largest audit firms known as "Big Four". However, research of market concentration, when other variables are taken in consideration, does not reveal dominance of "Big Four" in terms of net earnings, number of employees and number of clients. The differences in conclusions when different variables are concerned can be explained by relatively high audit fees of "Big Four" and a lack of correlation between operating revenue and net earnings.

Introduction

Global audit markets are characterized by competition between the largest audit firms known as "Big Four" and a large number of other audit firms. The four largest audit firms (PriceWaterhouseCoopers, Deloitte, Ernst & Young and KPMG) provide audit services in more than 150 countries where they play key roles in audit markets, particularly in respect to listed clients. Many fear that market concentration of the four largest audit firms can result in increase in fees of these audit firms and in decrease in fees, loss of independence and reduction of quality of audit work of other audit firms. Given the consequences of high concentration of audit markets in recent years, especially after the collapse of audit firm "Arthur Andersen", significant attention of governments and professionals was placed to research in the field of audit market concentration.

The concentration in the different markets can be measured using a several statistical and econometric methods, such as the Herfindahl-Hirschman index (HHI), Concentration ratios (CR_n), Gini coefficient, Linda index, Hannah-Kay index, Hall Tideman index etc. For example, Brezina, Baker and Cickova investigated a concentration of banking services in Slovakia by HHI and CR_n[1], Sohrab Uddin and Gupta studied insurance market concentration in Balgladesh by HHI, CR_n, Hall Tideman Index and Entropy Measure[2], and Njegomir and Stojic considered a non-life insurance market concentration in former Yugoslavia by using HHI[3].

The most commonly used indices for measuring the concentration in the market of audit services are HHI and CR_n. Based on these indices, Li, Song and Wong analyzed the concentration of audit services market in China in the 2001-2003 period (Li, Song, Wong, 2005, pp. 6-9). Dubaere investigated the concentration in the market of audit services in Belgium in 2005 by applying the HHI and CR_n to market share measured by number of auditors, number of audit clients and clients' size (Dubaere, 2008, p. 19). Quick and Sattler analyzed the concentration and market share of "Big Four|" in Germany in the 2005-2007 period also by using the HHI index and CR_4 (Quick, Sattler, 2011, p. 66). Apart from measurement of audit market concentration of individual countries, comparable researches were carried out and presented for certain regions. For example, the European Commission used HHI and CR_n to investigate market concentration in the EU in 2009[4].

The audit market in Republic of Serbia arose in 1996 when financial statement audit was introduced by law. At present, all "Big Four" audit firms are present at the national market, as well as many local audit firms. Since the

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[1] see more in: Brezina, Baker, Cickova, 2012, pp. 2-6.
[2] see more in: Sohrab Uddin, Gupta, 2012, pp. 80-88.
[3] see more in: Njegomir, Stojic, 2010, pp. 96-110.
[4] see more in: Le Vourc`h, Morand, 2011, pp. 16-23.

problem of audit market concentration in Serbia has never been investigated, the objective of this paper is to measure the concentration in the 2008-2011 period by analyzing the dominance of "Big Four" audit firms. The study of market concentration of audit services was conducted by using HHI and CR_4 based on four variables: operating revenue, net earnings, number of employees and number of audit clients. Input data was provided from publicly available Register of Audit Firms established by the Chamber of Certified Auditors and the Ministry of Finance, as well as from financial statements of audit firms available on the website of the Business Registers Agency.

1. Concentration in the Audit Market

Depending on a number of competitors and the level of their market shares, markets can range from perfect competition to monopoly. Low concentrations suggest competitive markets, which mean that the market is fairly evenly split between market participants. If the market is dominated by a small number of firms, this market is referred to as concentrated and oligopolistic, and in case of one dominant company even monopolistic.

Nowadays, the market of audit services is characterized by the existence of an oligopoly. In the European Union, national audit markets are dominated by "Big Four". For example, if only listed clients are considered, market share of "Big Four" is as much as 90% (Le Vourc`h, Morand, 2011, p. 6.).

There are several reasons for the dominance of "Big Four". Customers who choose one of the big four audit firms, do not primarily focus on the audit cost, but rather on the quality of provided audit services, audit staff competence, international reputation etc. One research, for example, reveals that audit clients select one of "Big Four" when they plan to expend to international markets and want to have the same auditor for all national subsidiaries (Schaen, Maijoor, 1997, p. 155).

It should be noted that an oligopolistic audit market is not constant, but it is subject to change from strong to low concentration. Factors that cause changes in the level of concentration in the market of audit services are:

- Rotation of auditors - rotation of auditors supports a concept of the auditor's independence. Audit rotation rules vary since they are stipulated by national regulations. For example, in Italy, the rotation of audit firms must be made for listed clients every six years, while in Spain the maximum period for rotation is nine years (see more: Cameran, Di Vicenzo, Merlotti, 2005, pp. 6-9). In Serbia, the rotation of auditors is mandatory within 10 years.
- Change of auditors by clients - orientation to other audit firms happens after the change in ownership structure or due to dissatisfaction with the existing auditor, in terms of quality and price.

- Changes in the number of audit clients – number of audit engagements is constantly changing, new businesses are established, liquidated, merged, etc. Changes in the number of audit clients affect the audit market concentration because some audit firms get new clients, while others reduce the number of engagements.
- Changes in the number of audit firms - changes in the number of audit firms result from establishment of new audit firms, and merging or closing of existing ones. Mergers of audit firms are the most important factor of market concentration since the integrated audit firms can significantly increase its market share.

The high concentration in the audit market has a negative impact on audit clients and many audit firms. Concentrated markets impose significant barriers to entry and better market positioning of smaller audit firms. Consequently, audit clients inn highly concentrated audit markets are limited to a restricted selection of an auditor, which may cause a conflict of interests and violation of the concept of independence.

2. Methods for Measurement of Audit Market Concentration

Different statistical and econometric methods can be used for the measurement of market concentration. OECD recommends two methods: Herfindahl-Hirschman index (HHI) and the Concentration ratios (CR_n) (Organization for Economic Co-operation and Development, 1993, pp. 24-25).

Herfindahl-Hirschman Index (HHI) is a measure of the size of firms in relation to the industry and an indicator of the amount of competition among them. HHI is a convex function of the market share of firms in the sector (industry). It is defined as the sum of the squares of the market shares of all firms in the industry (U.S. Department of Justice and the Federal Trade Commission, 2010, p. 19).

$$HHI = \sum_{i=1}^{N} S_i^2$$

where:
S_i is the market share of the firm i in the market,
N is the number of firms.

HHI ranges from 1/N to one. The maximum value of the HHI index of one indicates that the market is highly concentrated (monopolistic) and that entire market is supplied by one company. On the other hand, the minimum value of 1/N indicates that firms have equal market shares and the market is perfectly competitive. The level of market concentration measured by the HHI index

could be explained by different scales. U.S. Department of Justice and the Federal Trade Commission in the U.S. have defined the following scale of HHI index (U.S. Department of Justice and the Federal Trade Commission, 2010, p. 19):

- if the HHI index is below 0.01, the market is highly competitive.
- if the HHI index is below 0.15, the market is unconcentrated.
- if the HHI index is between 0.15 to 0.25, the market is moderate concentrated.
- if the HHI index is above 0.25, the market is high concentrated.

According to another classification, provided by the European Commission, HHI index could be explained by different scale (European Commission, 2004, p. 7):

- not concentrated markets: HHI is below 0.10,
- moderately concentrated markets: HHI is between 0.10 to 0.20,
- highly concentrated markets: HHI is above 0.20.

Concentration ratio (CR_n) is the percentage of market share held by the largest firms in an industry (Le Vourc`h, J., Morand, P. (ECSP Europe), 2011, p. 16.

$$CR_n = \sum_{i=1}^{n} S_i$$

where:
n is the number of firms,
S_i is the market share.

Concentration ratios range from 0 to 100 percent. Audit market concentration is mostly measured by concentration ratio CR_4, since there are four largest audit firms ("Big Four"). The following scale can be used for interpretation of CR_4 (Le Vourc`h, Morand, 2011, p. 17):

- 0% - means perfect competition (no concentration).
- between 0% to 50% - this category ranges from perfect competition to oligopoly (low concentration).
- between 50% and 80% - an industry in this range is likely an oligopoly (medium concentration).
- between 80% and 100% - this category ranges from highly concentrated oligopoly to monopoly (high concentration)
- 100% means an extremely concentrated oligopoly (total concentration).

Apart from HHI and CR_n, audit market concentration can be interpreted by other methods. For example, Bigus and Zimmerman (2008, p. 161) concluded that oligopolistic audit markets exist when there are three auditing firms which

supply one half of the audit market or when there are five or fewer audit firms which supply more than two-thirds of the market share.

Various independent variables can be used in HHI and CR_n methods. Different authors recommend operating revenue or revenue from audit services as a most appropriate variable for measurement of audit market concentration.[5] In addition to that, net earnings, number of CPA's, number of employees, number of audit engagements (clients), number of listed clients, size of audit clients and other variables can also be applied.

3. Audit Market Concentration in Serbia

3.1 Characteristics of Audit Market in Serbia

Audit market in Serbia emerged in 1996 when financial statement audit was introduced by law. Since the establishment of the first auditing firm, there is a constant increase in the number of audit firms. According to the Register of Auditing Firms held by Association of Certified Auditors and Ministry of Finance, at the moment there are 54 auditing firms (Figure 1).

Figure 1 Trend in the Number of Audit Firms in Serbia in Period 1996-2012
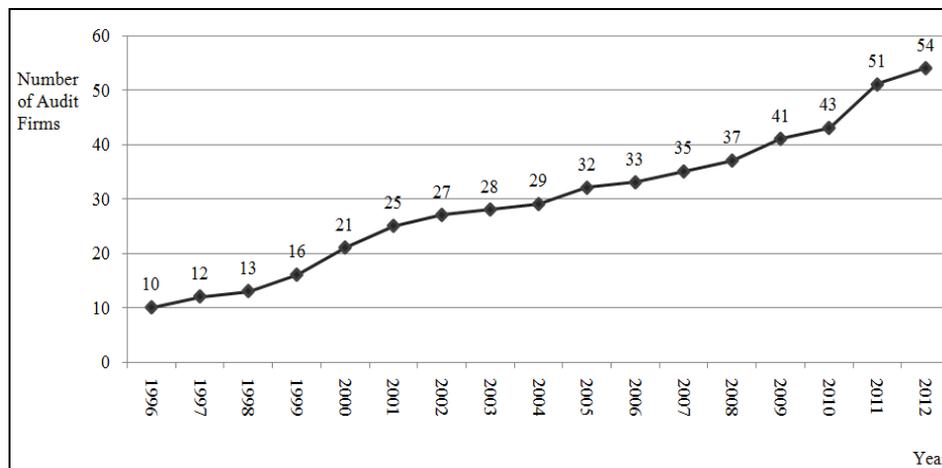
Source: Authors' construct according to data from Chamber of Certified Auditors, Retrieved August 19, 2012, http://www.kor.rs)

The increase in the number of auditing firms is accompanied by increase in number of employees in audit firms (Figure 2).

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[5] see more in: Le Vourc`h, Morand, 2011; U.S. Government Accountability Office, 2008, and Li, Song, Wong, 2005.

Figure 2 Number of Employees in Audit Firms in Serbia in the 2008-2011Period
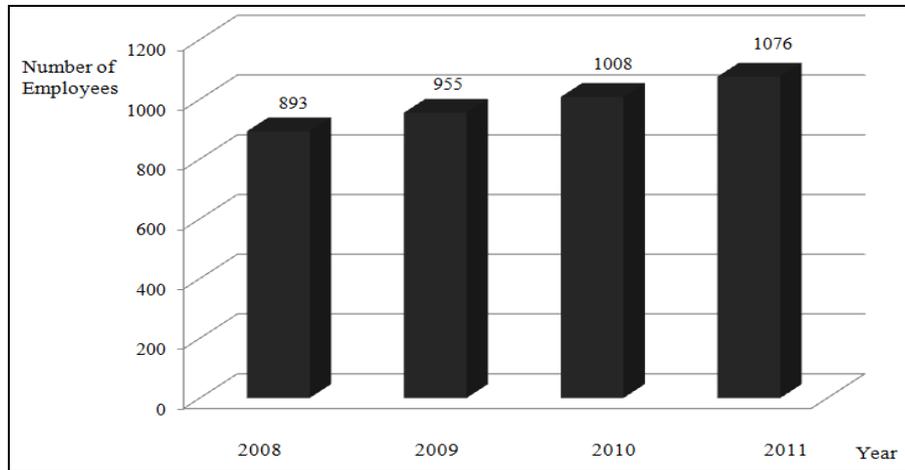
Source: Authors' calculations according to data from Business Registers Agency, Retrieved August 19, 2012, http://www.apr.gov.rs

Despite the relatively rapid growth, it can be observed that the audit market is still relatively underdeveloped. In fact, at the moment, none of audit firms meets the criteria of a large entity, and only four auditing firms ("Big Four") is medium-sized according to national regulation (Table 1)

Table 1 Summary of Audit Firms by Size According to Current Classification of the Republic of Serbia in the 2008-2011Period

Size of Audit	Year			
	2008	**2009**	**2010**	**2011**
Large-sized	-	-	-	-
Medium-sized	5	5	4	4
Small-sized	32	36	39	47
Total:	**37**	**41**	**43**	**51**

Source: Authors' calculation according to data from Business Registers Agency, Retrieved August 19, 2012, http://www.apr.gov.rs

3.2 Analysis of Audit Market Concentration in Serbia

The audit market concentration in Serbia was measured by Herfindahl-Hirschman index and concentration ratio CR_4 in the 2008-2011period. The analysis of market concentration is based on the scales of indicators defined by the European Commission. Operating revenue, net earnings, number of employees in audit firms and number of audit clients were used as independent variables.

Analysis of audit market concentration should provide answers to the following questions:

- Does "Big Four" have a dominant position in the audit market in Serbia?
- If there is are differences in conclusions about dominance in the audit market when different independent variables are applied, can these differences be explained?

The following table presents values of independent variables in observed period. These data are provided from financial statements of audit firms and they are aggregated in two groups: "Big Four" and "Other audit firms".

Table 2 Operating Revenue, Net Earnings, Number of Employees and Number of Audit Clients of "Big Four" and Other Audit Firms in Serbia in Period 2008-2011[6]

Independent Variables	2008	2009	2010	2011
Operating Revenue	2.454.328	2.547.465	2.625.704	2.851.958
"Big Four"	1.328.814	1.533.204	1.596.192	1.496.425
Other Audit Firms	**3.783.142**	**4.080.669**	**4.221.896**	**4.348.383**
Total				
Net Earnings	96.275	86.177	65.564	45.728
"Big Four"	334.871	327.289	287.054	234.401
Other Audit Firms	**431.146**	**413.466**	**352.618**	**280.129**
Total				
Number of Employees	487	477	459	511
"Big Four"	406	478	549	565
Other Audit Firms	**893**	**955**	**1.008**	**1.076**
Total	-	-	-	
Number of Audit Clients	-	-	-	783
"Big Four"	-	-	-	4.551
Other Audit Firms				**5.334**
Total				

Source: Authors' calculation according to data from financial statements, Business Registers Agency, http://www.apr.gov.rs Accessed 19 August 19 2012

Results of measurement of audit market concentration in Serbia are presented in the following table:

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[6] *Note:* Values of operating revenues and net earnings are presented in thousands of dinars. Data on number of audit engagements was available only for 2011.

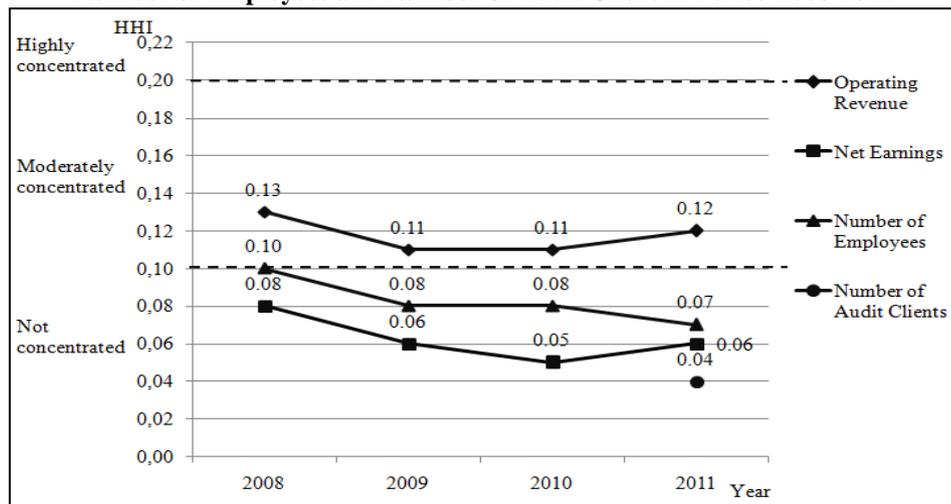**Table 3 Concentration of Audit Market in Serbia in the 2008-2011Period**

Audit Market Concentration Indices	Independent Variables			
	Operating Revenue	Operating Revenue	Operating Revenue	Operating Revenue
HHI 2008	0,13	0,08	0,10	-
HHI 2009	0,11	0,06	0,08	-
HHI 2010	0,11	0,05	0,07	-
HHI 2011	0,12	0,06	0,07	0,04
CR$_4$ 2008	64,88%	22,33%	54,53%	-
CR$_4$ 2009	62,42%	20,84%	49,95%	-
CR$_4$ 2010	62,19%	18,59%	45,53%	-
CR$_4$ 2011	65,56%	16,32%	47,49%	14,70%

Source: Authors' calculation

Measurement of market concentration according to operating revenue by applying HHI index and concentration ratio CR$_4$ indicated that the audit market in Serbia in the 2008-2011 period was moderately concentrated and that it had the characteristics of an oligopoly (figure 3 and figure 4). In 2011, HHI index for operating revenue was 0.12, and the concentration ratio was 65.56% (this means that almost 2/3 of the total operating revenue is shared by "Big Four").

If audit market concentration is measured by net earnings, HHI and CR$_4$ show that audit market in Serbia was not concentrated. In 2011, HHI index based on net earnings was 0.06 and CR$_4$ was 16.32% (figure 3 and figure 4).

Figure 3 HHI Index According to Operating Revenue, Net Earnings, Number of Employees and Number of Audit Client in Period 2008-2011
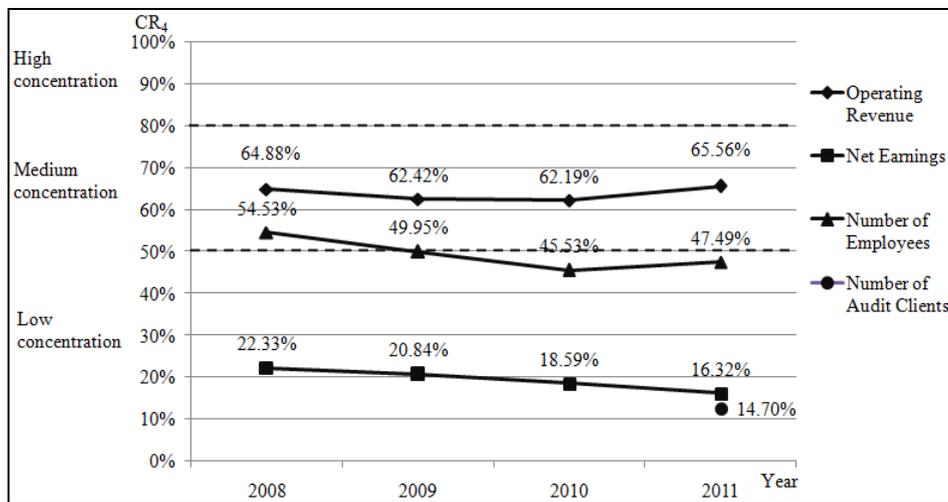

Source: Authors' calculation

Measurement of audit market concentration according to number of employees in audit firms showed that the audit market in Serbia was moderately concentrated in 2008, and that concentration was decreased when the years 2008 and 2011 were compared (Figure 3 and Figure 4).

If market share is measured by the number of audit clients, then it can be observed that the audit market in Serbia was not concentrated since "Big Four" carried out only 14.70% of audit engagements (Figure 3 and Figure 4).

Figure 4: CR$_4$ Index According to Operating Revenue, Net Earnings, Number of Employees and Number of Audit Client in Period 2008-2011

Source: Authors' calculation

Conclusion

Research reveals that the audit market in Serbia is oligopolistic when market share is measured by operating revenue of audit firms. "Big Four" audit firms have a dominant position in the audit market in Serbia, as in many other countries.

When other measures of market concentration are taken in consideration, such as net earnings, number of employees and number of audit clients, "Big Four" is not so dominant. The dominance is even decreased in 2011 compared to 2008. This decrease is not significant and it can be partly explained by establishment of new audit firms (in 2011 there were 14 more audit firms that in 2008) and increase in number of employees in other audit firms.

Different conclusions about oligopolistic character of audit market in Serbia when different variables are applied can partially be explained by lack of

correlation between operating revenue and net earnings of audit firms in Serbia (see more: Jaksic, Mijic, Andric, 2012).

Differences in market share when operating revenue and the number of clients are concerned (in the year 2011 "Big Four" had 65.56% of total operating revenue and only 14.70% of total audit engagements) confirms that "Big Four" has a significantly higher audit fees than other audit firms.

References

Agencija za privredne registre. (2012). Registar finansijskih izveštaja i podataka o bonitetu pravnih lica i preduzetnika. preuzeto 20.08.2012. sa sajta: http://www.apr.gov.rs

Bigus, J., Zimmermann, R. C. (2008). *Non-Audit Fees, Market Leaders and Concentration on the German Audit Market*, International Journal of Auditing, volume 12, str. 159-179.

Brezina, I., Pekar, J., Čičkova, Z. (2012). *The Analysis of Concentration of Slovak Banking Sector*. Subotica: SM 2012, str. 1-8.

Cameran, M., Di Vicenzo, D., Merlotti, E. (2005). *The Audit Firm Rotation Rule: A Review of the Literature.* Milan: SDA Bocconi

Dubaere, C. (2008). *Concentration on the Audti Market - master dissertation.* Ghent: Ghent University

European Commission. (2004). *Guidelines on the assessment of horizontal mergers*. Official Journal of European Union.

Jakšić, D., Mijić, K., Andrić, M. (2012). *Analysis of Variations in the Performance of Audit Firms in the Republic of Serbia*. Belgrade: Economic Annals, No. 193, str. 71-91.

Komora ovlašćenih revizora. (2012). *Registar preduzeća za reviziju*. preuzeto 19.08.2012. sa sajta: http://www.kor.rs

Le Vourc`h, J., Morand, P. (ECSP Europe). (2011). *Study on the Effects of the Implementation of the Acquis on Statutory Audits of Annual and Consolidated Accounts Including the Consequences on the Audit Market.* Paris: European Commission.

Li, C., Song, F., Wong, S. (2005). *Audit Firm Size Effects in China`s Emerging Audit Market - working paper.* Hong Kong: Institute of Economics and Business Strategy.

Ministarstvo finansija. (2012). *Registar preduzeća za reviziju.* preuzeto 19.08.2012. sa sajta: http://www.mfin.gov.rs

Njegomir, V., Stojić, D. (2010). *Determinants of Insurance Market Attractiveness for Foreing Investments: The Case of Ex-Yugoslavia*. Pula: Economic Research, vol. 23. str. 99-110.

Organisation for Economic Co-operation and Development. (1993). *Glossary of Industrial Organization Economics and Competition Law.* Europe: OECD

Schaen M., and S. Maijoor, 1997, The Structure of the Belgian Audit Market: the Effects of Clients' Concentration and Capital Market Activity, Internal Journal of Auditing, 1(2), str. 151- 162.

Sohrab Uddin, S.M., Gupta, D. A. (2012). Concetration and Competition in the Non-Banking Sector: Evidence from Bangladesh. Global Journal of Management and Business Research. USA: Global Journal Inc. str. 80-88.

US Government Accountability Office. (2008). *Audits of Public Companies - Continued Concentration in Audit Market for Large Public Companies Does Not Call for Immediate Action.* Washington: GAO

U.S. Department of Justice and the Federal Trade Commission. (2010). *Horizontal Merger Guidelines*. United States: Department of Justice and the Federal Trade Commission

Quick, R., Sattler, M. (2011). *Das Erfordernis der Umsatzunabhängigkeit und die Konzentration auf dem deutschen Markt für Abschlussprüferleistungen.* Zeitschrift für Betriebswirtschaft, volume 81, str. 61-98.

Zakon o računovodstvu i reviziji, Službeni glasnik RS, br. 46/2006 i 111/2009.

KONCENTRACIJA TRŽIŠTA REVIZIJSKIH USLUGA U REPUBLICI SRBIJI

Apstrakt: U radu je sprovedeno istraživanje i analiza koncentracije tržišta revizijskih usluga u Republici Srbiji u periodu 2008-2011. godina. Koncentracija na tržištu revizijskih usluga merena je Herfindahl Hirschman indeksom (HHI) i Indeksom koncentracije (CRn) na bazi nezavisnih varijabli: poslovni prihod, neto rezultat, broj zaposlenih i broj klijenata revizije. Rezultati istraživanja koncentracije revizijskog tržišta na bazi poslovnog prihoda kao najreferentnije varijable ukazuju da tržište revizijskih usluga u Republici Srbiji ima umerenu koncentraciju i da ima karakteristike oligopola. Međutim, posmatrajući koncentraciju tržišta prema ostalim varijablama, uočava se da nije prisutna dominacija „velike četvorke" po pitanju visine neto rezultata, broja zaposlenih i broja klijenata. Razlike između vrednosti pokazatelja koncentracije potvrđuju prethodna istraživanja tržišta revizijskih usluga u Republici Srbiji o nepostojanju korelacije između poslovnog prihoda i neto rezultata revizijskih firmi i relativno visokoj ceni revizijskih usluga „velike četvorke".

Ključne reči: tržište revizijskih usluga, „velika četvorka", koncentracija.