



doc. dr Almir Alihodžić

Ekonomski fakultet u Zenici,
Univerzitet u Zenici
almir_ecc@yahoo.com

TESTIRANJE PRIMENE KRALICEKOVOG DF POKAZATELJA NA BEOGRADSKOJ BERZI

Rezime

Meriti uspešnost poslovanja pre svega znači imati precizna definisana merila uspešnosti. Merenjem, tj. merilima uspešnosti utvrđuje se koliko je preduzeće uspešno koristilo svoje resurse. Pogrešno je izjednačiti uspešnost, tj. efikasnost i efektivnost, odnosno učinkovitost poslovanja. Preduzeće može biti uspešno u korišćenju svojih resursa ali ne mora biti i učinkovito ako ne ostvari postavljene ciljeve, jer efektivnost predstavlja sposobnost preduzeća za ostvarivanje postavljenih ciljeva. Za dobijanje neophodnih informacija potrebni su brojni postupci i informacije iz finansijskih izveštaja. Takođe, potrebno je imati u vidu njihovu ograničenost koja se odnosi na podatke iz prošlosti. U ovom radu se istražuje mogućnost aplikativne primjene Kralicekovog DF pokazatelja za pojedina preduzeća (akcije emitenata) podeljena u dve skupine i to: prvih deset preduzeća koja imaju najveće procentualno učešće u indeksnoj korpi i preduzeća koja su ostvarila negativan finansijski rezultat u 2011. godini, a koja se nalaze u sastavu berzanskog indeksa BELEXline.

Ključne reči: poslovna izvrsnost, bonitet preduzeća, finansijska snaga, DF pokazatelj

JEL: G17, G31, G33

Rad primljen: 29.12.2012.

Odobren za štampu: 25.02.2013.

TESTING THE KRALICEK DF INDICATOR APPLICATION ON THE BELGRADE STOCK EXCHANGE

doc. dr. sci Almir Alihodžić

Faculty of Economics in Zenica,
University of Zenica
almir_ecc@yahoo.com

Summary

Measuring business success primarily means having available precisely defined measure of success. By measurement, i.e. through success measures it is determined how much success an enterprise achieved in the employment of its resources. It is wrong to equate success, ie. efficiency and effectiveness, and efficiency of operations. An enterprise may be successful in using its resources, but may not be effective if its set objectives are not achieved, because the effectiveness is the ability of the enterprise to achieve its projected objectives. In order to receive necessary information many procedures and data from financial reports are required. In addition, the constraints of information received must be taken into consideration regarding data history. This paper investigates options for application of the Kralicek DF indicator on certain companies (issuers' shares) divided into two sets as follows: the first ten companies having the higher percentage of share in the index basket, and companies with a negative financial result in 2011, which are present in the BELEXline stock exchange index.

Key words: business excellence, company credit rating, financial strength, DF indicator

JEL: G17, G31, G33

Uvod

Finansijski izveštaji predstavljaju kvantificirane prikaze koji predstavljaju glavne izvore informacija o poslovanju preduzeća. Poznavanje osnovnih tehnika i metoda finansijske analize od kapitalnog je značaja za sve korisnike finansijskih izveštaja. Informacije dobijene iz finansijskih izveštaja mogu se koristiti u različite svrhe, i to: za merenje efikasnosti i efektivnosti poslovanja, evaluaciju vrednosti preduzeća, projektovanje budućih novčanih tokova, predviđanje budućeg poslovanja itd.

Različiti korisnici finansijskih izveštaja njihovom analizom žele doznati različite korisne informacije o poslovanju preduzeća. Vlasnici, tj akcionari na osnovu datih informacija predviđaju i odlučuju da li zadržati ili prodati svoje akcije ili udele, kakva je isplativost ulaganja u preduzeće u odnosu na druga preduzeća u istoj delatnosti, da li zadržati ili zameniti sadašnje menadžere i dr. Takođe, kreditori analizom žele doznati kolika bi dobit bila dostatna za pokriće dospelih kamata na obveznice ili kredite, odnosno kakvi su izgledi da obveznice budu plaćene po dospeću. Menadžeri na osnovu dobijenih informacija predviđaju i odlučuju o politici raspodele dobiti, mogućnostima i načinima finansiranja budućih ulaganja, verovatnosti uspešnosti budućeg poslovanja i dr. Zaposlenici upoređuju uspešnost i finansijski položaj preduzeća u odnosu na raniji period. Vladine agencije procenjuju trenutnu uspešnost i finansijski položaj pojedinih preduzeća i privrednih grana.

Na koji način utvrditi da li se preduzeće nalazi u finansijskim neprilikama, tj. pred stečajem? Kao rezultat napora brojnih stručnjaka na polju finansijske analize razvijeni su brojni modeli zbirnih finansijskih pokazatelja od kojih se posebno izdvajaju: *Altmanov Z - Score model*, *Kralicekov DF pokazatelj*, *Argentijev model*, *Ohlsonovi modeli*, *BEX model*, *Zavgrenin model*, *Theodossioujev model*, *Chesser-ov credit scoring model*, *Tafflerov model* i dr. Predmet istraživanja u ovom radu je mogućnost primene Kralicekovog DF pokazatelja za predviđanje

finansijskih neprilika za pojedina preduzeća tj. emitente u sastavu berzanskog indeksa BELEX, tačnije za prvih deset preduzeća sa najvećim procentualnim učešćem u indeksu, kao i za preduzeća koja su ostvarila negativan finansijski rezultat u 2011. godini, a koja se nalaze u sastavu indeksa BELEXline. Rad je struktuiran iz tri dela. Prvi deo opisuje pojedine teorijske modele za predviđanje finansijskih neprilika i njihove pretpostavke. Drugi deo govori o osnovnim tendencijama tržišta kapitala u Srbiji, posebno o karakteristikama akcijskog tržišta kapitala. I treći deo opisuje mogućnost primene Kralicekovog DF pokazatelja za pojedine akcije preduzeća. Na kraju se daju zaključna razmatranja.

Predviđanje kreditnog boniteta preduzeća po ZETA modelu

Zeta je nastao u drugoj polovini dvadesetog veka u SAD na osnovu istraživanja da li će preduzeće u budućnosti bankrotirati ili pak ne. Istraživanje je obuhvatilo mnoga preduzeća koja nisu bankrotirala kao i mnoga preduzeća koja su bankrotirala. Posmatrana preduzeća su pripadala istoj grani delatnosti, te su bilansi uzimani za iste godine, kao i za godine pre bankrotstva preduzeća. U samom početku je uzeto 30 finansijskih pokazatelja, a na samom završetku izabrano je samo pet. Finansijski pokazatelji koji su izabrani odnose se na: (1) odnos obrtnog kapitala i ukupnih sredstava - X_1 ; (2) odnos akumulirane zadržane zarade i ukupnih sredstava - X_2 ; (3) odnos zarade pre odbitka kamate i poreza i ukupnih sredstava - X_3 ; (4) odnos tržišne vrednosti kapitala i ukupnih obaveza - X_4 ; (5) odnos prihoda od prodaje i ukupnih sredstava - X_5 .

Obrtni kapital / ukupna sredstva - X_1 . Obrtni kapital jednak je razlici između trajnog i dugoročnog kapitala¹ kao i stalne imovine. Često se u literaturi sreće pod nazivom neto obrtni kapital i predstavlja računsku kategoriju koja može da bude pozitivna i negativna. Negativna će biti u slučaju kada je trajni kapital manji od stalne imovine.

Akumulirana zadržana zarada / ukupna

1 Zbir kapitala umanjenog za gubitak, dugoročna rezervisanja i dugoročne obaveze.

Introduction

Financial reports are quantitative presentations which are the main sources of information on the company business. Knowledge of the basic techniques and methods of financial analysis is of capital importance for all the users of financial reports. Information received from financial reports may be used for different purposes as follows: for measuring business efficacy and effectiveness, for evaluation of the company value, projection of future cash flows, prediction of future business operations, etc.

Different users of financial reports wish to gain through their analysis various useful information on the company business. The owners, i.e. shareholders, on the basis of information provided, predict and decide whether to keep or sell their stocks and shares, deliberate profitability of investment in the company in respect to investment made in some other companies in the same business branch, whether to keep or replace current managers, etc. In addition, through their analysis, creditors wish to learn what would be an adequate gain for covering interest due for payment on bonds or credits, i.e. what are the outlooks for the bonds to be paid on maturity. Managers, on the basis of information received, predict and decide on the policy of profit distribution, options and manners of financing future investments, probability of success of future business operations, etc. Employees are assessing success and financial position of the company in comparison with the previous period. Government agencies are assessing current success and financial position of individual companies and industrial branches.

What is the way to determine whether a company is in financial distress, i.e. facing bankruptcy? Ample efforts invested by many experts in the field of financial analysis have resulted in development of many models of aggregate financial indicators, where especially outstanding are the following: *Altman Z-Score model*, *Kralicek DF indicator*, *Argenty model*, *Ohlson models*, *BEX model*, *Zavgrenin model*, *Theodossiou model*, *Chesse credit scoring model*,

Taffler model, etc. Subject of research in this work is the Kralicek DF indicator for forecasting financial distress of certain companies, i.e. issuers within the stock exchange BELEX index, or more precisely, for the first ten companies with the highest percentage of share in this index, but also for the companies that have made a negative financial result in 2011, and which are present within the composition of the BELEXline index. This paper is structured in three parts. Part one describes individual theoretical models for forecasting financial distress and their assumptions. Part two speaks of the basic capital market tendencies in Serbia, especially the characteristics of the equity capital market. Part three describes options for the application of the Kralicek DF indicator on some of the company shares. Finally, closing deliberations are given.

Forecasting company credit worthiness after the ZETA model

Zeta evolved in the second half of the 20th century in the USA based on the research investigating whether a company is facing bankruptcy in future, or not. Research covered many companies that did not fall into bankruptcy, but also many companies that did go bankrupt. The investigated companies belong within the same business branch, and the balance sheets were taken for the same years, but also for the years prior to bankruptcy. In the beginning some 30 financial indicators were applied, and at the very end only five of them were selected. Financial indicators selected pertained to the following: (1) working capital/total assets ratio - x_1 ; (2) accumulated retained earnings/total assets ratio - x_2 ; (3) earnings before interest and tax/total assets ratio - x_3 ; capital market value/total liabilities ratio - x_4 ; (5) sales revenues/total assets ratio - x_5 .

Working capital/total assets ratio - x_1 . Working capital is equal to the difference between a permanent and a long-term capital,¹ and non-current assets. It is often encountered in literature under the name 'net working capital', and it is an computational value which

1 Sum of capital decreased for loss, long-term provisioning and long-term liabilities.

sredstva - X_2 . Akumulirana zadržana zarada predstavlja neraspoređeni dobitak. Ako je u bilansu uspeha iskazan i neraspoređeni dobitak i gubitak uzima se razlika između neraspoređenog dobitka i gubitka. Ova razlika može da bude negativna kada je neraspoređeni dobitak manji od gubitka. Kada preduzeće u bilansu stanja prikazuje samo gubitak tada je odnos gubitka i ukupnih sredstava isto negativan.

Zarada prije odbitka kamata i poreza / ukupna sredstva - X_3 . Zarade pre odbitka kamata i poreza predstavlja bruto dobitak uvećan za rashode finansiranja. Ako je umesto bruto dobitka ostvaren gubitak, onda se od rashoda finansiranja oduzima gubitak, što znači da i ovaj rezultat može da bude negativan i dogodiće se kada je gubitak veći od rashoda finansiranja.

Tržišna vrednost kapitala / ukupne obaveze - X_4 - Kod akcionarskih društava čije se akcije kotiraju na berzi kapitala, tržišna vrednost kapitala je jednaka proizvodu tržišne vrednosti njihovih akcija ostvarenih na berzi na dan bilansa i broja akcija koje se nalaze kod akcionara. Kod onih preduzeća čije se akcije ne prodaju na berzi, kao i kod svih drugih preduzeća umesto tržišne vrednosti kapitala uzima se knjigovodstvena vrednost kapitala.

Prihodi od prodaje / ukupna sredstva - X_5 - Prihod od prodaje predstavlja prihod od prodaje robe, proizvoda i usluga, dok ukupna sredstva su jednaka zbiru aktive umanjene za gubitak iznad visine kapitala iskazanog u aktivi.

ZETA skor odnosi vrednuju se na sledeći način:

$$Z\text{ skor} = 1,2 X_1 + 1,4 X_2 + 3,3 X_3 + 0,6 X_4 + 1,0 X_5 \quad (1)$$

Vrijednost Z - skora objašnjava se na sledeći način: (1) ako je Z skor $\geq 2,99$ preduzeće je sa zdravim poslovanjem, tj. ima dobre kreditne performanse; (2) ako je Z skor $> 1,81 < 2,99$ preduzeće posluje u sivom (rizičnom području) i ima minimalne kreditne performanse i (3) ako je Z skor $\leq 1,81$ preduzeće je pred bankrotstvom, odnosno nema kreditne performanse. Tabela u

nastavku ilustruje Altmanov Z score model.

Prema prethodnoj tabeli najveći značaj

Tabela br. 1: Altmanov Z - score model

Oznaka X	Ponder kojim se vrednuje	(%)
X_1	1,2	16,00
X_2	1,4	18,67
X_3	3,3	44,00
X_4	0,6	8,00
X_5	1,0	13,33
Ukupno od X_1 do X_5	7,5	100,00

Izvor: James C., V. „Financijsko upravljanje i politika“, MATE, Zagreb, 1997, str. 782 - 783.

ima pokazatelj X_3 - Zarade pre odbitka kamata i poreza na dobitak prema ukupnim sredstvima (44%). Ova informacija je od značaja za rentabilnost ukupnog kapitala.² Drugi pokazatelj po značaju je akumulirana zarada prema ukupnom kapitalu - X_2 (18,67%). Ovaj pokazatelj može biti problematičan iz sledećih razloga: (1) ako je preduzeće dobitak raspodelilo u kapital, tj. zakonske i statutarne rezerve ili je dobitak konvertovalo u dividendne akcije, time je povećalo kapital i zaštitu poverioca. U takvim slučajevima akumulirani dobitak može biti vrlo nizak pa i ravan nuli; (2) ako je dobitak isplaćen vlasnicima to podstiče vlasnike da se radi budućnosti preduzeća ograničavaju od raspodele dobitka.

Treći po učešću je pokazatelj odnos obrtnog kapitala i ukupnih sredstava - X_1 (16,00%). Kada je obrtni kapital pozitivan ovaj pokazatelj ne govori ništa o finansijskom položaju, tj. finansijskoj stabilnosti. Kada se ocenjuje finansijska stabilnost obrtni kapital se upoređuje sa zalihama, i za finansijsku stabilnost je bitno da li je obrtni kapital jednak, veći ili manji od zaliha.

Četvrti pokazatelj po značaju je odnos prihoda od prodaje i ukupnih sredstava - X_5 (13,33%). Ovaj racio izražava koeficijent obrta ukupne imovine, te je značajan pokazatelj ekikasnosti korišćenja imovine. Peti po značaju je odnos tržišna vrednost kapitala prema ukupnim obavezama - X_4 (8%). Ovaj odnos pokazuje pokrivenost dugova kapitalom i što je veći to je bolje.

2 Stopa bruto prinosa na ukupan kapital može da bude visoka a da pri tome stopa neto prinosa na sopstveni kapital bude niska pa čak i negativna. To se događa kada je bruto dobitak minoran ili čak negativan, a troškovi kapitala vrlo visoki.

may be either positive or negative. It will be negative in case when permanent capital is lower than the non-current assets.

Accumulated retained earnings/total assets ratio - x_2 . Accumulated retained earnings are the undistributed profit. If the income statement shows both the undistributed profit and loss, the difference is taken between undistributed profit and loss. This difference may be negative when the undistributed profit is lower than the loss. When a company is presenting in its balance sheet only loss, then the loss/total assets ratio is negative.

Earnings before interest and tax/total assets ratio - x_3 . Earnings before payment of interest and tax is a gross profit increased for financing costs. If instead of gross profit a loss was made, then the loss is subtracted from the financing costs, which means that this result may be negative as well, and will occur when the loss is higher than the financial costs.

Capital market value/total liabilities ratio - x_4 . In case of shareholding companies with shares quoted on the capital market, market value of capital is equal to the product of the market value of its shares reached on the stock exchange on the balancing day and the number of shares held by the shareholders. In case of companies that have shares which are not traded on the stock exchange, and in case of some other companies, instead of the capital market value what is taken into consideration is the book value of capital.

Earnings from sales/total assets ratio - x_5 . Revenues from sales are earnings from sales of goods, products and services, while total assets are equal to the sum of assets minus loss above the amount of capital presented in the assets.

Zeta score, or rather Z - score ratios are valued in the following manner:

$$Z\ skor = 1,2 X_1 + 1,4 X_2 + 3,3 X_3 + 0,6 X_4 + 1,0 X_5 \quad (1)$$

Value of Z - score is explained in the following manner: (1) if a Z - score is ≥ 2.99 the company has a sound business in hand, i.e. it has good credit performances; (2) if the Z -

score is $> 1.81 < 2.99$ the company is operating in the grey (risky) area and has minimal credit performances; and (3) if the Z - score is ≤ 1.81 company is facing bankruptcy, i.e. it does not have credit performances. The following Table is illustrating Altman's Z - score model.

Table 1 Altman Z - score model

Mark X	Evaluation weight	(%)
X_1	1,2	16,00
X_2	1,4	18,67
X_3	3,3	44,00
X_4	0,6	8,00
X_5	1,0	13,33
Total X_1 to X_5	7,5	100,00

Source: James C., V. „Financijsko upravljanje i politika“, MATE, Zagreb, 1997, p. 782 - 783.

The above Table shows that the highest significance has the indicator X_3 - Earnings before payment of interest and taxes/total assets ratio (44%). This information is important for the total capital profitability.² Second indicator in importance is the accumulated earnings/total capital ratio - X_2 (18.67%). This indicator may be problematic for the following reasons: (1) if the company allocated its profit into capital, i.e. legal and statutory reserves, or converted profit into dividend shares, thus it increased capital and creditor protection. In such cases the accumulated profit may be very low or even equal to zero; (2) if the profit was paid to the equity holders this will boost equity holders to limit themselves from the profit distribution for the sake of future of the company.

The third in importance indicator is the working capital/total assets ratio - X_1 (16.00%). When working capital is positive this indicator says almost nothing about the financial position, i.e. financial stability. When assessing financial stability, working capital is compared to the inventories, and for the financial stability it is important for the working capital to be equal, higher or lower than the inventories.

The fourth indicator in importance is the earnings from sales/total assets ratio - X_5 (13.33%). This ratio shows the coefficient of

2 Gross rate of return on total capital may be high, while at the same time net rate of return on equity capital may be low and even negative. This happens when the gross gain is minor or even negative, and the costs of capital are very high.

Originalni Altmanov Z - Score Model namjenjen je za preduzeća u industrijskoj grani čije akcije kotiraju na berzi. Altman je kasnije izvršio još dve korekcije svog modela od kojih se jedna odnosi na privatna preduzeća pri čemu je u brojiocu parametra X_4 došlo do zamene tržišne vrednosti knjigovodstvenom vrednošću kapitala i ponderi su promenjeni, tako da jednačina glasi:

$$Z' = 0,717X_1 + 0,847X_2 + 3,107X_3 + 0,420X_4 + 0,998X_5 \quad (2)$$

Ako je Z - score manji od 1,23 preduzeće je zrelo za stečaj, a ako je Z -Score veći od 2,90 preduzeće ima dobru budućnost. Područje sive zone nalazi se između 1,23 - 2,90. Duga izmena modela nastupila je iz razloga prilagođavanja stečaja za neindustrijska preduzeća na tržištima u nastajanju, pri čemu je isključen parametar X_5 i dodata konstanta 3,25 pa Altmanov EMS model glasi (engl. *Emerging Market Scoring - EMS*):³

$$Z'' = 3,25 + 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4 \quad (3)$$

Model za procjenu poslovne izvrsnosti - BEX model

Primenom logičke selekcije prema kriterijumima održivosti i kompatibilnosti u prikazivanju izvrsnosti od velikog broja pokazatelja iz svih područja odabrano je ukupno 14 pokazatelja, i to: 5 - strukturnih pokazatelja, 5 - pokazatelja finansijskih performansi i 4 - pokazatelja efikasnosti investiranja akcionara na tržištu kapitala.

Ovako odabrana skupina pokazatelja podvrgnuta je bila statističkim ispitivanjima te je dobijene standardna funkcija diskriminacije koja u sebi sadrži samo četiri ključna pokazatelja koji imaju najveći uticaj na određivanje pripadnosti preduzeća odgovarajućoj grupi. Određivanjem relativne važnosti uticaja pondera izabranih pokazatelja na diskriminaciju dve skupine preduzeća i daljom analizom izračunat je agregatni pokazatelj poslovne izvrsnosti - BEX indeks. BEX indeks pokazuje i meri poslovnu

izvrsnost preduzeća u dve dimenzije, i to:

- trenutnu poslovnu izvrsnost (*lagging* dimenzija) i
- očekivanu poslovnu izvrsnost (*leading* dimenzija).

Statističkim istraživanjima uz primenu savremenih naučnih metoda dokazana je prognostička vrednost BEX-a testiranjima stvarnih podataka preduzeća na tržištu kapitala u Hrvatskoj u periodu od 2000. - 2006. godine, koja iznosi više od 90%. Naime, ipak treba napomenuti da se ovde radi o statističkoj oceni prognostičke snage modela, dok stvarnu prognostičku vrednost treba tražiti korišćenjem vremenskih serija, segmentalnih procena i dodatnih informacija. Prednost BEX indeksa nad drugim sličnim modelima izrađenim u svetu ogleda se u sledećem:

- BEX model i BEX indeks su konstruisani u skladu sa uslovima poslovanja u hrvatskoj privredi. Drugi uvozni modeli konstruisani su u drugačijim uslovima, pa je njihova tačnost upitna.
- BEX indeks nije zavisao o pokazateljima s tržišta kapitala pa se može računati i za preduzeća koja tek ulaze na tržište kapitala, što je izuzetno važno, ali i za ostala preduzeća koja ne kotiraju na tržištu. Osnovni Altmanov Z-score, kao najpoznatiji svetski model, recimo, to ne omogućuje.
- Većina sličnih modela usmerena je na prognozirane buduće opasnosti od finansijskih teškoća i bankrota (npr. Altmanov Z - score, Ohlsonov, Argentijev model), a manje na izvrsnost. Za razliku od toga, BEX omogućava procenu poslovne izvrsnosti kao i prognozirane uspeha i neuspeha, što znači mnogo veći kvalitet.
- BEX indeks sadrži potpuno novi pokazatelj finansijske snage preduzeća koji do sada nije korišten u svijetu. Pored toga, novim se može smatrati i pokazatelj stvaranja nove vrijednosti, jer u tom obliku nije do sada korišten ni u jednom od poznatih svjetskih modela.

Interesantna je činjenica da su statistička istraživanja pokazala da pokazatelji s tržišta kapitala nisu statistički značajni za određivanje

3 Kritične vrednosti za drugu prilagođenu verziju iznose 1,10 i 2,60.

turnover of total assets, and it is an important indicator of the assets use efficacy. The fifth in importance ratio is the capital market value/total liabilities ratio - X_4 . This ratio shows coverage of debt by capital, and the higher it is, the better.

Original Altman Z - Score Model was designed for companies in the industrial branch where shares are quoted on the stock exchange. Altman later made another two corrections of his model, one of them pertaining to the private companies where in the numerator of the parameter X_4 there was a change of the capital market value into capital book value, and the weights were changed, so that the equation now reads as follows:

$$Z' = 0,717X_1 + 0,847X_2 + 3,107X_3 + 0,420X_4 + 0,998X_5 \quad (2)$$

If the Z - score is lower than 1.23, the company is ready for bankruptcy, and if the Z - score is higher than 2.90 the company is facing a good future. The area of the grey zone is located between 1.23 and 2.90. The second change of the model was made for reasons of adjusting bankruptcy of the non-industrial companies on the emerging markets, where the parameter X_5 was deleted and a constant 3.25 was added, so that the Altman EMS model, the Emerging Market Scoring³ model, now reads as follows:

$$Z'' = 3,25 + 6,56X_1 + 3,26X_2 + 6,72X_3 + 1,05X_4 \quad (3)$$

Business excellence assessment model - BEX Model

Application of logical selection according to the criteria of sustainability and compatibility in presenting excellence has led for a selection, from amongst a large number of indicators in all the areas, of 14 indicators, as follows: 5 - structural indicators, 5 - financial performances indicators, and 4 shareholders investment efficacy on the capital market indicators.

This selected set of indicators was subjected to statistical investigation and the standard discrimination function was obtained which

holds in itself only four key indicators which have the highest impact on determining the corresponding group where the company belongs. By determining the relative importance of the impact of the selected indicators' weights on the discrimination of the two sets of companies and in further analysis, what was calculated was the aggregate indicator of business excellence - the BEX Index. BEX index shows and measures business excellence of a company in two dimensions, as follows:

- current business excellence (*lagging dimension*), and
- expected business excellence (*leading dimension*).

Statistical research, with the application of the state-of-the-art scientific methods, proved the prognostic BEX value by testing real company data on the capital market in Croatia, in the period 2000 - 2006, which amounts to more than 90%. Namely, it is necessary to note that it is a case here of the statistical assessment of the prognostic power of the model, while the real prognostic value should be looked for by using the time series, segmented assessments, and additional information. The advantage of the BEX Index over some other similar models made in the world is reflected in the following:

- BEX model and BEX index are constructed in accordance with the business climate prevailing in the Croat economy. Other imported models are constructed under different circumstances, so that their accuracy is disputable.
- BEX index is not dependent on the capital market indicators so it may be calculated also for companies which are just now venturing on the capital market, which is very important, but also for other companies which are not quoted on the market. The basic Altman Z - score, as the best known world model, let us say, is not allowing for this procedure.
- Majority of similar models is focused more on prognosticating future hazards of financial distress and bankruptcy (for example, Altman Z - score, Ohlson, Argenty model), and less on excellence. Contrary to this,

3 Critical values for the other adjusted version amount to 1.10 and 2.60.

koja preduzeća su dobra a koja loša. Glavni razlog je u tome što ima preduzeća s lošim poslovnim rezultatima, a koja imaju pozitivnu tržišnu kapitalizaciju.⁴ Zbog toga pokazatelji kao što su: zarada po akciji, dividenda po akciji, povrat na akcionarsku glavnicu, prinos od dividende i odnos cene prema zaradi nisu se pokazali statistički značajnim za razlikovanje dobrih od loših preduzeća. To dokazuje da na cene akcija utiču i ostali faktori osim faktora poslovnog rezultata merenih finansijskim pokazateljima. Izveden je dokaz da pozitivan, a naročito posebno visok BEX indeks utiče na rast cena akcija i tržišnu kapitalizaciju. Dakle, procena poslovne izvrsnosti pomoću BEX indeksa dobra je bazna osnova za dodatnu procenu pomoću ostalih relevantnih informacija koje mogu pojačati procenu i prognostičku snagu modela. BEX model se sastoji od četiri pokazatelja s uticajem određenih pondera, što pokazuje sledeći izraz:

$$BEX = 0,388 \, ex_1 + 0,579 \, ex_2 + 0,153 \, ex_3 + 0,316 \, ex_4 \quad (4)$$

gde je:

ex_1 - profitabilnost

$$ex_1 = EBIT / UKUPNA AKTIVA$$

Pokazatelj ex_1 je izvrsnost (engl. *excellence*) merena odnosom zarade i kapitala merenog ukupnom aktivom (engl. *Total assets*). Pokazatelj ex_1 nema veliki uticaj na konačnu visinu BEX indeksa zbog toga što se radi o tzv. „tromom pokazatelju“, čija je osnovna svrha stabilizacija BEX modela. On dobija naročito na značaju kada se njegova vrednost procenjuje po segmentima. Warren Buffett smatra kako je kontinuirano dobar povrat na ukupan kapital (engl. *return on total capital*) vrlo moćan indikator da preduzeće može zadržati dugotrajnu konkurentsku prednost.⁵

ex_2 - stvaranje vrednosti

$$ex_2 = \text{Neto poslovna dobit} / \text{Vlasnički kapital} \times \text{cena}$$

Pokazatelj ex_2 bazira se na ekonomskog profita/dobiti koja prelazi cenu vlastitog kapitala. U proračunu se koristi kategorija poslovne dobiti kako bi se izbegli uticaji vanrednih događaja na rezultat poslovanja. Cena vlastitog kapitala je izračunata iz umnoška vlasničkog kapitala i cene kapitala koju bi vlasnici mogli ostvariti iz alternativnih nerizičnih ulaganja. Ako je ex_2 veći od 1, preduzeće stvara vrednost, a ako je manji od 1 preduzeće „jede“ svoju supstancu.

ex_3 - likvidnost

$$ex_3 = \text{radni kapital} / \text{ukupna aktiva}$$

Za merenje likvidnosti koristi se klasični pokazatelj odnosa radnoga kapitala prema ukupnoj aktivi. Radni kapital se izračunava kao razlika tekuće aktive i tekućih obaveza. Granična mera likvidnosti iznosi 25% radnog kapitala u odnosu naspram aktive.

ex_4 - finansijska snaga

$$ex_4 = 5 \, (\text{dobit} + D + A) / \text{ukupne obaveze}$$

Pokazatelj ex_4 bazira se na odnosu teorijski slobodnog novca iz svih aktivnosti, dakle dobit uvećana za amortizaciju i deprecijaciju i pokriva svih obaveza tim novcem. Standardna mera pokriva obaveza slobodnim novcem iznosi 20%. Taj pokazatelj nema linearni uticaj. Dakle, što se u kraćem vremenu obaveze pokrivaju iz zarade iz novčanog toka, negov uticaj na izvrsnost progresivno raste.⁶ U dužem vremenskom periodu pokriva obaveza iz zarade od novčanog toka degresivno pada. Na primer, pri investiranju zaduživanjem ex_4 se smanjuje jer se finansijski rizik povećava. Po aktiviranju investicije i prvom obračunu amortizacije finansijska snaga se vraća, a pri prvom ostvarenju dobiti po osnovu te investicije finansijska snaga se potpuno stabilizuje. Finansiranje emisijom novih akcija ne utiče na ex_4 ali ipak utiče na ex_2 jer se time povećava vlastiti kapital i njegov trošak. Kao što se da primetiti pokazatelji ex_1 i ex_3 , tj. profitabilnost

4 Tržišna kapitalizacija = (Broj izdanih akcija) x (Zaključna vrednost akcije).

5 Dobrim povratom na ukupni kapital smatra se iznos od 20%. U Hrvatskoj je kontrolna mera tog pokazatelja 17%.

6 U modelu je maksimalna vrednost ovog pokazatelja ograničena na 10 jer je naknadnim istraživanjem utvrđeno da skraćanje vremena pokriva obaveza iz dobiti i amortizacije na manje od 6 - meseci više ne utiče bitno na izvrsnost. Stoga, njegova maksimalna vrednost u BEX indeksu može biti 3,16 (0,316 x 10)

BEX allows for the assessment of business excellence, and also prognosticating both success and failure, which offers a much higher quality.

- BEX index contains a completely new indicator for the financial strength of the company, which was not used so far in the world. In addition, it may be deemed that the novelty is also the new value creation indicator, as in this form it has not been used in any of the better known world models.

It is interesting to note that the statistical research have shown that the capital market indicators are not statistically significant for determining whether companies are good or bad. The main reason here is the fact that there are companies with poor business results, yet having positive market capitalization.⁴ Therefore the indicators such as: earning per share, dividend per share, return on shareholding principal, return from dividend, and price/earning ratio have not shown to be statistically significant for differentiating good from bad companies. This proves that the share prices are also impacted by other factors except for the factor of the business result measured by financial indicators. Evidence was presented proving that a positive and especially a high BEX index impact is reflected in growth of share prices and market capitalization. Hence, the assessment of business excellence by means of the BEX index is a good basis for additional assessment by aid of the other relevant information which may enhance the evaluation and a prognostic capacity of the model. BEX model consists of the four indicators with the impact of certain weights, which is best illustrated in the following:

$$BEX = 0,388 \, ex_1 + 0,579 \, ex_2 + 0,153 \, ex_3 + 0,316 \, ex_4 \quad (4)$$

where:

ex_1 - profitability
 $ex_1 = EBIT / Total \, assets$

Indicator ex_1 is excellence measured by the earnings/capital ratio measured by total assets. Indicator ex_1 does not have any great influence on the final value of the BEX index because it is the case here of the so-called “lazy indicator” whose main purpose is to stabilize the BEX model. It gains in importance especially when its value is estimated per segments. Warren Buffet is of the mind that a continuously good return on total capital is a very powerful indicator showing that the company can maintain a long-term competitive advantage.⁵

ex_2 - value creation
 $ex_2 = Net \, business \, profit / Equity \, capital \times price$

The ex_2 indicator is based on economic profit/gain which is higher than the price of equity capital. What is used in calculation is the category of business gain in order to avoid the impact of extraordinary events on the business result. Price of equity capital is calculated from the multiplier of equity capital and price of capital that the owners could achieve from alternative risk-free investments. If the ex_2 is higher than 1, company is creating value, and if it is lower than 1 company is ‘eating’ its own substance.

ex_3 - liquidity
 $ex_3 = Working \, capital / Total \, assets$

For measuring liquidity classic indicator of the working capital/total assets ratio is used. Working capital is calculated as a difference between current assets and current liabilities. The marginal liquidity measure is 25% of working capital in respect to the assets.

ex_4 - financial strength
 $ex_4 = 5 \, (Profit + D + A) / Total \, liabilities$

The ex_4 indicator is based on the ratio of theoretically free money from all activities, ie. the profit increased for amortization and depreciation, and coverage of all liabilities from this money. Standard measure for covering

4 Market capitalisation = (Number of issued shares) x (Final share value).
 5 Good return on capital is considered to be the amount of 20%, In Croatia the control measure of this indicator is 17%.

aktive i likvidnost nemaju veliki uticaj na konačnu vrednost BEX indeksa. Naime, u svim sličnim modelima moraju postojati tzv. tromi pokazatelji koji sprečavaju velike oscilacije indeksa. Ova dva pokazatelja ipak opredeljuju rezultate BEX indeksa u graničnim područjima.

Ukupna poslovna izvrsnost procenjuje se uz pomoć BEX indeksa na sledeći način:

- BEX INDEX veći od 1 = dobra preduzeća
- BEX INDEKS između 0 i 1 = potrebna su unapređenja

Detaljno rangiranje poslovne izvrsnosti s prognozama očekivanja ilustruje sledeća tabela:

Kralicek DF pokazatelj

Dva poznata modela profesora Petera Kraliceka su: (1) DF model i (2) QuickTest model. Po uzoru na Altmanov model koji se bazira na uzorku američkih preduzeća, Kralicek je razvio svoj DF pokazatelj na uzorku evropskih preduzeća za identifikovanje krize u preduzeću. Jednačina DF pokazatelja je sledeća:

$$DF = 1,5X_1 + 0,08X_2 + 10X_3 + 5X_4 + 0,3X_5 + 0,1X_6$$

(5)

Tabela br.2: Rangiranje poslovne izvrsnosti i prognoza za budućnost⁷

Business excellence index (BEX)	Rang poslovne izvrsnosti (Business excellence rang)	Prognoza za budućnost
veći od 6,01 - 4 godine uzastopno	Svetska klasa (<i>world class</i>)	Preduzeće posluje sa vrhunskim rezultatima što se može očekivati i u iduće 4. godine, ako menadžment nastavi sa unapređenjima
veći od 6,01	kandidati za svetsku klasu (<i>world class candidate</i>)	Preduzeće posluje izvrsno što se može očekivati i u sledeće 3 - godine, ako menadžment nastavi sa unapređenjima
4,01 - 6,00	izvrsno	Preduzeće posluje izvrsno što se može očekivati i u sledeće 3 - godine, ako menadžment nastavi sa unapređenjima
2,01 - 4,00	vrlo dobro	Preduzeće posluje vrlo dobro što se može očekivati i u sledeće 2 - godine ako menadžment nastavi s unapređenjima
1,01 - 2,00	dobro	Preduzeće posluje dobro, ali se poboljšanje može očekivati samo ako se pristupi unapređenjima
0,00 - 1,00	ograničeno područje između dobrog i lošeg	Poslovna izvrsnost je pozitivna, ali nije zadovoljavajuća. Potrebno je pristupiti ozbiljnim unapređenjima.
manji od 0,00 (negativan)	loše	Ugrožena je egzistencija. Potrebno je hitno pristupiti restruktuiranju i unapređenjima, inače će se loše poslovanje nastaviti pa postoji opasnost od propasti (verovatnost je preko 90%)

IZVOR: Belak, V., Aljinovic-Barac, Z. „Tajne tržišta kapitala“, Zagreb: Sinergija doo. (2008) str. 34.

7 Rangovi poslovne izvrsnosti definisani su analiziranjem kretanja dosadašnjih stvarnih rezultata. Međutim, precizne prognoze nisu statistički potvrđene jer još nema dovoljno dugog vremenskog niza istorijskih podataka, zbog čega prognoze treba uzeti sa rezervom.

liabilities with free money is 20%. This indicator does not have a linear influence. Hence, the shorter the time in which liabilities are covered from the earnings from cash flows, the influence on excellence grows progressively.⁶ Over a longer period of time, covering liabilities from cash flow earnings shows a digressive fall. For example, in case of investment by borrowing, ex_4 is falling as the financial risk grows. Upon activation of investment and the first calculation of amortization financial strength is regained, and when the first profit is achieved based on the investment made, financial strength is fully stabilized. Financing by the issuance of new shares does not impact the ex_4 , but it does impact the ex_2 , as in this way equity capital is increased and its cost as well. It may be noted

that the indicators ex_1 and ex_3 , i.e. profitability of assets and liquidity do not have any great impact on the final value of the BEX index. Namely, in all the similar models there must be a presence of the so-called lazy indicators which are preventing great index oscillations. These two indicators, nonetheless, are determining the BEX index results in the marginal areas.

Total business excellence is assessed with the aid of the BEX index in the following manner:

- BEX INDEX higher than 1 = good companies
- BEX INDEX between 0 and 1 = upgrading necessary

Detailed ranking of the business excellence with prognosticated expectations is illustrated in the following table:

Table 2 Business excellence ranking and prognostication for the future⁷

Business excellence index (BEX)	Business excellence ranking	Prognostication for the future
Higher than 6.01 - 4 years consecutively	World class	Company operates with top results which is also to be expected for the next 4 years, if management is to continue with upgrading
Higher than 6.01	World class candidate	Company has excellent operation and this is to be expected also over the next 3 years, if management is to continue with upgrading
4.01 - 6.00	Excellent	Company has excellent operation and this is to be expected also over the next 3 years, if management is to continue with upgrading
2.01 - 4.00	Very good	Company has very good operation and this is to be expected also over the next 2 years - of management is to continue with upgrading
1.01 - 2.00	Good	Company has good operation but improvement can be expected only if upgrading is to be made
0.00 - 1.00	Limited area between good and poor	Business excellence is positive, but not satisfactory. It is necessary to make serious upgrading
Lower than 0.00 (negative)	Poor	Existence is endangered. Urgent restructuring and upgrading is needed, otherwise poor business operation will continue endangering survival (probability is over 90%)

Source: Belak, V., Aljinovic-Barac, Z. „Tajne tržišta kapitala“, Zagreb: Sinergija doo. (2008) p. 34.

6 In the model maximum value of this indicator is limited to 10 as the additional research has determined that shortening of time for covering liabilities from profit and amortization to less than 6 months no longer has significant impact on excellence. Therefore, its maximum value in BEX index may be 3.16 (0.316 x 10).

7 Business excellence ranks are defined by analyzing movements of past results achieved. However, precise prognoses were not statistically confirmed as there is no sufficient time available to assess long series of historical data, hence prognoses should be taken with reserve.

gde je:
DF - vrednost diskriminantne funkcije;
 X_1 - čisti novčani tok (EBIT + amortizacija)/
ukupne obaveze;
 X_2 - ukupna imovina/ukupne obaveze;
 X_3 - dobit pre kamata i poreza/ukupna
imovina;
 X_4 - dobit pre kamata i poreza/ukupan
prihod;
 X_5 - zalihe/ukupni prihodi; i
 X_6 - poslovni prihodi/ukupna imovina.

Kralicekov DF pokazatelj može
imati pozitivne i negativne vrednosti,
gde negativne vrednosti ukazuju na
insolventnost a pozitivne na solventnost
poslovnog subjekta. Dakle, početak
insolventnosti preduzeća već se dešava
kada vrednost DF pokazatelja pada
od 0,3 do 0,0, nakon čega nastupa
zona umerene insolventnosti, i to za
sve vrednosti DF od 0,0 do 1,0, kada
nastupa zona izrazite insolventnosti.
Za vrednosti pokazatelja više od 0,3
do 1,0 finansijska stabilnost preduzeća
prema DF pokazatelju je loša, a od 1,0 do 1,5
finansijska stabilnost je srednja. Za preduzeća sa
DF pokazateljem više od 1,5 do 2,2 finansijska
stabilnost je dobra, a od 2,2 do 3 je veoma dobra.
Preduzeća sa DF pokazateljem višim od 3,0
smatraju se izvrsnim. Sledeća tabela ilustruje
kritične vrednosti DF pokazatelja s pripadajućom
ocenom finansijske stabilnosti:

Tabela br. 3: Vrednost DF pokazatelja

Vrednost DF pokazatelja	Finansijska stabilnost
> 3,0	Izvrсна
>2,2	Vrlo dobra
>1,5	Dobra
>1,0	Srednja
>0,3	Loša
≤0,3	Početak insolventnosti
≤0,0	Umerena insolventnost
≤-1,0	Izrazita insolventnost

Osim DF modela, Kralicek je autor i
QuickTest modela, tj. brzog testa - *QuickTest*.
Dati model dobio je naziv po pravilu
minimalan ulaz - maksimalna informacija. Dakle,
suština Kralicekovog *QuickTest*a ogleda se
u proceni finansijske uspešnosti preduzeća
kao i rentabilnosti sredstava. Pomoću četiri

podređena pokazatelja koji mere rizičnost
zaduživanja, likvidnost, rentabilnost i uspeh, sa
QuickTestom na kraju dobijamo vrednost ocene
od 1 do 5, pri čemu 1 znači najbolje dok je 5
najslabija ocena, a što ilustrije sledeća tabela.

Tabela br. 4 Ilustracija Kralicekovog quicktest-a

Pokazatelj	Izvršno (1)	Vrlo dobro (2)	Dobro (3)	Loše (4)	Opasnost od insolventnosti (5)
Koeficijent vlastitog finansiranja	>30	≥20	≥10	<10	Negativan rezultat
Vreme otplativosti duga u godinama	<3	≤5	≤12	≤30	>30
Procent rentabilnosti ukupnog kapitala	>15	>12	≥8	<8	Negativan rezultat
Udeo gotovinskog toka u poslovnom prihodu	>10	≥8	≥5	<5	Negativan rezultat

Pokazatelji Kralicekovog quicktesta su:

K_1 - kapital/ukupna pasiva. Ovaj pokazatelj
pokazuje udeo kapitala u ukupnim izvorima.
Preporučuje se da je vrednost ovog pokazatelja
10% ili veća.

K_2 - (ukupne obaveze - gotovina)/(neto
dobit + amortizacija). Ovaj pokazatelj pokazuje
vreme otplate duga odnosno pokazuje kakav
je odnos između ukupnih obaveza umanjenih
za gotovinu i dobiti nakon oporezivanja
uvećanoj za amortizaciju. Ako je vrednost
ovog pokazatelja iznad 30 (godina), smatra
se da preduzeće ima određene teškoće sa
solventnošću. Savetuje se da vrednost ovog
pokazatelja bude 12 godina ili manja.

K_3 - EBIT/ukupna aktiva. Ovaj pokazatelj
pokazuje rentabilnost ukupne imovine u odnosu
na operativnu dobit. Ukoliko je vrednost ovog
pokazatelja negativna, preduzeće ima određene
teškoće sa solventnošću. Preporučuje se da
vrednost ovog pokazatelja bude 8% ili veća.

K_4 - (neto dobit + amortizacija)/poslovni
prihodi. Ukoliko je vrednost ovog pokazatelja
negativna, preduzeće ima određene poteškoće
sa solventnošću. Preporučuje se da vrednost
ovog pokazatelja bude 5% ili veća.

Kralicek DF Indicator

The two well known models by Professor Peter Kralicek are the following: (1) DF Model; and (2) Quick Test Model. After the fashion of the Altman model based on the sample of American companies, Kralicek developed his own DF indicator on the sample of European companies for identifying crisis in a given company. The DF indicator equation is the following:

$$DF = 1,5X_1 + 0,08X_2 + 10X_3 + 5X_4 + 0,3X_5 + 0,1X_6 \quad (5)$$

where

DF - the value of discriminant function;

X_1 - clean cash flow (EBIT + amortization)/total liabilities;

X_2 - total assets/total liabilities;

X_3 - profit before interest and taxes/total assets;

X_4 - profit before interest and taxes/total earnings;

X_5 - stocks/total revenues; and

X_6 - business revenues/total assets.

Kralicek DF indicator may have positive and negative values, where negative values are indicating at insolvency, while positive values are indicating at the solvency of the business entity. Therefore, the beginning of the company insolvency starts even as early as the time when the value of the DF indicator falls from 0.3 to 0.0, thereafter a zone of moderate insolvency begins, and this for all the values of the DF indicator, from 0.0 to 1.0, when the zone of emphatic insolvency ensues. For the indicator values higher than 0.3 to 1.0 financial stability of a company, according to the DF indicator, is poor, and from 1.0 to 1.5, financial stability is a medium one. For companies with the DF indicator higher than 1.5 and up to 2.2 financial stability is good, and from 2.2 to 3 it is very good. Companies having a DF indicator higher than 3.0, are considered to be excellent. The following Table illustrates critical values of DF indicator with the accompanying grade of financial stability:

Table 3 DF indicator values

DF indicator value	Financial stability
> 3.0	Excellent
>2,2	Very good
>1,5	Good
>1,0	Average
>0,3	Poor
≤0,3	Start of insolvency
≤0,0	Moderate insolvency
≤-1,0	Extreme insolvency

In addition to the DF model, Kralicek is also the author of the *QuickTest* model. This model was named after the rule of *minimum input - maximum information*. Hence, the essence of the Kralicek *QuickTest* is reflected in the assessment of financial success of a company and profitability of assets. By aid of four subordinated indicators which are measuring borrowing risk, liquidity, profitability, and success, with the *QuickTest* what we obtain in the final instance is the assessment grade value from 1 to 5, where 1 designates the best, and 5 the poorest grade, as illustrated on the following Table.

Table 4 Kralicek QuickTest illustration

Indicator	Excellent (1)	Very good (2)	Good (3)	Poor (4)	Insolvency danger (5)
Own financing coefficient	>30	≥20	≥10	<10	Negative result
Time of debt repayment in years	<3	≤5	≤12	≤30	>30
Percentage of total capital profitability	>15	>12	≥8	<8	Negative result
Share of cash flow in business revenues	>10	≥8	≥5	<5	Negative result

Kralicek QuickTest indicators are the following:

K_1 - capital/total liabilities. This indicator shows the share of capital in total sources. It is recommended for this indicator value to be 10% or higher.

K_2 - (total liabilities - cash) / (net profit + amortization). This indicator shows the time of debt repayment, i.e. shows what is the ratio

Ispitivanje mogućnosti za primenu Kralicekovog DF pokazatelja za pojedine akcije u sastavu berzanskog indeksa BELEXline

Ekonomsko - finansijska kriza manifestovala se veoma intenzivno na svim segmentima ekonomije, te je dobila karakteristike svetske - ekonomske krize. Od finansijske krize u Americi, preko krize evropskih država reflektovala se na nemogućnost vraćanja dugova te je time duboko zahvatila evrozonu dovodeći u pitanje opstanak zajedničke valute pa i organizaciju same Evropske unije. Kako ekonomija Srbije ima visok stepen zavisnosti od zemalja članica Evropske unije direktno ili preko ekonomija zemalja regiona prethodna godina je ekonomiju Srbije učinila jako nestabilnom. Jedan od važnijih makroekonomskih pokazatelja bruto društveni proizvod koji predstavlja meru ukupnih ekonomskih aktivnosti svih rezidentnih institucionalnih jedinica ima procenjen realan rast u odnosu na 2010. godinu, ali znatno niži od planiranog. Broj zaposlenih u 2011. godini manji je za 2,8% u odnosu na 2010. godinu, a stopa nezaposlenosti iznosi preko 22%. Takođe, fiskalni deficit je povećao, a javni dug je porastao do nivoa maksimalne zakonske granice. Srbija inače sa slabim kreditnim rejtingom dostigla je javni dug od 45% BDP-a.⁸ Inflacija od 7% sa koliko je završila 2010. godina, nije značajno odstupila od planirane, gde je tokom godine prosečno iznosila 11%. U datim privrednim i opštim okolnostima Beogradska berza je ostvarila ukupan promet akcijama na berzi i van berze od 333,4 miliona evra što predstavlja povećanje za 1,6 puta u odnosu na isti period u 2010. godini. Ovaj promet ostvaren je kroz 3,3 miliona transakcija i trgovalo se sa 38,3 komada akcija. Tržišna kapitalizacija na berzanskom tržištu akcija na dan 31. decembar 2011. godine iznosila je 7,43 milijarde evra, što predstavlja povećanje od 0,7% listiranih akcionarskih društava u odnosu na isti period u 2010. godini.

BELEXline je indeks ponderisan tržišnom kapitalizacijom koja se nalazi u slobodnom

prometu (engl. *free float*), koji se ne prilagođava za isplaćene dividende i nije zaštićen od dilutacionog efekta, koji se javlja usled isplate dividendi. BELEXline se sastoji od akcija kojima se trguje na tržištima Beogradske berze i koje su ispunile kriterijum za ulazak u indeksnu korpu. Težina komponenti u indeksu je ograničena na maksimalnih 10% u odnosu na free-float tržišnu kapitalizaciju indeksa. BELEXline je dizajniran kao osnovni *benchmark* za praćenje kretanja cena na srpskom tržištu kapitala. Dakle, BELEXline je dizajniran na način koji najbolje opisuje ukupna *broad market* tržišna kretanja i koji može služiti kao podloga za kreiranje strukturiranih proizvoda i derivata na domaćem i inostranom tržištu. Cena akcije koja se koristi za izračunavanje indeksa BELEXline je preovladavajuća, tj. cena zatvaranja koja je formirana u trgovanju akcijama koje čine indeksnu korpu.

Prilikom izračunavanja vrednosti indeksa u bilo kojem trenutku relevantna količina akcija određenog izdavaoca koja se koristi prilikom računanja, obuhvata ukupan broj običnih akcija pomnožen *free float* faktorom (FFc) na dan poslednje revizije indeksne korpe. Free float faktor (FFc) je procenat akcija koji se nalaze u slobodnom prometu i koji je javno dostupan potencijalnim investitorima.⁹ Pod pojmom akcija koje nisu u slobodnom prometu smatraju se akcije koje su u vlasništvu: (1) lica koja pojedinačno poseduju više od 5% akcija od ukupno izdatih akcija izdavaoca, izuzimajući akcije koje se nalaze u vlasništvu investicionih i penzionih fondova, društva za upravljanje fondovima, osiguravajućih društava, brokersko-dilerskih društava i druge akcije na kasti računima; (2) akcije koje poseduju međunarodne i strane organizacije i institucije za razvoj, ukoliko poseduju više 5% akcija od ukupno izdatih akcija izdavaoca; (3) akcije koje poseduje Republika Srbija, uključujući akcije koje poseduju organi, organizacije i ustanove osnovane posebnim zakonima od strane Republike.

Bazni datum BELEXline indeksa je 30.09.2004. godine sa baznom vrednošću od 1.000 indeksnih poena, ukupne tržišne kapitalizacije 121.509.581.652,00 dinara. U

8 U strukturi javnog duga pripada visokom učešću kratkoročnog duga po osnovu trezorskih zapisa.

9 FFc se dobija kada se od ukupnog broja akcija oduzmu akcije koje se nalaze u slobodnom prometu (engl. *non free float*).

between total liabilities minus cash and profit after tax, increased for amortization. If the value of this indicator is above 30 (years), it is deemed that the company has certain difficulties with solvency. It is advised that the value of this indicator should be 12 years or less.

K_3 - EBIT/total assets. This indicator shows profitability of total assets in respect to operative gains. If the value of this indicator is negative, company has certain difficulties with solvency. It is advised that the value of this indicator should be 8% or higher.

K_4 - (net profit + amortization) / business earnings. If the value of this indicator is negative, company has certain difficulties with solvency. It is advised that the value of this indicator should be 5% or higher.

Testing options for the Kralicek DF indicator application on certain shares in the BELEXline stock exchange index

Economic and financial crisis was manifested very intensively in all the segments of economy, and had acquired the features of a world economic crisis. From financial crisis in the United States, through the crisis in the European countries it was reflected in the inability to repay debts having thus profoundly involved the euro-zone jeopardizing the survival of the common currency, and even the organization itself of the European Union. As the economy of Serbia has a high degree of dependency on the European Union member countries, either directly or indirectly through the economies of the countries in the region, previous year has rendered the economy of Serbia a very unstable one. One of the most important macro-economic indicators, the gross domestic product which serves as measure for total economic activities of all the resident institutional units, has an estimated real growth in respect to 2010, but substantially lower than the planned one. The number of employed in 2011 was lower for 2.8% in respect to 2010, and the unemployment rate is higher than 22%. In addition, fiscal deficit is growing, and the

public debt has grown up to the level of the maximum legally prescribed limit. Serbia has, with its poor credit rating, reached public debt of 45% of the GDP.⁸ Inflation of 7% at the end of 2010 did not significantly deviate from the planned one, and during the year it was having an average of 11%. In the given economic and general circumstances, Belgrade Stock Exchange made a total turnover in trading in stocks on the stock exchange and over the counter of 333.4 million euro, which is an increase for 1.6 times in respect to the same period in 2010. This turnover was achieved through 3.3 million transactions and trading was carried out with 38.3 pieces of shares. Market capitalization on the stock exchange market, as of 31 December 2011, amounted to 7.43 billion euro, which is an increase of 0.7% of the listed shareholding companies in respect to the same period in the year 2010.

BELEXline is the index weighted by market capitalization which is on a free float, which is not being adjusted for paid dividends and is not protected from dilution effect which appears when dividends are being paid out. BELEXline consists of shares traded on the Belgrade Stock Exchange markets, which have complied with the criteria for admission into the index basket. The weight of components in the index is limited to the maximum 10% in respect to the free-float market capitalization index. BELEXline is designed as the basic benchmark for the follow up on prices on the Serbian capital market. Hence the BELEXline is designed in the way that best describes total broad market movements and it may serve as basis for creating structured products and derivatives on the domestic and the foreign market. Share price used to calculate BELEXline index is prevailing, i.e. it is the closing price which is formed through trading in shares which compose the index basket.

When calculating the value of index at any given moment in time, the relevant quantity of shares of the given issuer which is used for calculation covers a total number of common shares multiplied by the free float factor (FFc) on the day of the last revision of the index basket.

8 In the public debt structure, a high share is present of the short-term debt, based on treasury bills.

baznom periodu definiše se vrednost indeksa na 1.000 indeksnih poena, a zatim ograničava uticaj pojedinih komponenti i ujedno definiše broj akcija sa kojima će svaki izdavalac pojedinačno učestvovati indeksnoj korpi. Indeksna korpa se sastoji od običnih akcija sa pravom glasa sa kojima se trguje na Beogradskoj berzi, pri čemu se izbor hartija zahteva na sledećim pokazateljima: (1) frekfentnost u otkrivanju cene (cilj indeksa

je da predstavi kretanje cena akcija kojima se trguje na najmanje 10% od ukupno zakazanih trgovanja u prethodnom kvartalu i (2) free float tržišna kapitalizacija hartije (cilj indeksa je da predstavi kretanje što većeg procenta free float tržišne kapitalizacije akcija na Beogradskoj berzi). Struktura indeksne korpe berzanskog indeksa BELEXline na dan 26.10.2012. godine (poslednja revizija) je sledeća:

Tabela br. 5: Kompozicija indeksa BELEXline

R. br.	Izdavalac	Simbol	Količina	FFc	Procenat
1.	AIK banka a.d., Niš	AIKB	8.861.501	69,18%	10,07%
2.	Imlek a.d., Beograd	IMLK	8.741.010	18,32%	9,90%
3.	NIS a.d., Novi Sad	NIIS	163.060.400	13,97%	9,88%
4.	Bambi Banat a.d., Beograd	BMBI	360.106	51,02%	9,61%
5.	Komercijalna banka a.d., Beograd	KMBN	8.709.310	32,40%	7,06%
6.	Energoprojekt holding a.d., Beograd	ENHL	9.937.538	54,46%	6,93%
7.	Aerodrom Nikola Tesla a.d., Beograd	AERO	34.289.350	16,94%	5,64%
8.	Soja protein a.d., Bečej	SJPT	14.895.524	36,96%	5,63%
9.	Jubmes banka a.d., Beograd	JMBN	273.661	68,37%	3,70%
10.	Metalac a.d., Gornji Milanovac	MTLC	1.020.000	87,41%	3,30%
11.	Galenika Fitofarmacija a.d., Zemun	FITO	1.320.000	49,94%	3,15%
12.	Jedinstvo Sevojno a.d., Sevojno	JESV	304.719	70,62%	2,14%
13.	Univerzal banka a.d., Beograd	UNBN	567.481	100,00%	1,74%
14.	Crvenka fabrika šećera a.d., Crvenka	CRFS	681.413	10,43%	1,45%
15.	Banka Poštanska štedionica a.d., Beograd	PSBN	447.556	5,52%	1,40%
16.	Messer Tehnogas a.d., Beograd	TGAS	1.036.658	18,06%	1,40%
17.	Goša montaža a.d., Velika Plana	GMON	257.174	91,93%	1,21%
18.	Planinka a.d., Kuršumlija	PLNN	65.284	65,08%	1,18%
19.	Alfa plam a.d., Vranje	ALFA	174.812	50,68%	1,07%
20.	Veterinarski zavod Subotica a.d., Subotica	VZAS	4.260.196	24,41%	1,05%
21.	Dijamant a.d., Zrenjanin	DJMN	272.485	26,92%	1,03%
22.	Mlekara a.d., Subotica	MLSU	2.310.449	13,06%	0,94%
23.	Čačanska banka a.d., Čačak	CCNB	181.982	26,52%	0,76%
24.	Vital a.d., Vrbas	VITL	763.937	31,46%	0,73%
25.	Šajkaška fabrika šećera a.d., Žabalj	SJKS	838.025	7,68%	0,72%
26.	TE - TO a.d., Senta	TETO	400.414	14,05%	0,71%
27.	Soko Nada Stark a.d., Beograd	STRK	3.268.826	5,86%	0,57%
28.	Tigar a.d., Pirot	TIGR	1.718.460	66,28%	0,51%
29.	Razvojna banka Vojvodine a.d., Novi Sad	MTBN	3.187.147	13,77%	0,42%
30.	Planum GP a.d., Beograd	PLNM	414.110	60,01%	0,40%
31.	Energoprojekt Entel a.d., Beograd	EPEN	422.495	13,74%	0,37%
32.	BIP u restrukturiranju a.d., Beograd	BIPB	9.106.059	48,10%	0,36%
33.	Privredna banka a.d., Beograd	PRBN	5.706.666	35,20%	0,33%
34.	Dunav osiguranje a.d., Beograd	DNOS	259.179	83,15%	0,32%
35.	Montinvest a.d., Beograd	MOIN	23.890	82,08%	0,30%
36.	Lasta a.d., Beograd	LSTA	1.530.960	35,55%	0,28%
37.	Credy banka a.d., Kragujevac	CYBN	610.623	10,47%	0,27%
38.	Neoplanta a.d., Novi Sad	NEOP	2.383.723	13,31%	0,26%
39.	Voda Vrnjci a.d., Vrnjačka Banja	VDVA	114.787	17,27%	0,25%
40.	Jugohemija a.d., Beograd	JGHM	232.531	22,92%	0,25%
41.	Simpo a.d., Vranje	SMPO	1.059.700	61,77%	0,24%
42.	Napred Razvoj a.d., Beograd	NPRZ	300.658	13,45%	0,22%
43.	Impol Seval a.d., Sevojno	IMPL	942.287	15,00%	0,22%
44.	Valjaonica bakra Sevojno a.d., Sevojno	VBSE	643.356	9,40%	0,21%
45.	Radijator a.d., Zrenjanin	RDJZ	354.106	49,38%	0,19%
46.	Telefonija a.d., Beograd	TLFN	579.195	78,26%	0,17%
47.	Goša FOM a.d., Smederevska Palanka	GFOM	1.369.003	13,06%	0,15%
48.	Danubius a.d., Novi Sad	DNBS	161.106	5,13%	0,15%
49.	Agrobačka a.d., Bačka Topola	AGBC	80.799	41,17%	0,13%
50.	Dunav Grocka a.d., Grocka	DNVG	1.024.511	46,85%	0,13%
51.	Progres a.d., Beograd	PRGS	6.119.016	52,52%	0,13%
52.	Energoprojekt Niskogradnja a.d., Beograd	EPNS	1.493.131	6,68%	0,12%
53.	Energoprojekt Visokogradnja a.d., Beograd	EPVI	3.016.793	7,61%	0,11%
54.	Energomontaža a.d., Beograd	EGMN	71.290	17,56%	0,11%
55.	Trgovina 22 a.d., Kragujevac	DCMB	289.829	12,20%	0,11%
56.	Morava a.d., Jagodina	MRVJ	219.000	22,57%	0,11%
57.	Autoprevoz a.d., Čačak	APCA	651.581	7,81%	0,09%
58.	Interšped a.d., Subotica	ITSP	205.291	46,14%	0,08%
59.	Globos osiguranje a.d., Beograd	GLOS	1.240.734	28,21%	0,07%

Izvor: <http://www.belex.rs/trgovanje/indeksi/belexline/korp>

Free float factor (FFc) is the percentage of shares which are to be found in free float and which is publicly accessible to potential investors.⁹ The term non free float share designates those shares that are in the ownership of the following: (1) persons who are individually holding more than 5% of shares from the total issued shares of the issuer, with the exemption of shares held in the ownership of the investment and pension funds, trust funds, insurance companies, brokerage-dealer societies and other shares held on the custody accounts; (2) shares which are held by the international and foreign organizations and development institutions, if they hold more than 5% shares from the total number of shares issued; (3) shares held by the Republic of Serbia, including shares held by the bodies, organizations and institutions established under special laws by the Republic.

The basic date of the BELEXline index is 20 September 2004, with the basic value of 1,000 index points, of the total market capitalization

of 121,509,581,652.00 dinars. In the basic period index value is defined at 1,000 index points, and thereupon the limiting impact of certain components, and at the same time the number of shares is defined with which every issuer individually will participate in the index basket. Index basket consists of common shares with the voting rights which are traded on the Belgrade Stock Exchange, where the selection of securities is required to be compliant with the following indicators: (1) frequency in price discovery (the index objective is to present movement of the traded share prices at least at 10% of the totally scheduled trading sessions in the previous quarter; and (2) free float market capitalization of security (index objective is to present movement of as high as possible percentage of the free float market capitalization of shares on the Belgrade Stock Exchange). Structure of the index basket for the BELEXline stock exchange index, on the day of 26 October 2012 (the latest revision) is as follows:

9 FFc is obtained when from the total number of shares those shares are deducted which are in the non free float.

Vrednost indeksa BELEXline kao opšteg reprezentanta kretanja cena akcija kojima se trguje na berzanskom tržištu u okviru Beogradske berze smanjila se u posmatranom periodu, tj. za 253 trgovačka dana za 23,6%. U posmatranom periodu indeks je dnevno rastao po negativnoj prosečnoj stopi od 0,106%, tako da je prosečna srednja vrednost u posmatranom period iznosila 1.265,46 indeksnih poena.¹⁰

Predmet istraživanja ovog rada je mogućnost aplikativne primene Kralicekovog DF pokazatelja za pojedina preduzeća (akcije emitenata) podeljena u dve skupine i to: prvih deset preduzeća koja imaju najveće procentualno učešće u indeksnoj korpi i preduzeća koja su ostvarila negativan finansijski rezultat u 2011. godini, a koja se nalaze u sastavu berzanskog indeksa BELEXline. Prvih deset preduzeća koja imaju najveće procentualno učešće u strukturi berzanskog indeksa BELEXline su: (1) AIK banka a.d. Niš; (2) Imlek a.d. Beograd; (3) NIS a.d. Novi Sad; (4) Bambi Banat a.d. Beograd; (5) Komercijalna banka a.d. Beograd; (6) Energoprojekt holding a.d. Beograd; (7) Aerodrom Nikola Tesla a.d. Beograd; (8) Soja protein a.d. Bečej; (9) Jubmes banka a.d. Beograd; (10) Metalac a.d. Gornji Milanovac.

Preduzeća u sastavu berzanskog indeksa BELEXline koja su u 2011. godini ostvarila negativan finansijski rezultat su: (1) Razvojna banka Vojvodine a.d. Novi Sad - MTBN (gubitak ostvaren u 2011. godini iznosio je: (581.681,00

RSD); (2) BIP u restrukturiranju a.d., Beograd - BIPB (gubitak ovog društva u 2011. godini iznosio je: 646.436 RSD); (3) Privredna banka a.d. Beograd - PRBN (gubitak ostvaren u 2011. godini iznosio je: 792.637 RSD); (4) Montinvest - MOIN (gubitak ostvaren u 2011. godini iznosio je: 204.268 RSD); (5) Napred razvoj a.d. Beograd - NPRZ (gubitak ostvaren u 2011. godini iznosio je: 17.131 RSD); (6) Progres a.d. Beograd - PRGS (gubitak ostvaren u 2011. godini iznosio je: 1.539.311 RSD); i (7) Autoprevoz a.d. Čačak - APCA (gubitak ostvaren u 2011. godini iznosio je: 77.751 RSD); (8)

Na osnovu rezultata analize jednog dela tržišta kapitala u Srbiji tačnije regulisanog tržišta kapitala, i strukture prvih deset preduzeća u sastavu indeksa BELEXline sa najvećim procentualnim učešćem za period: 01.01.2011 - 31.12.2011. došlo se do sledećih podataka:

Tabela br.6: Proračun Kralicekovog DF pokazatelja za prvih deset preduzeća koja kotiraju na Beogradskoj za period: 01.01. - 31.12. 2011. godinu

R.br.	Preduzeće	Pokazatelji Kralicekovog DF pokazatelja						Kralicekov DF pokazatelj
		X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	
1.	AIK banka a.d., Niš	0,05448	0,11887	0,23112	1,17508	0,00	0,00983	1,58938
2.	Imlek a.d., Beograd	0,70824	0,08530	3,07451	0,54579	0,02512	0,28165	4,72061
3.	NIS a.d., Novi Sad	0,48483	0,12932	1,70593	1,03149	0,05519	0,08269	3,48944
4.	Bambi Banat a.d. Beograd	0,58994	0,17142	1,40044	0,60406	0,00004	0,11592	2,88181
5.	Komercijalna banka a.d., Beograd	0,03000	0,09532	0,14346	0,54186	0,00000	0,00845	0,81908
6.	Energoprojekt holding a.d., Beograd	0,62390	0,82774	0,37607	1,86035	0,00000	0,00473	3,69279
7.	Aerodrom Nikola Tesla a.d., Beograd	1,89119	1,08324	0,66531	1,31779	0,00000	0,02390	4,98143
8.	Soja protein a.d. Bečej	0,35514	0,2456	0,69682	0,46574	0,11001	0,07048	1,93275
9.	Jubmes banka a.d., Beograd	0,10487	0,17916	0,26282	0,82857	0,00000	0,01525	1,39067
10.	Metalac a.d., Gornji Milanovac	1,46600	0,49654	1,23127	1,96116	0,00129	0,01990	5,17617

Izvor: www.belex.rs (Proračun autora)

Na osnovu rezultata analize Kralicekovog DF pokazatelja dolazi se do zaključka da su najveću vrednost DF pokazatelja ostvarila sledeća preduzeća: (1) Metalac a.d. Gornji Milanovac - MTLC (DF 5,18), (2) Aerodrom

10 BELEXline je oscilirao u posmatranom periodu za čak 55,6%, između dostignute minimalne vrednosti od 961,55 zabeležene 20.12.2011., i dostignute maksimalne vrednosti od 1.495,83 zabeležene dana, 31.05.2011.

Table 5 Composition of the BELEXline index

Item No.	Issuer	Symbol	Quantity	FFc	Percentage
1.	AIK banka a.d., Niš	AIKB	8.861.501	69,18%	10,07%
2.	Imlek a.d., Beograd	IMLK	8.741.010	18,32%	9,90%
3.	NIS a.d., Novi Sad	NIIS	163.060.400	13,97%	9,88%
4.	Bambi Banat a.d., Beograd	BMBI	360.106	51,02%	9,61%
5.	Komercijalna banka a.d., Beograd	KMBN	8.709.310	32,40%	7,06%
6.	Energoprojekt holding a.d., Beograd	ENHL	9.937.538	54,46%	6,93%
7.	Aerodrom Nikola Tesla a.d., Beograd	AERO	34.289.350	16,94%	5,64%
8.	Soja protein a.d., Bečej	SJPT	14.895.524	36,96%	5,63%
9.	Jubmes banka a.d., Beograd	JMBN	273.661	68,37%	3,70%
10.	Metalac a.d., Gornji Milanovac	MTLC	1.020.000	87,41%	3,30%
11.	Galenika Fitofarmacija a.d., Zemun	FITO	1.320.000	49,94%	3,15%
12.	Jedinstvo Sevojno a.d., Sevojno	JESV	304.719	70,62%	2,14%
13.	Univerzal banka a.d., Beograd	UNBN	567.481	100,00%	1,74%
14.	Crvenka fabrika šećera a.d., Crvenka	CRFS	681.413	10,43%	1,45%
15.	Banka Poštanska štedionica a.d., Beograd	PSBN	447.556	5,52%	1,40%
16.	Messer Tehnogas a.d., Beograd	TGAS	1.036.658	18,06%	1,40%
17.	Goša montaža a.d., Velika Plana	GMON	257.174	91,93%	1,21%
18.	Planinka a.d., Kuršumlija	PLNN	65.284	65,08%	1,18%
19.	Alfa plam a.d., Vranje	ALFA	174.812	50,68%	1,07%
20.	Veterinarski zavod Subotica a.d., Subotica	VZAS	4.260.196	24,41%	1,05%
21.	Dijamant a.d., Zrenjanin	DJMN	272.485	26,92%	1,03%
22.	Mlekara a.d., Subotica	MLSU	2.310.449	13,06%	0,94%
23.	Čačanska banka a.d., Čačak	CCNB	181.982	26,52%	0,76%
24.	Vital a.d., Vrbas	VITL	763.937	31,46%	0,73%
25.	Šajkaška fabrika šećera a.d., Žabalj	SJKS	838.025	7,68%	0,72%
26.	TE - TO a.d., Senta	TETO	400.414	14,05%	0,71%
27.	Soko Nada Štark a.d., Beograd	STRK	3.268.826	5,86%	0,57%
28.	Tigar a.d., Pirot	TIGR	1.718.460	66,28%	0,51%
29.	Razvojna banka Vojvodine a.d., Novi Sad	MTBN	3.187.147	13,77%	0,42%
30.	Planum GP a.d., Beograd	PLNM	414.110	60,01%	0,40%
31.	Energoprojekt Entel a.d., Beograd	EPEN	422.495	13,74%	0,37%
32.	BIP u restrukturiranju a.d., Beograd	BIPB	9.106.059	48,10%	0,36%
33.	Privredna banka a.d., Beograd	PRBN	5.706.666	35,20%	0,33%
34.	Dunav osiguranje a.d., Beograd	DNOS	259.179	83,15%	0,32%
35.	Montinvest a.d., Beograd	MOIN	23.890	82,08%	0,30%
36.	Lasta a.d., Beograd	LSTA	1.530.960	35,55%	0,28%
37.	Credy banka a.d., Kragujevac	CYBN	610.623	10,47%	0,27%
38.	Neoplanta a.d., Novi Sad	NEOP	2.383.723	13,31%	0,26%
39.	Voda Vrnjci a.d., Vrnjačka Banja	VDAV	114.787	17,27%	0,25%
40.	Jugohemija a.d., Beograd	JGHM	232.531	22,92%	0,25%
41.	Simpo a.d., Vranje	SMPO	1.059.700	61,77%	0,24%
42.	Napred Razvoj a.d., Beograd	NPRZ	300.658	13,45%	0,22%
43.	Impol Seval a.d., Sevojno	IMPL	942.287	15,00%	0,22%
44.	Valjaonica bakra Sevojno a.d., Sevojno	VBSE	643.356	9,40%	0,21%
45.	Radijator a.d., Zrenjanin	RDJZ	354.106	49,38%	0,19%
46.	Telefonija a.d., Beograd	TLFN	579.195	78,26%	0,17%
47.	Goša FOM a.d., Smederevska Palanka	GFOM	1.369.003	13,06%	0,15%
48.	Danubius a.d., Novi Sad	DNBS	161.106	5,13%	0,15%
49.	Agrobačka a.d., Bačka Topola	AGBC	80.799	41,17%	0,13%
50.	Dunav Grocka a.d., Grocka	DNVG	1.024.511	46,85%	0,13%
51.	Progres a.d., Beograd	PRGS	6.119.016	52,52%	0,13%
52.	Energoprojekt Niskogradnja a.d., Beograd	EPNS	1.493.131	6,68%	0,12%
53.	Energoprojekt Visokogradnja a.d., Beograd	EPVI	3.016.793	7,61%	0,11%
54.	Energomontaža a.d., Beograd	EGMN	71.290	17,56%	0,11%
55.	Trgovina 22 a.d., Kragujevac	DCMB	289.829	12,20%	0,11%
56.	Morava a.d., Jagodina	MRVJ	219.000	22,57%	0,11%
57.	Autoprevoz a.d., Čačak	APCA	651.581	7,81%	0,09%
58.	Interšped a.d., Subotica	ITSP	205.291	46,14%	0,08%
59.	Globos osiguranje a.d., Beograd	GLOS	1.240.734	28,21%	0,07%

Source: <http://www.belex.rs/trgovanje/indeksi/belexline/korp>

The value of the BELEXline index, as the general representative of the share price movements of shares traded on the Belgrade Stock Exchange, was reduced in the observed

period, i.e. during the 253 trading days it fell for 23.6%. In the observed period, the index had a daily growth on a negative average rate of 0.106% so that the average mean value in the

Nikola Tesla a.d. - AERO (DF 4,98), (3) Imlek a.d. Beograd - IMLK (DF 4,72), (4) Energoprojekt holding a.d. Beograd - ENHL (DF 3,69), (5) NIS a.d.Novi Sad - NIIS (DF 3,49), (6) Bambi Banat a.d. Beograd - BMBI (DF 2,88) i ostala preduzeća sa vrednošću većom od jedinice, izuzev Komercijalne banke a.d. Beograd - KMBN čija je vrednost DF pokazatelj 0,82. Kako je već i rečeno za preduzeća čija je vrednost DF pokazatelja od 1,5 do 2,2 smatra se da su finansijski stabilna. Stoga, može se zaključiti da sva posmatrana preduzeća u sastavu berzanskog indeksa BELEXline se nalaze u zoni finansijske stabilnosti, osim dve finansijske institucije i to Komercijalne banka a.d. Beograd

- KMBN (DF 0,82) i Jumbes banke a.d. Beograd - JMBN (DF 1,39). Rezultati DF pokazatelja za ove dve finansijske institucije upućuju na problem sa insolventnošću, tako je je potrebno uraditi detaljnu analizu neto obrtnih sredstava i analizu neto novčanog toka da bi se proverila finansijska stabilnost ove dve institucije. Za posmatrana preduzeća čija je vrednost DF pokazatelja veća od 1,5 može se slobodno reći da ostvareni finansijski rezultati pozitivno koreliraju sa DF finansijskim pokazateljem. U nastavku slede rezultati analize za preduzeća u sastavu berzanskog indeksa BELEXline, koja su u 2011. godini ostvarila negativan finansijski rezultat.

Tabela br. 7: Proračun Kralicekovog DF pokazatelja za preduzeća koja su ostvarila negativan finansijski rezultat u 2011. i koja kotiraju na Beogradskoj berzi

R.br.	Preduzeće	Pokazatelji Kralicekovog DF pokazatelja						Kralicekov DF pokazatelj
		X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	
1.	Razvojna banka Vojvodine a.d. Novi Sad	(0,01722)	0,080000	(0,16306)	(0,53819)	0,00000	0,01130	(0,62716)
2.	BIP u restrukturiranju a.d., Beograd	(0,25442)	0,08000	(2,27026)	(2,12602)	0,04582	0,04963	(4,47525)
3.	Privredna banka a.d. Beograd	(0,04337)	0,08515	(0,31464)	(0,44325)	0,00000	0,011112	(0,70499)
4.	Montinvest	(1,41901)	0,34917	(2,24725)	(2,85554)	0,14874	0,02995	(5,99394)
5.	Napred razvoj a.d. Beograd	0,02773	0,47495	(0,04066)	(3,29455)	4,72844	0,00044	1,89635
6.	Progres a.d. Beograd	(1,77858)	0,32299	(3,08931)	(107,763)	0,04480	0,00043	(112,263)
7.	Autoprevoz a.d. Čačak	0,15601	0,22738	(0,85076)	(0,53480)	0,00829	0,07379	(0,92009)

Izvor: www.belex.rs (Proračun autora)

observed period was 1,265.46 index points.¹⁰

Topic of research of this paper is the options for applicative implementation of the Kralicek DF indicator on individual companies (issuer shares) divided into two sets, as follows: the first ten companies that are having the highest percentage share in the index basket, and companies that have made a negative financial result in 2011, and which are present within

the BELEXline stock exchange index. The first ten companies which are having the highest percentage of share in the structure of the BELEXline stock exchange index are the following: (1) AIK banka a.d. Nis; (2) Imlek a.d. Belgrade; (3) NIS a.d. Novi Sad; (4) Bambi Banat a.d., Belgrade; (5) Komecijalna banka a.d. Belgrade; (6) Energoprojekt holding a.d. Belgrade; (7) Aerodrom Nikola Tesla a.d. Belgrade; (8) Soja protein

a.d. Becej; (9) Jubmes banka a.d. Belgrade; (10) Metalac a.d. Gornji Milanovac. Companies within the composition of the BELEXline stock exchange index which have in 2011 had a negative financial result, are the following: (1) Razvojna banka Vojvodine a.d., Novi Sad - MTBN (loss recorded in the year 2011 was: 581,681.00 RSD); (2) BIP in restructuring a.d., Belgrade - BIPB (loss of this company in 2011 was: 646,436 RSD); (3) Privredna banka a.d., Belgrade - PRBN (loss made in 2011 amounted to: 792,637 RSD); (4) Montinvest - MOIN (loss made in 2011 amounted to: 204,26 RSD); (5) Napred razvoj a.d. Belgrade - NPRZ (loss made in 2011 amounted to: 17,131 RSD); (6) Progres a.d. Belgrade - PRGS (loss made in 2011 amounted to: 1,539,311 RSD); and (7) Autoprevoz a.d., Cacak - APCA (loss made in 2011 amounted to: 77,751 RSD).

On the basis of the analysis made into one part of the capital market of Serbia, more precisely the regulated capital market, and the structure of the first ten companies within the BELEXline index composition, with the highest percentage of share for the period from 1 January 2011 to 31 December 2011, the following data was found:

Table 6 Calculation of the Kralicek DF indicator for the first ten companies quoted on the Belgrade Stock Exchange, for the period 1 January - 31 December 2011

No.	Company	Kralicek DF indicator items						Kralicek DF indicator
		X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	
1.	AIK banka a.d., Niš	0,05448	0,11887	0,23112	1,17508	0,00	0,00983	1,58938
2.	Imlek a.d., Beograd	0,70824	0,08530	3,07451	0,54579	0,02512	0,28165	4,72061
3.	NIS a.d., Novi Sad	0,48483	0,12932	1,70593	1,03149	0,05519	0,08269	3,48944
4.	Bambi Banat a.d. Beograd	0,58994	0,17142	1,40044	0,60406	0,00004	0,11592	2,88181
5.	Komercijalna banka a.d., Beograd	0,03000	0,09532	0,14346	0,54186	0,00000	0,00845	0,81908
6.	Energoprojekt holding a.d., Beograd	0,62390	0,82774	0,37607	1,86035	0,00000	0,00473	3,69279
7.	Aerodrom Nikola Tesla a.d., Beograd	1,89119	1,08324	0,66531	1,31779	0,00000	0,02390	4,98143
8.	Soja protein a.d. Becej	0,35514	0,2456	0,69682	0,46574	0,11001	0,07048	1,93275
9.	Jubmes banka a.d., Beograd	0,10487	0,17916	0,26282	0,82857	0,00000	0,01525	1,39067
10.	Metalac a.d., Gornji Milanovac	1,46600	0,49654	1,23127	1,96116	0,00129	0,01990	5,17617

Source: www.belex.rs (Calculation by author)

On the basis of the Kralicek DF indicator analysis results, conclusion may be drawn that the highest value of the DF indicator was achieved by the following companies: (1) Metalac a.d. Gornji Milanovac - MTLC (DF 5.18); (2) Aerodrom Nikola Tesla a.d. - AERO (DF 4.98); (3) Implek a.d. Belgrade - IMLK (DF 4.72); (4) Energoprojekt holding a.d. Belgrade - ENHL (DF 3.69); (5) NIS a.d. Novi Sad - NIIS (DF 3.49); (6) Bambi Banat a.d. Belgrade - BMBI (DF 2.88); and other companies with the value higher than 1, except for the Komercijalna banka a.d. Belgrade - KMBN where value is the DF indicator 0.82. As it was already stated, for companies with the value of the DF indicator of 1.5 to 2.2 it is deemed that they are financially stable. Hence it may be concluded that all of the observed companies within the BELEXline stock

10 BELEXline oscillated in the observed period for as much as 55.6% between the reached minimum value of 961.55, recorded on 20 December 2011, and the reached maximum value of 1,495.83, recorded on 31 May 2011.

Takođe, na osnovu rezultata analize Kralicekovog DF pokazatelja dolazi se do zaključka da su najnižu, tj. negativnu vrednost DF pokazatelja u sastavu berzanskog indeksa BELeline ostvarila sledeća preduzeća: (1) Progres a.d. Beograd - PRGS (DF - 112,26), (2) Montinvest - MOIN (DF - 5,99), (3) BIP u restruktuiranju a.d. Beograd - BIPB (DF - 4,47), (4) Autoprevoz a.d. Čačak - APCA (0,92), (5) Privredna banka a.d. Beograd - PRBN (DF - 0,70), i (6) Razvojna banka Vojvodine a.d. Novi Sad - MTBN (DF - 0,63). Jedino preduzeće koje je ostvarilo pozitivnu vrednost DF pokazatelja u posmatranom periodu je Napred razvoj a.d. Beograd (DF 1,89). Posebno je zanimljiva činjenica da su sva posmatrana preduzeća sa negativnim finansijskim rezultatom u 2011. godini imala negativnu vrednost DF pokazatelja, izuzev preduzeća Napred razvoj a.d. Beograd, što dalje dokazuje pozitivnu koreliranost sa ostvarenim negativnim finansijskim rezultatom.

Kada se utvrdi da je za uslove stabilnog, privrednog poslovanja finansijski, imovinski i prinosni položaj preduzeća ispod prihvatljivog nivoa, odnosno da bonitet preduzeća nije zadovoljavajući, treba definisati strategiju poboljšanja boniteta, kako bi se u budućem periodu performanse preduzeća poboljšale. Strategije poboljšanja boniteta preduzeća obuhvataju sledeće mere: (1) *Pribavljanje dodatnog dugoročnog zajma radi otplate dela kratkoročnih kredita.* Ako preduzeće pribavi dugoročni zajam od inostranog kreditora, to će povećati obrtni kapital i delovaće pozitivno na finansijsku stabilnost; (2) *Investiranje u stalnu imovinu;* (3) *Prodaja dela fiksne imovine.* Ako postoji fiksna imovina koja nije neophodna za odvijanje procesa poslovanja trebalo bi datu imovinu prodati, jer bi se time smanjila stalna imovina, povećao obrtni kapital što bi se na kraju pozitivno odrazilo na finansijsku stabilnost; (4) *Prodaja učešća u kapitalu povezanih i nepovezanih preduzeća.* Ovom prodajom smanjili bi se dugoročni finansijski plasmani, što bi povećalo obrtni kapital i pozitivno delovalo na finansijsku stabilnost; (5) *Konverzija obaveza za poreze i doprinose u državni kapital.* Sa stajališta finansijskog položaja konverzija bi bila prihvatljiva jer bi ona povećala obrtni kapital i time finansijsku stabilnost; (6)

Osnivanje novih zavisnih preduzeća. Ako u okviru određenog preduzeća postoje delovi koji nisu tesno vezani za osnovnu delatnost preduzeća, trebalo bi sagledati mogućnost osnivanja zavisnih preduzeća od takvih delova; (7) *Segmentiranje matičnog preduzeća.* Ukoliko analiza prinosnog položaja preduzeća pokaže kontinuelnu tendenciju opadanja poslovnog dobitka matično preduzeće u skladu sa MSFI 8 - Izveštavanje po segmentu treba segmentirati na segmente u formi profitnih centara. U skladu sa ovim standardom preduzeće za svaki profitni centar bilansira poslovni rezultat po principu konsolidovanog bilansa. Uprava preduzeća, bilansiranjem finansijskog rezultata po segmentima dobija informacije koliko svaki profitni centar doprinosi ostvarivanju dobitka na nivou preduzeća.

Zaključak

Finansijski položaj preduzeća utvrđuje se na osnovu podataka prezentovanih u bilansu stanja preduzeća, a preko finansijske ravnoteže, zaduženosti, likvidnosti, solventnosti kao i reprodukcione sposobnosti. Finansijski položaj preduzeća se ocenjuje kao dobar, prihvatljiv i loš. Dobar finansijski položaj znači da postoji usklađenost imovinske i finansijske strukture i uspeha preduzeća sa principima finansijske politike kao što su rentabilnost, sigurnost, zaštita od prezaduženosti, fleksibilnost i nezavisnost. Za donošenje odluka o poslovanju preduzeća vrlo je bitno da sredstva po obimu i vremenu za koji su vezana odgovaraju obimu i vremenu raspoloživosti izvora finansiranja.

Bonitet preduzeća je kvalitativni i kvantitativni izraz poslovne sposobnosti preduzeća kao i sigurnosti njegovog privređivanja. Dakle, obuhvata sve karakteristike preduzeća, tako da se može reći da bonitet preduzeća predstavlja ukupnu ocenu o: finansijskoj stabilnosti, likvidnosti, solventnosti, adekvatnosti i strukturi kapitala, imovinskoj situaciji, profitabilnosti, riziku ostvarenja finansijskog rezultata, rentabilnosti i organizovanosti.

Rano otkrivanje stečaja kod preduzeća, finansijskih institucija je od velikog značaja pre svega za investitore. To je razlog da brojne studije pokušavaju da razviju modele koji

exchange index are within the zone of financial stability, except for the two financial institutions: Komercijalna banka a.d. Belgrade - KNBN (DF 0.82) and Jubmes banka a.d. Belgrade - JMBN (DF 1.39). The result of the DF indicator is that these two financial institutions are pointing out at the problem with insolvency, so that it is necessary to make a detailed analysis of the net working capital and analysis of the net cash flow in order to check financial stability of these two institutions. For the observed companies having the value of the DF indicator higher than 1.5 it may be freely said that the achieved financial result has a positive correlation with the DF financial indicator. Further in this text we are giving the results of the company analysis for the companies within the composition of the BELEXline stock exchange index, which have achieved in 2011 a negative financial result.

Especially interesting is the fact that all of the observed companies with the negative financial result in 2011 had the negative value of the DF indicator, except for the company Napred razvoj a.d. Belgrade, which further corroborates positive correlation with the achieved negative result.

When it is identified that the conditions for a stable economic business, financial, assets and return status of the company, are below an acceptable level, i.e. that the company credit worthiness is not satisfactory, it is necessary to define a strategy for enhancing credit worthiness, so that in the future period company performances would improve. Strategy for the company credit worthiness improvement comprises the following measures: (1) *Acquiring an additional long-term loan for purpose of repayment of one part of short-term credit*. If the company is able to procure a long-term loan from a cross-

Table 7 Calculation of Kralicek DF indicator for companies that have made a negative financial result in the year 2011, and which are quoted on the Belgrade Stock Exchange

No.	Company	Kralicek DF indicator items						Kralicek DF indicator
		X ₁	X ₂	X ₃	X ₄	X ₅	X ₆	
1.	Razvojna banka Vojvodine a.d. Novi Sad	(0,01722)	0,080000	(0,16306)	(0,53819)	0,00000	0,01130	(0,62716)
2.	BIP u restrukturiranju a.d., Beograd	(0,25442)	0,08000	(2,27026)	(2,12602)	0,04582	0,04963	(4,47525)
3.	Privredna banka a.d. Beograd	(0,04337)	0,08515	(0,31464)	(0,44325)	0,00000	0,011112	(0,70499)
4.	Montinvest	(1,41901)	0,34917	(2,24725)	(2,85554)	0,14874	0,02995	(5,99394)
5.	Napred razvoj a.d. Beograd	0,02773	0,47495	(0,04066)	(3,29455)	4,72844	0,00044	1,89635
6.	Progres a.d. Beograd	(1,77858)	0,32299	(3,08931)	(107,763)	0,04480	0,00043	(112,263)
7.	Autoprevoz a.d. Čačak	0,15601	0,22738	(0,85076)	(0,53480)	0,00829	0,07379	(0,92009)

Source: www.belex.rs (Calculation by author)

In addition, based on the Kralicek DF indicator analysis results conclusion can be drawn that the lowest, i.e. negative DF indicator value, within the composition of the BELEXline stock exchange index, was made by the following companies: (1) Progres a.d. Belgrade - PRGS (DF - 112.26); (2) Montinvest - MOIN (DF - 5.99); (3) BIP in restructuring a.d. Belgrade - BIPB (DF - 4.47); (4) Autoprevoz a.d. Cacak - APCA (0.92); (5) Privredna banka a.d. Belgrade - PRBN (DF - 0.70); and (6) Razvojna banka Vojvodine a.d. Novi Sad - MTBN (DF - 0.63). The only company which made a positive value of DF indicator in the observed period is Napred razvoj a.d. Belgrade (DF - 1.89).

border creditor, this will increase working capital and will have a positive effect on financial stability; (2) *Investment in non-current assets* ;(3) *Sale of one part of fixed assets*. If there are fixed assets available, which are not necessary for the core process of business operation of the company, then such assets should be sold, as this would decrease non-current assets, increase working capital which would ultimately have a positive effect on financial stability; (4) *Sale of the share of capital in related or not related companies*. Such sale would reduce long-term financial placements, which would increase working capital and have a positive effect on

moгу povećati sposobnost da se pravilno izvrši selekcija i otkrivanje kompanija koje će otići pod stečaj, nekoliko godina pre stečaja. Verovatnoća stečaja je od suštinskog značaja za ocenu statistike i drugih vrsta finansijske analize. Međutim ova verovatnoća izvođenja, koristeći intuitivnu nekompleksnu metodologiju, predstavila je veliki izazov za akademike i profesionalce. Na uzorku od kompanija iz različitih delatnosti pokazano je da pojedini parametri u ovom modelu nisu 100% pouzdani, odnosno stabilni u pojedinim privrednim granama i promenjenom makroekonomskom ambijentu.

Problem istraživanja poslovnih poteškoća karakteriše skup različitih metoda i modela, koje za primenu u Srbiji postoje određene prepreke. Kao prepreke navode se obuka istraživača na polju ekonometrije, zatim nedostupnost podataka. Naime, kompanije i finansijske institucije koje bi na američkom finansijskom tržištu bile primorane na stečaj u Srbiji i dalje posluju, zahvaljujući uticaju neefikasnog

finansijskog i pravnog sistema. Kao što se da primetiti na osnovu rezultata analize primene Kralicekovog DF pokazatelja za pojedine akcije u sastavu berzanskog indeksa BELEXline može se zaključiti da je DF pokazatelj za pojedine akcije imao pozitivne vrednosti kao i pozitivnu koreliranost sa ostvarenim finansijskim rezultatom u 2011. godini. Posmatrano za drugu skupinu preduzeća koja su u 2011. godini ostvarila negativan finansijski rezultat, da se uočiti da je takođe i DF pokazatelj oslikao stanje finansijskog rezultata za skoro sve akcije, izuzev akcija kompanije Napred razvoj a..d. Beograd, što takođe pokazuje pozitivnu koreliranost. Na osnovu prezentovane analize takođe se može zaključiti da je najbolje rešenje datu analizu kombinovati sa analizom finansijskog, imovinskog, i prinosnog položaja, jer je u našim uslovima ova kombinacija prihvatljiviji i sigurniji metod za predviđanje performansi i budućnosti preduzeća.

Literatura / References

- Altman, E. I (1993). "Corporate Financial Distress and Bankruptcy", John Wiley & Sons, Inc., USA & Canada.
- Altman. E I. (1968). „Financial ratios, Discriminant analysis and the prediction of corporate bankruptcy“, 1968, The Journal of Finance, vol. XXIII, No.4.
- Altman, E. I., Haldeman, R.G., Narayanan, P. (1977). „Zeta analysis: a new model to identify bankruptcy risk of corporations“, *Journal of Banking and Finance*, Vol. No. 1., Jun.
- Alihodžić, A. (2011). "Mogućnost primjene Z-score analize na bankarski sistem BiH", Časopis: Banke u BiH, broj: 126., Sarajevo, str. 26 - 30.
- Alihodžić, A. (2012). "Modeli za predviđanje finansijskih neprilika", Časopis: ZIPS, broj: 1248., Sarajevo, str. 58 - 64.
- Alihodžić, A., Džafić, J. (2012). "Models for the evaluation of business excellence in capital market of Bosnia and Hercegovina, Singidunum Journal of applied sciences, Vol. 9., No. 1., p. 9-15.
- Belak, V., Aljinovic-Barac, Z. (2008). „Tajne tržišta kapitala“, Zagreb, Sinergija doo.
- Ćirović, M. (2011). "Bankarstvo", Bridge Company, Beograd.
- James C. Van Horne (1997). "Financijsko upravljanje i politika - finansijski menadžment", Mate, Zagreb. Rodić, J., Vukelić, G., Andrić, M. (2011). „Analiza finansijskih izveštaja“, Proleter ad Bečej.
- Taffler, R J. (1983). „The Assessment of company solvency and Performance Using a Statistical model“, Accounting & Business Research; Autumn 83, vol. 15 issue 52.
- Taffler, R. J. (1985). „The Use of the Z - score Approach in Practice“, Working paper 95/1, Center for Empirical Research in Finance and Accounting, City University Business School, London.
- Web stranica: www.kralicek.at/pdf/quickbreak
- Web stranica Beogradske berze: www.belex.rs
- Web stranica Narodne banke Srbije: www.nbs.rs

financial stability; (5) *Conversion of liabilities for taxes and dues into state capital*. From the aspect of financial position, conversion would be acceptable as it would increase working capital and thus financial stability; (6) *Establishment of new affiliated companies*. If within a certain company there are some parts which are not closely connected with the core business activity of the company, the option should be assessed for establishment of affiliated companies from such parts; (7) *Segmenting of the parent company*. If the analysis of the earning position of the company shows a continuous tendency of fall of the business profit, the parent company should, in accordance with the IFRS 8 - Reporting per Segments, proceed with dividing company into segments in the form of profit centers. In accordance with this standard, company will balance business result for every profit center along the principle of consolidated balance sheet. Company management, by balancing financial result per segments, will receive information on how much each profit center is contributing to the achievement of profit on the company level.

Conclusion

Financial position of a company is determined on the basis of data presented in the company balance sheet, and through the financial equilibrium, its indebtedness, liquidity, solvency and reproduction capacities. Financial position of a company is judged as good, acceptable, or poor. Good financial position is the one when there is compliance of assets and financial structure and success of the company with principles of financial policy, such as profitability, security, over-indebtedness protection, flexibility and independence. For making company business decisions it is very important for the assets, both in their related volume and time, to correspond to the volume and time of availability of the financing sources.

Company credit worthiness is a qualitative and quantitative expression of the company business capability, but also safeguard of its business operations. Hence it covers all the company characteristics, so that it may be said that company credit worthiness is a total assessment of the following: financial stability, liquidity, solvency, capital adequacy and capital

structure, state of its capital assets, profitability, financial result achievement risk, earning power and cost efficiency, and organizational set up.

Early identification of bankruptcy for companies, financial institutions, is of great importance primarily for investors. This is the reason why many studies are striving to develop models which can boost capacities for proper selection and early detection of companies that will go bankrupt, even several years before the bankruptcy occurs. Bankruptcy probability is of essential importance for evaluation of statistical and other types of financial analyses. However, this probability of execution, using intuitive non-complex methodology, was a great challenge for academics and professionals. It was proved on the sample of companies from different branches that some of the parameters in this model have not as yet reach 100% reliability, i.e. they were stable in some industrial branches and in changed macro-economic environment.

The problem of research into business distress is characteristic for the set of different methods and models, where there are certain obstacles for their implementation in Serbia. Such obstacles are said to be training of researchers in the field of econometrics, but also data inaccessibility. Namely, companies and financial institutions which on the US financial market would be forced to go into bankruptcy, in Serbia still remain in business, thanks to the influence of inefficient financial and legal systems. As it can be observed from the results of analysis of the Kralicek DF indicator for certain shares in the composition of the BELEXline stock exchange index, the conclusion is that the DF indicator for some of the shares had positive value, and a positive correlation with the financial result achieved in 2011. When observed for the other set of companies which had a negative financial result in 2011, it may be noted that the DF indicator again reflected the position of financial result for almost all of the shares, except for the company Napred razvoj a.d. Belgrade shares, which again indicates at the positive correlation. On the basis of the presented analysis it can be also concluded that the best solution is to combine the given analysis with the analysis of financial, assets and earning capacity positions, as in our circumstances such combination is a more acceptable and sure method for predicting company performances and future.