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Sustainable Growth Rate: Evidence from Agricultural and Food Enterprises

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Sustainable growth rate is a maximum growth rate that one enterprise may achieve with a given set of financial policies. The growth of an enterprise per rate higher than sustainable growth rate may lead to financial troubles, insolvency, even to the enterprise bankruptcy. In order to be able to finance a rapid growth, the enterprise will have to issue new shares, increase indebtedness, change its dividend policy, increase production efficiency or improve the asset turnover ratio. The enterprise growth per rate lower than sustainable may lead to a stagnation of the enterprise.
The main goal of this paper is to show a sustainable growth rate calculation methodology and to apply this methodology in the determination of a sustainable growth rate in 2011 and 2012 for 60 enterprises in Serbia belonging to the agricultural and food sectors. Likewise, this paper is concerned with the comparison of the enterprise sustainable growth rate per stated sectors, the determination of existence of possible differences in their height in 2012 in relation to 2011 and with an overview of inflation effect on sustainable growth rate per selected sectors. All this is done in order to assess sustainable growth of agricultural and food sectors in the years under consideration.
Research results indicate that possibilities for the sustainable growth were scarce or there was no real sustainable growth in agricultural and food sectors in 2011 and 2012.

Keywords: sustainable growth rate, reinvestment rate, return on equity, inflation rate

1. Introduction

Profit is one of the most important performance measures of an enterprise. An additional extremely important performance measure is the enterprise's sales growth. Higgins (1977) proposed the use of sustainable growth rate as a maximal growth rate in sales that an enterprise can achieve while maintaining a given set of financial policies. The main task of Higgins sustainable growth rate model is to enable managers to determine the optimal level of enterprise growth through weighting its financial targets and operational performances. Also, an extremely important task of sustainable growth rate model is to enable regulators to stimulate sustainable growth of particular industry through the process of policy direction.

According to the author's knowledge, research regarding determination of sustainable growth rates of enterprises has not so far been conducted in Serbia. Therefore, the calculation of sustainable growth rates in 2011 and 2012 for 60 enterprises in Serbia that belong to agricultural sector and food industry (as a part of manufacturing sector) will be presented in this paper.

The agricultural sector is selected because Serbia, due to its natural resources and climate characteristics, has a high development potential in the agricultural production domain. It should be pointed out that the importance of agricultural development in Serbia is emphasized by the Strategy of Agriculture and Rural Development of Serbia for the period 2014-2024 (2014), as well as by the number of authors (Anufijev, Dašić, 2011; Vasiljevic et al., 2011; Raicevic et al., 2012).

On the other hand, the importance of food industry for the overall industry development and development of Serbia is recognized and highlighted by the Strategy and Developement Policy of the Industry of the Re-

public of Serbia from 2011 to 2020 (2011). Taking into consideration the above mentioned Strategy and the fact that agricultural production to a large degree represents the basis for the food industry development, the food industry is taken as the second sector of interest for this research.

The main goal of this paper is to determine sustainable growth rates of agricultural and food sectors and to check whether they are in accordance with the development possibilities of the selected sectors. In accordance with the goal settled, the following hypotheses are tested in this paper:

Hypothesis 1: There is no significant difference in the level of a sustainable growth rate of those enterprises belonging to the agricultural and food sectors in years 2011 and 2012.

Hypothesis 2: There is no significant difference in the level of a sustainable growth rate of those enterprises belonging to the agricultural and food sectors in year 2012 compared to the year 2011.

Hypothesis 3: An average sustainable growth rate is equal to the rate of inflation measured with the consumer price index in the years 2011 and 2012.

The rest of the paper is organized as follows: Section 2 shows literature review related to sustainable growth rate and its use. Section 3 provides information about the database which is used for sustainable growth rate calculation, as well as research methodology. Empirical results are presented in Section 4. The last section concludes the paper.

2. Literature review

Many authors were involved in the research of sustainable growth rate of enterprises and different industries in order to assess their performance, control their growth and propose policies for growth stimulation. One of them was Robert Higgins, who tried to answer the question of how big the growth rate that one enterprise can afford to itself has to be (Higgins, 1977), taking into consideration that an unrestrained growth of the enterprise may be opposite to financial policy of the enterprise. Higgins (1981) also considered an effect of inflation upon a sustainable growth rate, taking into consideration that sales increase may be the result of an increased scope of product or increased price of the product.

McFaddin and Clouse (1993) developed a model for evaluation of the interdependence of financial objectives, operational performance and sustainable growth rate in the US oil and gas utility industries. The developed model includes growth derived from equity issues and the effect of inflation. McFaddin and Clouse's research covered the period from 1972 to 1989 and compared results of the new model with actual growth rates as well as with the Higgins sustainable growth rates model. Research results have shown that McFaddin and Clouse's model represents a better tool for evaluation of sustainable growth rate and for directing policies that stimulate growth in oil and gas industries. Also, research results have shown that the new model converges to the Higgins model in cases in which there is no substantial growth that comes from equity issues or in cases when variables do not alter significantly from year to year.

The relationship between the real and sustainable growth rates was an object of Clouse and McFaddin's research (1994), which focused on the US gas utility industry from 1970 to 1990. The authors concluded that the potential for sustainable growth of the US gas utility was reflected through future stock issues, operational improvements and changes in financial objectives. They also concluded that the sustainable growth model represented an effective tool in financial planning and business policy addressing stimulation of growth in the US gas utility industry.

Platt et al. (1995) proposes a formula to calculate the sustainable growth rate for companies in financial distress. Platt's formula describes how much growth a company that has limited or no access to financial markets can endure. It represents a tool for assessing turnaround performance of companies in financial distress and a mean of control of its actual growth rate.

In his paper, Jegers (2003) claims that it is appropriate to express growth of non-profit organizations as activity growth. He derived a formula for sustainable growth rate of non-profit organizations according to which

sustainable growth rate of non-profit organizations is jointly determined by their profitability, capital structure and efficiency.

Olson and Pagano (2005) proposed a new application of sustainable growth rate according to which this measure is used for evaluation of the long run performance of bank mergers. These authors studied mergers of US publicly traded banks in the period from 1987 to 2000 and they proposed a model of sustainable growth which incorporates the return on assets of the bank, its dividend pay and equity capital ratio. The results of their study showed that acquiring bank's sustainable growth rate before acquisition and changes in the growth rate after the acquisition, as well as dividend payout ratio of the bank are statistically significant determinants of the abnormal stock return performance of the merged bank.

Starting from real possibilities of the enterprise and the conditions on financial market, Van Horne also was engaged in determination of the sustainable growth rate (Van Horne, Wachowicz, 2007). The goal was, based on aimed ratios of business, indebtedness and dividend payment, to determine a maximum percentage of sales growth. Van Horne pointed that each increase of assets must be equal to an increase of leverage and equity (through the retained earnings increase).

On the basis of the data of 54 companies listed in the Iran financial market Amouzesh et al. (2011) investigated the relationship between deviation of the actual growth rate from the sustainable growth rate, on one hand, and return on assets, price to book value, current ratio and acid ratio, on the other hand. The authors noticed a significant connection between deviation of the actual growth rate from the sustainable growth rate and return on assets, as well as a significant connection between the deviation of the actual growth rate from the sustainable growth rate and price to book value ratio. Rahid and Saad (2014) examined the association between sustainable growth, capital structure and firm performance in Association of Southeast Asian Nations (ASEAN). The results of their research showed that sustainable growth is associated with return on asset in all ASEAN countries. However, they found out that only sustainable growth of Malaysia and Singapore is associated with capital structure (debt equity ratio, total equity, total debt).

M.M. Fonseka et al. (2012) compared the Higgins model with the Van Horne model in order to determine which model is more suitable for determination of sustainable growth rate. They found that profitable enterprises sustainable growth rate based on Higgins' model is higher compared to the sustainable growth rate determined by application of the Van Horne's model. On the other hand, they also determined in their research that in enterprises with high leverage the Van Horne's model gives a higher sustainable growth rate in relation to the Higgins' model. However, the authors concluded that differences in models are not significant and that both tested models are equally suitable for use by the managers and researchers.

Yu-Chun Chang (2012) examined sustainable growth of an airline company in order to estimate the ability of the company to finance its future development. The author analyzed a real and Higgins' sustainable growth rates, showing great fluctuations up to the moment of merging of the analyzed airline company to another airline company. Upon the merging of companies, a gradual increase and convergence of real and sustainable growth rate was recorded.

Hong-Yi Chen et al. (2013) investigated the relation between an investment decision on optimal growth and the policy of dividend payment. They expanded the Higgins' model of sustainable growth creating a model that optimizes a sustainable growth rate and ratio of dividend payment. They also showed that the covariance between profitability and growth rate represents one of dividend payment policy determinants and that interaction between the risk of unprofitability and growth rate may influence a permanent stop of dividend payment in one enterprise.

Alberola et al. (2013) suggested new methodology for determination of sustainable growth rate, as an alternative to measuring potential growth on an aggregate level. The authors took into consideration the information provided by imbalance indicators including inflation and they applied their methodology on the following countries: the United States (US), the United Kingdom (UK), Spain, Germany and China. Their research results showed that the estimated sustainable growth rates were lower than potential growth before global financial crisis, while the estimated sustainable growth rates were higher than potential growth after the global financial crisis in the US, the UK and Spain. On the other hand, research results for Germany and China revealed that sustainable growth rates did not differ much from potential growth before the crisis,

while they were slightly lower than potential growth during the crisis. Krupkina et al. (2014) dealt with a similar topic and proposed a model for estimation of sustainable output growth that incorporated information contained in different indicators. Their model used a multivariate HP filter, which connected cyclical fluctuations in GDP with several macroeconomic imbalance indicators. The research covered 28 emerging countries and research results showed that the trend of output growth rates estimated on the basis of the proposed model was more stable and thus more consistent with the notion of sustainable output than that obtained with a univariate version of the filter.

Huang Xiyuan and Uhang Jingui (2015) determined sustainable financial growth of the companies listed on Growth Enterprises Market. Also, they identified factors that influenced sustainable growth the most. Their research results clearly showed that profitability was the most influential factor which impacted sustainable growth.

3. Data and Methodology

The database, according to which a sustainable growth rate calculation is made, consists of 60 enterprises from the Republic of Serbia, whose shares are traded on the Belgrade Stock Exchange (BSE, http://www.belex.rs), 30 enterprises from agricultural and 30 enterprises from food sector.

While forming the sample, a stratified sample method is used. Namely, two strata are formed, consisting of all enterprises with shares which are traded on the Belgrade Stock Exchange (BSE), and which at the same time belong to the agricultural and food sectors. From each monitored stratum a mere random sample of 30 enterprises is chosen. The union of two random samples makes a stratified sample based on which this research is done.

For the formation of the stratified sample it is particularly important that a total list of complete population be available and that each unit of the population can clearly be delineated into selected strata. Although in this study all enterprises were easily assigned into the strata, a potential limitation of the study could be the fact that only agricultural and food enterprises with shares traded on BSE are taken into consideration due to the difficulties to attain a complete list of all enterprises belonging to the selected sectors in Serbia.

The data on the inflation rate level measured with the consumer price index for 2011 and 2012 have been taken from the web site of the Ministry of Finance of the Republic of Serbia (Osnovni indikatori makroekonomskih kretanja – Basic indicators of macroeconomic developments, http://www.mfin.gov.rs/pages/article.php?d=7161).

In sustainable growth rate determination, the following formula is used: (Brealey, Myers, 2003, pp 837)

$g = bxROE$

where g is Higgins sustainable growth rate, b is the plowback ratio and ROE is return on equity.

A t-test of independent samples for testing the Hypothesis 1 is used in this paper in order to determine a possible existence of statistically significant difference between the sustainable growth rate of the enterprises belonging to the chosen sectors in 2011 and 2012.

A paired samples t-test is used for testing the Hypothesis 2, i.e., for determination of possible statistically significant difference in the level of the sustainable growth rate of food and agricultural enterprises in 2012 in relation to 2011.

Based on one-sample t-test the Hypothesis 3 is tested in order to determine if there is a statistically significant difference between an average sustainable growth rate of the food and agricultural enterprises and the rate of inflation in 2011 and 2012.

All calculations are done in Microsoft Excel 2010 and Eviews 7.1.

4. Research results

4.1. Determination of enterprise sustainable growth rate in Serbia

Furthermore, this paper brings an overview of results of the sustainable growth rate of the enterprises from the sample, according to the previously shown methodology, per sectors and years.

A sustainable growth rate of those enterprises from the sample, belonging to the food sector, is calculated and shown in Table 1.

Based on the data presented in the table, it is possible to notice that the enterprises analyzed in the food sector allocated approximately 85% of net income for reinvestments, while the rest of the net income are paid off to the shareholders as dividends. The enterprises paying off the highest dividends and in that way keeping the smaller share of net income for reinvestment are sugar factories in Crvenka and Sajkas. In spite of that their sustainable growth rate is not the smallest in the observed sample, because of their high rate of return on equity.

From Table 1 it can be seen that a profit margin has the greatest influence on the level of sustainable growth rate of observed food enterprises. In 2011, the TE-TO, Senta recorded the highest profit margin (21.01%) among the chosen enterprises. However, its profit margin was lowered to 16.80% in 2012.

The efficiency of using the total assets of chosen enterprises in observed years averagely remained the same and total assets turnover ratio was the highest in the Mlekara Loznica dairy enterprise (3.04 in 2011 and 3.60 in 2012).

The equity multiplier is relatively stable for the observed enterprises and it is in interval 1-3 in the examined years. Exceptions are multipliers of the Bioprotein enterprise and Mlekara Šabac, which are significantly higher in relation to other enterprises from the sample. In 2012, a significant increase in the Mlekara Šabac multiplier can be noticed, from 4.73 to 7.69, pointing to an increased reliance on borrowed financing sources.

In 2011, the highest sustainable growth rate within the enterprises from the sample, belonging to the food industry, was achieved by the Bečejska pekara enterprise (58.03%) and in 2012 by the TE-TO Senta (52.67%). A high and stable growth rate in observed years was characteristic of the Bambi enterprise (20.38% in 2011 and 20.51% in 2012). The lowest sustainable growth rate in 2011 was recorded in the Cookolend Paraćin (0.14%) and in the Bečejska pakara in 2012 (0.07%). The biggest fall of the sustainable growth rate in 2012 in relation to 2011 was recorded at the Bečejska pekara enterprise (57.96%) and the biggest growth was recorded in the TE-TO Senta enterprise (25.04%).

The sustainable growth rate of agricultural enterprises from the sample is determined for 2011 and 2012 (Table 2).

It is possible to notice from the table that changes in the policy of dividend pay in 2012 in relation to 2011 occurred in some agricultural enterprises. Namely, in 2011, eight enterprises paid the dividends to the shareholders, while in 2012 that was done only by five enterprises. An amount of net income of the Sava Kovacevic enterprise achieved in 2011 was equivalent to the amount of dividends being paid, which caused its zero growth rate.

The highest return on equity was recorded in the Agrovet enterprise (32.68% in 2011 and 37.91% in 2012), the Pionir enterprise (25.99% in 2011 and 27.39% in 2012) and the Granicar enterprise (24.54 % in 2011 and 28.37% in 2012), with their slight decrease noticeable also in 2012 in relation to the year 2011. It should be noted that these enterprises in the observed years paid out a significant share of net income in the form of dividends which reflected on realization of a lower level of the growth rate in relation to a potentially maximum one.

Also, it can be seen from the table that agricultural enterprises from the sample have higher profit margins, but their total asset efficiency is lower in relation to enterprises from the food sector due to the nature of agricultural production, which requires a certain amount of time in order to finish the production cycle. The eq-

uity multiplier of the agricultural enterprises from the sample is on an average lower than the equity multiplier of the food enterprises and it is in the interval 1-4. The exception is the multiplier of the Agrovet Melenci enterprise, which amounted to 6.09 in 2011 and to 5.61 in 2012.

The highest sustainable growth rate in 2011 was recorded by the Terravita enterprise (38.09%) while in 2012 the highest growth rate was recorded by the Agrovet enterprise (37.91%). A stable sustainable growth rates in the observed years were achieved by the Agrovrsac enterprise (9.1% in 2011 and 9.15% in 2012) and the Bezdan enterprise (13.53% in 2011 and 13.49% in 2012). The highest fall of the sustainable growth rate in 2012 in relation to 2011 was recorded in the Banatski Despotovac enterprise (22.70%) and the enterprise Borac had the highest increase in growth rate (16.39).

Table 1: The food enterprises sustainable growth rates in 2011 and 2012

Company	B		ROE		Profit margin		Asset turnover ratio		Equity multiplier		g	
	-1		(2)=3*4*5		-3		-4		-5		(6)=(1*2)	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	**2011**	**2012**
Neoplanta, Novi Sad	1	1	3.34	8.84	2.84	5.96	0.83	0.89	1.41	1.67	**3.34**	**8.84**
Bambi, Požarevac	0.8	0.79	25.48	25.87	11.56	13.48	1.15	0.98	1.92	1.95	**20.38**	**20.51**
Frikom, Beograd	1	1	10.58	8.37	6.83	4.91	0.78	0.94	1.98	1.82	**10.58**	**8.37**
Žitosrem, Inđija	0.46	0.54	16.83	15.21	8.98	6.77	1.37	1.52	1.37	1.47	**7.74**	**8.21**
Sojaprotein, Bečej	1	1	10.15	5.53	9.79	4.57	0.67	0.72	1.54	1.67	**10.15**	**5.53**
Mlekara, Šabac	1	1	20.86	17.84	3.31	1.57	1.33	1.48	4.73	7.69	**20.86**	**17.84**
Crvenka fabrika šećera, Crven	0.04	0.14	21.03	27.77	16.59	14.29	0.8	1	1.58	1.94	**0.92**	**3.83**
Medela, Vrbas	1	1	7.17	5.96	8.25	9.58	0.73	0.53	1.19	1.18	**7.17**	**5.96**
Žitopromet-Mlin, Senta	0.44	0.47	19.53	16.35	5.77	4.63	1.24	1.21	2.73	2.92	**8.56**	**7.76**
Imlek, Beograd	0.83	0.83	19.48	25.21	10.25	13.12	1.15	0.86	1.65	2.24	**16.26**	**21**
Bag, Bačko Gradište	1	1	2.76	9.65	3.81	13.68	0.63	0.57	1.15	1.24	**2.76**	**9.65**
FSH Jabuka, Pančevo	1	1	0.53	0.58	0.14	0.11	1.7	1.89	2.21	2.77	**0.53**	**0.58**
Mlinprodukt, Ada	1	1	12.63	4.16	6.04	2.27	1.16	1.01	1.8	1.81	**12.63**	**4.16**
Pekarska industrija, Pančevo	0.95	1	23	1.64	17.45	2.48	0.71	0.51	1.86	1.3	**21.85**	**1.64**
Šajkaška fabrika šećera, Žabalj	0.02	0.21	19.52	25.04	10.28	10.99	0.8	1.05	2.37	2.18	**0.3**	**5.19**
Niška mlekara, Niš	1	0.79	10.95	11.69	2.8	2.98	1.64	1.53	2.38	2.56	**10.95**	**9.27**
Dijamant, Zrenjanin	1	1	11.38	16.43	6.78	9.61	0.75	0.78	2.22	2.2	**11.38**	**16.43**
Pekarstvo, Kraljevo	1	1	12.09	4.54	4.28	1.85	0.95	1.09	2.97	2.25	**12.09**	**4.54**
Kikindski mlin, Kikinda	1	1	2.37	0.68	2.03	0.63	0.67	0.58	1.74	1.85	**2.37**	**0.68**
TE-To, Senta	0.5	1	55.3	52.67	21.01	16.8	1.22	1.35	2.16	2.33	**27.63**	**52.67**
Mlekara, Loznica	1	1	7.28	8.73	1.08	1.32	3.04	3.6	2.22	1.84	**7.28**	**8.73**
Bečejska pekara, Bečej	1	1	58.03	0.07	9.66	0.01	2.7	1.22	2.23	4.14	**58.03**	**0.07**
Čokolend, Paraćin	0.07	0.12	2.12	7.39	0.73	2.59	1.57	1.46	1.87	1.96	**0.14**	**0.87**
Bioprotein, Beograd	1	1	1.03	29.74	0.07	3.92	1.17	0.65	12.28	11.73	**1.03**	**29.74**
Žitobanat, Vršac	1	1	29.74	8.17	13.49	3.17	1.73	1.6	1.28	1.62	**29.74**	**8.17**
Sreten Gudurić, Užice	1	1	18.77	12.27	3.71	2.65	2.61	2.33	1.94	1.99	**18.77**	**12.27**
Budimka, Požega	1	1	0.57	0.12	0.83	0.2	0.24	0.19	2.94	3.12	**0.57**	**0.12**
Pekara 1. maj, Vršac	1	1	4.59	0.15	1.53	0.05	1.88	1.75	1.6	1.6	**4.59**	**0.15**
Voćar, Svilajnac	1	1	2.14	2.65	2.95	5.47	0.5	0.32	1.45	1.53	**2.14**	**2.65**
Banat fabrika ulja, Nova Crnja	1	1	10.57	2.73	6.56	1.12	0.78	0.97	2.06	2.49	**10.57**	**2.73**
Average values	0.84	0.86	14.66	11.87	6.65	5.36	1.22	1.15	2.36	2.57	11.38	9.27

Note: Compiled by the authors

Table 2: Sustainable growth rate of agricultural enterprises from the sample in 2011 and 2012

Company	B		ROE		Profit margin		Asset turnover ratio		Equity multiplier		g	
	-1		(2)=3*4*5		-3		-4		-5		(6)=(1*2)	
	2011	2012	2011	2012	2011	2012	2011	2012	2011	2012	**2011**	**2012**
PD Zaječar	0.97	1	16.44	17.26	43.62	33.82	0.33	0.44	1.15	1.16	**15.96**	**17.26**
Pionir, Srbobran	0.27	0.38	25.99	27.39	30	25.53	0.83	0.95	1.04	1.12	**6.96**	**10.31**
Agrovršac, Vršac	1	1	9.1	9.15	13.48	19.3	0.46	0.33	1.46	1.44	**9.1**	**9.15**
Borac, Šurjan	0.4	0.75	5.48	24.73	2.41	9.31	1.36	1.48	1.68	1.8	**2.19**	**18.58**
Graničar, Konak	0.25	0.7	24.54	28.37	15.56	18.99	1.43	1.25	1.1	1.2	**6.24**	**19.88**
Hajdučica, Hajdučica	1	1	5.05	1.92	3.29	1.06	0.85	1.13	1.8	1.61	**5.05**	**1.92**
Podunavlje, Čelarevo	1	1	9.86	6.12	34.69	14.87	0.12	0.15	2.47	2.77	**9.86**	**6.12**
Sloga, Kać	1	1	7.05	6.23	17.53	26.33	0.35	0.19	1.16	1.24	**7.05**	**6.23**
Napredak, Stara Pazova	1	1	0.54	2.13	1.34	4.23	0.31	0.37	1.29	1.37	**0.54**	**2.13**
Agrobačka, Bačka Topola	1	1	0.68	1.23	1.28	2.06	0.48	0.57	1.09	1.05	**0.68**	**1.23**
Vojvodina, Sombor	1	1	17.59	1.64	13.67	2.79	0.66	0.3	1.96	1.94	**17.59**	**1.64**
Sava Kovačević, Vrbas	0	0.72	15.94	11.16	20.2	11.73	0.36	0.38	2.22	2.48	**0**	**7.99**
Orahovo, Novo Orahovo	1	1	8.74	5.89	3.77	2.39	1.1	1.28	2.11	1.94	**8.74**	**5.89**
Kozara, Banatsko Veliko Selo	1	1	2.53	14.51	3.27	16.92	0.7	0.79	1.1	1.08	**2.53**	**14.51**
Bezdan, Bezdan	0.95	1	14.26	13.49	30.03	39.05	0.45	0.34	1.05	1.02	**13.53**	**13.49**
Lučić Prigrevica, Novi Sad	1	1	1.52	1.17	2.08	4.54	0.24	0.15	3.01	1.67	**1.52**	**1.17**
Zlatica, Lazarevo	1	1	13.99	18.22	31.88	36.74	0.43	0.48	1.01	1.02	**13.99**	**18.22**
Ravnica, Bajmok	0.9	1	24.09	8.46	35	14.76	0.64	0.52	1.08	1.1	**21.65**	**8.46**
Feketić, Sombor	1	1	12.46	14.12	8.09	13.23	0.35	0.28	4.41	3.85	**12.46**	**14.12**
Dragan Marković, Obrenovac	1	1	0.27	0.77	0.28	0.8	0.35	0.33	2.78	2.89	**0.27**	**0.77**
PKB, Beograd	1	1	0.79	1.39	3.8	6.28	0.14	0.14	1.52	1.62	**0.79**	**1.39**
Poljoprivreda Novo Selo, Orom	1	1	1.48	0.96	2.24	1.33	0.19	0.23	3.5	3.2	**1.48**	**0.96**
PP Pobleda, Pobeda	1	1	1.28	0.63	1.09	0.48	0.69	0.71	1.72	1.84	**1.28**	**0.63**
PP Miletić, Sombor	1	1	8.63	20.5	4.5	18.63	0.51	0.35	3.78	3.16	**8.63**	**20.5**
Banatski Despotovac	1	1	23.48	0.78	19.48	1.12	0.89	0.43	1.35	1.62	**23.48**	**0.78**
Budućnost, Bačka Palanka	1	1	0.63	1.26	1.03	1.64	0.32	0.36	1.94	2.14	**0.63**	**1.26**
Nova Peščara, Delibato	1	1	6.81	5.37	4.9	3.13	0.96	1.17	1.45	1.46	**6.81**	**5.37**
Agrovet, Melenci	1	1	32.68	37.91	7.29	4.87	0.74	1.39	6.09	5.61	**32.68**	**37.91**
Terravita, Ratkovo	1	1	38.09	19.34	449.91	56.66	0.06	0.2	1.32	1.67	**38.09**	**19.34**
Stari Tamiš, Pančevo	0.95	0.95	7.69	11.18	7.95	10.75	0.91	0.79	1.06	1.32	**7.31**	**10.62**
Average values	0.89	0.95	11.26	10.44	27.12	13.44	0.57	0.58	1.96	1.91	9.24	9.26

Note: Compiled by the authors

4.2. Sustainable growth rate comparative analysis

In the remainder of the paper we will examine, based on comparative analysis, if there is any significant difference between the level of sustainable growth rates of food and agricultural enterprises from the sample in order to determine whether the sector affiliation of the enterprise affects its sustainable growth rate. Also, special emphasis is placed on determination of changes in the level of sustainable growth rate in time, as well as on determination of relations of sustainable growth rate and the rate of inflation with an aim to overview the real growth of food and agricultural enterprises. The obtained results will help determine the adequacy of the level of sustainable growth rates achieved in the past by the food and agriculture sectors, emphasized as drivers of the future development of Serbia.

The average values of the sustainable growth rate of the enterprises from the sample, belonging to different sectors, are shown in Table 3. Based on comparative analysis, it is possible to see that in 2011 the highest average sustainable growth rate was recorded by those enterprises from the sample belonging to the food sector (11.38%), while in 2012 food and agricultural sector enterprises from the sample had approximately the same average sustainable growth rates (9.27% and 9.26%). The most significant deviation deviation from the average values of individual sustainable growth rates is recorded in the food sector in which the highest level of individual sustainable growth rate of all enterprises from the sample was also achieved, in both observed years. In 2011, a minimum sustainable growth rate of all enterprises from the sample was recorded by an agricultural enterprise which paid a total amount of net income in the form of dividends, while in 2012 a minimum sustainable growth rate was recorded in a food enterprise that paid the dividends in an amount that was almost the same as its net income in that year.

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Table 3: Descriptive statistics of sustainable growth rate values of the enterprises from agricultural and food sectors.

Descriptive statistics	Sustainable growth rate					
	Food sector		Agricultural sector		Total	
	2011	2012	2011	2012	2011	2012
Mean	11.38	9.27	9.24	9.26	10.31	9.27
Median	9.36	6.86	7.01	7.11	7.53	7.00
Maximum	58.03	52.67	38.09	37.91	58.03	52.67
Minimum	0.14	0.07	0	0.63	0.00	0.07
Std. Dev.	12.1	10.89	9.63	8.75	10.90	9.80
Skewness	2.07	2.4	1.44	1.24	1.93	2.04
Kurtosis	8.41	9.65	4.64	4.75	7.96	8.60
Observations	30	30	30	30	60	60
Jarque-Bera	15.16	12.94	64.62	93.67	110.19	134.12
Probability	0.00	0.00	0.00	0.00	0.00	0.00

Note: *Compiled by the authors*

From Table 3 one can notice small deviations of average sustainable growth rates between food and agricultural sector enterprises as well as slight movements of average sustainable growth rates in time.

Results of Jarque-Bera test (Table 3) indicate that sustainable growth rates for agricultural enterprises, food enterprises and all enterprises from the sample do not have normal distributions ($p<0.00$).

For an overview of the existence of statistically significant difference in the level of the sustainable growth rate of the enterprises belonging to different sectors the t-test of independent samples is used.[1] Since research

[1] According to Pallant (2009, pp. 205-206) assumptions for use of parametric procedures such as t-test are the following: dependent variable should be measured on a continuous scale, the research data used should be mutually independent, variances of the populations from which random samples are taken should be equal and distribution of the population from which the random samples are taken should be normal. However, Pallant (2009, pp. 206), as well as Ghasemi and Zahediasl (2012) point out that even when normality assumption is violated, if the sample size is considered to be large, parametric procedures and t-test as one of them can be used. Similarly, Skovlund and Fenstad (2001) stress out that t-test is robust to deviations from normality if the sample size is not very small.

sample is considered to be large[2] and results of Levine test for equality of variances showed that there was no significant difference between variances of sustainable growth rates of food and agricultural enterprises (Table 6), the t-test is appropriate.

Testing results of the Hypothesis 1 (Table 4) showed that there is no significant difference between sustainable growth rates of those enterprises belonging to the stated sectors (t(60)=0.76, p=0.45 for 2011 and t(60)=0.004, p=0.99 for 2012). It may be concluded that the differences in the sustainable growth rates of the enterprises belonging to different sectors are random and that the means in two groups of enterprises are equal, both in 2011 and in 2012.

Table 4: Results of t-test of independent samples for 2011 and 2012

	2011.		2012.	
Method	Value	Probability	Value	Probability
T-test (2-tailed)	0.76	0.45	0.004	0.99
Levine	0.36	0.55	0.007	0.93

Note: *Compiled by the authors*

To overview an existence of statistically significant difference in the level of a particular sector's sustainable growth rates in 2012 in relation to the year 2011, a paired samples t-test is used and the Hypothesis 2 is tested. The paired samples t-test is used because it is suitable for comparison of sustainable growth rate means of food and agricultural enterprises from the sample, which were determined on the two different occasions (for the year 2011 and the year 2012).

Table 5: *Results of paired samples t-test*

Rate	Sector	Value	Probability
T-test (2-tailed)	Food	0.71	0.48
T-test (2-tailed)	Agricultural	0.01	0.99

Note: *Compiled by the authors*

The results of paired samples t-test (Table 5) revealed that there is no statistically significant difference in the level of the sustainable growth rate of the food (t(60)=0.71, p=0.48) and agricultural (t(60)=-0.01, p=0.99) enterprises in 2012 in relation to the year 2011.

In order to bring a valid conclusion on the real potential for growth of agricultural and food enterprises, the inflation rate is included in the analysis. The results of testing of Hypothesis 3 are given in Table 6.

Table 6: Results of one sample t-test for 2011 and 2012

Method		Food sector		Agricultural sector	
		Value	Probability	Value	Probability
T-test (2-tailed)	2011	1.98	0.06	1.27	0.21
T-test (2-tailed)	2012	-1.47	0.09	-1.84	0.08

Note: Compiled by the authors

Table 6 shows the results of one sample t-test according to which it is possible to conclude that there is no statistically significant difference between the sustainable growth rate of the agricultural enterprises from the sample and the inflation rate measured with the consumer prices index in 2011 (7%) and therefore, no real growth possibilities existed for such enterprises because sustainable growth rate is at the level of infla-

[2] Sample is considered to be large if it contains 30 or more elements (Berenson et al., 2012, pp. 211; Brase, Brase, 2013, pp. 308).

tion. On the other hand, the obtained results show that the sustainable growth rate of food enterprises is significantly higher than the inflation rate measured with the consumer prices index in 2011 (7%), which means that food enterprises had real potential for growth in 2011.

Also, based on the obtained results of the one sample t-test shown in Table 6, the null Hypothesis 3 for food and agricultural enterprises for 2012 must be discarded and it may be concluded that an average sustainable growth rate of these enterprises is statistically different from the inflation rate measured with the index of consumer prices (12.2%). The results indicate that average sustainable growth rates of food and agricultural enterprises from the sample are statistically lower than the inflation rate, which implies that inflation partially consumed their limited financial resources in 2012.

Conslusion

A sustainable growth rate represents a growth rate which one enterprise can achieve, while at the same time ensuring that the enterprise does not fall into business problems caused by financing of growth that is too fast or, on the other hand, too slow.

A sustainable growth rate is an important tool for financial planning and directing the growth of an enterprise or business sector. This tool can be used for assessment of growth results achieved in a particular sector in the past, as well as for determination of government policies adequate for the stimulation of its future growth.

Due to the importance of food and agricultural sectors for the development of Serbia, the aim of this paper was to determine whether a sustainable growth rate for food and agricultural sectors was adequate in the past. Since agriculture in Serbia, due to its geographical position, natural resources of soil and favourable climate conditions, has a great development potential and a possibility to become a basis of economic development of the whole country, it would be expected that the enterprises from the agricultural sector achieve a high sustainable growth rate. The same could be said for food industry enterprises, because of the fact that agriculture to a large degree provides the basis necessary for food processing production.

In this paper, the research of the sustainable growth rate was done for the years 2011 and 2012 on the basis of the sample that consists of 60 enterprises, 30 belonging to the food and 30 belonging to the agricultural sectors. The results revealed that there is no difference in the sustainable growth rate of food and agricultural enterprises in 2011 and 2012, nor is there any difference in the level of the sustainable growth rate of food and agricultural enterprises in 2012 compared to 2011. Also, only food enterprises had opportunity for a real sustainable growth in 2011, while sustainable growth of the agricultural enterprises was at the level of inflation measured with the index of consumer prices (7%) and there were no opportunities for a real growth. In 2012 a statistically significant difference existed between average sustainable growth rates of the food and agricultural enterprises and the inflation growth rate measured with the index of consumer prices (12.2%). The obtained results indicate that the average sustainable growth rate of food and agricultural enterprises was lower than their rate of inflation and that those enterprises experienced a real decline in 2012.

Research results lead to a conclusion that although Serbia has comparative advantages in the field of food and agricultural sectors and although government and different authors recognized the importance of food and agricultural sectors for the development of the whole country, the opportunities for the sustainable growth were scarce or there was no real sustainable growth in the mentioned sectors in 2011 and 2012. This was especially true for the enterprises from the agricultural sector. It should be pointed out that the obtained results are in accordance with the conclusion of a number of authors, who recognized the difficult position of agricultural and food sectors (Pejanović et al., 2013; Antevski et al., 2012; Bešić et al., 2014).

It is important to point out that a sustainable growth rate and its component analyses could be used by regulators as a tool for selection of the most appropriate regulations and measures for the incitement of growth and development of the selected sectors as McFadden and Clause (1993) suggested. Therefore, regulators can focus on designing more efficient policies specific to agricultural and food sectors that would promote future sustainable growth, e.g., tax incentives, incentives for increased sale of domestic products on foreign markets, use of subventions for stimulating and protecting domestic producers, organizing visits to international fairs aimed at increasing sales of domestic products on foreign markets, dissemination of the newest knowledge and technologies through knowledge incubators and cooperation, access to cheap sources of indebtedness, etc.

Finally, it should be pointed out that this study was based on a sample that consisted of 60 enterprises, 30 from the food sector and 30 from the agricultural sector and that more extensive study should be undertaken in order to draw final conclusions about the state and growth possibilities of the food and agricultural sectors in Serbia. Also, in order to draw final conclusions about a sustainable growth rate a longer historic period should be taken into account, so that more realistic assessment of sustainable growth rate potential should be made, as well as better stimulating policy should be designed.

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