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Business risk challenges faced by entrepreneurs from the fruit and vegetables processing sector: Case study of Stara Zagora region

Key words: measures to reduce business risk, break-even point analysis, sales revenue

Su m m a r y: The purpose of the research is to focus on some of the challenges associated with business risk faced by entrepreneurs operationalizing in the sector ‘Processed and conserved fruit and vegetables’ in Stara Zagora region (Bulgaria). The authors point out the measures to reduce business risk associated with this sector, which measures are based on the data obtained by some modern methods for business risk analysis—the ‘break-even point analysis’ and the ‘percentage of variation’. Several indicators are calculated for the main three groups of the assortment structure: fruit and vegetable juices, conserved fruit and vegetables, and nuts and seeds. Knowledge and use of different methods for the analysis of business risk is a prerequisite for proper management for entrepreneurs. Their use would lead to the capture of warnings about a possible risk and taking appropriate action to prevent it.

1. Introduction

The risk is a category that is closely associated with the concept of entrepreneurial activity. Very often the entrepreneurial income is defined as ‘an excessive profit, received in an innovative production process and implemented innovative methods of risk’ (1, p. 15) using ‘new techniques and technologies, new forms of organization of labour and production, new products and markets, new marketing strategies, etc.’ (2, p. 14).

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Risk is not necessarily associated with the danger of capital loss. Rather it should be considered as a prerequisite for a favourable result of a situation, which might accumulate a certain level of profit.

As a management concept, the risk is defined as the ‘deviation from possible outcomes occurring in a given situation’ (3, p. 4). The reasons for these variations may be due to various factors such as sales volume, unit price, cost of raw materials, cost of work, existing competition, economic conditions, legislation, state and organization of industry, etc. The main task of the entrepreneur is to assess the degree of the risk and its management, rather than striving to avoid it.

In the economic theory, there are different classifications of risk according to various criteria. This research refers to the ‘business risk’ which is defined as the ‘possibility of adverse changes in market and economic conditions in which the entity operates’ (4). These changes affect the fundamentals of the company as sales volume, revenues, expenditures, financial results, profitability, etc.

The subject of this research is the business risk associated with entrepreneurship. Object are the companies from the sector of ‘Processed and conserved fruit and vegetables’ in Stara Zagora region. The study includes seven companies whose sales form 97% of the total sales of processed and conserved fruit and vegetables in the region. Figure 1 shows the assortment structure of sales of firms participating in the survey.

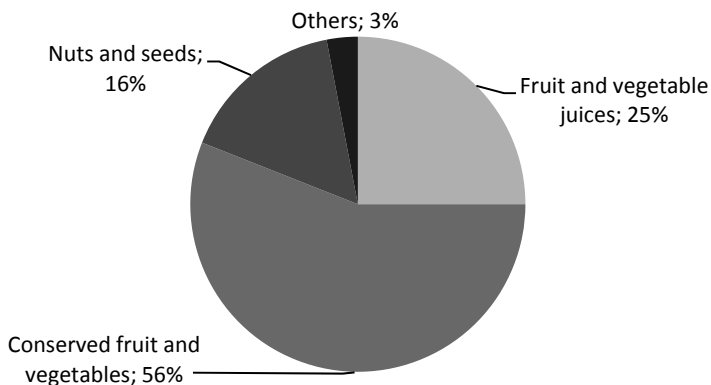


Figure 1. Assortment structure of the volume of production and sales in the sector ‘Processed and conserved fruit and vegetables’ in Stara Zagora region

Source: Trade Register.

The two methods that are used to assess the business risk of the entrepreneurs from the surveyed companies are the Break-Even Point Analysis (BEPA) and the Percentage of Variation (4). Break-even point analysis is widely used in the financial analysis.

Its application involves the performance of calculations to find the following indicators:

1. *Break-even point in units* ($q_{b/e}$)—this indicator determines the level of sales below which the company would generate loss.
2. *Break even-point in sales revenue* ($Q_{b/e}$)—this indicator provides information about the volume of sales in value to the amount of which the entrepreneur operates at a profit.
3. *Margin of safety* (Z)—calculated as a deduction between the actual level of sales (Q_p) and the critical size of sales ($Q_{b/e}$). It represents the provisions for reduction of sales revenue, within which the enterprise will not suffer a loss.
4. *Margin of safety in percentage* ($Z\%$)—represents the reduction in the amount in sales or revenues from the sales to the level of which the entrepreneur makes profit.
5. *Coverage ratio of critical revenue* (K_c)—indicates the degree of coverage of critical revenue by actual.
6. *Operating leverage* (OL)—indicates the sensitivity of the profits to changes in sales volume. There are various methods for determining it, but the purpose of our study calculates it by dividing 100% of *Margin of safety in percentage* ($Z\%$).

The analysis of the business risk by the represented algorithm would be more precise if we have the complete accounting information for each individual company. A very important point in this method is the correct determination of the fixed (FC) and variable costs (VC). They are the reference point in determining the *Break-even point in units* ($q_{b/e}$). Due to the confidential nature of some information, for the purposes of the present study the following approach is administered by making these preliminary clarifications:

1. The analysis is embodied in the main product groups of assortment structure of the companies participating in the study (Figure1).
2. The price does not include VAT.
3. ‘Analysis of the accounts of expenditure’ is used in determining the fixed (FC) and variable costs (VC).
4. The group ‘Variable costs (VC)’ includes: material costs, wages and social charges. All other costs are allocated to the group of ‘Fixed costs (FC)’.

The results of calculations are presented in (Table 1, Table 2 and Table 3).

Table 1

Fruit and vegetable juices—25% (in the 2006–2010 period)

No.	Indicator	2006	2007	2008	2009	2010
1	Sales volume (in tons)—(q)	4412	4353	4410	5445	5049
2	Sales price (in leva/ ton)—(p)	1450	1500	1520	1460	1440
3	Fixed costs (in leva)—(a)	999 000	1 037 000	1 364 000	1 813 000	1 674 000
4	Variable costs (in leva)	4 592 000	4 651 000	5 070 000	5 679 000	5 340 000
5	Av. variable costs per unit (in leva)—(b)	1040.80	1068.46	1149.66	1042.98	1057.64

No.	Indicator	2006	2007	2008	2009	2010
6	Profit/ loss (in leva)— $P=q \cdot p-(a+q \cdot b)$	806 400	841 500	269 200	457 700	256 560
7	Break-even point in units— $q_{be}=a/p-b$	2441	2403	3683	4347	4378
8	Break-even point in sales revenue— $Q_{be}=q_{be} \cdot p$	3 539 937	3 604 520	5 598 313	6 347 296	6 304 346
9	Sales revenue (in leva)— (Q_r)	6 396 000	6 525 000	6 696 750	7 844 250	7 245 250
10	Margin of safety— $Z=Q_r-Q_{be}$	2 856 063	2 920 480	1 098 437	1 496 954	940 904
11	Margin of safety in percentage of sales revenue— $Z\%=Q_r-Q_{be}/Q_r \cdot 100$	45	45	16	19	13
12	Margin of safety in percentage of sales volume— $Z\%=q-q_{be}/q \cdot 100$	45	45	16	20	13
13	Coverage ratio of critical revenue— $Kc=Q_r/Q_{be}$	2	2	1	1	1
14	Operating leverage	2	2	6	5	8

Source: Author's own study.

Table 2

Conserved fruit and vegetables—56% (in the 2006–2010 period)

No.	Indicator	2006	2007	2008	2009	2010
1	Sales volume (in tons)— (q)	6515	6358	6282	6875	6263
2	Sales price (in leva/ ton)— (p)	2200	2300	2390	2590	2600
3	Fixed costs (in leva)— (a)	2 239 000	2 321 000	3 055 000	4 061 000	3 750 000
4	Variable costs (in leva)	10 285 000	10 419 000	11 356 000	12 721 000	11 961 000
5	Av. variable costs per unit (in leva)— (b)	1578.66	1638.72	1807.70	1850.33	1909.79
6	Profit/ loss (in leva)— $P=q \cdot p-(a+q \cdot b)$	1 809 000	1 883 400	602 980	1 024 250	572 800
7	Break-even point in units— $q_{be}=a/p-b$	3604	3510	5246	5490	5433
8	Break-even point in sales revenue— $Q_{be}=q_{be} \cdot p$	7 927 764	8 072 712	12 539 081	14 219 789	14 126 087
9	Sales revenue (in leva)— (Q_r)	14 327 040	14 618 240	15 000 720	17 571 120	16 229 360
10	Margin of safety— $Z=Q_r-Q_{be}$	6 399 276	6 545 528	2 461 639	3 351 331	2 103 273
11	Margin of safety in percentage of sales revenue— $Z\%=Q_r-Q_{be}/Q_r \cdot 100$	45	45	16	19	13
12	Margin of safety in percentage of sales volume— $Z\%=q-q_{be}/q \cdot 100$	45	45	16	20	13
13	Coverage ratio of critical revenue— $Kc=Q_r/Q_{be}$	2	2	1	1	1
14	Operating leverage	2	2	6	5	8

Source: Author's own study.

Table 3

Nuts and seeds—16% (in the 2006–2010 period)

No.	Indicator	2006	2007	2008	2009	2010
1	Sales volume (in tons)— (q)	1412	1393	1379	1850	1839
2	Sales price (in leva/ ton)— (p)	2900	3000	3110	2750	2530
3	Fixed costs (in leva)— (a)	639 000	663 000	872 000	1 160 000	1 072 000

No.	Indicator	2006	2007	2008	2009	2010
4	Variable costs (in leva)	2 939 000	2 977 000	3 245 000	3 635 000	3 417 000
5	Av. variable costs per unit (in leva)—(b)	2081.44	2137.11	2353.15	1964.86	1858.08
6	Profit/loss (in leva)— $P=q \cdot p-(a+q \cdot b)$	516 800	539 000	171 690	292 500	163 670
7	Break-even point in units— $q_{bc}=a/p-b$	781	768	1152	1477	1595
8	Break-even point in sales revenue— $Q_{bc}=q_{bc} \cdot p$	2 263 867	2 305 056	3 583 188	4 062 995	4 036 403
9	Sales revenue (in leva)—(Q_r)	4 093 440	4 176 640	4 285 920	5 020 320	4 636 960
10	Margin of safety— $Z=Q_r-Q_{bc}$	1 829 573	1 871 584	702 732	957 325	600 557
11	Margin of safety in percentage of sales revenue— $Z\%=(Q_r-Q_{bc})/Q_r \cdot 100$	45	45	16	19	13
12	Margin of safety in percentage of sales volume— $Z\%=(q-q_{bc})/q \cdot 100$	45	45	16	20	13
13	Coverage ratio of critical revenue— $K_c=Q_r/Q_{bc}$	2	2	1	1	1
14	Operating leverage	2	2	6	5	8

Source: Author’s own study.

Break-even point in units (q_{bc}) and Margin of safety (Z) for 2010 are illustrated in Figure 2, Figure 3 and Figure 4.

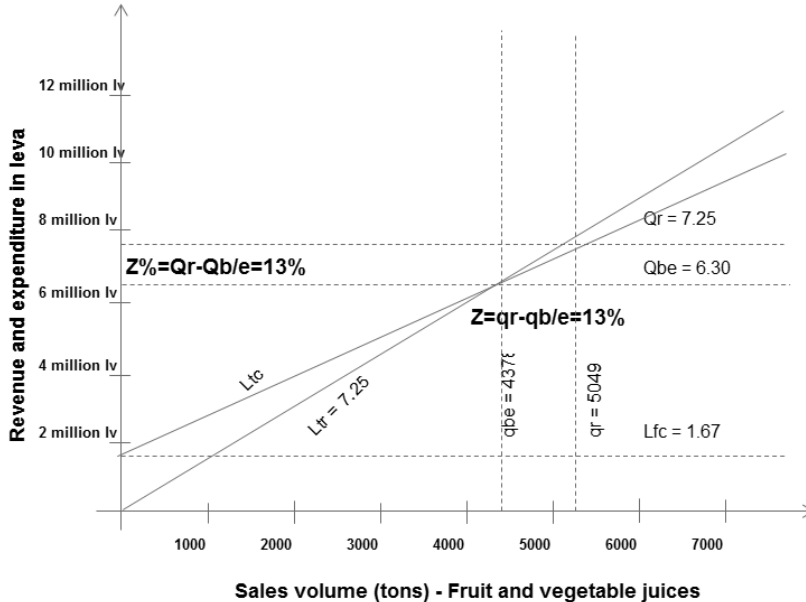


Figure 2. Break-even point in units and margin of safety—fruit and vegetable juices

Source: Author’s own study.

Break-even point in units ($q_{b/e}$) ‘Fruit and vegetable juices’ for 2010 is 4378 tons. Compared to the previous years of the period 2006–2010 it has increased. This trend continues at the indicator *Break even-point in sales revenue* ($Q_{b/e}$)—its size in 2010 is 6.3 million leva. The year 2007 is the most successful for the business within the referred period 2006–2010: the level of the profit is the highest—over 0.8 million leva and the rate of the margin of safety is 45%. For 2010 this level is 13%, i.e. it is possible a drop in the level of sales and level of sales revenue to 13%. Of course, it is necessary to analyze these indicators separately in details for each entrepreneur. The fixed cost line (Lfc) indicates the level of fixed costs—in 2010 they are 1.67 million leva. The total cost line (Ltc) indicates the level of total costs. The total revenue line (Ltr)—the level of revenue (7.2 million leva for 2010). The coverage ratio for 2010 is 1, i.e. the actual revenue covers the size of the critical revenue. In 2006 and 2007 the coverage ratio covers twice the size of the critical revenue, i.e. the level of business risk for this group of products is getting higher.

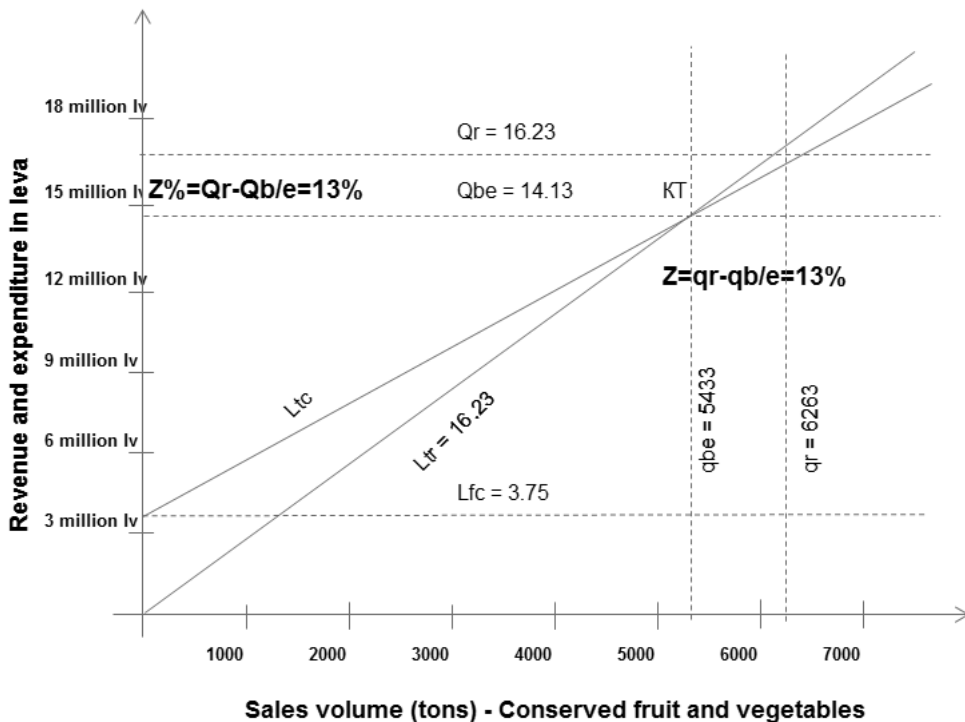


Figure 3. Break-even point in units and margin of safety—conserved fruit and vegetables

Source: Author's own study.

Figure 3 illustrates the *Break-even point in units* ($q_{b/e}$) and *Margin of safety* (Z) of ‘Conserved fruit and vegetables’. For this group in 2010 the margin of safety ($Z\%$) is 13% also, and the coverage ratio is 1, i.e. its level of business risk is relatively high. The highest margin of safety ($Z\%$) is in 2006 and 2007—45%. The lowest level of profit is in 2010—0.6 million leva. The *Break-even point in units* ($q_{b/e}$) in 2010 is 5433 tons and the *Break even-point in sales revenue* ($Q_{b/e}$)—14.13 million leva. The actual total sales amounted 6263 tons or 16.23 million leva.

Break-even point in units ($q_{b/e}$) and *Margin of safety* (Z) for the last group of products ‘Nuts and seeds’ is presented in Figure 4.

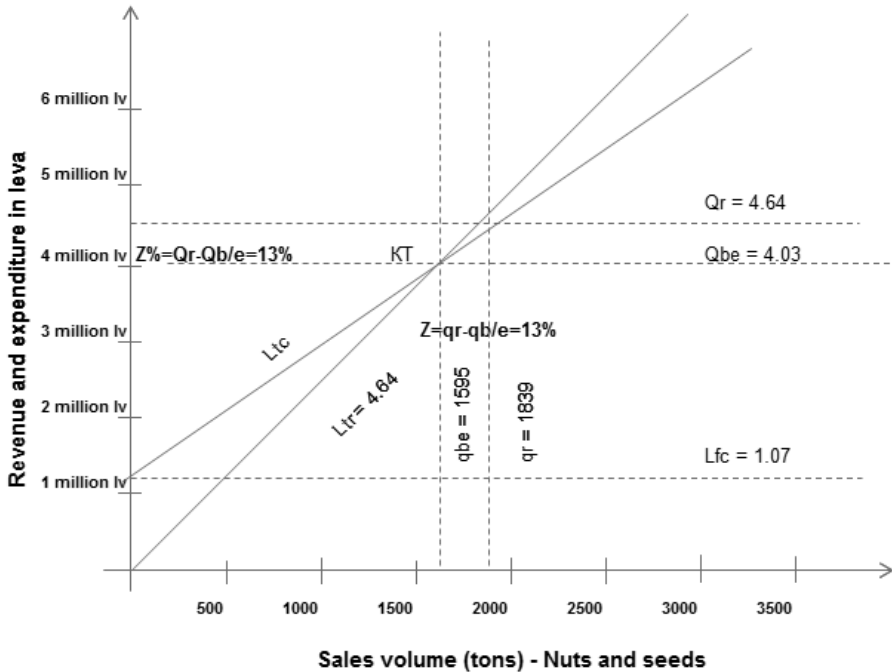


Figure 4. Break-even point in units and margin of safety—nuts and seeds

Source: Author’s own study.

In 2010 the level of *Break-even point in units* ($q_{b/e}$) reaches its highest level—1595 tons. *Break even-point in sales revenue* ($Q_{b/e}$) is calculated to 4.03 million leva. The actual implemented quantity production for the same period is 1839 tons, which is equivalent to the value of 4.64 million leva. The margin of safety in this group is also 13%, and the coverage ratio—1.

At all the three product groups *Operating leverage* (OL) is 8 in 2010. The dynamic trend of the value of this parameter is examined for the period 2006–2010 and the calculations ranged from 2 in 2005 to 8 in 2010. The lower levels of *Operat-*

ing Leverage (OL) are associated with the lower levels of business risk as the minor changes in sales volume do not significantly affect the financial result. This means that in the 2010 year the business risk reaches its highest level.

For more precise assessment of business risk, for the purpose of the present analysis method 'Break-even point analysis' is combined with the method 'Percentage of variation'. It is necessary to compare *Margin of safety in percentage (Z%)* with the *Percentage of variation of sales volume (V%)*. The *Percentage of variation (V%)* indicates the deviation of sales from their average size in the given period of time (i.e. 5 years period). The deviation can be both—positive and negative. If the *Percentage of variation (V%)* is high then the business risk is also high, as it reflects the increased uncertainty in the volume of sales. Provided that $V\%/2 > Z\%$, then there is a danger during the next period that the rate of loss of sales would be greater than the percentage of *Margin of safety (Z%)*, which is alert for high business risk.

Based on the information on the volume of sales of the analyzed companies from the sector 'Processed and conserved fruit and vegetables' for the period 2006–2010 and calculations of the percentage of variation of the three groups the following results are generated (Table 4).

Table 4

Comparative analysis of *Percentage of variation (V%)*
and *Margin of safety in percentage (Z%)*

Product groups	Percentage of variation (V%)	Margin of safety in percentage (Z%)
Fruit and vegetable juices	9%	13%
Conserved fruit and vegetables	4%	13%
Nuts and seeds	14%	13%

Source: Author's own study.

The *Percentage of variation (V%)* is the highest in the group of 'Nuts and seeds', i.e. business risk there is the highest. Fluctuations in sales of 'Conserved fruit and vegetables' are the smallest, indicating for the lowest levels of the business risk in that group. During the next period, in all of the three groups there is no risk of a decline in sales below the margin of safety.

Using these two methods the following conclusions can be drawn about the level of business risk for entrepreneurs of the sector 'Processed and conserved fruit and vegetables' in Stara Zagora region for the period 2006–2010:

1. *Sales volume* (tons) and *Sales revenue* (leva) exceed *Break-even point in units* ($q_{b/e}$) and *Break-even point in sales revenue* ($Q_{b/e}$), but the percentage of the margin of safety is getting lower.
2. *Margin of safety in percentage (Z%)* during the analyzing period is fluctuating and for the last two years (2009 and 2010) is 13%. Is this acceptable level indicating significant reserves for drop in sales without the risk of potential

loss? This can be confirmed in certainty if we compare *Percentage of variation* ($V\%$) with *Margin of safety in percentage* ($Z\%$). The percentage will be different in different industries. The entrepreneur could assess the acceptable values of this indicator. Therefore he/ she must justify his/ her judgment, relying on various indicators and methods.

3. *Coverage ratio of critical revenue* (K_c) for the last three years—2008, 2009, 2010 is 1, and reaches the values of 2 in 2006 and 2007. This indicates that the level of business risk increases as the actual revenue is at the same level as the critical sales revenues.
4. Despite fluctuations in *Operating leverage* (OL) its values in 2009 and 2010 increase significantly compared to 2006 and 2007. The higher level of this indicator is the evidence of increasing business risk.
5. *Percentage of variation* ($V\%$) has almost equal values with the *Margin of safety in percentage* ($Z\%$), which is another confirmation of high business risk during the period 2006–2010.
6. This analysis is based on some subjective assumptions that lead to distorted results. This applies especially to the determination of the variable and the fixed costs. For example, in the group ‘Conserved fruit and vegetables’ the percentage of cost of electricity probably is quite high and it should be considered as a variable cost. At the same time the ratio of staff in the firms is unknown and uncertain. What part of this staff is busy with activities that are constant and do not depend on changes in the volume of production? Firm-level results would be much more accurate, especially when the analyst can access the complete information about the types of costs and their distribution by types of products.

Knowledge and use of different methods for the analysis of business risk is a prerequisite for proper management for entrepreneurs. Their use would lead to the capture of warnings about a possible risk and taking appropriate action to prevent it.

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Wyzwania związane z ryzykiem biznesowym, przed którymi stoją przedsiębiorcy z branży przetwórstwa owocowo-warzywnego – region Stara Zagora

Streszczenie: Celem badań jest omówienie niektórych wyzwań związanych z ryzykiem biznesowym, przed którym stoją przedsiębiorcy prowadzący działalność w branży przetwórstwa i konserwowania owoców i warzyw w regionie Stara Zagora (Bułgaria). Autorzy wskazują środki służące ograniczeniu ryzyka biznesowego związanego z tą branżą, oparte o dane uzyskane za pomocą nowoczesnych metod analizy ryzyka biznesowego: analizy progu rentowności oraz procentu wariancji. Obliczono kilka wskaźników dla trzech głównych grup struktury asortymentu: soków owocowych i warzywnych, konserwowych owoców i warzyw oraz orzechów i nasion. Wiedza oraz zastosowanie różnych metod do analizy ryzyka biznesowego są dla przedsiębiorców warunkiem zasadniczym właściwego zarządzania. Ich wykorzystanie pomoże wychwycić sygnały świadczące o ewentualnym ryzyku i podjąć stosowne działania, aby mu zapobiec.

Słowa kluczowe: sposoby ograniczenia ryzyka biznesowego, analiza progu rentowności, przychody ze sprzedaży
