

## INCOME FLUCTUATIONS OF GRAIN INDUSTRIAL ENTREPRENEURIAL CANCER

**Yumaajav Byambaarai<sup>1</sup>, Enkhchimeg Dolgorsuren<sup>2</sup>**

<sup>1</sup> University of Internal Affairs, lecturer, Master, CPA

<sup>2</sup> National Defense University, Institute of Security Lecturer, Doctor and Associate Professor, Department of  
Economics and Management, Mongolia

Email: <sup>1</sup>*bymbaarayumaajav@gmail.com*, <sup>2</sup>*enkhchimeg4494@gmail.com*

### Abstract

10 percent of the agricultural sector is made up of farming and 90 percent is made up of the livestock industry. Meat and meat products account for 12 percent of Mongolia's food consumption, and flour and bakery products for 18 percent. This research aims to determine the current situation and perspective of the wheat industry, the main raw material of flour products, the main food of Mongolians. The size of the organization has a significant impact on the income volatility of wheat producers. Therefore, in order to ensure the income stability of businesses, the government needs to take measures such as capitalization, diversification of income from the implementation of crop rotation technologies, and the establishment of a joint technology park.

**Key words:** Income fluctuations, Standard deviation, income stability of businesses, crop

### Introduction

One big part of food industry of Mongolia is amounts for agricultural industry. This sector had been making up 20 percent of GDP until 2009, but since 2009, this number has decreased to 10 per cent due to mining investment. 10 percent of agricultural sector is made up by farming and 90 percent is made up by livestock industry. Meat and meat products account for 12 percent of Mongolia's food consumption, and flour and bakery products for 18 percent.

This research aims to determine current situation and perspective of wheat industry, the main raw material of flour products, main food of Mongolians.

During the research of wheat industrial entrepreneurs in the leading province in this sector, many companies have been bankrupted, vanished or haven't given any financial report. This illustrates this industry is real risk.

This sector is dependent on many factors such as environmental, climatic, and technological condition and soil deterioration. This research raises a hypothesis that the amount of the entrepreneurs' asset and income influence on this industry the highest. According to "Farm Household Income Volatility: An Analysis Using Panel Data From a National Survey"<sup>1</sup> by Nigel Key, Daniel Prager, and Christopher Burns, income fluctuation is determined by three methods. The methodology to determine the income fluctuation of these researchers is used in the research. The novelty of this study is to determine whether business unit amount is relevant with income fluctuation.

The result of this research shows the income fluctuation of small entrepreneurs is high, but the medium and big entrepreneurs' income fluctuation is low. Therefore, the conclusion that policy to enhance the business to keep the sustainability of entrepreneurs' income should be followed is drawn.

---

<sup>1</sup> [www.ers.usda.gov/publications/](http://www.ers.usda.gov/publications/)

### Development of Farming Industry of Mongolia

Mongolia's agricultural sector began to develop in 1959, when the "Atar I"<sup>2</sup> campaign was launched to use steppe and grow grain, potatoes, vegetables, and fodder. As a result of this decision, 300 thousand hectares of steppe land was possessed for agricultural purposes and 295.5 thousand tons of grain was harvested. Subsequently, the 11th Plenary Session of the Central Committee of the MPRP in 1976 decided to implement the "Atar-2" Campaign, focusing on using an additional 230,000 hectares of arable land and strengthening the technical base. The "Atar-3" campaign has been implemented since 2008 and the abandoned land has been re-circulated and planted in 515 thousand hectares in 2015, 505 thousand hectares in 2016 and 524.3 thousand hectares in 2017.

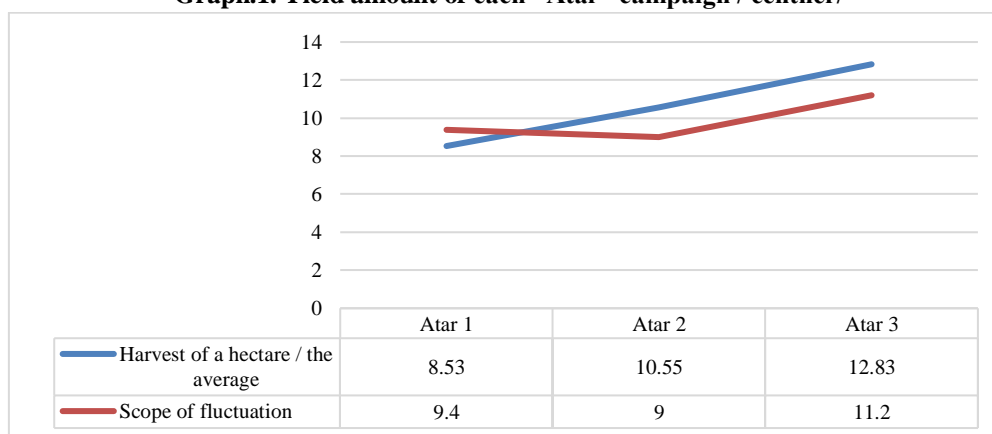
Mongolia did not cultivate land before 1959. During the socialist era, with the help of Russia, the sector developed and began to cultivate 300,000 hectares of land. By 1989, it had occupied an additional 673,000 hectares, which is the highest rate, of arable land. However, due to the unprepared transition to a market society in 1990, the agricultural sector collapsed, and in 2007 the area under crops was 114.8 thousand hectares, which is 6 times less than in the previous period which had the highest rate. However, since 2008, thanks to the redistribution of investment in the mining sector, the Atar III campaign has been implemented and 78% of the highest crop area has been put into circulation. However, the following calculations show the change in the amount of a hectare of field and the fluctuations of the maximum and minimum harvest.

**Table1. Result of each "Atar" campaign**

|        | <b>Total farm land</b> | <b>Harvest of a hectare / the highest</b> | <b>Harvest of a hectare / the lowest</b> | <b>Harvest of a hectare / the average</b> | <b>Scope of fluctuation</b> |
|--------|------------------------|---|--|---|-----------------------------|
| Atar 1 | 300                    | 13.1                                      | 3.7                                      | 8.53                                      | 9.4                         |
| Atar 2 | 673                    | 14.6                                      | 5.6                                      | 10.55                                     | 9                           |
| Atar 3 | 524.3                  | 16.8                                      | 5.6                                      | 12.83                                     | 11.2                        |

In each of the Atar campaigns, the highest yields were achieved, the lowest yields were increased, the average yields were also good, but the difference between the maximum and minimum yields was unfavorable.

**Graph.1. Yield amount of each "Atar" campaign / centner/**



The Government of Mongolia announced the "Atar 4" Campaign on December 25, 2019 by Resolution No. 476 of the Government of Mongolia to implement the "ATAR-4 SUSTAINABLE CULTIVATION DEVELOPMENT CAMPAIGN" nationwide from January 1, 2020. The campaign aims to mitigate and rehabilitate soil erosion, degradation and fertility degradation, develop climate-adapted agriculture, increase risk tolerance, ensure the sustainability of agro-ecosystems, and fully address food needs and security.<sup>3</sup>

<sup>2</sup> In March, 1959, Resolution to implement "Atar-1" campaign was approved by the Plenum No 6 of Central committee of MPRP.

<sup>3</sup>[https://1212.mn/BookLibraryDownload.ashx?url=gazar\\_tarialan\\_2019.pdf&ln=Mn](https://1212.mn/BookLibraryDownload.ashx?url=gazar_tarialan_2019.pdf&ln=Mn)

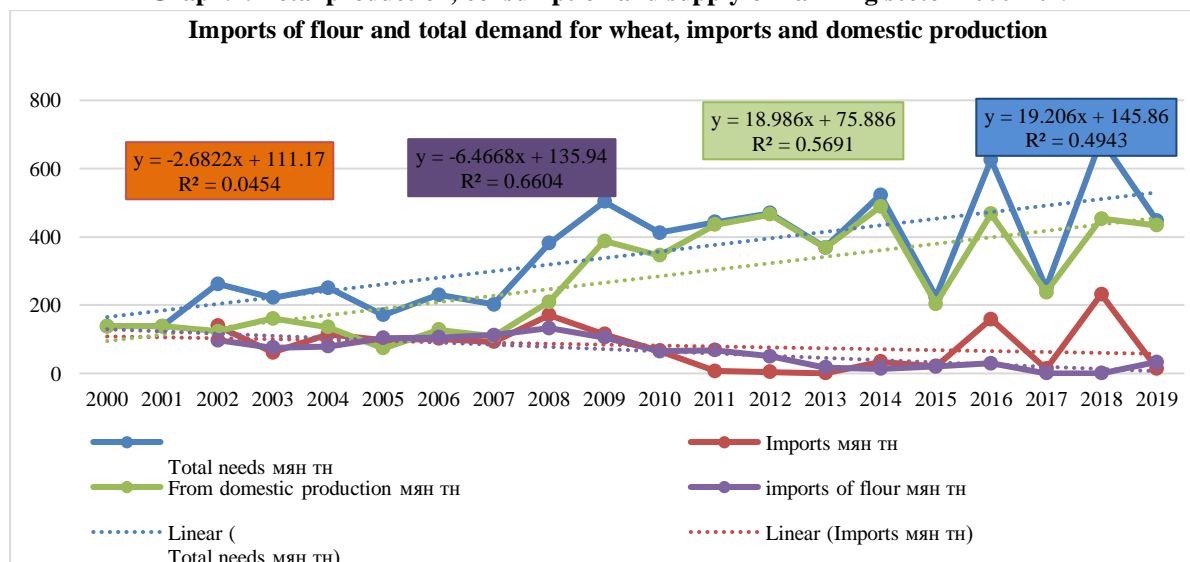
The extreme weather conditions<sup>4</sup> in our country and the global drought and global warming are exacerbating the situation, as well as the short ripening period of grain and the import of machinery, technology, pesticides and fertilizers, which is detrimental to businesses' profitability.

About 85% of 331 soums of our country have an economy based on agricultural production, 36% of GDP is produced by the agricultural sector, and 56.7% of the total employed population is employed in this sector.<sup>5</sup> This is a very important sector to support the sustainable development of the country's economy. On the other hand, domestically produced vegetables and grains are very important for food security.

### Current Situation Of Grain Production Of Farming Sector

Flour and bakery products account for 18% of the country's food consumption, and the main raw material for flour is wheat, which aims to meet domestic demand. The extent to which this goal has been achieved can be determined from the following research. Determining the total demand for wheat and flour in Mongolia, the following results are obtained.

**Graph.2. Total production, consumption and supply of Farming sector 2000-2019**



Resource: researcher's finding

Wheat production is directly dependent on national policy. For example, in connection with the launch of the Atar-3 campaign in 2009, the volume of flour and wheat imports has sharply decreased since 2008 and has started to be supplied from domestic production. Wheat imports fell 2.68 times over time, while flour imports fell 6.46 times, indicating that domestic wheat supply was sufficient to meet flour production. Demand for wheat has increased 19.2 times, while domestic supply of wheat has increased 19 times, another indication that supply is meeting the growing demand. However, due to the sharp increase in consumption in 2015 and climate change in 2015-2016, there was a need to import to meet domestic demand.

Our southern and northern neighbors are able to supply, but in case of any risk, they will first meet their domestic needs and then export abroad. This means that supply risk remains. Therefore, it is important for our country to study and support opportunities and ways to reliably meet this growing demand domestically.

Considering the restructuring of Mongolia's agriculture, the situation is as follows.

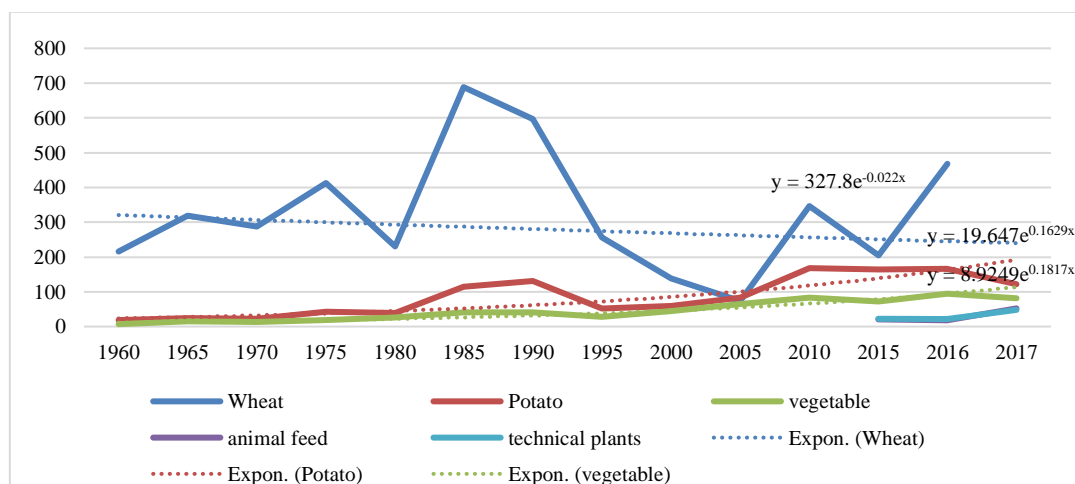
Harvested, thousand tons

<sup>4</sup> MARCC-2014 Presentation of Climate Change of Mongolia

<https://modis.gsfc.nasa.gov/data/>

<https://landsat.usgs.gov/>

<sup>5</sup> -<http://mofa.gov.mn/exp/blog/8/245>



Resource: [https://www.1212.mn/stat.aspx?LIST\\_ID=976\\_L10\\_2](https://www.1212.mn/stat.aspx?LIST_ID=976_L10_2)

From the graph above, it is clear that grain production is highly volatile. Compared to the sown area, the yield per hectare is always higher for potato cultivation and fluctuates for wheat.

### Mathematic Calculation Of Income Fluctuation

In order to find out how income fluctuates in the long run, a number of quantitative studies will be performed using a database that analyzes business income fluctuations. Cameron and Tracy, (1998) and Gottschalk and Moffitt, 1994; Haider, (2001) used income dynamics to analyze long-term changes in personal income by dividing it into fixed and non-fixed income. In their latest study, they looked at trends in changes in non-farm income. (e.g., Congressional Budget Office, 2008; Dahl et al., 2011; Dynan et al., 2012; Moffitt and Gottschalk, 2011; Shin and Solon, 2011; Ziliak et al., 2011).

When studying income changes, calculations ( $|y_{it} - y_{is}|$ ) are used to obtain positive changes with negative values.

$y_{is}$  and  $y_{it}$  represent the income of  $i$  enterprises in  $s$  and  $t$  years.

An easy measure of income change is the standard deviation of income.

$$SD_i = \sqrt{\frac{(y_{is} - \bar{y}_i)^2 + (y_{it} - \bar{y}_i)^2}{n-1}} \quad [1]$$

Here:

$SD_i$  – standard deviation

$n$  – sample unit number

$y_{is}$  –  $s$  year's  $i$  entity's income

$y_{it}$  –  $t$  year's  $i$  entity's income

$(\bar{y}_t)$  –  $t$  time's average income

If income randomly changes from year to year at a normal level, real income of about 68 percent over time will decrease by one standard deviation from average income. About 95 percent of the time will be reduced by 2 standard deviations from the average. Absolute changes and standard deviations determine the level of fluctuations in income over the long term, but do not fully reflect the amount of changes associated with expected income.

One measure of the variability determined by the average income is the personal absolute value of the arc change (AAPC).

$$AAPC_i = 100 * \left[ \frac{y_{it} - y_{is}}{\bar{y}_i} \right] \quad [2]$$

Here:

$AAPC_i$  - Орлогын өөрчлөлтийн орлогын дундаж хэмжигдэхүүнд эзлэх хувь

$y_{is}$  - s year's i entity's income

$y_{it}$  - t year's i entity's income

$\bar{y}_i$  - t time's average income

$\bar{y}_i$  -нь average income of year:  $y_i = 0.5 * (y_{it} + y_{is})$ .

The percentage of income change in the average measure of income is used as a measure of income volatility instead of the usual per cent change, and the percentage of income change in the average measure of income is symmetrically related to income increase or decrease, ranging from -200 to 200 (Dyan et al. , 2012; Hardy and Ziliak, 2014). The second major factor is the need to use this model when there is a high distributional distortion from year to year. AAPC has a value between 0 and 200.

The covariance deviation, or CV variance coefficient, divided by the mean, is the second quantity determined by the average income. If the coefficient of variability is high, the income changes in direct proportion to the average, but if it is low, the income decreases slightly from the average income.

The absolute value of the income fluctuation coefficient (ACV) is the negative mean value of income.

$$AC_i = \left| \frac{SD_i}{\bar{y}_i} \right| = \sqrt{\frac{(y_{is} - \bar{y}_i)^2 + (y_{it} - \bar{y}_i)^2}{\bar{y}_i}} \quad [3]$$

Compared to AAPC, ACV has no value limit. When a household business has a very low average income, ACV can be very high, which distorts the regression. For example, suppose a household business earning \$ 20,000 a year loses \$ 18,000 the following year. For this household, the average income is \$ 1,000, but the standard deviation is 26,870. The ACV is 26.9 and above. To solve this problem, we use the actual logarithm of the ACV as a regression-dependent variable. Log changes reduce the impact of overstatements and bring the data closer to normal distribution.

A measure used to analyze trends in corporate income fluctuations is the Standard Deviation from the Mean (SDAPC) (Dahl et al., 2011; Ziliak et al., 2011; Dyan et al., 2012). Unlike previous formulas, the SDAPC does not measure the volatility of an entity's income, but rather represents a value at a point in time, a fragment of the sample, or a period of time.

$$SDAPC_t = \sqrt{\frac{1}{N} \sum_{i=1}^N (APC_{it} - \overline{APC}_t)^2} \quad [4]$$

$$APC_{it} = (y_{it} - y_{is}) / \bar{y}_i \quad [5]$$

Here:

$APC_{it}$  and N is the number of businesses in the sample

Average income is found with formula of  $y_i = 0.5 * (y_{it} + y_{is})$  and negative income amount can be used at the first and the second year.

### Determining The Impact Of Organization On The Income Fluctuation Of Wheat Industry Entrepreneurs

Selenge, Khentii and Dornod aimags are the most suitable regions for wheat cultivation in Mongolia, and Selenge aimag leads in total cultivation. Therefore, the current situation of grain processing companies in Selenge aimag was studied.

There are 371 grain companies in Selenge aimag which has been working in grain industry since 2010, of which 85 companies went bankrupt, 32 companies went missing, 157 companies did not report, and 97 companies that have been operating steadily for the last 10 years were analyzed with the financial statements.

Chapter 5 of the CIT Law, Article 20.1 of the Tax Rates Chapter, provides that if the sales revenue of an enterprise is up to 300.0 million, it is considered as micro, 1%, and from 300 million to 1.5 billion is considered as small, 10% tax and 90% discount, 1.5 to 6 billion for medium income, 10% tax, and more than 6 billion for large income, 600 million and 25% tax for income over 6 billion. Also, according to Article 4 of the revised Law on Support of Small and Medium Enterprises and Services, and Article 5 of Chapter 2, business entities must be small (with up to 10 employees, sales revenue up to 300.0 million), small (10- With 50 employees, sales revenue is classified as 300 million to 1 billion MNT), medium (50-200 employees, 1-2.5 billion MNT).

According to the above sales revenue criteria, 58% of the surveyed companies are micro, 33% are small, 4% are medium, and 4% are large. Based on the income data of the 97 companies surveyed, the following results were obtained based on the above-mentioned indicators of income change rate, absolute value of income fluctuation coefficient, and income fluctuation trends. The surveyed organizations were categorized as micro, small, medium, and large, and each of the three indicators was calculated to determine how the size of the organization affects revenue fluctuations.

|        | Sdi   | ACVi   | SDAPCi |
|--------|-------|--------|--------|
| Micro  | 27.4  | 100.52 | 0.92   |
| Small  | 184.4 | 99.74  | 0.76   |
| Medium | 52.17 | 97.56  | 0.89   |
| Large  | 34.34 | 80.54  | 0.76   |

1. **Percentage of change in income (SDi).** The percentage change in income was 27.4 for micro businesses, 34.34 for large businesses, and 52.17 for medium-sized businesses, indicating that income change is low in the long run. Small businesses, on the other hand, have a high share in the sector, but the rate of change in income is 184.4, indicating that income is volatile in the long run.

2. **Absolute value of income fluctuation coefficient (ACVi).** Eighty-five percent of micro businesses are above average to the right. This represents a high change in income. Ninety-three percent of small businesses deviate from the average to the right. The share of medium-sized businesses is also 97 percent, which is a big change. However, the ratio of large enterprises is 80.54 percent, which means that income fluctuations from the average income are less than those of other businesses.

3. **Revenue Fluctuation Trends (SDAPCi).** In terms of income change trends, micro and medium-sized businesses are the most volatile. The change trend for small and large businesses is less but relatively high.

In summary, the income of micro and small businesses is volatile in many respects. In the future, reducing the income volatility of wheat producers will ensure the long-term sustainability of businesses in this sector. Methods to ensure income sustainability include a number of measures, such as increasing revenue sources, irrigation, crop rotation, and technical innovation. The best option is to diversify your income by implementing crop rotation technologies to produce other agricultural resources needed for crop rotation. However, farmers argue that there is a shortage of markets for crops other than wheat. However, the following research shows that this is not the case. In other words, our country imports the following products and we are able to produce them domestically.

The following information was collected in order to analyze some types of imported products, to determine their supply from domestic production, and to combine them with wheat production and use them for crop rotation. Among the products grown in our country, rapeseed is the most profitable in terms of foreign trade balance with the average profit of USD 2,846,000, and wheat is the most profitable and loss-making product with an average annual loss of USD 10,998,000.

**Rapeseed.** Rapeseed has been identified as a crop suitable for crop rotation. Due to market instability, farmers are at risk of crop rotation. Therefore, if the supply channels for the rapeseed market can be clarified and stabilized, it will be the most important factor for farmers to stabilize their incomes. Rapeseed-wheat technology has a dual impact on tillage and revenue compared to soil cultivation-wheat technology.

**Buckwheat.** Due to the high consumption of buckwheat in our country, it is necessary to take measures to grow it in our country. An average of USD 1201.54 thousand is spent annually on the import of buckwheat.

In terms of forage for cattle, it is a product with large foreign trade deficits. The average annual loss is \$ 3,855,000. Forage for cattle is a crop that can be grown in our country. Therefore, it is possible to expand agricultural production by growing fodder in the production of import-substituting products, and it is necessary to use it for crop rotation.

From the above analysis, it can be concluded that the use of rapeseed and fodder crops in wheat rotation can increase the variety of crops and stabilize the income of farmers. This is because the survey shows that there is room for a supply of rapeseed and fodder plants in the market.

## Conclusion

At a time when the world is running out of food to sustain overpopulation, food security is an important issue for every country. Mongolia has been focusing on the development of its wheat industry, and as a result, it is able to meet its domestic demand for wheat. However, in some years, crops are lost and large imports continue. The research also found that wheat producers are unable to run sustainable businesses in the sector.

The size of the organization has a significant impact on the income volatility of wheat producers. Micro and small businesses are often forced out of the industry due to the inability to introduce new techniques and technologies. Therefore, the government needs to take the following measures:

1. To conduct research on the experience of other countries, new techniques and technologies, and support their implementation in practice regularly;
2. To increase revenue sources to ensure revenue sustainability, implement crop rotation technology and diversify income;
3. Since small businesses are not able to invest heavily in equipment and technology, measures such as the establishment of a joint technology park, the development of outsourcing services and professional consulting services are considered effective.

In addition, the financial strengthening of entrepreneurs and the creation of large and sustainable businesses will have a significant impact on the development of this sector.

## References

1. ICMS In-depth review of the investment climate and market structure in the energy sector of Mongolia, 2013, Energy Charter Secretariat
2. Foreign Direct Investment to Mongolia, 2015, Frontier's Strategy
3. K.Nigel, P. B. (2017). Farm Household income volatility: An Analysis using Panel Data From a National Survey. USA.
4. Lindauer, R. (2017). *Modern Risk Management Remarks*. ISBN 978-87-403-1712-1.
5. LLC, R. M. (2006). An introduction to factor analysis of information risk (FAIR).
6. Strategy, F. (2015). Foreign Direct Investment to Mongolia. Ulaanbaatar.
7. Hall JR. (2009). The elephant in the room is called game theory. Risk Analysis,
8. <sup>1</sup>[https://www.itemsoft.com/event\\_tree.html?gclid=CjwKCAjww5r8BRB6EiwArcckC1OH0yUjbu\\_K4HC Hfp36NiBzEjWHcqauKGNy6fClvqW3x2HkDfS18hoCHQMqAvD\\_Bw](https://www.itemsoft.com/event_tree.html?gclid=CjwKCAjww5r8BRB6EiwArcckC1OH0yUjbu_K4HC Hfp36NiBzEjWHcqauKGNy6fClvqW3x2HkDfS18hoCHQMqAvD_Bw)

9. <sup>1</sup><https://www.weibull.com/basics/fault-tree/index.htm#:~:text=The%20two%20most%20commonly%20used,connected%20using%20an%20OR%20gate.>
10. <sup>1</sup><https://www.icheme.org/media/12368/4-lopa-introduction.pdf>

### Appendix. Some indicators of research calculations.

**Tab1. meduiem entrepreneurs**

| year   | Level of income volatility |            |            |            | The absolute value of the percentage change in income |            |            |            | Changes in income volatility index |           |           |           | Revenue volatility trend |           |           |           |
|--------|----------------------------|------------|------------|------------|---|------------|------------|------------|------------------------------------|-----------|-----------|-----------|--------------------------|-----------|-----------|-----------|
|        | Д1                         | Д2         | Д3         | Д4         | Д1  | Д2         | Д3         | Д4         | Д1                                 | Д2        | Д3        | Д4        | Д1                       | Д2        | Д3        | Д4        |
| 2010   |                            |            |            |            |   |            |            |            |                                    |           |           |           |                          |           |           |           |
| 2011   | -0.7157816                 | -13.030762 | -11.849603 | -2.288057  | 99.390337   | -11.475601 | 11.262613  | -89.45339  | 0.7027958                          | 0.0811448 | 0.0796387 | 0.632531  | 1.1172463                | 0.0444687 | 0.0004836 | 0.7184748 |
| 2012   | -5.8551539                 | -4.9417835 | -4.4422226 | -1.4142136 | 21.590707   | 25.035246  | 27.464034  | -200       | 0.1523865                          | 0.1770259 | 0.1942    | 1.4142136 | 0.0776193                | 0.0237877 | 0.0338583 | 3.8145803 |
| 2013   | -2.0177151                 | -2.6335374 | -2.1741723 | 0          | -107.90513  | 42.333558  | -96.397438 | 200        | 0.7630045                          | 0.2993435 | 0.6816328 | 1.4142136 | 1.0321664                | 0.1070701 | 1.1121991 | 4.1898199 |
| 2014   | 0                          | -1.7196465 | -0.4309965 | -0.2646654 | 0   | 58.275951  | 124.26056  | 145.52933  | 0                                  | 0.4120732 | 0.8786549 | 1.0290478 | 0.003981                 | 0.2368181 | 1.3270383 | 2.2565996 |
| 2015   | -1.4142136                 | -2.2903167 | -1.7276595 | -2.6727335 | -200  | -89.325712 | 7.8638623  | -71.947208 | 1.4142136                          | 0.6316282 | 0.0556059 | 0.5087436 | 3.7515996                | 0.9788669 | 0.0001439 | 0.4523465 |
| 2016   | 0                          | -1.4077777 | -3.4148993 | -2.7218373 | 200   | 66.86954   | 34.308867  | -70.193685 | 1.4142136                          | 0.4728391 | 0.2426003 | 0.4963443 | 4.2563624                | 0.3278427 | 0.0637333 | 0.4290668 |
| 2017   | -2.4801164                 | -18.733658 | -5.3217409 | -1.6660961 | -79.763447  | -7.8451701 | 23.457444  | -147.46917 | 0.5640127                          | 0.0554737 | 0.1658692 | 1.0427645 | 0.5395477                | 0.0304752 | 0.0207188 | 2.0385749 |
| 2018   | -315.80477                 | -2.7382005 | -5.0516578 | -0.1955327 | 0.4468122   | 41.047531  | 24.557586  | 156.67535  | 0.0031594                          | 0.2902499 | 0.1736484 | 1.107862  | 0.0045648                | 0.0988193 | 0.0240069 | 2.6038937 |
| 2019   | -8.2411006                 | -3.652194  | -2.3852955 | -2.8882167 | 15.804434   | -48.019412 | -84.270234 | 39.334807  | 0.1117542                          | 0.3395485 | 0.5958805 | 0.2781391 | 0.0489028                | 0.3321379 | 0.8711169 | 0.1938227 |
| Summa  | -327.79385                 | -42.671679 | -51.082753 | -15.35704  | 172.03994   | -53.938292 | 202.92863  | 467.60301  | 2.5914848                          | 4.0540299 | 3.3003523 | 5.6438869 |                          |           |           |           |
| Mean   | -36.421539                 | -4.7412977 | -5.6758614 | -1.9196301 | 19.115549   | -5.9931436 | 22.547626  | 58.450376  | 0.2879428                          | 0.4504478 | 0.3667058 | 0.7054859 |                          |           |           |           |
| Sdi    |                            |            |            | 52.17268   |   |            |            | 97.567156  |                                    |           |           | 0.4396851 |                          |           |           | 1.2911944 |
| SDAPCi |                            |            |            |            |   |            |            |            |                                    |           |           |           | 1.0970663                | 0.4921931 | 0.6194352 | 1.3620727 |

**Table2. big entrepreneurs**

| year   | Level of income volatility |            |            |            | The absolute value of the percentage change in income |            |            |            | Changes in income volatility index |           |           |           | Revenue volatility trend |           |           |           |
|--------|----------------------------|------------|------------|------------|---|------------|------------|------------|------------------------------------|-----------|-----------|-----------|--------------------------|-----------|-----------|-----------|
|        | T1                         | T2         | T3         | T4         | T1  | T2         | T3         | T4         | T1                                 | T2        | T3        | T4        | T1                       | T2        | T3        | T4        |
| 2010   |                            |            |            |            |   |            |            |            |                                    |           |           |           |                          |           |           |           |
| 2011   | -0.1555915                 | -4.4765214 | -2.8266784 | -0.1356103 | 163.9291  | -37.518122 | 40.019794  | 167.81594  | 1.1591537                          | 0.2652932 | 0.2829827 | 1.1866379 | 2.6872748                | 0.0947152 | 0.1601584 | 1.1960826 |
| 2012   | -15.828847                 | -17.140572 | -15.715729 |            | -9.352188   | 7.9237957  | -9.4226739 |            | 0.06613                            | 0.0560297 | 0.0666284 |           | 0.0087463                | 0.0215094 | 0.0088787 |           |
| 2013   | -95.965984                 | -2.6487914 | -1.38027   | -1.4677439 | 1.4628823   | 42.141135  | 67.750757  | 65.025778  | 0.0103441                          | 0.2979828 | 0.4790702 | 0.4598017 | 0.000214                 | 0.2389589 | 0.4590165 | 0.0043236 |
| 2014   | -186.23583                 | -0.1911669 | -2.0897611 | -0.1548597 | 0.7564948   | 157.43683  | 50.564189  | 164.06828  | 0.0053492                          | 1.1132465 | 0.3575428 | 1.160138  | 5.723E-05                | 2.6954783 | 0.2556737 | 1.1155143 |
| 2015   | -9.0150322                 | -1.5372024 | -2.8309093 | -1.5627458 | -17.022463  | -170.36755 | -66.58875  | -165.28157 | 0.120367                           | 1.2046805 | 0.4708536 | 1.1687172 | 0.0289764                | 2.6773226 | 0.4434062 | 5.0055982 |
| 2016   | -0.9539744                 | -2.0025144 | -0.8177971 | -0.9239874 | 85.138138   | 52.192298  | 92.741159  | 86.703366  | 0.6020175                          | 0.3690553 | 0.655779  | 0.6130854 | 0.7248503                | 0.3473285 | 0.8600923 | 0.0798231 |
| 2017   | -7.1588094                 | -4.0938851 | -3.6009476 | -0.7147345 | 17.979006   | -41.756898 | -48.869777 | 99.463533  | 0.1271308                          | 0.2952659 | 0.3455615 | 0.7033134 | 0.0323245                | 0.1226023 | 0.2388255 | 0.1682079 |
| 2018   | -9.159549                  | -4.4254148 | -20.839326 | -6.3567551 | -16.731419  | -38.033792 | -7.0246282 | 20.020402  | 0.118309                           | 0.2689395 | 0.0496716 | 0.1415656 | 0.027994                 | 0.0979158 | 0.0049345 | 0.1476863 |
| 2019   | -3.3202328                 | -6.1556115 | -0.9813338 | -4.0406038 | -54.119608  | -25.955994 | 83.758565  | 29.787274  | 0.3826834                          | 0.1835366 | 0.5922625 | 0.2106278 | 0.2928932                | 0.0369167 | 0.7015497 | 0.0821573 |
| Summa  | -327.79385                 | -42.671679 | -51.082753 | -15.35704  | 172.03994   | -53.938292 | 202.92863  | 467.60301  | 2.5914848                          | 4.0540299 | 3.3003523 | 5.6438869 |                          |           |           |           |
| Mean   | -36.421539                 | -4.7412977 | -5.6758614 | -1.9196301 | 19.115549   | -5.9931436 | 22.547626  | 58.450376  | 0.2879428                          | 0.4504478 | 0.3667058 | 0.7054859 |                          |           |           |           |
| Sdi    |                            |            |            | 34.342848  |   |            |            | 80.542292  |                                    |           |           | 0.3824257 |                          |           |           | 1.0762421 |
| SDAPCi |                            |            |            |            |   |            |            |            |                                    |           |           |           | 0.650071                 | 0.8388317 | 0.5899657 | 0.9873825 |