Economic Features of Bankassurance as Farm Risk Management Measure

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ABSTRACT

In recent years there have been accelerated climate changes around the world that have a particular impact on the achievement of results in agriculture, primarily in plant production. Scientific predictions point to even more pronounced consequences of climate changes that reflect in the further increase in the variability of weather parameters and the emergence of extreme harmful events, such as droughts, floods and storm winds, which negatively affect the amount of the achieved yield of crops and fruits. On the other hand, agricultural production is a specific area of business that is also subject to the effects of market and financial factors. In order to prevent these risks, it is necessary to manage them, and bankassurance is just one of the new products for risk management in agricultural production. This refers to financial instrument that integrates banking and insurance offerings in the common financial market, and for farmers, this market product is a combination of credit and insurance that can stabilize their revenue, but also to secure invested capital in production. The aim of the paper is to present the theoretical basis for bankassurance, as well as the tasks that are taken over by the three main stakeholders in this business, such as an agricultural producer, a bank and an insurance company. The insurance company will also realize its function by applying one of the modern insurance models, which can be AGR (Adjusted gross revenue), which represents a model where all crops and products that a farm grows and produces insure with only one policy. The insured event arises when the farm does not achieve the planned and insured revenue level during the production year. In this way, the farm is protected from all kinds of natural and economic risks. A practical example of using bankassurance in agriculture from the perspective of farmers is also given in this paper, all with the aim of multiple protection of production under more favorable conditions of risk transfer.

KEY WORDS: Farm, risk management, bankassurance, adjusted gross revenue

Introduction

Risks in agricultural production are becoming more pronounced year after year if the consequences of climate change, globalization and market liberalization are taken into account, as well as increased requirements for quality standards and food safety of products. A large number of authors have dealt with risks in agriculture, and as a general attitude they cite that the following sources of risk in agriculture can be systematized in general: production, financial, human, market and political risks (Barry, 1984; Hardaker et al., 1997; Ebneth, 2003; Vasiljevic et al., 2013; Markovic, 2013). Relying on the previous division, the most commonly mentioned risk types can be classified into two categories: internal risks (in farms) that are related to the production itself, its financing and the impact of human factors, as well as external risks (in the environment) which include the influence of market and politics (Ivanović and Marković, 2018).

Risk mitigation includes measures that are applied for risk management, and they can be classified as internal (risk avoidance, production diversification, reserves creation, etc.) or external character (insurance, forward contracts, commodity derivatives, etc.), depending whether they are available at the farm or can be bought on the market. What measures will be applied mostly depends on the owner of the farm, but they should be designed to influence the management of internal and external risks and to reduce their impact to an acceptable level.

In the past, individual measures managed individual risks in the most common case (e.g. production risks protection was carried out by yield insurance, financial risks protection was carried out by subsidized loans with lower interest rates, bilateral forward contracts or forward contracts were used for the protection from the market risks, health insurance against sickness and farmers' injuries etc.). More recently, the tendency is to carry out protection against a greater number of risks with certain so-called package of products.

In agricultural production there is a need to provide, through the provision of financial resources for the start-up of some production, the possibility of simultaneously carrying out its insurance against potential risks, and this product is called bankassurance. For farmers, this market product is a combination of loan and insurance that can simultaneously stabilize farmer's revenue, but also insure invested capital in the production. In this way, farmers are allowed to save time, commission and costs (Krstić et al., 2011). The banking sector, striving for further geographical expansion and penetration in terms of increasing the number of clients from different segments, appears as a viable source that is also suitable for the distribution of various insurance products (Neelamegam and Veni Pushpa, 2009). Lately, the distribution of insurance products through banks has steadily increased in many parts of the world (Teunissen, 2008). At the same time, bankassurance is the simplest way of distributing insurance products through the banking network (Choudhury et al., 2016). The uniqueness of such a product on the market can be manifested eg. by combining loan for working capital (for purchasing inputs in production - seeds, fertilizers, fuels, etc.) and insurance in agriculture that most often covers the basic risk package (combined insurance against the hail and a small number of other dangers - lightning, fire, etc.), but modern insurance models can also be included that would, in addition to yields, also insure revenue, so in addition to production and financial risks, price risks would be insured too. One of such modern models of insurance that allows simultaneous protection both from yield and price risks is AGR (Adjusted Gross Revenue). In particular, AGR provides protection against the reduction of revenue due to production losses that can be attributed to unpredictable natural disasters and market fluctuations that affect the revenue of the farm in the insured year (Johnson et al., 2008).

The aim of the paper is to demonstrate, on a practical basis, the possibility of applying a bankassurance. On the one hand, an agricultural producer raises short-term loan for financing the purchase of necessary inputs, while on the other hand simultaneously concludes the insurance policy while insuring his expected income by using the AGR model.

Material and methods

For the purpose of realization of the set goal of the survey, the data of individual farm from the West Bačka district (AP Vojvodina, Serbia), which deals with the production of basic crops (wheat, corn, sunflower) on the surface of 20 ha, as well as the data of two financial institutions (bank and insurance company) with whom the farmer has many years of business cooperation. The paper analyzes the possibility of applying bankassurance in the production of basic crops.

The costs of purchasing a bankassurance are obtained through the calculation of the amount of funds that the farmer will return to the bank according to the appropriate method of calculating interest. If the proportional method of calculating interest is taken into account, that monetary amount can be calculated through a loan depreciation plan with equal annuities. Annuity (a) is calculated according to the general formula:

$$a = K \cdot r^{nm} \cdot (r-1) / r^{nm} - 1, \text{ wherein } r = 1 + p_m/100, p_m = p/12, n=1, m=12 \qquad (1)$$

wherein: K - loan amount (principal), n - repayment period (year), m - repayment dynamics (number of instalments - months to be repaid in one year), p - annual interest rate (%), p_m - monthly interest rate (%)

Then interest is calculated in the first annuity (I_1), based on the following formula:

$$I_1 = K_1 \cdot p/100 \cdot m, \text{ wherein } K_1 = K \qquad (2)$$

Below is the part of an annuity that is intended for repayment (O_1), where the interest in the first annuity is deducted from the annuity amount:

$$O_1 = a - I_1 \qquad (3)$$

The rest of the debt in the second month (K_1) represents the difference between the initial balance of the debt and repayment in the first month, according to the form below, and then the procedure proceeds for the remaining months according to the initiated procedure, which will be seen later in the results of the survey:

$$K_1 = K - O_1 \tag{4}$$

When concluding the insurance policy with the AGR model, the farmer first defines the percentage coverage level (65, 75 or 80%) and the rate of payment (75 or 90%). In order for the farmer to qualify for the highest levels of coverage and rate of payment, it is necessary that the sowing structure consists of at least three different crops.

At the beginning of the year, based on data of achieved yields and prices in the preceding five years, the expected revenue for the insured year is formed. Insured event occurs if the achieved revenue is below the agreed trigger level at the end of the year calculated on the basis as follows:

$$T_l = E_r \cdot C_l \tag{5}$$

wherein: T_l - the trigger level, E_r - expected revenue, C_l – coverage level

The insured sum in effect represents the amount of coverage (C) and is calculated as the product of the trigger level (E_r) and the payment rate (P_r):

$$C = E_r \cdot P_r \tag{6}$$

The amount of premium paid by a farmer to an insurance company as a risk transfer charge is calculated based on the following formula (state subsidy amounts 40%):

$$K_v = C \cdot p - 40\% \tag{7}$$

wherein: K_v - producer's premium, C - amount of coverage, p - premium rate

According to the aforementioned calculations, the amount of the bankassurance costs includes the interest on the raised loan and the amount of the insurance premium.

At the end of the production year, any revenue deficiency due to either reduced yield or lower purchase prices is considered. Revenue deficiency (R_d) is calculated as the difference between the established trigger level (T_l) and the achieved revenue (R_r).

$$R_d = T_l - R_r \tag{8}$$

Indemnity is calculated based on the following formula:

$$I = R_d \cdot P_r \tag{9}$$

wherein: I - amount of indemnity, R_d – revenue deficiency, P_r - payment rate

Results and discussions

Bankassurance (loan with insurance) is a new product (financial instrument) that integrates the banking and insurance offer in the common financial market. Here, it is primarily intended to create and realize certain insurance products through the banking network. In the case of bankassurance, the farmer has two financial institutions in front of him - a bank and an insurer, but the whole job is applied through the application for this product through the bank, with the note that the insurer is involved if a harmful event occurs. The amount of coverage that is approximate to the level of production costs, i.e. the necessary production investments increased for average earnings, is taken as the basis for calculating the insurance sum.

Each of these financial institutions is in charge of appropriate activities. The insurer is responsible for the development of products from the part of insurance, it carries the risk and performs damage assessment and compensates the users of bankassurance, takes over the reinsurance function, and it can also market and sell the joint product. On the other hand, the functions of the bank consist in maintaining and developing a database of farmers as clients, marketing and selling products, training of

loan officers on the sale, but also providing recommendations on conditions of insurance (insurance sum) since the sum of the loan, which is approximately at the level of the production costs of the farmers.

The purpose of the existence of bankassurance in agriculture consists in the successful merging of interests of agricultural producers as clients, insurance companies and banks. The farmer receives the entire financial service in one place (through the bank), a more favourable price of the service through lower interest costs and insurance premium, which simultaneously protects him from several sources of risk (financial, production, market), but also additional security through the insurance of his own production. The bank is improving its services in agriculture by adding new products for insurance of crops, fruits and animals, simultaneously increasing the number of farmers, as users of services, and their loyalty to banks is increasing. In this way the insurer reduces the costs of its own sales network and increases the number of farmers who are already banking clients.

The manner of functioning of the bankassurance is shown on the example of an individual farmer from the West Bačka district, who is engaged in the production of basic crops (wheat, corn and sunflower) on the surface of 20 ha. The farmers' decision is to finance the production from a bank loan while simultaneously insuring his production using the AGR insurance model. Given that average investments in the production of these crops at the level of 500 €/ha, the farmer takes a short-term loan of € 10,169.18 for the purchase of necessary inputs in production. The loan repayment period is one year in 12 monthly instalments, and the annual interest rate is 9%.

The amount of cash that the farmer must return to the bank can be calculated through a loan depreciation plan with equal annuities. Annuity (a) is about € 889, and is obtained based on formula (1) if data is pre-set. According to formula (2) interest in the first annuity is € 76.27. The part of an annuity for repayment (€ 813.07) is calculated according to formula (3), while the amount of the remainder of the debt in the second month is € 9,356.43, and it is obtained according to formula (4).

Table 1
Repayment plan of short-term loan for the purchase of inputs
Tabela 1
Plan otplate kratkoročnog kredita za nabavku inputa

Installment	Loan Balance (€)	Interest (€)	Repayment (€)	Annuity (€)
0	10,169.18			
1	9,356.43	76.27	813.07	889.34
2	8,537.26	70.17	819.16	889.33
3	7,711.95	64.03	825.31	889.34
4	6,880.46	57.84	831.50	889.34
5	6,042.72	51.60	837.73	889.33
6	5,198.71	45.32	844.02	889.34
7	4,348.36	38.99	850.35	889.34
8	3,491.63	32.61	856.72	889.33
9	2,628.48	26.19	863.15	889.34
10	1,758.86	19.71	869.62	889.33
11	882.71	13.19	876.15	889.34
12	0.00	6.62	882.40	889.02
Total	-	**502.54**	**10,169.18**	**10,672.72**

Further, the process proceeds according to the given procedure, so the loan repayment plan can be seen in Table 1. The farmer should return to the bank taken short-term loan increased by € 502.54 interest, which totals € 10.672,72. It is certain that in this way the farmer can provide relatively favourable funds for the successful realization of the sowing and the production itself.

Table 2
Calculation of insurance indemnity using Adjusted Gross Revenue model
Tabela 2
Obračun naknade iz osiguranja primenom modela korigovanog bruto prihoda

Contract data	Value
Expected revenue (€)	22,905
Coverage level (%)	80
Payment rate (%)	90
Trigger level (€)	18,324
Insurance sum (coverage) (€)	16,491
Premium rate (%)	2.5
Total Premium (€)	412
Subsidy amount (€) (40%)	165
Producer´s premium (€)	247
Achieved revenue (€)	10,542
Revenue deficiency (€)	7,782
Indemnity (€)	7,004

On the other hand, AGR (adjusted gross revenue) allows all crops on the farm to be insured with only one policy. This type of insurance protects against low revenue due to losses in production, which result from a decrease in yield or market price. Namely, the aim is to provide protection against small revenue due to production losses attributable to the inevitable natural disasters and market fluctuations that affect the revenue of the farm in the insured year.

The way how AGR function will also be shown on the case of the analyzed farm. Based on data on average achieved yields and prices realized in the past five years, expected revenue was € 22,905. Given that the analyzed farm shows the diversification of production, which is reflected in three crops, the agricultural producer is provided with an 80% coverage level, as well as a 90% payment rate what is needed for the calculation of trigger level (based on formula 5) and coverage (insurance sum), according to formula 6. The payment rate essentially means how much a farmer (insured) will receive for each € of lost revenue in the insured year. In other words, the producer will be compensated for € 90 for every € 100 of lost revenue. Below is the calculation of the insurance indemnity according to the AGR model.

Table 2 shows the entire procedure for calculating the insurance indemnity using the AGR model. In the production year, the analyzed farm achieved total revenue in the amount of € 10,542, which is € 7,782 less than the trigger level, based on formula 8, and on this way, it can be concluded that the insured event occurred. The insurance company is obliged to pay the agricultural producer (insured) an indemnity in the amount of € 7,004, according to formula 9. Total insurance indemnity is directly dependent on the yield level and the market price of the crop. With increasing yield or market price, the indemnity is gradually reduced and at one point it is equal to zero, i.e. there will be no insurance indemnity if the total realized revenue of the farm reaches the trigger level. Irrespective of the realized revenue, the one who are insured have a liability to the insurer in the amount of € 247, which represents the amount of the insurance premium when the amount covered by the state through subsidies is deducted and it is calculated based on formula 7.

Bankassurance is a protection against financial risks by borrowing money from the bank, but also the protection from yield and price risks through revenue insurance. It is certain that in this way the Serbian farmer could provide relatively favourable funds for the successful realization of sowing and the production of basic crops, but on the other hand he would have guaranteed protection against certain sources of risk.

Based on the example of using this model, it is clear that the basic assumption for the implementation of such a model in Serbia is the proper demand from the farmers (individual farmer from West Bačka district is taken as an example here). Insufficient awareness of the possibilities offered by bankassurance, insufficient supply of new risk management products, instability of the market, traditional distrust of farmers towards institutions, as well as insufficient determination of the state to

address this issue are just some of the reasons for the current situation in this area of agribusiness and for not introducing some new risk management products, like bankassurance with AGR in this research presented.

But nevertheless, with this bankassurance model available in the future, Serbian farmers will be given more comprehensive protection than traditional insurance, since in addition to revenue insurance, invested capital in production is also ensured.

Conclusions

Agricultural producers face the risks that endanger the production (internal risks) on the farm, but also they face the environmental risks (external risks) that are primarily related to the impact of the market. In order to protect themselves against potential risks, it is necessary to implement and apply appropriate risk management instruments.

Bankassurance is a protection against financial risks by borrowing money from the bank, but also from production risks through production insurance. AGR, in addition to production risks, also represents protection against price risks, that is, the risk of changing the price of the product. The main advantage of the bankassurance for farmers (insured) is reflected in multiple production protection under more favorable conditions of risk transfer, while on the other hand through a bank loan, also under favorable conditions, farmer gets the financial resources that are necessary for investment in production. The advantage of AGR is that the insured with only one policy ensures all of his crops.

With the application of the bankassurance, the analyzed farm financed the entire production with loan funds with an annual interest rate of 9%, in 12 monthly installments, while on the other hand the premium rate for the insurance policy was only 2.5%. In this way, the insured secured his entire investment in production on the one hand, while on the other he also secured the expected income from production. It is certain that the presented bankassurance model can be a complement to the existing risk management instruments, and because of these advantages, it could have a positive effect on the increase of the secured agricultural production as well as on the strengthening of trust between bankers, insurers and farmers.

Acknowledgement

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Ekonomska obeležja bankoosiguranja kao mere za upravljanje rizicima na poljoprivrednom gazdinstvu

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SAŽETAK

Poslednjih godina svedoci smo ubrzanih klimatskih promena širom sveta koje naročito imaju uticaja na ostvarene rezultate u poljoprivredi, pre svega u biljnoj proizvodnji. Predviđanja ukazuju na još izraženije posledice klimatskih promena koje se ogledaju u daljem povećanju varijabilnosti klimatskih parametara i pojavi ekstremnih klimatskih događaja kao što su suše, poplave i olujni vetrovi koji imaju negativan uticaj na ostvarene prinose useva i plodova. Sa druge strane, poljoprivredna proizvodnja predstavlja specifičnu oblast poslovanja na koju snažno dejstvo takođe imaju i tržišni i finansijski faktori. Da bi se predupredili ovi rizici neophodno je primenjivati odgovarajuće instrumente za upravljanje rizicima, a bankoosiguranje upravo predstavlja jedan od novih proizvoda za upravljanje rizicima u poljoprivrednoj proizvodnji. Reč je o finansijskom instrumentu kojim se integriše bankarska i osiguravajuća ponuda na zajedničkom finansijskom tržištu, a za poljoprivrednika ovaj tržišni proizvod predstavlja kombinaciju kredita i osiguranja kojim on može da stabilizuje svoje prihode, ali i da osigura uloženi kapital u proizvodnju. Cilj rada jeste da predstavi teorijsku osnovu bankoosiguranja kao i zadatke koje preuzimaju tri osnovna učesnika u ovom poslu, a to su poljoprivredni proizvođač, banka i osiguravajuća kuća. Osiguravajuća kuća će takođe svoju funkciju realizovati pomoću jednog savremenog modela osiguranja koji se zove Korigovani bruto prihod (AGR) i koji predstavlja model osiguranja kojim se sa samo jednom polisom osiguravaju svi usevi i proizvodi koje jedno gazdinstvo uzgaja i proizvodi. Do osiguranog slučaja dolazi kada gazdinstvo u toku proizvodne godine ne ostvari planirani i osigurani nivo prihoda. Na taj način gazdinstvo se štiti od svih vrsta prirodnih i ekonomskih rizika. Takođe, daje se praktičan primer korišćenja bankoosiguranja u poljoprivredi iz ugla poljoprivrednika u saradnji sa bankom i osiguravajućom kućom, a sve u cilju višestruke zaštite proizvodnje pod povoljnim uslovima za prenos rizika.

KLJUČNE REČI: Poljoprivredno gazdinstvo, upravljanje rizicima, bankoosiguranje, korigovani bruto prihod