Food chain structure, price and risk management strategies - insights from the Serbian raspberry case study[1]

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Abstract: *Due to its high market share, global recognition and competitiveness, the raspberry production has been the most important fruit production in Serbia. The paper addresses the main issues related to price fluctuations and risk management strategies in the Region of Sumadija and Western Serbia. Price fluctuations of a specific commodity are observed both on global and local markets, while data on income and budget support were calculated based on FADN data (2014 and 2015) and Boniteti.rs database.*

In traditionally organized agricultural societies on farm business diversification is the risk strategy that is most often used. However, this strategy is only partially applied due to unique social and cultural environment (the micro region is specialized in raspberry production). Furthermore, having in mind historical circumstances (transition from the social to market oriented production), underdeveloped food chain structure has created additional problems. The findings indicate a different dispersion of the value created due to significant differences in the market power of the value chain participants. Being powerless, it is hardly expected from raspberry producer to be "an equal" partner at the market. Finally, analysis shows that the price-linked public policies influence farmers' risk exposure and improve farms income particularly in the fruit sector in Serbia. However, these policies also affect farmers' risk management behaviour. The normal risk behaviour assumes that farmers are responsible for managing their own business. They can fully express their economic, social and environmental behaviour if they are supported by measures that facilitate more informed business choices.

Keywords: *price, income, government support, market structure and risk management*

1. INTRODUCTION

Although farmers face a lot of risk, the paper focuses on market price and food chain structure as the most important factors that shape raspberry farmers risk strategies in Serbia. Furthermore, farmers do not, as a rule, worry about price by itself but rather about income (Fafchamps, 1992). The producer prices are dependent on local factors such as market structure as well (Blein and Longo, 2009). It is particularly important for underdeveloped or developing countries which markets are not fully regulated. Other factors also create the instability of domestic market in developing countries such as the influence of natural factors (climate change and conditions), lack of organization of farmers within the food chain (lack of

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storage facilities, access to credit and unreliable linkages within the value chain) as well as smallholder production or fragmentation. Therefore, it is very important to observe interrelations among food chain structure, food price/farmers income and risk strategies applied in the practice. When the food chain structure is fully regulated (there are no risks for market imperfections), than producers have full capacity to build risk control strategies. However, in the case of imperfect conditions, producers are even faced with more problems that create specific, uncertain conditions. In a such a case, the compensation is made by state that apply agricultural policy measures directed toward farm income support. Furthermore, the choice of institutional settings is influenced by the tendency of ministers/government to avoid blame for unpopular decisions (Daugbjerg and Swinbank, 2007) which can play significant role in the case of important agricultural market segments at the national level.

Having in mind all mentioned above, the paper aims to explore position of raspberry farmers in Serbia (are they important market players) and to explain how is value added distributed along the value chain. Applied risk strategies related to price taking and financial position of farmers can be divided in top-down created institutional support and bottom-up activities applied by farmers themselves. Starting from overall importance of raspberry sector segment for agricultural and economic development in Serbia, policy makers are constantly focused on implementation of different strategies related to income support. Therefore, the paper also explores the significance of state support to fruit sector farm income in Serbia. As the result of our analysis, policy recommendations are derived - policy measures should be more oriented toward institutional support (the extension service should be based on big data analysis and management tools improvement, warehousing system implementation and designing of specific instruments for credit support etc.). The new form of institutional support should open the door for bottom-up activities and creation of independent risk control strategies. Finally, this analysis can be considered as the typical answer of producers under the poor market conditions and in the frame of huge farmers dependence on state support.

2. THE RASPBERRY SECTOR IN SERBIA – BASIC FACTS AND FIGURES

Raspberry production in Serbia ranged between 68,000 and 106,000 tones in the period 2002-2016 (production highly depends on weather conditions). The highest production of raspberries was achieved in the first observed year (106,000 tones, whereas the lowest production values were recorded in 2014 (61,715 tones) and 2016 (61,875 tones). Area under raspberry production is around 11000 ha, with maximum of 12,025 ha reached in 2013. Only 3-5 % of areas planted with raspberry are irrigated (note: open air only).

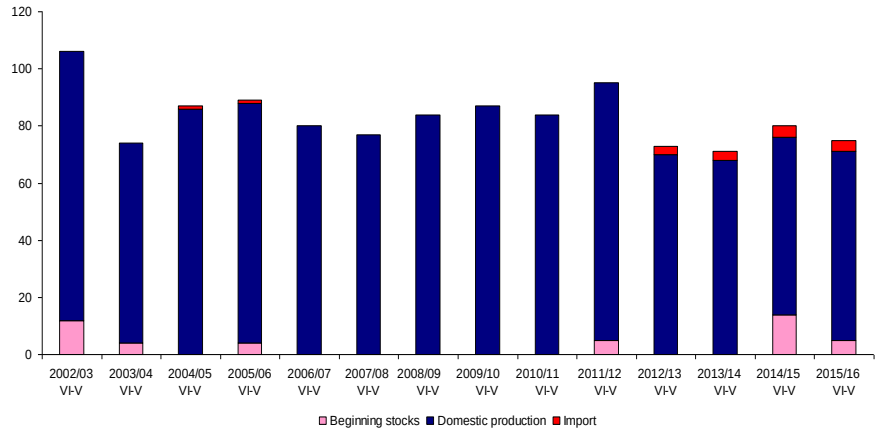

Figure 1. Total supply of raspberry in Serbia (in 000 tons)

Source: Supply utilization balance: Raspberry (http://www.minpolj.gov.rs)

Picking begins in late June and ends in July, depending on weather conditions and fields location. Most fresh raspberries are sold and consumed during the summer season. Only a small number is exported mostly in the Western Balkan region (less than 2-3% of total raspberries production).

Domestic consumption encompasses domestic use in fresh and processed form, losses and ending stocks. Significant spread widening can be noticed between export and domestic consumption of Serbian raspberry (Fig. 2). The dominant part of Serbian raspberries is exported in frozen form. After continuous growth in the pre-crisis period, the export recorded stagnation, fall and then recovery from 2009. This volatility is mostly due to prices of raspberry because quantity exported was relatively stable during the observed time interval. Average export of raspberry from Serbia in last five years reached 69,400 tons or EUR 138.5 millions that is 26.3% higher then in 2013. The main export destinations for the export of frozen raspberries from Serbia are Germany, France, Belgium, USA, UK and Sweden while fresh raspberry is predominantly exported to Austria and Germany. Generally, raspberry production is very important for agricultural sector in Serbia - of the total value of fruits exports in 2014, which amounted to about EUR 415.8 million, raspberries participated with export value of EUR 186.8 million, or with close to 45%. The annual value of raspberry exports in the last five years is around 41.2% of the total value of fruit exports and that is the result of price policies in the international markets and increasing competitiveness of Polish and Chilean raspberries.

Figure 2. Domestic consumption vs. export of raspberry from Serbia (% of total consumption)

Source: Supply utilization balance: Raspberry (http://www.minpolj.gov.rs)

Looking at the values of sale and purchase, they are due to price fluctuations highly volatile in relation to the data expressed in tones. The lowest value was recorded at the beginning of the observed period when RSD 1,592 million raspberries were sold and repurchased. After that, the value of sale and purchase reached its first maximum in 2008. After the reduction in 2009, the value recorded growth reaching the new high of RSD 11,380 millions in 2015.

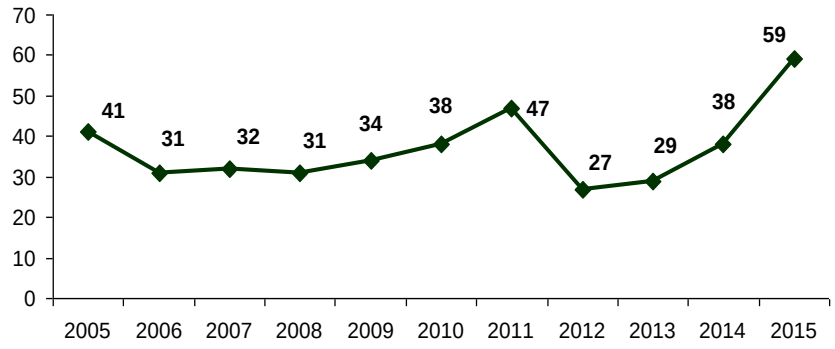

Figure 3. Raspberries: quantity of sale and purchase (t), 2005-2015

Source: Statistical yearbooks

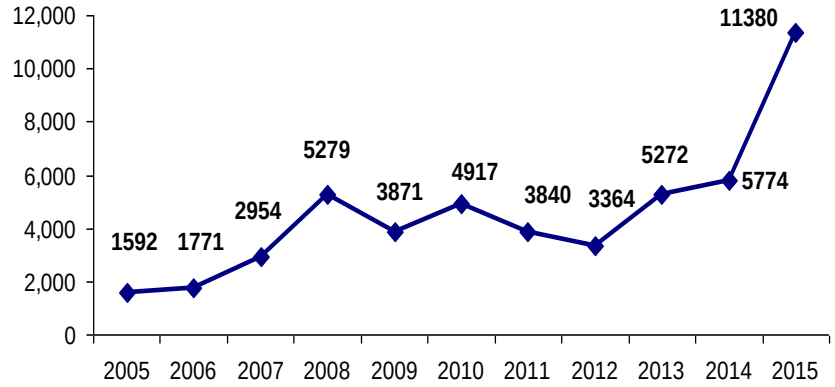

Figure 4. Raspberries: value of sale and purchase, 2005-2015

Source: Statistical yearbooks

Statistical Office of the Republic of Serbia regularly publishes information about the value of sales of raspberries at local marketplaces. In 2015, the sale of raspberries at Serbian marketplaces amounted to 124 million RSD. Market prices data for fresh raspberries and other agricultural products are available from centralized System of the Market Information for the Agriculture in Serbia (STIPS, http://www.stips.minpolj.gov.rs). Data on fresh raspberry prices are collected and provided by STIPS in the fruits category. It is important to notice that these data are available exclusively for the fresh raspberry and thus they are available only seasonally, in months when the raspberry is produced (STIPS generally covers local supply chain of fresh raspberry). Market prices of raspberry on wholesale and green markets in Serbia vary depending on product supply. On average, fresh raspberry is available on the market from week 21 till week 36. Belgrade market (capital) is, in general, facing higher prices of raspberry than other cities' markets. It can be noted that wholesale prices in 2013 have increased in comparison to previous years reaching the levels between 230-500 RSD/kg (EUR 2.03-4.42). Raspberry retail prices on green markets in Serbia differ based on the product origin, seasonal factors in production and concrete retail market. Availability of raspberry has prolonged to period between week 23 and week 44. Prices vary between 80-1000 RSD/kg, while they are significantly higher in Belgrade, especially at the beginning and the end of the season.

3. DOES THE RASPBERRY FARM GATE PRICE REFLECT PURE MARKET INFLUENCES?

3.1 Question 1 - The Explanation of chain structure: Are raspberry farmers the most important players at the market?

Raspberry fruit chain in Serbia is basically short chain, while it is both national and international by its nature (Radosavljevic, 2008; Simović et. al, 2010; Zaric et al, 2012; Stojanović and Radosavljevic, 2013). The chain can be described as unity of three levels (see Fig. 5): U (input suppliers and small farmers), P (intermediaries and wholesalers) and D (retailers and consumers).

The U1 level referred to *input suppliers*. Fabricated pesticides and fertilisers are standard, and yields are highly dependent upon their usage. A significant portion of planting materials is produced in Serbia. The importance of the Fruit Research Institute from Čačak (a town in the central part of Serbia) with up to 600,000 certified seedlings annually should be emphasized. This part of the chain is only partially based on import. It seems that farmers have no trust in the healthiness of imported seedlings given that some of them were faced with the problem of the root decay recently, while this disease came with the imported seedling material.

U2 represents the *farmers* or raspberry producers. This sector mainly consists of small farms of up to the 1 hectares of fields under these perennial crops, while the average farm possesses 0.5 hectares (producers can not use advantage of the economies of scale and production costs are usually high). The state of technology applied is poor. Serbian raspberry farms are in most cases family-owned seasonal part-time business. The raspberry sector is characterised by the labour-intensive production - workforce on such farms is mostly made up of the family members and when it is necessary during the picking season, seasonal workers, who come from different parts of the country. The position of hired seasonal labour is not fully regulated - they have only partial recognition of their working and social status (Grivinis et al., 2015).

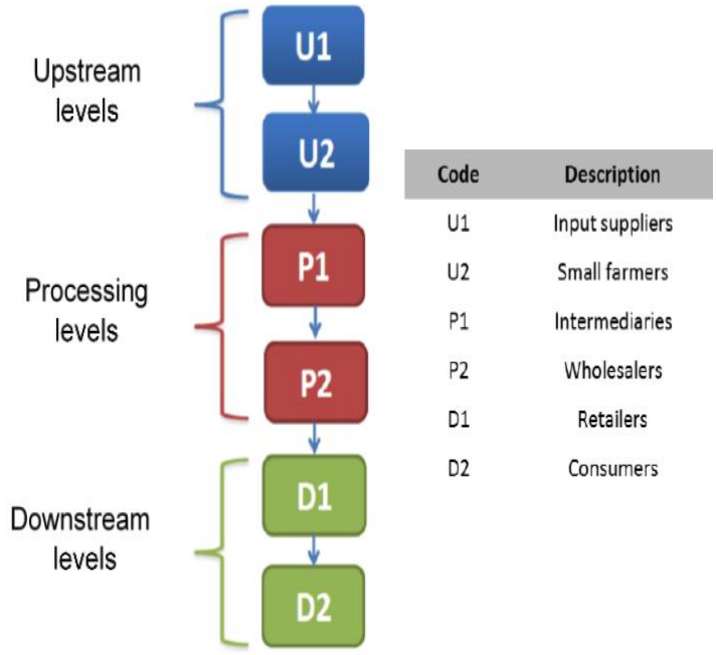

Figure 5. Raspberry value chain

P1 level refers to the *intermediaries*, mainly buying agents or traders. They conduct primary processing of raspberries, such as selection, packaging, freezing and storage. Refrigerated transport to the distribution (retail) channels is also a part of their activities. A small portion of their activities related to purchasing of a primary product from U2 level can also belong to the upstream section of the value chain. Small intermediaries are rarely exporters, provided that only the small portion of the big players can make contact with the foreign companies directly. In those rare cases, P1 and P2 levels should be considered integrally. Most of the small intermediaries are at the same time farmers, so in these cases, U2 and P1 level are vertically integrated. Raspberry is usually transported from U2 to P1 level in fresh form small vehicles: trucks (up to 5 tones), vans and tractors. Because of the fragile nature of the product transport in closed cargo is appreciated. It is estimated that every hour in transportation costs one day of storage of fresh raspberry and a maximum number of days is seven. Consequently, transportation of more than 1 hour is not an option in the raspberries case. Only some bigger farms are vertically integrated and possess their own cooling houses near their farms. Others, which are not integrated, have to transport their product to P1 level or directly to P2 level.

It can be considered that U2-P1-P2 linkage (farming, primary processing and export) is the most important for raspberry production in Serbia. From the economic and social point of view, it is crucial to consider the distribution of bargaining power in farmers-intermediaries' relation. The local companies which provide cold storage represent dominant wholesalers. Because farmers are small, they are unorganised and therefore not able to reach higher prices for their product (they are price takers). The significant part of the total value added is claimed by big intermediaries, with capacities for sustainable export of this product. Not just farmers, but small intermediaries can also be found in an unfavourable position when it comes to the distribution of total value added created in the raspberry business.
In addition, there is a limited number of organisations (or cooperatives) that can help farms to sell their raspberries at wholesale markets (Nikolić et al., 2013). The Federation of Associations of raspberry producers of Western Serbia exists only since 2012. Its goals are a single purchase price on the whole territory of Serbia, construction of private cold storages in municipalities where they do not exist, direct contacts of this organisation with foreign buyers and lobbying for the state subsidies.

While considering P1 and P2 levels, we should bear in mind that observed cold storages are not just specialised for raspberries, but for all other fruits that need such a freezing or refrigerated treatment. The market and consequently bargaining power are concentrated in that part of the chain. Small intermediaries can be seen in that chain just as the price takers, given that while they are unable to export to the foreign markets, they have to sell processed raspberry to the major intermediaries and to expect some price premium for their efforts in the processing stage. Besides the price, farmers have to accept all other conditions and terms of trade with the intermediaries, which put them in the worst position of all in the value chain regarding bargaining power and ability to influence other elements of the chain.

3.2 Question 2 - The consequence of chain structure: How is value added distributed along the value chain?

In order to estimate the value added in the raspberry chains for Serbia we have collected the balance sheet data for small and medium size companies that are processing and distributing raspberries and raspberry products for the period 2012-2016. We have collected data for 24 companies based on the Serbia Investment and Export Promotion Agency (SIEPA) database. Balance sheet data are provided by database Bisnode/Poslovna.rs. In our sample we have 14 small and 9 medium size companies. The added value is calculated as the difference between farm gate, wholesale and retail prices and non-factor costs at each stage of the food chain from producer to final consumer.

Table 1. Simple average and asset weighted value added and value added per employee for raspberry processors and exporters, in EUR

In EUR	2012	2013	2014	2015	2016
Average asset weighted value added	-1397194.8	1155776.6	1935765.7	-439553.2	-4515.3
Average value added	-101701.0	264602.3	628761.4	-152162.3	226410.6
Average asset weighted value added per employee	-10169.3	10176.4	17557.6	-2474.2	1455.3
Average value added per employee	2610.1	4111.7	9147.7	-5320.1	2808.5

Source: Authors' calculation based on SIEPA and Bisnode/Poslovna.rs data

The value added calculation is an important indicator of production factors employed capacity to efficiently utilize raw materials and other production services. The distribution of value added along the food chain provides additional information about the participants' power and dominance in the concrete production and distribution process of the generated product from the farm gate to final consumer. Thus, the value added indicators provide more information about food chain structure in sense of measurement of: performance and productivity, growth and size, i.e. importance, vertical integration and economic concentration. As mentioned previously, traders predominantly export raspberry in the frozen form. The average value added and value added per employee for exported raspberries are provided in Table 1.

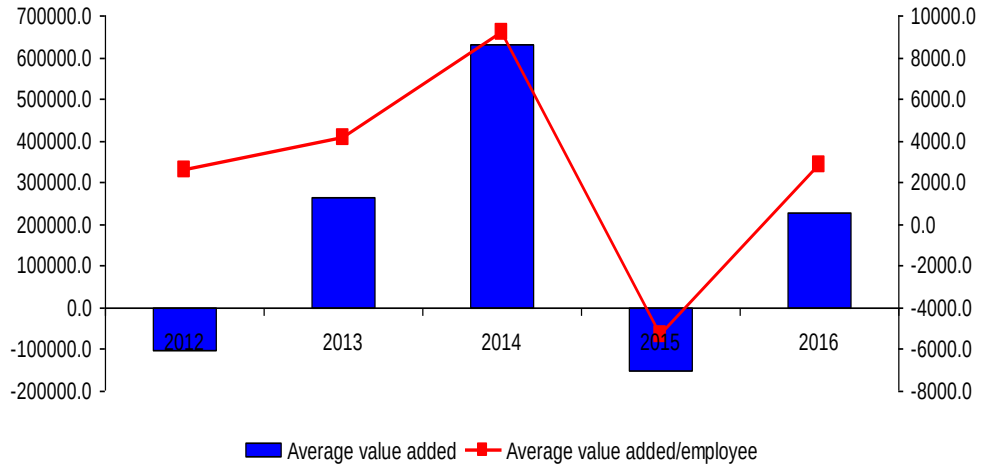

Figure 6. Average value added and average value added per employee for raspberry processors and exporters, in EUR

Source: Authors' calculation based on SIEPA and Bisnode/Poslovna.rs data

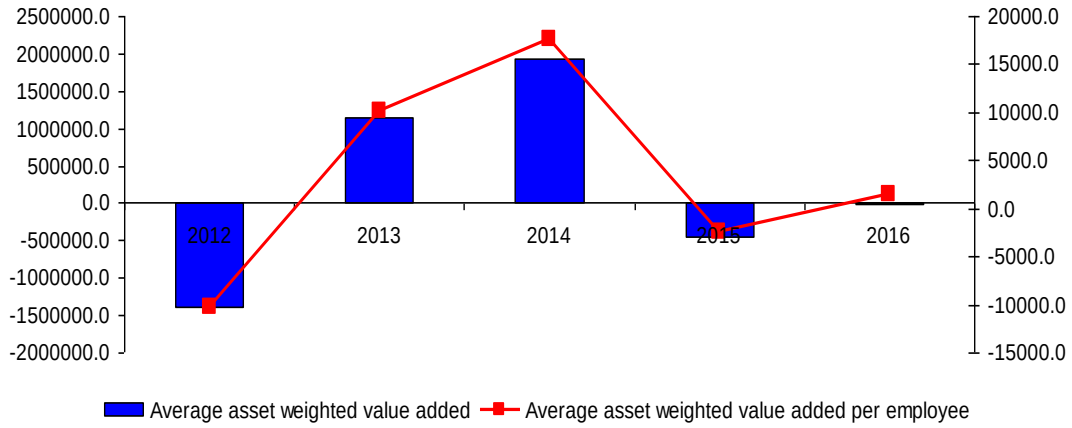

Figure 7. Average asset weighted value added and average asset weighted value added per employee for raspberry processors and exporters, in EUR

Source: Authors' calculation based on SIEPA and Bisnode/Poslovna.rs data

Data indicate high total and per employee value created in the post-crisis period and significant drop in the 2015 and 2016 caused by natural hazards and by decreasing demand and export.

Based on the available average farm gate, wholesale and retail prices of raspberry per kg (Statistical Office of the Republic of Serbia and STIPS) and exchange rate data from the NBS we have estimated value added created and distributed in each segment of the chain per kg of raspberry.

Table 2. Value added creation and distribution for the raspberry food chain

In EUR/Kg	**2006**	**2008**	**2010**	**2012**	**2014**	**2016**
Farm gate price	0.68	2.107	1.264	1.104	1.298	1.578
Farm costs*	0.7	0.7	0.7	0.7	0.7	0.7
Wholesale price	0.975	2.787	2.087	1.591	2.430	2.599
Retail price	2.342	3.684	4.270	2.652	3.325	3.322
Value added						
Farm gate – costs	-0.02	1.407	0.564	0.404	0.598	0.878
Wholesale - farm gate	0.295	0.68	0.822	0.487	1.131	1.022
Retail – wholesale	1.367	0.896	2.184	1.061	0.895	0.723
Total value added per kg	1.642	2.984	3.570	1.952	2.625	2.622
Value added for the farmer	-1%	47%	16%	21%	23%	33%
Value added for the wholeseller	18%	23%	23%	25%	43%	39%
Value added for the retailer	83%	30%	61%	54%	34%	28%
Farm gate/retail price	29%	57%	30%	42%	39%	47%
Wholesale - farm gate /Retail price	13%	18%	19%	18%	34%	31%
Retail - wholesale / Retail price	58%	24%	51%	40%	27%	22%

Source: Authors' calculation based on Statistical Office of the Republic of Serbia, STIPS and NBS data, Farm costs data are available from Simovic et al., 2010 and interviews with relevant sector's stakeholders.

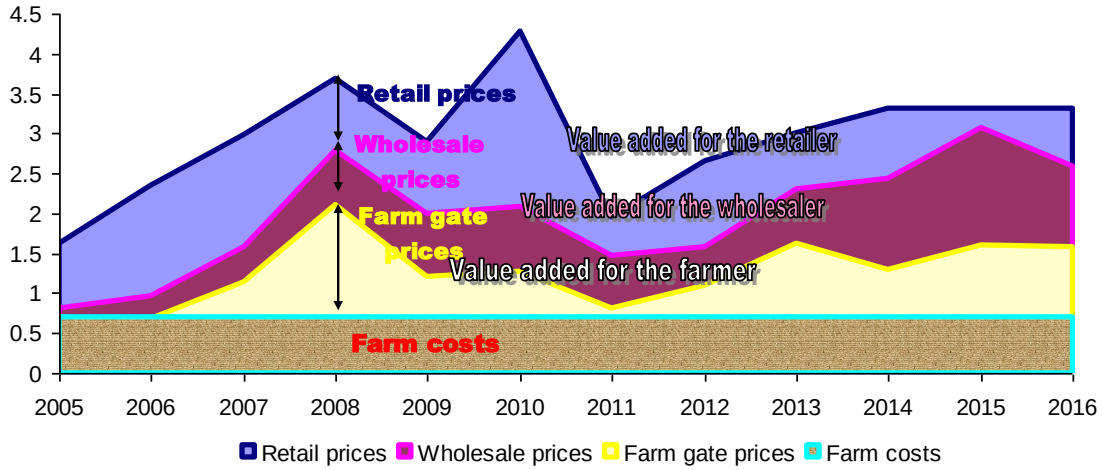

Figure 8. Value added creation and distribution in the raspberry food chain, in EUR/Kg

Source: Authors' calculation and presentation based on Statistical Office of the Republic of Serbia, STIPS and NBS data

It can be noticed that value created per kg of raspberry was mostly increasing in the 2005-2013 period reaching the peak in 2010 and significant drop in 2011 with recovery tendency in the following years. And what is of importance is the increasing share of farmers in created value distribution in the whole chain, from negative values in mid 2000s to 40% in 2013. The dominant share in the created value distribution still remains with wholesalers indicating the need for better cooperation of producers.

3.3 Question 3 - The agricultural policy and farm income: Is the influence of state support significant?

The following econometric analysis of financial position and performance of farms in Serbia is based on panel data models. The estimation is conducted for fruit growing in period 2014-2015. Totally 108 farms were included into analysis based on data available in FADN for two observed years. The following variables are used as potential factors of financial position of farms: (1) total output (SE131), total intermediate consumption (SE275), balance of subsidies and taxes (SE600), depreciation (SE360) and total external factors value (SE 365). The choice of mentioned factors is determined by the availability of data on sector level. Initial panel data model is of the following form:

$$NI_{it} = \beta_1 + \mu_i + \lambda_t + \beta_2 TO_{it} + \beta_2 IC_{it} + \beta_3 Sub_{it} + \beta_4 Depr_{it} + \beta_5 EF_{it} + u_{it} \ ;$$

$i = 1, ..., N_j$; t = 1, 2,..., T

where: N_j – number of farms in sector j; t – observed year, NI_{it} – dependent variable (Farm net income), TO_{it}, IC_{it}, Sub_{it}, $Depr_{it}$ and EF_{it} –total output, total intermediate consumption, balance of subsidies and taxes, depreciation and total external factors value of farm i in year t, respectively. Error term of panel data model is denoted as u_{it}, whereas μ_i are λ_t representing individual (farm) and time effects. Differences in farm income across farms are captured by individual effects, whereas its time dynamics by time effects. Since regressors in

observed model are in fact components of farm net income (dependent variable) and these regressors themselves could also be correlated, high multicollinearity problem could be expected. Consequently, the effects of regressors would not be estimated separately.[2] The mentioned problem is confirmed in the model using usual econometric criteria.[3] According to these criteria, potential sources of multicolinearity problem in panel data model are two regressors: intermediate consumption and external factors value.

Table 3. Correlation analysis

Correlation matrix							Partial corr. coefficient (p-value)
	IN	*TO*	*Sub*	*IC*	*Depr*	*EF*	
IN	1.0000						
TO	0.5302	1.0000					0.9772 (0.000)
Sub	0.0531	0.4763	1.0000				0.6132 (0.000)
IC	0.1211	***0.7348***	0.7828	1.0000			-0.8607 (0.000)
Depr	-0.7011	0.1680	0.2369	0.2765	1.0000		-0.9836 (0.000)
EF	0.1166	***0.7520***	0.6825	***0.8313***	0.319	1.0000	

According to VIF criteria, external factors value variable is dropped from the model. This also coincides with the fact that the fruit growing in Serbia is a sector in which the external factors value effects (particularly, rent paid) is not expected. Test results indicate that pooled model is not appropriate since it produces inefficient estimates of regression parameters due to heteroscedasticity problem as well as due to significant individual effects. Tests for individual effects confirmed significant variability of intercept term across individuals (farms), and hence these effects have to be encompassed by panel data model. Moreover, Hausman misspecification test indicate that individual effects could be treated as fixed. Since heteroscedasticity also exists in fixed effects model, robust version of Hausman test is used.

Table 4. Testing results

Test	Test statistics
Breusch-Pagan heteroscedasticity test (pooled model)	6.12 (*p-value* = 0,0134)
Individual effects:	
F test (fixed effects model)	3.94 (*p-value* = 0,000)
BP тест (random effects model)	12.90 (*p-value* = 0,000)
Honda test (random effects model)	3.59 (*p-value* = 0,000)
Hausman robust misspecification test	9.760 (*p-value* = 0,0447)

As the analysis is based on only two-year period (as a minimum for panel data analysis), time effect is included in model as fixed parameter. Results of alternative fixed effects specifications with robust standard errors are presented in Table 5[4] Starting with pooled, fixed and random effects models, panel data testing procedures are conducted and some of the results are presented in Table 4. All tests indicate significant individual (farm) effects, i.e. intercept variability across farms, and heteroscedasticity problem as well. According to the Hausman robust test result, final model is in the form of fixed effects with robust standard errors (estimation results are given in Table 5).

[2] For instance, regression coefficient of one determinant (e.g. intermediate consumption) may contain the effect of some other determinant in the model (e.g. external factors value) if the two determinant are highly correlated. Then, regression coefficient estimates depend on exclusion of some regressors from the model (their sign and significance could change).

[3] For instance, Variance inflation factor (VIF), preliminary correlation analysis (correlation matrix in Table 2), auxiliary regression of each regressor on other regressors, etc.).

[4] Due to heteroscedasticity problem even in fixed individual effect model, the estimation of robust standard errors is needed.

Table 5. Fixed effects specifications - estimation results, Dependent variable: farm net income in fruit growing

	Fixed effects model with robust standard errors	
Regressor	(1)	(2)
TO	1.0710***	1.0441***
Sub	0.9497	0.7637**
Depr	-1.0156***	-1.0019***
IC	-1.6746***	-1.7234***
TO_r	-0.18298 ***	0.1263**
Sub_r	-0.4787	
Depr_r	0.01507	
IC_r	0.7176*	
TO_15	-0.0249	
Sub_15	0.3652	
Depr_15	0.0311	
IC_15	0.0963	
d_2015	30075.22	134704.8**
Constant	-88468.08	397935.0*
R^2	0.9785	0.9719
F test	6867.56***	19743.33***

***, ** and * significant at 1%, 5% and 10% significance level, respectively.

The results of estimation and testing procedure in fruit growing indicates there are no significant different determinant effects in two years (insignificant regression coefficient of interaction variables (*TO_15, Sub_15*, *Depr_15*, *EF_15*). Hence, these interactions are dropped from the further estimation procedure. According to the final estimation results of fixed effects model with robust standard errors (Table 5, model (2)), there is significant positive impact of total output of fruit growing farms and this effect on net income is less in farms of Vojvodina than in Central Serbia (regresion coefficient of variable TO in Vojvodina: 1,0441 and in Central Serbia is: 1,0441+0,1263=1.1704, significant on 1% and 5% level, respectively). It is particularly important as the sector in the focus is located in the Central part of Serbia, and has been obviously in the focus of top-down direct policy support. Large farms are overrepresented in Vojvodina (Serbia - North), while small family farms dominate in Central Serbia. Furthermore, different raspberry varieties are produced in two observed regions (Polana in Vojvodina and Vilamet dominantly in Central Serbia). Strong influence of output produced on farms position also refers to underdeveloped farming based on outdated technology.

The effects of farm supporting measures (variable Sub) are also positive and significant at 1% significance level. Instead of direct support (input subsidies) the more efficient state support should be governed toward measures that can help in better functioning of the raspberry food chain (institutional arrangements, food chain organisation etc.). In a modern economy food chain counts on the so-called integrators (cooperatives, unions, horizontal and vertical integrations). However, their role is less evident in our practice. Institutions such as public warehouses (cold storages) or horizontally integrated small storage capacities at the local level can also help achieving better price risk control, stabile family farm income growth, and straitening of fruit farmers position in Serbia.

4. Risk management strategies and policy recommendations

The transition have strongly influenced the rural population in the Region of West Serbia and Sumadija. Without permanent jobs (many industrial capacities were closed in the past 20 years, while the establishment of new companies couldn't absorb high unemployment rate), they turned more on agriculture with traditional production of raspberries. However, the negative trends have appeared due to the unfavourable structure of the farms (small holdings, aggravation of the aging structure of farmers) (Djurkovic, 2012). Having in mind all limitations, the further activities (the main alternatives and strategies) can be divided into those that can be undertaken by the producers individually, while some problems still require significant institutional support. Certainly, it is not the question of direct forms of state support. Instead, the model of macro regulator that creates the adequate environment for business development and facilitate the sustainability of rural areas is highly requested.

There is the evidence that an improvement of institutional framework raises agricultural efficiency, but an enhancement in 'selection of authority' reduces agricultural efficiency. Some authors also advocate that the choice of institutional setting is influenced by the tendency of ministers/government to avoid blame for unpopular decisions (Daugbjerg and Swinbank, 2007). Therefore, the agricultural efficiency substantially can be strengthened due to institutional framework improvement. The other authors pointed out the lack of linkages within food chain as the crucial factor causing inefficiency (between industry, government, and institutions, between farmers and processing unit, between farmers, traders and exporters etc.). It particularly influences farms position in the less developed markets (Gardas et. al, 2017). By eliminating factors that support inefficiency, stakeholders should be more guided toward sustainable behaviour (economic, social and ecological).

Table 6. Raspberry CS in Serbia - the main problems and strategies

Problem	Institutional support / top - down	Farmer strategies / down - up
Inefficiency, poor organization at farm level	Public financing of data analysis for farm management decision making - **Big data implementation** for management purposes	**Intensive use of IT technologies for knowledge transfer** - how we can make big data easily available for the average farmer to minimize environmental effects and maximize profit.
Price - volatility and unpredictability	**Creating the environment for effective and efficient price control**: Public warehousing (warehouse receipt model)	**Use of innovative financial instruments** - the agricultural commodity derivatives (forward contracting, futures contracting etc.).
Financing agricultural production	Establishment of **micro-finance institutions** (particularly important for small businesses), designing of the specific farms credit arrangements.	Initiating **the specific credit arrangements that fits farmers needs** due to specific cash flow.
Great dependence on export companies and the lack of producer organizations	Building of **the specific market environment** that will allow improvement of competitiveness and business development - institutional arrangement of contracting.	**Long term contracting** with processors, traders and exporters, **Labelling** - farms orientation toward PDO/PDI or organic production, **Processing** - juice industry, frozen fruit industry etc., **Creation of unions of the small family owners with cold storages**.

In our case, due to the lack of strong institutional arrangements, agricultural producers depend on the price determined by the strongest participants - traders/exporters (and not only agricultural producers, but also small traders). The bulk of the raspberry production is for export. Almost 90% of raspberry production is frozen, while only 10% is used for processing or fresh retail sale. Exports are fairly variable and dependent on several markets (almost

60% of exports go to 2 countries and more than 80% of exports in 6 countries in the World). The price of raspberries are unknown in advance. In addition, farmers are forced to buy inputs for production using unusual contracts - the input price is set without any information about the final product price. Small and medium-sized cold storages work for a few big market players / exporters. Price volatility caused by uncertainty and unpredictability discourages investment in production, storage and processing. This is also result of the unfavourable market structure, where buyers / distributors of raspberries have a stronger position than the primary producers.

Evidently, the weakest position in the Serbian food chain belongs to farmers. They are unorganized, divided and without adequate representation in the various governing bodies (Živkov, 2013). Producers are constantly asking themselves what should they do when they deal with powered partners such as traders or exporters, how much they are empowered during the market negotiation process, why there are no instruments for price risk control... The main barrier is seen in excessive expectations and reliance on the state. However, the main strategies are identified as the mix of state (national or local) and farmers actions (Table 6). Without state support farmers will do their business as usual continually facing with obstacles that don't allow modern agribusiness development.

The key words are efficient institutions and market oriented and organized small raspberry family business in the Region of West Serbia and Sumadija. Small family business related to raspberry production in the region is often organized in the form of part-time farming. This additionally aggravates the situation related to traditional system transformation to a modern agribusiness. Producers' organizations should play a key role in the development of the sector while strict implementation of regulations in the area of competition protection is also recommended.

However, the innovative instruments that would allow forward contracting - the trade in advance, for the known customer and at a predetermined price, still don't exist. The establishment of effective and efficient price control using public warehousing (warehouse receipt model) can be a good solution. In that context, the supporting programs for small cold storages and establishment of cooperatives among them are highly recommended, so that primary producers and small traders can be more flexible in terms sales. All stakeholders can benefit from the better organized food chain, while agricultural producers can use modern risk management instruments in price risk control. This instruments can help risk avoidance, minimizing of risk exposure and cost on the farm, maximizing input-output ratio both in terms of quality and quantity and securing the better product price.

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