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The operation of the Hungarian Broiler Product Chain

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Abstract: The general objective of this paper is to present the inner connections of the broiler product chain and the process of value generation in the economic situation of 2007. I introduce the input-output model of the broiler product chain adapted from macro-economic analysis, in which I calculated the direct connections of the product chain phases and between the national economic branches outside the chain. Then I point to the disproportion of the product chain through the profit distribution. Moreover, to evaluate the process of the value generation I demonstrate the value added generated along the value chain (year 2007). On the basis of the results 825 EUR of value added is realized to one ton of ready product (chicken meat), from which the major portion is shared by processing. The paper also determines the added value and the major factors influencing its ratio within the product chain.

Key words: broiler, product chain, input-output model, value generation, value added

1. Introduction

Changes of the economic and market environments as well as the more and more strengthening marketing competition make the investigation of economic factors influencing the competitiveness of the Hungarian poultry sector especially of the broiler sector important and necessary both in a farm level and extended to the whole product chain. Furthermore, it is essential to reveal the product chain connections and to introduce the value generation and partial markets continuously. *Felföldi* (2007a) stated that „to develop a successful competitive strategy, it is vital ... to reveal the operation of the whole chain ... and always essential to plan and calculate.” In association with these, the general objective of my research is to investigate the inner connections of the product chain and the process of value generation.

2. Materials and Methods

In order to realize the research I used the farm-level data of a whole and closed vertical integration in Hungary. The reason is its significant role played in producing broiler in Hungary and the limited available database and data sources relating to the certain phases of the product chain. To carry out farm business analysis I used the simulation model of the broiler product chain (*Szöllősi*, 2008), which input parameters includes several economic and technological variables, the output results contain data necessary for other analysis.

To introduce and investigate the inner connections of the broiler product chain I adapted the input-output model (Balance of Enterprise Connections), which is used to measure macro-economic performance. In 1925 the statistical office in the Soviet Union published a national economy balance in which input-output model (*Wassily W. Leontief* (1906–1999)) firstly described the structure of macro-economy (*Nagy*, 2004). The input-output model is the first formal and numerical expressible model of economic circle (*Augusztinovics*, 1996). According to my mind this model is able to illustrate and introduce the direct connections of the participants of product chain and other national branches both in natural quantity and value.

Determining the value added we should apply the value chain analysis, which illustrates the most important participants of the examined industry during the production. *Apáti and Felföldi* (2007) and *Felföldi* (2007b) analyzed product chains in the fruit and vegetable sector which had resulted in stressing upon the post harvest technology and logistics as weaknesses of those industries. These weaknesses also refer to the importance of operations to produce added value. During the value chain analysis numbers of participants, type of competition, value generation of the certain product, and the profit of the certain chain phases may be studied (*Szűcs*, 2006). In this paper I focus on the last two methods.

Calculating the value added between certain chain phases as a category of the production value, I considered phrasing of *Pfau and Posta* (1996): “The value added is the difference of gross production value and reuse and the value of purchased goods.” On the other hand I took into account the method used by KSH (Hungarian Central Statistical Office)

(2007): “In macro-economic circumstances the gross value added (Gross Domestic Product) is equal to difference of the gross output and cost of commodities used to produce. Moreover, I had respect for professional standing of *Pupos* (2007): “The value added can be calculated as the difference of production value and material cost.”

3. Results and Discussion

3.1. Operation of the Broiler Product Chain

On the basis of the data of the year 2007 of the simulation model (Szöllősi, 2008) and accordance its general aspects, a production cost of 3 475 EUR/ton chicken meat incur in the level of the modeled product chain, and parallel to this a production value of 3 557 EUR/ton chicken meat is realized. On the other hand, if we analyze economic situation at the level of product chain, we need to consider that certain product chain phases transmit their products to each other, in this way the value of products means revenues in one phase and it comes up as a cost in other phase. In order to filter these accumulations, I applied the structure of input-output model in a novel approach. The input-output balance of the product chain contains the input and output of certain product chain phases that is it reflects the direct connections of the producing and utilizing product chain phases (*Table 1*). The table rows contain the output enterprises, in contrary columns show input chain phases. The dark-grey matrix includes enterprises within production chain, and the light-grey matrix contains participants out of the chain.

According to *Table 1* the feed production is in direct connection with three other chain phases in which transferred value to the broiler growing phase is determinative. It is 92% of total production value of feed production. Looking at this value from the consumption side it reveals that feed cost come from value transmit takes 63% of the total broiler production cost. Moreover, I concluded that the produced mixed feed and hatching chicks are responsible for 80% of the production cost of broiler growing. Near 25% of the production cost of rearing parent stock, 73% of the cost of egg production, 75% of the cost of hatching and 60% of processing cost come from value transmit within the product chain. Only the last processing phase plays a role in the marketing outside the product chain (99%), and only the by-products of the products of the other enterprise get into markets outside the product chain. Even the fact can be determined from the input-output model that in what ratio the broiler product chain contributes to the revenue of national economic branches providing the poultry enterprise. In case of purchased inputs, producing mixed feed has determent significance (70%) through its utilization of feed raw material. The processing (67%) and broiler growing (17%) phases of the product chain have outstanding roles in direct employment. In case of material assets and required services, even these two phases are determent.

By the help of the input-output model, I constructed the non-cumulative form of the costs, production value and profit conditions of the product chain. The production costs takes 1 549,33 EUR/ton chicken meat, in contrary the production value is 1 630,79 EUR/ton chicken meat. As a result of this cost and value the profit of production chain is 81,46 EUR projected to chicken meat as a ready product of one ton.

Table 1: Output-Input Model of the Broiler Product Chain (2007)¹

Unit: EUR/ton ready product (chicken meat)

<i>Input enterprises</i>	Feed production	Parent stock rearing	Parent stock hatching egg production	Hatching	Broiler growing	Processing	Selling	Other factors increasing production value	Total
<i>Output enterprises</i>									
Feed production		9,46	45,84	-	616,00	-	-	-	671,30
Parent stock rearing	-		37,96	-	-	-	0,51	-	38,47
Parent stock hatching egg production	-	-		111,19	-	-	10,67	-	121,86
Hatching	-	-	-		166,79	-	0,06	-	166,85
Broiler growing	-	-	-	-		938,80	2,77	-	941,58
Processing	-	-	-	-	-		1 616,78	-	1 616,78
Purchased inputs	565,25	22,35	7,08	15,72	87,70	107,74			805,84
Personal inputs	14,98	1,66	6,27	10,68	35,52	139,78			208,89
Depreciation	7,20	2,27	4,20	3,14	14,47	24,81			56,10
Required services	10,46	0,97	2,45	4,67	34,11	153,39			206,04
Other inputs	19,08	1,89	10,55	3,37	25,80	211,77			272,46
Total	616,96	38,59	114,36	148,78	980,38	1 576,30			3 475,37
Net profit	54,33	-0,12	7,50	18,07	-38,80	40,48			81,46

Source: Own construction and calculation used results of Szöllősi's model (2008)

¹ Supposing a product chain without capital uniformity

3.2. Disproportion of the Production Chain

I looked for the answer of the question that under what price the profit of the product chain can be divided proportionally among the certain phases. I used two approaches. The criteria of distributing the profit in the ratio of the cost are decreasing the price of mixed feed by 5,9%, as well as reducing the prices of hatching eggs and hatched chick by 6,35% and 13,03%, respectively. On the other hand it is necessary to increase the selling price of reared parent stock by 1,23% and the price of broiler by 0,3%. In accordance with the value of fixed assets feed prices should be decreased by a greater degree, by 7,24%, the price of hatched chick by a smaller degree, by 7,47%. At the same time the value of reared parent stock should be higher by 7,91%, the price of hatching eggs by 2,09% and the selling price of broiler should grow by 2,48%.

It is clear from the results of the investigation that besides the profit distribution in the ratio of costs improving the results of phases showing a deficit may be realized only at the expense of the lower phases (feed production, egg production, hatching) of the product chain. Parallel to this, the broiler growing is exposed to a greater extent within the product chain in the input side (feed mixture and hatched chick) than in the processing side. In case of investment rated profit distribution the ratio of defencelessness is more emphasized, though its tendency cannot be defined in an expressed way (Figure 1).

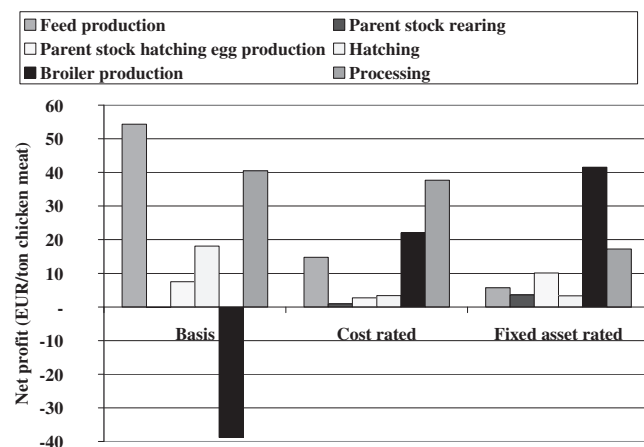
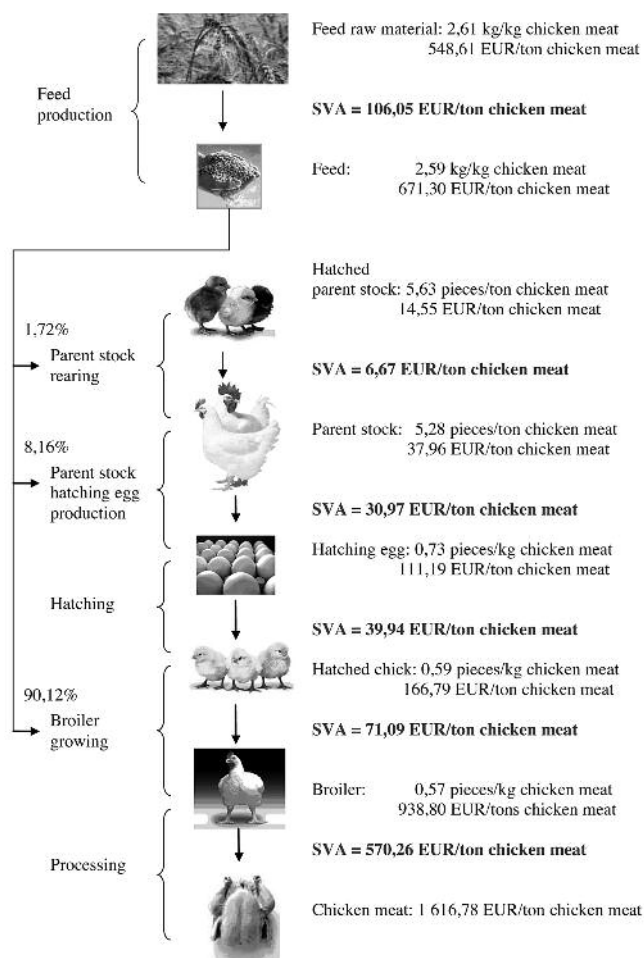


Figure 1: Profit Distribution among the phases of product chain
Source: Own calculation used results of Szöllösi's model (2008)

3.3. Examining Value Added in the Broiler Product Chain

The value generation of broiler product chain is realized as Figure 2 reflects which shows the per unit value added of the modeled product chain, furthermore it contains the specific natural quantity and value of the products from the certain phases of the product chain. The arrows show the process of the value generation (Figure 2).



SVA: Specific Value Added
1 EUR = 260 HUF

Figure 2: Value Generation along the Broiler Product Chain (2007)²
Source: Own illustration and calculation used results of Szöllösi's model (2008)

On the basis of the value chain analysis, starting from the feed raw material (548,61 EUR/ton chicken meat) getting into the product chain and the imported hatched parent stock (14,55 EUR/ton chicken meat) we go through rearing, egg production, hatching then growing, and we reach processing, where ready products of 1 616,78 EUR/ton chicken meat get to the market. The whole vertical integration realizes 824,95 EUR/ton chicken meat of value added. I revealed by the value chain analysis that the determining phase is processing as it constitutes 69% of the total production value. Besides, feed production (13%) and broiler growing (9%) have highly significance within the value chain.

The ratio of value generation between the certain phases of product chain is influenced by the tendency of economic and technological parameters. According to the results of elasticity analysis on the generated value most of the input parameters definitely affect on the total performance of the product chain. The inner ratio is influenced by the selling price of broiler by increasing the value added of growing and

² Supposing a product chain without capital uniformity

by this it side by side decreases the produced value of the processor. I highlight the effect of the price of feed mixtures as well, which concerns the other three phases of the product chain and most of all decreases mainly the performance of growing. Relating to the generated value of the whole product chain the selling price of processed products and the daily weight gain of broiler are relevant factors. There are other significant factors such as number of eggs per hen housed, hatching ratio, ratio of hatching eggs and finishing weight of broiler. Factors influencing the value added of enterprises mainly in a negative way are prices of feed raw material and per kilogram feed consumption of growing.

4. Conclusion

By adapting the input-output model to the broiler product chain, I revealed and calculated the direct connections of the certain product chain phases and between the participants outside the product chain.

Then by drawing attention to the disproportion of the broiler production chain, I found cost rated the broiler growing is exposed to a greater extent within the product chain in the input side (feed mixture and hatched chick) than in the processing side.

I revealed and calculated the value generating process realizing along the broiler product chain and I concluded that processing is dominant (69%). Moreover, I determined the most important factors influencing the value added and its ratio within the product chain.

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