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*SZCZEPAN FIGIEL*

*JUSTYNA KUFEL*

Institute of Agricultural and Food Economics  
– National Research Institute  
Warsaw

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## **MERGERS AND ACQUISITIONS IN THE GLOBAL AGRO-FOOD SECTOR AND FLUCTUATIONS IN ECONOMIC ACTIVITY**

### **Abstract**

*The intensity of business merges and acquisitions changes over time. Theoretically, competitive companies constantly seek for ways to grow, mainly due to expected economies of scale and scope. In the paper we discuss various aspects of business mergers and acquisitions in the context of market concentration. We also highlight the issue of symptoms and causes of fluctuations in economic activity. Using data for the period of 2000-2012 we analyse the value of the overall business mergers and acquisitions in connection with the global economic growth and selected stock market indices. Next, we focus on the global agro-food sector and test the hypothesis that the number and value of mergers and acquisitions in this sector were related to the business cycle fluctuations observed in the period of 2000-2010.*

*Firstly, the results of our research show that both merger and acquisition transactions carried out in the agro-food sector had largely inter-branch or, at the most, inter-sectorial character. Secondly, a positive relationship between fluctuations in economic activity in the global agro-food sector and the intensity of mergers and acquisitions was found, especially regarding the value of those transactions, what means that economic recovery facilitates concentration processes. Thirdly, the observed connection between the directions of changes in the merger and acquisition activities and the changes in stock market indices seems to be determined by the situation on the capital markets.*

### **Introduction**

Changes in the structure of agro-food sector are the subject of constant interest due to their importance for competition and economic welfare of producers and consumers of food.

This concerns particularly concentration potentially leading to anti-competitive conduct of players dominant in a given sector, mainly consisting in the use of market power in price fixing. The intensification of the concentration processes in the agro-food sector is a global phenomenon present in many countries. For example, already in 1966, in a report drawn up under the auspices of the National Commission on Food Marketing, it was concluded that the concentration in many sectors of the American agro-food sector reached too high and undesirable level, especially in the processing of fruit and vegetables with excessive spending on advertising and promotion. It was also found that in the way of mergers and acquisitions companies are becoming larger, far exceeding the size needed to maintain full operational effectiveness (Sexton R. 2000).

In Poland, we also deal with the phenomenon of concentration in food processing. In 2009, 280 large companies (employing more than 250 employees) accounted for only 1.8% of the total population numbering 15,700 operators in the sector, while their share in employment was 36.5% and in sales 53.4%. In 2000-2009, the degree of concentration increased in most industries, mainly in the sugar industry, production of soft drinks and confectionery, and in the processing of milk and fish. Brewing and tobacco industries are also characterised by high and stable share of large companies. In 2010, the largest three companies (holding companies) generated 85.7% of oil industry's revenue, 78.5% in brewing industry, 76.0% in tobacco industry, 75.6% in potato industry and 69.6% in sugar industry. A group of large and medium-sized companies, known as sector leaders, emerged in each of these industries. It is also predicted that the concentration processes in Poland will continue and the importance of large companies will grow (Szczepaniak I. 2011).

Mergers and acquisitions are inherent features of these processes. Their number and scale is characterised by irregular occurrence in time. Some authors relate it to the business cycle. Already in 1959, Nelson (1959), examining the 1895-1956 period, found that mergers positively and with great regularity react to business cycles. He pointed out that the peaks of activity in the area of mergers precede peaks in the business cycle. According to Maule (1968), the average peak of activity in mergers occurs about 10 months in advance of the middle peak in the business cycle.

In 2006, some market analysts expressed similar opinions. In their view, high activity in the area of mergers and acquisitions could signal a peak in the global business cycle. Based on observations they found that high activity in the area of mergers and acquisitions is almost always a sign of the approaching peak of the business cycle (AMEinfo 2006). Hypothetically, therefore, it can be assumed that there exists a general regularity consisting in the fact that, along with the improvement of the economic situation, as a result of mergers and acquisitions (M&As), the degree of concentration in the various sectors of the economy increases, while the downturn is accompanied by a decrease in the area of mergers and acquisitions, resulting in a weakening of the trend towards concentration. In this context a question may be raised whether this regularity is also

visible in the agro-food sector under the conditions of the current financial crisis and the very significant slowdown in the global economic growth related thereto which has been noted in recent years. Seeking answers to this question, an analysis was conducted, which aimed at determining the effect of fluctuations occurring in the last decade, in particular those observed after 2008 in the form of a sharp decline in the pace of economic growth in many countries – and in the case of some countries even a recession – on the process of concentration in the global agro-food sector. The main focus of the analysis was the number and value of M&A transactions recorded in the sector in 2000-2010, against the background of changes in economic conditions as well as changes in the value of production and the level of food prices. Interpretation of the results is shown in relation to the selected theoretical aspects and processes of concentration and cyclical fluctuations.

### **Theoretical premises of mergers and acquisitions in the context of concentration processes**

Mergers and acquisitions of different types of companies can be regarded as a form of broadly defined purchase. The first of these is a creation of one entity based on two or more previously independent companies. It is called a merger, if the resulting entity is based on one of the original companies, but when companies lose their legal status and as a result of combining their capital and assets a new entity is formally created, we are dealing with consolidation. The second form is acquisition, which means the transfer of control of the company from one group of investors to another. There are various forms of acquisitions, which include: purchase of stocks (shares), purchase of property, power of attorney, privatisation, lease and joint venture (Frąckowiak W. (ed.) 1998).

Mergers and acquisitions can be dictated by a variety of reasons, however, regardless of their nature, they lead to an increase in the concentration of production and of market share. Concentration is a result of efforts of enterprises to improve their competitive ability by increasing the scale of production (horizontal concentration) or to increase the range of production expanding it to the preceding or following links in the chain of production in which they operate (vertical concentration). In theory, economic justification for increasing the scale of production depends on the effects that the company is able to achieve due to this expansion. Formally, these effects can be determined by analysing the course of the long-term cost function. In the case where the ratio between the level of input and the level of production effort remains constant, the impact of  $k$ -fold increase in input costs can be represented as follows:

$$LRTC_0 = \sum_{i=1}^n x_i p_i$$

$$LRTC_k = \sum_{i=1}^n k x_i p_i = k LRTC_0$$

where:

$x_i$  – number of units of a given input;

$p_i$  – unit price of a given input;

$LRTC_0, LRTC_k$  – long-term total production cost, with initial and  $k$ -fold increased level of inputs, respectively.

Long-term average cost with new level of production ( $lY$ ) increased  $l$ -fold in comparison to its initial level ( $Y$ ):

$$LRAC_k = \frac{kLRTC_0}{lY} = \frac{k}{l} LRAC_0$$

Between the economies of scale and the shape of the curve of long-term average costs there is a direct dependence with one of the three possibilities:

$\frac{k}{l} > 1$  – increasing long-term average cost and decreasing economies of scale;

$\frac{k}{l} = 1$  – constant long-term average cost and constant economies of scale;

$\frac{k}{l} < 1$  – decreasing long-term average cost and increasing economies of scale.

An obvious economic incentive to increase the scale of production is present in the case of the second option, and even more visibly in the third one. Concentration of production may lead to market concentration that means increasing the share of a given entity or group of entities in a relevant market, understood as market of goods considered to be substitutes in terms of price, properties, or use. In extreme cases, it can lead to creation of a monopoly.

Company's search for benefits from an increase in the scope of production may also result in a rise of market power. These occur when the production of many products in one enterprise is cheaper than in separate companies. In the case of substitutes, there are also benefits from increased market share. Benefits from increased scope of activity can be identified (*ceteris paribus*), comparing the profits made by the company before and after this increase. Assuming that the profit of an enterprise depends on the scope of its activity, generally speaking, the profit functions associated with the different areas of activity can be determined as follows:

$$\pi_0 = f(d_1, d_2, \dots, d_k)$$

$$\pi_m = f(d_m)$$

$$\pi_z = f(d_1, d_2, \dots, d_k, d_m)$$

where:

$d_i$  – given type of activity for  $i = 1, \dots, k$ ;

$\pi_0$  – company profit achieved by  $k$  number of activities;

$\pi_m$  – profit derived from  $m$  activity not belonging to company's range of activities;

$\pi_z$  – company profit achieved from a range of activities including  $k$  types of activities enlarged by  $m$  activity.

Increasing the scope of activities of the company by  $m$  activity is economically justified if the following condition is met:

$$\pi_z > \pi_0 + \pi_m$$

In other words, the profit achieved by increasing the activity scope of the company is greater than the sum of profits at the initial range of activities and profits of the businesses outside this range. This situation is often referred to as the synergy effect.

Both the potential benefits of the increase in the scale (economies of scale) and increase in the scope (economies of scope) are a source of investment and development decisions of enterprises leading to concentration. But these are not the only causes of concentration, which may be a consequence of other factors. Also, the results that it causes, can be assessed in many aspects. The issue of concentration is tackled by many authors representing different strands of economics. They often formulate different assessment of the causes and effects of concentration. Classical and neoclassical models of market structures, especially the comparison of perfect competition with monopoly shows that the increase in company's market share to the extent allowing it to influence the sales volume and price, results in losses in the overall economic prosperity inevitable. They are the result of monopolistic pricing practices, achieving excessive profits, reducing production and maintaining unused production capacity and missing propensity to reduce costs and innovate because of the lack of competitive pressure. Arrow-Debreu general equilibrium model plays a special role in the theoretical explanation of the importance of perfectly competitive markets (markets where none of the sellers or buyers can have influence on price fixing). In this model it is assumed that perfect competition determines the optimal allocation.

In reality, however, we can have to deal with growing economies of scale and scope and technical progress, which leads the observed markets to be characterised by a smaller or larger degree of concentration of its structures and imperfect forms of concentration. One of the reasons for this situation is the existence of barriers to entry, defined as the price level to which the company can increase the prices above the average cost – without encouraging the entry of new competitors – or as a cost of production incurred by a competitor entering the market, and not borne by companies already present in this market.

In the 70s new models started to appear, in which the role of an enterprise as a place of transformation of inputs into outputs was surpassed, allowing for a better explanation of the rationale for concentration processes (Czerwonka L., Pankau E. 2005). These models are more focused on the enterprise and their common feature is the recognition that the intensity of competition and the number of players in the market do not have to be correlated. Although in a static approach perfect competition is the most effective solution for the economy and consumers, but in a dynamic approach, technological progress that increases

the efficiency cannot be overlooked. Schumpeter argued that the introduction of new products and technologies is limited to large enterprises that by creating technological progress lead to an increase in efficiency and social benefits (Kozłowska A. 2010).

Among the number of different theoretical proposals of explaining the sources of concentration five theories deserve attention. These include: Chicago School theory, theory of contested markets, transaction cost theory, agency theory and the concept of strategic management. According to these theories company growth stems from the desire to increase efficiency and is associated with entrepreneurship, not with the market power (Czerwonka L., Pankau E. 2005). However, this approach does not cover all factors, diverse in nature, which influence activity in the area of mergers and acquisitions, especially in the conditions of globalisation and the development of capital markets. These factors include the economic climate and are associated with stock market situation, presence of economic shocks as well as changes and differences in relative market valuation of companies emerging due to these phenomena (Komlenovic S., Mamun A., Mishra D. 2009).

The economic situation measured by GDP changes, as well as the conditions in the capital market, reflected in returns on assets, may affect the activity in the area of mergers and acquisitions. GDP growth can be taken as a sign of future growth in aggregate demand, which justifies the need to increase production capacity. Internal investment and mergers are the two options for increasing production capacity. The advantage of the latter is that the increase in production capacity occurs much faster than in the case of the former. Before the peak point of the business cycle is reached, growth in most branches of production is weakened, and the aggregated activity in the area of mergers starts to decrease. Similarly, during a recession, the decline in demand results in the appearance of excess capacity in the sector, we have to deal with the tendency of reducing production potential.

On the other hand, with reference to the neoclassical theory, it is believed that the waves of activity on the market of mergers and acquisitions are caused by economic shocks forcing companies of given sectors and industries to undertake reorganisation, while mergers are its most effective form. Between the number of mergers in an industry and the size of the shocks immediately preceding the merger there is a positive relationship. As a result, they are concentrated in a few industries, which is confirmed by the results of empirical studies (Andrade G., Mitchell M., Stafford E. 2001; Mitchell M., Mulherin J. 1996; Mulherin J., Boone A. 2000). Another explanation of the phenomenon of mergers and acquisitions is the theory of overvalued equity, having a behavioural nature. According to this theory merger waves are caused by differences in relative valuation, resulting in the overvalued company acquiring shares of undervalued companies (Shleifer A., Vishny R. 2003). The results of testing the Q theory, which explains capital bases of companies' investment, provide an interesting confirmation of this phenomenon. The essence of this theory is the postulate stating that the level of company's

investment should increase with the  $q$  index, defined by Tobin as a ratio of company's stock exchange value to replacement cost of its assets. Therefore, companies should invest when  $q > 1$ , because they can sell the equity right to the resulting physical capital at a price higher than the cost of it. It turns out that the Q theory also enables explaining why some companies buy the others. Research shows that investment in mergers and acquisitions increases with the growth of  $q$  index, even to a greater extent than direct investment in their own company assets (Jovanovic B., Rousseau P. 2008).

The variety of factors that may influence mergers and acquisitions can be divided into endogenous and exogenous ones. The first of these are reflected in the production and cost functions of a given company, determining its ability to increase the scale and scope of activities. The second, reflect mezzo- and macro-economic conditions that are favourable or unfavourable for taking such steps. While the potential influence of endogenous factors on the activity in the area of mergers and acquisitions raises little doubt about the mechanism behind it, the impact of exogenous factors on this activity, especially macroeconomic factors, is less obvious. This includes the role of fluctuations.

The research shows that the expansion phase triggers greater asset allocation than the recession phase. Two different albeit related reasons explain this situation. The first is the pro-cyclicality of aggregate demand and the effects of economies of scale that are an increasing function of demand's level. The second is the possibility of concluding a transaction dependant on the situation on financial markets. During a recession, potential buyers may have to deal with limited credit facilities, and mergers and acquisitions wait for moments of greater liquidity on capital markets. As a result, financial constraints make M&As pro-cyclical. Thus, business cycles influence the scale of M&As by creating conditions for a possible increase in the market power of companies due to economies of scale (M&A related) or due to economies of scope (M&A unrelated) (Kozłowska A. 2010).

### **Manifestations and causes of economic fluctuations**

Fluctuations are closely connected with the phenomenon of business cycles and a specific point in time on the development path of the economy. Currently, cycles are defined as fluctuations in the rate of growth of economic activity, consisting in alternating occurrence of periods of relatively high and relatively low rate of growth (Lubiński M. 2004). The concept of business cycle applies to both cyclical and irregular fluctuations in economic activity with changes occurring in a variety of economic indicators. Today, business cycles are characterised by irregularities in scale, duration, changes in the level of production, employment, and prices (Skrzypczyński P. 2010).

In line with the approach of Lucas (Lucas R.E. 1995), business cycle fluctuations are a process of repetitive but irregular oscillations around its long-term growth path. Cyclical fluctuations are largely attributed with a cyclical nature understood as a sequential string of increases and decreases in economic

activity. These sequences differ in their length, sometimes very significantly, as indicated by the results of empirical studies on developed economies. Business cycles are fluctuations from 1.5-2 to 8-10 years long with the average length of the cycle of 5-8 years. It is worth mentioning that some authors expressed the opinion that treating such fluctuations as cycles was somewhat exaggerated, because in fact these are only succeeding phases. It is widely believed, however, that fluctuations are a macroeconomic phenomenon, a medium-term or long-term process, and their manifestation is varied in time dynamics of values of fundamental economic variables that characterise economic activity on a particular territorial area (country, region, etc.).

The theory of economic fluctuations is based on a classic course of the business cycle. There are four phases distinguished in it, which are: slump, recession, recovery and boom, and two turning points, known as the trough and peak. Usually the following phenomena can be observed in the slump phase: excess of supply over demand, rising inventories, decline in production, revenues, profits and employment, as well as decline in the price level (today rather slowing inflation). While the recession phase shows a steady disappearance of the downward trend in relation to production, employment, wages, prices, profits, investment and consumption. Stability and equilibrium at a low level are restored, and the low level of prices and the low rate of profit force companies that survived the slump, to improve their profitability. In the recovery phase there is an increase in: demand, production, revenues, profits, employment and prices. A boom phase, occurs when economic activity reaches the highest level, i.e. when it exceeds the level of activity observed during the last boom phase. Stabilisation and equilibrium at a high level of production (high sales, high employment, high rates of profit) and the high level of prices also appear in this phase. The main features of the cycle are: length (of a downward and an upward phase), frequency (number of cycles in a given unit of time), amplitude (difference between the extreme values of certain elements in the cycle), intensity (strength of upward or downward trends in different phases) and symmetry (information regarding relation between the amplitude of each phase and determinants of their length) (Olczyk M. 2011).

Currently, the contemporary cycle is characterised by shorter and less deep phases. This is attributed to many years of effective implementation of state stabilisation policy, rapid expansion of the service sector that is more resistant to downturns, existence of more reliable information about the economic situation and its prospects, larger and faster flow of information and processes of globalisation and internationalisation. Although each cycle is different in terms of its duration, similar development of certain economic variables can be observed. In this context, the following are distinguished: pro-cyclical (positive correlation with GDP), counter-cyclical (negative correlation with GDP) and a-cyclical (no correlation with GDP) variables. Pro-cyclical variables include: consumption, investment (including housing and stocks), employment, labour productivity, real wages, money supply, inflation, stock prices and interest rate.

Unemployment is counter-cyclical, net export is weakly counter-cyclical and government spending is considered a-cyclical (Olczyk M. 2011).

Causes of fluctuations are explained in a number of different theories of business cycles. A basic criterion for dividing these theories is the economic nature of the causative factors – whether they are exogenous or endogenous. Supporters of exogenous causes perceive the economy in a classical way, as a stable system, showing a tendency to grow rapidly. Source of growth is capital accumulation, technical progress, discovery of new resources or population growth at full use of factors of production. External interference that can be caused by technological shocks or state intervention leads to destabilising the system, but after they disappear the economy spontaneously and quickly returns to the path of dynamic growth, making full use of production factors. An example is the theory of exogenous shocks, according to which the cycles are the result of random external stimuli, appearing in an irregular and uncoordinated way, which results in disruptions. Models showing these shocks exclude even the possibility of endogenous fluctuations.

On the other hand, according to the theories of endogenous economy, in addition to long-term growth, it is an inherently unstable system, experiencing alternating periods of recovery and stagnation. We, therefore, have to deal with a cyclical growth, trend and cycle are not separated and fluctuations are treated as attributes of growth (Lubiński M. 2004). Currently, Keynesian interpretation of fluctuations, real business cycle theory and the interpretation of the Austrian school are considered as the mainstream of the theory of fluctuations (Barczyk R. et al. 2010). Generally speaking, the dispute between the representatives and supporters of these trends revolves around whether in the market system there are immanent mechanisms that cause continuous and repetitive imbalance, or the market economy possesses intrinsic tendency to stability, but when external destabilising impulses appear, processes to restore the equilibrium are activated.

Equilibrium business cycle theories are considered to be the latest cognitive achievement concerning the causes of fluctuations. Their essence is the recognition of the cyclical fluctuations as a result of optimisation conducted by business entities, depending on the circumstances leading to an increase or decrease in production. Thus, each phase of the cycle may be an optimum state, and possible interventions aimed at changing it only lead to a deterioration of economic efficiency. Two approaches were developed within the equilibrium business cycle theories: monetary theory of nominal income and real business cycle theory.

In the monetary theory of nominal income, formulated by Friedman, significant changes in the rate of growth of money stock are the necessary and sufficient condition for significant changes in the rate of growth of monetary income, which roughly corresponds to both the long-term changes and duration of the business cycle. A key role in shaping the dynamics of national income and the formation of cycles is played by cash factors, and disturbances are a result of interaction between stable demand and unstable supply. In turn, the real business cycle theory, whose creators are Kydland and Prescott (1982), says that

fluctuations in output and employment are the result of changes in real factors in the economy with the markets quickly adjusting to a new situation, thus, they always remain in equilibrium. Ignored are the monetary factors and the causes of the business cycle are attributed to the supply side of the economy. The central element of this theory is the assumption that the rate of technological progress and the associated productivity gains are subject to volatile changes, which affect the supply of goods, and consequently the consumption decisions. The business cycle causes permanent technological shocks changing the path of growth. Negated is the existence of even temporary deviations from the status of full market equilibrium and, consequently, government intervention is considered to be unnecessary (Lubiński M. 2004).

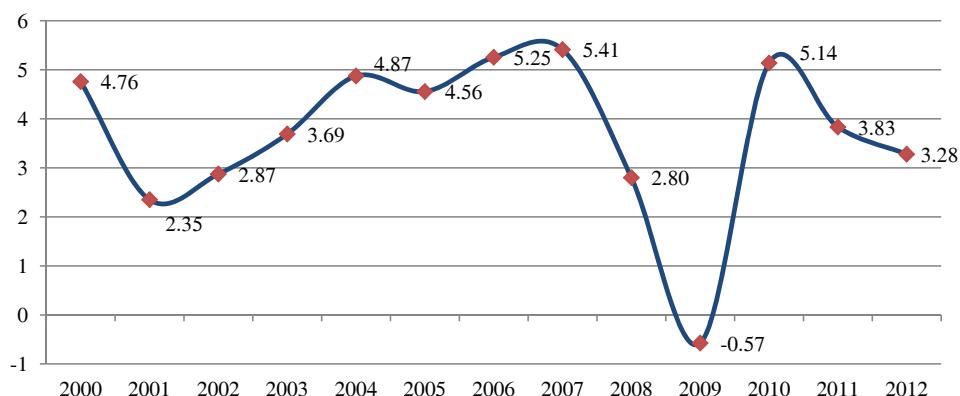
In the light of the research on mergers and acquisitions, and relation of its intensity with economic fluctuations, equilibrium business cycle theory shows some interesting implications. Firstly, mergers and acquisitions carried out in different phases of the business cycle are primarily motivated by the desire of companies to optimise their operations. Secondly, similarly to cycle formation, their occurrence can be influenced by cash factors, as reflected in the conditions of financial markets. Thirdly, in real terms technological changes should be seen as important causative factor of mergers and acquisitions. Fourthly, mergers and acquisitions may be induced either endogenously, as a result of optimisation of business activities, or exogenously, as a result of changes in the business environment. In other words, we can assume that mergers and acquisitions that are part of the economic activity, on the one hand, affect business cycle fluctuations, on the other, their intensity is dependent on these fluctuations. Determining whether such compounds were clearly revealed in the past decade, marked by variable economic conditions, may be an important contribution to the verification of the accuracy of theoretical findings concerning the mechanisms of cyclical fluctuations.

### **Mergers and acquisitions and global economic situation in 2000-2012**

Until recently, cyclical processes were studied mainly from the perspective of single economies. Today, in the era of globalisation and increasing role of trans-national corporations, the concentration of capital must be examined from the perspective of a global economy. However, the analysis of the global economy, and especially the search for linkages between intensity of mergers and acquisitions, and economy fluctuations – in a logical sense not differing from the national scene – is burdened with a greater degree of complexity. The main problem is the treatment of the global economy as a whole, which *de facto* means indirectly approving the assumption of its uniformity. Although the linkages between many national economies intensify with increasing globalisation and regional integration; this in some sense implicit assumption is, however, a quite far-reaching simplification, if only because of the diversity of business cycles in individual economies. Yet, it is increasingly common to talk about development trends and business conditions in the global economy which, irrespective of the degree of diversity and complexity of the relationship and interaction between

the economies of different countries, are dealt with primarily through the prism of changes in the global GDP.

Figure 1 shows the evolution of these changes in 2000-2012. As one can see, at the beginning of this period, in 2001, a very significant slowdown in the global GDP – from 4.8% to 2.4%, took place. The next three years saw a marked improvement with a growth rate of 4.9% in 2004, and after a slight weakening in the next year, there was another strengthening with the growth rate of 5.4% in 2007. In 2008, its firm weakening was seen, and in 2009 one can talk of recession due to the observed decline in GDP of 0.6%. After rebounding in the next year to 5.1% in 2011 and 2012, there was a repeated weakening of the global GDP growth. There is, therefore, no doubt that in the last twelve years in the global economy, treated as one unit, we had to deal with a significant slowdown, which makes this period very interesting from the point of view of the undertaken analysis, which is an attempt to confirm the relationship between the state of the economic conditions and the intensity of mergers and acquisitions.



**Fig. 1.** Changes in global GDP in 2000-2012 (%)

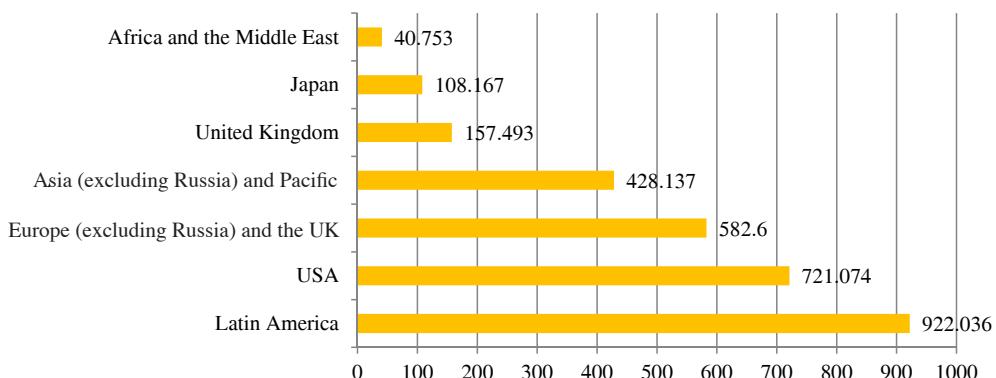
Source: Own elaboration based on World Economic Outlook Database.

Economic size of mergers and acquisitions in the global economy is very significant. The total value of mergers and acquisitions in 2009, thus immediately after the start of the recent financial crisis, was USD 2,960.26 billion (Figure 2).

Given their geographical distribution in the world, Latin America occupied the first place, which accounted for 31.1% of the total value of these transactions. The second was the USA (24.4%), while the third Europe (19.6%). The phenomenon of mergers and acquisitions shows not only geographical diversity, but also variability of its intensity in time, suggesting relationship with economic fluctuations. The analysis conducted by BZ WBK, which uses data on the number and value of mergers and acquisitions in Europe and the USA in 2000-2010 collected by Thomson Reuters, shows that there is a positive correlation between the value and the number of these transactions and the economic situation (Skowroński R., Mitoraj T., Lipkowsky P. 2011). At the beginning of this period – at the peak of the

bull market – there were many overvalued internet companies and the concluded transactions were of a very high value. A noteworthy example thereof was the merger of America Online with Time Warner worth EUR 202 billion. With the deterioration of the economic situation the total value of these types of transactions fell by 68% (from EUR 3,700 to 1,200 billion), and their number by 37% (from 19,000 to 13,000). Between 2003-2007, M&A market rebuilt itself to a level close to EUR 3,000 billion. However, in 2009 it declined again to EUR 1,500 billion (Skowroński R., Mitoraj T., Lipkowski P. 2011). Comparing these observations to the evolution of the rate of global economic growth, as shown in Figure 1, it can be concluded that the increase in world mergers and acquisitions is pro-cyclical.

The results of the analysis conducted by BZ WBK also indicate the existence of the relationship between activity in mergers and acquisitions, and stock exchange situation in different economic regions of the world. In the 2000-2010 period, the number and value of mergers and acquisitions in the United States was positively correlated with the S&P500 index, while in Western Europe with Euro Stoxx index. Similar, albeit slightly weaker dependence emerged between the number and value of mergers and acquisitions in Central Europe, Eastern Europe and Poland, and the level of stock market indices – CEE and WIG (Skowroński R., Mitoraj T., Lipkowski P. 2011).



**Fig. 2.** World value of mergers and acquisitions in 2009 (USD billion)

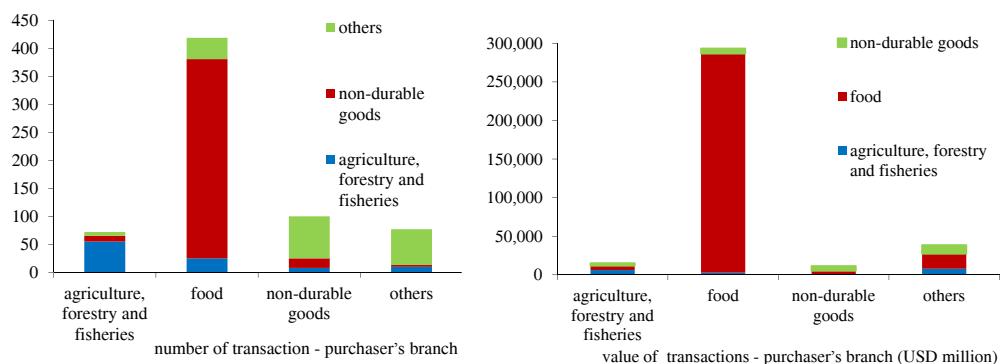
Source: Own elaboration based on IMAA (Thomson Financial 2012).

### **Mergers and acquisitions in the global agro-food sector and the relationship between their intensity and fluctuations in 2000-2010**

Unambiguous classification of some companies in the sector poses significant difficulties due to the usually highly diverse profile of their business activity, especially in the case of multinationals. Using, in the analysis, the classification by type of activity applied by Thomson Reuters it was assumed that companies operating in three branches are related with the wider agro-food sector: 1) agriculture, forestry and fisheries; 2) food; and 3) trade in non-durable goods. In

the 2000-2010 period, there were 668 mergers and acquisitions involving these types of companies.

The total value of 649 of them amounted to USD 358.3 billion. The average value of a transaction was USD 0.55 billion. The cheapest transaction amounted to only USD 0.002 million (object – Japanese company Kyushu Sagami Ham; buyer – Japanese trading company dealing in non-durable goods S Foods Inc.), and the most expensive one reached USD 60.4 billion (object – American company Anheuser-Busch cos Inc., buyer – Belgian company InBev NV). Figure 3 shows the evolution of the number and value of mergers and acquisitions in the agro-food sector in 2000-2010, according to the sector represented by the buyer, specifying the object of the acquired businesses.



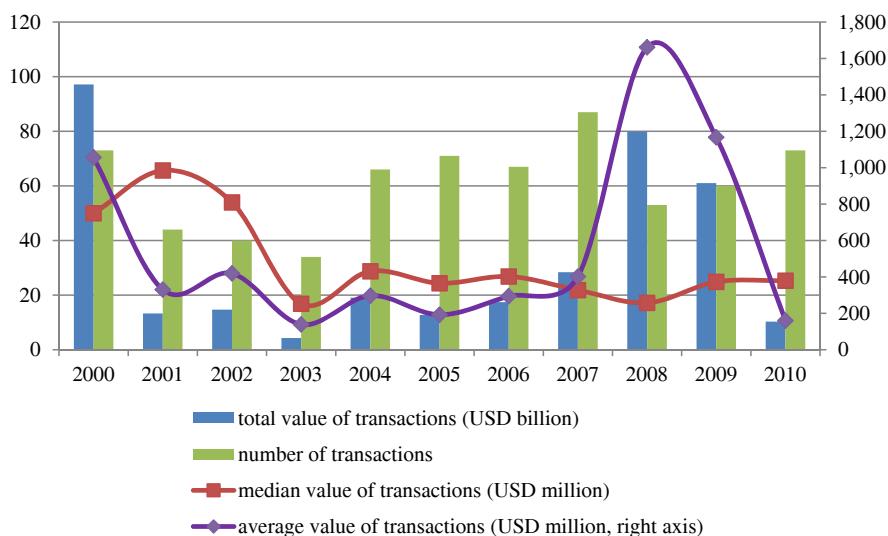
**Fig. 3.** Number and value of mergers and acquisitions in the agro-food sector in 2000-2010

Source: Own elaboration based on BZ WBK and Thomson Reuters data.

Considering the number of these transactions, it is to be noticed that we are dealing with distinct horizontal concentration within each of the three analysed branches. Most of transactions, that is 356, are mergers and acquisitions of food producers by other food manufacturers. It amounts to 85% of all such transactions carried out by food producers within the sector. Companies operating in other sectors concluded 11.7% of all transactions, showing interest mainly in companies involved in trade of non-durable goods (82% of these transactions). Out of 21 sectors other than agro-food sector, most mergers and acquisitions were concluded by the companies from textile industry (20%), refining (13%), and paper industry and retail trade (8%). In terms of the value of M&As, the object of which were companies from the agro-food sector, it was also dominated by companies involved in food production (87.6% of all transactions). The average value of all transactions was approximately USD 700 billion, but the largest amounts were paid by the companies operating in the same industry. This confirms horizontal concentration visible in the case of the number of transactions. The value of transactions involving food producing companies as an object was much higher than those in the other two branches. The average value of a transaction amounted to

USD 813 million, while in the agriculture, forestry and fisheries it was USD 176 million, and in trade in non-durable goods it was USD 148 million.

Number, as well as the value of M&As in the global food sector, were characterised by a large irregularity in each year of the analysed period. The number of these transactions throughout the entire period ranged from 34 to 87 per year (Figure 4). It may be noted that during the economic downturn in 2001-2003, this number decreased, and in a period of relatively good economic situation in 2004-2007 it grew, not counting a slight decline in 2006. With the beginning of the global financial crisis in 2008, there was a significant decrease in the number of mergers and acquisitions, and in the next two years their number grew again. In 2010, the recorded number of such transactions was identical with the one in the year 2000, namely 73.

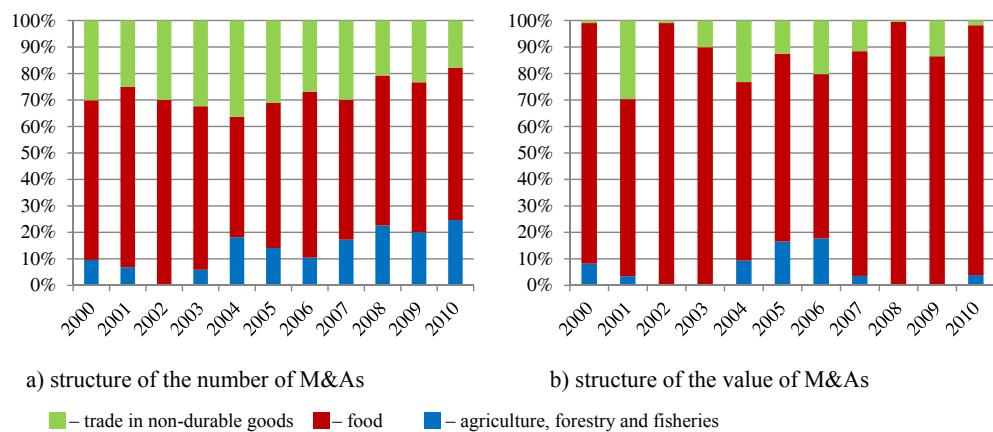


**Fig. 4.** Value and number of mergers and acquisitions in the world agro-food sector in 2000-2010  
Source: Own elaboration based on BZ WBK and Thomson Reuters data.

The total value of mergers and acquisitions was in each year of the analysed period even more diverse. From more than USD 90 billion in 2000, it plummeted to just USD 4.3 billion in 2003. In 2004-2006, the total value of M&As did not exceed USD 20 billion, and in 2007 there was a fairly significant increase and it reached over USD 28 billion. In 2008, there was a surge in the value of such transactions and it totalled USD 80 billion. In subsequent years, the value of mergers and acquisitions in the a global agro-food sector decreased significantly, especially in 2010, when it exceeded just USD 10 billion. Comparing the changes in the number and value of these transactions, it can be seen that while in 2000-2007 the directions of these changes were mostly compatible, then – since 2008 – they were inconsistent. Between 2008 and 2009, a relatively high total value of transactions was accompanied by their relatively small number, as a result, the average value of a transaction was record-high (respectively USD 1,662 and 1,167 million).

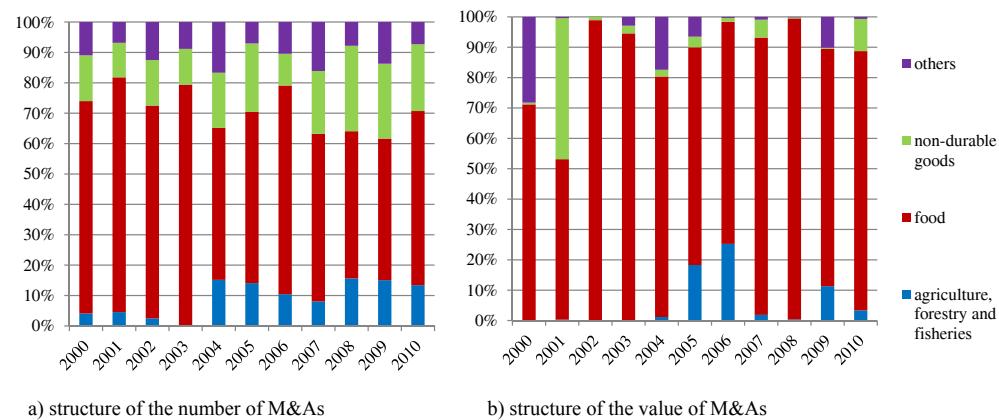
However, this was caused not so much by an increase in the average value of transactions, but by several high-value transactions. This is evidenced by the median value of a transaction, which in 2000-2003 did not exceed USD 66 million, while in subsequent years it oscillated between 15-30 million. In general, the median values in comparison with the much larger values of the mean, especially in 2008 and 2009, showed a very distinct right-skewed asymmetry of the distribution of mergers and acquisitions in this period.

Figures 5 and 6 show the structure of the total number and value of mergers and acquisitions in the agro-food sector, by their object's branch or by purchaser in 2000-2010.



**Fig. 5.** Structure of the number and value of mergers and acquisitions in the agro-food sector by sector of transaction's object

Source: Own elaboration based on BZ WBK and Thomson Reuters data.



**Fig. 6.** Structure of the number and value of mergers and acquisitions in the agro-food sector by sector of purchaser

Source: Own elaboration based on BZ WBK and Thomson Reuters data.

Comparing the data for the years of the analysed period, some changes in the interest in the acquired companies from different branches of the agro-food sector are observable. The share of companies specialised in agriculture, forestry and fisheries in the total number of companies that were the subject of mergers and acquisitions was increasing (Figure 5a). In 2004-2007, companies of this sector, as well as companies involved in trade in non-durable goods, were also a relatively large part of the total value of the acquired companies (Figure 5b). Nevertheless, both in terms of the number and value of these transactions, food industry companies dominated. They accounted for 53-70% of the total number, and 62-99% of the total value of the acquired companies.

Similar observations arise in relation to changes in the structure of number and value of mergers and acquisitions by purchaser's sector. There was also an increase in the share of companies specialised in agriculture, forestry and fisheries in the total number of these transactions, although their share in the total value of the transaction was significant only in 2005-2006 and again in 2009. Among acquiring companies food-producing ones played a key role as they accounted for 50-80% of the total number of transactions and their share in the total value of these transactions accounted for 53-99% each year. Not counting 2000 and 2004, companies not belonging to agro-food sector played a minor role in mergers and acquisitions of agro-food companies.

Analysing the value of mergers and acquisitions in the agro-food sector against all these types of transactions carried out in 2000-2007 in the USA and Europe, it is worth noting that on the list of the largest ten M&As (Top 10) transactions related to companies operating in this sector appeared very rarely, both in the role of an acquired or an acquiring company. Therefore, it can be considered interesting that in 2008, seen as the beginning of the financial crisis, four out of the largest ten deals in Western Europe and three in the United States concerned agro-food companies (respectively, 50% and 44% of the total value of these transactions). In 2009, transactions of this nature accounted for 45% of the total value of the largest ten mergers and acquisitions in Eastern Europe. Also in 2010, large mergers and acquisitions in the United States and Western Europe concerned companies from the agro-food sector. Their share in the total value of the largest ten transactions amounted to 22% and 18%, respectively<sup>1</sup>. It is worth noting that in the analysed period companies from the agro-food sector appeared on the list of the largest ten mergers and acquisitions as the ones being taken over rather than being the ones to undertake a take-over. It can be assumed that the state of the overall economic situation in 2008-2010 favoured the transactions, in which agro-food companies were the object of a transaction.

In addition to fluctuations in general economic conditions, which are manifestations of changes in the size of main macroeconomic variables (mainly GDP), the activity in mergers and acquisitions in a sector may be influenced by economic factors associated with its functioning. With regard to the agro-food sector at national level, one can use a variety of time series data and calculated on this basis indicators to assess the condition prevailing at a given time (Idzik M. 2007).

<sup>1</sup> Based on data received by courtesy of BZ WBK.

At a global level, an important limitation is the availability of appropriate data reflecting sectorial fluctuations at this level of spatial aggregation. In this analysis FAO data was used. It was given in the form of indices relating to food production in the world and its value<sup>2</sup>, in fixed prices from the 2004-2006 period<sup>3</sup> and world food prices<sup>4</sup>. The first two variables can be treated as an approximation of the changes in global agro-food sector's production, and the third as price level changes in this sector. According to the conceptual essence of economic fluctuations, treated as oscillations around the long-term growth path, the data was deprived of trend. The data concerning the number and value of mergers and acquisitions concluded in different years was normalised by dividing them respectively by the total number and the total value of the transaction for the entire analysed period. Then, assuming that the intensity of the phenomenon of mergers and acquisitions is the sum of the number and value of transactions, the geometric mean of these two standardised indicators was calculated. Figure 7 shows the evolution of the values of all six variables, after calibrating them to facilitate visual comparison of the changes in the analysed period<sup>5</sup>.

Making this comparison, it can be concluded that direction of the changes of the values of analysed indices reflects the situation in the global agro-food sector and the indicators showing the intensity of mergers and acquisitions in this sector are characterised by a fairly large similarity. Searching for statistical confirmation of the relationship between these variables, simple correlation coefficients were calculated and presented in Table 1.

All calculated correlation coefficients have positive signs, which is consistent with the thesis of a positive impact of good economic situation on the intensity of mergers and acquisitions. However, the coefficients of correlation between the ratio of the number of mergers and acquisitions adopted in the analysis and business climate indicators proved to be statistically insignificant, which could mean that the number of such transactions is not explicitly dependent on the economic situation in the sector. Relatively high, and more importantly statistically significant are the correlation coefficients between the indicator of transactions' value and the aggregated indicator of the number and value of mergers and acquisitions, and indices of volume and value of production. This indicates that the intensity of mergers and acquisitions in the global agro-food sector in the analysed period changed with fluctuations in the sector, which are a reflection of cyclical changes in the volume and value of production. Lower, albeit at acceptable levels of statistical significance, correlation coefficients between the index values and the aggregate indicator of the number and value of mergers and acquisitions, and the index of food prices, suggest that cyclical changes in these

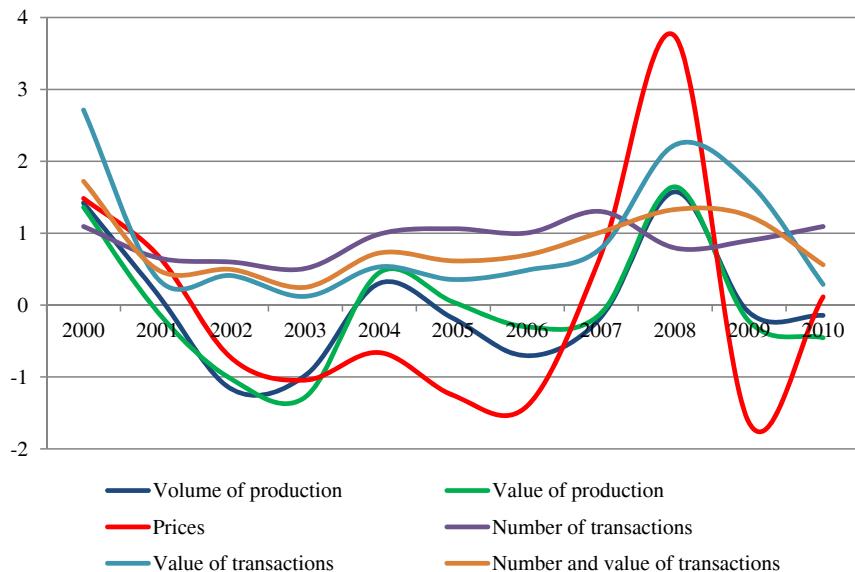
<sup>2</sup> <http://faostat.fao.org/site/612/DesktopDefault.aspx?PageID=612#ancor>, 07.02.2013.

<sup>3</sup> <http://faostat.fao.org/site/613/DesktopDefault.aspx?PageID=613#ancor>, 07.02.2013.

<sup>4</sup> <http://www.fao.org/worldfoodsituation/wfs-home/foodpricesindex/en/>, 07.02.2013.

<sup>5</sup> The value of the index of production value was multiplied by 100, value of price index was divided by 10, while the values of indices of number and value of transactions and the value of mean of these two indices were multiplied by 10.

prices to a lesser extent explain the variability of the intensity of mergers and acquisitions in the global agro-food sector in the analysed period.



**Fig. 7.** Indices of the volume and value of food production and its prices (without trend) vs. standardised indicators of the number and value of mergers and acquisitions in the global agro-food sector in 2000-2010

Source: Own elaboration based on FAO, BZ WBK and Thomson Reuters data.

Table 1

**Correlation coefficients between the indicators of the number and value of mergers and acquisitions and economic indices in the global food sector in the analysed period**

Business cycle indices	Indicator of the number and value of mergers and acquisitions		
	Number indicator	Value indicator	Number and value indicator
Production volume index	0.30	0.81***	0.79***
Production value index	0.37	0.80***	0.80***
Price index	0.07	0.60**	0.53*

\*\*\*, \*\*, \* – statistical significance at the level of, respectively:  $\alpha \leq 0.01$ ,  $\alpha \leq 0.05$  and  $\alpha \leq 0.1$ .

Source: Own elaboration based on FAO, BZ WBK and Thomson Reuters data.

## **Summary and conclusions**

The basic theoretical premise of undertaking mergers and acquisitions is the competitive behaviour of companies, aimed at searching for the benefits of the economies of scale and scope. Mergers and acquisitions in the global economy, including the global agro-food sector, have recently grown to a very substantial size, as described in this article. In addition to individual economic motivations of given companies having an endogenous nature, an important role in the course of this phenomenon may be played by exogenous macroeconomic factors. According to some authors, the intensity of mergers and acquisitions is characterised by variability in time, conditioned by economic fluctuations (AMEinfo 2006; Kydland F.E., Prescott E.C. 1982; Maule C. 1968). The results of the analysis covering the period of 2000-2010, whose main objective was to verify the occurrence of this regularity in the global agro-food sector, empower the authors not only to reach a few conclusions but also to identify research problems that need to be solved.

Firstly, the structure of the number and value of mergers and acquisitions concluded in the global agro-food sector in the analysed period shows that these transactions appear primarily inside a branch, or at most inside a sector. Rarely do they appear outside a given sector, which can be considered understandable, given the business risks associated with takeover of a firm with an activity significantly different from the one previously conducted. As a result mergers and acquisitions concentrate mainly on a horizontal perspective, which, due to significant economic scale may limit competition in an industry or a sector.

Secondly, the relationship between the occurrence of fluctuations in the global agro-food sector and the intensity of mergers and acquisitions in this sector appeared in the analysed period. This applies especially to the value of these transactions, which increased with the improvement of the economic situation. This means that mergers and acquisitions in the agro-food sector, as in the whole world economy, are pro-cyclical. It can, therefore, be concluded that the economic recovery is conducive to undertaking mergers and acquisitions, and consequently to a build-up of concentration processes.

Thirdly, the activity in mergers and acquisitions seems to be determined by the situation on the capital markets. It is indicated by the observed relationship between the direction of changes in the activity levels and changes in stock market indices. The boom on stock market, generally associated with higher market valuation of companies, creates more possibilities for financing transactions of this type and it becomes an important factor in stimulating their conclusion. In a sense, it confirms Tobin's Q theory.

The analysis is not free from limitations that should be borne in mind when interpreting the results. On the one hand, it requires treating these results with caution, on the other, it leads to the identification of new research problems. The most important issues in this context include:

- a) quality and completeness of data concerning mergers and acquisitions and difficulty in unambiguous classification of industry and sector participants, especially for big multinationals with a large range of activities;

- b) length of time series related to the frequency of measurement of variables (shot yearly, quarterly);
- c) selection of variables and applying appropriate measures reflecting fluctuations, particularly in the sectorial approach.

In terms of the research questions, topics of interest seem to include a closer determination of the relation between economic conditions across the global economy and economic situation in the agro-food sector, as well as whether the impact of economic fluctuations – especially large ones, related to global crises – on the intensity of mergers and acquisitions depends on the nature of the sector and the changing investor interest in listed companies. It also seems important to determine whether the progressive development of capital markets and observed in some regions, synchronisation of business cycles can have an impact on the frequency and scale of mergers and acquisitions. Due to the potential negative economic consequences as a result of the increasing concentration, it certainly deserves further in-depth analysis with the use of longer time series. This is particularly the case of the agro-food sector, whose effectiveness has a significant impact on the economic prosperity of mass consumer.

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