INTERCONDITIONALITY BETWEEN THE DYNAMICS OF MERGERS AND ACQUISITIONS AND MACROECONOMIC FACTORS

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Abstract
This article aims to test the hypothesis that between the activity of mergers and acquisitions and the factors of a macroeconomic nature is a relationship of interdependence. The synthesis of the literature highlighted that among the most frequently approached factors can be mentioned the following: the exchange rate, tax rate, capital market interest rate and GDP. By applying regression analysis and correlation for a data set covering the period from 1985 to 2020, a close link was established between the evolution of the number of mergers and acquisitions and the evolution of World GDP. The other factors have an insignificant influence. This is explained by the fact that mergers and acquisitions themselves are an accelerating factor for the sustainable development and growth of the business, stimulating innovation, technology development, modernization and therefore economic growth. And all this is reflected in GDP growth.

Key words: *analysis; corporate tax rate; factor; GDP; mergers and acquisitions; macroeconomic.*

JEL Classification: *G34; H21; F38.*

I. INTRODUCTION

The acceleration of economic growth is correlated with the evolution and development of the capital market, which, in turn, determines the level of resource provision of an economy. The resources needed for faster development must be of a high, innovative quality, ensuring sustainable economic growth. Therefore, an important role is played by investments in technological and innovative development projects, which are also associated with increased risk. The majority of the projects are carried out with very large investments, which are possible due to the consolidation of capital internationally. Mergers and Acquisitions (M&A) make an important contribution to the international consolidation of capital, while the processes of globalization of financial markets and internationalization of business boost the development of activity on the M&A market.

Mergers/acquisitions affect the interests not only of shareholders and of managers of companies, but also of other entities, starting from company personnel and finishing with society as a whole. Due to their peculiarities, mergers and acquisitions lead to a change in the balance of market forces and affect the entire economic system of the country and the world as a whole (Zhylenko & Meshko, 2019:44). This influence materializes in:
- growth of tax revenues to the budgets of various levels;
- increase of the region's investment attractiveness;
- development of regions and countries through participation of companies in infrastructure and social projects;
- creation of new jobs and other effects.

There are different opinions about the tax factor since many M&A transactions are concluded for the purpose of tax optimization. The authors of the study „Are mergers and acquisitions influenced by taxation?" analyzed the influence of tax systems on the behavior of investors in M&A transactions, as well as on the number of completed transactions within one time cycle and within the framework of the country (Ciobanu & Dobre, 2015). Particularly, the total number of transactions that have been concluded both in various countries and in the global economy depends on fiscal factors, such as the effective tax rate, the corporate tax rate used in a particular country, as well as other categories of taxes. This ultimately, is reflected in the total amount of paid taxes, which in turn is directly dependent on the number of transactions carried out.

Another aspect highlighted by the researchers Ciobanu and Dobre (2015) would be the possibility to avoid paying taxes, which is considered a determining factor in decisions about mergers and acquisitions. In addition, this aspect also has a direct impact on the overall cost of the transaction. Conducting a statistical analysis of the average income tax rates in the offshore zones ranged from 0 to 50% (for example, 50% - Comoros, and 0% - the Cayman Islands, Bahamas, Vanuatu, Bahrain). The presented analysis is reflected in Figure 1.
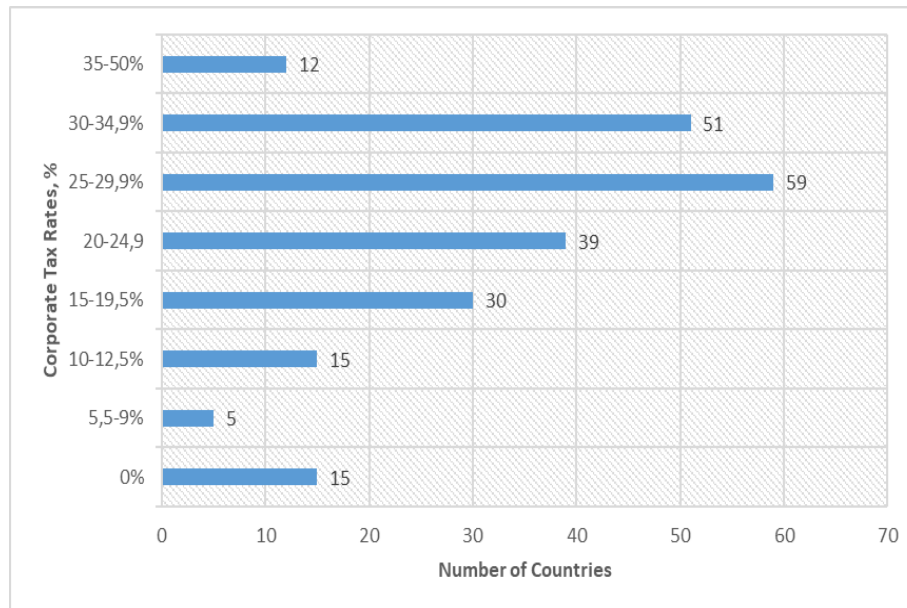
Figure 1 – Distribution of Worldwide Corporate Tax Rates 2021
Source: Bray (2021)

What would developing countries, such as the Republic of Moldova, gain from the introduction of the global minimum tax rate? A study by EUTAX Observatory researchers found that developed countries would have a greater benefit than developing countries (Barake et al., 2021:14). Thus, it is estimated that the revenues of developed countries will increase by about 19% due to the reform of the international tax rules for multinational companies compared to the estimated increase of about 2% for developing countries. Therefore, the planned reform will not contribute to the development of developing economies.

In order to avoid tax evasion, a global agreement on the taxation regime for the profits of multinational corporations (MNCs) by the G20 states was adopted at the end of October 2021. This agreement was signed by 137 countries around the world to end worldwide tax competition and ensure that all MNCs pay their fair share of taxes in any jurisdiction where they make a profit. Starting from 2023, after the reform of international tax rules, multinational companies will be taxed at a minimum rate of 15%. According to the calculations of OECD experts, only from the 100 largest transnational companies more than 125 billion US dollars will be distributed to countries around the world (OECD, 2021a).

The benchmark agreement, signed by 137 countries from 140 OECD / G20 Inclusive Framework Member States on 4th November 2021, covers more than 90 percent of global GDP (OECD, 2021b).

The intensity of activity in the field of M&A is largely due to the dynamics of macroeconomic indicators. The macroeconomic factors influencing the development of mergers/acquisitions markets, according to research results (Singh, 2020), are:

- stock market capitalization;
- dynamics and volume of GDP;
- interest rate;
- tax legislation, etc.

Many researchers have noted the influence of macroeconomic factors. The dependence of the number of M&A transactions on the external environment, expressed in economic growth, was studied in the work "Home country macroeconomic factors on outward cross-border mergers and acquisitions: Evidence from the UK" (Boateng, 2014). The authors of this study focused on the fact that "…higher GDP may result in higher levels of cash reserve in the hands of firms which may encourage them to acquire companies abroad" (Boateng, 2014: 202-216).

II. RESULTS AND DISCUSSIONS

The increase in the number of transactions in the M&A market, as well as the aggregated amounts of transactions, allow us to assess the activity of this market (see Figure 2).
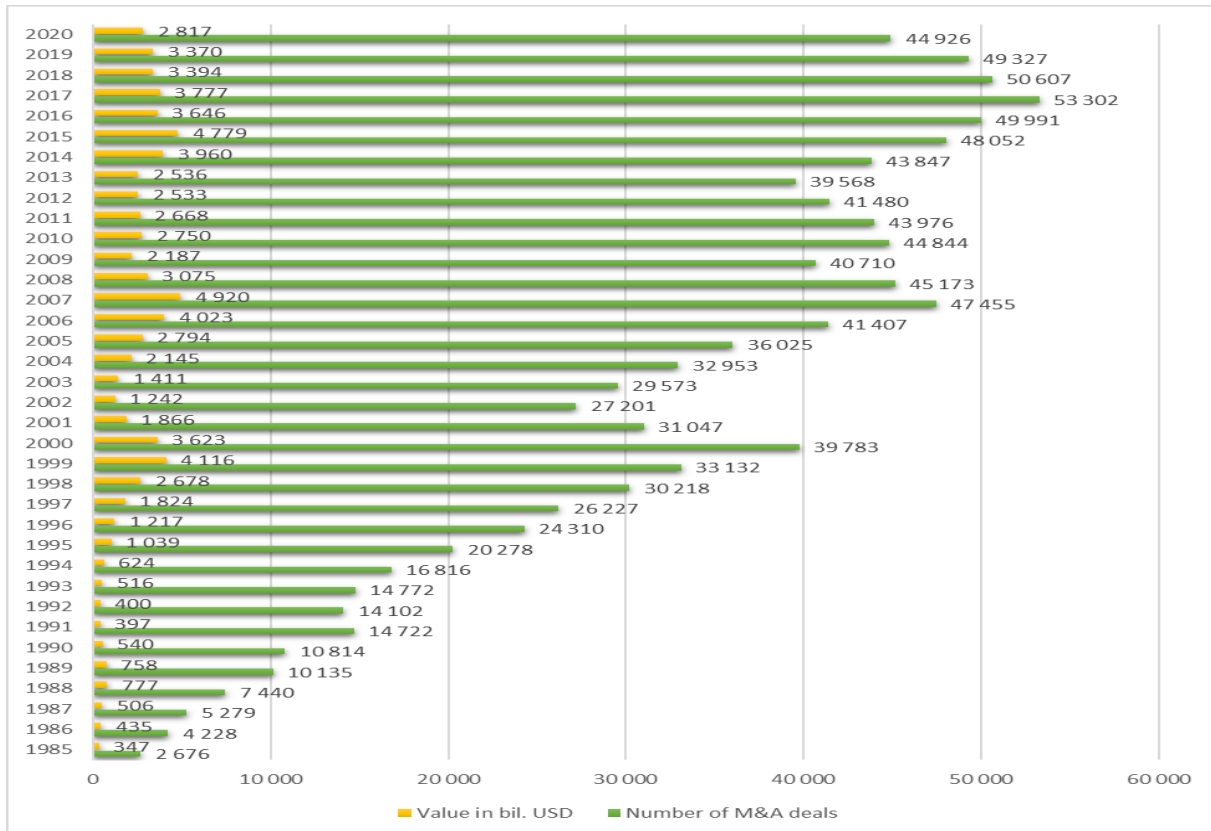
Figure 2 – The number and value of completed M&A transactions on a global scale for 1985 - 2022
Source: Elaborated by author on the base of world M&A Statistics

Moreover, an analysis of the average annual dynamics of the volume and number of M&A transactions is shown in Figure 3.
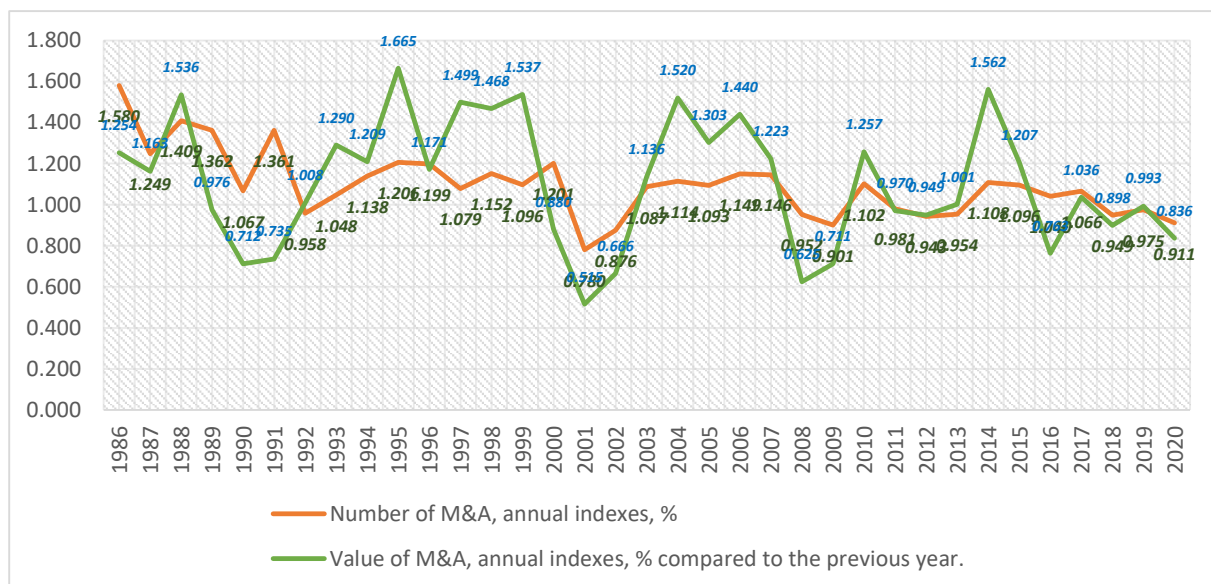

Figure 3 – Analysis of the dynamics of M&A transactions for the period of 1986 - 2020, years in%.
Source: Calculated by the author based on data in Figure 2.

The change in the average cost of transactions is associated with the evolution and dynamics of the number of transactions, which, as the study shows, has a greater volatility compared to the moderate dynamics of the number of transactions (Figure 4).
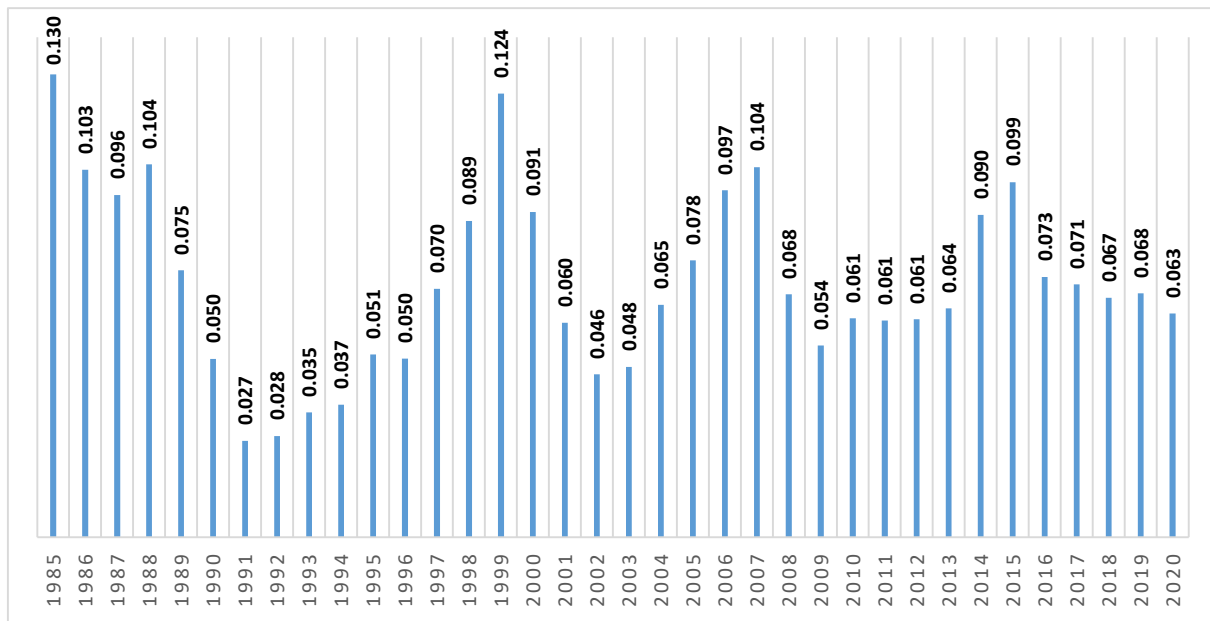
Figure 4 – The average value of an M&A transaction, billion. USD
Source: Calculated by the author

Analyzing the Figure 4, we see that the average cost of one transaction has a cyclical dynamic and for the study period averaged 0.071 billion US dollars, varies in the range from 0.027 to 0.13 billion US dollars.

An analysis of the dynamics of the global M&A market (Figure 5) over the past 36 years indicates a linear growth trend.
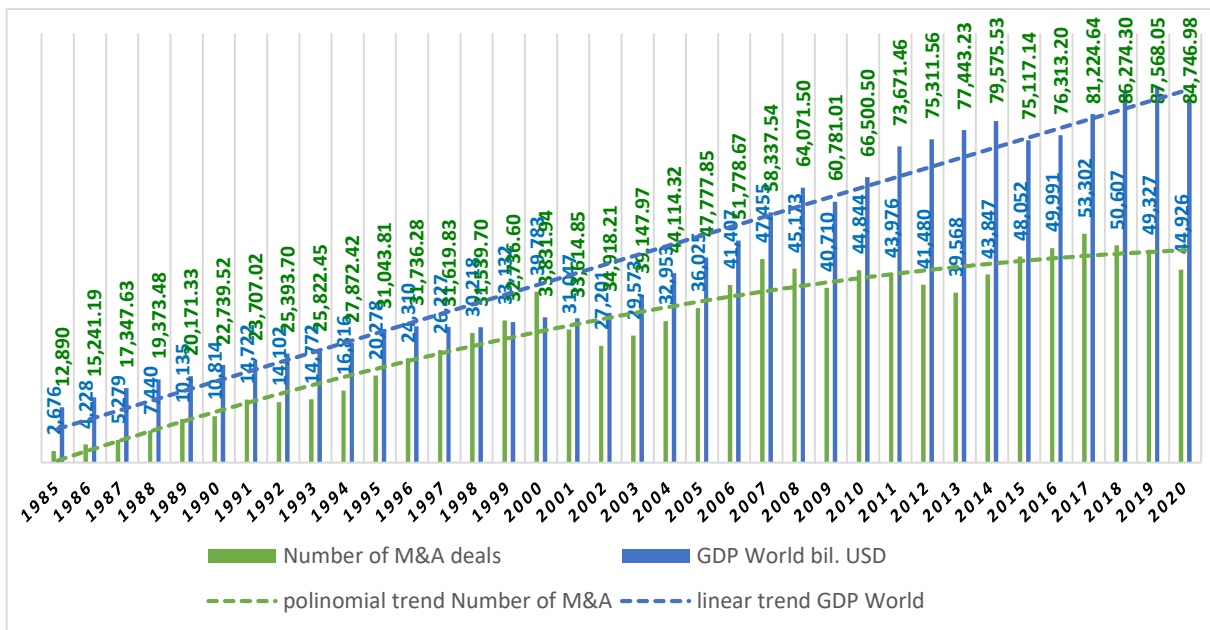

Figure 5 – Trend and evolution of the M&A number and world GDP between 1985 and 2020.
Source: Developed by the author based on the data from IMAA and World Bank statistics

Table 1 reflects the trend function, which is a polynomial of degree 2. This expression is an interpretation of the dynamics of the number of transactions, which, unlike the evolution of world GDP, has a non-linear trend that describes an increase or decrease in the number of transactions.

Table 1. Adjustment values for the number of M&A transactions ranked by the function of time and the indicator of world GDP expressed as a function of the trend for the period 1985-2020

Indicator	Trend function	Coefficient of determination (R²)
Number of M&A deals	$y = -30,32\ t^2 + 2521,5t - 1988,2$	0,9484
GDP World	$y = 5591,6 + 2252,3t$	0,9554

Source: Author's calculations

Forecasting of indicators for a three-five-year period is carried out with the help of the trend function, which is confirmed by the value of the coefficient of determination, which averages of 95%.

In order to establish the relationship between the activity of the M&A market and the macroeconomic factors, the indicator of the M&A number of transactions was chosen as a performance indicator. The object of the study is the completed transactions for the period of 1985-2020. When studying the influence of macroeconomic factors, a hypothesis has been put forward that the activity of the M&A market is influenced by external factors, the generalization of which is world GDP. In order to test the proposed hypothesis, the dependence of the mergers/acquisitions market activity on the dynamics and volume of world GDP for 1985–2022 was studied.

Applying the regression analysis of the relationship between the number of concluded M&A transactions and world GDP, a linear relationship was obtained, expressed by the equation (1):

$$y = bx + a + \varepsilon_i, \tag{1}$$

where: ε_i – observed error values (estimates); a and b respectively, the estimates of the parameters α and β of the regression model.

To evaluate the parameters α and β, the least squares method was applied and the system of normal equations was solved (Baron et al., 1996, p.167):

$$\begin{cases} n \cdot a + b \sum x_i = \sum y_i \\ a \sum x_i + b \sum x_i = \sum x_i y_i \end{cases} \tag{2}$$

The empirical regression coefficients have the following values:

$$b = 0.579,\ a = 3635.88$$

The linear regression equation has the form:

$$M\&A = 3635.88 + 0.579 * GDP \tag{3}$$

Regression coefficient $b = 0,579$ shows the average change in the number of M&A transactions with an increase or decrease in the value of world GDP by one billion US dollars. In this case, with an increase in world GDP by one billion US dollars, the number of M&A transactions increases by an average of 0.579.

The change in the number of M&A transactions is expressed in the value of the regression coefficient $b = 0.579$ with simultaneous positive or negative dynamics in the amount of 1 billion US dollars of world GDP. The value of this coefficient can be interpreted as follows: an increase in the number of M&A transactions by 0.579 was caused by an increase in world GDP by 1 billion dollars.

The statistical significance of the equation was verified using the determination coefficient and F-test. Table 2 is an assessment of the regression parameters in terms of their quality.

Table 2. Results of regression analysis using the Excel package

Regression statistics					
Multiple R	0,910467				
R²	0,828951				
Adjusted R²	0,82392				
Standard error	6481,118				
Observations	36				
ANOVA					
	df	**SS**	**MS**	**F**	**Sig.**
Regression	1	6921271584	6921271584	164,7729774	1,36255E-14

Residual	34	1428166424	42004894,83			
Total	35	8349438008				
	Coefficients	**Standard error**	**T-statistics**	**P-value**	**Bottom 95%**	**Top 95%**
Y-intersection	3635,882	2390,577536	1,520921822	0,137525969	-1222,356529	8494,12
GDP variable	0,579247	0,045125341	12,83639269	1,36255E-14	0,48754087	0,670952

Source: Author's calculations using the Regression in Excel

Determination coefficient R^2 is equal to 82.89%:
$$R^2 = 0.910^2 = 0.8289$$

Solving the problem of the selection accuracy of the regression equation, attention can be paid to the fact that changes in the number of M&A transactions are caused by changes in GDP. This fact is confirmed by a probability of 82.89% of cases. Another issue arising from the presence of specification errors as a result of the existence of those factors that were not taken into account in this model is reflected in the amount of 17.11% dynamics of the number of transactions.

Applying formula 4 to calculate the Fisher test (Baron et al., 1996, p.177), the resulting value are 164.772. That is, the values of the factors $k_1=1$, $k_2=34$, $F_{table} = 4.08$. Since the actual value of $F > F_{table}$, the coefficient of determination is statistically significant, respectively, the found estimate of the regression equation is statistically reliable.

$$F = \frac{R^2}{1-R^2} \frac{n-m-1}{m}$$

(4)

The closeness indicator (correlation coefficient) is 0.9104 and indicates a close and direct correlation between the number of M&A transactions and world GDP. Thus, the results of the analysis confirm the proposed hypothesis about the interdependence between the activity in the M&A market, expressed in the number of deals concluded and the dynamics of world GDP.

III. CONCLUSIONS

Based on the obtained results, when applying regression analysis, the existence of the interdependence of the main factors affecting economic growth and capital accumulation in international financial markets through M&A transactions, was proved. The presented analysis shows that with a probability of 82.89%, changes in world GDP affect changes in the number of M&A transactions. It was also found that the model parameters are statistically significant. The obtained estimates of the regression equation allow us to use it to make forecasts.

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