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THE ECONOMIC CYCLE AND ACQUIRERS' VALUE

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## Abstract

**Purpose:** The economic situation is crucial in decision-making, both for families and companies. For that reason, this work aims to contribute to the literature by investigating how the economic cycle may influence the wealth and the decisions taken by the shareholders of the acquiring firms.

**Methodology:** Transactions announced by acquiring companies that belong to a European Union country between the period 2000 to 2020 were analyzed. By performing an event study and a Multiple Linear Regression Model, we examine the wealth of acquiring shareholders and evaluate how specific characteristics of the deal and, above all, how the economic cycle affects the value created for acquiring shareholders.

**Results:** The results suggest that the economic cycle, measured by the output gap, does not affect value creation. However, when the acquisition is announced in periods with positive output gap, this is, the economy is above its potential level, the higher the output gap (considering the year before of announcement), the greater the value created for acquiring shareholders.

**Conclusion:** In sum, acquisitions made when the economy is performing above its potential level add more value for the acquiring firm shareholders.

**Key Words:** Mergers and Acquisitions, Abnormal Returns, Event Studies, Economic Cycle

**JEL-Codes:** G34

## Resumo

**Objetivo:** É fundamental ter em atenção a situação económica aquando da tomada de decisão, tanto para as famílias como para as empresas. Por essa razão, este trabalho pretende contribuir para a literatura investigando como é que o impacto do ciclo económico pode influenciar os lucros e as decisões tomadas pelos acionistas da empresa adquirente.

**Metodologia:** Foram analisadas as transações anunciadas pelas empresas adquirentes pertencentes a países da União Europeia entre o ano de 2000 a 2020. Através da aplicação da metodologia de um *event study* e de um modelo de regressão múltipla, avaliamos se há criação de valor para os acionistas da empresa adquirente como resultado do anúncio da fusão e aquisição e, principalmente, se e como é que o ciclo económico tem influência nesses retornos.

**Resultados:** Os resultados obtidos sugerem que o ciclo económico, medido pelo output gap, não afeta a criação de valor. No entanto, quando a aquisição é anunciada em períodos em que o output gap é positivo, ou seja, em que a economia está acima do seu nível potencial, quanto mais positivo o output gap (considerando o ano anterior ao do anúncio), maior o valor criado para os acionistas da empresa adquirente.

**Conclusão:** Concluimos que as aquisições feitas durante períodos em que o desempenho da economia está acima do seu nível potencial agregam mais valor para os acionistas das empresas adquirentes.

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## 1. Introduction

According to the Institute for Mergers, Acquisitions, and Alliances (IMAA), more than 790 000 merger deals with a value of over \$57 trillion have been announced since 2000. In 2020, we lived an unusual year. The Covid-19 pandemic brought not only a healthy but also an economic crisis. In the first half of the year, M&A deal value and volume had dropped 22% and 49%, respectively, considering the year before. However, in the second half of the year, it seems that the M&A activity had recovered. Companies need to adapt to the existing strategies and pursue new ones to resist these troubled times. For example, they need to decide if they give up on the transactions that were in preparation for months or pursue the deal but with other conditions.

It is known that historically, mergers and acquisitions activity has occurred in waves, and there exist several theories trying to explain them as the Q-Theory (Jovanovic, 2002), Neoclassical Hypothesis (Harford, 2005), the Overvalued Shares Theory (Shleifer & Vishny, 2003), and Managerial Discretion Theory (Khorana & Zenner, 1998). From that, what we can retrieve is that what every M&A wave has in common is that they started in a period of economic growth and ended with a type of economic shock such as a recession.

Many researchers have then been studying the relationship between the impact of macroeconomic variables on merger activity (Becketti, 1986), the M&A decisions across economic cycles and their impact on the firm's exit in a recession (Ding, 2010), the Cross-border mergers during the 2007-2008 global financial crisis (Reddy, 2014), the value creation of M&As in cyclical economies (Andriuskevicius, 2015). However, there is not much literature about the impact of the economic cycle on M&A performance and specifically on the bidder's shareholders' value.

The present study has the purpose of aim companies to evaluate the impact that the economic situation has on their investment decisions, particularly, over a merger and acquisition. Thus, the main research question to be answered is: "What is the impact of the economic cycle on acquirers' value?". By using a sample of 930 completed M&A deals announced between 2000 and 2020 for acquirers listed in a country belonging to the European Union, we perform an event study to evaluate the abnormal returns of shareholders of acquiring firm around the announcement date and use a Multiple Linear Regression Model to assess the influence of the economic cycle on those returns.

We were able to report that the shareholders of acquiring firms earn positive abnormal returns around the M&A announcement. In particular, the results suggest that the

acquisitions that are made when the economy is performing above its potential level, this is, when we have a positive output gap, add more value for the acquiring firm shareholders.

The rest of the work is organized as follows. In section 2, we discuss some related literature and empirical facts regarding the subject of the dissertation. In section 3, we present the methodology used in the sample described in section 4. In section 5, we examine the results, and section 6 concludes the work.

## 2. Literature Review

In this section, the literature review regarding the acquirer's performance and its relation to the economic cycle is presented. It contains some previous studies about mergers and acquisitions and the economic cycle. Additionally, some determinants that affect the value created for shareholders of the acquiring firm are exposed. Lastly, some important features about the indicator that will be used as a measure of the economic cycle are presented.

### 2.1 M&A and the economic cycle

The relationship between M&As and the economic cycle has been subject of research throughout the years. However, most of the existing literature only considers the variations in the stock market.

Becketti (1986) analyses the link between merger activity and the business cycle by focusing if variables as interest rates, output, and stock prices can explain the merger activity and if mergers have negative effects on the macroeconomy. The author analyzed forty years of US mergers (1948-1985) separated into years of expansion and recession and concluded that the number of mergers increase during expansions and decrease during recessions and that the merger activity starts to decline before the GNP (Gross National Product) reaches its peak. From the macroeconomic variables mentioned above, the one that has a major influence on merger activity is the interest rate fluctuations indicating the necessity of acquiring firms on debt financing. Conversely, the author found no impact of mergers on interest rates, demonstrating that the concern about the negative effect of merger activity on the macroeconomy seems unjustified. Using Becketti (1986) as a representation of the capital market circumstances for the one year return of the S&P500 and the one-year actual yield of the 10-year Treasury Bonds, Komlenovic, Mamun, and Mishra (2011) expected a positive relationship between a change in the total stock price level and the upcoming industry mergers and a negative effect of the bond yield in the future industry mergers. As a proxy of the business cycle, the authors used the Chicago Fed National Activity Index and found that the industry combined mergers increase during boom and peak periods and decrease during recessions and through periods. The authors concluded that those findings were robust for both related and unrelated mergers.

Ding (2010) used a sample of M&A deals in the US from the period 1980-2006 as a proxy for management's investment decisions and unintentional firms exit in a recession to

evaluate the impact of the level of investment decisions across the business cycle on long-run firm performance. As seen in previous studies, at the aggregate level, the behavior of M&A activities is pro-cyclical. However, the firm's exits tend to be counter-cyclical. The purpose of the study was to answer if at the firm level the firms that follow various M&A activities during expansions were the ones that had a higher probability of exit during recessions. In fact, the authors concluded that the higher the level of M&A activities during expansions, the higher the exit rates in succeeding recessions. Also, those firms that pursue M&A activities during economic expansions tend to exit more frequently due to bad performance in the following recession than firms that allocate M&A investment decisions to non-expansionary firms.

Bouwman, Fuller, and Nain (2009) studied the difference between the gains generated by the mergers announced during booming stock markets and those announced during low-valuation markets. Using a sample of 2 944 US mergers that were announced between the 1979-2002 period, the authors found that in the short run the acquisitions announced when the market was booming generated significantly better returns than the acquisitions announced when the market was depressed. However, in the two years after de acquisition, the situation is reversed, i.e., acquiring firms during high-valuation markets significantly underperform acquiring firms during low-valuation markets. More recently, Eisenbarth (2014) analyzed whether firms behave anti-cyclical, that is, when they take advantage of phases with low asset prices to acquire other firms, or whether they behave pro-cyclical, that is, when they acquire firms in phases of high market valuation. The author found a positive correlation between the number of transactions and the market value, demonstrating that firms behave pro-cyclically. However, the author also concluded that in the long run, anticyclical transactions were more successful than pro-cyclical ones.

## **2.2 Determinants of acquirer returns**

To evaluate the impact of the mergers and acquisitions on the shareholders' wealth, researchers, typically, use the event-study methodology. The use of this methodology requires an assumption of market efficiency, this is, the share price reacts to new information in an appropriate and unbiased way, and the gains reflect the value of the firm in the upcoming periods (Fama, 1970). Then, researchers need to decide on a proper event window (can be short-run or long-run) and a proper benchmark to calculate the abnormal returns.

There is no consensus, although, about which is the best event window to use and which is the best performance measure, varying between studies.

The evidence about the value creation of bidder shareholders is not clear. Some studies indicate that bidder's shareholders earn negative or insignificant abnormal returns (Andrade, Mitchell, and Stafford (2001); Moeller, Schlingemann, and Stulz (2004); Campa and Hernando (2004)), while others found positive returns, even if small (Franks and Harris (1989); Goergen and Renneboog (2004); Martynova (2006)).

Empirical research suggests that some characteristics of the deal, acquirer, and target firms may have an impact on shareholders' gains. Next, we present the main variables that according to the literature influence the wealth of the bidder shareholders.

### **2.2.1 Relative Size**

Studies show that the relative size between the acquirer and the target firm influences the wealth of the bidder's shareholders.

Asquith, Bruner, and Mullins (1983) found a positive relationship between the bidding cumulative excess returns and the size of the target, i.e., the larger the target relative to the bidder, the larger the benefits for the bidding firm's shareholders. Using a sample of U.K. acquisitions for the period 1955-1985, Franks and Harris (1989) observed positive abnormal returns for bidders when the relative size of the target to the bidder is between 50% and 100% over the -4 to +1 month announcement period and that the gains become less significant as the size of the target decreases. Also Jarrell and Poulsen (1989) and Fuller, Netter, and Stegemoller (2002) verified that the share price of the bidder shareholders increases as the size of the target increases relative to the acquirer firm. Contrary to these findings, Martynova and Renneboog (2011) report negative abnormal returns for European bidding firms when the relative size of the target is larger.

One possible justification for the reason why buying larger targets is positively related to bidder's shareholders' gains is given by Roll (1986). In their study about Hubris Hypothesis, the author states that as the benefits for acquiring a larger firm are difficult to absorb, the number of firms trying to buy them is lower and so the acquirer firm may be able to pay a lower premium. Contrarily, Martynova and Renneboog (2011) justify that since it is expected a more difficult post-merger integration and therefore higher integration costs, investors may doubt that those costs are incorporated in the value of the shareholders and revise the expected returns downwards.

### 2.2.2 Legal form of the Target

According to the literature, buying a public or a private company has different results on the bidder's gains. Chang (1998) analyses bidder returns at the announcement date when buying a private company and concludes that bidders earn positive abnormal returns when they pay with stock and earn zero abnormal returns using cash. The author also emphasizes the difference between the bidder's positive gains by acquiring a private company with the negative abnormal returns by acquiring a public firm when using stock as a method of payment. These results go in line with the ones found in the studies conducted by Fuller et al. (2002), Moeller et al. (2004) for the US market, and by Martynova and Renneboog (2011) and Faccio, McConnell, and Stolin (2006) for the European market.

Some explanations for verifying such results given by Chang (1998) are that stock payments for acquiring privately held firms create large block holders since the rights are more concentrated in that form of companies and that further examination discloses a positive correlation between bidder's returns with the creation of a new block holder and the number of common shares issued for target shareholders. For Martynova and Renneboog (2011) the bidder's better results can be explained by the fact that as the market is illiquid for the shares of private firms, the acquirer may be able to practice a price discount.

Travlos (1987) states that bidders suffer losses when paying for listed firms with stock. However, thirty years later, the author in the article *"Value Creation from M&As: New Evidence"* concluded that after the 2009 crisis bidder firms gain positive returns acquiring listed firms and that using stock exchanges does not generate more meaningful losses. That result may be explained by the growth of the importance of corporate governance inside the companies (Alexandridis, Antypas, & Travlos, 2017).

### 2.2.3 Industry Relatedness

The value creation of acquirers may be influenced by the industry relatedness between the acquirer and the target firm. A merger is horizontal if both companies operate in the same line of business, and it is vertical if the acquirer and the target firms are from different positions in an equal value and production chain. So, in those two cases, the acquirer and the target are industrially related. The merger is industrially unrelated if the objective is a conglomerate (financial, managerial, or concentric).

It is expected related industries outperforming unrelated ones ((Morck, Shleifer, & Vishny, 1990); (Fan & Goyal, 2006)). Fan and Goyal (2006) by analyzing vertical relatedness



mergers from the period of 1962 to 1996 concluded that both vertical and horizontal mergers create similar positive abnormal returns and that the wealth effects are larger in vertically related mergers than unrelated ones, therefore consisting with the significance of operating synergies.

However, Seth (1990) and Harrison and Hoskisson (1991) found no evidence that, on average, related mergers generate more value than unrelated mergers arguing that greater synergies may happen when exists variances in resource allocation.

In fact, Capron and Pistre (2002) concluded from a sample of 101 horizontal acquisitions where analyzed the relationship between the bidder's abnormal returns and the post-merger resource transfer, that bidders don't gain significant returns when only receives the target's resources. That for the contrary, acquirers only experience positive abnormal returns when they allocate their resources to the target such as innovative, marketing, or management skills.

#### **2.2.4 Method of Payment**

An acquirer can use as methods of payment in an M&A deal: cash, equity (using an exchange ratio to convert target shares into acquirer shares), or a combination of the two. Occasionally, the acquirer can issue debt or hybrid securities to pay to the target shareholders. According to the literature, tender offers and hostile takeovers are usually financed with cash and friendly mergers with common stock (Travlos (1987); Martin (1996)). There is evidence that bidders experience negative abnormal returns when pays with common stock but it gains positive returns at the announcement period in cash payments (Travlos (1987); Moeller et al. (2004); Martynova (2006); Martynova and Renneboog (2011)). However, Goergen and Renneboog (2004) by analyzing the European domestic and cross-border takeovers recorded that when bidders pay with equity, the market reacts more favorably (+1%).

Acquirers may decide the payment method to use depending on their expectations regarding the post-merger performance. If the bidder firm has high confidence in the deal, will pay with cash as a sign and it does not expect to share the benefits with the target. Contrarily, using equity may signal that the acquirer is uncertain about the future synergies, and it wants to share the risk with the target. Asymmetric information between the bidder and the target can also influence the chosen means of payment and consequently the market reaction. So, if acquirers believe that their shares are undervalued (the market will revise the value of the shares upwards), they will choose to pay with cash and if they think that their

shares are overvalued (the market revises the shares downwards), they will instead prefer to pay with equity (Martynova, 2006).

According to Travlos (1987), the choice of using cash or equity as the method of payment can also have consideration tax implications and the increase of leverage. In fact, the author reveals that acquirer firms with poor past returns tend to pay transactions with equity.

### **2.2.5 Hostility/Contestability**

Acquisitions can be seen as being hostile or friendly. In a friendly acquisition, the managers of the target firm approve the deal proposed by the acquirer firm. On the other hand, in a hostile acquisition, the target's managers do not accept the deal. So, if the acquirer firm still wants to pursue the deal needs to offer a greater price than the market price of the target firm preceding the acquisition and tender directly the shares of the target's shareholders for that price (Goergen & Renneboog, 2004).

Accordingly, in the acquirers perspective, if in a hostile takeover they pay a greater premium to the target shareholders it is expected that a greater part of their wealth to be dispended on the acquisition and so it is probable this to have a negative impact on the post-acquisition performance of the bidder (Varaiya & Ferris, 1987). In fact, Franks and Mayer (1996), Goergen and Renneboog (2004), and Martynova and Renneboog (2011) found that bids that are opposed by target managers have a negative impact on the bidder's shareholders gains. On the other hand, Franks, Harris, and Titman (1991) show that hostile bids had a mean excess return of 1.32%, which is significant.

For friendly mergers, some literature shows evidence that acquirers firms gain significant abnormal returns (Goergen and Renneboog (2004); Martynova and Renneboog (2011)). Opposing to these findings is the study conducted by Franks and Harris (1989) that found that bidder's shareholders experience negative abnormal returns when the acquirer has a friendly attitude towards the target firm.

Schwert (2000) alerts to the fact that exist multiple different definitions for the "hostility" concept and that turns tougher for studiers and practitioners to make comparisons between the research findings.

### **2.2.6 Domestic vs Cross Border Deals**

We live in a globalized world where the economies are becoming even more cohesive. So, it is expected that cross-border mergers continue to increase in the future. Erel, Liao, and Weisbach (2012) state that the localization between the acquiring firm and the target is relevant and gives some factors that motivate pursuing cross-border deals. The authors affirm that it is more probable for an acquiring firm to merge with a firm located in a close country than with a firm in a distant country and that the economic advance and accounting superiority have an impact on the probability of a company being an acquirer or a target. Along with this, the authors also found in their study that it is more probable for firms located in a country whose currency has appreciated to buy firms located in a country whose currency has depreciated.

Despite those motivations, it is also expected that the cultural, governmental, and transaction differences to difficult the merger by increasing the integration costs. In fact, Campa and Hernando (2004) studied the mergers and acquisitions of the European Union firms between 1998 and 2000 and found that in nearly 55% of the transactions, the gains of acquiring firm shareholders were negative and that this low-value creation was more relevant in mergers in regulated industries and more significant in mergers between two different countries of the eurozone.

Therefore, acquirer firms that pursue domestic acquisitions experience higher returns than those that follow cross-border operations (Goergen and Renneboog (2004); Moeller, Schlingemann, and Stulz (2005); Martynova (2006), Kuipers, Miller, and Patel (2009)). Martynova and Renneboog (2008) relate that the acquirer returns are higher when the acquirer and the target belong to near countries or have the same language group. These findings are then consistent with the fact that deals between firms in countries with similar cultures are probable to create more value (Cheng & Yang, 2017).

## **2.3 Output Gap**

To predict the impact of the economic cycle on acquirers' value it is important to include indicators that capture the European Union economic conditions. As a measure of the economic cycle, it will be used the output gap. The output gap measures the difference between the potential output and the actual GDP. As GDP, the output gap can be positive or negative. A positive output gap means that the actual GDP is higher than the full-capacity output. The demand is very high and to face it workers operate upon their most efficient

capacity. On the other hand, a negative output happens when the actual GDP is lower than the full capacity that the economy could achieve. It means that exists a slack in the economy due to lower demand. Neither of these two situations is ideal.

The output gap is calculated based on the potential output, and both are important notions to evaluate the cyclical position of the economy and its productive capacity. Thus, the potential output measures the economic growth capacity and depends on the evolution of labor, capital, and technological development. In fact, according to Havik et al. (2014): *“The Potential growth constitutes a summary indicator of the economy’s capacity to generate sustainable, non-inflationary, growth whilst the output gap is an indication of the degree of overheating or slack relative to this growth potential.”* (p.4).

As the potential output is unobservable, it is difficult to measure. There are different methods to calculate it and can be either derived by a statistical or economic approach. In the European case, the approach chosen was the economic one because of the advantage of understanding the issues behind the potential output changes and make the connection between the policy measures and the outcomes of those policies. Another advantage is the possibility of making and changing assumptions given the economic situation, which provides more flexibility to the model.

Havik et al. (2014) gave three conditions that need to be fulfilled:

- Simplicity and easy to use.
- Must be suitable for all European countries and be comparable between them.
- The estimates must be unbiased since they will be the base for budgetary resolutions among member states.

Despite these difficulties, the output gap is an important indicator used by policymakers to study what measures implement to reduce the economic cyclicity.

## 2.4 Research Questions

Since there is no consensus regarding the value creation resulting from the M&A announcement, our first research question is to evaluate if the M&A announcement creates value ( $CAR > 0$ ), destroys values ( $CAR < 0$ ), or if it has a null impact on the wealth of the shareholders of the acquiring firm, i.e., if the generated returns are not significantly different from zero ( $CAR = 0$ ). Thus, the hypothesis to be tested is defined as:

**H1:** The M&A announcement has an impact on the wealth of acquirers' shareholders (CAR $\neq$ 0).

Subsequently, we want to evaluate if the economic cycle has an impact on the magnitude of the abnormal returns produced with the announcement of the M&A. Hence, the hypothesis to be tested is:

**H2:** the economic cycle has an impact on the value creation of the acquirers' shareholders resulting from the M&A announcement.

## 3. Methodology

### 3.1 Abnormal returns

In an event study, the use of financial market data allows measuring the impact of a specific event on the value of the firm (MacKinlay, 1997). The effect on the shareholder's wealth is measured by examining the firm stock price reaction to the announcement of the event (Kothari & Warner, 2007). In this dissertation, the event considered is the M&A announcement.

Event studies are also used to test market efficiency. If the financial markets are informationally efficient, there should be an immediate reaction to the event on the announcement date and no additional reaction on the following trading days. According to the Efficient Market Hypothesis developed by Fama (1970), in these markets, the information available is always fully reflected in prices. Then, depending on the perception of the market participants about the event, the market reacts positively or negatively to the additional information that was disclosed.

Therefore, the shareholders' expectations about the future profitability of the firm will change following the information released on the announcement of the M&A and be promptly reflected in the current stock price. So, it is possible to notice whether the announcement has an abnormal impact on the stock returns of the firm by analyzing the behavior of involved firms' stock prices around the deal announcement day and comparing it with the market's performance. The abnormal returns correspond to the excess return concerning what would be obtained in case the M&A announcement did not happen.

However, the question of the abnormal returns of the day of the announcement reflects the true value created for the acquiring shareholders raises. According to Peterson (1989) due to the existence of information leakages and rumors resulting from insider information, the share price of the acquirer's firm may have already incorporated information regarding a possible M&A a few days before the announcement. On the other hand, it is possible to occur a delay in incorporating the M&A announcement into the stock price of the acquiring firm due to a slow information process.

Therefore, an event window over which the abnormal returns will be analyzed must be set. The range of the length of the event window depends on each researcher. However, it should not be too short to not misguidedly exclude the effect of information released

before the event, but it should not be too long to not include other effects than those resulting from the event (Peterson, 1989).

### 3.1.1 Abnormal returns calculation

The M&A announcement impact on the acquirer's shareholders wealth is measured by computing the abnormal returns of stocks nearby the announcement day. The difference between the actual returns ( $R$ ) and the expected returns ( $E(R)$ ) at day  $t$  corresponds to the abnormal returns ( $AR$ ) for each company  $i$ .

$$AR_{i,t} = R_{i,t} - E(R_{i,t}) \quad (1)$$

According to Brown and Warner (1980) a security's price performance can only be "abnormal" in comparison with a specific benchmark. Therefore, it is necessary to use a model or models that generate "normal" returns. MacKinlay (1997) suggests the *constant mean return model* and the *market model* as the two most common choices to demonstrate the normal returns. Additionally, Brown and Warner (1980, 1985) suggested another different model to be used as a benchmark, namely the *market-adjusted return model*.

The market model method is commonly used since it considers both risks associated with the mean returns and the market (MacKinlay, 1997), and even being a simple methodology it performs well (Brown & Warner, 1980). According to this model, the expected (normal) return of any security  $i$  is given by:

$$E(R_{i,t}) = \alpha_i + \beta_i * R_{m,t} + \varepsilon_{i,t} \quad (2)$$

where,

$E(R_{i,t})$  = expected return of the share of acquiring firm  $i$  on day  $t$ .

$\alpha_i$  = measure of the average return of shares of acquiring firm  $i$  that is not explained by the market.

$\beta_i$  = measure of the sensibility of shares of acquiring firm  $i$  towards the market volatility.

$R_{m,t}$  = return of the market index on day  $t$ .

$\varepsilon_{i,t}$  = stochastic error,  $\sum \varepsilon_{i,t} = 0$ .

If the M&A announcement had not occurred, it is possible to assume that the difference between the actual return and the expected return on day  $t$  would be zero.

Conversely, if the event had occurred, these returns should be different, and the daily abnormal returns of the firm  $i$  on day  $t$  are obtained as follows:

$$\varepsilon_{i,t} = AR_{i,t} = R_{i,t} - E(R_{i,t}) = R_{i,t} - (\alpha_i + \beta_i * R_{m,t}) \quad (3)$$

assuming,

$AR_{i,t}$  = abnormal return of the share of acquiring firm  $i$  on day  $t$ .

$R_{i,t}$  = actual return of the share of acquiring firm  $i$  on day  $t$ .

The cumulative abnormal returns (CAR) aggregate an individual security through time. Thus, the CAR of the acquiring firm  $i$  for a certain event window is given by the sum of all abnormal returns from the first day until the last day of the event window.

$$CAR_i = \sum_{t=1}^T AR_{i,t} \quad (4)$$

By defining day 0 as being the announcement day for an M&A operation for a given company, the announcement day will happen within the event window (period between T1 and T2), which is after the estimation window (T0 and T1) and before the post-event window (T2 and T3).

As reported in the studies of Campa and Hernando (2004) and Martynova and Renneboog (2008) there is a lack of statistical relevance of long-term abnormal returns, consequently, our study does not include the post-acquisition period.

It is important to define non-overlapping estimation and event windows so the estimators for the parameters of the normal return model are not influenced by the returns around the event (MacKinlay, 1997). Thus, for this study, it was considered a 3-day and a 12-day event window [-1; +1] and [-10; +1], respectively, where 0 corresponds to the event day. The event day corresponds to either the announcement day or the first trading day following the announcement in case the announcement is made on a non-trading day. In addition, windows of 7, 11, and 21 days ([-3; +3], [-5; +5], [-10, +10]) are also used to diminish biases and better assess the M&A impact. It is considered several windows because there is no consensus about what should be used due to the paradox of using a too small or an extended event window.



Following the study of Holler (2012) our estimation window has 180 days, between the day -30 and the day -210. The author made a meta-research reviewing 400 event studies and found that estimation window lengths spread out between 30 and 750 days.

Since our sample is composed of acquiring firms listed in a European Union country, we employ the STOXX Europe Total Market Index (TMI) as a proxy for the market return.

To estimate the parameters of the market model of each firm and obtain the normal returns, the Ordinary Least Squares (OLS) method is used. The OLS estimators are obtained through a logarithm transformation to approximate the returns to normality (Jr & V., 1990).

$$\widehat{R}_{i,t} = \ln\left(\frac{P_t}{P_{t-1}}\right) \quad (5)$$

$$\widehat{R}_{m,t} = \ln\left(\frac{I_t}{I_{t-1}}\right) \quad (6)$$

where,

$P_t$  = market price of the share of the acquiring firm  $i$  on day  $t$ .

$P_{t-1}$  = market price of the share of the acquiring firm  $i$  on the day before day  $t$ .

$I_t$  = Index price on day  $t$ .

$I_{t-1}$  = Index price on the before day  $t$ .

Thus, the equation below represents the expected return according to the MM:

$$E(R_{i,t}) = \widehat{\alpha}_i + \widehat{\beta}_i * R_{m,t} \quad (7)$$

Therefore, it is essential to test whether the abnormal returns (if any) generated by the announcements are statistically significant or not. In this regard, a parametric test is going to be carried out. The rejection of the null hypothesis ( $H_0: CAR=0$ ) tests if the M&A announcement affects the wealth of the acquiring firm's shareholders. If the cumulative abnormal returns have a normal distribution, the test statistics for the null hypothesis have a t-Student distribution.

$$\mathbf{CAR} \sim \mathbf{N}(\mathbf{0}, \sigma) \quad (8)$$

$$t = \frac{\mathbf{CAR}_t}{\hat{\mathbf{S}}(\mathbf{AR}_t)} \quad (9)$$

where,

$\hat{\mathbf{S}}(\mathbf{AR}_t)$  = standard deviation of AR, an unbiased estimator of the standard deviation of the population ( $\sigma$ ).

Additionally, we use the non-parametric test Wilcoxon signed-rank test to best interpret our findings. This test considers the absolute value of abnormal returns ( $H_0$ : median=0). When the number of observations is large, under the null hypothesis of equally likely positive or negative abnormal returns, the distribution of the statistic is approximately a normal distribution (Serra, 2002):

$$\mathbf{Z} \sim \mathbf{N}(\mathbf{0}, \sigma) \quad (10)$$

$$\mathbf{Z} = \sum_i \mathbf{r}_i^+ \quad (11)$$

$$\mathbf{E}(\mathbf{Z}) = \frac{\mathbf{N}(\mathbf{N} + 1)}{4} \quad (12)$$

$$\sigma^2(\mathbf{Z}) = \frac{\mathbf{N}(\mathbf{N} + 1)(2\mathbf{N} + 1)}{24} \quad (13)$$

Where,

z- test statistics for Wilcoxon signed-rank test.

$r_i^+$  - rank of the observations  $i$  with a positive absolute value of the abnormal return.

N- number of observations in a certain event window.

### 3.1.2 Abnormal returns- Multiple Linear Regression Model

Evaluating the relationship between the abnormal returns and some characteristics of the deal, of the acquirer firm, and particularly of the economic cycle, it is possible to understand how these factors impact the wealth of the acquirer shareholders on the

announcement. In this context, by shaping a multiple linear regression model (MLRM), we have two main equations.

One of the main equations is defined as:

$$\begin{aligned}
 \mathbf{CAR}_i = & \beta_0 + \beta_1 \mathbf{INDUSTRY}_i + \beta_2 \mathbf{CROSS - BORDER}_i + \beta_3 (\mathbf{LOG}) \mathbf{DEAL\_SIZE}_i \\
 & + \beta_4 \mathbf{RELATIVE\_SIZE}_i \\
 & + \beta_5 \mathbf{PRIVATE}_i + \beta_6 \mathbf{SUBSIDIARY}_i + \beta_7 \mathbf{OUTPUT\_GAP}_{i,t-1} \\
 & + \varepsilon_i \qquad \qquad \qquad (14)
 \end{aligned}$$

The dependent variable  $\mathbf{CAR}_i$  is the Cumulative Abnormal Returns of the acquiring firm for the event windows  $[-1; +1]$  and  $[-10; +1]$ , the main event windows formerly defined. The cumulative abnormal returns for the share of the acquiring firm  $i$  ( $\mathbf{CAR}_i$ ) is defined as the sum of abnormal returns for the share of the acquiring  $i$  over the event window, expressed in percentage. It measures the stock price reaction to the M&A announcement, assuming that on that day the new information that is released in the market is quickly reflected on the stock returns. At the time of the M&A's announcement, the higher the immensity of abnormal returns performance, the higher the impact of that event on the acquiring shareholders' wealth.

The economic cycle, measured by the output gap, is our variable of interest since our purpose is to understand its impact on the abnormal returns resulting from M&A announcements. The control variables that also affect the abnormal returns and that were mentioned previously in the literature review are also considered. The cross-border, industry, private, and subsidiary variables are dummies.

In the second main equation, the variable output gap is a dummy variable ( $\mathbf{D\_OUTPUT\_GAP}$ ), that will take the value of one if the output gap is positive and zero otherwise.

$$\begin{aligned}
 \mathbf{CAR}_i = & \beta_0 + \beta_1 \mathbf{INDUSTRY}_i + \beta_2 \mathbf{CROSS - BORDER}_i + \beta_3 (\mathbf{LOG}) \mathbf{DEAL\_SIZE}_i \\
 & + \beta_4 \mathbf{RELATIVE\_SIZE}_i \\
 & + \beta_5 \mathbf{PRIVATE}_i + \beta_6 \mathbf{SUBSIDIARY}_i + \beta_7 \mathbf{D\_OUTPUT\_GAP}_{i,t-1} \\
 & + \varepsilon_i \qquad \qquad \qquad (15)
 \end{aligned}$$

## 3.2 Independent Variables

The independent variables considered previously in the linear regression model, as their measures and the expected relationship of each one with the dependent variable (CAR), are following exposed.

RELATIVE\_SIZE is the relative size of the deal. It is the log of deal size divided by the log of the acquirer's market value of equity two months prior to the acquisition announcement. The measure was previously considered by Dandapani, Hibbert, and Lawrence (2020).

INDUSTRY is a dummy variable that takes the value of one if the bidder and the target operate in the same industries and zero otherwise. The measure was previously considered by Martynova and Renneboog (2008).

CROSS-BORDER is a dummy variable that equals one if the acquirer and target firm are from the same countries and equals zero otherwise. Considered in the study of Martynova and Renneboog (2011).

(LOG) DEAL\_SIZE is the logarithm of the transaction value.

PRIVATE is a dummy variable that equals one if the target is a private company and zero otherwise. The measure was previously considered by Dandapani et al. (2020).

SUBSIDIARY is a dummy variable that takes the value of one if the target is a subsidiary of another firm and equals zero otherwise. The measure was previously considered by Dandapani et al. (2020).

OUTPUT\_GAP is a variable used as a proxy of the economic cycle.

D\_OUTPUT\_GAP is a variable that considers if the deal occurred in a period where the economy was producing above or below its potential. It is a dummy variable that takes the value of one if the deal occurred in a year of a positive output gap, and zero otherwise.

## 4. Data

In this section, the selection process of our sample is exposed, as well as a summary of it regarding, for example, the years in which there were more deals, to which countries the acquirers and targets mostly belong, among other characteristics. Furthermore, the descriptive statistics of the variables will also be presented.

### 4.1 Sample Selection

The list of M&A deals composing our sample was collected from the Thomson Reuters database.

For an M&A transaction to be included in the sample, we have defined some requirements: **(1)** deal type is *Acquisition* or *Merger*; **(2)** the deal was “*completed-confirmed*” or “*completed-assumed*” between January 2000 and December 2020 (the choice of this time period concerns to the fact that the duration of one economic cycle is about 5 to 10 years); **(3)** the acquirer firm was listed at the time of the announcement deal; **(4)** the acquirer belongs to a country of the European Union (the United Kingdom included); **(5)** the percentage acquired must be higher than 50%; **(6)** the firms involved are non-financial to avoid dealing with the special regulatory environment and accounting issues related to financial institutions; **(7)** the deal value must be higher than 100 million USD. After applying these seven criteria in the Thomson Reuters database, we have obtained a sample with 1 099 M&A transactions.

Moreover, 107 deals made for the same acquirer that do not present a difference of at least 240 trading days between the announcement days were excluded.

There were also excluded, 62 acquirers that do not have available stock prices in some days of the event windows and at least 180 days of the estimation windows affected (necessary to calculate the abnormal returns). Thus, the final sample is constituted by 930 M&A bids.

The economic cycle effect is captured in the study using the output gap as a synthetic measure of the economic conditions. As referred before, a positive output gap indicates a period where economy is performing above its potential. Contrarily, a negative output gap indicates a period where the economy is performing below its potential.

Figure 1 represents the output gap of the European Union from 2000 to 2022 (2021 and 2022 is an estimation). This data indicates that most of the years show a negative output gap mainly due to international crises such as the dotcom bubble with the recession in 2003,

the international financial crises in 2008 and the consequent sovereign debt crises in 2010, and more recently, in 2020, the pandemic crises.

It is also important to refer to the relationship between the output gap and inflation through the Phillips curve. As pointed before, the output gap is a succinct indicator of the relative demand and supply components of economic activity, and for that reason measures the degree of inflation pressure in the economy because is a link between the production of goods and services, and consequently, inflation. Thus, *ceteris paribus*, with a positive output gap over time, prices will start to rise in response to demand pressure, and inflation will rise. According to the Philipps curve, there is a trade-off between inflation and unemployment. So, a positive output gap means higher inflation and a low rate of unemployment. However, as a high level of inflation is not bearable either, central banks intervene by raising interest rates.

**Figure 1- European Union Output Gap<sup>1</sup>**



In table 1, we present a summary of the number of deals that occurred in each year. It is observed for our sample that the years with more announcements are 2000 and 2007 (representing 9.78% and 7.74%, respectively). It is also interesting to note that in the years followed by the 2008 crisis the number of deals announced is lower as well as in the year 2020 which was marked by the pandemic. This could be an indication of the volatility that the market was suffering in those periods.

<sup>1</sup> The output gap data was retrieved from the AMECO online Database corresponding to 2000 and 2022.

**Table 1- Distribution by Years**

This table exhibit the sample distribution by year.

<b>Year</b>	<b>Nº of Deals</b>	<b>Percent</b>	<b>Year</b>	<b>Nº of Deals</b>	<b>Percent</b>
2000	91	9.78	2011	53	5.70
2001	28	3.01	2012	33	3.55
2002	23	2.47	2013	32	3.44
2003	23	2.47	2014	55	5.91
2004	29	3.12	2015	42	4.52
2005	60	6.45	2016	49	5.27
2006	54	5.81	2017	46	4.95
2007	72	7.74	2018	53	5.70
2008	39	4.19	2019	44	4.73
2009	30	3.23	2020	34	3.66
2010	40	4.30	<b>TOTAL</b>	<b>930</b>	<b>100</b>

As displayed in table 2, which represents the distribution by acquirer and target nation, the United Kingdom is the country to which most of the acquirers belong (representing 36.67%), followed by France, representing 14.95%. Regarding the targets, the United States is the nation on which most of them belong (27.74% of the targets), followed by the United Kingdom that represents 22.04% of the targets' nation. In annexes 2 and 3 are present the completed distribution of the sample by acquirer and target nation.

**Table 2- Distribution by Acquirer and Target Nation**

This table shows the top 10 distribution of our sample by acquirer and target nation.

Top 10 by Acquirer Nation			Top 10 by Target Nation		
Country	Nº of Acquirers	Percent	Country	Nº of Targets	Percent
United Kingdom	341	36.67	United States	258	27.74
France	139	14.95	United Kingdom	205	22.04
Germany	70	7.53	France	59	6.34
Sweden	65	6.99	Italy	45	4.84
Spain	59	6.34	Netherlands	43	4.62
Netherlands	52	5.59	Spain	43	4.62
Italy	48	5.16	Germany	37	3.98
Finland	32	3.44	Sweden	33	3.55
Ireland	28	3.01	Canada	32	3.44
Belgium	24	2.58	Switzerland	16	1.72
<b>TOTAL</b>	<b>858</b>	<b>87.26</b>	<b>TOTAL</b>	<b>771</b>	<b>82.89</b>

Concerning the industry sector of the parties involved, as observed in table 3 (and in annex 4 the full distribution of the sample by industry), most of the acquirers belong to Pharmaceuticals (representing 7.63%), followed by Building & Engineering (representing 5.48%). The Pharmaceuticals industry is also the industry that most of the targets belong to, followed by Food and Beverage (representing 6.34% and 5.81%, respectively). The fact that most acquirers and targets belong to the pharmaceuticals sector is an indicator of the constant change in the sector due to technological evolution. Therefore, one of the ways to follow this evolution faster is to acquire other companies that already have the technology that they need.



**Table 3- Top 10 distribution by Industry**

This table illustrates the top 10 distribution of our sample by acquirer and target industry.

<b>Industry</b>	<b>N° of Acquirers</b>	<b>N° of Targets</b>
Pharmaceuticals	71	59
Building/Construction & Engineering	51	45
Food and Beverage	49	54
Oil & Gas	45	48
Metals & Mining	42	38
Professional Services	37	34
Transportation & Infrastructure	37	46
Telecommunications Services	33	17
Publishing	31	19
Power	30	20
Others	504	550
<b>TOTAL</b>	<b>930</b>	<b>930</b>

Table 4 shows some specific characteristics of our sample considering important from the literature review.

The number of cross-border deals surpasses considerably domestic deals, which suggests the tendency of acquiring companies to invest outside their main country. Although, the literature indicates that acquire firms that pursue domestic deals obtain higher abnormal returns than those that follow cross-border operations.

**Table 4- Distribution by Deal Characteristics**

This table exhibit the distribution of our sample by deal characteristics.

	<b>N° of deals</b>	<b>Percent</b>
<b>Cross-border</b>		
YES	607	65.27
NO	323	34.73
<b>Industry Relatedness</b>		
YES	497	53.44
NO	433	46.56
<b>Target Legal Form</b>		
Public	412	44.30
Private	228	24.52
Subsidiary	273	29.35
<b>Bidder's Attitude</b>		
Friendly	925	99.46
Hostile	5	0.54
<b>Output Gap</b>		
Positive	571	61.40
Negative	359	38.60
<b>Output Gap Year</b>		
<b>Before</b>		
Positive	562	60.43
Negative	368	39.57

Regarding the industry relatedness, the sample is equilibrated, with just over half of the deals being made by companies belonging to the same sector. Public targets represent almost half of the sample. It is possible to observe that almost all the deals occurred in a friendly attitude and for that reason, the variable will not be considered.

Concerning to the variable of interest of this study, most of the deals occurred in periods where the economy was performing above its potential level.

## 4.2 Sample Description

In table 5, the descriptive statistics of our dependent variable, CAR, for the various event windows are presented.

According to the results exhibited, the mean of the CAR obtained by the acquirers that composes our sample is positive across all event windows, there is, exists value creation. The lower CAR is in the event window [-10; +10] and the higher is in the event windows [-10; +1] and [-1; +1]. The results observed in event window [-10; +1] can be viewed as a sign of market anticipation and information leakage. However, the standard deviation is very high in all event windows, which suggests a wide range of CAR values.

**Table 5-Descriptive Statistics of the dependent variable**

This table shows the descriptive statistics of our dependent variable. CAR is defined as the sum of abnormal returns of the firm over the event window for the European Union acquiring firms between 2000 and 2020. \*\*\*, \*\*, \*, indicates significance at 1%, 5% and 10% confidence level, respectively.

	<b>CAR</b> <b>[-10; +10]</b>	<b>CAR</b> <b>[-10; +1]</b>	<b>CAR</b> <b>[-5; +5]</b>	<b>CAR</b> <b>[-3; +3]</b>	<b>CAR</b> <b>[-1; +1]</b>
<b>Mean</b>	0.5369	1.1888***	0.9251***	0.9583***	1.2955***
<b>Median</b>	1.2693***	1.1386***	1.2188***	0.8052***	0.9753***
<b>Minimum</b>	-69.9847	-47.0248	-50.8968	-46.2265	-41.0904
<b>Maximum</b>	121.1028	133.7031	116.7694	103.7691	108.0938
<b>Std. Dev.</b>	12.6010	10.6368	10.42564	9.1579	8.3487
<b>Variance</b>	158.7858	113.1418	108.694	83.8671	69.7003
<b>Skewness</b>	0.2717	2.27583	1.13199	1.1933	2.6924
<b>Kurtosis</b>	15.2249	32.0353	22.2070	22.8956	36.5992
<b>Obs.</b>	930	930	930	930	930

Table 6 shows the descriptive statistics of the numeric variables of our sample.

The mean of the output gap of the year that occurred the deal announcement is negative while the mean of the output gap of the year before the deal announcement is positive but close to zero. The median of the variables is 0.6, and the mean is very distant from that value.

Regarding the deal size, as it is calculated with the logarithm function, its standard deviation is equal to 1.4086, assumes a minimum value of 4.6078 and a maximum value of 11.6140.

The relative size is also calculated with the log function. So, the mean is close to the median (0.8153 and 0.7874, respectively), and the standard deviation is close to zero.

The skewness values of the output gap and output gap of the year before are both negative, which means that the data is skewed left, while the skewness value of the deal and relative size are positive.

**Table 6- Descriptive Statistics of the numeric variables**

This table shows the descriptive statistics of the numeric variables. The Output Gap (proxy for economic cycle) is the value of output gap for the year of the announcement deal. Output Gap Year Before is the value of output gap considering the year before of announcement deal. Deal Size (LOG) is the logarithm of the transaction value. The Relative Size is the logarithm of deal size divided by the acquirer's market value of equity two months prior to the acquisition announcement.

	<b>Output Gap</b>	<b>Output Gap Year Before</b>	<b>Deal Size (LOG)</b>	<b>Relative Size (LOG)</b>
<b>Mean</b>	-0.0952	0.0087	6.3441	0.8153
<b>Median</b>	0.6	0.6	5.9949	0.7874
<b>Minimum</b>	-13.1	-15.6	4.6078	-5.9520
<b>Maximum</b>	8.1	8.5	11.6141	6.7112
<b>Std. Dev.</b>	2.7150	2.2272	1.4086	0.4269
<b>Variance</b>	7.3712	4.9607	1.9840	0.1823
<b>Skewness</b>	-1.4136	-1.1264	1.0049	0.9402
<b>Kurtosis</b>	5.7482	6.7385	3.5349	140.0593
<b>Obs.</b>	930	930	930	859

After the analysis of the descriptive statistics of the variables, it is possible to observe the existence of outliers, mainly in the CAR values. To handle this, it was used the winsorization<sup>2</sup> method to bring robustness to the estimators.

Hereafter, the CAR values will be considered after applying the winsorization method. The descriptive statistics of the CAR winsorized are present in annex 5.

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<sup>2</sup> Since the outlier was observed in the percentiles 1% and 99%, all observations greater than the percentile 99% took the value of the percentile 99%, and all observations lower than the percentile 1% took the value of the percentile 1%. Method considered by (Barnett & Lewis, 1994)

## 5. Results

In this section, the results obtained with the application of the methodology to our sample are presented. Firstly, the results will be discussed from a univariate point and then, from multivariate analysis, we will evaluate if the economic cycle has an impact on the acquirers' value creation.

### 5.1 Cumulative Abnormal Returns

It was conducted an event study for the event windows [-10; +10], [-10; +1], [-5; +5]; [-3; +3] and [-1; +1] to examine the impact of M&A announcement on stock returns of the acquirers' shareholders. The results obtained are displayed in table 7.

For the event window [-10; +10], which is the most extended period analyzed, the CAR value is positive but not statistically different from zero. Thus, the M&A announcement has no impact on the value creation of acquirers' shareholders during this period.

**Table 7- CAR for M&A Announcements across various Event Windows**

This table shows the results of the cumulative abnormal returns across all event windows. Note that this results already covers winsorized data. \*, \*\*, \*\*\*, indicates significance at 10%, 5% and 1% confidence level, respectively.

	<b>[-10; +10]</b>	<b>[-10; +1]</b>	<b>[-5; +5]</b>	<b>[-3; +3]</b>	<b>[-1; +1]</b>
<b>CAR (%)</b>	0.4929	1.0501***	0.8154***	0.8864***	1.1704***
<b>Positive CAR (#)</b>	532	538	527	528	546
<b>Non-Parametric test (z)</b>	3.217	4.239	4.230	4.548	5.767
<b>N</b>	930	930	930	930	930

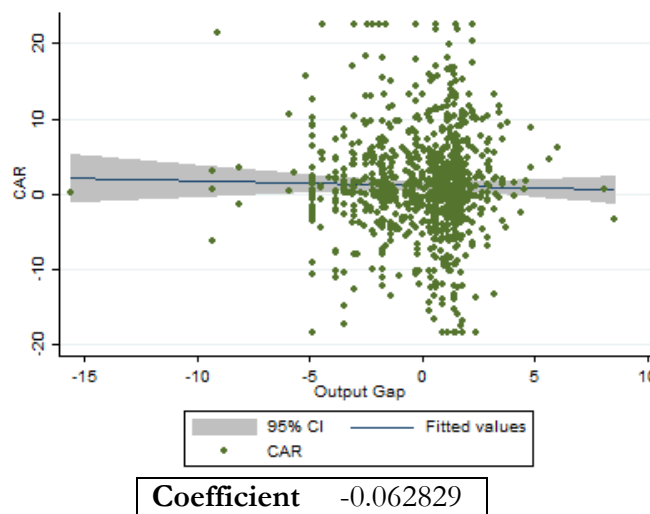
The CAR for the remaining event windows is positive and statistically different from zero, which means that the M&A announcement has an impact on the acquirers' shareholder returns. The highest CAR value is for the event window [-1; +1], suggesting that the investor who earns most are those that buy shares of the acquiring firm the day before the announcement and sell them one day after the announcement. These results are consistent with the ones reported by Goergen and Renneboog (2004) that reported positive abnormal returns for acquirers' firms in shorter event windows.

## 5.2 Univariate Analysis

As the main goal is to study the impact of the economic cycle on acquirers' shareholder's returns, we will analyze the relationship between the CAR for the event window [-1; +1] and the output gap of the year before<sup>3</sup>.

From figure 2 is possible to observe that for a one unit increase in the output gap, the CAR decreases, on average, 0.062829 units. However, this coefficient of the output gap is not statistically significant in explaining CAR values.

**Figure 2- CAR and Output Gap**



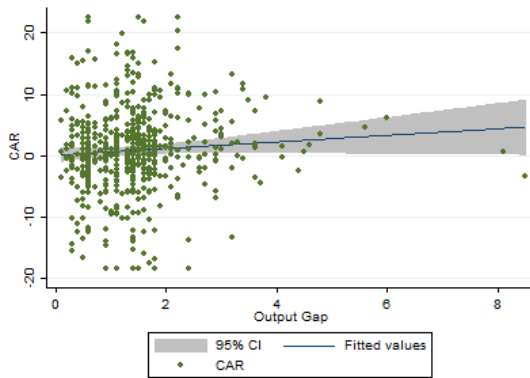
When the output gap is positive, i.e., when the economy is operating above its potential, for a one unit increase in the output gap, the CAR value increases, on average, 0.534817 units. In this case, the output gap is statistically significant in explaining CAR at a 10 % confidence level.

Conversely, when the economy is performing below its potential, for a one unit increase in the output gap, the CAR decreases, on average, -0.0292681 units. In this case, the output gap is not statistically significant in explaining CAR.

Regardless of the significance of the results, we can notice that when the output gap is positive, the increase in the CAR value is higher than the decrease verified when it is negative. Thus, when the economy is operating below its potential, the effect on the value creation of the acquiring shareholders is almost null.

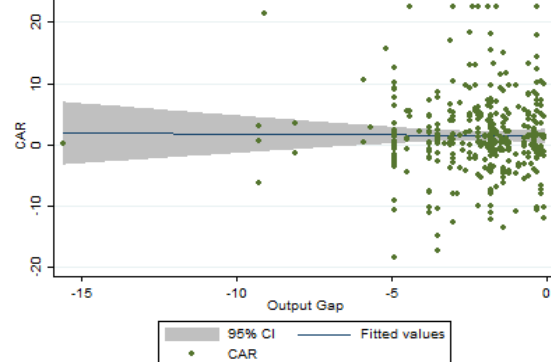
<sup>3</sup> The Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity was realized. We found no heteroskedasticity in none of the regressions.

Figure 4 – CAR and Output Gap if > 0



<b>Coefficient</b>	0.534817* <sup>4</sup>
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Figure 3 – CAR and Output Gap if < 0



<b>Coefficient</b>	-0.0292681
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In table 8, it is presented the results from testing the CAR for the event window [-1; +1] when the output gap is positive and when it is negative, this is, for the two sub-samples used in the specifications above. We perform a t-test to test the null hypothesis, defined as the mean of a positive output gap being equal to the mean of a negative output gap. We reject the null hypothesis at a 10% confidence level and accept the hypothesis of the mean of a negative output gap being higher than the mean of a positive output gap.

**Table 8-Positive Output Gap vs Negative Output Gap**

This table exhibit the results from testing the difference of a positive and negative output gap. \*, denotes significance at 10% level.

	<b>Positive Output Gap</b>	<b>Negative Output Gap</b>	<b>Difference</b>
<b>Mean</b>	0.9088	1.5700	0.6611*
<b>Median</b>	0.9711	1.0003	0.0291
<b>Std. Dev.</b>	7.0884	6.4531	
<b>Wilcoxon Rank-Sum test</b>			0.843
<b>Obs.</b>	562	368	

To trace possible signs of multicollinearity, we analyze the correlation coefficients between the variables used in our study. In general, there is no strong correlation between

<sup>4</sup> \* Indicate statistical significance at 10% level.



variables (annex 6), with the highest coefficient being 0.20 (between the CAR and the target firm being a subsidiary). Hence, we can rule out the violation of this classical assumption.

### 5.3 Multivariate Analysis

We have estimated our model, using a smaller [-1; +1] and a larger [-10; +1] event windows and different options for our main variable, the output gap. In regression **(1)**, we use the output gap of the announcement year. In regressions **(2)** and **(3)**, it was studied the impact when the output gap is positive or negative, respectively. Lastly, in regression **(4)** it was used a dummy variable of the output gap, which takes the value of one if the output gap is positive and zero otherwise. For regressions **(5)**, **(6)**, **(7)**, and **(8)** the logic was the same but instead of using the value of the output gap of the announcement year, it was used the value of the output gap of the year before. The results<sup>56</sup> obtained are displayed in tables 9 and 10.

Regarding our main independent variable, the output gap, we can observe that is only significant, at a 10% confidence level, in regression **(6)**, when calculated using the event window [-10; +1]. This event window is then more important than the event window [-1; +1] because it considers the potential effect of market anticipation and informational leakage. We can observe that when the economy is performing above its potential level, this is, the output gap is positive, an increase by one unit in the output gap will add, on average, 0.7841 points the value created for shareholders of the acquiring firm, *ceteris paribus*.

Concerning the control variables, it is possible to observe that only the variables representing the relative size, the target being a private firm, and the target being a subsidiary are statistically significant across almost all the regressions for both event windows used.

Consistent with previous works conducted by Asquith et al. (1983), Franks and Harris (1989), and Fuller et al. (2002), we found that the value created to the acquirers' shareholders increase with the relative size of the deal. About the legal status of the target, as expected, we found a positive relationship between private and subsidiary targets, and the

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<sup>5</sup> It was performed the Ramsey RESET test to verify if the model has omitted variables. Our model has no omitted variables; thus, it has no specification problems.

<sup>6</sup> The Breusch-Pagan/ Cook-Weisberg test for heteroskedasticity was realized. We found heteroskedasticity in regressions **(3)** and **(7)** for both event windows. To control for heteroskedasticity, we use robust standard errors, in order to assure that we are able to do proper statistical inference.

value creation. These results are in accordance with the literature (Chang (1998); Moeller et al. (2004); Faccio et al. (2006); Martynova and Renneboog (2011)).

The cross-border variable is only significant when the economy is performing below its potential (regression **(3)** of the two event windows and regression **(7)** using the shorter event window). However, contrarily to the expected, the coefficient is negative, i.e., *ceteris paribus* domestic bids decrease the value creation of acquiring shareholders. One possible explanation is the fact that we live in a globalized world and cross-border M&A may be an easy way to get access to new markets since it will take advantage of the expertise that the target firm already has.

Although not statistically different, the variable industry has a negative coefficient, meaning that related industries decrease, on average, the CAR value by a marginal amount. These results are consistent with the ones found by Capron and Pistre (2002) that performed a study only including related firms and verified a negative and not statistically different from zero impact on the abnormal returns, concluding that the fact of acquiring and target firms belonging to the same industry is not a necessary condition for the acquiring shareholders to profit from synergistic gains.

**Table 9- MLR [-1; +1]**

This table exhibit the results of the estimation of the multiple linear regression model for the event window [-1; +1]. The dependent variable is CAR. It contains the value of the coefficients between each independent with the CAR. The standard error of the coefficients is in parenthesis. \*\*\*, \*\*, \*, indicates significance at 1%, 5% and 10% confidence level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Output Gap</b>	0.01437 (0.0830)							
<b>If &gt;0</b>		0.2813 (0.3365)						
<b>If &lt;0</b>			0.0929 (0.1365)					
<b>Dummy Output Gap</b>				-0.3042 (0.4653)				
<b>Output Gap Year Before</b>					-0.0718 (0.1009)			
<b>If &gt;0</b>						0.4908 (0.3184)		
<b>If &lt;0</b>							-0.1212 (0.1759)	
<b>Dummy Output Gap Year Before</b>								-0.5595 (0.4615)
<b>Industry</b>	-0.1981 (0.4492)	-0.0389 (0.5985)	-0.4799 (0.6850)	-0.1985 (0.4490)	-0.1853 (0.4494)	0.1394 (0.6124)	-1.0261 (0.65029)	-0.1629 (0.4498)
<b>Cross-Border</b>	-0.0642 (0.4781)	0.8785 (0.6764)	-1.5200** (0.7407)	-0.0410 (0.4789)	-0.0526 (0.4780)	0.6314 (0.6398)	-1.1729* (0.7078)	-0.0311 (0.4783)
<b>Deal Size</b>	-0.0440 (0.1770)	-0.2084 (0.2244)	0.3633 (0.2899)	-0.0457 (0.1768)	-0.0479 (0.1769)	-0.1809 (0.2372)	0.3145 (0.2664)	-0.05329 (0.1769)

<b>Relative Size</b>	1.8009*** (0.5355)	1.8572* (1.0379)	0.8859 (1.2650)	1.8028*** (0.5352)	1.7958*** (0.5352)	0.4826 (0.7769)	3.3590*** (0.7021)	1.7831*** (0.5350)
<b>Private</b>	2.1459*** (0.6205)	2.2091** (0.9371)	2.07135** (0.94531)	2.0978*** (0.6204)	2.1072*** (0.6189)	2.2530*** (0.8670)	2.0800** (0.8868)	2.0493*** (0.6214)
<b>Subsidiary</b>	3.7925*** (0.5573)	3.4349*** (0.6303)	4.5649*** (0.8428)	3.7263*** (0.5576)	3.7469*** (0.5536)	3.1186*** (0.7405)	4.8948*** (0.8281)	3.7183*** (0.5537)
<b>Constant</b>	-1.5425 (1.3304)	-1.4404 (1.8458)	-2.6215 (2.2108)	-1.3252 (1.3647)	-1.5019 (1.3287)	-0.7938 (1.8302)	-4.6183** (2.0990)	-1.1187 (1.3701)
<b>R-Squared</b>	0.0703	0.0740	0.1014	0.0707	0.0708	0.0551	0.1569	0.0718
<b>Adjusted R-Squared</b>	0.0626	0.0615	0.0809	0.0630	0.0631	0.0421	0.1388	0.0642
<b>F-statistic</b>	9.19	5.90	4.93	9.25	9.26	4.24	8.67	9.41
<b>Prob (F-statistic)</b>	0.0000	0.0000	0.0000	0.0000	0.0000	0.0001	0.0000	0.0000
<b>N</b>	859	526	314	859	859	517	334	859

**Table 10- MLR [-10; +1]**

This table exhibit the results of the estimation of the multiple linear regression model for the event window [-10; +1]. The dependent variable is CAR. It contains the value of the coefficients between each independent with the CAR. The standard error of the coefficients is in parenthesis.

\*\*\*, \*\*, \*, indicates significance at 1%, 5% and 10% confidence level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<b>Output Gap</b>	0.0364 (0.1106)							
<b>If &gt;0</b>		0.4842 (0.4063)						
<b>If &lt;0</b>			0.0878 (0.2053)					
<b>Dummy Output Gap</b>				-0.2731 (0.6199)				
<b>Output Gap Year Before</b>					-0.1263 (0.1344)			
<b>If &gt;0</b>						0.7840* (0.4348)		
<b>If &lt;0</b>							-0.2030 (0.2211)	
<b>Dummy Output Gap Year Before</b>								-0.9742 (0.6143)
<b>Industry</b>	-0.6336 (0.5983)	-0.7786 (0.8077)	-0.5557 (0.9010)	-0.6361 (0.5982)	-0.6121 (0.5985)	-0.32566 (0.8363)	-1.5107* (0.8171)	-0.5732 (0.5987)
<b>Cross- Border</b>	-0.2212 (0.6368)	0.7757 (0.8525)	-1.6753* (1.0255)	-0.1974 (0.6381)	-0.1992 (0.6366)	0.4395 (0.8737)	-1.1020 (0.8895)	-0.1621 (0.6367)

<b>Deal Size</b>	-0.2687 (0.2357)	-0.36615 (0.3051)	-0.1254 (0.3621)	-0.2718 (0.2356)	-0.2764 (0.2355)	-0.3851 (0.3239)	0.13729 (0.3348)	-0.2856 (0.2354)
<b>Relative Size</b>	2.1299*** (0.7132)	1.62159** (0.8212)	4.1670*** (1.4736)	2.1289*** (0.7131)	2.1197*** (0.7128)	0.6652 (1.0610)	3.7986* (0.8823)	2.0976* (0.7123)
<b>Private</b>	1.5045* (0.8264)	1.6227 (1.1211)	1.21029 (1.2293)	1.4451* (0.8265)	1.4287* (0.8243)	1.6988 (1.1840)	1.2966 (1.1145)	1.32829 (0.8273)
<b>Subsidiary</b>	3.9716*** (0.7423)	3.4665*** (1.0138)	4.6677*** (1.1625)	3.8902*** (0.7429)	3.8809*** (0.7373)	3.2226*** (1.0113)	5.1672* (1.0407)	3.8317* (0.7371)
<b>Constant</b>	-0.1496 (1.7721)	-0.1552 (2.43714)	-2.1556 (2.7290)	0.0656 (1.8182)	-0.0684 (1.7696)	0.0372 (2.4994)	-3.62200 (2.6378)	0.59822 (1.8240)
<b>R-Squared</b>	0.0503	0.0460	0.0879	0.0504	0.0512	0.0386	0.1305	0.0530
<b>Adjusted R-Squared</b>	0.0425	0.0331	0.0670	0.0426	0.0434	0.0254	0.1118	0.0452
<b>F-statistic</b>	6.44	3.57	4.42	6.45	6.55	2.92	5.71	6.80
<b>Prob (F-statistic)</b>	0.0000	0.0009	0.0001	0.0000	0.0000	0.0052	0.0000	0.0000
<b>N</b>	859	526	314	859	859	517	334	859

## 6. Conclusions

With a sample composed by the announcements of European Union acquiring firms that took place during the period 2000-2020, the purpose of this research was to evaluate the behavior of the acquirers' shareholders around the M&A announcement and, most importantly, to understand if the economic situation has an impact on those returns.

We conduct an event study to calculate the CAR around the announcement day for multiple event windows. Then, we perform a multiple linear regression model with the output gap, which is the variable used as a proxy to the economic cycle, as the principal independent variable to gauge the effect on CAR.

The results evidence that, in general, the cumulative abnormal returns resulting from the announcement of an M&A are positive and statistically different from zero. However, this conclusion depends on the event window used, i.e., on the investment window of the investors. The highest value was verified on the smallest window, indicating that the market responds more positively on the day before and one day after the announcement. In the more extensive window, the abnormal returns, although positive, were close to zero and not statistically significant.

Regarding the influence of the economic cycle on the magnitude of the abnormal returns, the results demonstrate that when the economy is operating above its potential, the CAR value increases and is statistically significant in explaining them. Conversely, when the economy operates below its potential, the CAR value decreases but is not statistically significant. These conclusions follow previous literature on the topic, namely Bouwman et al. (2009) that found that in the short run, the acquisitions announced when the market was booming generated significantly better returns than the acquisitions announced when the market was depressed.

When adding the explanatory variables regarding the deal and the target characteristics, the output gap is only significant when positive and for the event window [-10; +1]. We also found that the relative size of the deal and the private and subsidiary status of the target has a positive and statistical significance on the returns generated by acquiring firms.

Concluding, from a broader perspective, the results suggest that if the acquisition is announced when the output is above its potential, the higher the output gap (considering the year before the announcement), the greater the value created for acquirer shareholders. These

results are also accurate when we control for other factors such as industry, the legal form of the target, the deal, and relative size.

For future research recommendations, we believe that the study can be conducted in other M&A markets such as the USA, which is the biggest. Additionally, could be interesting to examine the event for more widely post-announcement event windows to see the behavior of the returns in the long run like in Bouwman et al. (2009).



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## Annexes

Annex 1- Description of Independent Variables		
Variable	Description	Source
Relative Size	The deal size divided by the acquirer's market value of equity two months prior to the acquisition announcement.	Acquirer market value from Thomson Reuters DataStream
Related Industries	=1 if the target and the acquirer are in the same industry; =0 otherwise.	Thomson Reuters EIKON
Cross-Border	=1 if the target and the acquirer are in the same country; =0 otherwise.	Thomson Reuters EIKON
Deal Size (log)	The logarithm of the transaction value.	Thomson Reuters EIKON
Private	=1 if the target is a private entity; =0 otherwise	Thomson Reuters EIKON
Subsidiary	=1 if the target is a subsidiary of another firm; =0 otherwise	Thomson Reuters EIKON
Output Gap	Proxy to economic cycle.	AMECO Online

Annex 2- Distribution by Acquirer Nation		
Country	Nº	of Percent Acquirers
Austria	8	0.86
Belgium	24	2.58
Croatia	1	0.11
Cyprus	3	0.32
Denmark	23	2.47
Finland	32	3.44
France	139	14.95
Germany	70	7.53
Greece	6	0.65
Hungary	1	0.11
Ireland	28	3.01
Italy	48	5.16
Lithuania	1	0.11
Luxembourg	10	1.08
Malta	2	0.22
Netherlands	52	5.59
Poland	10	1.08
Portugal	4	0.43
Slovenia	3	0.32
Spain	59	6.34
Sweden	65	6.99
United Kingdom	341	36.67
<b>TOTAL</b>	930	100

Annex 3- Distribution by Target Nation		
Country	Nº	of Percent Targets
Australia	15	1.61
Austria	3	0.32
Belgium	9	0.97
Brazil	9	0.97
Canada	32	3.44
China (Mainland)	6	0.65
Denmark	11	1.18
Finland	11	1.18
France	59	6.34
Germany	37	3.98
Greece	4	0.43
India	4	0.43
Ireland	6	0.65
Italy	45	4.84
Malta	3	0.32
Netherlands	43	4.62
Norway	12	1.29
Poland	10	1.08
Portugal	6	0.65
Russia	7	0.75
Slovenia	3	0.32
South Africa	5	0.54
Spain	43	4.62
Sweden	33	3.55
Switzerland	16	1.72
United Kingdom	205	22.04
United States	258	27.74
Others	35	3.76
<b>TOTAL</b>	930	100



<b>Annex 4- Distribution by Industry</b>				
<b>Industry</b>	<b>N° of Acquirers</b>	<b>Percent</b>	<b>N° of Targets</b>	<b>Percent</b>
Advertising & Marketing	23	2.47	20	2.15
Aerospace & Defense	20	2.15	12	1.29
Alternative Energy Sources	6	0.65	12	1.29
Automobiles &Auto Parts	7	0.75	13	1.40
Automobiles & Components	12	1.29	4	0.43
Biotechnology	16	1.72	24	2.58
Building/Construction & Engineering	51	5.48	45	4.84
Chemicals	29	3.12	28	3.01
Construction Materials	11	1.18	9	0.97
Containers & Packaging	13	1.40	10	1.08
Electronics	9	0.97	7	0.75
Food & Beverage Retailing	10	1.08	8	0.86
Food Processing	17	1.83	13	1.40
Food and Beverage	49	5.27	54	5.81
Healthcare Equipment & Supplies	26	2.80	26	2.80
IT Consulting & Services	26	2.80	31	3.33
Internet Software & Services	11	1.18	25	2.69
Machinery	28	3.01	24	2.58
Metals & Mining	42	4.52	38	4.09
Oil & Gas	45	4.84	48	5.16
Paper & Forest Products	7	0.75	10	1.08
Pharmaceuticals	71	7.63	59	6.34
Power	30	3.23	20	2.15
Professional Services	37	3.98	34	3.66
Publishing	31	3.33	19	2.04
Software	23	2.47	50	5.38

Telecommunications Equipment	16	1.72	8	0.86
Telecommunications Services	33	3.55	17	1.83
Textiles & Apparel	8	0.86	14	1.51
Transportation & Infrastructure	37	3.98	46	4.95
Water and Waste Management	7	0.75	12	1.29
Wireless	9	0.97	21	2.26
Others	170	18.28	169	18.17
<b>TOTAL</b>	<b>930</b>	<b>100</b>	<b>930</b>	<b>100</b>

**Annex 5- Descriptive Statistics after applying winsorization method**

	<b>CAR</b> <b>[-10; +10]</b>	<b>CAR</b> <b>[-10; +1]</b>	<b>CAR</b> <b>[-5; +5]</b>	<b>CAR</b> <b>[-3; +3]</b>	<b>CAR</b> <b>[-1; +1]</b>
<b>Mean</b>	0.4929	1.0501***	0.8154***	0.8864***	1.1704***
<b>Median</b>	1.2694***	1.1386***	1.2188***	0.8052***	0.9753***
<b>Minimum</b>	-36.0872	-26.1927	-30.2601	-23.2863	-18.4543
<b>Maximum</b>	30.4519	30.0567	25.2119	21.9819	22.5416
<b>Std. Dev.</b>	11.1509	9.0248	9.0430	7.8329	6.8481
<b>Variance</b>	124.3446	81.4462	81.7769	61.3558	46.8968
<b>Skewness</b>	-0.4808	0.0096	-0.4338	-0.2696	0.1193
<b>Kurtosis</b>	4.4203	4.5843	4.59625	4.2345	4.4159
<b>Obs.</b>	930	930	930	930	930

**Annex 6- Correlation Matrix**

	<b>CAR</b>	<b>Industry</b>	<b>Cross-Border</b>	<b>Deal Size</b>	<b>Relative Size</b>	<b>Private</b>	<b>Subsidiary</b>	<b>Output Gap</b>
<b>CAR</b>	1.000							
<b>Industry</b>	-0.0186	1.0000						
<b>Cross-Border</b>	0.0233	-0.0644	1.0000					
<b>Deal Size</b>	-0.0787	0.0512	-0.1034	1.0000				
<b>Relative Size</b>	0.0994	0.0234	0.1129	0.1296	1.0000			
<b>Private</b>	0.0501	-0.0084	-0.0177	-0.3026	0.0475	1.0000		
<b>Subsidiary</b>	0.2007	-0.0204	0.0598	-0.1688	-0.0724	-0.3613	1.0000	
<b>Output Gap</b>	-0.0447	0.0433	0.0244	0.0098	-0.0054	-0.0364	-0.0585	1.0000