The revenue growth performance of global M&A transactions. A benchmarking study by market & sector

Abstract. This paper evaluates the impact of the global M&A transactions on revenue growth performance by employing a paired samples t-test methodology. Using the paired samples t-test this paper provides an answer on the importance of M&A deals in terms of topline revenue growth by sector and geographical regions. Although most of the articles in the literature have studied the associated of M&A with stock returns and cost synergies, very few have been focused on capturing revenue synergies that can be crucially important for growth companies or startups that aim to rapidly increase their market share.

Keywords: Mergers, Acquisitions, paired samples, t-test, price-to-earnings ratio, revenue, growth

JEL Classification: C12, G34, G32, H20, O40

1. Introduction
Global M&A research revealed a great amount of information about shareholder value, cost synergies and financial performance. Very few academic papers study the relationship between acquisitions and revenue growth performance. Capturing revenue synergies in M&A deals often takes a back seat to securing cost synergies. This paper creates focus on revenue growth in relation to
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M&A activity. While cost synergies can be enough to justify an acquisition, revenue synergies can become a heavier task for M&A analysts. Therefore, this study aims to quantify at the global level what are the industries, world regions, and economic periods that perform better in terms of revenue growth as a result of their acquisitions.

2. Literature Review

The topic of mergers and acquisitions (M&A) has benefited from a robust academic interest in recent decades. Under the influence of globalization and economic integration, businesses are constantly exposed to a broader competition and a higher risk of uncertainty. Therefore, to survive and grow in a more complex business environment, many companies have oriented their focus to M&A strategies.

In the economic literature, M&A is described as “a combination of assets and liabilities of two companies to form a single but larger entity, which could be similar in size to merging or a larger or more resourceful firm absorbs a smaller (or weaker) one as acquisition” (Chui, 2017). Mergers and acquisitions represent today an important process in the development of a company. There are more than 300 thousand M&A deals with a higher value than 1 million dollars that took place at global level between 2000 and 2020. Also, the M&A research tends to expand in many academic areas such as economics (Mankiw, 2006), law (Coates, 2015) or marketing (Christofi et al., 2017). The M&A regulation environment starts in 1914 in USA with the Clayton Antitrust Act, and more recently in 2004 the EU - Council Regulation (EC) No 139/2004 of 20 January 2004 on the control of concentrations between undertakings (the EC Merger Regulation).

But, as the recent research findings illustrate, this topic has started to attract interest of scholars and practitioners from a larger spectrum of disciplines related to behavioral, institutional, and cultural factors that improved the understanding of non-economic aspects of M&A’s, and particularly to explain why some firms fail to meet their financial goals. Indeed, in recent years, ‘research into the human and psychological aspects of M&A has increased in prominence, (but) the M&A literature continues to be dominated by financial and market studies’ (Cartwright, 2005).

In practice, many firms take advantage of M&A to capture new market opportunities, to gain a better position in the relevant market, and ultimately to increase their profits. Therefore, the strategical approach of M&A is mainly guided by the potential economic benefits of M&A such as economies of scale, and synergy effects in the area of administrative, sales, reputation, and market share (Carney, 2009). Based on their research findings, Eun and Resnick (2007) emphasize that the synergetic gains created are the primary factor for companies to start M&A. In addition to this, Carney indicates some non-financial motives that
favor M&A decisions such as CEO’s power domination, overconfidence, and ego (Carney, 2009). According to Dorata (2012), the strategic motivations of M&A can be divided into three categories based on some major drivers: resource-driven strategies, market-driven strategies, and risk-driven strategies. Valuable and innovative findings can also be identified in recent research developed by De Bodt et al. (2014). Since the largest body of literature has extensively focused on determinants of mergers and the expected outcomes of the acquiring firms, they explored the process of M&A following a different perspective: Why are the target shareholders willing to sell? To what extent are the bid premium, the probability of deal success, and the target shareholders profit functions of the willingness to sell?

According to Grimpe and Hussinger (2008), for the small companies that are acquired, the most important factors in the M&A deals are the numbers of patents & technologies that they own, and the case of big companies acquisition the nontechnological aspects come on top. For companies to develop, there is a high need for research & development investments. This process is indeed long-term one and implies certain risks, meaning that it does not always get finalized with the expected results. Furthermore, the literature suggests that M&A transactions do not generate positive returns for shareholders or from an operational point of view for the acquiring company (King et al., 2004). This is why there are cases where companies would prefer to acquire a firm that has already finalized the needed research, owns the patent, and has a great experience in the targeted business (Ahuja & Katila, 2001). Therefore, the acquiring companies aim to increase their market share with the aim to create a monopoly or oligopoly market (Andrade et al., 2001), increase their revenues, create cost synergies and improve their profit margin (Ahuja & Katila, 2001). It has to be taken into account that when an acquisition is made, the transaction costs are increasing in a substantial manner due to the extended negotiation time, advisory, or even business travel expenses (Khan et al., 2005). On top, there are often challenges that can appear linked to organizational culture differences that can lead to negative M&A performance as a result of employee productivity reduction, decrease of management authority, excessive personnel turnover, job safety & career. Other transactional costs can be represented by the acquisition announcement premium, calculated as the difference between the acquisition price and the price before the announcement, according to Laamanen (2007), companies can pay even up to 50% on top of the market value of the acquired company, which has an obvious high impact on the profitability of the investment.

Horizontal, vertical and conglomerate mergers and acquisitions are the three types of mergers and acquisitions (Gaughan, 2017). The term "horizontal integration" or "horizontal merger" refers to a transaction in which the firms involved manufacture or supply the same goods or services, this form of agreement accounts for the vast majority of M&A transactions. Horizontal mergers include Disney’s 7.4 billion dollar acquisition of Pixar in the media-entertainment business in 2006, Google's 1.65 billion dollar acquisition of YouTube in the technology industry in 2006, and
Exxon and Mobil's 78.9 billion dollars megamerger in 1998. Because any reduction in the number of firms operating in the same industry might offer additional market power to the companies that survive, especially the acquirer, horizontal mergers frequently attract the attention of competition authorities. Vertical mergers are business combinations with a buyer-seller relationship. The eyewear business in the United States is a good example. Luxottica, an Italian manufacturer, extended its presence in the United States through a series of acquisitions. It was able to buy big brands like Ray-Ban and Oakley, as well as shops like LensCrafters and Sunglasses Hut. In the case where in the transaction are involved two firms that are not rivals and do not have a buyer–seller relationship, a conglomerate merger occurs. Philip Morris, a tobacco corporation, bought General Foods for $5.6 billion in 1985, Kraft for $13.44 billion in 1988, and Nabisco for $18.9 billion in 2000. Philip Morris, which eventually changed its name to Altria, had leveraged the cash flow from its food and tobacco companies to diversify its business and become less of a domestic tobacco firm and more of a food company (Gaughan, 2017). Taking into account the past experience and analyzing the intensity of M&A’s in time, the researchers have found that the M&A process does not follow a linear path in time. Their findings identify so-called merger waves based of different determinants. According to Gugler et al. (2012), many mergers occur during stock market booms, because the optimism that prevails in capital markets during such booms weakens the constraints on managers, thereby allowing them to undertake wealth-destroying mergers. Some other scholars follow a standard neoclassical assumption in explaining the M&A waves within industries. If a particular industry experiences a sectorial shock, then the mergers within that particular sector becomes profitable (Harford, 2005). Another behavioral determinant of M&A waves is described by Shleifer and Vishny (2003): many firms become overvalued during a stock market boom, and the managers of these firms undertake mergers to exchange their overvalued share for real assets; this can be seen as one of the very important factors that generate negative returns for the acquiring companies and their shareholders (King et al., 2004). The legal determinant was also relevant for M&A waves in the last century. The antitrust laws and active enforcement have made merger for market power difficult to achieve since the 1940s (Andrade et.al., 2001). On contrary, in 1990s, governments deregulated to some extent the business environment and the legal constraints that prevent monopolies were relaxed, firms have had more financial incentives to undertake mergers and create market power. Today, the phenomenon of M&A becomes more and more present in the global business environment. But an ex-post evaluation of the success of these strategical decisions in the last century is questionable for both scholars and practitioners. Despite significant achievements and the prevalence of M&A, not every M&A case successfully achieves its strategic or financial objectives (Chui, 2017). Analyzing M&A in the European market, Kitching identified failure rates of 46-50% based on managers’ self-reports (Kitching, 1974). And considering more
recent findings, despite the volume of capital involved, the results are still in sharp contrast with the estimated net result. According to Mitchell et. al. (2001), three of four M&A deals fail and produce disappointing results. An examination of the returns to acquiring firm shareholders also illustrates that M&A continue to produce negative average returns similar to those seen historically (Cartright & Schoenberg, 2006). Therefore, the research question related to whether M&A is wealth-creating for shareholders or not is still valid today as it was one century ago.

In this paper, we analyze the M&A environment from a revenue growth perspective. We focus on small, mid, high and mega cap M&A deals which are higher than 1 million dollars per transaction, it is important to mention that we include in our analysis only public companies listed on the stock market in order to source the P&L revenue data from the Thomson Reuters Eikon (Refinitiv) database. Our dataset includes 3200 M&A transactions between 2004 and 2020 for which the analysis is done by different sectors and geographical regions. The analysis will be a short and mid term one showcasing the impact of the M&A deals 1 and 2 years post-M&A compared to 1 year pre-M&A. We aim to understand if there are better and worse periods for this kind of investment activity from a revenue growth standpoint, especially important for growth companies. In the case of growth companies the valuation is focused mainly towards Price-to-sales (P/S) multiples, as where there is no direct profit metric, the valuation is done via relative comparison with the main peers from the industry. For example, if there is a growth company with a P/S of 5, if the average of the net profit margin from the main peers is 20%, then the company is valued at a hypothetical P/E of 25 (5/0.2). The special case of growth company is that these kinds of companies realize aggressive investments in the first years of start-up in order to gain accelerated revenue growth and market share. This study aims to quantify at global level what industries, world regions, and economic periods perform better in terms of revenue growth as a result of their acquisitions.

The next sections are as follows. Section 3 describes the methodology we use and identifies the sample of M&A events between 2004 and 2020. The sample is adjusted considering region and sector. Section 4 illustrates the data and results of our analysis on the revenue growth performance of global M&A transactions. Some conclusions are drawn in the final section.

3. Methodology

The M&A environment defined in this paper is represented by all M&A transactions greater than 1 million USD for companies listed on the stock market around the world, resulting in the analysis of 3227 M&A events. While taking a parsimonious approach with the paired samples t-test methodology, the analysis in this paper is done at the global level with the following regions: North America, Europe, Japan, Asia Pacific, excluding Central Asia, Central & South America,
Africa, Middle East, and Central Asia. When running the analysis by sector, the chosen split is the following: Energy, Financials, FMCG, Health Care, Real Estate, Services, Technology, Industrials & Materials.

This paper provides novel evidence of post-merger and acquisition revenue growth performance of acquiring firm compared to pre-merger. The key study topic examined in this paper is the statistical significance of the revenue growth ratio for 3,227 M&A events around the world. The analysis will determine if 1 year before the merger and 1 or 2 years following the merger the aggregated acquisition effect created revenue synergies by sector and world region. It is important to mention that the study is focusing only on acquisitions in which the company fully acquires 100% of the target company; this will help to provide a detailed understanding of the phenomenon.

The difference between post-M&A performance and pre-M&A revenue growth performance was assessed using a paired samples t-test. The paired-samples t-test compares two variables from the mean of the same group. It examines whether the difference between the two variables' means differs from zero in a significant manner from a statistical point of view. The paired-samples t-test analyses if the variable before and after merger and acquisition has changed significantly. The paired-samples t-test compares the mean of two variables from the same group before and after an event. The performance of those businesses whose data is accessible pre-M&A and post-M&A has been examined. Acquisition event analysis is done by sector and region at the global level between years 2005 and 2019.

Statistical analysis is done by closely following the paired sample t-test methodology applied by Rani et al. (2016). With the objective of comparing if two samples in which data from one sample can be matched with observations from the other sample, a paired t-test is used to compare two population means.

Suppose n numbers of acquisition events have been made at time t, the comparison will be made by comparing the events of revenue growth events% at t-1 compared to t + 1 and t+2, where “t” is the year of the acquisitions. The results of the tests can be used to draw conclusions about the impact of acquisition deals by industry, world and timeline.

Let \( x = \text{revenue growth percentage before the acquisition event (t-1)} \), \( y = \text{revenue growth percentage post-acquisition (t+1 or t+2)} \).

The approach for testing the null hypothesis that the real mean difference is zero is defined as follows:

I. Calculate the difference: \( d_i = y_i - x_i \) between the two observations for each pair, ensuring that positive and negative differences are distinguished.

II. Calculate the mean difference: \( \bar{d} \)
III. Calculate the standard deviation of the differences, $S_d$, and use it to compute the standard error of the mean difference, $SE(\bar{d}) = \frac{S_d}{\sqrt{n}}$.

IV. Calculate t-statistic, which is given by $T = \frac{\bar{d}}{SE(\bar{d})}$. Under the null hypothesis, this statistic follows a t-distribution with $n - 1$ degrees of freedom.

V. Using the tables of the t-distribution, the p-value for the paired t-test can be obtained.

### 4. Data and results

The data used in this paper consist of annual & daily data from Refinitiv between 2004 and 2020 that are used to estimate all paired samples t-test for the revenue growth performance and descriptive statistics. Description of each variable and dataset can be found in Table 1.

<table>
<thead>
<tr>
<th>Variables</th>
<th>Description and source</th>
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<td>Worldwide Acquisition Deals between 2004-2020 &gt; 1 million USD</td>
<td>In millions of USD absolute values. Data source: Refinitiv.</td>
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<td>Revenues of the acquiring companies 2004-2020</td>
<td>In millions of USD absolute values. Data source: Refinitiv.</td>
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<td>Price to Earnings multiples for each deal</td>
<td>Stock Price/Eps for the acquired companies. Data source: Refinitiv</td>
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<td>Deal Purpose from each acquisition deal</td>
<td>Synopsis for each M&amp;A deal. Data source: Refinitiv</td>
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In order to link the revenue synergies with the valuation side of M&A, the P/E ratios weighted average by the acquisition value are presented in Figs. 1 and 2. Denoted by the following formula: $\sum \frac{DP_i}{\sum DP_i} \cdot P_i$, where:
$D_{V_t}$ represents the deal value of the specific acquisition event, $\sum_{t} D_{V_t}$ is the total deal value from the respective sector or world region, $P_t$ is the acquisition price of the acquired company and $E_t$ is represented by the net earnings in the last fiscal year for the acquired company.

Figure 1. P/E Ratio by sector

Figure 2. P/E ratio by region

Figure 3. Deal Purpose from Deal Synopsis

In Figures 1 and 2 there is evidence of the earnings multiple for the acquired companies. It can be obvious to be seen that the highest multiples in regions are in in USA (almost 120) and in Europe close to 60, while to lowest find themselves in Africa and Asia close to 20. When looking at the acquisition P/E ratio by sector the Financials and Leisure sector stand out with the highest P/E ratios (in the area of 250). The overall P/E ratio valuation picture is exposing an overall tendency of overpayment considering that the S&P 500 average P/E ratio from the last 20 years is at a multiple of 26 (Fig.7). According to Aktas (2016), this can be linked to CEO narcissism that tends to have the disposition to overestimate the potential of cost synergies and overconfidence in their own abilities to influence business growth.

At the same time, from Figure 3 it can be seen that from the M&A universe defined in this paper, 38% are declared to be done to strengthen operations, 33% are done to create cost synergies in order to maximize profit and 13% is to expand
the business in new countries. In summary, 84% of M&A deals have a clear financial reason in sight from the start. This is sourced from the Refinitiv database deal synopsis that provides a brief summary for the M&A reason.

Figure 4. Significant revenue growth or decline as a result of M&A by region
NA = North America, EUR = Europe, ASIA = Asia and Pacific Excl. Central Asia, C&S A= Central & South America, AFR = Africa & Central Asia, JAP = Japan (0,1) axis = significant revenue growth, (-1,0) axis = significant revenue decline. Data & Graph Source: Author’s Processing.

Figure 5. Significant revenue growth or decline as a result of M&A by sector

$E =$ energy, $F =$ financials, $FMCG =$ Fast-Moving Consumer Goods, $HC =$ Health Care, $IM =$ Industrials and Materials, $RE =$ real estate, $S =$ Services, $T =$ Technology. (0,1) axis = significant revenue growth, (-1,0) axis = significant revenue decline. Data & Graph Source: Author’s Processing.

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<th>Table 2 – Acquisitions value % by sector</th>
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According to Figures 4 and 5 it is obvious that before 2009 all M&As resulted in statistically significant revenue decline across sectors and geographical regions, bringing to light the fact that the great recession directly impacted this type of investment confirming the procyclical nature for the M&A activity. After 2009 the best region for M&A investments is North America, being the only one that is generating statistically significant revenue growth almost every year after 2009, this only happens 1 year after the M&A or 2 years after the acquisition deal. The second best region is Japan, which generated statistically significant revenue growth in 2013, 2017, and 2018, while Europe, Asia, Africa, Central & South America mostly did not show significant growth or a significant revenue decline as a result of the M&A activity.

When looking by sector, the financial industry is the one benefiting mostly about significant revenue growth after 2009 until present, since 2015 energy is showcasing significant revenue growth linked to M&A activity as well. FMCG is marginally benefiting from the M&A activity while Health Care, Services, Technology, Industrials & Materials show either an aggregated decline in revenue or not a significant growth rate. The analysis on the Real Estate industry is showcasing a particularly important finding, that would be that in terms of revenue growth the Real Estate sector never benefited from M&A activity in terms of significant revenue growth, the only statistically significant revenue growth is shown in 2007 where the real estate prices has been the base for the bubble that caused the great recession, proving that the M&A activity in the Real Estate sector does not generate revenue growth.

Figure 6 – S&P 500 Historical P/E Ratio (2000-2021)
Data Source: Refinitiv. Graph Source: Author’s Processing.

Figure 7 – Average monthly VIX index (2000-2021)
Data Source: Refinitiv. Graph Source: Author’s Processing.
When correlating the percentage of deal value over time (Table 2) in each industry with the economic uncertainty proxied by the VIX index in Figure 7 (Bonciani, 2016; Horvath & Zhong, 2019) there is an obvious procyclical character of the M&A deals. When the uncertainty is high in 2008 during the great recession, we had the lowest deal value percentage in all industries and significant revenue decline despite the M&A activity. While when the uncertainty has the lowest value in 2017, we can see in Table 2 that we have in most of the industries the highest investment levels from the dataset.

5. Conclusions

The best geography-based location for revenue growth as a result of the M&A activity is North America, followed by Japan. The most prolific sector for significant revenue growth as a result of M&A is the financial industry. Overall, it can be said that M&A activity does not generate significant revenue growth in all the world regions and in all sectors. Moreover, there is novel evidence that significant revenue growth as a result of M&A is happening just as a result of the economic cycle, finding that is confirmed also by Fig.7 that expresses the stock market implied volatility from the last 21 years. One very important aspect to point out is that M&A transactions are usually done at a higher P/E ratio compared to the average representative indexes as the average S&P 500 P/E ratio, which can be found in Fig.7 stands historically at an average of 26 in the last 2 decades according to Refinitiv data, while the USA weighted average M&A P/E ratio is above 100, meaning that there is a tendency of overpayment due to overconfidence and synergy premium belief. Additionally, the higher the P/E ratio, the higher the probability of significant revenue growth. There is negative correlation between acquisition of “value companies” with low P/E ratios and “growth companies” with high or non-existent P/E ratios. As the sectors and regions with the highest P/E ratios at acquisition time (North America and the Financial sector) are the ones benefiting from statistically significant revenue growth as a result of their investments.

The results from the current study need to be interpreted with caution, as they refer only to public companies and they do not offer the cost and profit side of the analysis. For further research, we intend to extend the analysis on the latest cost synergies & profitability benchmarking as a result of the global M&A transactions.
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