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Interaction between VC Investments and lagged M&A Activity across different countries

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GLOSSARY

Throughout the thesis, the terminology included in this glossary will be reiterated on several occasions. The purpose of this section is to make it easier to understand the concepts and technical terms used in this work by offering comprehensive and precise definitions. This will help readers navigate and interpret the text more effectively.

Start-up: a startup is a recently formed company that is usually distinguished by innovation, scalability, and a focus on solving a certain market demand or issue. Many times, startups work in developing sectors and use technology to disrupt established business models. Usually still in the early phases of development, these businesses are looking for quick expansion and frequently depend on outside financing, including venture capital, to support their expansion.

Venture Capital (VC): Venture Capital (VC) is a type of finance given by investors to startups and small businesses that show great development potential but might not have access to more conventional sources of capital. Venture capitalists usually take equity shares in the business in return for their investment and actively participate in directing its operations and strategic orientation. This kind of investment has a greater risk, but should the business flourish, it may provide large profits.

Mergers and Acquisitions (M&A): M&A, or Mergers and Acquisitions, is a strategic business activity in which businesses are consolidated via a variety of transactions including takeovers, mergers, acquisitions, and consolidations. Combined assets, resources, and operations of two or more companies are the goals of M&A activities, which also seek to improve competitiveness, increase market share, and enter new markets. These are sometimes complicated transactions that need meticulous preparation, discussion, and regulatory clearance.

Initial Public Offering (IPO): An IPO, or Initial Public Offering, is the procedure by which a privately owned corporation makes its shares available to the public for the first time, therefore becoming a publicly listed firm. A corporation may raise money from outside investors to support its objectives for development and expansion by holding an IPO. Together with giving current owners liquidity, this historic occasion makes it possible for investors to freely purchase and sell the company's shares on the stock market.

ABSTRACT

Venture Capital (VC) is widely recognized as a crucial factor for startup growth, and several policies are often designed by governments to ensure a higher availability of this type of finance. However, there is a concern that in an economy without economic dynamism and the resulting prospects for growth, venture capital may not help promote the projected growth. Conversely, the weakness of venture capital may be a sensible response by investors and it could signal that something in the economy is not working properly.

This work particularly investigates the causal and temporal relationship between Mergers and Acquisitions (M&A) and Venture Capital investments, arguing that a more active M&A market may act as a precursor, with a certain time lag, to increased Venture Capital activity, because investors react positively to better exit opportunities. Few studies have investigated the complex dynamics between M&A and VC markets, this study aims to fill the gap through a cross-country perspective, contributing to the academic debate and offering insights to investors, governments, and policymakers.

A systematic review of the literature on subject matter has been conducted. Furthermore, a total of 10 relevant nations have been specifically selected, and comprehensive data has been obtained regarding their GDP, long-term interest rates, number and value of venture capital investments, as well as the number and value of mergers and acquisitions investments.

A preliminary analysis with correlations and graphs was first carried out for each country. Based on the temporal lags identified, a multivariate linear regression model has been developed and the regression line equation derived. Furthermore, an indicator for Venture Capital market maturity has been defined and calculated, in order to identify three clusters of countries. Finally, an Autoregressive Distributed Lag (ADL) model was run to also leverage the time series information of lagged VC activity that serves as the dependent variable.

The findings of the study demonstrate that the number and the value of VC investments in a given year and country can be explained with statistical significance by the number of M&A deals, GDP, and long-term interest rates with a temporal lag. The model confirms enhanced

predictability in more mature VC markets, like USA, Canada, UK and Israel, where lagged M&A activity significantly influences both the value and the number of VC transactions. The USA, with its well-established financial market, exhibits the most robust results, exceptionally showing that lagged M&A transactions, GDP, and long-term interest rates outweigh the significance of the autoregressive component of lagged VC transactions.

In contrast, the results highlight that in less mature markets, such as Japan, Italy, and Spain, the influence of lagged M&A activity on VC investments is poorer, reflecting the absence or weakness of a virtuous system that supports this dynamic.

Overall, the application of the ADL model and the interpretation of the results on the basis of VC market maturity constitute novel elements in the research field in which the study fits, and are intended to stimulate the academic research in the complex determinants of the VC market and the joint cross-country dynamics with the M&A market.

1 Introduction

Innovation financing has seen a substantial transformation in recent decades with emerging enterprises changing the way they access capital.

In particular, Venture Capital (VC) finance is playing an increasingly important role in supporting and encouraging entrepreneurial innovation and consequently fostering technological advancement and economic progress.

The final purpose of Venture Capital is to generate big capital gains by investing in high-growth innovative businesses and exiting them at the proper moment and with an attractive valuation. The exit strategy is determined by several factors and in recent years there has been a shift in the paradigm with Venture Capitalists preferring an exit via Mergers and Acquisitions (M&A), unlike in the past when they preferred exits via Initial Public Offerings (IPOs).

However, the landscape of Venture Capital investments is dynamic, driven by a wide range of macroeconomics and sectoral factors. Many studies have investigated the importance of the exit strategy and some studies tried also to formalize the key determinants and the cross-country variations in Venture Capital financing.

Several academic papers compared the IPO activity with the Venture Capital market, but the literature relating M&A and VC market is much poorer.

This thesis aims to fill this gap by analyzing the causal and temporal links between M&A and VC markets to contribute and stimulate new perspectives to the academic discourse. Through a cross-country perspective, the analysis will examine possible relationships and time lags, suggesting that the M&A activity influences the Venture Capital market with a certain time lag.

As a first step, the current literature will be reviewed to provide the reader with an overview of Venture Capital financing, the importance of an exit strategy, the determinants, and cross-country variances in Venture Capital investments.

Based on the literature review, 10 countries (USA, Israel, Canada, Japan, Germany, Spain, Italy, France, Netherlands, United Kingdom) will be analyzed to understand if VC activity and lagged M&A activity are correlated both in terms of number of investments as well as in terms of value of investments.

Furthermore, the GDP and the long-term interest rates will also be considered in order to build a multivariate linear regression model using macroeconomic variables and M&A activity, trying to predict the number and the value of VC investments in a given country. Three country clusters have been identified through the definition and calculation of an indicator for the venture capital market maturity. Lastly, for the first time in this field of research, an Autoregressive Distributed Lag (ADL) model has been developed to take VC transactions with lag into account.

The objective of the research is to clarify how changes in lagged M&A activity may affect the dynamics of the VC market, across countries with different VC market maturity. The study aims to improve knowledge of the intricate interrelationships between these two essential components of the financial markets, and other essential factors such as GDP and long-term interest rates, stimulating the academic debate and providing insights that could assist investors, governments, and entrepreneurs in making informed decisions.

2 Literature review

2.1 *Venture Capital Financing*

Venture capital (VC) is a form of financing provided by professional investors to new firms that exhibit long-term growth potential. VC has emerged as a critical source for startup financing, providing both financial resources and strategic expertise that can contribute to innovation and ultimately economic growth (Wright & Robbie, 1998).

The objective of VC is to invest in the infrastructure of the startup (fixed assets and working capital in terms of balance sheet, and manufacturing, marketing, and sales in terms of expense investments) until it becomes credible and big enough to be sold with the help of an investment banker (Zider, 1998).

From an accounting point of view, VCs provide cash to the startup (asset), getting shares issued by the company (equity).

Generally, VCs do not invest in the development stage of a startup, while they usually finance the early growth stage of startups with high long-term development potential.

Venture Capital is essential as a source of financing for high-risk startups that would not have access to the debt capital market. Their investors are insurance companies, pension funds, and financial firms, which expect a return of 25-35% per year over the lifetime of the investment. Given the high risk, it is just a small fraction of their total portfolio.

However, Venture Capital is not only financing, but it also provides startups with technical expertise and a useful network for potential clients and business development (Zider, 1998).

Concerning the investment profile, VCs choose companies in industries that are growing fast, thus focusing on the middle part of the industry S-curve. These segments have high growth rates and are more likely to have exit opportunities because investment bankers are continually looking for new issues, easy to sell, with high relative valuations and consequently high commissions for the bank, which account for 6-8% of the amount raised through an Initial Public Offer (IPO) (Zider, 1998).

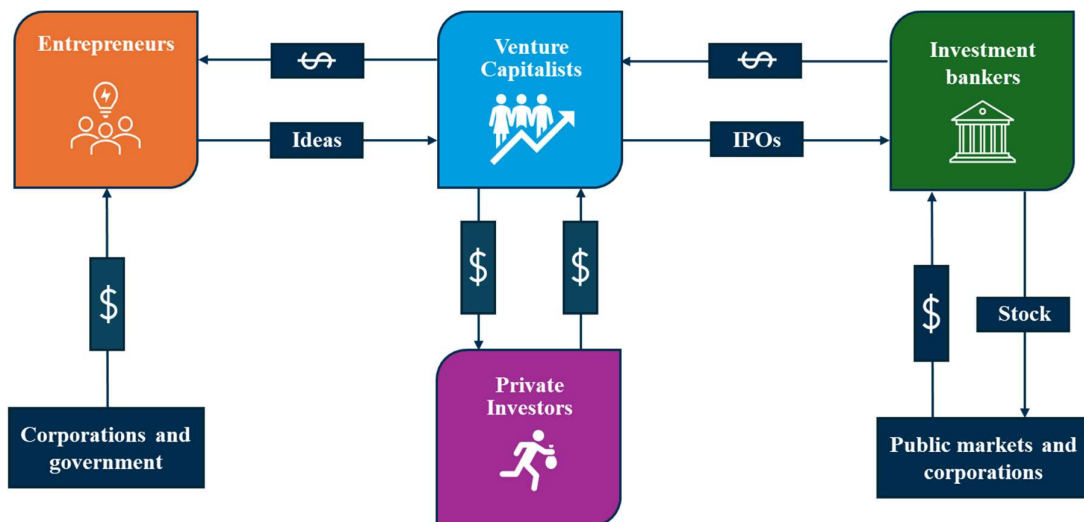
As represented in Figure 2.1.1, there are four main players in the venture capital industry:

- Entrepreneurs

- Venture Capitalists (VCs)
- Private Investors
- Investment Bankers

The entrepreneurs are the startups that have ideas and need funds for financing; the private investors look for high returns on investments; the investment bankers need companies to sell. Venture Capitalists are in the middle between the other three players, profiting from the creation of a market for them (Zider, 1998).

Figure 2.1.1 – The players in the Venture Capital Industry



Source: Own elaboration based on Bob Zider, 1998, Harvard Business Review November-December

Among VCs, Limited partners (LPs) give funds to General Partners (GPs), who then invest the money in young firms like startups (Lemley and McCreary, 2020).

The Venture Capital cycle begins with raising a venture fund, continues with the investment in, monitoring of, and enhancement of businesses, ends when the venture capital firm closes profitable deals (exit) and gives its investors their money back, and restarts with the venture capitalists raising additional funds (Lerner and Gompers, 2001).

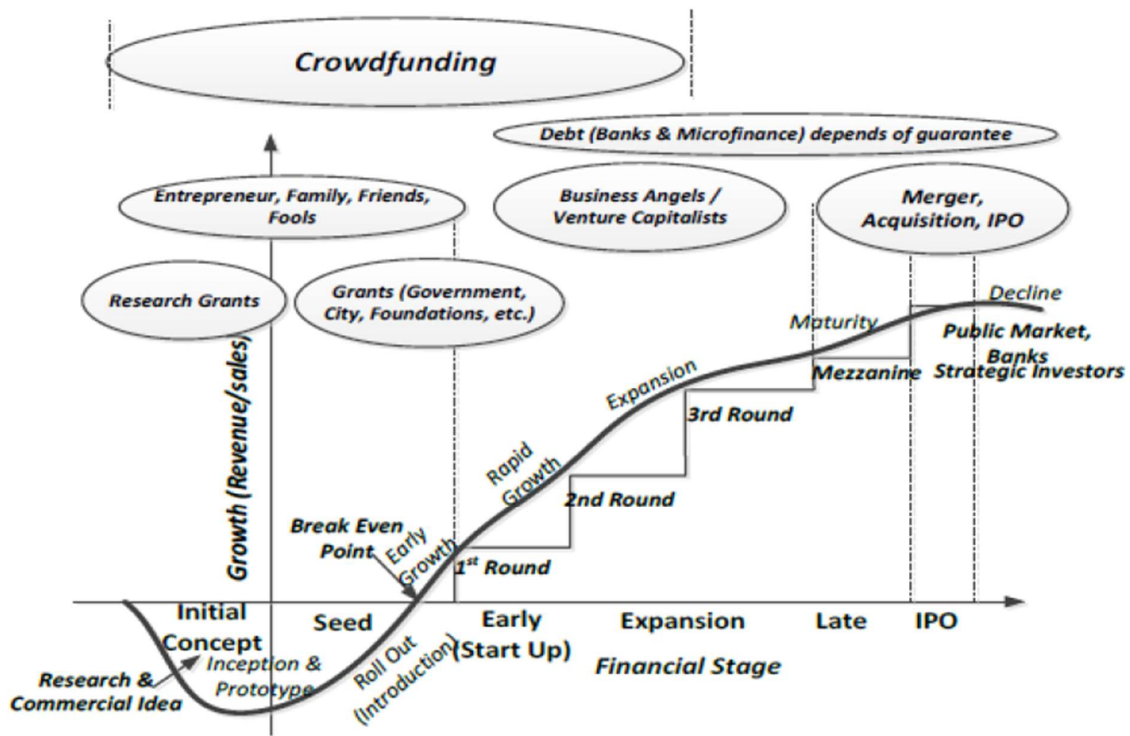
As reported in Figure 2.1.2, showing Venture financing, the first step is Seed financing, necessary for the design and development of the business Idea and the beginning of the start-up phase (Rossi, 2014).

At this stage, the primary investors in new businesses are the entrepreneur's family and/or business angels. Product development and early marketing are funded by startup capital. Enterprises may be in the initial stages of development or have recently commenced operations and have not yet engaged in commercial product sales. Funding is necessary at this point to implement R&D for the new concept or product. Once the product has taken shape, a specific amount of venture capitalists will join the company since they wish to establish the firm (Rossi, 2014).

After developing its product, the company needs additional funding to start producing and marketing it. This is known as the post-created stage. The business hasn't made any money yet. High advancement occurs during the Expansion-Development stage. Capital is utilized in this stage of the firm to finance acquisitions, develop new services and products, boost working capital, and/or increase output (Rossi, 2014).

The Cycle ends with the exit. A successful exit enables venture capitalists (VCs) to obtain further funding from limited partners (LPs). This, in turn, enables the VCs to undertake fresh investments, so augmenting the expansion of the portfolio firm, its sector, and the economy at large (Espenlaub, Khurshed & Mohamed, 2014).

Figure 2.1.2 – Venture financing lifecycle



Source: Lasrado & Lugmayr, 2013

There are several pieces of evidence from the literature arguing that VC-backed companies have better performance than non-VC-backed ones.

According to Puri & Zarutskie (2012), the firms in the economy that receive venture capital financing are below 0.5%. However, venture financing supported 56% of the companies that underwent Initial Public Offerings (IPOs) between 1995 and 2018 and remained operational by the end of 2019 (Lerner, Nanda, 2020).

Following the works of Chemmanur et al. (2011), and Puri & Zarutskie (2012), there is evidence that Venture Capital decreases the likelihood of firm failure and increases firm sales, contributing to the market performance of these firms.

The two main ways that VC investments have been shown to have increased efficiency are through the initial selection of firms that were already more efficient than their peers without VC backing, and the significant improvement in those companies' operational efficiency after receiving VC funding. Moreover, the positive impact of VC backing and the associated efficiency gains, significantly increase the likelihood of a successful exit (through an IPO or

acquisition) for the invested firms (Chemmanur et al., 2011).

The growth rate of global Venture Capital has exceeded that of the USA, leading to an increase in the concentration in a few large VC firms and a focus on a narrow range of industries, often related to software (Lender & Nanda, 2020).

According to the National Venture Capital Association (NVCA) study of 2002, for every \$1,000 in assets, Venture Capital-backed companies invested nearly three times as much in R&D, paid nearly three times as much in federal taxes, produced nearly twice as many exports, and had roughly twice as many sales between 1970 and 2000.

According to Kortum & Lerner's (2000) estimation, these companies provide roughly 14% of innovation even though they only contribute approximately 3% of R&D spending overall.

There is also a difference in the threshold for failure. When a VC-backed firm fails, it tends to be larger in terms of the number of employees and sales, but less profitable than a non-VC-backed firm at the time of the failure. This suggests that Venture Capitalists give their firms time and resources to grow before deciding on termination (Puri & Zarutskie, 2012).

VCs are aware that most of the companies in their portfolio will fail, but the return that one successful company could get justifies the investment. The expected return over five years for one or two years of financing is 10 times the capital invested, although, on average “good plans, people and businesses succeed only one in ten times” (Zider, 1998).

VC funds show, in fact, a distribution pattern of returns that diverges from the typical bell curve seen in normal distributions. They follow instead a power law curve, with a significant skewness in the return's distribution, meaning that a small portion of firms yield a substantial portion of profits (Cochrane, 2004).

There is a certain level of information asymmetry characterizing the Venture Capital industry. Compared to potential investors, entrepreneurs are more aware of the caliber of their projects. (Aquilina, Del Villar, Sanchez & Cornelli, 2024).

Information Asymmetry is the circumstance in which one party to a transaction (typically the business and the entrepreneur looking for funding) has access to more or superior knowledge than the other party, which in this case is the Venture Capitalist.

According to Hall and Lerner (2010), information asymmetries are particularly detrimental to

innovative and young businesses.

To better understand the information asymmetry in VC industry, one can refer to the work of Cumming & Johan (2008).

2.2 *The importance of Exit in the VC Industry*

When a VC invests in a company, it focuses hugely on the “exit strategy”, that is “*the ways funders and founders can cash out their investment*” (Lemley & McCreary, 2020), or “*the process by which the founders of privately held firms leave the firm they helped to create*” (DeTienne, 2010).

The objective of VCs is to get paid by selling the company, turning the equity they have invested into cash.

The importance that Venture Capital (VC) plays in the broader economic development is recognized by policymakers. The Venture Capital business is likely to expand more slowly or perhaps stagnate if the VC cannot exit successfully because of inefficiencies in the capital markets. This would harm the level of entrepreneurial activity in an economy (Espenlaub, Khurshed & Mohamed, 2014).

There are generally two main possible options when talking about high-growth innovative venture exit strategies: Initial Public Offering (IPO) and Merger and Acquisitions (M&A).

The former consists of the process through which a privately held firm goes public, by selling for the first time its shares to the public. To go public, the company needs to be beyond a certain stage in the lifecycle, and the timing of the IPO is also influenced by market conditions, with firms more likely to go public when comparable firms’ valuation improves, suggesting a more favorable investor sentiment (Ritter & Welch, 2002).

The latter is a strategic transaction where one bigger firm acquires another one, to achieve growth, enter new markets, or obtain competitive advantages. The M&A process involves several steps: identifying potential targets, conducting due diligence, negotiating terms, and integrating the target company post-acquisition (DePamphilis, 2019).

Young companies with outside equity investors are more likely to be targeted for Mergers and Acquisitions (M&A) because they give angels or Venture Capitalists the first chance to sell all or part of their equity stakes when the company is being acquired (Cotei & Farhat,

2017).

According to Cumming & Johan (2007), other exit possibilities are:

- *Secondary sales*

The entrepreneur does not sell; instead, the VC sells to another VC.

- *Buybacks*

The business owner buys back (repurchases) the venture capitalist's interest.

- *Write-offs (liquidation)*

Startups may recognize at an early stage that their ventures are not viable or successful and decide to exit the market rather than persist with something unlikely to succeed. In this case, the startup sells the assets to pay off creditors and investors in the predetermined order of priority.

Eric Ries in his book “The Lean Startup” (2011) talks about early exits as chances for less promising firms and business ideas to "fail fast and learn quickly."

According to Wennberg & Detienne (2014), Exit strategies, M&A, and IPOs are complex choices that need accurate planning and evaluation of several variables, such as the venture's performance, the entrepreneur's objectives, and market conditions. These exit strategies are essential components of strategic management in the entrepreneurship sector, providing avenues to realize the value that entrepreneurs and their teams have built. They are not just means to end the entrepreneurial journey.

Incumbent players are increasingly buying startups, because either they value the technology or because they have lots of expenditure capacity, but it is also a way to eliminate a potential competitor who might leapfrog them in Schumpeterian competition (Lemley & McCreary, 2020).

According to Schwienbacher (2018), Incumbents have an incentive to make a higher offer than what the company would raise through an IPO.

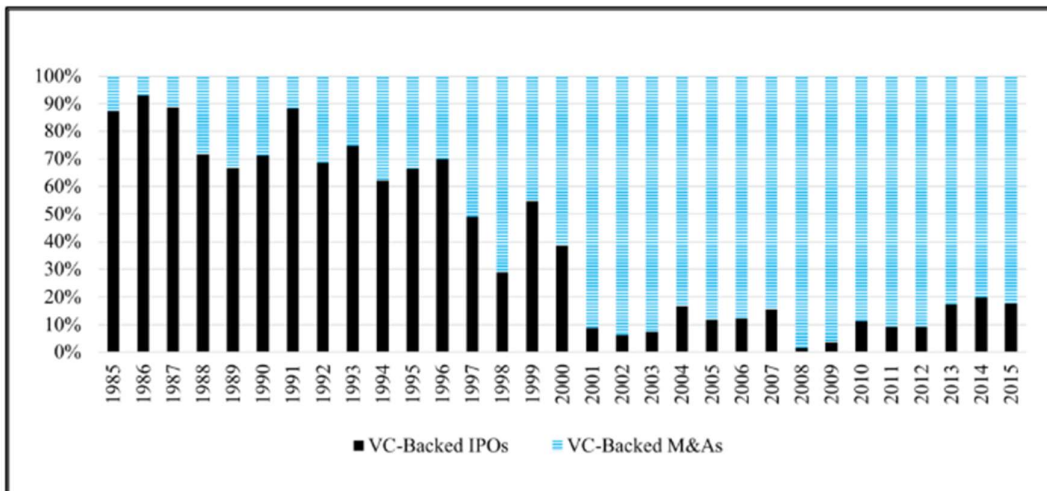
Those companies are willing to pay very high premiums to protect their franchises (Norbäck,

2013).

From the point of view of VCs in terms of reputation and innovation, Amor & Kooli (2019) analyzed a comprehensive dataset of U.S. IPOs and M&As from 1996 to 2015. Their findings show a phenomenon called “grandstanding” with M&A exit strategies that are as crucial as IPOs in enhancing the reputation of young VC firms. To establish their name, young venture capitalists often take a smaller premium in M&A transactions; this is comparable to the greater underpricing seen in Initial Public Offerings (IPOs).

As shown in Figure 2.2.1, in the US, while almost 1 in 2 exits was by IPO in the 1990s, only about 1 in 10 was in the 2010s (Lemley & McCreary, 2020).

Figure 2.2.1 - US VC-Backed Exits: % IPOs vs % M&As

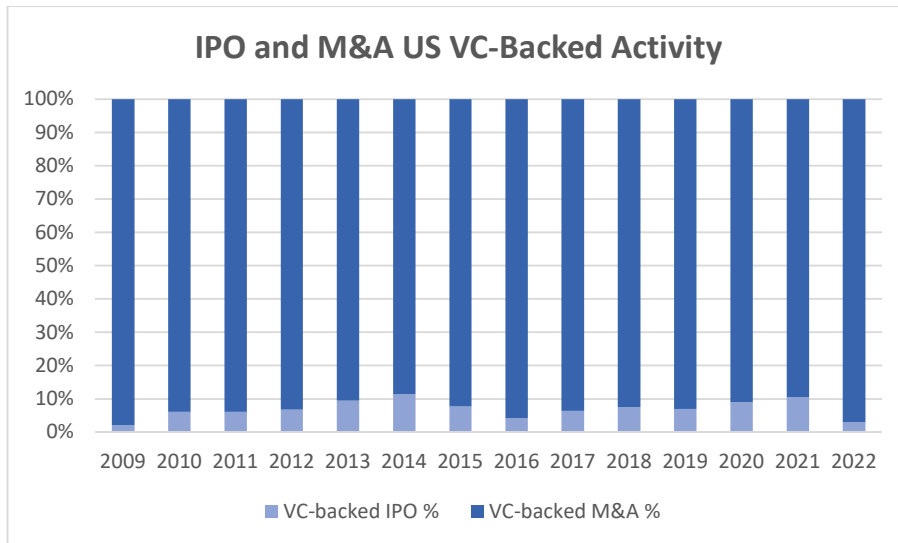


Source: NATL Venture Capital ASS’N, 2014 YEARBOOK, at 14 fig. 9, 15 fig. 10 (2014), NATL Venture Capital ASS’N, 2016 YEARBOOK, at 64 fig. 4.03, 68 fig. 4.07 (2016)

The rise in Venture Capital investments, which have a short holding duration of five to ten years, has significantly accelerated startup exits (Pisoni & Onetti, 2018).

As reported in Figure 2.2.2, which is an author elaboration based on the data from Pitchbook, published on the NVCA 2023 Yearbook, among the VC-backed exits through IPOs or M&A in the USA from 2009 and 2022, on average less than 1 over 10 is through IPOs. Looking at this last figure for 2022, it is only 3%.

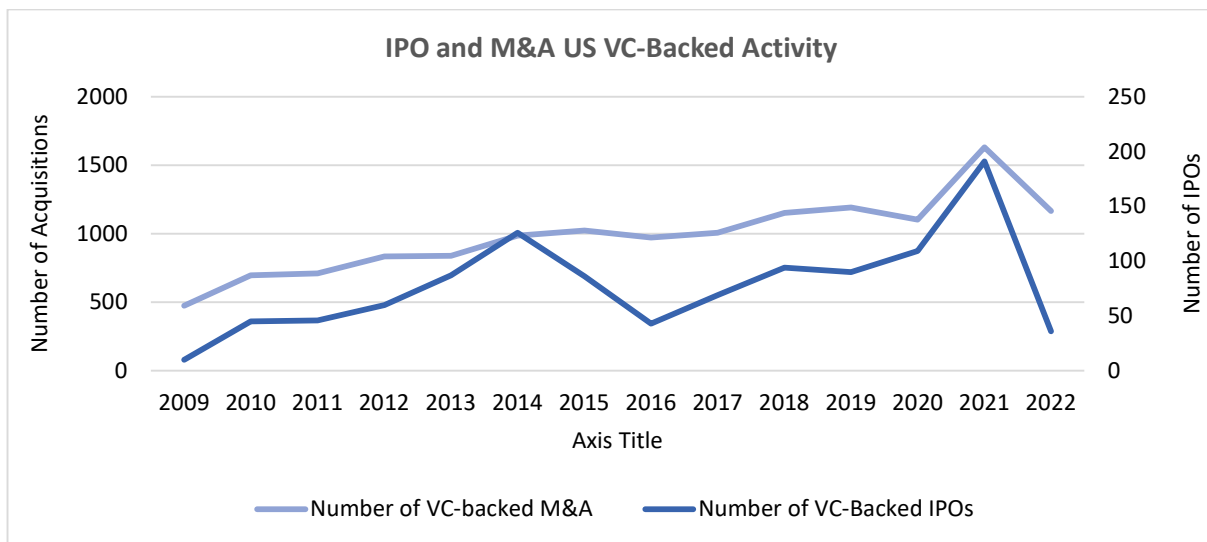
Figure 2.2.2 - IPOs and M&A US VC-Backed Activity



Source: Own elaboration based on data from Pitchbook published on NVCA 2023 Yearbook

Comparing the Number of VC-backed Acquisitions (M&A) with the Number of VC-backed IPOs from Figure 2.2.3, it is possible to notice that in the 5 years between 2017 to 2021, the number of US-based venture capitalist-backed businesses that have been acquired exceeded between eight to fourteen times the one of companies that go public.

Figure 2.2.3 - IPO and M&A US VC-Backed Transactions



Source: Own elaboration based on data from Pitchbook published on NVCA 2023 Yearbook

Looking at the above data, one wonders why for VC-backed companies an exit in the form of

M&A has recently become much more popular than one via IPO.

Analyzing the exit choice between IPO and M&A by entrepreneurs and VCs, one can refer to the work of Bayar & Chemmanur (2010).

The authors found that one of the major aspects determining this choice is the competition in the product market: a stand-alone firm faces the product market on its own after an IPO, while an acquired firm can benefit from the support of the acquirer, potentially enhancing its competitive position (Bayar & Chemmanur, 2010).

Another aspect they found crucial in the choice between IPO and M&A is the difference in information asymmetry, with potential acquirers generally having better industry-specific knowledge to value the firm more accurately than IPO market investors (Bayar & Chemmanur, 2010).

The other crucial point is related to the private benefits of control post-exit, in IPOs, entrepreneurs can maintain some control over the firm and benefit from it, while in acquisitions, they may lose these benefits but can negotiate from a position of lesser information asymmetry (Bayar & Chemmanur, 2010).

A strong point in favor of M&A instead of IPO is the avoidance of the cost of complying with the Sarbanes-Oxley Act, "which requires public companies to audit their internal controls, from inventory tracking to the security of their competitive systems..." (Wall Street Journal, February 2005).

Moreover, evidence shows that IPOs have higher valuations than acquisitions with a valuation premium that is 22% higher in IPOs over takeovers (Brau, Francis & Kohers, 2003). This can also be explained by the fact that IPO firms tend to be higher than growth firms (Poulsen & Stegemoller, 2008). In the article of Brau et al. (2003), it is also highlighted the influence of the industry on the exit decision. Particularly, firms in less concentrated industries and those associated with high-tech are observed to favor IPOs, indicating a strategic selection based on industry dynamics and perceived market valuations (Brau, Francis & Kohers, 2003).

The need for liquidity and the time horizon of the investment are two other key elements to consider. Takeovers are often associated with a liquidity discount compared to IPOs, where insiders in takeovers accept a lower payout for the benefits of immediate liquidity. The fast cash-out option and liquidity consideration make takeovers a more appealing option for insiders looking for quick gains than IPOs, which may offer higher but delayed returns. (Brau,

Francis & Kohers, 2003).

Brau et al., also summarize the increasing trend found in the recent decades toward M&A over IPOs as due to a combination of factors such as regulatory complexities associated with IPOs, the immediate liquidity advantages that acquisitions offer to firm insiders, and the shifting industry consolidation in favor of consolidation (Brau, Francis & Kohers, 2003).

2.3 Key Determinants and Cross-Country Variations in Venture Capital Investments

The largest Venture Capital industry in the world is in the United States. Venture capital is an American creation, not diffused globally as quickly as other financial innovations (Hege, Palomino & Schwienbacher, 2009).

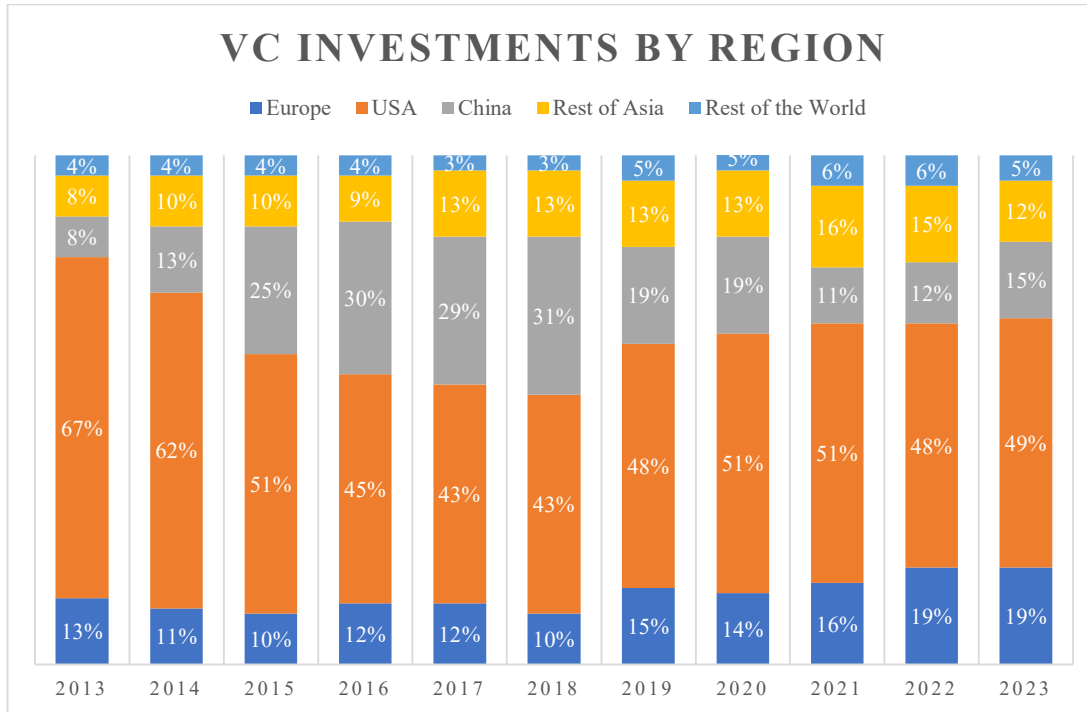
The Venture Capital market started in the 60s in the US, financing companies like Microsoft, Apple, Inter, or 3Com., which are currently a reference in the market. In Europe, it started much later, in the 80s (Félix, Pires & Gulamhussen, 2012).

Europe is second in the world in terms of R&D investments, but it has only been since the late 1990s that Europe has seen growth in the venture capital (VC) sector. In 1999, investments reached \$12 billion, or nearly 25% of US levels. (Hege et. Al., 2009).

To update these figures with very recent data, one can cite the report “Global Tech and VC – Q3 2023” from Dealroom.co, which is a global provider of data and intelligence on startups. As reported in Figure 2.3.1, Europe reached a historical peak in VC Investments in 2023, which accounted for 19% of global VC Investments and consolidated the positive trend of the last years. China has lost half of the share in 2023 compared to 2018, with a 2023 percentage of VC investments that accounted for 15%, far below the 31% it had 5 years before.

The USA has been confirmed to be the giant in the VC industry, generating half of the global Investments.

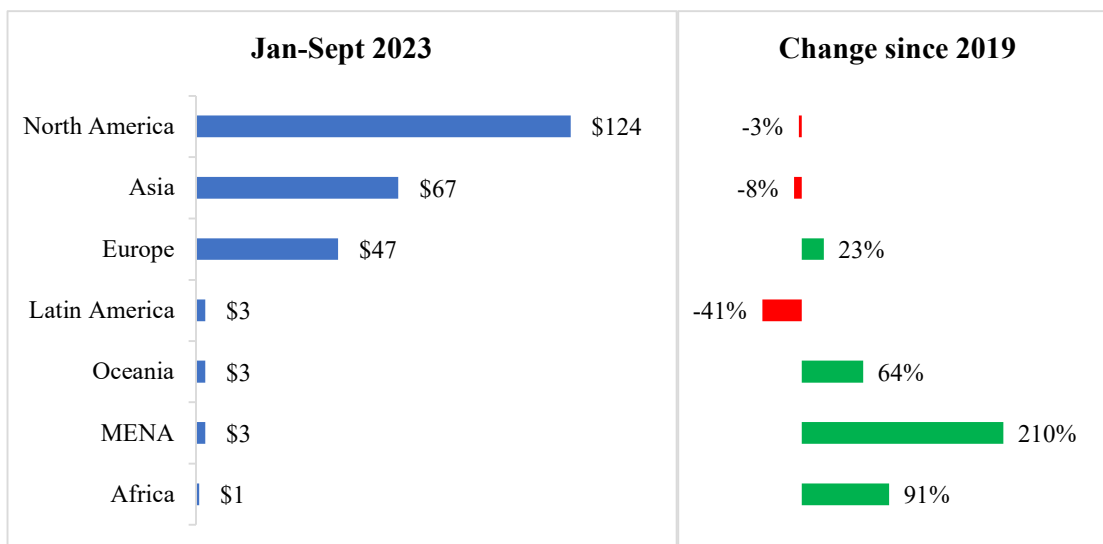
Figure 2.3.1 – VC Investments By Region



Source: Own elaboration based on the report “Global Tech and VC – Q3 2023” from Dealroom.co

Of the three biggest regions in the world by VC Investments (North America, Asia, and Europe), Europe is the only one growing in 2023 compared to 2019 (+23% Jan-Sept 2023 vs same period 2019). In Figure 2.3.2, it is reported the investments done in the period January-September 2023 with the percentage change since 2019.

Figure 2.3.2 – Leading Global Regions by VC Investments



Source: Own elaboration based on the report “Global Tech and VC – Q3 2023” from Dealroom.co

The USA is almost stable in the values of 2019 (-3%), while Asia has shown a bigger contraction (-8%).

Among the emerging regions, MENA (Middle East and North Africa) is the one growing the most, with an increase of +210% vs 2019.

By using this data, it is possible to see that Europe has reached about 38% of US levels in 2023, which is a step closer to bridging the gap, but it is still lagging behind the USA.

This European delay is historically due to distinct characteristics and outcomes in terms of several factors like taxation, regulatory environments, cultural attitudes towards entrepreneurship and risk as well as the structure and development of the stock market. Concerning this last point, the likelihood and the route of exit are likely to be influenced by variations in national stock market activity levels (Black & Gilson 1998; Cumming, Fleming & Schwienbacher 2006; Cumming and MacIntosh 2003). The likelihood of exiting via public markets, or initial public offerings (IPOs), rises with more active stock markets.

Due to its environment that encourages high-risk investments, especially in technology-focused businesses, and its robust stock market, which offers plenty of exit opportunities through IPOs, the United States has historically led the world in venture capital (Black & Gilson, 1998).

On the contrary, Europe’s VC market has been characterized by a less favorable regulatory and tax environment, cultural adversity over risk and entrepreneurship, and a historical absence of a dynamic stock market offering sufficient exit opportunities (Hege, Palomino & Schwienbacher, 2009).

The work of Hege et al. (2009) is one of the first international and comparative studies of the VC market. They studied the period between 1997 and 2003, characterized by a rapid increase in venture funding and contemporaneously by a rise in high-tech IPOs throughout Europe. They concluded that despite these developments, Europe continues to struggle with fragmented marketplaces because of various national laws and cultural norms, which affect

cross-border investments and startup growth (Hege et al., 2009).

Hege et. Al. (2009), found 4 main factors affecting VC investments:

- *IPO Exits*: a lack of IPO markets for VC exits could be one of the main reasons why there is a lag in venture financing, especially in countries like Germany or Japan (Black & Gilson, 1998)
- *Stock Market Development*: stock exchanges have a determinant role in venture development (Rajan & Zingales, 2003). The countries with a higher market capitalization/GDP ratio should show greater intensity and returns of the VC market.
- *Law and Finance*: VC is particularly affected by the quality of law enforcement due to the contractual relationship between venture investors and portfolio companies (La Porta et Al., 1997). A higher level of legal investor protection helps in achieving better venture performance.
- *Tax Subsidies for Venture Capital and Related Fiscal and Legal Conditions*: in some European countries, incentives for VC investors have been developed by governments. These public subsidies could be a factor in underperformance if they skew investment choices and encourage venture capitalists to back ventures they otherwise wouldn't (Lerner, 1999).

Hege et Al. (2009), in the conclusion of their study, argued that US venture capitalists behave in a way that is more aligned with theoretical predictions than European ones. Moreover, they did not find any difference between countries implementing a Common Law system or a Civil Law system.

Other factors analyzed in previous literature as determinants of VC activity in a cross-country setting are GDP growth, interest rates, IPO activity, total value of stock traded, stock turnover, R&D spending, and corporate income tax rate (Brunetti & Weder, 1998). Moreover, the legal, social, and political climate of a nation has a significant impact on the growth of the venture capital market and can account for significant regional variations (Bonini & Alkan 2011).

Also, private investment, which is a well-known indicator of a nation's degree of economic development and openness, is negatively correlated with institutional uncertainty (Brunetti & Weder, 1998).

Previously, it has been demonstrated how much literature has been concerned with analyzing the correlation between the stock market, and thus the market for IPOs, and VC activity. It has also been demonstrated how, however, by far the most frequently used way of exit by VC-backed companies in recent years is via M&A. Therefore, it is natural for research to be conducted on the relationship between the M&A market and the VC market. The investigation aims to ascertain whether a strong M&A market results in a stronger venture capital market and vice versa.

Phillips, G., & Zhdanov, A. (2017) made the first study in the academic literature analyzing the link between M&A activity and VC activity around the world. Studying data from the period between 1985 and 2014, they found a strong positive association between M&A activity and subsequent VC investments. Since many start-ups rely on Venture Capital funding and venture capitalists prefer exits through acquisitions over initial public offerings (IPOs), their findings imply that vibrant M&A markets have significant ex-ante incentive effects for fostering entrepreneurship and growth. In particular, their preliminary analysis of correlations between the M&A and the VC market shows that there is a strong association between them. Moreover, the correlation between current VC and lagged M&A activity is higher than the one between current M&A and lagged VC activity, thus suggesting that the M&A market generally tends to lead. They also found insignificant correlations between VC growth and lagged IPO growth (Phillips & Zhadanov, 2017).

The work of Félix, Pires & Gulamhussen (2012) analyzes the determinants of Venture Capital Activity in Europe, aggregating data from 23 European countries for the period 1998-2003. They found a positive impact of the size of the M&A market and the market-to-book ratio on Venture Capital activity. This is the first research that considers the size of the M&A market as a factor influencing venture capital, providing a more complete examination of the effects of the exit environment.

All the factors analyzed by Félix et al. (2012) as determinants of the Venture Capital market, including the theoretical aspects supporting the choice from previous literature, will now be reported.

- *GDP Growth*

The Gross Domestic Product (GDP) is one of the indicators of national income and revenue for a nation's economy at a specific point in time. It is defined as the total market value of all final goods and services produced in a nation within a specified timeframe, which usually is one year (Kira, 2013).

An expanding economy has a positive impact on the Venture Capital demand because of more appealing opportunities for entrepreneurs and the emergence of new companies.

Gompers & Lerner (1998) argued that expansions in the macroeconomic system will result in a rise in the number of start-ups and a corresponding rise in the need for Venture Capital.

Moreover, Audretsch & Ács (1994) found a positive relationship between macroeconomic fluctuations and the emergence of new startups.

Félix et. Al. (2012) found a positive and statistically significant impact of GDP growth on VC investments.

- *Interest rate*

The level of interest rates has a negative effect on Venture Capital supply. When interest rates increase, investing in bonds becomes an appealing alternative to investing in VC funds, thus reducing the supply of funds for VC (Gompers & Lerner (1998).

However, interest rates have an ambiguous effect in terms of demand for Venture Capital financing. While higher interest rates can hinder business creation and expansion, they also make Venture Capital financing more appealing compared to traditional funding sources. As a result, the effect of interest rates on venture capital demand can vary, depending on which factor prevails.

Romain & Van Pottelsberghe (2004a) studied the effect of Short-term interest rates (1 year) and Long-term interest rates (10 years) on VC intensity, finding a substantial influence and indicating that the supply-side effect of interest rates is weaker than the demand-side effect.

The gap between the long-term and short-term interest rates is just as important as the long-term interest rate level. Venture capitalists would be less attracted to riskier investments the greater the disparity (Romain & Van Pottelsberghe, 2004a).

Félix et. Al. (2012) confirmed what was also found by Romain & Van Pottelsberghe (2004a), and by Gompers and Lerner (1998), arguing that long-term real interest rates are a determinant of VC investments with a negative effect on the supply side, canceled out by the positive impact on the demand-side.

- *Unemployment rate*

Félix et. Al. (2012) found a negative impact of the unemployment rate on venture capital investments.

There are several ways that the unemployment rate can affect the need for venture capital. Lower economic expectations and less entrepreneurship are caused by higher unemployment rates. The effect on entrepreneurial incentives, however, varies depending on whether a person is employed or not. While jobless people have lower opportunity costs and stronger incentives to launch a new business (self-employment), employed people may view a lower expected return in the event of a business failure due to extended unemployment. Although the consequences are mixed overall, the negative effects of the incentives for employed individuals to start a business seem to be predominant since Félix et. Al. (2012) found a negative and statistically significant impact of the unemployment rate on VC activity. Another possible explanation could be that the unemployment rate is positively correlated to market labor rigidity, and the model they built may have captured the effect of this last variable.

- *Market capitalization growth*

Jeng & Wells (2000) found no statistical significance of the impact of market capitalization growth on Venture Capital.

The market capitalization growth is a good indicator of what investors expect from the economy. Therefore, an increase in market capitalization is predicted to benefit

investors by providing more funds for Venture Capital investment. Additionally, higher market capitalization is expected to boost investor and entrepreneur confidence in economic growth, leading to increased demand for Venture Capital funds. However, the variable represents capital gains in the stock market, serving as an indicator of capital market returns. When these returns rise, investing in venture capital becomes comparatively less appealing than investing in stocks, resulting in a reduced supply of funds for venture capital. This last point may explain why Jeng & Wells (2000) did not find a statistically significant impact of market capitalization growth on Venture Capital intensity (Félix et. Al., 2012).

Félix et. Al. (2012) found a negative and statistically significant impact of market capitalization growth on VC activity. According to their interpretation of the data, the effect of rising capital market returns deterring venture capital (VC) seems to be more significant than the correlation between market capitalization growth and optimistic economic prospects.

- *Total Entrepreneurial Activity (TEA) index*

There is a connection between Venture Capital and entrepreneurship. According to Gompers (1998), there will be more venture capital available in the market the more entrepreneurial activity there is.

The TEA (Total Entrepreneurship Activity) index is calculated by the Global Entrepreneurship Monitor (GEM) and is a number between 1 and 20 and takes into account the number of new entrepreneurs and new companies.

TEA impacts the demand for VC positively but could harm the supply side because, with a higher TEA, Venture Capitalists need to spend more time on the screening of projects to invest in (Félix et. Al., 2012).

Félix et. Al. (2012) found a negative and statistically significant impact of TEA on VC activity. They discussed the use of TEA in this analysis, saying that this indicator may not fully capture the entrepreneurial process. Since TEA includes both high-growth and low-growth entrepreneurial activities, it is not aligned with VC investment preferences which exclude low-growth businesses.

- *IPO and M&A market size*

The relationship between the IPO market and VC investments has been studied a lot, and it has been already mentioned in a lot of studies in the dedicated paragraph 2.2.

Félix et. Al. (2012) conducted the first study on VC intensity determinants including also the M&A market and not only the IPO, in line with the most recent trends about the increasing frequency of exits through M&A instead of IPOs. It is expected that a more active M&A market will create a more favorable climate for the Venture Capital industry. Therefore, the size of the M&A market and the availability and demand for venture capital funds should be positively correlated (Félix et. Al., 2012).

Félix et al. (2012) found a positive impact of both IPO and M&A on VC activity.

- *Market-to-book ratio*

The market-to-book ratio has been a widely used indicator of company value. It is computed by dividing the company's market value at the end of its fiscal year by the total amount of common equity.

In research employing micro-level data (investee firm), the market-to-book ratio has been employed to assess the extent of information asymmetry (Gompers, 1995; Cumming & MacIntosh, 2003).

It has been used in this sense because it measures the discrepancy between recorded accounting values and market perceptions. A high ratio indicates that investors are paying more for the company's potential for future profits, which could be the result of better information or insights than what the book value of the company completely reflects. On the other hand, a low ratio could be the result of information asymmetry or a lack of openness and could suggest undervaluation or skepticism about the company's prospects.

There should be a positive correlation between the market-to-book ratio and the quantity of venture capital financing because greater ratios are linked to businesses or industries that have significant growth potential and are exposed to the highest agency costs, as confirmed by Gompers (1995).

The work of Félix et. Al. (2012) is the first one to assess the impact of information asymmetry through the market-to-book ratio at the macro level, hypothesizing a positive effect on Venture Capital activity. They found a positive and statistically significant effect, but they argued that this effect would be stronger and clearer using individual company data instead of aggregated ones.

- *Research and Development expenditure (R&D)*

Gompers and Lerner (1998) found that if Research and Development (R&D) expenditure rises, potential business owners with exciting ideas could become more numerous. Thus, positively impacting the demand for VC.

In terms of supply, R&D is risky and the traditional financing sources are not appropriate. Gompers and Lerner (1998) also demonstrated that R&D is often associated with VC financing.

Félix et. Al. (2012) hypothesized a positive relationship between R&D expenditure and VC activity and confirmed this hypothesis with statistical significance.

3 Methodology

3.1 *Research questions*

The Venture Capital (VC) sector has been subject to intense examination in academic literature due to its critical role in fostering startup growth and innovation.

The literature review that comes before this study describes the operational nuances of Venture Capital, with a focus on exit strategies, it explores the factors that influence VC investments and emphasizes how country environments differ from one another.

Notably, a paradigm shift in the preferred exit paths has been noted: Mergers and Acquisitions (M&A) have been increasingly common as the preferred exit strategy for VC-backed firms since the 2000s, whereas Initial Public Offerings (IPOs) previously held a dominant position. This change reflects more significant changes in the investing and economic domains rather than just a market trend.

Nonetheless, there is a lack of scholarly research explicitly comparing the M&A and Venture Capital market dynamics. Though several studies have compared the IPO and VC markets, there is a dearth of research specifically addressing M&A-VC dynamics.

M&A activity is one factor that determines venture capital intensity, according to a seminal study by Félix et al. (2012), suggesting a complex interaction. In a similar vein, Philips and Zhadanov (2017) investigate the relationship between M&A and Venture Capital investments in various nations; nonetheless, this field is still relatively unexplored, indicating a lack of thorough knowledge regarding the interrelationships between both markets.

Through an examination of the complex interrelationship between the M&A and VC markets, this thesis seeks to close this gap. Through a cross-country lens, the analysis aims to clarify how the rise of M&A as a popular exit strategy affects VC market dynamics. It will examine possible relationships and time lags, suggesting that a healthy M&A market not only precedes but also might accelerate Venture Capital market activity, but with certain temporal lags. This research seeks to add new perspectives to the academic discourse by analyzing the causal and temporal relationships between M&A and VC markets. By doing so, it hopes to provide a

more nuanced understanding that could help investors, policymakers, and entrepreneurs navigate the intricate web of exit strategies and startup financing.

3.2 Sample selection

To address the research question, the following preliminary steps were taken:

- i. Selection of appropriate factors as independent variables
- ii. Selection of appropriate dependent variables
- iii. Selection of appropriate data sources
- iv. Selection of a set of countries

3.2.1 Selection of appropriate factors as independent variables

The choice of factors to consider as independent variables of Venture Capital investments has been driven by the academic literature on the theme, the scope of the research, and the availability of reliable and comparable data.

For each country, the factors considered are the following:

- GDP
- Number of M&A transactions
- Value of M&A investments
- Long-term interest rate

- *GDP*

The Gross Domestic Product (GDP) is an indicator of the economic health of a country as well as of economic progress. It has been included in the analysis of VC investments because of the already discussed evidence that a growing economy favors the emergence of start-ups and consequently Venture Capital investments. For the purpose of this research, it is interesting to analyze on a yearly basis.

- *Number of M&A transactions*

The number of M&A transactions for a given country measures the number of all the transactions in Mergers or Acquisitions that involve companies of that country. For the purpose of this research, it is interesting to analyze on a yearly basis. The company involved could be either a Buyer (also known as an acquirer or acquiring company) which has the money and resources to take control of the other company, or a Seller (also known as an acquiree or acquired company) which is bought or absorbed by the acquiring company.

There can be three types of M&A transactions for a given country:

- Outbound M&A: a transaction involving a company of the country of interest acquiring or merging with a foreign company.
- Inbound M&A: a transaction involving a foreign company acquiring or merging with a company of the country of interest.
- National M&A: a transaction occurring within the borders of a single country, involving companies with headquarters in the same country.

To study the effect of the M&A market on the VC one, it is important to reflect on the impact each type of M&A transaction could have on the VC activity to understand if they are all relevant for the analysis.

○ *The Outbound M&A activity's potential impact on VC activity*

If companies from the given country actively acquire businesses abroad, this suggests a thriving and expanding business environment. This could lead to greater knowledge sharing, market expansion, and access to new technologies or markets. All these factors could positively impact the growth of the Venture Capital market in the home country. Outbound M&A activity may also indicate the presence of successful and financially stable companies, which could attract more domestic Venture Capital investment.

- *The Inbound M&A activity's potential impact on VC activity*

Inbound Mergers and Acquisitions introduce foreign capital, expertise, and innovative technologies into the domestic market. Increased Inbound M&A activity indicates that the country is perceived as an appealing investment destination, potentially bolstering confidence among local investors, including Venture Capitalists. Furthermore, foreign acquisitions facilitate partnerships or collaborations between local startups and international entities, potentially granting access to larger markets or superior resources.

- *The National M&A activity's potential impact on VC activity*

National Mergers and Acquisitions reflect the overall health of the domestic economy and the business landscape dynamics. The number and the characteristics of such deals could indicate trends in the overall economy, industry consolidation, or market shifts. Regarding the Venture Capital market, national M&A activity could directly influence investment prospects, as successful exits through acquisitions might spur more entrepreneurs and investors to engage in the startup ecosystem.

Overall, all three types of M&A transactions could be relevant for analyzing the relationship between the M&A and the VC activity in each country.

- *Value of M&A investments*

The value of M&A investments measures the economic and monetary value of all the M&A transactions that involve companies of a given country, being either acquirers or acquirees. For this research, it is interesting to analyze yearly.

The rationale for considering the value of M&A investments involving a given country is similar to the one of the previous variable, which is the number of M&A transactions.

The two factors should be considered together because they can provide complementary information.

For instance, in a given country, there might be a high volume of deals but with a cumulative financial impact relatively low. This could indicate the predominance of small-scale acquisitions, a focus on niche markets, or the prevalence of early-stage startups engaging in strategic partnerships rather than large-scale acquisitions.

To gain a comprehensive understanding of the joint dynamics between M&A and VC capital markets both the number of M&A transactions and the value of M&A transactions are important.

- *Long-term interest rates*

The long-term interest rate refers to the yield on government bonds with long maturities, typically 10-year or 30-year bonds, in a given country for a specific year.

The interest rates are implied by the prices at which government bonds are traded on financial markets and the loan repayment is guaranteed by governments. They are one of the factors affecting corporate investments, in fact, they are favored by low long-term interest rates and discouraged by high interest rates. So, the variable can be considered as a key indicator of economic expansion and financial conditions within a country.

Long-term interest rates reflect the cost of borrowing for long-term investments, thus influencing the overall availability of capital in the economy and consequently having an impact on the VC market, as already discussed in paragraph 2.3.

For the purpose of this study, it is interesting to analyze long-term interest rates on a yearly basis.

3.2.2 Selection of appropriate factors as dependent variables

The dependent variables this study is interested in should be linked to VC market intensity.

For this purpose the factors considered for each country are two:

- Number of VC deals
- VC Equity Value

- *Number of VC deals*

The Number of VC deals measures the total count of Venture Capital deals that occur in a specific country over a defined year. This study should take into account only deals involving domestic startups, meaning that the investee company (the company in which the venture capital fund invests) must have headquarters in the same country under study.

There is no interest in making differences between VC deals involving a domestic VC (a Venture Capital with headquarters in the nation under study) or a foreign VC (a Venture Capital with headquarters in a different nation with respect to the one under consideration) since it is more relevant for the study to consider all the deals involving domestic startups.

For the same reason, it is not relevant to differentiate the sizes of the deals. All the investments from the early stage to later stages should be considered.

- *VC Equity Value*

The VC Equity Value is the estimated total equity of the investor at the round date. It does not take into account the debt part of the investment.

It will measure the monetary value of the same deals identified in the previous point.

3.2.3 Selection of appropriate data sources

The analysis involves several variables. To get meaningful results it is fundamental to select reliable data sources and filter the data according to the specific objectives of the study.

The selection of the data sources should start from the variable of interest previously defined and the sources found in the literature.

The sources and rules for the independent variables will be the following:

- *GDP*

The time series of the GDP per country have been taken from the World Bank's data platform.

The World Bank is an international development organization owned by 187 countries. It consists of five distinct organizations: IBRD, IDA, IFC, MIGA, and ICSID. It is one of the largest research centers in the world in the field of development and its data and reports go through rigorous quality control processes.

Data per country from 1985 to 2022 have been extracted.

The data source is World Development Indicators with the last updated date the 26th of October 2023.

The indicator code is "NY.GDP.MKTP.CD".

The indicator name is: "GDP (current US\$)".

The source note is: "GDP at purchaser's prices is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products. It is calculated without making deductions for the depreciation of fabricated assets or for the depletion and degradation of natural resources. Data are in current U.S. dollars. Dollar figures for GDP are converted from domestic currencies using single-year official exchange rates. For a few countries where the official exchange rate does not reflect the rate effectively applied to actual foreign exchange transactions, an alternative conversion factor is used".

Source: The World Bank – World Development Indicators¹

- *Number of M&A transactions*

The data for the number of M&A transactions per country have been taken from the IMAA, which is the Institute for Mergers, Acquisitions, and Alliances.

The institute offers M&A statistics worldwide to users. The information provided is current and comprehensive. It covers many regions and sectors and regularly updates

¹ <https://databank.worldbank.org/source/world-development-indicators>

the M&A statistics. It can be used as a reputable source in academic studies on M&A since the data come from “Thomson Reuters” (formerly “Thomson Financial”).

Thomson Reuters” (formerly “Thomson Financial”) is the industry standard in the financial sector for M&A transactional information and volume analysis. The deals database tracks over 1 million M&A transactions worldwide dating back to the 1970s. It has been widely used by leading global financial publications, investment banks, and educational institutions.

For each country under study, the total number of M&A transactions for the available years was extracted from the database. These figures include Inbound, Outbound, and National transactions.

For some countries, the split between Inbound, Outbound, and National transactions was available and was extracted as well.

Sources:

- IMAA Institute – M&A statistics by countries²
- LSEG Data and Analytics³
- *Value of M&A Investments*

The Value of M&A Investments per country has been taken from IMAA with the same logic explained in the previous point. Values are in millions of US\$.

Sources:

- IMAA Institute – M&A statistics by countries²
- LSEG Data and Analytics³
- *Long-term interest rates*

The data regarding the historical series of long-term interest rates per country have been taken from OECD statistics. The Organization responsible for Economic Cooperation and Development (OECD) acts as a foundation pillar. It provides a wealth

² <https://imaa-institute.org/mergers-and-acquisitions-statistics/ma-statistics-by-countries/>
³ <https://www.lseg.com/en/data-analytics/products/deals-intelligence/#t-m-and-a>

of detailed, carefully gathered information. This enables comprehensive global economic examination and assessment.

The OECD uses careful methods for getting, checking, and putting together data. It works closely with national statistics offices and other trusted sources in member countries. This makes sure the data is correct and consistent.

Additionally, the OECD sets standard definitions and methods for reporting data. Member countries follow these rules when giving information. This uniformity reduces differences in data, making it easier to compare countries and analyze results accurately.

- The Dataset used for the study is: *Monthly Monetary and Financial Statistics (MEI)*.
- The variable extracted is: *Long-term interest rates, Per cent per annum*
- The definition reported for the variable is: “*Long term (in most cases 10 year) government bonds are the instrument whose yield is used as the representative ‘interest rate’ for this area. Generally the yield is calculated at the pre-tax level and before deductions for brokerage costs and commissions and is derived from the relationship between the present market value of the bond and that at maturity, taking into account also interest payments paid through to maturity.*”
- Direct source of data: “*In nearly all instances, data are provided by the national central bank*”.
- Data extracted on 11 Feb 2024 10:13 UTC (GMT) from OECD.Stat

Source: OECD Statistics⁴

⁴ https://stats.oecd.org/OECDStat_Metadata/ShowMetadata.ashx?Dataset=MEI_FIN&Coords=%5bSUBJECT%5d.%5bIRLT%5d&ShowOnWeb=true&Lang=en

The sources and rules for the dependent variables will be the following:

- *Number of VC deals & VC Equity Value*

The data concerning the Number of VC deals and the VC Equity Value have been extracted from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics.

LSEG Data & Analytics is a top provider that gives data and information about money markets. Their platform lets people see and study details on venture capital deals as well as equity investments. It has many helpful tools that give deep insight into these financial activities.

Setting up the proper parameters for filtering has been essential to extracting the right data.

For each country object of the study the following filters applied:

- Currency = USD
- Universe = Private Equity/VC
- Include: Focus Investments
- Include: Private Equity Entities
- Deal Type: Venture Capital Deals
- Venture Capital Deals == true
- Investee Company Nation Include [*Name of the Nation*]

Output: Volume Analysis

3.2.4 Selection of a set of countries

The choice of the countries to analyze has been driven by the data availability to allow cross-country comparisons. Only countries with complete and reliable data, in terms of all the discussed variables, have been selected. All the countries of the G7 have been included in the analysis. The 10 countries chosen accounts for 47.5% of 2024 global GDP according to a forecast based on "World Economic Outlook Database, April 2024". The figure is even higher in terms of percentage of global VC investments.

The countries selected are the following:

- Canada
- France
- Germany
- Israel
- Italy
- Japan
- Netherlands
- Spain
- United Kingdom
- United States of America

The identified sample of countries should enable cross-country comparisons, figuring out for instance if there are similar or different trends in Europe with respect to the USA and the peculiarity of individual countries.

Some countries have various business setups, rules, and levels of Venture Capital backing and Mergers or Acquisitions. This variety allows a thorough examination of how these factors influence each other across different national situations.

4 Preliminary Analysis

4.1 *Qualitative analysis of graphs*

To predict some outcomes a qualitative examination of the data has been carried out, using various graphs before moving on to the creation of hypotheses and statistical analysis.

The types of graphs that have been plotted are:

- M&A number of deals vs VC number of deals per country
- M&A Value vs VC Equity Value per country
- GDP and long-term interest rates per country

The following paragraphs report the qualitative analysis carried out for two countries: the United States and Italy, which represent in order the most and the least virtuous of the analyzed markets. To consult the qualitative analysis of the other countries, the reader is referred to the appendix.

4.2 *Qualitative Analysis - USA*

As an example, representative of the work done country by country, the graphs plotted for the USA are reported.

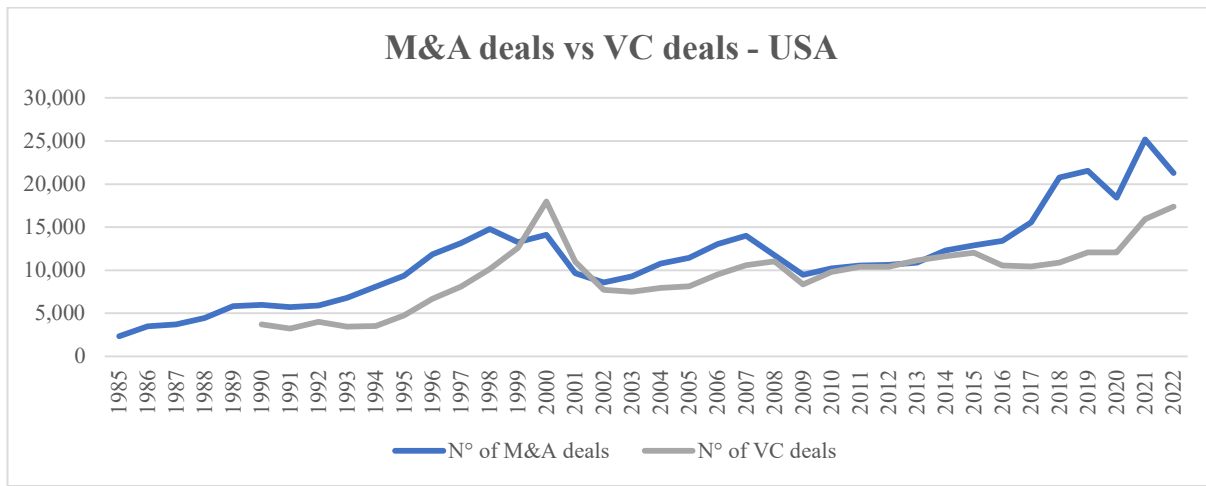
Figure 4.2.1 represents the number of Mergers and Acquisitions (M&A) deals compared to Venture Capital (VC) deals in the USA. It shows two curves: one representing the number of M&A deals (blue one) and the other representing the number of VC deals (grey one) over the years.

The two variables seem to be correlated, with the VC deals following the M&A deal pattern with around a two-year temporal lag. This implies that following the temporal lag period, VC increases or drops in a manner consistent with an increase or reduction in M&A activity.

It is also notable that there are periods in which the two lines move together, without a particular temporal lag, thus suggesting that other factors may influence the VC market independently or simultaneously with M&A activity.

To state a clearer cause rather than just correlation, a deeper analysis is needed. Looking at other economic factors could help determine this.

Figure 4.2.1 – M&A number of deals vs VC number of deals in the USA



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Plotted over the same period as the preceding graph, Figure 4.2.2 shows the value of Venture Capital (VC) equity (grey curve) vs Mergers and Acquisitions (M&A) value (blue curve) in the United States. Although the two measures are on different scales, it is possible to compare them since the M&A value is plotted against the left primary y-axis, and the VC equity value is plotted against the right secondary y-axis in this graph.

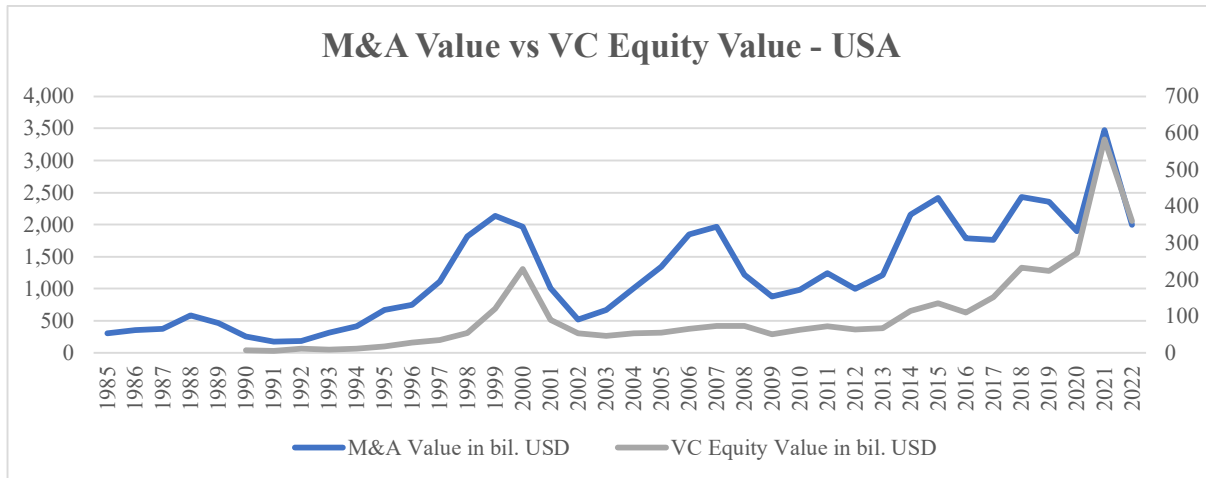
The lag of two years identified in the previous graph when comparing M&A deals and VC deals seems not to be present when looking at the M&A value and VC Equity value. In fact, the values of M&A and VC equity seem to fluctuate in closer synchrony, sometimes with no particular lag or with just a one-year lag.

Prominent economic events, such as the dot-com bubble and the 2007-2008 financial crisis, have had a noticeable effect on Venture Capital and M&A activity.

The M&A values seem to fluctuate more than VC equity values, probably because of the

nature of M&A deals, which involve well-established companies and large amounts of money.

Figure 4.2.2 - M&A Value vs VC Equity Value in the USA



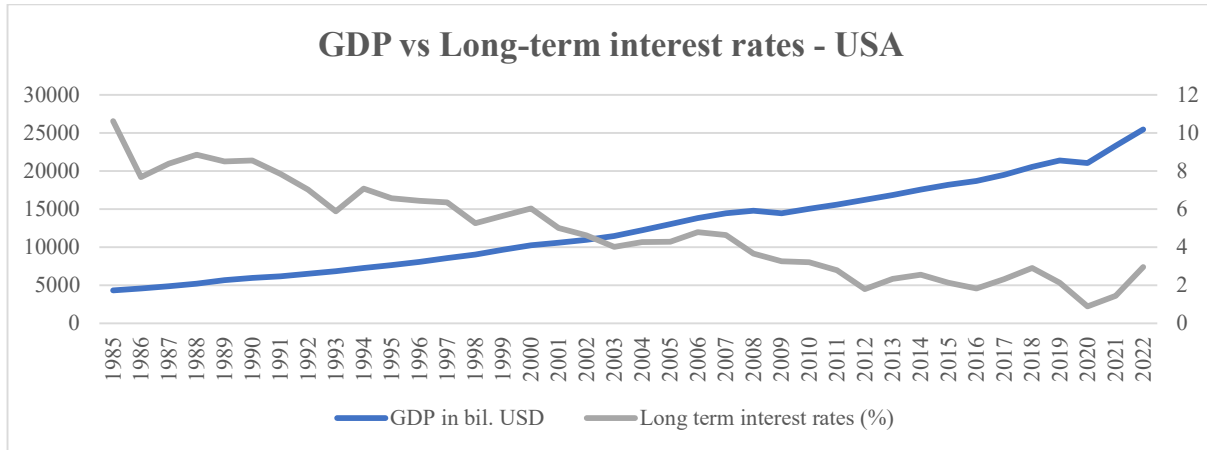
Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure 4.2.3 shows a graph of two distinct economic indicators for the US: long-term interest rates (shown with the gray line against the right y-axis) and the GDP in billions of USD (shown with the blue line against the left y-axis) for the years 1985 to 2022.

These graphs are very useful for understanding the economic environment in the USA.

Over the period displayed, the United States GDP has generally increased, signifying economic expansion. Certain noticeable variations might be related to economic cycles, such as recessions and expansions. Moreover, from 1985 until about 2012–2013, long-term interest rates were typically declining. After that, they stabilized and showed some minor variations, but they remained at a relatively low level compared to the previous levels.

Figure 4.2.3 – GDP and Long-term interest rates in the USA



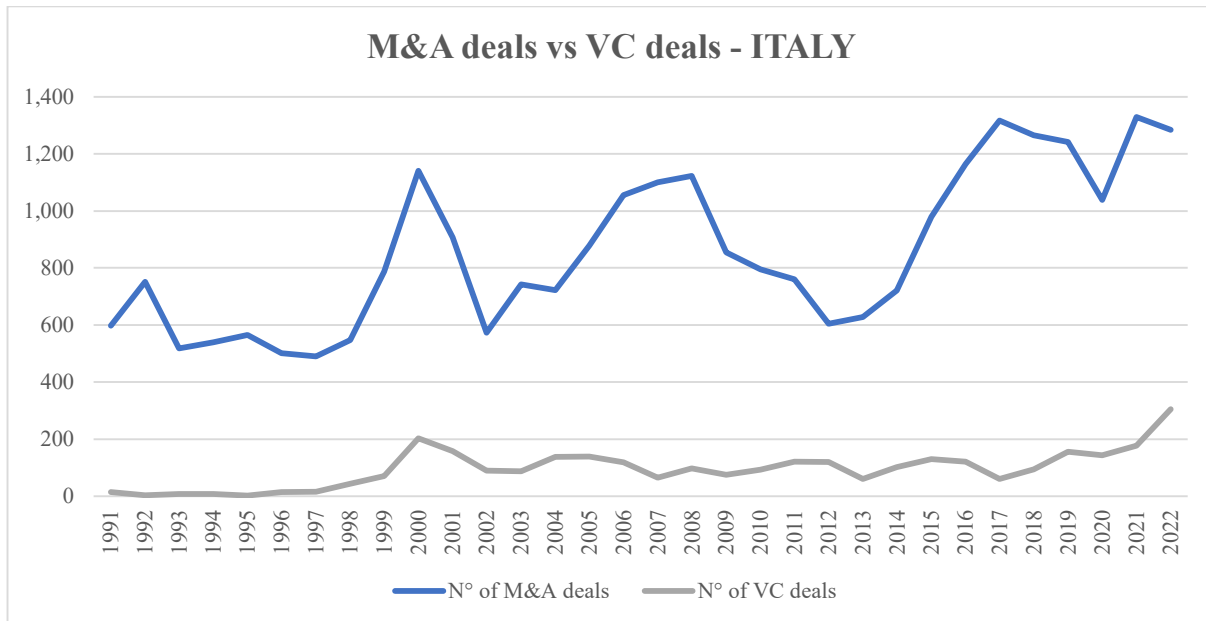
Source: Own elaboration based on World Bank's data and OECD statistics

4.3 Qualitative Analysis - Italy

The same qualitative analysis is reported also for Italy for the particular interest of the author.

Figure 4.3.1 shows the number of Mergers and Acquisitions (M&A) deals compared to the number of Venture Capital (VC) deals in Italy. The graph has two lines: the blue line represents the M&A deals, and the grey line represents the VC deals over the years between 1991 and 2022. The data suggests that VC deals generally have the same trends as M&A deals, but the changes are less pronounced and do not exhibit a consistent delay as observed in the US market (no particular temporal lag is evident). It seems that the Italian market operates differently when it comes to VC deals compared to M&A activities. There may be specific factors unique to the Italian market that are responsible for this divergence in trends and the Italian VC market could be less mature than the USA one.

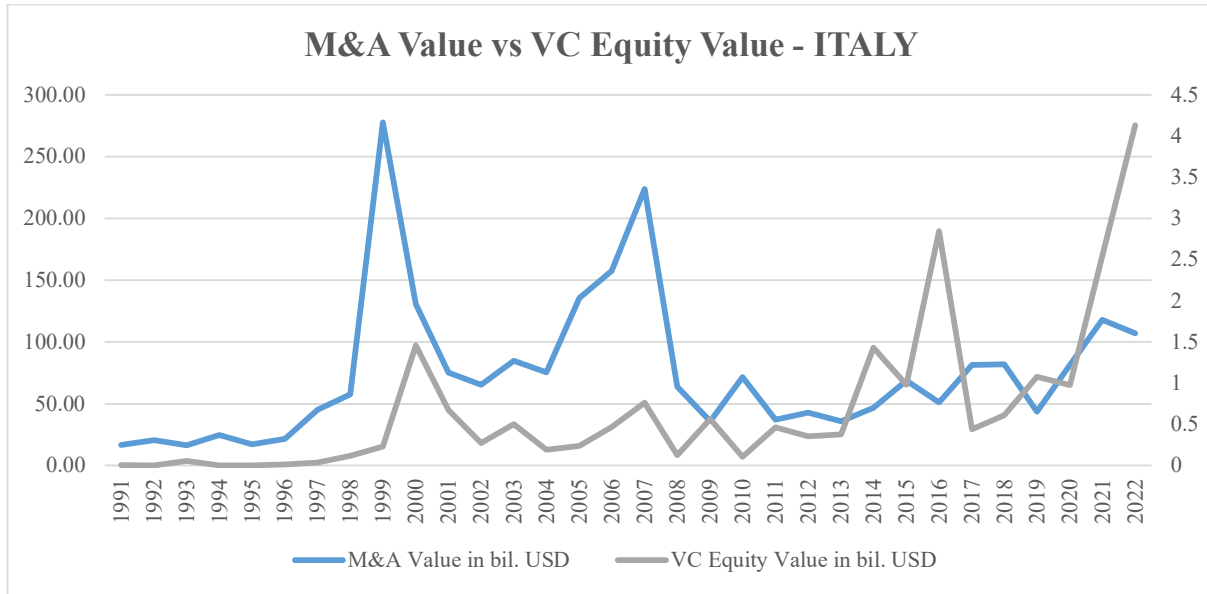
Figure 4.3.1 - M&A number of deals vs VC number of deals in Italy



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure 4.3.2 shows the comparison between the value of Mergers and Acquisitions (M&A) and the value of Venture Capital (VC) equity in Italy. The blue line represents the M&A Value, while the grey line represents the VC Equity Value, with each aligned to its own y-axis. In Italy, the relationship between Mergers and Acquisitions (M&A) and Venture Capital (VC) values seems to be more complex than in the United States. There are instances where increases in M&A value do not correspond with increases in VC equity value, suggesting that the Italian markets may react differently to economic events or market influences. The two variables seem to be weakly correlated and sometimes anticorrelated. It is also relevant to highlight the huge increase in VC Equity Value in Italy in the couple of years 2021-2022.

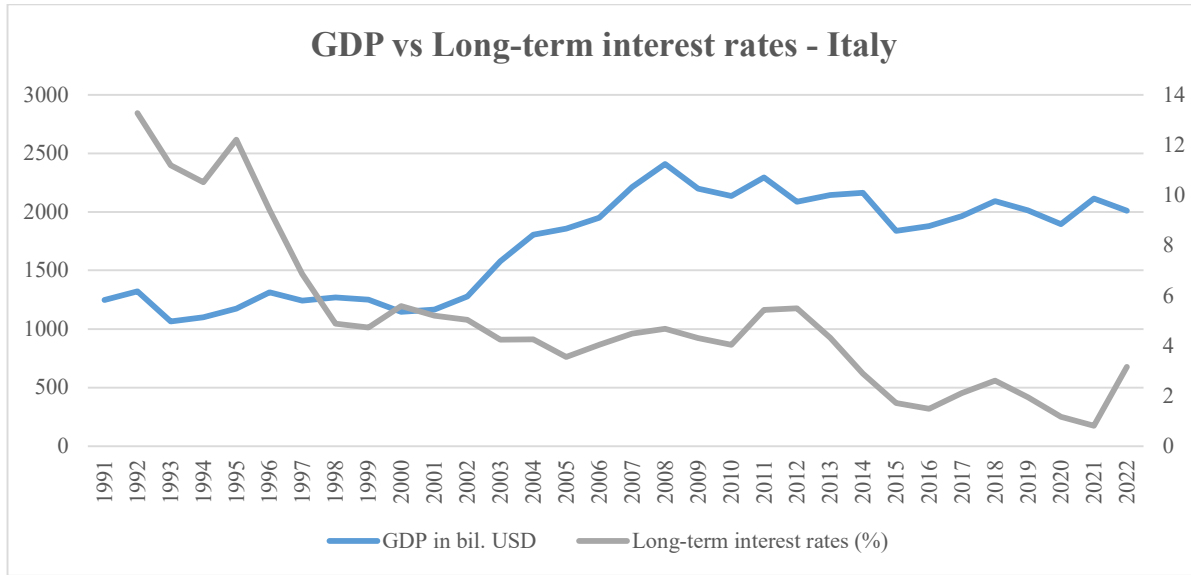
Figure 4.3.2 - M&A Value vs VC Equity Value in Italy



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Finally, in Figure 4.3.3, a comparison between Italy's Gross Domestic Product (GDP) and long-term interest rates is shown, providing an insight into the country's economic performance. The GDP trend, represented by the blue line, shows variations over time, reflecting Italy's economic highs and lows. The long-term interest rates, shown in grey, are decreasing over time in line with global economic trends. However, there are noticeable fluctuations that warrant closer scrutiny to fully comprehend within the context of Italy's economic situation.

Figure 4.3.3 – GDP and Long-term interest rates in Italy



Source: Own elaboration based on World Bank's data and OECD statistics

In the Italian market, the relationship and timing between VC and M&A activity show nuances that distinguish them from the patterns observed in the US (Figure 4.2.1). While the number of M&A transactions in Italy fluctuates significantly, VC transactions show a steady and gradual trend over time. The clear timing between M&A and VC activity, which was evident in the US data, suggests that VC transactions in Italy do not directly follow the growth of M&A or that there may be unique factors unlike in the US market, where VC activity seemed to respond to M&A activity with a continuous lag. The Italian VC market may be influenced by local market situations, regulatory settings, or economic policies that differ from those in the US, or due to differences in investment strategies, financing cycles, or industry sectors that dominate the Italian market.

4.4 Correlations Analysis per country

Another preliminary study was undertaken to calculate the correlation between the two time series with lags of 0, 1, 2, 3, 4, and 5 years for each country.

The time series analyzed are both the number and the value of M&A investments and Venture Capital investments by year and nation, in order to calculate the following correlations:

- Correlation between N° of M&A deals and N° of VC Investments

- Correlation between the value of M&A deals and the value of VC Investments

The correlation is a statistical analysis that allows us to measure and analyze the degree and the direction of the relationship between two variables.

It is important to say that even if two variables show a high correlation, it does not imply that they have a causal relationship. While it is true the opposite, for sure if two variables have a causal relationship, they show a high correlation. In other words, causation implies correlation, but correlation does not necessarily imply causation.

So, this is why the analysis of the correlation can only be considered as a preliminary analysis.

There are two possible correlations: positive or negative.

The correlation is positive when the variables change in the same direction. An increase in the first variable corresponds to an increase in the second variable, and a decrease in the first variable corresponds to a decrease in the second variable.

The correlation is negative when the variables change in opposite directions. An increase in the first variable corresponds to a decrease in the second variable, and a decrease in the first variable corresponds to an increase in the second variable.

To study the correlation, Karl Pearson's coefficient of correlation has been calculated. It is usually indicated with the letter ρ , and it measures, with a number from -1 to 1, the degree of linear relationship between two variables.

There are three significant possibilities:

- $\rho = 1$ indicates a perfect positive linear relationship
- $\rho = -1$ indicates a perfect negative linear relationship
- $\rho = 0$ indicates no linear relationship

The formula used to calculate the Pearson's correlation coefficient is:

$$\rho = \frac{\sum(X_i - \bar{X})(Y_i - \bar{Y})}{\sqrt{\sum(X_i - \bar{X})^2 * \sum(Y_i - \bar{Y})^2}}$$

Where:

- X_i and Y_i are individual data points at the year i .
- $\bar{X}$ and $\bar{Y}$ are the means of the first variable X and the second variable Y respectively over all the years considered.

In this paper the Pearson's correlation coefficient will be interpreted as follows:

- $0 \leq |\rho| < 0.3$ is considered as a weak correlation
- $0.3 \leq |\rho| < 0.7$ is considered as a moderate correlation
- $|\rho| \geq 0.7$ is considered as a strong correlation

The two preliminary hypotheses this study will formulate are:

H1: The N° of M&A deals and the N° of VC Investments per country are positively correlated with a certain temporal lag.

H2: The value of M&A deals and the value of VC Investments per country are positively correlated with a certain temporal lag.

Further analyses would be pointless if the VC and M&A markets did not show a significant positive correlation.

For each country the time series of the variable “Number of M&A deals”, “Number of VC Investments”, “Value of M&A deals”, “Value of VC Investments” were available and organized in a table.

To investigate the H1, the Pearson's coefficient for the variables Number of M&A deals (X) and Number of VC Investments (Y) for a given country has been calculated in 6 different ways:

- No temporal lag: considering the complete time series of the two variables
- 1 year lag: considering for X the time series starting and ending 1 year before Y
- 2 years lag: considering for X the time series starting and ending 2 years before Y
- 3 years lag: considering for X the time series starting and ending 3 years before Y

- 4 years lag: considering for X the time series starting and ending 4 years before Y
- 5 years lag: considering for X the time series starting and ending 5 years before Y

The following table (Table 4.4.1) shows in a compact way, the results of the Pearson's correlation coefficient calculation for "Number of M&A deals", and "Number of VC Investments" for the countries object of the study. A color scale from red to green was used, where the closer the cell is to green, the higher the correlation. Conversely, the closer the cell is to red, the worse the correlation. In bold is the highest correlation identified for each country.

Table 4.4.1 – Correlation between "Number of M&A deals", and "Number of VC Investments" per country and per temporal lag

		Correlation between N° of M&A deals and N° of VC Investments					
		no Lag	1-year lag	2-year lag	3-year lag	4-year lag	5-year lag
Country	USA	76%	81%	83%	82%	74%	62%
	ISRAEL	81%	86%	79%	78%	67%	56%
	UK	81%	83%	76%	80%	73%	61%
	FRANCE	59%	50%	49%	66%	63%	47%
	GERMANY	66%	70%	54%	52%	52%	35%
	SPAIN	56%	70%	55%	62%	65%	51%
	ITALY	66%	58%	37%	43%	49%	49%
	NETHERLANDS	47%	44%	44%	56%	54%	50%
	JAPAN	5%	5%	9%	20%	33%	45%
	CANADA	43%	34%	38%	36%	32%	25%

To investigate the H2, the Pearson's coefficient for the variables Value of M&A deals (X) and Value of VC Investments (Y) for a given country has been calculated in 6 different ways:

- No temporal lag: considering the complete time series of the two variables
- 1 year lag: considering for X the time series starting and ending 1 year before Y
- 2 years lag: considering for X the time series starting and ending 2 years before Y
- 3 years lag: considering for X the time series starting and ending 3 years before Y
- 4 years lag: considering for X the time series starting and ending 4 years before Y
- 5 years lag: considering for X the time series starting and ending 5 years before Y

The results confirm H1. In each country analyzed, the Number of M&A deals and the Number of VC Investments are moderately or strongly correlated with different temporal lags.

For instance, the USA shows a strong correlation (0.83) with 2-year temporal lags, in line with what has been previously shown and discussed in Figure 4.2.1.

Similarly, Italy shows a moderate correlation (0.66) with no temporal lag, in line with what has been previously discussed and shown in Figure 4.3.1.

The following table (Table 4.4.2) shows compactly, the results of the Pearson's correlation coefficient calculation for "Value of M&A deals", and "Value of VC Investments" for the countries object of the study. A color scale from red to green was used, where the closer the cell is to green, the higher the correlation. Conversely, the closer the cell is to red, the worse the correlation. In bold is the highest correlation identified for each country.

Table 4.4.2 – Correlation between "Value of M&A deals", and "Value of VC Investments" per country and per temporal lag

		Correlation between value of M&A deals and value of VC Investments					
		no Lag	1-year lag	2-year lag	3-year lag	4-year lag	5-year lag
Country	USA	80%	70%	66%	65%	53%	47%
	ISRAEL	44%	35%	33%	46%	50%	47%
	UK	59%	62%	48%	49%	36%	18%
	FRANCE	26%	32%	25%	21%	20%	27%
	GERMANY	32%	42%	37%	22%	8%	15%
	SPAIN	14%	17%	20%	34%	34%	1%
	ITALY	19%	28%	2%	-14%	-2%	-16%
	NETHERLANDS	49%	36%	32%	43%	16%	10%
	JAPAN	25%	38%	43%	47%	38%	34%
	CANADA	75%	58%	43%	53%	43%	36%

The results confirm H2. In each country analyzed, the value of M&A deals and the value of VC Equity Investments are moderately correlated with different lags, except for the US and Canada where the correlation is strong, and Italy where it is weak or negative.

For instance, the USA shows a strong correlation (0.80) with no temporal lags, in line with what has been previously shown and discussed in Figure 4.2.2. Similarly, Italy shows a weak correlation (0.28) with a 1-year temporal lag and negative correlations with 3 to 5 years lag, in line with what has been previously discussed and shown in Figure 4.3.2.

5 Empirical research

5.1 Hypotheses

Thanks to the preliminary analysis conducted, it is possible to affirm that, in a given country, the number of VC investments is correlated with the number of M&A deals, while the value of VC investments is correlated with the value of M&A deals, with different temporal lags depending on the country analyzed.

Evidence from the literature review shows that other macroeconomic variables, like GDP and long-term interest rates, play an important role in influencing the number/value of VC Investments.

The insights taken from the literature and the results obtained in the preliminary analysis, can be used to formulate further hypotheses in line with the objectives of this study.

More specifically, an in-depth statistical study will be conducted to see whether it is possible to estimate the number/value of VC deals using a country's time series of M&A deals, GDP, and long-term interest rates, and to what degree of accuracy. Moreover, the influence of the Venture Capital Market maturity on the predictability will be assessed. Finally, the impact of the past historical series of the dependent variable will be evaluated, performing the Autoregressive Distributed Lag (ADL) analysis.

H3: VC activity can be explained by the lagging M&A activity, especially in countries with strong VC market maturity.

H3.1: The number of VC investments in a given year and country can be predicted with statistical significance using the time series of the number of M&A deals, GDP, and long-term interest rates, with a certain temporal lag.

H3.2: The value of VC investments in a given year and country can be predicted with statistical significance using the time series of the value of M&A deals, GDP, and long-

term interest rates, with a certain temporal lag.

H4: Using lagged VC activity improves the predictability of the model, with an effect on the significance of the other variables depending on the maturity of the VC market.

5.2 Autoregressive Distributed Lag (ADL) model

The data collected allows to analyze the historical series of the variables for a period between 1985-1991 to 2022 depending on the country.

To explain the variability of the Number (or the Value) of VC investments it is possible to use the independent variables previously discussed through a multivariate linear regression model. However, since the historical series of VC transactions are available, adding this information to the model should allow to better explain the variability. The ADL model perfectly fits this purpose.

The Autoregressive Distributed Lag (ADL) model is a parametric model that incorporates the influence of explanatory variables and time series dynamics. It is composed of stochastic regression using time series containing explanatory variables with their lag, and the historical values of the variable under study with its lag. The notation ADL (p_j, p) is often used, with p_j indicating the lag of the dependent variable and p indicating the lag of the independent variables (Lopo et al., 2014).

It is possible to represent the model with the following equation:

$$y_t = \beta_0 + \sum_{j=1}^k \sum_{i=1}^q \beta_{ji} x_{jt-i} + \sum_{i=1}^p \phi_i y_{t-i} + \varepsilon_t$$

in which:

- y_t : dependent variable in time t ;
- β_0 : a constant;
- y_{t-i} : the dependent variable in $t - i$;
- x_{jt-i} : is the j^{th} independent variable in $t - i$, $i = \{1, \dots, p_j\}$, $j = \{1, \dots, p\}$;
- β_{ji} : coefficient of the j^{th} independent variable in $t - i$;
- ϕ_i : coefficient of the dependent variable in $t - i$;
- ε_t : random residual

5.3 *VC Market Maturity Indicator*

To interpret the results, it is interesting to consider also the maturity of the Venture Capital market in each country.

The ability of the models to explain the variability of VC investments could be affected by how developed the market is in that given country.

For this purpose, a dedicated indicator has been defined according to the following formula:

$$VC\ Market\ maturity = \frac{VC\ Equity\ Value\ (\$)}{GDP\ (\$)}$$

It measures the proportion of VC investment to the country's GDP and it has been calculated for each country, for the last year of analysis (2022).

5.4 *Statistical Experimental Procedure*

All data found and filtered from the sources already discussed in Chapter 3, have been collected in an Excel spreadsheet. Each country had a dedicated sheet in which the statistical analysis had been developed.

For each of the countries object of the study, the process has proceeded as follows:

1. Plot of the graphs “M&A number of deals vs VC Number of Investments”, “M&A Value vs VC Equity Value” and “GDP vs Long-term interest rates”
2. Calculation of the correlations between the Number of VC investments and the lagged Number of M&A deals with lags from 0 to 5 years, and consequent determination of the temporal lag (lag with the highest correlation)
3. Calculation of the correlations between the value of VC investments and the lagged value of M&A deals with lags from 0 to 5 years, and consequent determination of the temporal lag (lag with the highest correlation)
4. Multivariate linear regression analysis with the number of VC investments as the

- dependent variable and the number of M&A deals, the GDP, and the long-term interest rates as independent variables with the temporal lag identified in step 2.
5. Multivariate linear regression analysis with the value of VC investments as the dependent variable and the value of M&A deals, the GDP, and the long-term interest rates as independent variables with the temporal lag identified in step 3.
 6. Calculation of the correlations between the Number of VC investments and the Number of VC Investments with lag (from 1 to 5 years) and consequent determination of the temporal lag (lag with the highest correlation)
 7. Calculation of the correlations between the VC Equity Value and the VC Equity Value with lag (from 1 to 5 years) and consequent determination of the temporal lag (lag with the highest correlation)
 8. ADL analysis with the number of VC investments as the dependent variable and the number of VC investments with the temporal lag identified in step 6 as independent variable.
 9. ADL analysis with the number of VC investments as the dependent variable, the number of VC investment with the lag identified in step 6, and the number of M&A deals, the GDP, and the long-term interest rates with the temporal lag identified in step 2 as independent variables.
 10. ADL analysis with the value of VC investments as the dependent variable and the value VC investments with the temporal lag identified in step 7 as independent variable.
 11. ADL analysis with the value of VC investments as the dependent variable, the value of VC investments with the lag identified in step 7, and the value of M&A deals, the GDP, and the long-term interest rates with the temporal lag identified in step 3 as independent variables.

5.4.1 Methodological note on the choice of the temporal lag

As previously explained in steps 4 and 5, the temporal lags found in steps 2 and 3 have been used for carrying out the regression analysis. The same logic has been applied in step 6 and 7

for determining the lags to be used for the ADL analyses performed in step 8, 9, 10, and 11. In fact, in steps 2 and 3 the correlations between the number and value of venture capital (VC) investments and mergers and acquisitions (M&A) activity have been analyzed, figuring out the peculiar time lags for each country included in the study.

It has been discovered that applying the time lag where the correlation was highest produced better linear regression outcomes.

This method finds support in theoretical and statistical evidence. In statistics, a larger correlation between variables is generally associated with a regression model that is more able to explain variance in the dependent variable.

Furthermore, it has been applied the same temporal lags found in the correlation study not only to directly involved variables (number/value of VC investments and number/value of M&A investments), but also to economic indicators such as GDP and long-term interest rates. This seeks to assure temporal consistency while also capturing the underlying dynamics of the interaction of Venture Capital, Mergers and Acquisitions, and macroeconomic variables.

5.4.2 Methodological note on the choice of the statistics technique

It has been chosen to conduct a multivariate linear regression analysis to investigate the relationship between VC investments and M&A investments, GDP, and Long-term interest rates.

Correlation analysis measures the strength and direction of a linear relationship between two variables, but it does not consider the influence of other factors interacting at the same time. In contrast, regression analysis not only describes these correlations but also quantifies the extent to which each independent variable impacts the dependent variable, allowing for deeper insights into data that involves several predictors and a response variable (Pandey S., 2020).

Furthermore, correlation coefficients do not indicate whether one variable changes in response to another. There is no attempt to classify one variable as "dependent" and another as "independent." This is done by regression analysis (Pandey S., 2020).

Beyond clarifying the relationships between the variables, the regression model has predictive

potential. Understanding how the variables interact makes it possible to estimate future VC investment trends based on changes in M&A activity, GDP, and interest rates.

5.4.3 Note on the interpretation of regression coefficients and line equations

The independent variables “long-term interest rates”, “GDP”, and “M&A investments” used as predicting variables are correlated with each other, so the model could be affected by multicollinearity. This makes it difficult to interpret the coefficients, thus determining the true relationship between the predicting variables and the outcome variable.

For this reason, and also because it was out of the scope of this study, no interpretation of the individual effects of each variable has been done.

When looking at the regression line equation, one should remember that it has been derived from the independent variables with a characteristic temporal lag.

Let's call t the temporal lag between the number of M&A investments and the number of VC investments identified in the country x .

To predict the number of VC investments in the country x in the year y , one should look at the regression line equation substituting in the independent variables the values they had in the year $y - t$.

6 Results

The results of the statistical analysis will be presented in an aggregated way.

The reader is referred to the appendix for more in-depth results by country, which include the graphs plot in the preliminary analysis, the multivariate linear regression output with the regression line equation, the ADL analyses and the interpretation.

6.1 VC market maturity

The VC Market Maturity Indicator has been calculated for each country as defined in paragraph 5.3 using 2022 data, which is the last year object of the study.

The indicator expresses the proportion of venture capital investment to the country's GDP.

Table 6.1.1 shows the results of VC market maturity in 2022 classified into three clusters of countries and represented with three different colors:

- Strong VC market maturity if the indicator is greater than 1% (represented in green)
- Moderate VC market maturity if the indicator is between 0.4% and 1% (represented in orange)
- Weak VC market maturity if the indicator is lower than 0.4% (represented in red)

Table 6.1.1 - VC market maturity indicator for 2022

Country	VC Market maturity indicator for 2022
Israel	2.88%
USA	1.41%
Canada	1.31%
UK	1.21%
France	0.89%
Netherlands	0.51%
Germany	0.47%
Spain	0.33%
Japan	0.21%
Italy	0.21%

Israel, USA, Canada and UK were the countries with the strongest VC market maturity in 2022, according to the defined indicator.

France, the Netherlands and Germany showed moderate VC market maturity, while Spain, Japan and Italy were the countries with the weakest VC market maturity.

The three clusters will be used for the representation and interpretation of the results of the statistical analyses.

6.2 Results of the analysis on the N° of VC Investments

In the preliminary analysis (chapter 4) the calculation of the correlations between N° of VC Investments and lagged N° of M&A deals has been presented. This procedure was crucial for the identification of the temporal lag to apply in the regression model.

Thereafter, the correlation between N° of VC Investments and N° of VC Investments with a temporal lag from 1 year to 5 years has been calculated for each country. This is necessary for the identification of the temporal lag to apply to the autoregressive component of the ADL model.

The results are reported in table 6.2.1, which shows in a compact way, the results of the Pearson's correlation coefficient calculation for "N° of VC Investments", and "N° of VC Investments with lag" for the countries object of the study. A color scale from red to green was used, where the closer the cell is to green, the higher the correlation. Conversely, the closer the cell is to red, the worse the correlation. In bold is the highest correlation identified for each country.

Table 6.2.1 - Correlations between N° of VC Investments and N° of VC Investments with lag

		Correlations between N° of VC Investments and N° of VC Investments with lag				
		1-year lag	2-years lag	3-years lag	4-years lag	5-years lag
Country	USA	83%	59%	40%	23%	8%
	ISRAEL	90%	77%	64%	51%	41%
	UK	90%	74%	66%	59%	48%
	FRANCE	77%	53%	60%	50%	32%
	GERMANY	86%	56%	37%	28%	29%
	SPAIN	67%	55%	46%	29%	13%
	ITALY	73%	45%	41%	33%	16%
	NETHERLANDS	69%	45%	43%	20%	11%
	JAPAN	90%	65%	9%	2%	-1%
	CANADA	88%	73%	70%	21%	-11%

As shown in the table 6.2.1, for each country the highest correlation is between VC investments and the same investments with one-year lag. Such correlation values are very high. It is possible to conclude that there is a strong positive correlation between the N° of VC Investments and the same variable with 1-year lag in all the countries object of the study. This means that including the autoregressive component with lag in the analysis should ameliorate the predictability of the model.

To analyze the formulated hypotheses, for each country, three different regression models with the N° of VC Investments as dependent variable have been performed:

- Regression 1: Regression model with N° M&A deals, GDP, and Long-term interest rates as independent variables with their lag
- Regression 2: ADL Regression model with N° of VC Investments with the lags identified in table 6.2.1
- Regression 3: ADL Regression model with N° M&A deals, GDP, and Long-term interest rates with their lag, and N° of VC Investments with the lag identified in table 6.2.1

Table 6.2.2 shows in a compact way the R-squared obtained for the three regressions. The results are divided into the three clusters of countries discussed in the previous paragraph (paragraph 6.1).

Table 6.2.2 - R-squared (Analysis on the N° of VC Investments)

Country	R-Squares (Analysis of the N° of VC Investments)				
	Regression 1	Regression 2	Regression 3	Delta % Reg. 3 vs Reg. 1	Delta % Reg. 3 vs Reg. 2
USA	82.6%	68.6%	84.0%	1.7%	22.4%
UK	77.0%	80.6%	85.5%	11.0%	6.0%
Israel	72.9%	81.6%	80.5%	10.4%	-1.2%
Canada	55.5%	78.2%	81.0%	45.8%	3.5%
Germany	64.8%	73.7%	77.8%	20.1%	5.5%
France	61.6%	58.6%	67.4%	9.4%	14.9%
Netherlands	49.3%	47.5%	63.6%	28.9%	33.8%
Italy	51.4%	52.7%	63.2%	23.0%	19.9%
Spain	50.3%	44.5%	59.3%	18.0%	33.2%
Japan	21.1%	81.5%	83.7%	296.2%	2.7%

From the table above, it is immediate to notice that the countries with the highest R-squares in Regression 1 belong to those with the most mature VC markets. In fact, the USA are the country in which N° of M&A deals, GDP and Long-term interest rates with lag, better explain the variability of the N° of VC Investments (R-squared of 82.6%).

On the other hand, Japan is the country with the worst result for regression 1 (R-squared of only 21.1%).

Considering the results of the Regression 3, it is possible to affirm that the R-squares improve in all the countries considered, reaching good values of R-squared in all the countries object of the study

Adding the autoregressive component to the model in regression 3 increases the R-squared of Japan by 296.2%. Instead, the USA increased their R-squared by only 1.7%.

To reach robust conclusions, it is also crucial to look at the significance of the variables in the various regressions. To do so, one should refer to the p-values of the variables, which should be higher than 0.05 to be significant.

In table 6.2.3 the p-values for Regression 1 have been reported. The N° of M&A deals with lag is significant in all the considered countries, except for France and Japan. GDP is not significant in the countries where VC market maturity is weak, and a similar insight can be taken for Long term interest rates.

Table 6.2.3 - P-Values for Regression 1 (Analysis of the N° of VC Investments)

Country	P-Values for Regression 1 (Analysis of the N° of VC Investments)		
	GDP in bil. USD	N° of M&A deals	Long term interest rates (%)
USA	0.001	0.000	0.000
UK	0.071	0.000	0.002
Israel	0.012	0.002	0.302
Canada	0.000	0.003	0.005
Germany	0.592	0.004	0.019
France	0.035	0.147	0.002
Netherlands	0.003	0.001	0.048
Italy	0.511	0.032	0.030
Spain	0.532	0.021	0.554
Japan	0.476	0.256	0.547

Looking at the p-values referring to the ADL model (Regression 3), shown in table 6.2.4, it is immediately apparent that the autoregressive component, represented by the N° of VC investments with lag, is always significant except in the USA which deserve a separate discussion. In fact, in the USA GDP, N° of M&A deals and Long term interest rates with lag are significant, while the past VC transactions have no significance in explaining the N° of VC investments in the country.

GDP and Long term interest rates with lag lose their significance in the majority of the cases and in the totality of less mature markets adding the autoregressive component to the model. The N° of M&A deals with lag is still significant in the majority of the countries, especially in the most mature VC markets.

Table 6.2.4 - P-Values referred to Regression 3 (Analysis of the N° of VC Investments)

Country	P-Values referred to Regression 3 (Analysis of the N° of VC Investments)			
	N° of VC deals (ADL)	GDP in bil. USD	N° of M&A deals	Long term interest rates (%)
USA	0.138	0.004	0.000	0.001
UK	0.000	0.044	0.047	0.018
Israel	0.011	0.267	0.055	0.714
Canada	0.000	0.276	0.081	0.954
Germany	0.001	0.965	0.218	0.319
France	0.050	0.212	0.072	0.252
Netherlands	0.003	0.033	0.007	0.257
Italy	0.008	0.486	0.056	0.355
Spain	0.010	0.217	0.034	0.791
Japan	0.000	0.081	0.612	0.416

To conclude, the statistical analyses show that the N° of M&A deals with lag has a crucial importance in explaining the variability of the N° of VC investments, especially in the most mature markets. The ADL model helps to improve the R-squares in all the countries but with the addition of the autoregressive component, GDP and Long term interest rates lose their significance.

6.3 Results of the analysis on the VC Equity Value

In the preliminary analysis (chapter 4), the calculation of the correlations between VC Equity Value and lagged M&A Value has been presented. This procedure was crucial for the identification of the temporal lag to apply in the regression model.

Thereafter, the correlation between VC Equity Value and VC Equity Value with a temporal lag from 1 year to 5 years has been calculated for each country. This is necessary for the identification of the temporal lag to apply to the autoregressive component of the ADL model. The results are reported in table 6.3.1, which shows in a compact way, the results of the Pearson's correlation coefficient calculation for "VC Equity Value", and "VC Equity Value with lag" for the countries object of the study. A color scale from red to green was used, where the closer the cell is to green, the higher the correlation. Conversely, the closer the cell is to red, the worse the correlation. In bold is the highest correlation identified for each country.

Table 6.3.1 - Correlations between VC Equity Value and VC Equity Value with lag

		Correlations between VC Equity Value and VC Equity Value with lag				
		1-year lag	2-years lag	3-years lag	4-years lag	5-years lag
Country	USA	77%	73%	70%	55%	37%
	ISRAEL	83%	93%	84%	73%	68%
	UK	80%	84%	73%	70%	55%
	FRANCE	79%	74%	65%	74%	62%
	GERMANY	65%	85%	10%	57%	-63%
	SPAIN	56%	43%	48%	38%	20%
	ITALY	57%	37%	25%	10%	36%
	NETHERLANDS	52%	51%	51%	31%	14%
	JAPAN	79%	67%	57%	37%	25%
	CANADA	71%	78%	68%	51%	37%

As shown in the table 6.3.1, for each country the highest correlation is between VC Equity Value and the same variable with one- or two-years lag. Such correlation values are very high. It is possible to conclude that there is a strong positive correlation between the N° of VC Investments and the same variable with 1- or 2-year lag in all the countries object of the study. This means that including the autoregressive component with lag in the analysis should ameliorate the predictability of the model.

To analyze the formulated hypotheses, for each country, three different regression models with the VC Equity Value as dependent variable have been performed:

- Regression 1: Regression model with M&A value, GDP, and Long-term interest rates as independent variables with their lag
- Regression 2: ADL Regression model with VC Equity Value with the lags identified in table 6.3.1
- Regression 3: ADL Regression model with M&A value, GDP, and Long-term interest rates with their lag, and N° of VC Investments with the lag identified in table 6.3.1

Table 6.3.2 shows in a compact way the R-squared obtained for the three regressions. The results are divided into the three clusters of countries discussed in paragraph 6.1.

Table 6.3.2 - R-squared (Analysis on the VC Equity Value)

Country	R-Squares (Analysis on the Equity Value of VC Investments)				
	Regression 1	Regression 2	Regression 3	Delta % Reg. 3 vs Reg. 1	Delta % Reg. 3 vs Reg 2
USA	74.1%	59.6%	80.6%	8.7%	35.1%
UK	57.2%	69.9%	74.6%	30.4%	6.7%
Israel	59.1%	86.1%	88.4%	49.6%	2.6%
Canada	57.9%	60.2%	80.2%	38.6%	33.3%
Germany	40.0%	72.8%	75.5%	88.9%	3.8%
France	47.4%	62.8%	67.9%	43.5%	8.2%
Netherlands	33.2%	26.9%	43.3%	30.7%	61.1%
Italy	34.5%	32.0%	41.3%	20.0%	29.4%
Spain	31.6%	31.2%	40.1%	27.1%	28.7%
Japan	26.8%	61.8%	63.5%	137.1%	2.9%

From the table above, it is immediate to notice that the countries with the highest R-squares in Regression 1 belong to those with the most mature VC markets.

Similarly to the results of the analysis on the N° of VC investments, the USA are the country in which M&A value, GDP and Long-term interest rates with lag, better explain the variability

of the VC Equity Value (R-squared of 74.1%).

On the other hand, Japan is the country with the worst result for regression 1 (R-squared of only 26.8%).

Considering the results of the Regression 3, it is possible to affirm that the R-squares improve, reaching good values of R-squared, in all the countries considered.

Adding the autoregressive component to the model in regression 3 increases the R-squared of Japan by 137.1%. Instead, the USA increased their R-squared by only 8.7%.

To reach robust conclusions, it is also crucial to look at the significance of the variables in the various regressions. To do so, one should refer to the p-values of the variables, which should be higher than 0.05 to be significant.

In table 6.3.3 the p-values for Regression 1 have been reported. The M&A value with lag is significant in the most mature markets similarly to the GDP, while Long term interest rates are significant in half of the countries.

Table 6.3.3 - P-Values for Regression 1 (Analysis on VC Equity Value)

Country	P-Values for Regression 1 (Analysis on VC Equity Value)		
	GDP in bil. USD	N° of M&A deals	Long term interest rates (%)
USA	0.003	0.002	0.025
UK	0.018	0.006	0.001
Israel	0.026	0.753	0.563
Canada	0.231	0.001	0.269
Germany	0.846	0.255	0.157
France	0.620	0.915	0.005
Netherlands	0.681	0.106	0.423
Italy	0.694	0.811	0.011
Spain	0.804	0.745	0.023
Japan	0.612	0.308	0.158

Looking at the p-values referring to the ADL model (Regression 3), shown in table 6.3.4, it is immediately apparent that the autoregressive component, represented by the VC Equity Value with lag, is always significant except in Italy and Spain where is slightly not significant. GDP and Long-term interest rates with lag lose their significance in almost the totality of the countries adding the autoregressive component to the model. The M&A value with lag is still significant in the most mature VC markets.

Table 6.3.4 - P-Values referred to Regression 3 (Analysis of the N° of VC Investments)

Country	P-Values for Regression 3 (Analysis on VC Equity Value)			
	VC Equity Value in bil. USD (ADL)	GDP in bil. USD	M&A Value in bil. USD	Long term interest rates (%)
USA	0.004	0.990	0.000	0.923
UK	0.000	0.209	0.031	0.326
Israel	0.000	0.529	0.301	0.882
Canada	0.000	0.094	0.001	0.009
Germany	0.000	0.265	0.159	0.290
France	0.000	0.838	0.969	0.161
Netherlands	0.036	0.878	0.135	0.316
Italy	0.099	0.868	0.649	0.155
Spain	0.070	0.821	0.960	0.093
Japan	0.000	0.780	0.602	0.558

To conclude, the statistical analyses show that the value of M&A deals with lag has a crucial importance in explaining the variability of the VC equity value in the most mature markets. The ADL model helps to improve the R-squares in all the countries. With the addition of the autoregressive component, lagged GDP and Long term interest rates lose their significance, while lagged M&A value maintains its significance in the most mature VC markets.

7 Conclusions

7.1 Discussion

According to the literature review carried out, this is the first study that tried, applying a cross-country perspective, to develop a model for predicting with statistical significance the VC investments based on lagged M&A activity, lagged macroeconomic variables such as GDP and long-term interest rates. The main novelty points are the use of the Autoregressive Distributed Lag (ADL) model and the interpretation of the results through a VC market maturity indicator defined on purpose.

The results of the study confirm that the number of VC investments in a given year and country can be explained by the number of M&A deals, the GDP, and the long-term interest rates of that country with a certain temporal lag. The predictability of the model is better in more mature VC markets, where the lagged M&A activity has a crucial significance both in terms of value as well as in terms of N° of transactions.

The USA is the country with the best results, and the only country where the autoregressive component is not significant in the analysis of the N° of VC investments. This means that in the USA, lagged M&A transactions, GDP, and Long term interest rates are more significant than lagged VC transactions in explaining the N° of VC investments.

The results also confirm that the value of VC investments in a given year and country is explained by the value of M&A deals, the GDP, and the long-term interest rates of that country with a certain temporal lag. Also, in this case, it is particularly true in mature markets.

The study's findings indicate that lagged macroeconomic indicators and M&A transactions have a substantial impact on venture capital investments. Additionally, they highlight the variation in predictive capability across different countries. The diversity of maturation and dynamics of venture capital (VC) markets can be seen by the variation in R-squared values among nations. Notably, countries with well-established financial markets and strong

economic indicators (such as the United States, Canada, the United Kingdom, and Israel) exhibit better correlation and predictive capacity than those with less mature markets (such as Italy, Spain, and Japan) which have weak or missing virtuous systems.

The results clearly show that VC market maturity has an important influence on the interaction of VC and M&A operations. The more established venture capital ecosystem in mature economies makes for a more predictable environment that can be effectively modeled with the use of past data on macroeconomic factors and M&A activity. High R-squared values seen in the US, UK, and Israel provide proof of this. These nations not only provide excellent M&A exit opportunities but also maintain economic stability, which promotes regular investment patterns.

On the other hand, countries like Japan, with a considerably low R square of 21.1% for the number of VC investments and 26.8% for the value of VC investments, as well as Italy and Spain, show that where the market is not mature yet, the mechanism of M&A activity driving the VC one is weak or not in place.

The results also confirm the hypotheses that it is possible to predict with statistical significance the number and the value of VC investments in a given year and country with a certain temporal lag using the time series of the number or value of M&A deals, GDP, and long-term interest rates.

Adding the autoregressive component represented by the lagged VC activity, improves the predictability of the model. This means that leveraging the information on the historical series of the dependent variable has a crucial role in enhancing the R-squares. This effect is observed in every country under study, except for the USA, which has the largest venture capital market globally. In the USA, the autoregressive component is not significant in the analysis on the N° of VC investments, while lagged M&A transactions, GDP and Long term interest rates have a preponderant significance.

Overall, it is possible to conclude that a mechanism for driving the Venture Capital market through the M&A market exists; it is already well developed, especially in the United States, as well as in Israel, Canada and the United Kingdom, and it has been triggered to a lesser

extent in countries such as France and Germany, but it has not succeeded in triggering in countries like as Japan.

7.2 Limitations and Future Research Directions

Although this study has limitations, it does provide direction and ideas for future research and improvements.

First, the study tried to interpret the results looking at the VC market maturity. An indicator trying to estimate the maturity of the VC market in the different countries has been defined for the purpose of classifying the countries in three different clusters of maturities. In studies where the indicator is not used just for simple clustering, a more sophisticated indicator could be defined that considers the different aspects of such a complex concept as VC market maturity.

Moreover, the study did not interpret the coefficients (sign and value) of the regression models due to the possible multi-collinearity of variables. To be able to assert anything about the impact of independent variables such as GDP and long-term interest rates, one would have to study their correlation with VC activity individually. Since the aim of the study was to particularly study the impact of M&A activity and to try to find an equation to predict VC activity based on macroeconomic variables such as GDP and long-term interest rates, this work was not done. The findings from the authoritative studies cited in the literature review that investigated the impact of these variables on VC activity can be verified in future studies using the dataset already built.

Furthermore, it would be interesting to replicate this study in other countries and also with a data split by industry to better understand the underlying phenomenon and, therefore, to give more detailed recommendations to policymakers and investors. From this perspective, further studies can investigate the impact on VC and on M&A investments of different governments' policies (regulations, taxation...) to identify what are the best strategies and provide recommendations.

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APPENDIX

The results obtained for each country will be reported in full in this Appendix to enable the reader to delve into aspects of interest.

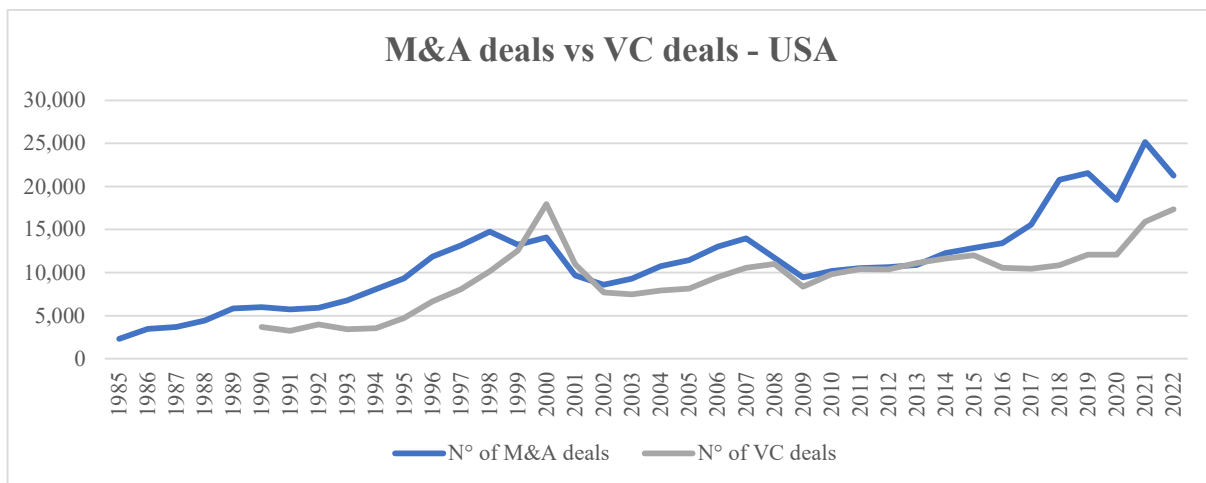
For each country, the reader can find a preliminary analysis with the graphs and the correlations analyses, the regression outputs with interpretation, the ADL analyses and finally the interpretation of the results.

A1. USA

Preliminary Analysis

Figure A1.1 compares the number of M&A transactions with the number of VC transactions in the US over the years.

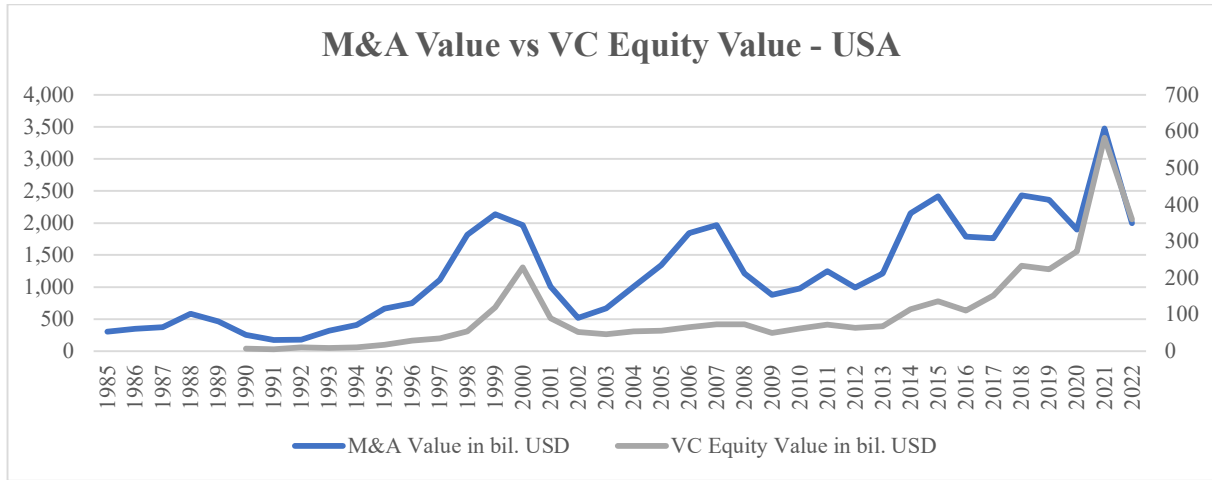
Figure A1.1 - M&A number of deals vs VC number of deals in the USA



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A1.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in the US over the years.

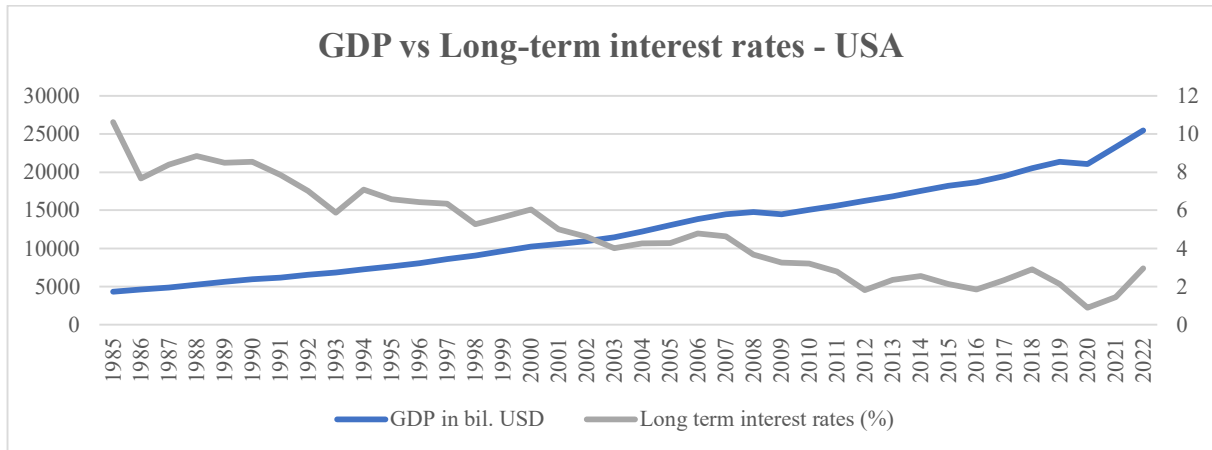
Figure A1.2 - M&A Value vs VC Equity Value in the USA



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure 6.1.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in the US.

Figure A1.3 - GDP and Long-term interest rates in the USA



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	76%	Strong Correlation
Correlation 1-year lag	81%	Strong Correlation
Correlation 2-year lag	83%	Strong Correlation
Correlation 3-year lag	82%	Strong Correlation
Correlation 4-year lag	74%	Strong Correlation
Correlation 5-year lag	62%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	80%	Strong Correlation
Correlation 1-year lag	70%	Moderate Correlation
Correlation 2-year lag	66%	Moderate Correlation
Correlation 3-year lag	65%	Moderate Correlation
Correlation 4-year lag	53%	Moderate Correlation
Correlation 5-year lag	47%	Moderate Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line are then reported.

Regression on Number of VC Investments with a 2-year lag

<i>Regression Statistics</i>	
Multiple R	0,90865289
R Square	0,82565007
Adjusted R Square	0,80761388
Standard Error	1633,94996
Observations	33

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	366648371	1,2E+08	45,78	4,03704E-11
Residual	29	77423981	2669792		
Total	32	444072353			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	19100,44	4128,65	4,626	7,158E-05	10656,41	27544,48
GDP in bil. USD	-0,79	0,22	-3,593	1,192E-03	-1,23	-0,34
N° of M&A deals	0,81	0,12	6,971	1,155E-07	0,58	1,05
Long-term interest rates (%)	-1928,82	422,47	-4,566	8,470E-05	-2792,87	-1064,77

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The r square has a strong value (higher than 0,7), meaning that the number of VC deals is explained for the 82.6% by the number of M&A deals, by the GDP, and by the Long-term interest rates of the USA.

All three independent variables are statistically significant given the p-values strongly lower than 0.05.

The number of VC investments in the USA can be predicted by the regression line of the equation:

$$y = -1928,82 \text{ Long-term interest rates (\%)} + 0,814552 \text{ N}^\circ \text{ of M\&A deals} \\ - 0,78587 \text{ GDP in bil. USD} + 19100,44$$

Regression VC Equity Value with no lag

<i>Regression Statistics</i>	
Multiple R	0,86073602
R Square	0,74086649
Adjusted R Square	0,71405958
Standard Error	64,2300645
Observations	33

ANOVA					<i>Significance F</i>
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	
Regression	3	342051,18	114017	27,637141	1,202E-08
Residual	29	119639,53	4125,5		
Total	32	461690,71			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>	<i>Upper 95,0%</i>
Intercept	-391,452	123,312	-3,174	0,004	-643,653	139,251	-643,653	139,251
GDP in bil. USD	0,019	0,006	3,289	0,003	0,007	0,031	0,007	0,031
M&A Value in bil. USD	0,074	0,022	3,375	0,002	0,029	0,119	0,029	0,119
Long term interest rates (%)	31,731	13,398	2,368	0,025	4,328	59,134	4,328	59,134

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be strongly explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.7409.

All three independent variables are statistically significant given the p-values lower than 0.05.

The value of VC investments in the USA can be predicted by the regression line of the equation:

$$y = 31,731 \text{ Long-term interest rates}(\%) + 0.074 \text{ M\&A value in bil. USD} \\ + 0.019 \text{ GDP in bil. USD} - 391,452$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	83%	Strong Correlation
2 years lag	59%	Moderate Correlation
3 years lag	40%	Moderate Correlation
4 years lag	23%	Weak Correlation
5 years lag	8%	Weak Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	83%	Strong Correlation
2 years lag	59%	Moderate Correlation
3 years lag	40%	Moderate Correlation
4 years lag	23%	Weak Correlation
5 years lag	8%	Weak Correlation

1 year lag	77%	Strong Correlation
2 years lag	73%	Strong Correlation
3 years lag	70%	Strong Correlation
4 years lag	55%	Moderate Correlation
5 years lag	37%	Moderate Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC Investments with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.828212
R Square	0.685936
Adjusted R Square	0.675467
Standard Error	2069.562
Observations	32

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	2.81E+08	2.81E+08	65.52187	4.91E-09
Residual	30	1.28E+08	4283086		
Total	31	4.09E+08			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1738.183	1050.016	1.655388	0.108271	-406.235	3882.602
N° of VC deals (1 year lag)	0.858684	0.106082	8.094558	4.91E-09	0.642036	1.075332

ADL Regression 2 years lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.916401
R Square	0.839791
Adjusted R Square	0.816056
Standard Error	1558.087
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	3.44E+08	85895544	35.38239	2.26E-10
Residual	27	65546166	2427636		
Total	31	4.09E+08			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	17335.99	4800.275	3.611459	0.001225	7486.643	27185.34
N° of VC deals (1 year lag)	0.228226	0.149185	1.529813	0.137696	-0.07788	0.534329
GDP in bil. USD	-0.7585	0.240166	-3.15823	0.003885	-1.25128	-0.26572
N° of M&A deals	0.702124	0.159284	4.40799	0.000149	0.3753	1.028949
Long term interest rates (%)	-1811.63	500.8583	-3.61706	0.001207	-2839.31	-783.956

ADL Regression VC Equity Value 1 years lag

<i>Regression Statistics</i>	
Multiple R	0.772191
R Square	0.596279
Adjusted R Square	0.582822
Standard Error	77.93151
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	269101.4	269101.4	44.30878	2.26E-07
Residual	30	182199.6	6073.321		
Total	31	451301			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	28.49555	18.48729	1.541358	0.133713	-9.26055	66.25164
VC Equity Value in bil. USD 1 year lag	0.824576	0.123876	6.656484	2.26E-07	0.571588	1.077564

ADL Regression no lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.897586
R Square	0.805661
Adjusted R Square	0.77687
Standard Error	56.99422
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	363595.8	90898.95	27.98319	2.95E-09
Residual	27	87705.23	3248.342		
Total	31	451301			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-68.2661	155.3847	-0.43934	0.663914	-387.089	250.557
VC Equity Value in bil. USD 1 year lag	0.524268	0.167337	3.133013	0.004137	0.180921	0.867615
GDP in bil. USD	0.000102	0.008178	0.012529	0.990096	-0.01668	0.016882
M&A Value in bil. USD	0.08497	0.020105	4.226231	0.000243	0.043717	0.126222
Long term interest rates (%)	1.573062	16.20316	0.097084	0.923377	-31.6731	34.8192

Interpretation of results

The USA have the biggest VC market in the world, and a strong VC market maturity. The regression models show very high values of R-squared, both in terms of N° of VC Investments (82.6%), as well as in terms of VC Equity Value (74.1%) with all the variables statistically significant.

The ADL analysis on the N° of VC Investments does not ameliorate significantly the R-squared and the autoregressive component is not significant.

The ADL analysis on the VC Equity Value slightly ameliorate the R-squared, but losing significance of GDP and Long-term interest rates.

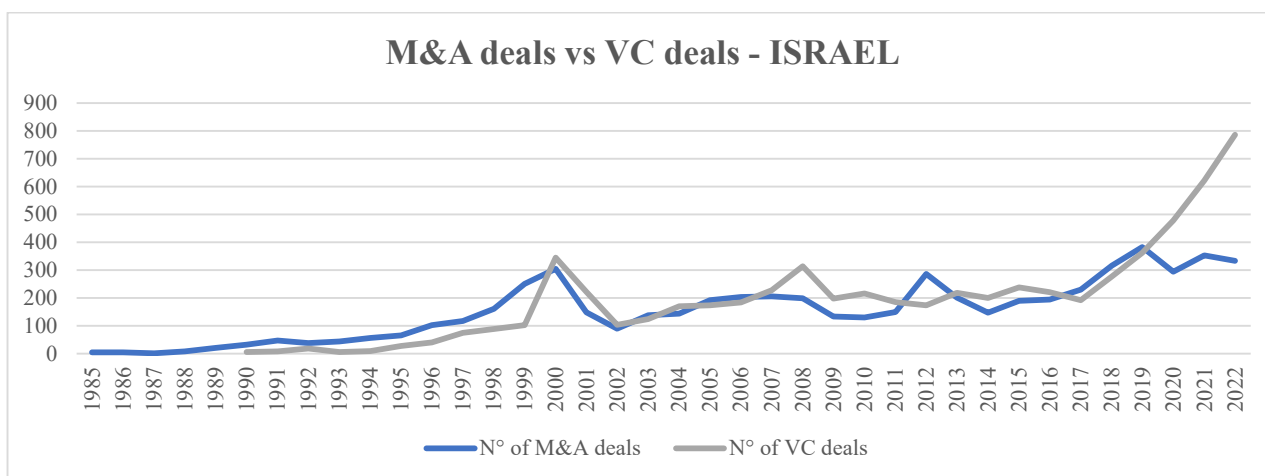
The variables N° of M&A deals and M&A Value have always been significant in all the analyses conducted.

A2. Israel

Preliminary Analysis

Figure A2.1 compares the number of M&A transactions with the number of VC transactions in Israel over the years.

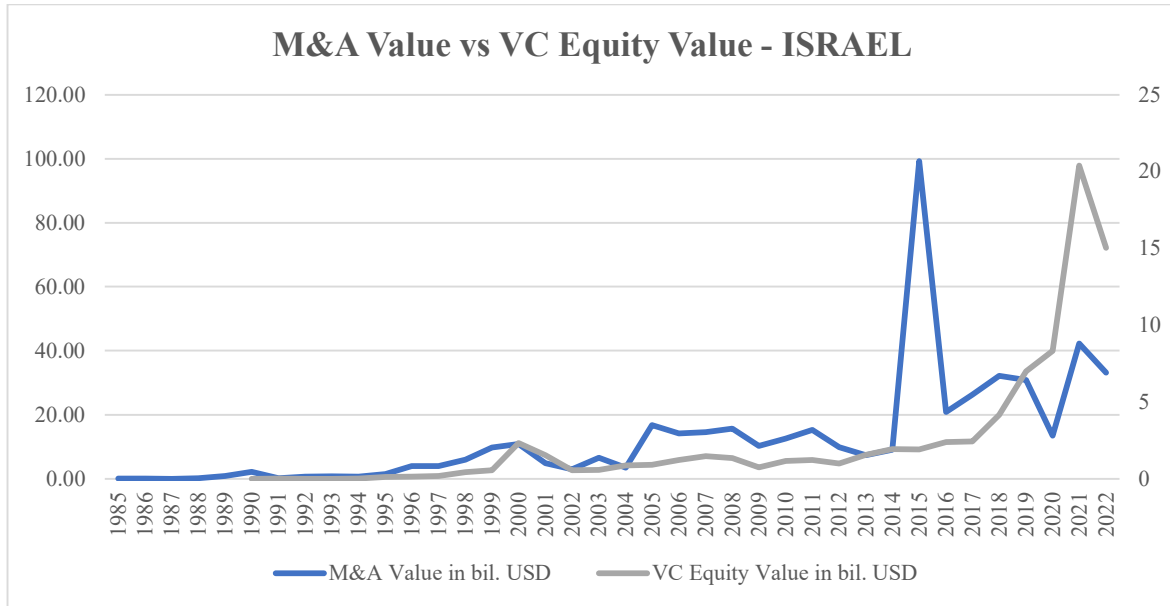
Figure A2.1 - M&A number of deals vs VC number of deals in Israel



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A2.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in Israel over the years.

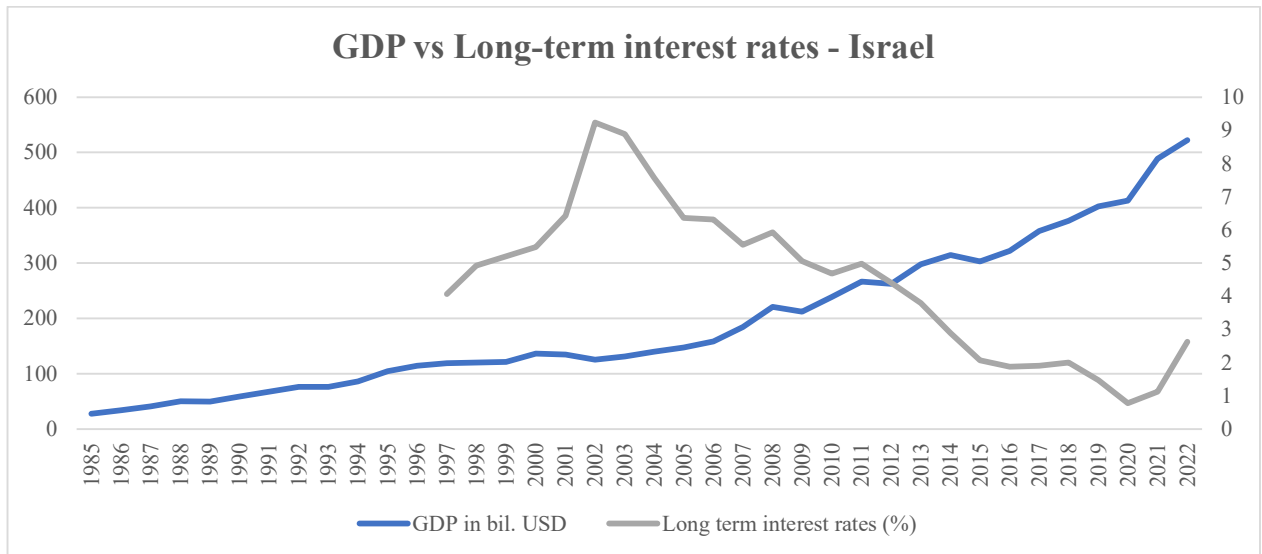
Figure A2.2 - M&A Value vs VC Equity Value in Israel



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A2.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in Israel.

Figure A2.3 - GDP and Long-term interest rates in Israel



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	81%	Strong Correlation
Correlation 1-year lag	86%	Strong Correlation
Correlation 2-year lag	79%	Strong Correlation
Correlation 3-year lag	78%	Strong Correlation
Correlation 4-year lag	67%	Moderate Correlation
Correlation 5-year lag	56%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	44%	Moderate Correlation
Correlation 1-year lag	35%	Moderate Correlation
Correlation 2-year lag	33%	Moderate Correlation
Correlation 3-year lag	46%	Moderate Correlation
Correlation 4-year lag	50%	Moderate Correlation
Correlation 5-year lag	47%	Moderate Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line are then reported.

Regression on Number of VC Investments with a 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,854007
R Square	0,729327
Adjusted R Square	0,69066
Standard Error	89,9363
Observations	25

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	457685,4	152561,784	18,8614794	3,6064E-06
Residual	21	169859,3	8088,53753		
Total	24	627544,6			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-262,9158	153,1517	-1,7167	0,1007	-581,4122	55,5805
GDP in bil. USD	0,9182	0,3344	2,7455	0,0121	0,2227	1,6138
N° of M&A deals	1,0909	0,3090	3,5306	0,0020	0,4483	1,7335
Long term interest rates (%)	16,4588	15,5558	1,0581	0,3021	-15,8912	48,8088

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the number of VC investments can be strongly explained by the number of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.7293.

In this scenario, the p-values for GDP and the number of M&A transactions are both significant (less than 0.05), indicating that these variables have a statistically significant impact on the number of VC investments. However, the p-value for long-term interest rates is non-significant, implying that it may not have a meaningful effect on the dependent variable in this model. The variable will be kept in the regression line equation and the overall regression model because of its theoretical relevance and because removing it will not improve considerably the R square of the model.

The number of VC investments in Israel can be predicted by the regression line of the equation:

$$y = 16,4588 \text{ Long-term interest rates(\%)} + 1.0909 \text{ N° of M\&A deals} + 0.9182 \text{ GDP in bil. USD} - 362,92$$

Regression on Value of VC Investments with a 4-year lag

<i>Regression Statistics</i>	
Multiple R	0,768686
R Square	0,590878
Adjusted R Square	0,522691
Standard Error	3,498821
Observations	22

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	318,2444	106,08146	8,66554677	0,00089911
Residual	18	220,3515	12,2417503		
Total	21	538,5959			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-2,4779	5,9987	-0,4131	0,6844	-15,0807	10,1248
GDP in bil. USD	0,0358	0,0148	2,4198	0,0263	0,0047	0,0669
M&A Value in bil. USD	0,0143	0,0448	0,3193	0,7532	-0,0798	0,1083
Long term interest rates (%)	-0,3713	0,6304	-0,5889	0,5632	-1,6957	0,9532

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be explained at a 59.1% level by the number of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.5909.

In this scenario, the p-value for GDP is significant (less than 0.05), indicating that the variable has a statistically significant impact on the value of VC investments. However, the p-value for long-term interest rates and M&A value are non-significant, implying that they may not have a meaningful effect on the dependent variable in this model. The variables will be kept in the regression line equation and the overall regression model because of their theoretical relevance and because removing them will not improve considerably the R square of the model.

The value of VC investments in Israel can be predicted by the regression line of the equation:

$$y = -0.3713 \text{ Long-term interest rates(\%)} + 0.0143 \text{ M\&A Value in bil.USD} + 0.0358 \text{ GDP in bil.USD} - 2.4779$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	90%	Strong Correlation
2 years lag	77%	Strong Correlation
3 years lag	64%	Moderate Correlation
4 years lag	51%	Moderate Correlation
5 years lag	41%	Moderate Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	83%	Strong Correlation
2 years lag	93%	Strong Correlation
3 years lag	84%	Strong Correlation
4 years lag	73%	Strong Correlation
5 years lag	68%	Moderate Correlation

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.903069
R Square	0.815534
Adjusted R Square	0.809385
Standard Error	75.28985
Observations	32

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	751829	751829	132.6314	1.55E-12
Residual	30	170056.8	5668.561		
Total	31	921885.9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3.841928	22.05922	0.174164	0.862906	-41.209	48.89286
N° of VC deals (1 year lag)	1.11278	0.096624	11.51657	1.55E-12	0.915447	1.310113

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.89741
R Square	0.805344
Adjusted R Square	0.766413
Standard Error	78.15212
Observations	25

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	505389.6	126347.4	20.68639	7.07E-07
Residual	20	122155.1	6107.754		
Total	24	627544.6			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-138.612	140.3203	-0.98783	0.335038	-431.315	154.0906
N° of VC deals (1 year lag)	0.635359	0.227343	2.794716	0.011187	0.16113	1.109589
GDP in bil. USD	0.394672	0.345776	1.141411	0.267182	-0.3266	1.115947
Total N° of M&A deals	0.639706	0.31332	2.041701	0.054594	-0.01387	1.29328
Long term interest rates (%)	5.234226	14.10158	0.37118	0.714406	-24.1812	34.64961

ADL Regression VC Equity Value 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.928059
R Square	0.861293
Adjusted R Square	0.85651
Standard Error	1.701038
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	521.0492	521.0492	180.0739	5.72E-14
Residual	29	83.91236	2.89353		
Total	30	604.9616			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.61851	0.389559	-1.58772	0.123195	-1.41525	0.178228

VC Equity Value in bil. USD 2						
years lag	2.188142	0.163061	13.41916	5.72E-14	1.854645	2.521639

ADL Regression 4 years lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.940195
R Square	0.883966
Adjusted R Square	0.856664
Standard Error	1.91734
Observations	22

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	476.1006	119.0251	32.37728	9.53E-08
Residual	17	62.49529	3.676194		
Total	21	538.5959			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-2.75047	3.287513	-0.83664	0.414401	-9.68652	4.185578
VC Equity Value in bil. USD 2						
years lag	2.109024	0.321847	6.552872	4.92E-06	1.429986	2.788063
GDP in bil. USD	0.005976	0.009294	0.642986	0.528811	-0.01363	0.025584
Total M&A Value in bil. USD	0.026245	0.024599	1.066913	0.300929	-0.02565	0.078144
Long term interest rates (%)	0.052734	0.351466	0.150041	0.882498	-0.68879	0.794262

Interpretation of results

Israel has a strong VC market maturity. The regression models show high values of R-squared, both in terms of N° of VC Investments (72.9%), as well as in terms of VC Equity Value (59.1%).

The ADL analysis on the N° of VC Investments ameliorate the R-squared to 80.5%. GDP and Long-term interest rates are not significant.

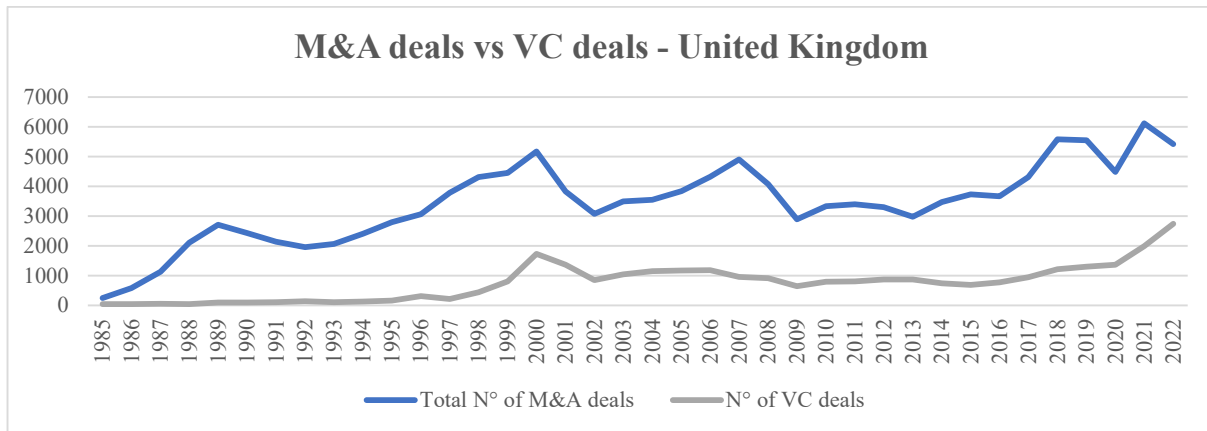
The ADL analysis on the VC Equity Value significantly ameliorate the R-squared to 88.4%, but losing significance of M&A Value, GDP and Long-term interest rates.

A3. United Kingdom

Preliminary Analysis

Figure A3.1 compares the number of M&A transactions with the number of VC transactions in the UK over the years.

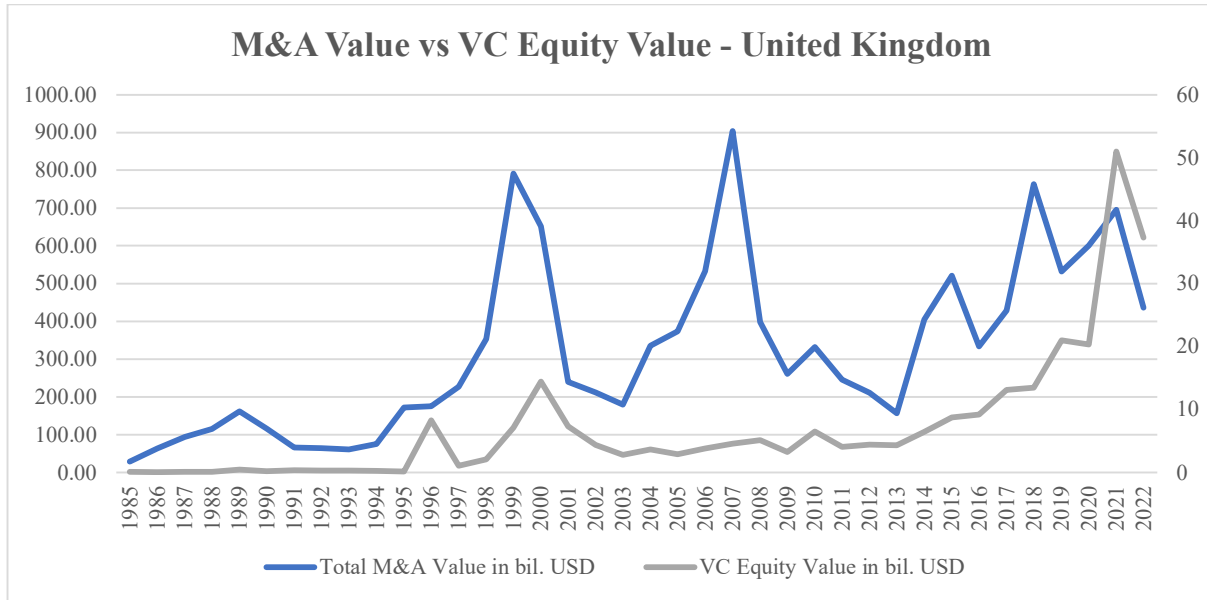
Figure A3.1 - M&A number of deals vs VC number of deals in United Kingdom



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A3.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in the UK over the years.

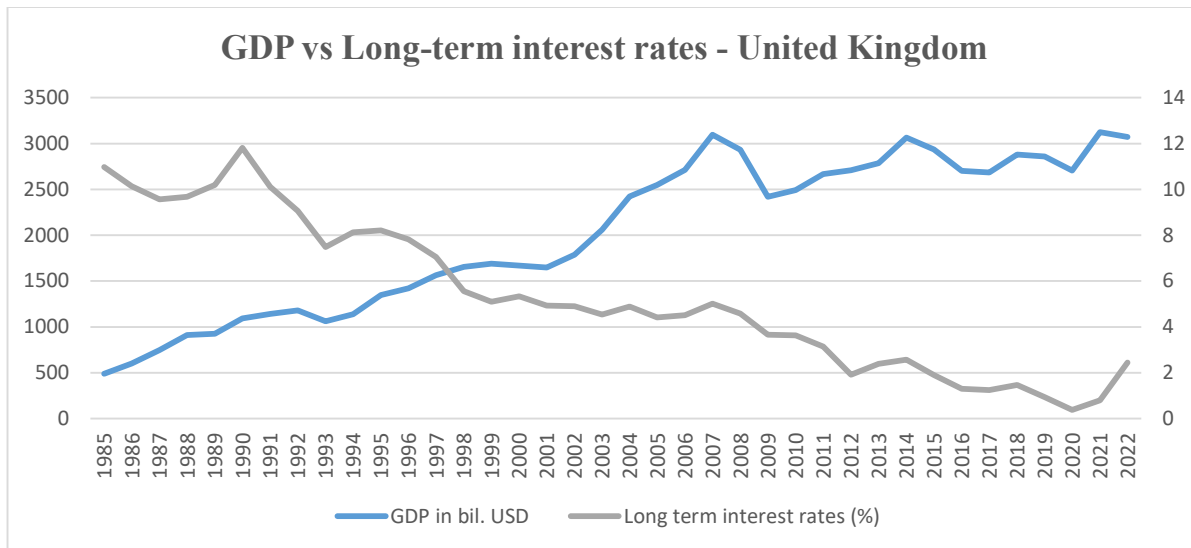
Figure A3.2 - M&A Value vs VC Equity Value in United Kingdom



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A3.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in the UK.

Figure A3.3 - GDP and Long-term interest rates in United Kingdom



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	81%	Strong Correlation
Correlation 1-year lag	83%	Strong Correlation
Correlation 2-year lag	76%	Strong Correlation
Correlation 3-year lag	80%	Strong Correlation
Correlation 4-year lag	73%	Strong Correlation
Correlation 5-year lag	61%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	59%	Moderate Correlation
Correlation 1-year lag	62%	Moderate Correlation
Correlation 2-year lag	48%	Moderate Correlation
Correlation 3-year lag	49%	Moderate Correlation
Correlation 4-year lag	36%	Moderate Correlation
Correlation 5-year lag	18%	Weak Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with a 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,87754
R Square	0,770076
Adjusted R Square	0,749174
Standard Error	304,8427
Observations	37

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	10271055	3423685	36,84192	1,21E-10
Residual	33	3066658	92929,04		

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1105,852	521,770	2,119	0,042	44,303	2167,401
GDP in bil. USD	-0,286	0,153	-1,862	0,071	-0,598	0,026
Total N° of M&A deals	0,276	0,061	4,545	0,000	0,153	0,400
Long term interest rates (%)	-128,723	38,574	-3,337	0,002	-207,203	-50,243

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The r square has a strong value (higher than 0,7), meaning that the number of VC deals is explained for the 77% by the number of M&A deals, by the GDP, and by the Long-term interest rates of the UK.

All three independent variables are statistically significant given the p-values lower than 0.05.

The number of VC investments in the UK can be predicted by the regression line of the equation:

$$y = -128.723 \text{ Long-term interest rates (\%)} + 0,276 \text{ N° of M\&A deals} - 0,286 \text{ GDP in bil. USD} + 1105.85$$

Regression VC Equity Value with 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,756206
R Square	0,571847
Adjusted R Square	0,532924
Standard Error	7,194585
Observations	37

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	2281,42533	760,4751	14,69175	3,01936E-06
Residual	33	1708,14795	51,76206		
Total	36	3989,57329			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	36,511	11,563	3,158	0,003	12,986	60,036
GDP in bil. USD	-0,009	0,004	-2,483	0,018	-0,017	-0,002
Total M&A Value in bil. USD	0,021	0,007	2,931	0,006	0,006	0,035
Long term interest rates (%)	-3,249	0,885	-3,672	0,001	-5,050	-1,449

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.5718.

All three independent variables are statistically significant given the p-values lower than 0.05.

The value of VC investments in the UK can be predicted by the regression line of the equation:

$$y = -3.249 \text{ Long-term interest rates(\%)} + 0.021 \text{ M\&A value in bil.USD} - 0.009 \text{ GDP in bil.USD} + 36.511$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	90%	Strong Correlation
2 years lag	74%	Strong Correlation
3 years lag	66%	Moderate Correlation
4 years lag	59%	Moderate Correlation
5 years lag	48%	Moderate Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	80%	Strong Correlation
2 years lag	84%	Strong Correlation
3 years lag	73%	Strong Correlation
4 years lag	70%	Strong Correlation
5 years lag	55%	Moderate Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.898022
R Square	0.806444
Adjusted R Square	0.800914
Standard Error	271.5878
Observations	37

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	10756115	10756115	145.8259	4.9E-14
Residual	35	2581598	73759.95		
Total	36	13337713			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	40.5486	75.67845	0.535801	0.595485	-113.087	194.184
N° of VC deals (1 year lag)	1.046042	0.086623	12.07584	4.9E-14	0.870189	1.221896

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.924503

R Square	0.854707
Adjusted R Square	0.836545
Standard Error	246.0869
Observations	37

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	11399833	2849958	47.06103	5.79E-13
Residual	32	1937881	60558.77		
Total	36	13337713			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	831.0838	425.9844	1.950973	0.059863	-36.618	1698.786
N° of VC deals (1 year lag)	0.68538	0.158751	4.317335	0.000142	0.362015	1.008744
GDP in bil. USD	-0.25952	0.124055	-2.09201	0.044458	-0.51221	-0.00683
Total N° of M&A deals	0.124856	0.060358	2.068593	0.046744	0.001911	0.2478
Long term interest rates (%)	-81.9199	32.9725	-2.48449	0.018395	-149.083	-14.7571

ADL Regression VC Equity Value 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.835971
R Square	0.698847
Adjusted R Square	0.68999
Standard Error	5.903512
Observations	36

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	2749.764	2749.764	78.89954	2.21E-10
Residual	34	1184.95	34.85146		
Total	35	3934.714			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.66365	1.35264	-0.49063	0.626838	-3.41254	2.085245
VC Equity Value in bil. USD 2 years lag	1.606054	0.18081	8.882541	2.21E-10	1.238603	1.973504

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.863585
R Square	0.745779
Adjusted R Square	0.712977
Standard Error	5.68043
Observations	36

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	2934.428	733.607	22.73532	7.58E-09
Residual	31	1000.286	32.26728		
Total	35	3934.714			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	9.401954	10.80967	0.869772	0.39111	-12.6445	31.44843
VC Equity Value in bil. USD 2 years lag	1.278123	0.275011	4.647542	5.88E-05	0.717235	1.839011
GDP in bil. USD	-0.004	0.003114	-1.28335	0.20888	-0.01035	0.002355
Total M&A Value in bil. USD	0.013027	0.005782	2.253048	0.031476	0.001235	0.024819
Long term interest rates (%)	-0.86586	0.867726	-0.99785	0.326078	-2.6356	0.903879

Interpretation of results

The UK has a strong VC market maturity. The regression models show high values of R-squared, both in terms of N° of VC Investments (77.0%), as well as in terms of VC Equity Value (57.2%).

The ADL analysis on the N° of VC Investments ameliorate the R-squared to 85.5% with all the variables statistically significant.

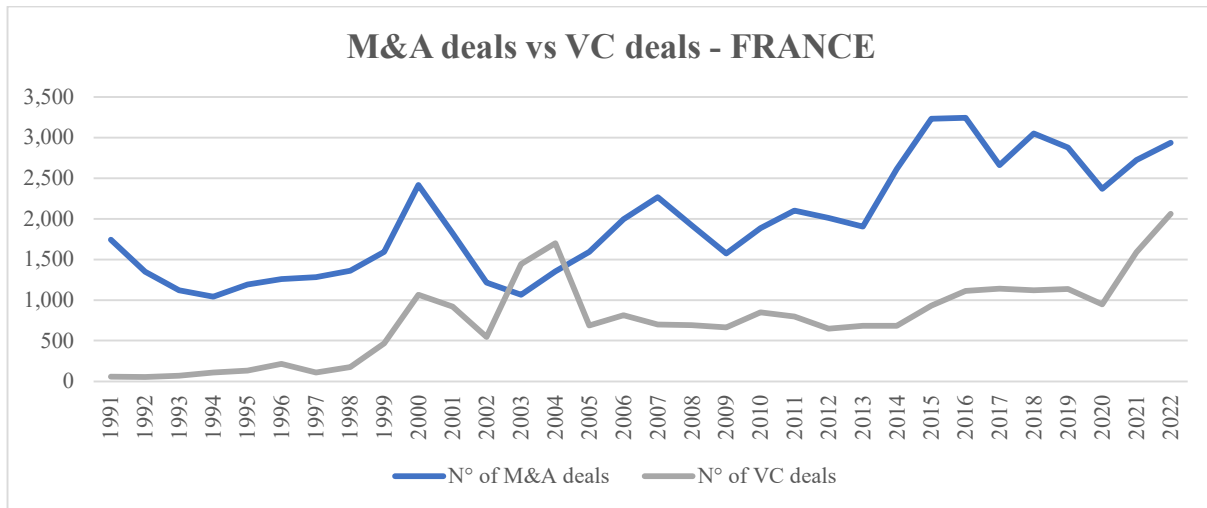
The ADL analysis on the VC Equity Value significantly ameliorate the R-squared to 74.6%, but losing significance of GDP and Long-term interest rates.

A4. France

Preliminary Analysis

Figure A4.1 compares the number of M&A transactions with the number of VC transactions in France over the years.

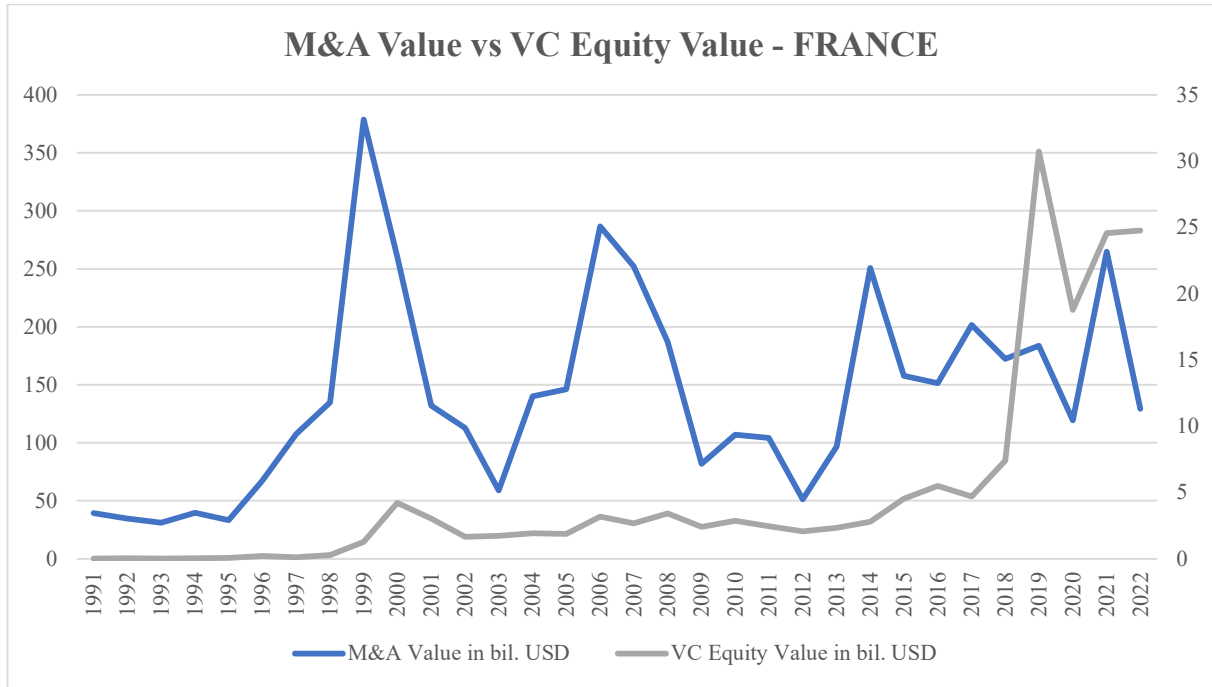
Figure A4.1 - M&A number of deals vs VC number of deals in France



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A4.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in France over the years.

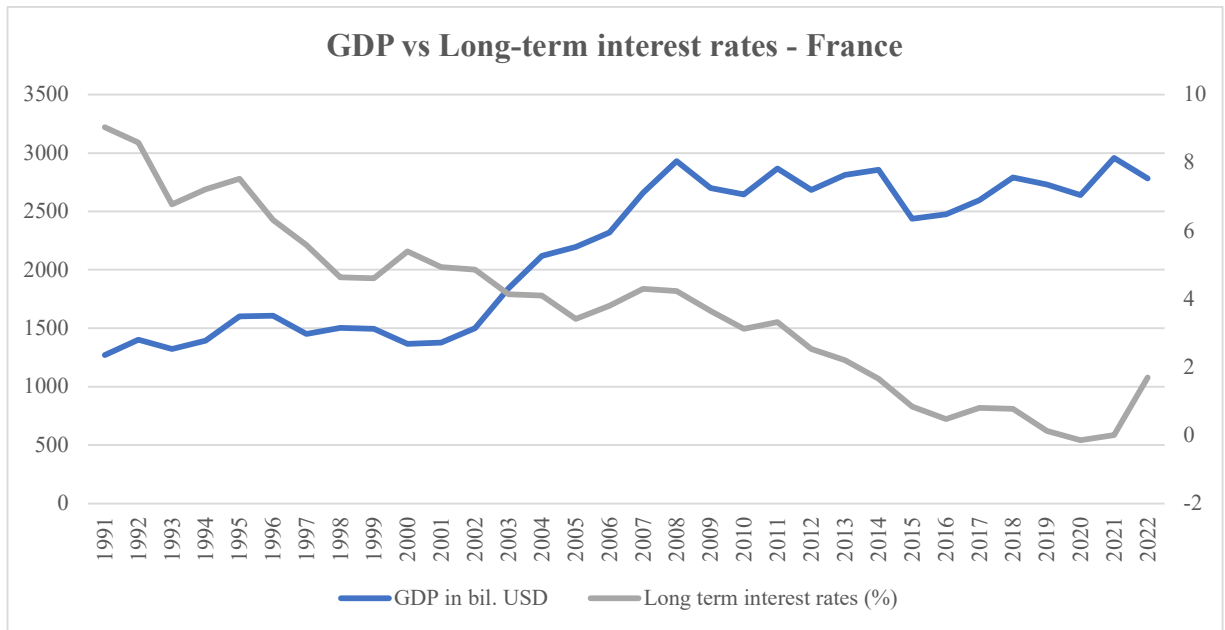
Figure A4.2 - M&A Value vs VC Equity Value in France



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A4.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in France.

Figure A4.3 - GDP and Long-term interest rates in France



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	59%	Moderate Correlation
Correlation 1-year lag	50%	Moderate Correlation
Correlation 2-year lag	49%	Moderate Correlation
Correlation 3-year lag	66%	Moderate Correlation
Correlation 4-year lag	63%	Moderate Correlation
Correlation 5-year lag	47%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	26%	Weak Correlation
Correlation 1-year lag	32%	Moderate Correlation
Correlation 2-year lag	25%	Weak Correlation
Correlation 3-year lag	21%	Weak Correlation
Correlation 4-year lag	20%	Weak Correlation
Correlation 5-year lag	27%	Weak Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with a 3-year lag

<i>Regression Statistics</i>	
Multiple R	0,784936
R Square	0,616125
Adjusted R Square	0,57006
Standard Error	313,1067
Observations	29

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	3933725	1311242	13,37513	2,09E-05
Residual	25	2450895	98035,79		
Total	28	6384620			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1867,853	598,502	3,121	0,005	635,215	3100,492
GDP in bil. USD	-0,350	0,157	-2,229	0,035	-0,673	-0,027
N° of M&A deals	0,208	0,139	1,495	0,147	-0,078	0,494
Long term interest rates (%)	-168,902	49,273	-3,428	0,002	-270,383	-67,421

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The r squared value, which is around 0.616, suggests that the combined impacts of GDP, the number of M&A deals, and long-term interest rates explain around 61.6% of the variance in VC transactions in France. This indicates that the model has a reasonable amount of explanatory ability for understanding fluctuations in the Number of VC investments.

The variables GDP and Long-term interest rate are statistically significant given the p-values lower than 0.05. However, the number of M&A transactions, despite exhibiting a

positive coefficient, fails to attain statistical significance at the conventional threshold ($p = 0.147$) implying that they may not have a meaningful effect on the dependent variable in this model. The variable will be kept in the regression line equation and the overall regression model because of its theoretical relevance and because removing it will not improve considerably the R square of the model.

The number of VC investments in France can be predicted by the regression line of the equation:

$$y = -168.902 \text{ Long-term interest rates (\%)} + 0,208 \text{ N}^\circ \text{ of M\&A deals} \\ - 0,350 \text{ GDP in bil. USD} + 1867.853$$

Regression VC Equity Value with 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,688118
R Square	0,473507
Adjusted R Square	0,415007
Standard Error	6,096528
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	902,5311	300,8437	8,094234	0,000527
Residual	27	1003,527	37,16765		
Total	30	1906,058			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	17,575	9,718	1,808	0,082	-2,366	37,516
GDP in bil. USD	-0,002	0,003	-0,501	0,620	-0,008	0,005
M&A Value in bil. USD	0,002	0,014	0,108	0,915	-0,028	0,031
Long term interest rates (%)	-2,430	0,786	-3,090	0,005	-4,043	-0,817

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.4735. This indicates that approximately 47.35% of the variability observed in the value of VC investments can be accounted for by variations in the value of M&A deals, GDP, and long-term interest rates.

The variable long-term interest rates is statistically significant given the p-values lower than 0.05, while the variables GDP and M&A Value may not influence the model. However, the variables are still included in the regression line equation and the overall regression model due to their theoretical relevance, and deleting them will not significantly increase the model's R square.

The value of VC investments in France can be predicted by the regression line of the equation:

$$y = -2.430 \text{ Long-term interest rates(\%)} + 0.002 \text{ M\&A value in bil. USD} - 0.002 \text{ GDP in bil. USD} + 17.575$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	77%	Strong Correlation
2 years lag	53%	Moderate Correlation
3 years lag	60%	Moderate Correlation
4 years lag	50%	Moderate Correlation
5 years lag	32%	Moderate Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	79%	Strong Correlation
2 years lag	74%	Strong Correlation
3 years lag	65%	Moderate Correlation
4 years lag	74%	Strong Correlation
5 years lag	62%	Moderate Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.765819
R Square	0.586478
Adjusted R Square	0.572219
Standard Error	327.0405
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	4399009	4399009	41.12934	5.16E-07
Residual	29	3101709	106955.5		
Total	30	7500718			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	180.4051	110.6781	1.629998	0.113917	-45.9571	406.7673
N° of VC deals (1 year lag)	0.838667	0.130772	6.413216	5.16E-07	0.571209	1.106125

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.820963
R Square	0.67398
Adjusted R Square	0.619643
Standard Error	294.4994
Observations	29

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	4303103	1075776	12.40375	1.31E-05
Residual	24	2081517	86729.87		
Total	28	6384620			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	788.4857	768.4044	1.026134	0.31506	-797.423	2374.395
N° of VC deals (1 year lag)	0.423751	0.205333	2.063721	0.050018	-3.6E-05	0.847538
GDP in bil. USD	-0.20851	0.162648	-1.28198	0.212097	-0.5442	0.127178
Total N° of M&A deals	0.248823	0.132217	1.881929	0.072028	-0.02406	0.521705
Long term interest rates (%)	-75.8577	64.6576	-1.17322	0.25222	-209.304	57.58902

ADL Regression VC Equity Value 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.824225
R Square	0.679346
Adjusted R Square	0.630015
Standard Error	4.848412
Observations	31

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	1294.873	323.7183	13.77109	3.72E-06
Residual	26	611.1846	23.5071		
Total	30	1906.058			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	7.223801	8.133588	0.888144	0.382606	-9.49503	23.94263
VC Equity Value in bil. USD 1 year lag	0.667179	0.163309	4.085384	0.000374	0.331493	1.002864
GDP in bil. USD	-0.0005	0.002425	-0.2067	0.837856	-0.00548	0.004483
Total M&A Value in bil. USD	0.000452	0.011376	0.039765	0.968585	-0.02293	0.023836
Long term interest rates (%)	-1.02895	0.713167	-1.44279	0.161021	-2.49488	0.436987

Interpretation of results

France has a moderate VC market maturity. The regression models show good values of R-squared, both in terms of N° of VC Investments (61.6%), as well as in terms of VC Equity Value (47.4%).

The ADL analysis on the N° of VC Investments does not significantly ameliorate the R-squared (67.4%). N° of M&A deals, GDP and Long-term interest rates are not significant.

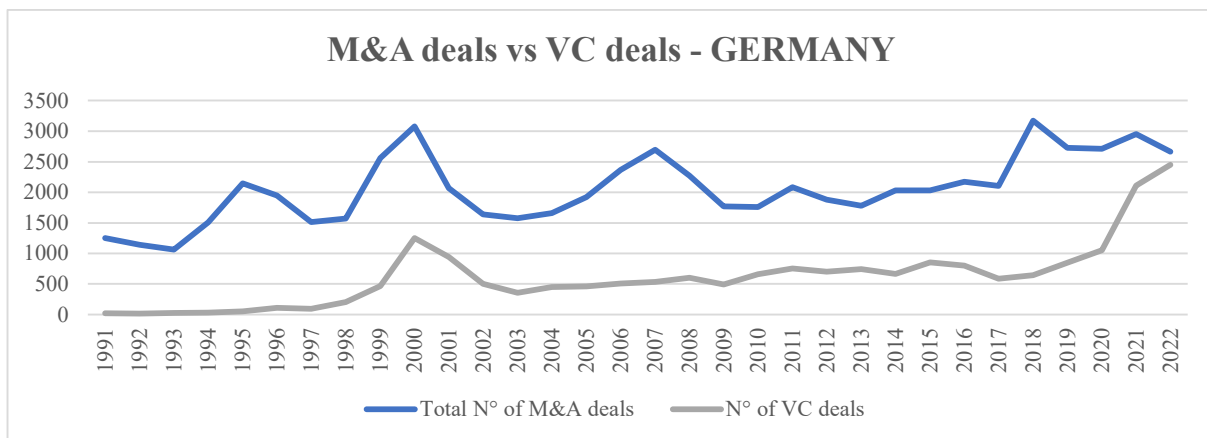
The ADL analysis on the VC Equity Value significantly ameliorate the R-squared to 67.9%, but losing significance of M&A Value, GDP and Long-term interest rates.

A5. Germany

Preliminary Analysis

Figure A5.1 compares the number of M&A transactions with the number of VC transactions in Germany over the years.

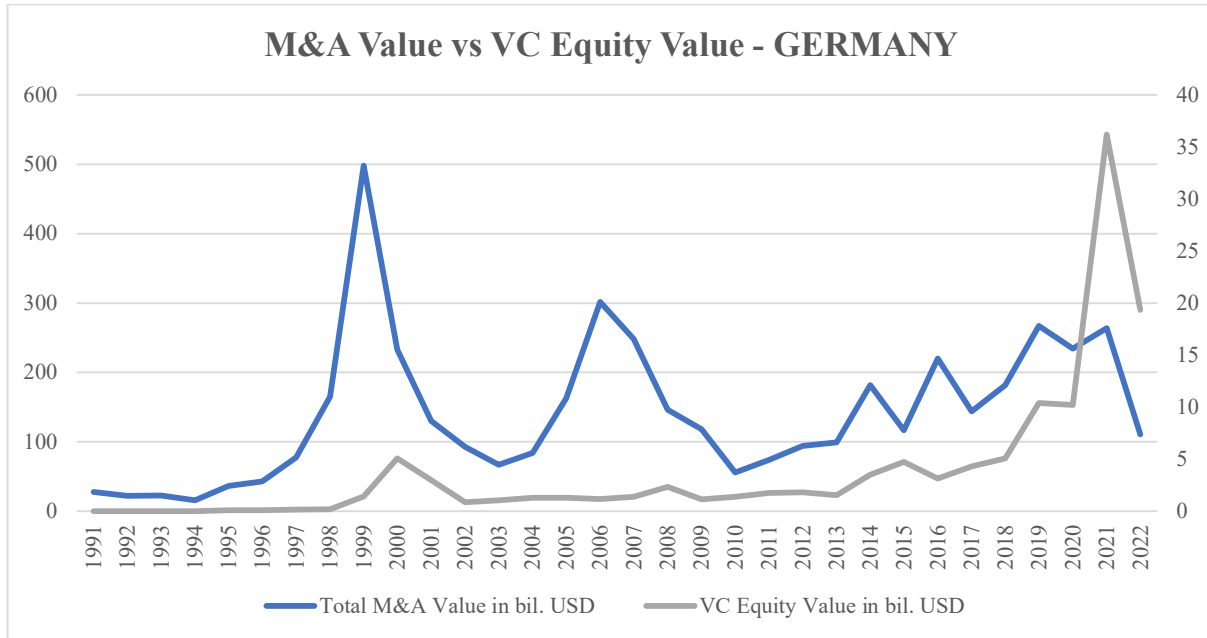
Figure A5.1 - M&A number of deals vs VC number of deals in Germany



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A5.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in Germany over the years.

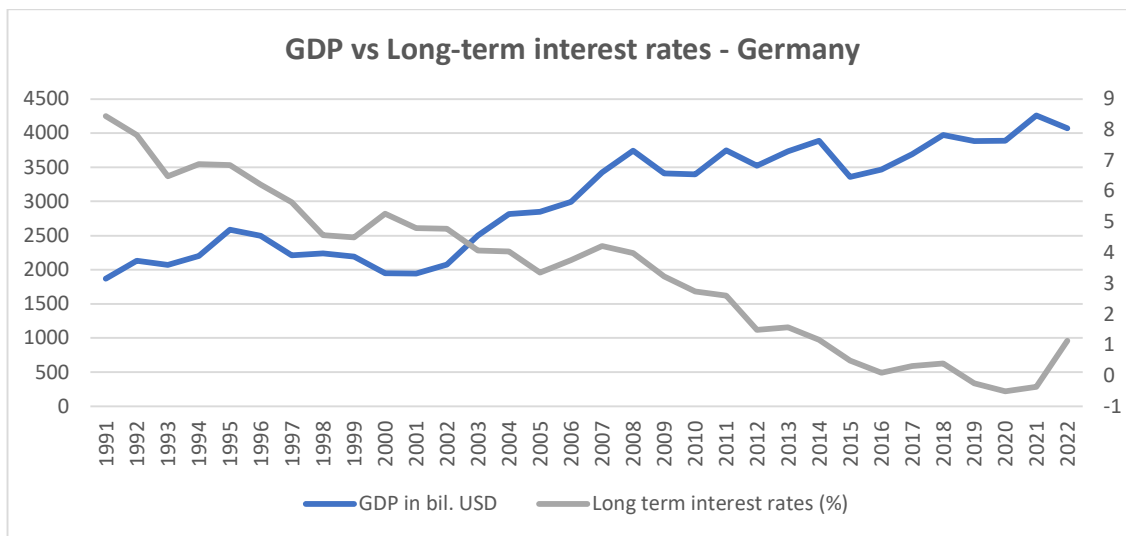
Figure A5.2 - M&A Value vs VC Equity Value in Germany



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A5.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in Germany.

Figure A5.3 - GDP and Long-term interest rates in Germany



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	66%	Moderate Correlation
Correlation 1-year lag	70%	Moderate Correlation
Correlation 2-year lag	54%	Moderate Correlation
Correlation 3-year lag	52%	Moderate Correlation
Correlation 4-year lag	52%	Moderate Correlation
Correlation 5-year lag	35%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	32%	Moderate Correlation
Correlation 1-year lag	42%	Moderate Correlation
Correlation 2-year lag	37%	Moderate Correlation
Correlation 3-year lag	22%	Weak Correlation
Correlation 4-year lag	8%	Weak Correlation
Correlation 5-year lag	15%	Weak Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with a 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,804829
R Square	0,64775
Adjusted R Square	0,608611
Standard Error	337,0074
Observations	31

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	5638956	1879652	16,55002	2,66E-06
Residual	27	3066497	113574		
Total	30	8705454			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	466,518	689,206	0,677	0,504	-947,617	1880,652
GDP in bil. USD	-0,086	0,159	-0,542	0,592	-0,413	0,240
Total N° of M&A deals	0,425	0,137	3,100	0,004	0,144	0,706
Long term interest rates (%)	-122,412	48,993	-2,499	0,019	-222,939	-21,886

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The r square has a good value (higher than 0,6), meaning that the number of VC deals is explained for 64.78% by the number of M&A deals, by the GDP, and by the Long-term interest rates of Germany.

The variables “number of M&A deals” and “Long-term interest rates” are statistically significant given the p-values lower than 0.05. However, the variable “GDP”, fails to attain statistical significance at the conventional threshold ($p = 0.592$) implying that it may not have a meaningful effect on the dependent variable in this model. The variable will be kept in the regression line equation and the overall regression model because of its theoretical relevance and because removing it will not improve considerably the R square of the model.

The number of VC investments in Germany can be predicted by the regression line of the equation:

$$y = -122.412 \text{ Long-term interest rates (\%)} + 0.425 \text{ N° of M\&A deals} - 0,086 \text{ GDP in bil. USD} + 466.518$$

Regression VC Equity Value with 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,632148
R Square	0,399611
Adjusted R Square	0,332901
Standard Error	5,870509
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	619,3273	206,4424	5,990284	0,002885
Residual	27	930,4978	34,46288		
Total	30	1549,825			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	5,020	11,997	0,418	0,679	-19,597	29,636
GDP in bil. USD	0,001	0,003	0,196	0,846	-0,005	0,006
Total M&A Value in bil. USD	0,014	0,012	1,163	0,255	-0,010	0,037
Long term interest rates (%)	-1,318	0,906	-1,455	0,157	-3,176	0,541

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the variance in the value of VC investments can be explained at 39.96% by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal la.

All three independent variables are not statistically significant given the p-values lower than 0.05.

Because the coefficients lack statistical significance, it is prudent to use caution when attempting to use them to create a regression equation. While it is technically possible to create a regression equation using these coefficients, the lack of statistical significance

shows that such an equation may not be able to forecast VC equity value using the given independent variables.

The value of VC investments in Germany can be predicted by the regression line of the equation:

$$y = -1.318 \text{ Long-term interest rates(\%)} + 0.014 \text{ M\&A value in bil. USD} + 0.001 \text{ GDP in bil. USD} + 5.020$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	86%	Strong Correlation
2 years lag	56%	Moderate Correlation
3 years lag	37%	Moderate Correlation
4 years lag	28%	Weak Correlation
5 years lag	29%	Weak Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	65%	Moderate Correlation
2 years lag	85%	Strong Correlation
3 years lag	10%	Weak Correlation
4 years lag	57%	Moderate Correlation
5 years lag	-63%	Anticorrelation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.858698
R Square	0.737363
Adjusted R Square	0.728306
Standard Error	280.7856
Observations	31

ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	1	6419078	6419078	81.41847	6.44E-10	
Residual	29	2286376	78840.56			
Total	30	8705454				

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	40.82369	83.77921	0.487277	0.629725	-130.524	212.1714
N° of VC deals (1 year lag)	1.066355	0.118179	9.023218	6.44E-10	0.824652	1.308058

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.882168
R Square	0.77822
Adjusted R Square	0.7441
Standard Error	272.5024
Observations	31

ANOVA						
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>	
Regression	4	6774757	1693689	22.8083	3.49E-08	
Residual	26	1930697	74257.57			
Total	30	8705454				

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	66.66934	566.5891	0.117668	0.907235	-1097.97	1231.31
N° of VC deals (1 year lag)	0.741874	0.189692	3.910936	0.000589	0.351956	1.131792
GDP in bil. USD	-0.00575	0.130311	-0.04416	0.965117	-0.27361	0.262103
Total N° of M&A deals	0.163359	0.129328	1.263139	0.21775	-0.10248	0.429196
Long term interest rates (%)	-44.9651	44.28955	-1.01525	0.31934	-136.004	46.07334

ADL Regression VC Equity Value 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.85296
R Square	0.727541
Adjusted R Square	0.717811
Standard Error	3.862666
Observations	30

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1115.551	1115.551	74.76788	2.15E-09
Residual	28	417.7653	14.92019		
Total	29	1533.316			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-1.16929	0.935068	-1.25049	0.221471	-3.08469	0.746108
VC Equity Value in bil. USD 2 years lag	2.318151	0.268092	8.646842	2.15E-09	1.768989	2.867313

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.868902
R Square	0.754991
Adjusted R Square	0.715789
Standard Error	3.876476
Observations	30

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	1157.64	289.4099	19.25924	2.42E-07
Residual	25	375.6767	15.02707		
Total	29	1533.316			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>	<i>Lower 95,0%</i>
Intercept	-12.0579	8.50196	-1.41825	0.168464	-29.568	5.452214	-29.568
VC Equity Value in bil. USD 2 years lag	2.34532	0.395475	5.930387	3.44E-06	1.530824	3.159816	1.530824
GDP in bil. USD	0.002175	0.001908	1.140054	0.265069	-0.00175	0.006106	-0.00175
Total M&A Value in bil. USD	0.011195	0.007719	1.45032	0.159401	-0.0047	0.027093	-0.0047
Long term interest rates (%)	0.781264	0.722222	1.08175	0.289688	-0.70618	2.268708	-0.70618

Interpretation of results

Germany has a moderate VC market maturity. The regression models good moderate values of R-squared in terms of N° of VC Investments (64.8%), and moderate value in terms of VC Equity Value (40.0%).

The ADL analysis on the N° of VC Investments ameliorate the R-squared to 77.8%. N° of M&A deals, GDP and Long-term interest rates are not significant.

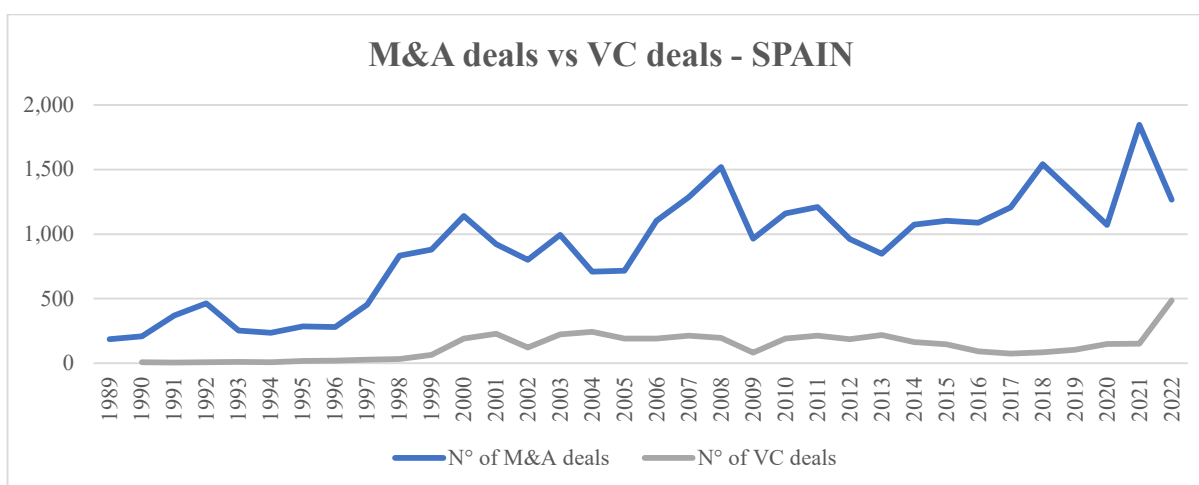
The ADL analysis on the VC Equity Value significantly ameliorate the R-squared to 75.5%, but losing significance of M&A Value, GDP and Long-term interest rates.

A6. Spain

Preliminary Analysis

Figure A6.1 compares the number of M&A transactions with the number of VC transactions in Spain over the years.

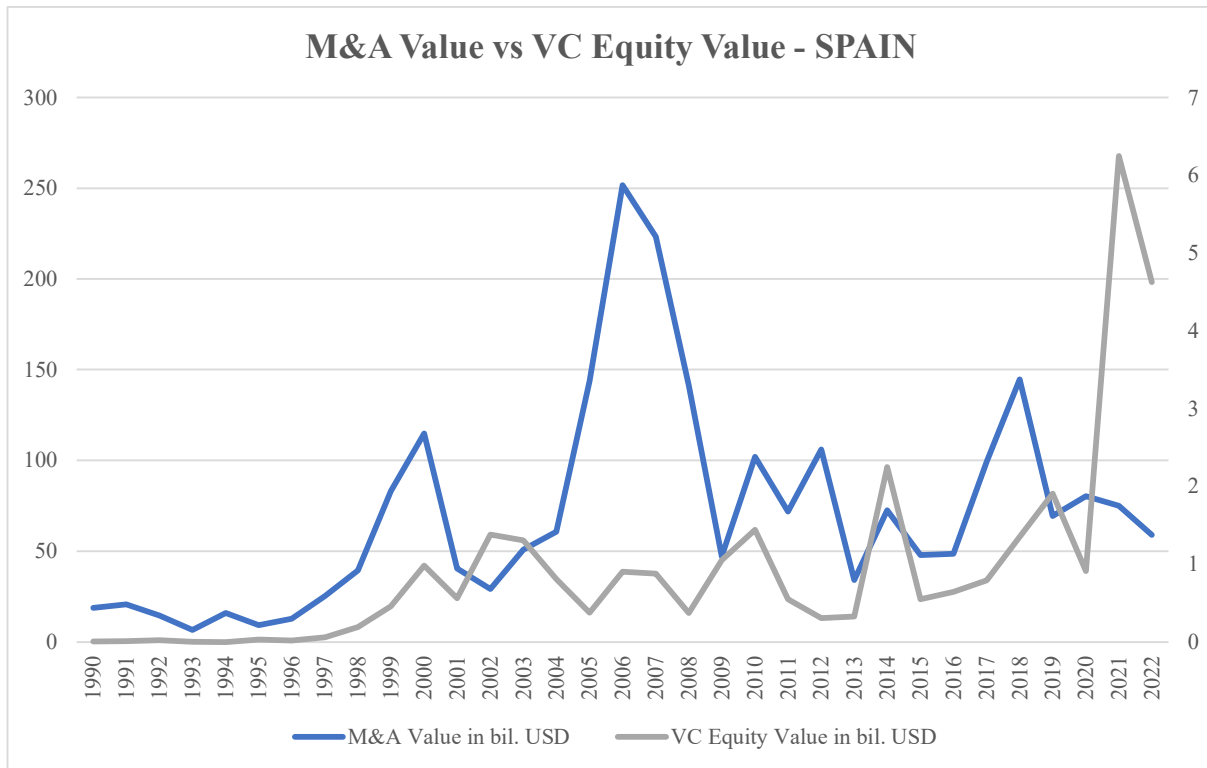
Figure A6.1 - M&A number of deals vs VC number of deals in Spain



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A6.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in Spain over the years.

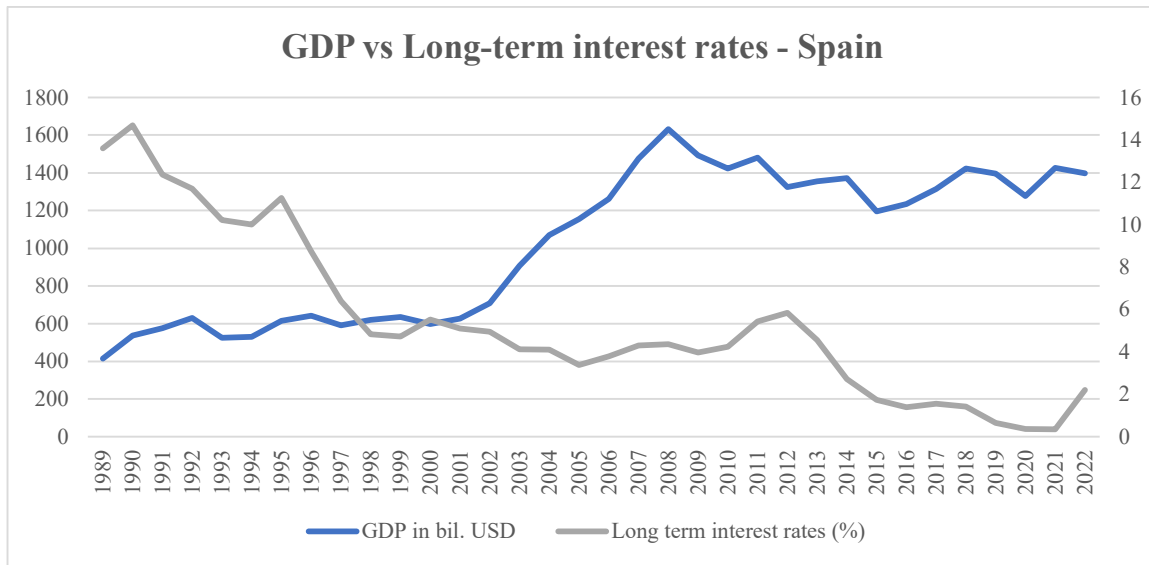
Figure A6.2 - M&A Value vs VC Equity Value in Spain



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A6.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in Spain.

Figure A6.3 - GDP and Long-term interest rates in Spain



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	56%	Moderate Correlation
Correlation 1-year lag	70%	Strong Correlation
Correlation 2-year lag	55%	Moderate Correlation
Correlation 3-year lag	62%	Moderate Correlation
Correlation 4-year lag	65%	Moderate Correlation
Correlation 5-year lag	51%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	14%	Weak Correlation
Correlation 1-year lag	17%	Weak Correlation
Correlation 2-year lag	20%	Weak Correlation
Correlation 3-year lag	34%	Moderate Correlation
Correlation 4-year lag	34%	Moderate Correlation
Correlation 5-year lag	1%	Weak Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with a 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,709011
R Square	0,502696
Adjusted R Square	0,451251
Standard Error	76,04713
Observations	33

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	169530,4	56510,13	9,771488	0,000129
Residual	29	167711,8	5783,165		
Total	32	337242,2			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	45,075	91,688	0,492	0,627	-142,448	232,598
GDP in bil. USD	-0,037	0,059	-0,632	0,532	-0,157	0,083
N° of M&A deals	0,165	0,068	2,430	0,021	0,026	0,305
Long term interest rates (%)	-3,894	6,512	-0,598	0,554	-17,212	9,424

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The r square has a value of 0.5027, meaning that the number of VC deals is explained for the 50.3% by the number of M&A deals, by the GDP, and by the Long-term interest rates of Spain.

The number of M&A deals is the only independent variable statistically significant given the p-value lower than 0.05. However, the variables “Long-term interest rates” and “GDP”,

fail to attain statistical significance at the conventional threshold (respectively $p = 0.554$ and $p = 0.532$) implying that it may not have a meaningful effect on the dependent variable in this model. The variables will be kept in the regression line equation and the overall regression model because of their theoretical relevance and because removing them will not improve considerably the R square of the model.

The number of VC investments in the Spain can be predicted by the regression line of the equation:

$$y = -3.894 \text{ Long-term interest rates (\%)} + 0,165 \text{ N}^\circ \text{ of M\&A deals} \\ - 0,037 \text{ GDP in bil. USD} + 45.075$$

Regression VC Equity Value with 4-year lag

<i>Regression Statistics</i>	
Multiple R	0,56182
R Square	0,315642
Adjusted R Square	0,236678
Standard Error	1,167756
Observations	30

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	16,35268	5,450893	3,997269	0,018214
Residual	26	35,45501	1,363654		
Total	29	51,80769			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2,371	1,188	1,996	0,056	-0,070	4,813
GDP in bil. USD	0,000	0,001	-0,251	0,804	-0,002	0,002
M&A Value in bil. USD	0,001	0,005	0,329	0,745	-0,008	0,011
Long term interest rates (%)	-0,202	0,084	-2,422	0,023	-0,374	-0,031

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be partially explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.3156.

Among the three independent variables, just the long-term interest rates is statistically significant given the p-values lower than 0.05.

Because the coefficients lack statistical significance, it is prudent to use caution when attempting to use them to create a regression equation. While it is technically possible to create a regression equation using these coefficients, the lack of statistical significance shows that such an equation may not be able to forecast VC equity value using the given independent variables.

The value of VC investments in Spain can be predicted by the regression line of the equation:

$$y = -0.202 \text{ Long-term interest rates(\%)} + 0.001 \text{ M\&A value in bil. USD} \\ - 0.0002 \text{ GDP in bil. USD} + 2.371$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	67%	Moderate Correlation
2 years lag	55%	Moderate Correlation
3 years lag	46%	Moderate Correlation
4 years lag	29%	Weak Correlation
5 years lag	13%	Weak Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	56%	Moderate Correlation
2 years lag	43%	Moderate Correlation
3 years lag	48%	Moderate Correlation
4 years lag	38%	Moderate Correlation
5 years lag	20%	Weak Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.667337
R Square	0.445339
Adjusted R Square	0.42685
Standard Error	77.10111
Observations	32

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	143187.5	143187.5	24.08706	3.02E-05
Residual	30	178337.4	5944.581		
Total	31	321524.9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	35.34402	24.50851	1.442112	0.15963	-14.709	85.39708
N° of VC deals (1 year lag)	0.830475	0.169213	4.907857	3.02E-05	0.484895	1.176055

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.770318
R Square	0.59339
Adjusted R Square	0.533152
Standard Error	69.58479
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	190789.7	47697.43	9.850685	4.77E-05
Residual	27	130735.1	4842.042		
Total	31	321524.9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	23.13965	84.5645	0.273633	0.786449	-150.372	196.6517
N° of VC deals (1 year lag)	0.549237	0.198753	2.763418	0.010174	0.14143	0.957043
GDP in bil. USD	-0.06944	0.054948	-1.26383	0.217095	-0.18219	0.043299
Total N° of M&A deals	0.14047	0.063043	2.22816	0.034393	0.011116	0.269823
Long term interest rates (%)	-1.65875	6.18451	-0.26821	0.790576	-14.3483	11.03081

ADL Regression VC Equity Value 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.55835
R Square	0.311755
Adjusted R Square	0.288813
Standard Error	1.110786
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	16.76688	16.76688	13.58913	0.000897
Residual	30	37.01536	1.233845		
Total	31	53.78224			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.443748	0.244248	1.816794	0.079252	-0.05507	0.942568
VC Equity Value in bil. USD 1 year lag	0.641388	0.17399	3.686343	0.000897	0.286053	0.996724

ADL Regression 4 years lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.633502
R Square	0.401325
Adjusted R Square	0.305537
Standard Error	1.11384
Observations	30

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	20.79171	5.197928	4.189718	0.009868
Residual	25	31.01598	1.240639		
Total	29	51.80769			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.748852	1.179726	1.482422	0.150725	-0.68084	4.178544
VC Equity Value in bil. USD 1 year lag	0.39728	0.210027	1.891566	0.070189	-0.03528	0.82984
GDP in bil. USD	-0.00019	0.00081	-0.22875	0.820924	-0.00185	0.001482
Total M&A Value in bil. USD	0.000223	0.004351	0.051209	0.959566	-0.00874	0.009185
Long term interest rates (%)	-0.14799	0.084789	-1.74541	0.093194	-0.32262	0.026634

Interpretation of results

Spain has a weak VC market maturity. The regression models show a moderate value of R-squared in terms of N° of VC Investments (50.3%), and a weak value in terms of VC Equity Value (31.6%).

The ADL analysis on the N° of VC Investments slightly ameliorate the R-squared to 59.3%. GDP and Long-term interest rates are not significant.

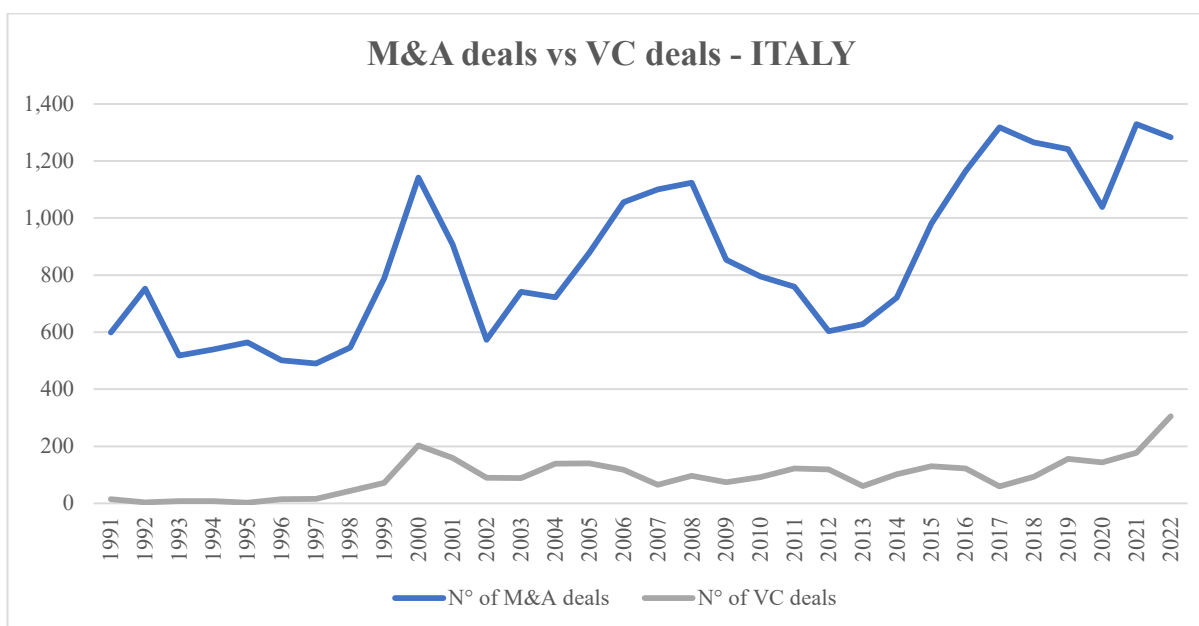
The ADL analysis on the VC Equity Value slightly ameliorate the R-squared to 40.1%, but losing significance of all the variables.

A7. Italy

Preliminary Analysis

Figure A7.1 compares the number of M&A transactions with the number of VC transactions in Italy over the years.

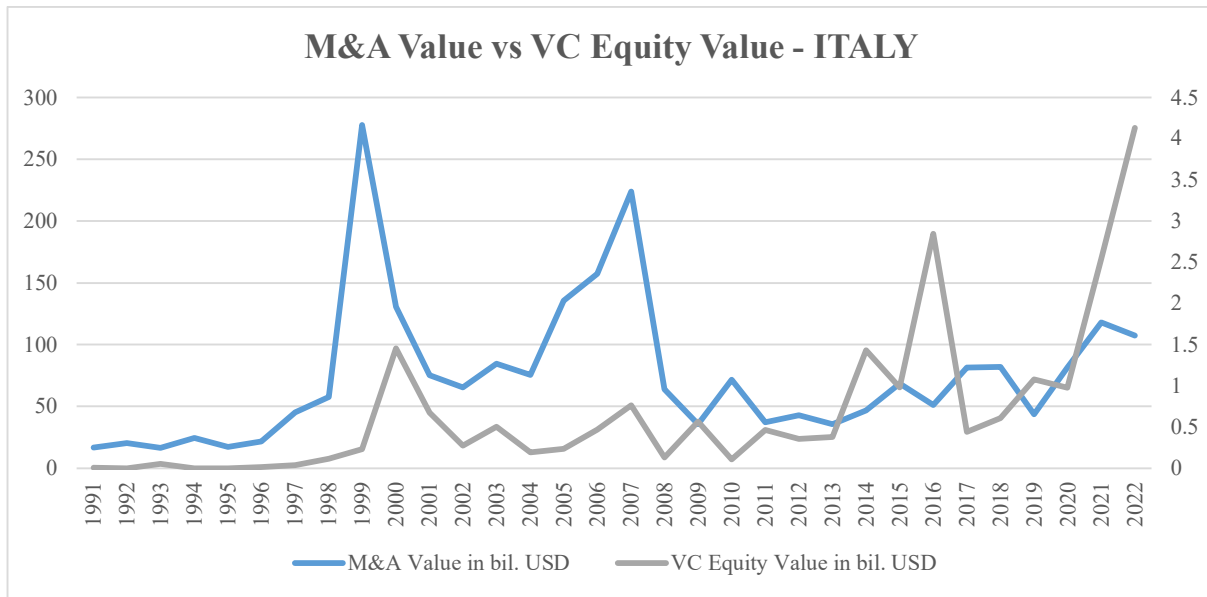
Figure A7.1 – M&A number of deals vs VC number of deals in Italy



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A7.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in Italy over the years.

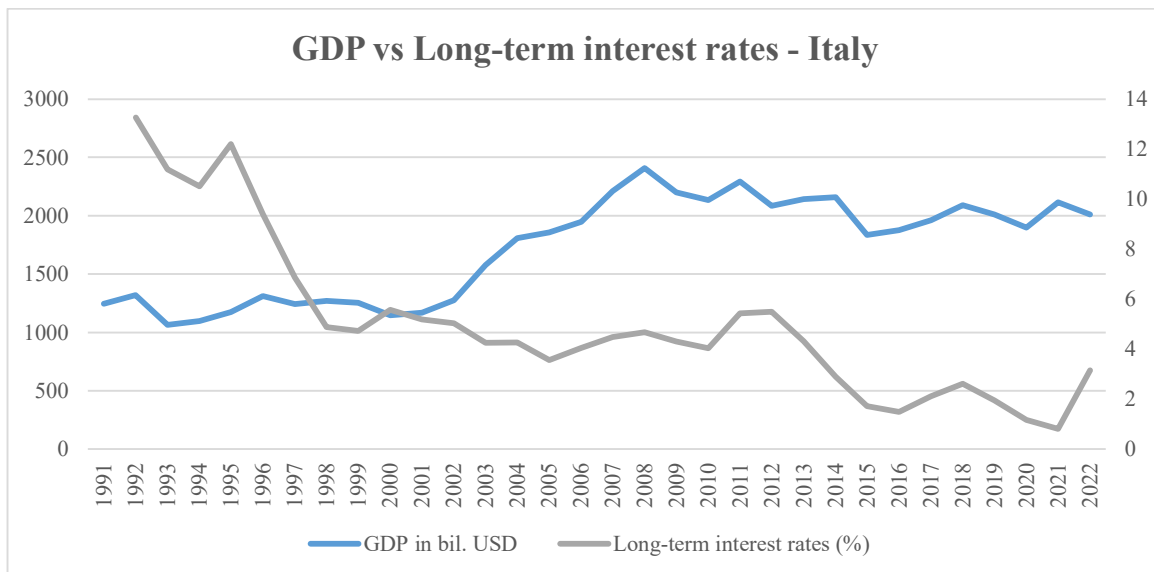
Figure A7.2 - M&A Value vs VC Equity Value in Italy



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A7.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in Italy.

Figure A7.3 - GDP and Long-term interest rates in Italy



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	66%	Moderate Correlation
Correlation 1-year lag	58%	Moderate Correlation
Correlation 2-year lag	37%	Moderate Correlation
Correlation 3-year lag	43%	Moderate Correlation
Correlation 4-year lag	49%	Moderate Correlation
Correlation 5-year lag	49%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	19%	Weak Correlation
Correlation 1-year lag	28%	Weak Correlation
Correlation 2-year lag	2%	Weak Correlation
Correlation 3-year lag	-14%	Inverse Correlation
Correlation 4-year lag	-2%	Inverse Correlation
Correlation 5-year lag	-16%	Inverse Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with no lag

<i>Regression Statistics</i>	
Multiple R	0,716979
R Square	0,514058
Adjusted R Square	0,460065
Standard Error	48,76038
Observations	31

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	67908,84	22636,28	9,520745	0,000185068
Residual	27	64194,51	2377,574		
Total	30	132103,4			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	91,577	72,567	1,262	0,218	-57,318	240,472
GDP in bil. USD	-0,018	0,027	-0,667	0,511	-0,074	0,038
N° of M&A deals	0,098	0,044	2,259	0,032	0,009	0,188
Long-term interest rates (%)	-9,520	4,159	-2,289	0,030	-18,054	-0,986

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The number of VC deals is explained for the 51.4% by the number of M&A deals, by the GDP, and by the Long-term interest rates of Italy.

All the independent variables are statistically significant given the p-values lower than 0.05, except for the “GDP” which has a $p = 0.511$.

The number of VC investments in Italy can be predicted by the regression line of the equation:

$$y = -9.520 \text{ Long-term interest rates (\%)} + 0.098 \text{ N° of M\&A deals} - 0.018 \text{ GDP in bil. USD} + 91.577$$

Regression VC Equity Value with 1-year lag

<i>Regression Statistics</i>	
Multiple R	0,586965404
R Square	0,344528386
Adjusted R Square	0,268897046
Standard Error	0,806197539
Observations	30

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	8,882340234	2,960780078	4,555365351	0,010777
Residual	26	16,89881625	0,649954471		
Total	29	25,78115649			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1,917	1,125	1,704	0,100	-0,396	4,230
GDP in bil. USD	0,000	0,000	-0,398	0,694	-0,001	0,001
M&A Value in bil. USD	0,001	0,003	0,242	0,811	-0,005	0,006
Long-term interest rates (%)	-0,181	0,066	-2,756	0,011	-0,316	-0,046

Interpretation:

Firstly, the model's statistical significance is indicated by the p-value equal to 0.01, which is less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be partially explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.3445.

Among the three independent variables, just the long term interest rates is statistically significant given the p-values lower than 0.05.

Because some coefficients lack statistical significance, it is prudent to use caution when attempting to use them to create a regression equation. While it is technically possible to create a regression equation using these coefficients, the lack of statistical significance shows that such an equation may not be able to forecast VC equity value using the given independent variables.

The value of VC investments in Italy can be predicted by the regression line of the equation:

$$y = -0.181 \text{ Long-term interest rates}(\%) + 0.001 \text{ M\&A value in bil. USD} - 0.0002 \text{ GDP in bil. USD} + 1.917$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	73%	Strong Correlation
2 years lag	45%	Moderate Correlation
3 years lag	41%	Moderate Correlation
4 years lag	33%	Moderate Correlation
5 years lag	16%	Weak Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	57%	Moderate Correlation
2 years lag	37%	Moderate Correlation
3 years lag	25%	Weak Correlation
4 years lag	10%	Weak Correlation
5 years lag	36%	Moderate Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.726062
R Square	0.527166
Adjusted R Square	0.510861
Standard Error	46.41008
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	69640.37	69640.37	32.33228	3.78E-06
Residual	29	62462.98	2153.896		
Total	30	132103.4			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	21.32369	15.79518	1.350012	0.187456	-10.9811	53.62846
N° of VC deals (1 year lag)	0.864388	0.152016	5.686148	3.78E-06	0.55348	1.175297

ADL Regression NO lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.795092
R Square	0.632171
Adjusted R Square	0.575582
Standard Error	43.23078
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	83511.95	20877.99	11.17127	2.08E-05
Residual	26	48591.4	1868.9		
Total	30	132103.4			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	29.214	67.86132	0.430496	0.670383	-110.277	168.7049
N° of VC deals (1 year lag)	0.562651	0.194727	2.889432	0.007684	0.162383	0.962918
GDP in bil. USD	-0.01712	0.024234	-0.70627	0.4863	-0.06693	0.032698
Total N° of M&A deals	0.078565	0.039276	2.000313	0.056012	-0.00217	0.159299
Long term interest rates (%)	-3.92348	4.165268	-0.94195	0.354889	-12.4853	4.638355

ADL Regression VC Equity Value 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.565256
R Square	0.319514
Adjusted R Square	0.296049
Standard Error	0.785638
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	8.404536	8.404536	13.6166	0.000922
Residual	29	17.89958	0.617227		
Total	30	26.30412			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.271984	0.184637	1.473069	0.151504	-0.10564	0.64961
VC Equity Value in bil. USD 1 year lag	0.759732	0.205886	3.690068	0.000922	0.338648	1.180815

ADL Regression 1 year lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.6429
R Square	0.41332
Adjusted R Square	0.319452
Standard Error	0.777825
Observations	30

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	10.65588	2.663969	4.403174	0.007853
Residual	25	15.12528	0.605011		
Total	29	25.78116			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.066759	1.193818	0.89357	0.380074	-1.39195	3.525473
VC Equity Value in bil. USD 1 year lag	0.444908	0.259856	1.712136	0.099251	-0.09027	0.980091
GDP in bil. USD	-7.4E-05	0.000444	-0.1678	0.868091	-0.00099	0.00084
Total M&A Value in bil. USD	0.001231	0.002674	0.460448	0.649175	-0.00428	0.006739
Long term interest rates (%)	-0.11067	0.075397	-1.46786	0.154612	-0.26596	0.044611

Interpretation of results

Italy has a weak VC market maturity. The regression models show a moderate value of R-squared in terms of N° of VC Investments (51.4%), and a weak value in terms of VC Equity Value (34.5%).

The ADL analysis on the N° of VC Investments ameliorate the R-squared to 63.2%. GDP and Long-term interest rates are not significant.

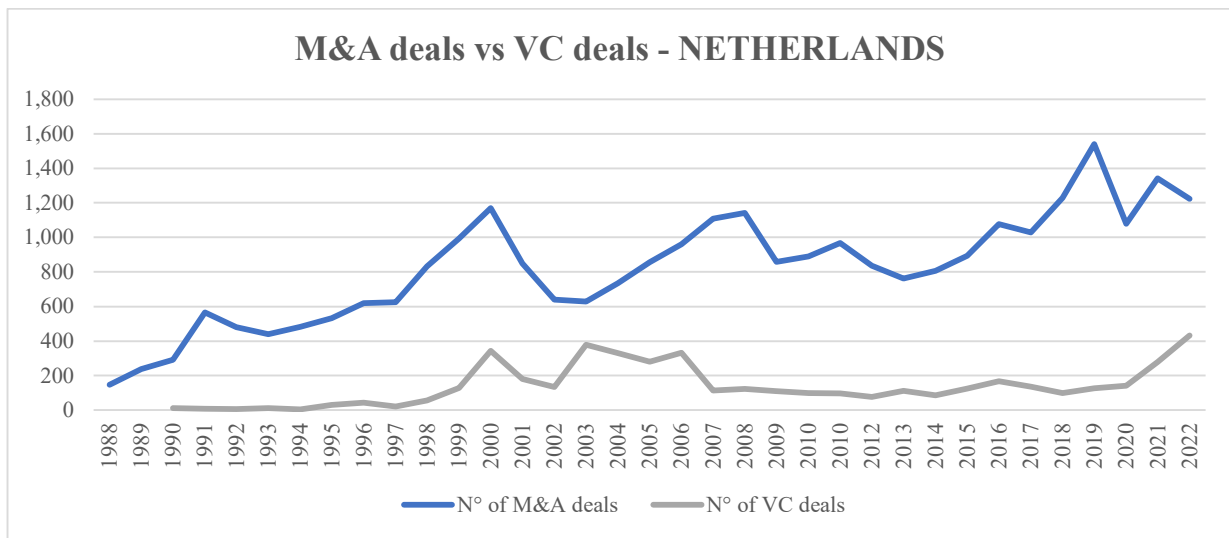
The ADL analysis on the VC Equity Value slightly ameliorate the R-squared to 41.3% but losing significance of all the variables.

A8. Netherlands

Preliminary Analysis

Figure A8.1 compares the number of M&A transactions with the number of VC transactions in the Netherlands over the years.

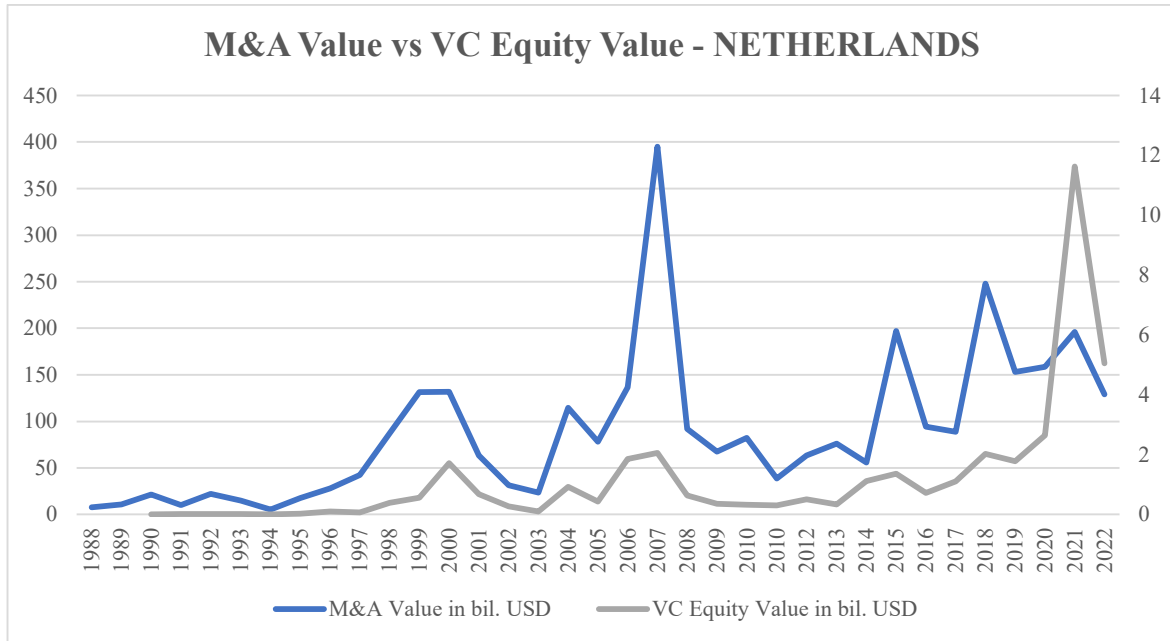
Figure A8.1 - M&A number of deals vs VC number of deals in the Netherlands



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A8.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in the Netherlands over the years.

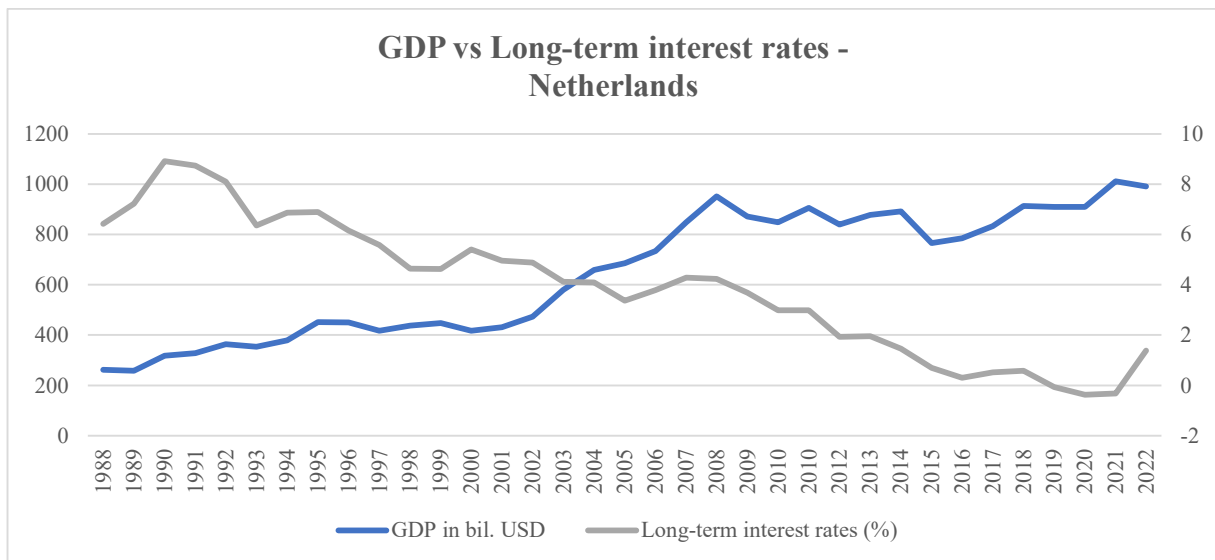
Figure A8.2 - M&A Value vs VC Equity Value in the Netherlands



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A8.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in the Netherlands.

Figure A8.3 - GDP and Long-term interest rates in Netherlands



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	47%	Moderate Correlation
Correlation 1-year lag	44%	Moderate Correlation
Correlation 2-year lag	44%	Moderate Correlation
Correlation 3-year lag	56%	Moderate Correlation
Correlation 4-year lag	54%	Moderate Correlation
Correlation 5-year lag	50%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	49%	Moderate Correlation
Correlation 1-year lag	36%	Moderate Correlation
Correlation 2-year lag	32%	Moderate Correlation
Correlation 3-year lag	43%	Moderate Correlation
Correlation 4-year lag	16%	Weak Correlation
Correlation 5-year lag	10%	Weak Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with a 3-year lag

<i>Regression Statistics</i>	
Multiple R	0,702172
R Square	0,493045
Adjusted R Square	0,438728
Standard Error	87,86476
Observations	32

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	210234,8	70078,28	9,077243	0,000233
Residual	28	216166	7720,216		
Total	31	426400,9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	279,129	135,476	2,060	0,049	1,619	556,640
GDP in bil. USD	-0,423	0,132	-3,193	0,003	-0,694	-0,151
N° of M&A deals	0,298	0,081	3,654	0,001	0,131	0,465
Long-term interest rates (%)	-25,754	12,481	-2,063	0,048	-51,320	-0,187

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The number of VC deals is explained for the 49.3% by the number of M&A deals, by the GDP, and by the Long-term interest rates of Netherlands.

All three independent variables are statistically significant given the p-values lower than 0.05.

The number of VC investments in the Netherlands can be predicted by the regression line of the equation:

$$y = - 25.754 \text{ Long - term interest rates (\%)} + 0,298 \text{ N° of M\&A deals} \\ - 0,423 \text{ GDP in bil. USD} + 279.129$$

Regression VC Equity Value with no lag

<i>Regression Statistics</i>	
Multiple R	0,575766
R Square	0,331506
Adjusted R Square	0,262352
Standard Error	1,841069
Observations	33

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	48,74533	16,24844	4,793707	0,007839
Residual	29	98,29656	3,389536		
Total	32	147,0419			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0,411134	2,649886	0,155152	0,877777	-5,00849	5,830758
GDP in bil. USD	0,001144	0,00276	0,414684	0,681425	-0,0045	0,006788
M&A Value in bil. USD	0,007956	0,004768	1,668843	0,105911	-0,00179	0,017707
Long-term interest rates (%)	-0,19697	0,242464	-0,81238	0,42319	-0,69287	0,29892

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be just partially explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.3315.

All three independent variables are not statistically significant given the p-values higher than 0.05.

Because the coefficients lack statistical significance, it is prudent to use caution when attempting to use them to create a regression equation. While it is technically possible to create a regression equation using these coefficients, the lack of statistical significance shows that such an equation may not be able to forecast VC equity value using the given independent variables.

The value of VC investments in the Netherlands can be predicted by the regression line of the equation:

$$y = -0.197 \text{ Long-term interest rates(\%)} + 0.008 \text{ M\&A value in bil. USD} \\ + 0.001 \text{ GDP in bil. USD} + 0.411$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	69%	Moderate Correlation
2 years lag	45%	Moderate Correlation
3 years lag	43%	Moderate Correlation
4 years lag	20%	Weak Correlation
5 years lag	11%	Weak Correlation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	52%	Moderate Correlation
2 years lag	51%	Moderate Correlation
3 years lag	51%	Moderate Correlation
4 years lag	31%	Moderate Correlation
5 years lag	14%	Weak Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.68918
R Square	0.474969
Adjusted R Square	0.457468
Standard Error	86.38548
Observations	32

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	202527.3	202527.3	27.13952	1.29E-05
Residual	30	223873.5	7462.451		
Total	31	426400.9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	45.19997	24.30239	1.859898	0.072731	-4.43214	94.83208
N° of VC deals (1 year lag)	0.754694	0.144867	5.20956	1.29E-05	0.458836	1.050552

ADL Regression 3 years lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.797302
R Square	0.63569
Adjusted R Square	0.581718
Standard Error	75.85124
Observations	32

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	271058.8	67764.7	11.77818	1.15E-05
Residual	27	155342.1	5753.41		
Total	31	426400.9			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	133.1804	125.2712	1.063137	0.297137	-123.855	390.2156
N° of VC deals (1 year lag)	0.491822	0.151263	3.251432	0.003075	0.181456	0.802189
GDP in bil. USD	-0.27558	0.122871	-2.2428	0.033319	-0.52769	-0.02346
Total N° of M&A deals	0.218823	0.074406	2.94094	0.006637	0.066155	0.371491
Long term interest rates (%)	-13.2358	11.44165	-1.15681	0.257482	-36.7121	10.2405

ADL Regression VC Equity Value 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.51846
R Square	0.26880
Adjusted R Square	0.24443
Standard Error	1.88382
Observations	32

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	39.138	39.138	11.029	0.002
Residual	30	106.463	3.549		
Total	31	145.601			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.6414	0.3760	1.7058	0.0984	-0.1265	1.4094
VC Equity Value in bil. USD 1 year lag	0.5453	0.1642	3.3209	0.0024	0.2099	0.8806

ADL Regression NO lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.65813
R Square	0.43313
Adjusted R Square	0.34915
Standard Error	1.74841
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	63.064	15.766	5.157	0.003
Residual	27	82.537	3.057		
Total	31	145.601			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.3042	2.5548	0.5105	0.6138	-3.9377	6.5461
VC Equity Value in bil. USD 1 year lag	0.3773	0.1705	2.2134	0.0355	0.0275	0.7271
GDP in bil. USD	-0.0004	0.0027	-0.1548	0.8782	-0.0060	0.0051
Total M&A Value in bil. USD	0.0070	0.0045	1.5394	0.1353	-0.0023	0.0163
Long term interest rates (%)	-0.2429	0.2376	-1.0222	0.3158	-0.7304	0.2446

Interpretation of results

The Netherlands have a moderate VC market maturity. The regression models show good value of R-squared in terms of N° of VC Investments (49.3%), and weak value in terms of VC Equity Value (33.2%).

The ADL analysis on the N° of VC Investments ameliorate the R-squared to 63.6%. Only Long-term interest rates are not significant.

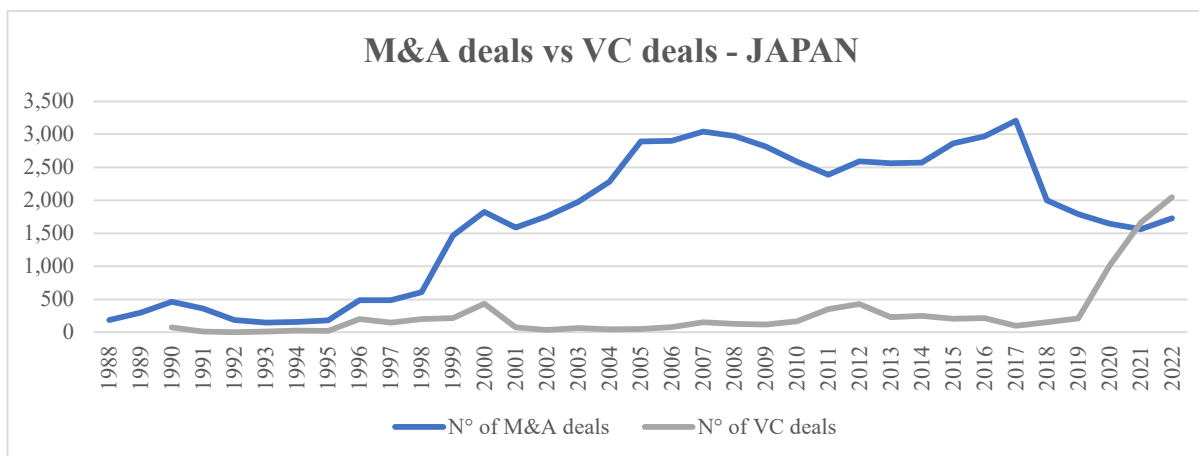
The ADL analysis on the VC Equity Value significantly ameliorate the R-squared to 43.3%, but losing significance of M&A Value, GDP and Long-term interest rates.

A9. Japan

Preliminary Analysis

Figure A9.1 compares the number of M&A transactions with the number of VC transactions in Japan over the years.

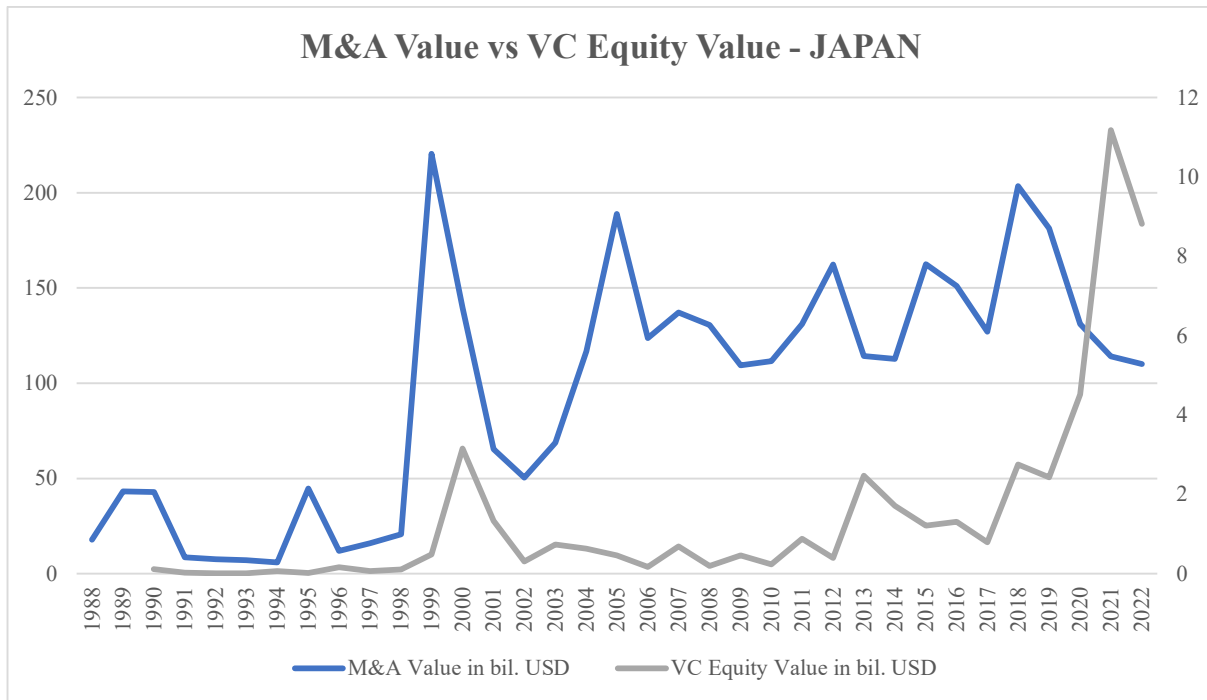
Figure A9.1 - M&A number of deals vs VC number of deals in Japan



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A9.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in Japan over the years.

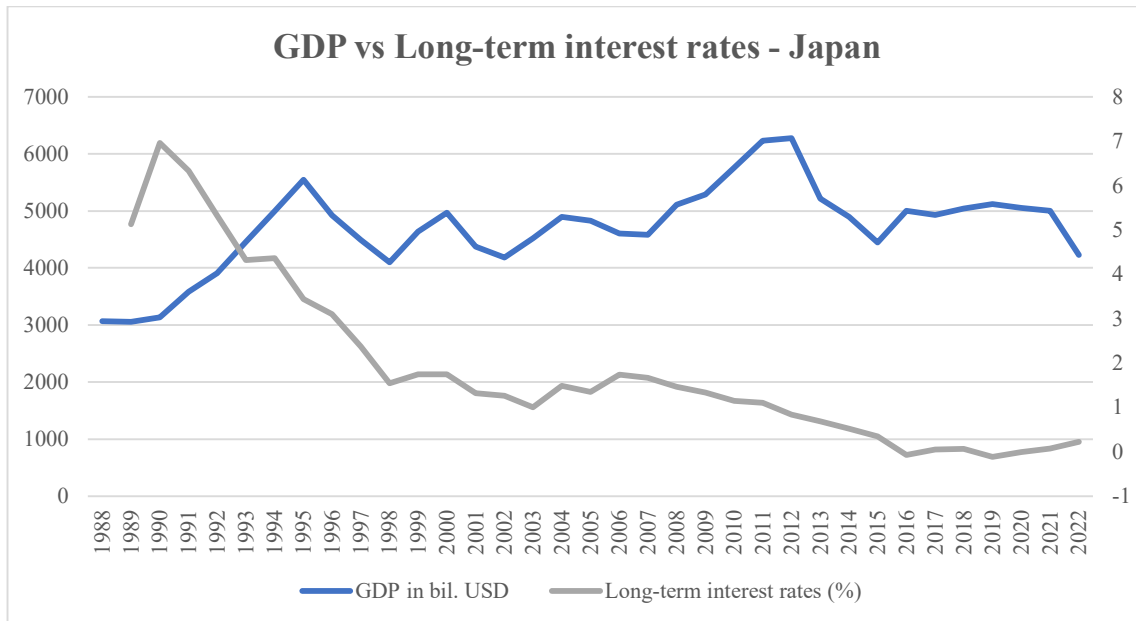
Figure A9.2 - M&A Value vs VC Equity Value in Japan



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A9.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in Japan.

Figure A9.3 - GDP and Long-term interest rates in Japan



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	5%	Weak Correlation
Correlation 1-year lag	5%	Weak Correlation
Correlation 2-year lag	9%	Weak Correlation
Correlation 3-year lag	20%	Weak Correlation
Correlation 4-year lag	33%	Moderate Correlation
Correlation 5-year lag	45%	Moderate Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	25%	Weak Correlation
Correlation 1-year lag	38%	Moderate Correlation
Correlation 2-year lag	43%	Moderate Correlation
Correlation 3-year lag	47%	Moderate Correlation
Correlation 4-year lag	38%	Moderate Correlation
Correlation 5-year lag	34%	Moderate Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with a 5-year lag

<i>Regression Statistics</i>	
Multiple R	0,4597
R Square	0,211324
Adjusted R Square	0,116683
Standard Error	442,175
Observations	29

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	1309721	436573,8	2,2329	0,109231
Residual	25	4887967	195518,7		
Total	28	6197689			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	648,119	835,026	0,776	0,445	1071,650	2367,888
GDP in bil. USD	-0,102	0,141	-0,723	0,476	-0,392	0,188
N° of M&A deals	0,147	0,127	1,163	0,256	-0,113	0,408
Long-term interest rates (%)	-51,082	83,644	-0,611	0,547	-223,349	121,185

Interpretation:

None of the independent variables (GDP, number of M&A deals, long-term interest rates) appear to have statistically significant associations with the number of Venture Capital investments, as evidenced by p-values greater than 0.05.

The total regression model is similarly not statistically significant, implying that the combined effect of the independent variables does not adequately explain the variation in the number of VC investments.

This is why it is not recommended to proceed with writing the linear regression line equation.

Regression VC Equity Value with 3-year lag

<i>Regression Statistics</i>	
Multiple R	0,517644
R Square	0,267956
Adjusted R Square	0,186617
Standard Error	2,274761
Observations	31

<i>ANOVA</i>					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	51,13998	17,04666	3,294337	0,03557
Residual	27	139,7125	5,174535		
Total	30	190,8524			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	3,422	3,990	0,858	0,399	-4,765	11,609
GDP in bil. USD	0,000	0,001	-0,513	0,612	-0,002	0,001
M&A Value in bil. USD	0,009	0,009	1,038	0,308	-0,009	0,028
Long-term interest rates (%)	-0,504	0,348	-1,451	0,158	-1,217	0,209

Interpretation:

Firstly, the model's statistical significance is indicated by the p-value of 0.0356, which is less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be just partially explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.268.

All three independent variables are not statistically significant given the p-values higher than 0.05.

Because the coefficients lack statistical significance, it is prudent to use caution when attempting to use them to create a regression equation. While it is technically possible to create a regression equation using these coefficients, the lack of statistical significance shows that such an equation may not be able to forecast VC equity value using the given independent variables.

The value of VC investments in Japan can be predicted by the regression line of the equation:

$$y = -0.504 \text{ Long-term interest rates(\%)} + 0.009 \text{ M\&A value in bil.USD} + 0.0004 \text{ GDP in bil.USD} + 3.422$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	90%	Strong Correlation
2 years lag	65%	Moderate Correlation
3 years lag	9%	Weak Correlation
4 years lag	2%	Weak Correlation
5 years lag	-1%	Anticorrelation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	79%	Strong Correlation
2 years lag	67%	Moderate Correlation
3 years lag	57%	Moderate Correlation
4 years lag	37%	Moderate Correlation
5 years lag	25%	Weak Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.902743
R Square	0.814945
Adjusted R Square	0.808776
Standard Error	199.4253
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	5254228	5254228	132.1138	1.62E-12
Residual	30	1193114	39770.46		
Total	31	6447342			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.988539	42.91403	0.046338	0.963348	-85.6536	89.63068
N° of VC deals (1 year lag)	1.269087	0.110412	11.49408	1.62E-12	1.043595	1.494579

ADL Regression 5 years lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.915014
R Square	0.837251
Adjusted R Square	0.810126
Standard Error	205.0071
Observations	29

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	5189019	1297255	30.8665	3.81E-09
Residual	24	1008670	42027.92		
Total	28	6197689			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	595.171	387.1854	1.537173	0.137331	-203.94	1394.282
N° of VC deals (1 year lag)	1.221013	0.12709	9.607438	1.07E-09	0.958711	1.483315
GDP in bil. USD	-0.11895	0.065375	-1.81949	0.081335	-0.25388	0.015978
Total N° of M&A deals	0.03078	0.059898	0.51387	0.612042	-0.09284	0.154403
Long term interest rates (%)	-32.1118	38.83017	-0.82698	0.416395	-112.253	48.02976

ADL Regression VC Equity Value 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.785823
R Square	0.617517
Adjusted R Square	0.604768
Standard Error	1.568937
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	119.2255	119.225	48.4349	9.9E-08
Residual	30	73.84685	2.46156		
Total	31	193.0724	2		

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	0.362041	0.321278	1.12687	0.26872	-0.2941	1.01817
VC Equity Value in bil. USD 1 year lag	0.926165	0.133079	6.95951	9.9E-08	0.654382	1.19794

ADL Regression 3 years lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.797031
R Square	0.635259
Adjusted R Square	0.579145
Standard Error	1.636268
Observations	31

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	121.2407	30.31017	11.32086	1.87E-05
Residual	26	69.61174	2.677375		
Total	30	190.8524			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	1.181907	2.903404	0.407076	0.687284	-4.78613	7.14994
VC Equity Value in bil. USD 1 year lag	0.824136	0.161062	5.116897	2.47E-05	0.493069	1.155203
GDP in bil. USD	-0.00015	0.000523	-0.28275	0.779608	-0.00122	0.000926
Total M&A Value in bil. USD	0.003483	0.006594	0.528168	0.601862	-0.01007	0.017036
Long term interest rates (%)	-0.15372	0.259198	-0.59307	0.558255	-0.68651	0.379066

Interpretation of results

Japan has a weak VC market maturity. The regression models show very low values of R-squared, both in terms of N° of VC Investments (21.1%), as well as in terms of VC Equity Value (26.8%).

The ADL analysis on the N° of VC Investments greatly ameliorate the R-squared to 83.7%. M&A deals and Long-term interest rates are not significant.

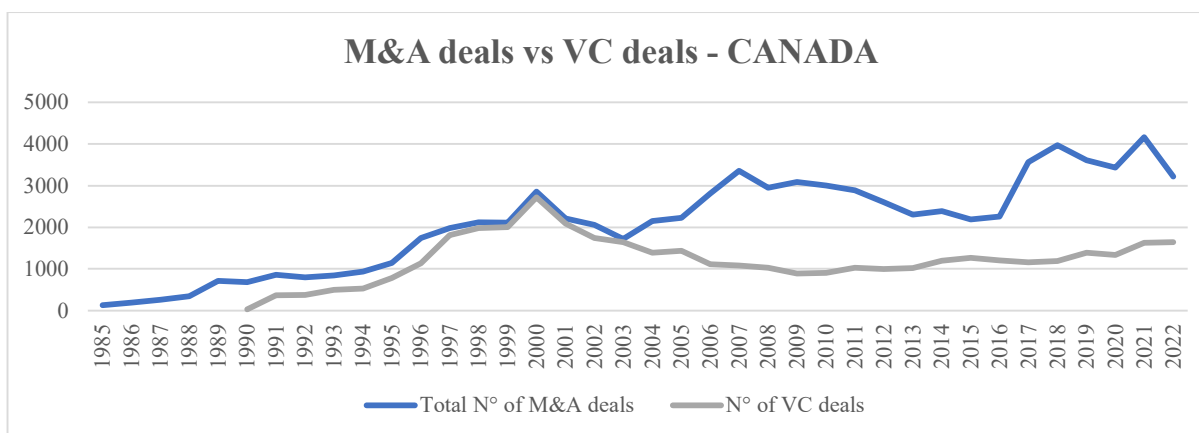
The ADL analysis on the VC Equity Value significantly ameliorate the R-squared to 63.5%, but losing significance of M&A Value, GDP and Long-term interest rates.

A10. Canada

Preliminary Analysis

Figure A10.1 compares the number of M&A transactions with the number of VC transactions in Canada over the years.

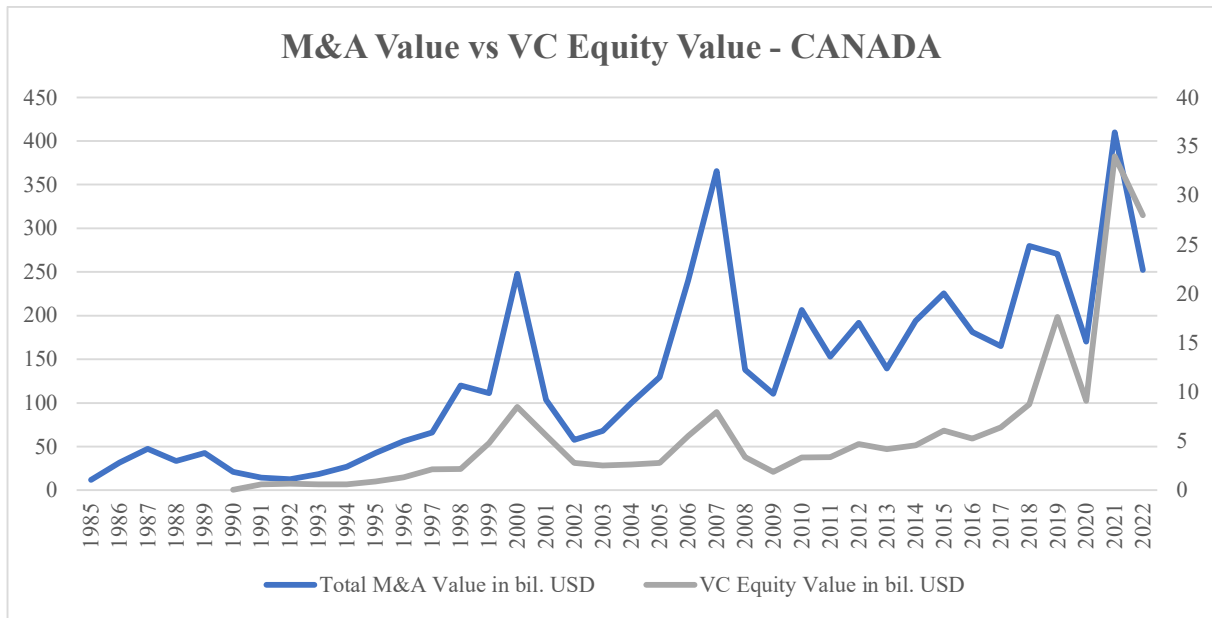
Figure A10.1 - M&A number of deals vs VC number of deals in Canada



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A10.2 shows the trends of M&A Value (primary axis on the left) and VC Equity Value (secondary axis on the right) in Canada over the years.

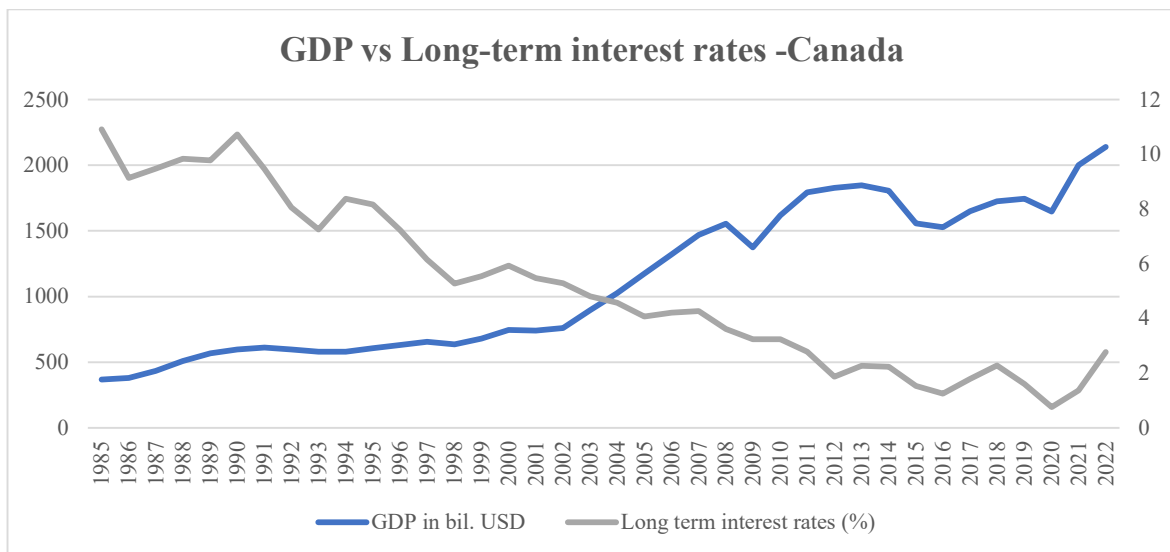
Figure A10.2 - M&A Value vs VC Equity Value in Canada



Source: Own elaboration based on data from Refinitiv Eikon (previously Thomson Eikon, Thomson One), now called LSEG Data & Analytics, and from IMAA

Figure A10.3 below compares the annual development of GDP (primary axis on the left) with that of long-term interest rates (secondary axis on the right) in Canada.

Figure A10.3 - GDP and Long-term interest rates in Canada



Source: Own elaboration based on World Bank's data and OECD statistics

The tables below show the correlations between the Number of M&A Deals and Number of VC Investments and the correlations between M&A Value and VC Equity Value, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of M&A and N° of VC Investments

Correlation with no Lag	43%	Moderate Correlation
Correlation 1-year lag	34%	Moderate Correlation
Correlation 2-year lag	38%	Moderate Correlation
Correlation 3-year lag	36%	Moderate Correlation
Correlation 4-year lag	32%	Moderate Correlation
Correlation 5-year lag	25%	Weak Correlation

Correlation between M&A Value and VC Equity Value

Correlation with no Lag	75%	Strong Correlation
Correlation 1-year lag	58%	Moderate Correlation
Correlation 2-year lag	43%	Moderate Correlation
Correlation 3-year lag	53%	Moderate Correlation
Correlation 4-year lag	43%	Moderate Correlation
Correlation 5-year lag	36%	Moderate Correlation

Regression Analysis

The statistical outputs of the regression, the interpretation of the results and finally the equation of the regression line were then reported.

Regression on Number of VC Investments with no lag

<i>Regression Statistics</i>	
Multiple R	0,74515
R Square	0,555248
Adjusted R Square	0,509239
Standard Error	390,9874
Observations	33

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	5534682	1844894	12,0683	2,66012E-05
Residual	29	4433262	152871,1		
Total	32	9967944			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	2729,063	673,546	4,052	0,000	1351,507	4106,620
GDP in bil. USD	-1,396	0,284	-4,908	0,000	-1,977	-0,814
Total N° of M&A deals	0,438	0,133	3,280	0,003	0,165	0,711
Long term interest rates (%)	-188,031	62,034	-3,031	0,005	-314,905	-61,157

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold.

This makes it possible to proceed with the interpretation of the other statistical findings. The r square has a good value, meaning that the number of VC deals is explained for the 55.5% by the number of M&A deals, by the GDP, and by the Long-term interest rates of Canada.

All three independent variables are statistically significant given the p-values lower than 0.05.

The number of VC investments in Canada can be predicted by the regression line of the equation:

$$y = -188.031 \text{ Long-term interest rates (\%)} + 0,438 \text{ N° of M\&A deals} - 1.396 \text{ GDP in bil. USD} + 2729.063$$

Regression VC Equity Value with no lag

<i>Regression Statistics</i>	
Multiple R	0,760888
R Square	0,578951
Adjusted R Square	0,535395
Standard Error	5,043173
Observations	33

ANOVA					
	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	3	1014,181	338,0603	13,29188	1,22496E-05
Residual	29	737,5742	25,43359		
Total	32	1751,755			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-11,142	7,397	-1,506	0,143	-26,271	3,987
GDP in bil. USD	0,005	0,004	1,223	0,231	-0,003	0,013
Total M&A Value in bil. USD	0,051	0,014	3,799	0,001	0,024	0,079
Long term interest rates (%)	0,818	0,725	1,128	0,269	-0,666	2,302

Interpretation:

Firstly, the model's statistical significance is indicated by the low p-value, which is significantly less than the 0.05 threshold. This makes it possible to proceed with the interpretation of the other statistical findings.

It is possible to affirm that the value of VC investments can be explained by the value of M&A deals, the GDP of the country, and Long-term interest rates with no temporal lag, given the R-squared of 0.579.

Among the three independent variables, just the value of M&A investments is statistically significant given the p-values lower than 0.05.

Because some coefficients lack statistical significance, it is prudent to use caution when attempting to use them to create a regression equation. While it is technically possible to create a regression equation using these coefficients, the lack of statistical significance shows that such an equation may not be able to forecast VC equity value using the given independent variables.

The value of VC investments in the Canada can be predicted by the regression line of the equation:

$$y = 0.818 \text{ Long-term interest rates}(\%) + 0.051 \text{ M\&A value in bil. USD} + 0.005 \text{ GDP in bil. USD} - 11.142$$

ADL Analysis

The tables below show the correlations between the Number of VC deals and N° of VC deals with lag and the correlations between VC Equity Value and VC Equity Value with lag, using a color scale with the highest correlation in green and the lowest correlation in red, and the time lag for which the correlation is highest is highlighted in bold.

Correlation between N° of VC deals and N° of VC deals with lag

1 year lag	88%	Strong Correlation
2 years lag	73%	Strong Correlation
3 years lag	70%	Moderate Correlation
4 years lag	21%	Weak Correlation
5 years lag	-11%	Anticorrelation

Correlation between VC Equity Value and VC Equity Value with lag

1 year lag	71%	Strong Correlation
2 years lag	78%	Strong Correlation
3 years lag	68%	Moderate Correlation
4 years lag	51%	Moderate Correlation
5 years lag	37%	Moderate Correlation

The statistical outputs of the ADL regression are reported below.

ADL Regression N° of VC investment with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.884499
R Square	0.782339
Adjusted R Square	0.775084
Standard Error	247.9588
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	6629724	6629724	107.8292	1.88827E-11
Residual	30	1844508	61483.59		
Total	31	8474232			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	266.3883	106.0477	2.511966	0.017618	49.80989532	482.9666
N° of VC deals (1 year lag)	0.822885	0.079245	10.38408	1.89E-11	0.661045388	0.984725

ADL Regression NO lag (GDP + M&A + Long-term interest rates) and with N° of VC deals with 1 year lag

<i>Regression Statistics</i>	
Multiple R	0.899759
R Square	0.809566
Adjusted R Square	0.781354
Standard Error	244.4782
Observations	32

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	6860453	1715113	28.69542	2.25501E-09
Residual	27	1613779	59769.58		
Total	31	8474232			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	293.8463	565.4547	0.519664	0.607532	-866.3708733	1454.064
N° of VC deals (1 year lag)	0.73553	0.107758	6.825742	2.48E-07	0.514428579	0.956632
GDP in bil. USD	-0.27521	0.247673	-1.11116	0.276295	-0.783389096	0.232978
Total N° of M&A deals	0.16751	0.092271	1.815423	0.080582	-0.021813516	0.356834
Long term interest rates (%)	2.963655	50.94911	0.058169	0.954042	-101.5752838	107.5026

ADL Regression VC Equity Value 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.776027
R Square	0.602218
Adjusted R Square	0.588501
Standard Error	4.809889
Observations	31

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	1	1015.727	1015.727	43.90427	2.90496E-07
Residual	29	670.9159	23.13503		
Total	30	1686.642			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-0.64497	1.345129	-0.47948	0.635191	3.396065133	-
VC Equity Value in bil. USD 2 years lag	1.624037	0.2451	6.62603	2.9E-07	1.122751943	-

ADL Regression NO lag (GDP + M&A + Long-term interest rates) and with VC Equity Value with 2 years lag

<i>Regression Statistics</i>	
Multiple R	0.8958
R Square	0.802458
Adjusted R Square	0.772066
Standard Error	3.579769
Observations	31

ANOVA

	<i>df</i>	<i>SS</i>	<i>MS</i>	<i>F</i>	<i>Significance F</i>
Regression	4	1353.459	338.3648	26.40433	7.9745E-09
Residual	26	333.1834	12.81474		
Total	30	1686.642			

	<i>Coefficients</i>	<i>Standard Error</i>	<i>t Stat</i>	<i>P-value</i>	<i>Lower 95%</i>	<i>Upper 95%</i>
Intercept	-20.3415	6.422178	-3.16739	0.003906	33.54250855	-7.14056
VC Equity Value in bil. USD 2 years lag	1.337765	0.239118	5.594572	7.05E-06	0.846250262	1.82928
GDP in bil. USD	0.00541	0.003111	1.738736	0.093911	0.000985648	0.011805
Total M&A Value in bil. USD	0.038661	0.009906	3.902726	0.000602	0.018298383	0.059023
Long term interest rates (%)	1.964578	0.693733	2.831894	0.008816	0.538589406	3.390566

Interpretation of results

Canada has a strong VC market maturity. The regression models show good values of R-squared, both in terms of N° of VC Investments (55.5%), as well as in terms of VC Equity Value (57.9%).

The ADL analysis on the N° of VC Investments significantly ameliorate the R-squared to 81.0%. N° of M&A deals, GDP and Long-term interest rates are not significant.

The ADL analysis on the VC Equity Value significantly improve the R-squared to 80.2%. In this case, only GDP is not significant enough.