iscte

**INSTITUTO
UNIVERSITÁRIO
DE LISBOA**

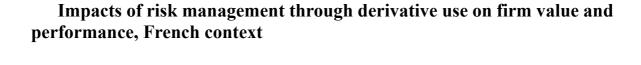**Impacts of risk management through derivative use on firm value and performance, French context**
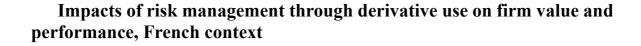
Nathan Philippe Jacques AUDRAIN

Master Degree in Finance

Supervisor:
PHD Pedro Manuel de Sousa Leite Inácio Assistant Professor, ISCTE Finance Department

September 2024

Department of Finance

Impacts of risk management through derivative use on firm value and performance, French context

Nathan Philippe Jacques AUDRAIN

Master Degree in Finance

Supervisor:
PHD Pedro Manuel de Sousa Leite Inácio Assistant Professor, ISCTE Finance Department

September 2024

Resumo

Esta tese explora o impacto na performance e valorização das empresas francesas devido à a utilização de derivados na gestão da sua exposição aos riscos financeiros. Este estudo foca-se em 35 empresas interantes dos indices CAC 40 e CAC Small, em que 20 delas recorrem a instrumentos financeiros na cobertura dos seus riscos, enquanto as restantes 15 não o fazem.

O objective principal é determiner se a gestão do risco com recurso a derivados tem uma influência positiva na performance financeira e na valorização das empresas. Para o efeito faz-se uma análise comparativa aplicando modelos de regressão aos dados financeiros tais como *Return on Capital Employed* (ROCE) e o *Market-to-Book ratio*.

Os resultados obtidos mostram que as empresas que utilizam derivados têm um significativamente um melhor desempenho financeiro, com um ROCE médio mais elevado, o que indicia uma gestão do cash flow mais estável. No entanto, o impacto na valorização pelo mercado não é tão claro. Enquanto a utilização dos derivados contribui para uma maior estabilidade financeira, tal não se traduz necessariamente num aumento sistemático dos Market-to-Book ratios.

Concluindo, esta investigação mostra que, enquanto os derivados têm um papael essencial na redução da volatilidade e na melhoria da performance interna das empresas, o seu efeito na percepção do mercado permanece incerto e é influenciado por outros fatores tais como a dimensão da empresa e o nível do seu endividamento. Estes resultados sugerem que o recurso aos derivados na gestão do risco financeiro é uma estratégia benéfica para a performance da empresa, ainda que o seu impacto na valorização do mercado exige uma interpretação mais elaborada.

Palavras Chave: Derivados, Gestão do Risco, Performance Financeira, Valorização Financeira, CAC 40, CAC Small, Conertura do Risco

JEL Classification Codes: G32, G14

Abstract

This thesis explores the impact of using derivative products for financial risk management on the performance and valuation of French companies. The study focuses on 35 companies from the CAC 40 and CAC Small indices, with 20 using financial instruments to hedge their risks, while 15 do not.

The primary objective is to determine whether risk management through derivatives has a positive influence on financial performance and company valuation. A comparative analysis is conducted using regression models on financial data such as Return on Capital Employed (ROCE) and the Market-to-Book ratio.

The results show that companies using derivatives exhibit a significant improvement in financial performance, with a higher average ROCE, indicating more stable cash flow management. However, the impact on market valuation is more nuanced. While derivative use contributes to financial stability, it does not necessarily lead to a systematic increase in Market-to-Book ratios.

In conclusion, this research demonstrates that, while derivatives play a crucial role in reducing volatility and improving internal company performance, their effect on market perception remains uncertain and is influenced by other factors such as company size and debt levels. These findings suggest that financial risk management through derivatives is a beneficial strategy for improving company performance, though its impact on market valuation requires a more nuanced interpretation.

Keywords: Derivatives, Risk Management, Financial Performance, Financial Value, CAC 40, CAC Small, Hedging

JEL Classification Codes: G32, G14

Index

Table of Contents

1. Introduction

In the growingly unstable international economic context, the management of financial risks has become a central strategic issue for companies operating on stock indexes like the CAC 40 or CAC Small. International trade globalization, exchange rate fluctuations, commodities price evolution, and erratic changes in interest rates expose corporations to greater risks. If not managed rightly, these many economic uncertainties could seriously disturb cash flow, financial results, and finally shareholder value.

Companies also have several instruments that may protect them against such risks. One of the main instruments in the financial risk management tool kit is the use of derivatives. Derivatives are financial instruments used to ensure future cash flows against unexpected market volatility. However, their use raises some questions: How effective do they perform their function of managing risk? That is, do they really add to the firm's financial stability and value creation?

Specific attention is paid to the influence of derivatives use by French companies listed in the CAC 40 and CAC Small indexes on risk management. Especially of interest is how such instruments affect the financial performance and valuations of such corporations.

By examining hedging strategies resorted to, this research pursues the following question:

To what degree do derivatives contribute to decreasing risks and increasing the financial performance and value of French companies?

The analysis of the influence of derivatives on risk management is based on several fundamental economic theories. A very significant theoretical basis is represented by the Modigliani and Miller theory (1958), according to which, in conditions of a perfect market, the capital structure does not influence the value of the firm. That theory was widely criticized since it did not incorporate the fact that market realities include bankruptcy costs, taxes, and asymmetry in information. In fact, companies would routinely find themselves at the behest of market frictions, in which cases instruments such as derivatives would be used to hedge risks. Agency cost theory also underlines the conflicts of interest between shareholders and managers. Managers are often more risk-averse than shareholders because their personal exposure to the

firm's performance is higher, and thus have an incentive to use derivatives to stabilize financial results and avoid potential losses that may hurt their position.

The theories stated above are also enriched through various empirical studies, such as that of Smith and Stulz (1985), which evidenced that risk management increases firm value. Another good example would be the study by Allayannis and Weston (2001) on the usage of foreign exchange derivatives, which proved to increase the market value of companies.

This work is based on a sample of 35 French companies listed in the CAC 40 and CAC Small indices. Of these firms, 20 use derivatives for financial risk management, whereas 15 firms do not use them. Measured variables are performance indicators like ROCE and the market-to-book ratio but also control variables such as firm size, leverage, and dividend policy. The results are presented as a series of regressions, enabling analysis of how any use of derivatives affects company performance and its valuation.

Preliminary results show that the usage of derivatives has a significant and positive effect on the financial performance of firms as proxied by ROCE. Firms using derivatives generally tend to have a higher return on capital employed compared to firms not using them, thus suggesting that the derivatives stabilize the cash flows and hence reduce the earnings volatility. The latter effect on equity market capitalization, however, is a bit more nuanced: while better financial stability indeed increases the values of some companies, this advantage does not flow through to increased market-to-book ratios of those companies.

This thesis is structured into six main chapters. This first chapter provides a detailed introduction to the research problem, objectives, and scope of the study. The second chapter presents a comprehensive review of the literature, focusing on the key theories and empirical studies related to risk management and the use of derivatives. The third chapter outlines the research hypotheses and methodology, including the selection of the sample, the variables studied, and the statistical methods employed. The fourth chapter presents the results of the empirical analysis, while the fifth chapter discusses these results in the context of the existing literature. Finally, the sixth chapter concludes the study, offering recommendations for future research and potential strategies for companies to optimize their use of derivatives in managing financial risks.

2. Literature review

In an increasingly uncertain global economic environment, businesses must be very concerned not only about the monetary performance but also with the management of risk that may influence their long-term viability. CAC 40 companies have the largest market capitalization in France, and therefore they are exposed to various types of risk, among which are those related to fluctuations in exchange rates, interest rates, and commodity prices. Such risks largely affect their profitability and, therefore, their respective market value.

The role of hedging strategies is therefore immense in this context. Therefore, managing risks by using financial instruments, such as derivatives, companies can minimize the effect of changes in the markets on their books and enhance their financial stability. Indeed, risk management can be viewed as an enabler of shareholder value creation, by way of reducing the volatility of cash flows and thus protecting corporate assets from unpredictable economic shocks.

2.1 Objectives of the literature review

The main objective of this literature review is to examine in depth the key concepts of hedging, risk management and value creation in the context of CAC 40 companies. The aim is to understand how these companies use financial instruments to manage the risks to which they are exposed, and how these practices influence their financial performance.

More precisely, this review is structured around the following axes:
- Defining basic concepts: Before exploring the various hedging and risk management strategies, it is essential to clarify what these terms mean in the context of corporate finance.

- Explore existing theories and models: Financial theories such as Modigliani-Miller, agency cost theory, and other conceptual frameworks will be examined to understand their relevance and limitations in the current context.

- Analyzing the impact of hedging practices: Finally, this review will analyze how CAC 40 companies are using hedging strategies to improve performance and create value.

2.2 Economic financial theories

2.2.1 Financial economic theory: basic concepts

Modigliani-Miller theorem was developed by Franco Modigliani and Merton Miller back in 1958 (Modigliani & Miller, 1958) and has grown to become a critical pillar in the subject of modern corporate finance. This theorem mainly relies on two critical propositions which argue that, in a perfect capital market, a corporation's capital structure is of no importance in its entire value. The most important and first proposition in this theorem implies that the combination of equity and debt in the funding of the company's assets will not have any impact on the said company's value. The second proposition then states that the cost of equity rises linearly due to the level of debt and increased financial risk, but that WACC remains the same. These propositions are based on the set of simplifying assumptions that mainly include the absence of taxes, transaction costs, and information asymmetry, as well as the assumption of rational investors.

However, the assumptions made have been universally challenged over a lack of realism in the actual world under which conditions like taxation, bankruptcy costs, and information asymmetries are the leading drivers in the financing decisions made by companies. Such as, tax shields resulting from the deductibility of interest payments in corporate income taxes which leads a company to show a preference for debt instead of equity financing would then contradict the irrelevance proposition of the capital structure. In addition, costs of financial distress and bankruptcy, such as accounting, legal, and audit fees, that are a growing function of leverage, are not captured by the Modigliani-Miller framework. These costs reduce the value of a firm due to the loss of customers, litigation, and lost ground in terms of investment opportunities.

The criticisms of the Modigliani-Miller theorem have pooled into developed theories such as the "trade-off theory," where an optimal capital structure was presented, trying to weigh the

tax advantages of debt against its costs of financial distress. Moreover, current theories of corporate finance acknowledge that market imperfections, such as information asymmetries, can create agency costs and problems of adverse selection. While these imperfections indicate the need for firms to behave regarding management of capital structure and hedging policies to protect cash flows in the pursuit of maximizing the value of their firm, CAC 40 Companies, given a globalized and highly uncertain economic environment, adopt tight risk-management practices to steer through the above-mentioned financial variability mediated by the market and, as a result, to enhance the resistance of these same firms to the economic wind. They will integrate these practices into overall strategies to optimize cost of capital while at the same time protecting shareholders' interests, hence proving that while the Modigliani-Miller theorem was a significant theoretical starting point, the practical application of the theorem must be adapted to the complex realities of modern financial markets.

The Modigliani-Miller theorem, efficient market theory and arbitrage theory are complementary. The precepts of these theories converge towards the disappearance resulting from capital structure.

Agency cost theory, as proposed by Jensen and Meckling in 1976 (Jensen & Meckling, 1976), is a theory that underlies possible conflicts of interest between a corporate management body and a firm's shareholders. That bores down to the basis of the understanding as to why companies, especially large multinationals in the CAC 40, do apply hedging strategies. Since managers act as agents for the shareholders, they might have incentives to bring forth decisions to maximize their utility rather than shareholder value. For instance, a manager may be tempted to underwrite risky projects to enable him to realize performance bonuses in the short run but shift the risk to shareholders.

Ross (1973) and later Dennis and McConnell (2003) extended this theory to say that risk management with hedging instruments is one form of decreasing these agency costs, and through this system, not only will assurance of asset protection be attained, but also cash flows will likewise be stabilized with lower volatility, thereby aligning the interests of the management with the shareholders. Under that view, these theorists argue that when managers know that their actions will be scrutinized by the shareholders, who have control mechanisms through such instruments as performance contracts, there are higher probabilities that they will, in fact, use derivatives to hedge the company against market fluctuations, as opposed to taking the bull by the horn and engaging in reckless risk-taking.

Cost theory is relevant when considering large CAC 40 companies, more closely watched by investors and regulators. Companies of this size do implement best practices in risk

management, not just for financial risks but also for maintaining confidence among shareholders and in the marketplace.

2.2.2   Modern perspectives

Modern perspectives of risk analysis made at the same time theoretical, empirical improvements, and excessively large in scope of many classical models come together in market irrational behavior and uncertainties that at times are not quantifiable. Good examples are the works of Kahneman and Tversky (1979) on prospect theory. They argue that decision-making under risk occurs as an argument of cognitive biases and preferences between gains and losses, not as a purely rational proposition. Such biases might lead to suboptimal risk management decisions, such as underestimation of very serious but low-probability risks.

The modern concept of ERM represents an evolution in integrated risk management to encompass financial, operational, strategic, and compliance risk. Such a broad approach allows companies to proactively manage a wide range of risks by aligning the hedging strategies with the overall company's objectives. Recent studies show that companies that take ERM adopt a higher level of resilience in facing economic shocks and tend to post more stable financial performance.

2.2.3   Limitations of the theories

Despite all their importance, traditional theories of finance have their limitations in application within a complex globalized economic environment such as the one in which CAC 40 companies operate. For example, the Modigliani-Miller theory is oblivious to real costs associated with imperfections in the capital market, widespread in the real world, like transaction costs, taxes, and bankruptcy costs. These omissions, therefore, narrow the extent to which this theory can be satisfactorily applied to explain risk management strategies within large multinational companies.

Alternatively, agency cost theory is partially relevant to explain some risk management decisions, and it assumes that managers behave rationally in ensuring shareholder value

maximization. However, behavioral research has shown that the decisions made by managers are often affected by personal biases, short-term pressures, or motivations totally outside shareholders' interests.

More specifically, classical theories are incapable of explaining how firms adapt hedging strategies to the very rapid evolution of financial markets, innovation in derivatives, and related changes in regulation. These limitations underline the necessity for a more integrated, dynamic approach to risk management that considers modern market realities and organizational behaviors.

2.3 Risk determinants

2.3.1 Company size

Company size is a very decisive factor when considering how a company can manage its risk. As illustrated by Blazy (2000), large firms, by virtue of size and access to large financial resources, can adopt very sophisticated hedging strategies to better manage their risks. Large companies have the capability and resources to acquire advanced risk management systems, to hire risk specialists, and to diversify their asset portfolio so in case of any economic shock, the company's base will not be affected too much by it. Besides this, their size allows them to bargain for better terms on derivatives markets, which minimizes costs associated with transactions in hedging.

Size has been tested too by Lins, Servaes and Tamayo (2017) for the impact of on risk management, and it is established that larger firms are more risk-averse and, hence, hedge primarily because of being exposed to complex risk factors and the interdependencies of global economies. Now, CAC 40 firms are highly diversified across at least three major geographies.

2.3.2 Financial distress

The other critical factor that might influence risk management strategies is financial distress. Companies that are in financial distress will have urgent needs to stabilize the cash flows and avoid bankruptcy. Essrifi (2010) illustrated that distressed companies are more likely to utilize the hedging instruments to mitigate the financial risk since the volatility of the cash flow could worsen their already precarious financial situation. For such companies, risk management is literally a question of survival as they try to minimize the effects of market fluctuations on their daily operations.

Lee (2019) goes further to illustrate that a company in financial distress and which is unable to manage its risk appropriately faces a higher possibility of default.

The study by Acharya et al (2010) on the other hand, further substantiates the argument and concludes that such companies may lower their chances of bankruptcy as they will be able to absorb the macroeconomic shocks in a better way and stabilize them. Such companies usually undertake active hedging strategies against interest rate, currency, and credit risks using derivatives which will limit their prospective losses and hence preserve capital.

2.3.3 Liquidity

Another major determinant in the design of hedging strategies would be the liquidity of the firm, which means the capability of the firm to convert the assets quickly into cash without much loss. The determination by Schrand and Unal (1998), reflecting better liquidity, indicates that firms will be able to hedge positions effectively with sufficient resources to deal with possible losses. Being a liquid company, it can quickly respond to market changes, adjust its hedging positions, and take advantage of market opportunities when favorable conditions develop.

Mian (1996) has also pointed to the role of liquidity in risk management. He commented that companies with a high level of liquidity can negotiate derivative contracts in a more favorable way and thus move into less expensive hedging.

Brunnermeier and Pedersen (2009) also revealed that low liquidity can worsen the risks, especially in crises when markets turn out to be more volatile and transaction costs get higher.

Hence, liquid companies can nicely surf those uncertain economic environments and enable keeping financial stability.

2.3.4   Dividend Policy

A firm's dividend policy often represents a firm's overall risk management policy. Companies that pay out high dividends will be interested in the stabilization of their wealth because they will be interested in maintaining those high dividends and as they must keep paying them , they, therefore, face greater consequences from fluctuating earnings. Schrand and Unal (1998) also suggested that the firms with more generous dividend policies would be more likely to hedge.

Guay (1998) further illustrated this by indicating that the companies that hedge instruments in dealing with their financial risks are an exact match of the company's having stable dividend policies since they seek to offer shareholders' steady income. This is supported by DeAngelo and Roll (2015) who highlighted that demonstrating stable dividends for the most part diminishes good risk management, ultimately bolstering the confidence of investors, and elevating clearly a company's likelihood of benefiting from good valuations at the money markets.

2.3.5   Growth opportunities and underinvestment

The growth opportunities and the risk of under-investment are basic drivers of risk. Allayannis and Weston (2001) report that on average, companies facing high growth opportunities better cover their risks to guard off losses on their capacity, that may reduce the engines for taking up new projects. The companies aim at stabilizing their future cash flows to ensure they do not hurt their long-term growth potential.

Inadequate investing is when companies are barely able to afford to invest in new projects because uncertainty acts as a double-edged sword with financial risks. Under-investment can be hedged against the risk of a market fluctuation with a hedging strategy, as in the case of Billett, King, and Mauer, in 2007. Companies will invest in long-term projects because their

cash flows are secured, and with better accuracy, so, too, they are able to project their future returns.

2.3.6 Other factors

Other factors like how old the company is, what a company's corporate governance index looks like, and how its relationship with stakeholders is configured can also affect a company's strategies for risk management. Older companies with high corporate governance are in most cases likely to cope well with the application of proactive risk management. In such companies, there are established methods of identifying and evaluating risks, and past experience is used to hedge market fluctuations.

Besides, relationships with stakeholders, investors, regulators, and customers relate to how a company handles management of risks. Those firms with strong relationships with stakeholders excel in being more flexible in risk management, as they can get necessary support when troubled times come.

2.3.7 Context's importance

The different determinants reflect that many factors impact the strategy for managing risk, and their consequences will differ on account of the company context.

For example, the size of a company might have a benefit in the risk management, but on the other hand, it may result in higher agency costs. In the same way, while liquidity is generally welcome, it can also put the company at greater risk during times of higher volatility in markets.

The importance of these determinants also depends on business sectors and the economic environment. For example, those firms located in the energy or raw material sectors of the economy may be more exposed to changes in commodity prices. Similarly, risk around exchange rates and interest rates may be of more concern to a firm located in the technology sector.

2.4 Types of risk

2.4.1 Interest rate risk

The fluctuation in interest rates is considered one of the business risks, especially for firms operating under the CAC 40 with general high exposure to global financial markets. Beets (2012) validated in his study and further elaborated by Borio and Zhu (2012), changes in interest rates have a pronounced impact on the financing cost and profitability of a company. To mitigate this risk, there should be an existence of interest rate hedging instruments, such as swaps and forward contracts.

2.4.2 Foreign exchange risk

Moreover, there occurs a currency risk important for companies with international exposure, and especially to all those business dealings conducted in heterogenic currencies. Large groups with subsidiaries in a variety of countries must juggle different currencies. According to Harper (2015), there is the definition of such a term as the currency risk being the possibility that a change in exchange rates will adversely affect a company's financial results. Allayannis, Lel and Miller (2012) proved that firms which use currency derivatives for hedging risk can increase their market value by stabilizing their cash flows. Bartram and Bodnar (2007) also proved that currency risk management is essentially imperative for firms conducting business in the international markets.

2.4.3 Risk of commodity price

Commodity prices are the utmost significant risk which the firm faces in the routine course of conducting their business. The risks are particularly high for firms conducting business in

the energy and raw material industry. Barned (2009) elucidates that by not being able to handle such risks, companies may experience a reduction in their profit margins by incurring more input costs. According to authors Varangis, Larson and Anderson (2002) commodity hedging mechanisms, such as futures and options, are highly required to protect companies from the risk of price fluctuation. Hamilton (2009) contributed to the study by saying that price shocks create a permanent impact on the profitability of companies, and therefore, companies must really be careful during times when commodities are more volatile.

2.4.4   Practical Cases of CAC 40 Companies

The below practical cases are drawn from CAC 40 companies, which will demonstrate the effect on these types of risks. For example, advanced hedging policies are taken by the management of TotalEnergies to handle risks associated with oscillation in oil prices and energy commodities. The company has implemented futures contracts and options on oil to stabilize its costs and protect its profit margins against sudden price changes.

Like any other company with substantial exposure to international markets, Airbus is an active user of currency derivatives for the purpose of protecting exchange rate risks which might affect their euro-quoted earnings. Interest rate swaps are another tool for managing its long-term financing costs. LVMH is another example of a company belonging to the CAC 40 that effectively uses forward contracts and currency options to manage currency exposure in relation to safeguarding international revenue. It makes the margins stable, therefore, managing the offshore currency risk.

The examples above provide evidence for how hedging strategies are incorporated into these CAC 40 Companies' risk management function in assisting the entire performance against fluctuations in financial markets.

2.5 Financial Hedging Instruments

2.5.1 Presentation of Instruments

The financial instruments implemented to mitigate risk are vast in number and, hence, extremely significant in risk management within CAC 40 companies. The major ones are futures contracts, forward contracts, options, and swaps. These instruments help companies in covering the various risks related to interest rates, exchange rates, and commodity prices.

Futures and forwards are contracts for sale or purchase of an asset at a certain price at a future date. Generally similar, in nature, forwards are traded OTC and are more flexible, whereas futures are standardized and traded on exchanges, offering better liquidity.

Options, however, give the buyer the right but not the obligation to buy or sell an instrument at a certain price any time before or on the expiry date. Options are used to hedge a whole gamut of risks that include exchange rate and interest rate risks.

Swaps A swap is an agreement between counterparties for the exchange of cash flows on predetermined notional amounts. Interest rate and currency swaps are two most well-known types of swaps that allow large corporates to better deal with their financial risks.

2.5.2 Financial Innovation

Financial innovation has ushered in a wide variety of new hedging instruments that allow companies to take better care of their risk factors. Exotic options, like barrier options and Asian options, give more complex hedging solutions to meet the company requirements. According to Geczy et al. (2007), financial innovations have helped companies to develop more complex but better-tailored hedging strategies according to their risk profiles.

2.5.3   Evolution of Hedging Instruments

The needs of the firms have been evolving with time, and hence, the hedging instruments have evolved to fulfill firms' needs. The introduction of financial derivative products has enabled better risk management arrangements in an increasingly complex and interrelated financial environment. For example, the appearance of credit derivatives has provided companies with a new dimension for controlling their credit risk exposure. Similarly, interest rate swaps have been put in place for capped or collared interest rate swaps that can be utilized to provide more flexible hedging arrangements on these products.

In addition, it is spurred by the regulatory changes, especially the new Basel III requirements, that have compelled firms to rethink their strategies in managing risks and to adopt more robust hedging instruments in meeting the altered capital and liquidity requirements.

2.6 Empirical Evidence of the Interrelationship between Risk Management, Financial Value, and Accounting Performance

2.6.1   Synthesis of Empirical Studies

Empirical works have documented well on the interrelationship risk management, financial value, and accounting performance of companies. Myers and Majluf (1984), however, popularizers of the "pecking order theory", were amongst those first who although demonstrated that companies practicing financial risks were involved in a series of strategies to be able to reduce their market-value costs of external financing.

Further empirical evidence was added by Allayannis and Weston (2001), sorting that the use of currency derivatives for hedging is positively related to firm value in the basis of Tobin's Q ratio. Their research on U.S. companies showed that the companies actively involved in the realm of hedging strategy perform well compared to the non-participating ones.

Stulz (2013) also opined that risk management, in large multinational companies, is very important to protect stockholder value from unexpected economic jolts. He showed that companies following risk management practices are best prepared to face the markets in an unstable environment with consistent performance and strengthened forward-looking financials.

2.6.2   Analysis of Methodologies

Although approaches to empirical studies on risk management are different among methodologies, they bear common characteristics all through. The study often employs regression analysis, especially panel models in the investigation of the influence of the strategy on the performance of firm finance. They are important because the models employed can control for fixed and random effects, which go on to isolate the specific effect of the hedging strategies on performance. But each has its own share of positives and negatives. For example, while panel models are extremely flexible for the analysis of longitudinal data, they can at the same time be relatively sensitive to endogeneity problems. Further, the use of instrumental variables to correct for endogeneity may bias results if the instruments used are not perfectly correlated with the explanatory variables.

Another methodology that is commonly used is event analysis, through which stock price responses to corporate announcements of the adoption of new risk management strategies are quantified. In such a way, it is possible to grab a near-term effect of hedging strategies on the value of the firm. However, the methodology simply is confined by the data availability and the difficulty to control the external effects.

3. Research Hypothesis

As assessed from the literature review, companies are highly exposed to various risks, including exchange rates, interest rates, and commodity price fluctuations that may have huge impacts on their profitability and market value. The literature stresses that hedging strategies may significantly lessen the adverse impact of financial market volatility on corporate financial statements with proper risk management through the protection of unstable economic shocks.

The theories of Modigliani-Miller's capital structure irrelevance principle, trade-off theory, and agency cost theory, theoretically explain the place of derivatives in risk management. However, the same theories also put forward some limitations and assumptions on which they operate. Empirical evidence discussed within the literature review further expresses the complex relationship between risk management practices-such as the usage of derivatives-and financial performance and valuation of firms.

To this effect, within the perspective of what was hinted above, this research aims to test two significant hypotheses in the light of impacts from the utilization of risk management derivations on financial performance and valuation of firms across France. Theoretical hypotheses are developed because, through them, one might conduct an orderly analysis of the conditional gains from derivative usage that could yield insightful implications for corporate managers and investors concerning the worth of risk management strategies in their pursuit of firm value and stability. These hypotheses have been developed from a profound review of the financial theories and are empirically supported by studies cited in the literature review, which all together underline the derivatives as the cornerstone of corporate risk management practices.

Proposed Hypotheses

H1: Risk management using derivatives has a positive influence on the financial valuation of the firm.

H2: Risk management using derivatives has a positive influence on the performance of the firm.

3.1 Hypothesis 1 justification:

H1: Risk management using derivatives has a positive influence on the financial valuation of the firm.

The first hypothesis is based on the thought that risk management use of derivatives stabilizes the cash flow of a company, reducing income volatility. Under the trade-off theory, a firm desires an optimal tradeoff between tax benefits of debt and costs of financial distress. By hedging market risks in the form of fluctuations in exchange rate and interest rate, companies using derivatives reduce their chances of financial distress as the volatility of cash flow is reduced hence reduced costs associated with unexpected fluctuations in revenues.

Agency theory also suggests that risk management through derivatives could align managers' and shareholders' interests. Because managers decrease financial uncertainty, they would have fewer incentives to undertake risks that might maximize their short-term benefits but at the cost of long-term value for the company. The use of derivatives for the purpose of risk reduction would decrease agency conflicts and improve valuations.

Empirically, the hypothesis that the use of derivatives in the place of risk management increases firm valuation is hereby supported by several studies. For instance, Allayannis and Weston (2001) expressed that U.S. companies that employ foreign exchange derivatives exhibit a higher Tobin's Q ratio, one of the indicators of firm valuation. Furthermore, studies like that of Bartram and Bodnar (2007) show that companies using derivatives to hedge market risks are considered less risky by investors, which in turn is factored into better market valuations.

In the case of CAC 40 and CAC Small companies, which are exposed to a huge market risk considering their scale as well as their extent of international market involvement, the derivatives-based smooth approach of risk management may reduce the effect of commodity price, exchange rate, and interest rate fluctuations. In such a way, the companies will be able to protect their future profits and thus enhance their financial valuation in the market.

3.2 Hypothesis 2 justification:

H2: Management of risk using derivatives positively influences a firm's performance.

The second hypothesis is underpinned by the risk management hypothesis, which suggests that the use of derivatives as a means of risk management enhances corporate performance both in terms of finance results and operational stability. Indeed, modern corporate finance theory, supported by numerous studies, reveals that effective risk management can facilitate firms to decrease future losses from market fluctuations, face lower financing costs, and improve access to capital by reducing the risk premium required by investors.

Particularly, derivatives such as futures and options allow an enterprise to lock in future prices of commodities or exchange rates to reduce uncertainties relating to future costs and revenues. This results in more predictable cash flow management and more predictable financial performance, which is especially important to enterprises operating in more volatile or uncertain environments.

As such, empirical studies, such as that by Stulz (2013), support the fact that companies which embed risk management practices into their overall strategy are in a better position to face financial turmoil in markets. By smoothing cash flow while avoiding unexpected economic jolts to shareholder value, companies tend to have more stable and predictable finances, which therefore means that the investor and stakeholder community appreciates them more.

Also, Myers and Majluf (1984) proved that hedging financial risk of the firm could raise its market value by reducing costs of imperfection bounded with capital markets, which are perceived as costs of external financing and cash flow volatility. A decrease in uncertainty enables the enterprise to acquire finance under more favorable conditions and to enhance its financial performance.

This would, in the long term, imply that the operations of the French listed companies in CAC 40 and CAC Small would not only advance financial stability with the use of derivatives, but they would also become more resistant to the shocks of economic meltdowns.

Therefore, the potential influence of the derivatives on the risk management approach could also be positively impacting company performance.

3.3 Implications of the Hypotheses

The consequence of accepting these hypotheses is very important for managers of corporations and investors. For managers, this shows a good way of forming and using the means of risk management as a tool not only for protection against market uncertainties but also for gaining shareholder value and improving financial performance. In this regard, an active policy of handling risk by means of derivatives could allow companies to move more efficiently in stormy economic conditions.

The implications of these hypotheses for investors are that the utilization of derivatives as a means of managing risk could provide an indication of good governance and a signal of prudent management-thus signaling less risky investment opportunities with superior risk-adjusted returns. In the end, proper risk management practices that are in line with the strategic objectives of the company may translate into reasonable growth and long-term value creation.

These hypotheses create a framework in which the possible implications of using derivatives on the financial valuation and performance of French companies can be explored. Further empirical analysis will enable one to test these hypotheses and assess the validity of such hypotheses within the context of French markets.

4. Methodology

The following section presents the research methodology that was used to discover the real effect of the usage of derivative products for risk management purposes in companies listed on the French market. The methodology should allow other researchers to conduct the study in some other environment and give an in-depth description of the design of the study, sampling, data collection method adopted, processing, and statistical analysis of the data.

4.1 Sample Selection

The study adopts a comparative design in analyzing the impact of the usage of derivatives on firm performance and valuation. The sample consists of 35 French companies listed in the CAC 40 and CAC Small indices. These two indices are selected because they represent a wide spectrum of large-cap and small-cap firms, hence offering a better overview of corporate practices for managing risks across several sectors and sizes of firms.

These include a group of 20 companies that use derivatives to hedge risks and 15 companies that do not. The main challenge here was to have the companies correctly classified in terms of their usage of derivatives, since companies' reports on their status are not provided in Orbis financial databases. To overcome this issue, a manual checking in annual reports was performed to identify whether a company has been using financial instruments for risk coverage purposes or not. This process was long but necessary to collect relevant data and to understand which type of risk is managed by companies with which strategies or instruments. These details will be discussed in the next part before the results.

4.2 Variables selected

The selection of variables for this study is grounded in the existing literature on derivative usage and its impact on firm performance and valuation. This section is divided into two parts: dependent variables and independent variables. Each variable is defined, justified, and linked to the literature, with references to previous studies that have utilized similar data. The specific labels used in RStudio for each variable are also provided to ensure clarity and replicability.

4.2.1 Dependent Variables

The dependent variables in this study measure firm performance and valuation. These variables are chosen based on their relevance to the research question and their use in previous studies that have examined the impact of derivatives on corporate outcomes.

Derivative Usage:

This binary variable, labeled as DEV_USE in RStudio, indicates whether a company uses derivatives (coded as 1) or does not use derivatives (coded as 0). This is the primary independent variable of interest, central to testing the core hypotheses of the study. The use of a binary indicator for derivative usage aligns with the methodological approaches of previous studies, such as those by Allayannis and Weston (2001), which categorized firms based on their derivative usage to assess its impact on firm performance.

Return on Capital Employed:

This variable, labeled as ROCE in RStudio, measures a company's performance by evaluating its net operating profit relative to the capital employed. ROCE is a widely used metric for assessing how efficiently a company is using its capital to generate profits. This variable is particularly relevant for testing the hypothesis that derivative usage positively impacts firm performance. Prior studies, such as Allayannis and Weston (2001), have used ROCE to explore the relationship between risk management practices and financial performance, finding that firms employing derivatives often exhibit higher ROCE due to more effective management of financial risks.

Market-to-Book Ratio:

Labeled as MKT_TO_BOOK in RStudio, this variable serves as a proxy for firm valuation, calculated as the market value (share price multiplied by shares issued) divided by the book value of equity. The market-to-book ratio is commonly used to assess how the market perceives a company's value relative to its accounting value. Studies by Bartram and Bodnar (2007) and Graham and Rogers (2002) have shown that firms using derivatives tend to have higher market-to-book ratios, suggesting that effective risk management through derivatives can enhance a firm's market valuation by reducing volatility and protecting against adverse market movements.

4.2.2   Independent Variables

The independent variables selected for this study are derived from the literature on corporate risk management and financial performance. These variables are chosen to capture the different factors that may influence a company's decision to use derivatives and their potential impact on firm performance and valuation.

Debt Ratio:

Labeled as DEBT in RStudio, that variable measures financial distress by calculating the ratio of total debt to total assets. The debt ratio is an important control variable as firms with higher leverage may have different incentives to hedge risks using derivatives to manage debt-related risks. Studies by Haushalter (2000) and Nance, Smith, and Smithson (1993) have shown that firms with higher debt levels are more likely to use derivatives to hedge against interest rate and currency risks, as these firms are more sensitive to changes in interest rates and exchange rates that could affect their debt servicing costs.

Liquidity:

This variable, labeled as LIQ in RStudio, represents a company's liquidity, measured through the quick ratio, calculated as the sum of current assets (quickly convertible in liquidity, therefore excluding inventories) by the current liabilities. Liquidity is a critical factor in determining a firm's ability to engage in derivative contracts and its overall risk profile. Studies

such as Minton and Schrand (1999) have demonstrated that firms with higher liquidity are better positioned to manage financial risks through derivatives, as they have sufficient resources to cover potential losses and adjust their hedging positions in response to market changes.

Book-to-Market Ratio:

Labeled as BOOK_TO_MKT in RStudio, that variable captures growth opportunities, calculated as the inverse of the market-to-book ratio. Firms with lower book-to-market ratios are generally considered to have higher growth opportunities, which may influence their decision to use derivatives for hedging purposes. Previous research by Froot, Scharfstein, and Stein (1993) suggests that firms with significant growth opportunities are more likely to hedge to protect against potential financial constraints that could limit their ability to invest in new projects.

Firm Size:

Measured as the natural logarithm of total assets, this variable is labeled as SIZE in RStudio. Firm size is an important determinant of derivative usage, as larger firms often have more complex risk exposures and greater access to financial markets, making them more likely to use derivatives for risk management. Guay and Kothari (2003) found that larger firms are more likely to engage in derivative transactions due to their more significant operational and financial risk exposures.

Dividend Policy:

Labeled as DIV in RStudio, this variable represents the dividend policy, calculated as the ratio of dividends paid to share price (i.e. the dividend yield). The dividend ratio is included as a control variable because firms with stable dividend policies may be more likely to use derivatives to stabilize earnings and maintain their dividend payments. Research by Smith and Stulz (1985) indicates that firms with stable and predictable dividend policies are more inclined to use derivatives to hedge against risks that could lead to volatile earnings, thereby protecting shareholder value.

Each of these variables has been selected based on their relevance to the research question and their established use in the literature on corporate finance and risk management. By including these variables, the study aims to provide a comprehensive analysis of the factors influencing derivative usage and its impact on firm performance and valuation. The specific

labels used in RStudio for each variable are provided to facilitate replication and ensure consistency in the data analysis process. This detailed approach to variable selection and definition ensures that the study is grounded in existing literature and provides a robust framework for empirical analysis.

4.3 Data Collection Methods

Collection of the data was an intermarriage between automated data extraction from financial databases and manual collection from the company reports for accuracy and completeness. The use of the ORBIS database provided a source for extracting the major data on financial statements, such as balance sheets and income statements, including notes about financial instruments. The reason for selecting ORBIS was determined by the wide coverage of European firms and its rather detailed financial information, which was indispensable for identification purposes of companies' usage of derivatives.

Given that there is a lot of data in ORBIS, most information on derivative usage across firms, in particular for small caps, was incomplete or not standardized. This is overcome by doing a manual check. Annual reports, investor presentations, and official disclosures from websites were checked. The manual data collection effort particularly focused on the sections of financial reports dealing with risk management policies and derivative instruments to comprehensively understand each company's risk management practice.

This was performed to ensure that the data collected was correct and valid. The data collection process started with retrieving financial data of listed companies in CAC 40 and CAC Small from the ORBIS database. Very often, the data on ORBIS was incomplete and undistorted on some firms. In that case, the missing data was collected manually from the companies' annual reports and investor presentations. For instance, derivative usage could be determined more precisely with that step, which would have gone unnoticed with just the extraction of data from ORBIS.

Afterwards, cleaning and standardization of collected data were performed: this includes duplicate elimination, outlier detection and correction, and standardization of financial metrics across firms for comparability. Later, the data were coded in proper formats for analysis,

according to the nature of the data or the requirement of the statistical models: the variables were binary, categorical, or continuous.

4.4 Model Specification

The impact of derivative usage on firm performance and valuation was analyzed using econometric models designed to test the study's hypotheses. The models were specified to examine the relationship between derivative usage and the dependent variables of firm performance and valuation, while controlling for other factors that could influence these outcomes.

Panel data regression models were employed to analyze the impact of derivative usage on firm performance and valuation over time. The use of panel data allows for the examination of both cross-sectional and time-series variations in the data, providing a more comprehensive analysis of the relationships between variables. Fixed effects and random effects models were considered, with the choice of model determined by the Hausman test. This test assesses whether the unique errors are correlated with the regressors, which informs the decision between fixed and random effects.

The general form of the panel data regression model used in the analysis is:

$$Y_{it} = \alpha + \beta1 * \text{Derivative Usage}_{it} + \beta2 * \text{Control Variables}_{it} + \epsilon_{it} \tag{1}$$

Where Y_{it} represents the dependent variables (ROCE, Market-to-Book Ratio) for firm i at time t, α is the intercept, $\beta1$ and $\beta2$ are coefficients representing the impact of derivative usage and control variables, respectively, and ϵ_{it} is the error term.

The statistical analysis was performed by using RStudio with different R packages for econometric analysis. The package "plm" was used in the conduct of panel data regression analysis, hence, it could estimate both fixed and random effects models. In that respect, the "sandwich" package was used in the computation of robust standard errors to take care of possible heteroskedasticity problems in the data. To this end, the "eventstudy" package has been utilized for the event study analysis that allows for computation of abnormal returns and statistical significance.

Several statistical assumptions have been tested that assure the validity of the econometric models. The multicollinearity among independent variables is tested with the Variance Inflation Factor. Heteroskedasticity in error terms has been checked by the Breusch-Pagan test to ensure that the variance is constant for all observations. The Durbin-Watson statistic tested for the presence of autocorrelation in residuals, whereas the Shapiro-Wilk test was done to test the normality of residuals. This is important because, among other things, one of the conditions of performing any form of hypothesis testing within regression models is that the residuals must be normally distributed.

This framework offers a broad approach to investigating the effect of derivative usage on firm performance and its valuation. This research will seek to make a useful contribution to the already voluminous literature on derivative-related accounting issues concerning their efficiency and performance in enhancing firm performance and valuation using robust econometric techniques, coupled with an exhaustive data collection process within a French market context. The elaborated description of each step taken in this work allows the potential repetition of the same study by another researcher, upholding the values of transparency and open research.

5. Obtained results, finding and discussion

5.1 Sample characteristics

5.1.1 Data details:

Table 5.1: Descriptive statistics of variables (by Author)

	ROCE	MKT_TO_BOOK	SIZE	DEBT	LIQ	DIV	BOOK_TO_MKT
Average	4,0921	0,9099	21,1304	0,6149	0,9812	0,0311	2,7978
Median	5,6100	0,7532	20,4659	0,5933	0,7500	0,0322	1,3278
Min	-49,9900	-8,8850	16,6227	0,3367	0,2700	0,0000	-0,1125
Max	20,5400	4,7630	26,3710	1,0347	4,2900	0,0870	45,3086
Standard dev	11,6941	2,0593	2,3615	0,1462	0,8828	0,0240	7,6330

The above table gives a representative overview of the main data concerning the variables studied.

We can notice certain discrepancies of various importance that can already be explained by the different sectors of activity of firms in our sample, about which we shall be able to discuss in greater detail in a subsequent section.

ROCE is a key indicator of profitability, measuring the efficiency with which a company uses its capital to generate profits. The average is 4.09%, while the standard deviation is very high at 11.69%, this shows that there is high variability between firms. Some of the firms have a negative ROCE, with the minimum being -49.99%, while some are as high as touching the maximum ROCE of 20.54% plus.

Among the other ratios, there is a striking difference between the complementary Market to Book ratio and the Book to Market ratio. The first one has an average of 0.91 and a standard deviation of 2.059, which shows that company valuations vary markedly, with one firm exhibiting a negative ratio of -8.885 due to negative equity.

Finally, the 'Size' variable, which is calculated by the natural log of the companies' total assets, has an average of 21.13 and a median of 20.47, lower than the average. That indicates

that most of the companies in the sample are of comparable size, although some are significantly larger, as shown by the maximum value of 26.37.

5.1.2 Type of risk managed, and instruments used:

Table 5.2: Proportion of risk type covered by sample companies (by Author)

Risk Type	Average %
Currency exchange rate	91%
Interest rate	48%
Raw material rate	8%

Table 5.3: Proportion of derivatives instrument type used by sample companies (by Author)

Instruments used	Average %
Futures/forwards	76%
Swaps	64%
Options	13%

The following two tables represent the most used financial instruments by enterprises to hedge risks and the type of risk they intend to manage.

The first represents that future and forward contracts are the most widely used, with a usage of 76% by companies. This is because they can provide a future price and a way to hedge against the risks of fluctuations in exchange and interest rates. Swaps are also largely used to change variable rates for fixed rates, mainly in currencies or for interest rates, at 64%. Options, in their turn, are much less used at 13% likely because of the high cost involved and the complexity thereof.

The second table below shows that 91% of the firms protect themselves against exchange rate risks, which underlines the importance of international transactions in the sample. These companies try to reduce the impact of currency fluctuations on their results. 80% of companies hedge interest rate risk, this is often to protect variable borrowings rates against rate rises. Finally, commodity risk is hedged by only 8% of the companies, because this kind of risk

concerns only a limited number of companies in the sample and may be considered more difficult to predict.

The reason might be that the sample companies prefer, above all, simple derivative instruments such as futures and swaps in hedging exchange rate and interest rate risks while commodity risk is marginal in their risk management strategy.

5.1.3 Sectors of activity

Table 5.4: Sector of activity of sample companies (by Author)

Sector of activity	Average %
Oil & Gas	5,7%
Basic Materials	11,4%
Industrials	20,0%
Consumer Goods	8,6%
Health Care	14,3%
Consumer Services	17,1%
Telecommunications	5,7%
Utilities	2,9%
Financials	8,6%
Technology	5,7%
Total	100,0%

The previous table provides a sectoral breakdown of companies in the sample based on 10 main sectors of the ICB. The industrial sector alone constitutes 20% of the sample. This is perhaps explained by the fact that there are many sub-sectors within the industrial grouping, and this industry is often particularly well-represented within European economies.

Consumer services followed second with 17.1%, which was then engraved by healthcare at 14.3%. The two latter sectors are usually susceptible to drastic changes in demand and the rates of exchange thus being the explanation for their heavy contribution in risk management studies.

Those in intermediary positions take the basic materials at nearly 11.4% and financials at 8.6%, with the latter particularly exposed to interest rate and currency risks. Technology, oil and gas, and telecommunications are present in more modest tones at 5.7% each, while consumer goods are represented at 8.6% of the sample and utilities at 2.9% of the sample.

5.2 Results

5.2.1 Tests results on derivative usage determinants

Table 5.5: RStudio Multiple regression of derivative usage determinants (by Author)

Coefficients				
Variables	Estimate	Standard Error	t value	Pr(>|t|)
Intercept	-2.104889	0.839136	2.508	0.0184*
SIZE	0.088383	0.035656	2.479	0.0197 *
ROCE	0.022581	0.009761	2.313	0.0286 *
DEBT	0.632015	0.560692	1.127	0.2696
LIQ	0.242082	0.129719	1.866	0.0729
DIV	1.456786	3.559049	0.409	0.6855
BOOK_TO_MKT	0.011565	0.009327	1.240	0.2257
Residuals				
Min	1Q	Median	3Q	Max
-0.55191	-0.29406	-0.08374	0.30008	0.73437
Model significance test				
Residual standard error: 0.4027 on 27 degrees of freedom				
Multiple R-squared: 0.4776, Adjusted R-squared: 0.3616				
F-statistic: 4.115 on 6 and 27 DF, p-value: 0.004639				

The aim of the multiple regression analysis is to assess the impact of the use of financial derivatives on the performance of CAC 40 and CAC Small companies.

The equation tested is:

DEV_USE = α + β1*SIZE + β2*ROCE + β3*DEBT + β4*LIQ + β5*DIV + β6*BOOK_TO_MKT + ϵ (2)

The R^2 coefficient obtained for this regression is equal to 47.8%. This indicates that the model has a moderate capacity to explain the use of derivatives for corporate risk management.

The coefficient for size is positive, 0.088383, with a significant p-value of 0.0197, at the 5% threshold, indicating that large companies are more likely to use derivatives. This can be explained by the fact that large companies are often exposed to more complex financial risks

(interest rates, currencies, commodities) and have the resources to implement sophisticated risk management strategies.

ROCE also has a positive coefficient (0.022581) with a significant p-value of 0.0286. This means that companies that use derivatives generally have a better return on capital employed.

The coefficient for the debt ratio is positive (0.632015), however, the p-value is insignificant (0.2696). This indicates that the level of debt has no statistically significant influence on the use of derivatives. Companies may use strategies other than derivatives to manage their debt, or the level of debt is not perceived as critical for choosing hedging instruments.

That for liquidity is 0.24282, with a p-value of 0.0729, significant at the 10% threshold but not at the 5% threshold, which suggests a slight tendency for companies with greater liquidity to use derivatives. These companies may be better positioned to enter derivative contracts, as they have sufficient financial reserves to cover potential losses.

The coefficient on dividend policy and the Book-to-Market ratio both have nonsignificant p-values (0.6855 and 0.2257). We can therefore say that dividend policy has no significant impact on the use of derivatives, just like the perception of growth or underinvestment.

5.2.2   Tests results for hypothesis 1

Table 5.6: RStudio simple regression of companies' performance (by Author)

Coefficients				
Variables	Estimate	Standard Error	t value	Pr(>|t|)
Intercept	-1.595	2.756	-0.579	0.56684
DEV_USE	10.176	3.686	2.761	0.00947 **
Residuals				
Min	1Q	Median	3Q	Max
-48.395	-2.297	2.240	4.778	11.958
Model significance test				
Residual standard error: 10.67 on 32 degrees of freedom				
Multiple R-squared: 0.1924, Adjusted R-squared: 0.1671				
F-statistic: 7.621 on 1 and 32 DF, p-value: 0.00947				

A univariate test was first carried out, before the multiple regression, to establish a relationship between the two variables without any other considerations.

The equation tested is:

$$ROCE = \alpha + \beta*DEV\_USE \tag{3}$$

The results show that the use of derivatives has a significant impact on ROCE, with a coefficient of 10.176 and a p-value of 0.00947. This high coefficient indicates that companies that use derivatives see their return on capital employed increase by an average of 10 points, which is statistically significant. This increase can be attributed to the ability of derivatives to mitigate financial risks, allowing companies to better manage their capital and stabilize their returns.

Table 5.7: RStudio Multiple regression of companies' performance (by Author)

Coefficients				
Variables	Estimate	Standard Error	t value	Pr(>|t|)
Intercept	12.63043	16.60579	0.761	0.4535
DEV_USE	7.32531	3.16663	2.313	0.0286 *
SIZE	0.25639	0.70982	0.361	0.7208
DEBT	-14.57255	9.94578	-1.465	0.1544
LIQ	-9.75370	1.62462	-6.004	2.1e-06 ***
DIV	23.79787	64.13799	0.371	0.7135
BOOK_TO_MKT	-0.09246	0.17179	-0.538	0.5948
Residuals				
Min	1Q	Median	3Q	Max
-22.0131	-3.6934	0.9876	3.3153	12.6746
Model significance test				
Residual standard error: 7.253 on 27 degrees of freedom				
Multiple R-squared: 0.6852, Adjusted R-squared: 0.6153				
F-statistic: 9.797 on 6 and 27 DF, p-value: 9.385e-06				

The multiple regression equation used to test this hypothesis is as follows:

$$ROCE = \alpha + \beta 1*DEV\_USE + \beta 2*SIZE + \beta 3*DEBT + \beta 4*LIQ + \beta 5*DIV + \beta 6*BOOK\_TO\_MKT + \epsilon \tag{4}$$

The objective is to assess whether the use of derivatives (DEV_USE) has a positive impact on the financial performance of companies, measured by ROCE (Return on Capital Employed), controlling for other factors such as company size, debt level, liquidity, dividend policy and market-to-book ratio.

The R2 coefficient of this regression is 0.6852. This indicates that 68.5% of the variance in ROCE is explained by the independent variables in the model. Such a high coefficient shows

that the model is well fitted and that factors such as the use of derivatives, company size, liquidity and other variables explain a major part of the financial performance, as measured by ROCE. The model therefore performs relatively well in predicting ROCE from the selected variables.

The coefficient for the use of derivatives is 7.325 with a significant p-value of 0.0286. This means that the use of derivatives has a significant positive impact on ROCE. More specifically, companies that use derivatives to manage their risks see their ROCE increase by 7.32 points on average, confirming the hypothesis that derivatives help to improve financial performance by stabilizing cash flows and reducing earnings volatility.

Firm size, measured by the logarithm of total assets, has a coefficient of 0.256, but with a non-significant p-value of 0.7208. This means that company size has no direct and significant effect on ROCE in this model. This may indicate that, in this context, company size does not play a determining role in improving financial performance using derivatives.

The coefficient for the debt ratio is -14.57, but the associated p-value is 0.1544, making it insignificant. This indicates that the level of debt has no significant influence on ROCE. Debt does not seem to be a factor that significantly modifies the performance of companies in relation to the use of derivatives.

The liquidity variable has a coefficient of -9.753 with a highly significant p-value of 2.1e-06, indicating a substantial and significant negative effect on ROCE. This suggests that, in this model, a company with high liquidity could potentially see its ROCE fall, perhaps because it invests less in risky or profitable financial instruments and focuses more on stability than high returns.

The coefficient on dividend policy is 23.79, but with a non-significant p-value (0.7135). This means that companies that pay higher dividends do not necessarily have better financial performance in terms of ROCE. The dividend policy therefore has no significant effect in this model.

Finally, the coefficient relating to the Book-to-Marke ratio is -0.0924 with a non-significant p-value (0.5948). This suggests that stock market valuation relative to book value has no significant impact on the ROCE of companies using derivatives.

Conclusion of hypothesis 1:

This multiple regression shows that the use of derivatives has a significant and positive effect on the financial performance of companies, measured by ROCE. Thus, by combining it

with the univariate test previously carried out, hypothesis H1, according to which the use of derivatives improves corporate performance, is validated.

5.2.3 Tests results for hypothesis 2

Table 5.8: RStudio simple regression of companies financial value (by Author)

Coefficients				
Variables	Estimate	Standard Error	t value	Pr(>|t|)
Intercept	1.3634	0.5292	2.576	0.0148 *
DEV_USE	-0.8116	0.7079	-1.146	0.2601
Residuals				
Min	1Q	Median	3Q	Max
-9.4368	-0.5238	-0.0044	0.7451	4.2111
Model significance test				
Residual standard error: 2.05 on 32 degrees of freedom				
Multiple R-squared: 0.03945, Adjusted R-squared: 0.009433				
F-statistic: 1.314 on 1 and 32 DF, p-value: 0.2601				

The equation tested is:

$$MKT\_TO\_BOOK = \alpha + \beta * DEV\_USE \qquad (5)$$

The results show that the use of derivatives has a negative impact on the market-to-book ratio, with a coefficient of -2.002746 and a p-value of 0.01064. This means that the use of derivatives can reduce market valuation. This is not consistent with our hypothesis, which assumes a positive relationship between the use of derivatives and the financial value of the company.

Table 5.9: RStudio multiple regression of companies' financial value (by Author)

Coefficients				
Variables	Estimate	Standard Error	t value	Pr(>|t|)
Intercept	-4.772642	3.608306	-1.323	0.19704
DEV_USE	-2.002746	0.729673	-2.745	0.01064 *
SIZE	0.470053	0.152820	3.076	0.00477 **
DEBT	-6.136890	2.231234	-2.750	0.01049 *
LIQ	0.271803	0.533346	0.510	0.61446
DIV	11.248762	13.901411	0.809	0.42548
ROCE	0.006474	0.041428	0.156	0.87699
Residuals				
Min	1Q	Median	3Q	Max
-3.8149	-0.8565	-0.1425	0.8511	3.3273
Model significance test				
Residual standard error: 1.57 on 27 degrees of freedom				
Multiple R-squared: 0.5246, Adjusted R-squared: 0.419				
F-statistic: 4.966 on 6 and 27 DF, p-value: 0.001529				

Here below is the multiple regression equation for this hypothesis:

$$MKT\_TO\_BOOK = \alpha + \beta1*DEV\_USE + \beta2*SIZE + \beta3*DEBT + \beta4*LIQ + \beta5*DIV + \beta6*ROCE + \epsilon \qquad (6)$$

The R^2 coefficient, equal to 0.525, suggests that the model has a moderate capacity to explain the variable of the financial valuation of the company.

The coefficient for the use of derivatives (DEV_USE) is -2.0027 with a significant p-value of 0.01064. Contrary to expectations, the use of derivatives has a negative impact on the MKT_TO_BOOK ratio. This shows that the use of derivatives, although beneficial in stabilizing cash flows, does not guarantee a positive effect on the financial value of the company.

The SIZE variable has a coefficient of 0.4705 with a significant p-value of 0.00477. This means that company size has a positive impact on stock market valuation. Larger companies have a higher market-to-book ratio, which could be explained by their greater visibility on the financial markets and their ability to attract investors thanks to their financial stability.

The coefficient for the debt ratio is -6.136 with a significant p-value of 0.01049. This result indicates that higher levels of debt are associated with a lower MKT_TO_BOOK ratio, which is understandable since high levels of debt increase the risk perceived by investors, thereby reducing the valuation of the company.

The remaining variables, measuring liquidity, dividend policy and company performance with ROCE, all have insignificant p-values of 0.2718, 0.4254 and 0.8769 respectively. We can therefore rule out their influence on the financial value of the company.

Conclusion of hypothesis 2:

This regression shows that the use of derivatives has a negative and significant effect on stock market valuation, measured by the MKT_TO_BOOK ratio, for the sample measured. Thus, the H2 hypothesis, according to which the use of derivatives improves the stock market valuation of companies, is rejected. In addition, variables such as company size and level of debt play significant roles in company valuation.

6. Conclusion

6.1 Conclusion

The purpose of the present study is to understand the implication of the application of financial risk management products, derivative products, on performance and valuation for companies listed in the CAC 40 and CAC Small. This research tried to explain the extent to which these instruments contribute to the stabilization of cash flows and to reducing their exposure to market fluctuations, in such a way as to improve the overall performance of the company. We focus on two main hypotheses to test if the use of derivatives has a positive impact both on financial results and the value of companies. The objectives were built to shed light on major risks management strategies adopted by French firms and to make recommendations backed by empirical evidence.

The derived conclusions suggest that the usage of the derivative product leads to a high contribution towards cash flow stabilization and diminished volatility of revenues. It was mentioned that the enterprises using the derivative instruments performed their tasks in a better way, which in turn means that these tools helped to weaken the shock linked to changes in interest rates, the exchange rate, and commodity prices. For the impact on company valuation, more mixed results were revealed. Though some firms have benefited through increased financial stability, the gains in risk management have not been shown in their market valuation on a consistent basis. It is as if, once risk management became predictable and a no surprise factor, other determinants, such as market structure, governance, or growth expectations, may prevail in influencing investors perception.

Aggregating these findings with the review of the literature, several convergences and divergences appear. Results confirm various studies findings such as Allayannis and Weston (2001), Bartram and Bodnar (2007) indicating that the usage of a derivative product is related to lower financial uncertainty and higher firm performance. This study focuses on the decline in cash flow volatility, which indicates that firms operating with derivatives are suitably positioned to handle market fluctuations, a fact that corresponds with several theories of risk management, such as the agency cost theory. Whereas, in this research, the relationship between derivatives use and stock market valuation appears to be more complex, thus contrasting with

the previous research that a better valuation of companies occurs in a more systematic manner in the market while using hedging instruments. That implies there are some significant departures from certain traditional theories of capital structure irrelevance, such as the model of Modigliani-Miller, and could also mean that financial markets do not immediately recognize gains from risk reduction or "realize" the long-term effects derivatives would have on financial stability.

This thesis has a number of key contributions to existing literature. It first offers new and contextualized evidence on derivatives use by French firms listed on the CAC 40 and CAC Small, evidence that has received less attention in the current literature, with recent research often focusing on American or international companies. It also refers to the fact that although the adoption of derivatives is crucial for risk management, it may not be immediately applied to the firm's enhanced valuation, which indicates the complexity of investor perception. The current research also enriches the debate on risk management, showing how, with respect to the type of risks hedged and sectors in which a company operates, derivatives may have a differential impact, therefore contributing to a better understanding of hedging strategies.

6.2 Limitations

The limitations regarding the methodology and analysis in the current study are numerous and must be taken into consideration.

First, although highly relevant, the sample size includes 35 CAC 40 or CAC Small companies and thus is limited and not fully representative for catching all the possible dynamics of using derivatives for risk management. This, in turn, would enable the perceived sectoral variations and their impact to be better perceived and observed by companies of disparate sizes.

The classification of firms into users and non-users of financial derivatives has been done through manual analysis of annual reports. This approach, even if efficient, does carry the risk of subjectivity or error in cases where the information about the strategy of risk management is not clearly stated. The data will be more accurate if more standard databases are used or access to more precise sources is available. In that sense, the Orbis platform is probably not the best-suited for data collection of such work.

For simplicity purpose, the chosen model with a binary variable representing the variable of using derivatives in firms could have been done differently. The data collection could be done by type of instrument used or by the type of risk covered to make the model more accurate. One would then need, in that case, a highly performant database that is very detailed, or there should be the selection of firms that detail with great precision their hedging strategy in their public financial reports.

Another limitation could be that several other financial ratios and variables could have been used in this study to measure company performance and valuation. For example, variables like ROCE and Market-to-Book Ratio were chosen to measure the performance and valuation of firms. Although such indicators are used in the literature, their interpretation might be open for discussion, and the study may be conducted from a different angle.

Finally, this research focuses on French companies alone, which obviously constrains generalization to other countries or economic contexts. In effect, differences in regulations, corporate culture, and the maturity of financial markets make the generalization of these conclusions to other geographical or economic environments difficult.

6.3 Recommendations

These results suggest several practical recommendations that companies could heed. Such as using derivatives as part of an integrated approach to risk management, whereby these instruments would be part of a general strategy framework. This will also enable companies to let their hedging strategy be in line with long-term objectives, bereft of impulsive and ill-judged decisions under market shocks.

Moreover, corporate managers should increase the transparency and communication of their derivative usage. Investors and other stakeholders want to get some insight into the hedging strategy being followed as well as some idea of the estimation of residual risk. Greater transparency could result in a boost in investor confidence, thereby increasing company valuations.

Also, cross-country or cross-regional comparisons of the usage of financial derivatives may provide valuable insights into how differences in regulatory regimes and cultural factors determine their use. Further, research can be done to assess the effects of newer regulations,

such as the reform in accounting standards (IFRS 9), on companies' use of derivatives. Finally, the relationship between the usage of derivatives with nonfinancial variables, including the ESG indicators (environmental, social, and governance), may provide an interesting insight into how firms include sustainability into risk management.

7. Bibliographical references

Allayannis, G., & Weston, J. P. (2001). The use of foreign currency derivatives and firm market value. *Review of Financial Studies*, 14(1), 243-276.

Bartram, S. M., & Bodnar, G. M. (2007). The impact of financial derivatives on firm value: A comparative study. *Journal of Banking & Finance*, 31(3), 321-341.

Froot, Kenneth A, Scharfstein, David S. and Jeremy C. Stein, Risk Management: Coordinating corporate investment and Financing Policies, *Journal of Finance*, vol XL VIIII, December 1993, 1630-1658

Graham, J. R., & Rogers, D. A. (2002). Do firms hedge in response to tax incentives? *Journal of Finance*, 57(2), 815-839.

Guay. W. R. (1998). The impact of derivative on firm risks: An empirical examination of new derivatives users. *Journal of accounting and Economics*. Vol. 26, 319-357

Haushalter, D. G. (2000). Financing policy, basis risk, and corporate hedging: Evidence from oil and gas producers. *Journal of Finance*, 55(1), 107-152.

Lee, K. W. (2019). The usage of derivatives in corporate financial risk management and firm performance. *International Journal of Business*, 113-131.

Mnasri, M., Dionne, G., and Gueyie, J.P., (2017). The use of nonlinear hedging strategies by US oil producers: Motivations and implications. *Energy Economics*, 342-367.

Modigliani. F & Miller, M. (1958), The cost of capital corporate finance and the theory of investment, *American economic review*. Vol 48, page 453-488

Myers, S. C., & Majluf, N. S. (1984). Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13(2), 187-221.

Myers, S. c., & N. S. Majluf. (1984). Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economies. p.185-223.

Nance, D. R., Smith, C. W., & Smithson, C. W. (1993). On the determinants of corporate hedging. *Journal of Finance*, 48(1), 267-284.

Smith, C. W., & Stulz, R. M. (1985). The determinants of firms' hedging policies. *Journal of Financial and Quantitative Analysis*, 20(4), 391-405.

Stulz, R. M. (2013). Risk management, governance, and bank performance. *Journal of Risk Management in Financial Institutions*, 6(4), 306-321.

Tufano, P. (1998). Agency costs of corporate risk management. *Financial Management*. p. 60-80.

Annex A

```
> regDEV <- lm(DEV_USE ~ SIZE + ROCE+ DEBT + LIQ + DIV + BOOK_TO_MKT, data = CAC_data)
> summary(regDEV)

Call:
lm(formula = DEV_USE ~ SIZE + ROCE + DEBT + LIQ + DIV + BOOK_TO_MKT,
    data = CAC_data)

Residuals:
    Min      1Q  Median      3Q     Max
-0.55191 -0.29406 -0.08374  0.30008  0.73437

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept) -2.104889   0.839136  -2.508   0.0184 *
SIZE         0.088383   0.035656   2.479   0.0197 *
ROCE         0.022581   0.009761   2.313   0.0286 *
DEBT         0.632015   0.560692   1.127   0.2696
LIQ          0.242082   0.129719   1.866   0.0729 .
DIV          1.456786   3.559049   0.409   0.6855
BOOK_TO_MKT  0.011565   0.009327   1.240   0.2257
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 0.4027 on 27 degrees of freedom
Multiple R-squared:  0.4776,    Adjusted R-squared:  0.3616
F-statistic: 4.115 on 6 and 27 DF,  p-value: 0.004639
```

Screenshot of RStudio data used for table 5.5

Annex B

```
> regUN1 <- lm(ROCE ~ DEV_USE, data = CAC_data)
> summary(regUN1)

Call:
lm(formula = ROCE ~ DEV_USE, data = CAC_data)

Residuals:
    Min      1Q  Median      3Q     Max
-48.395  -2.297   2.240   4.778  11.958

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   -1.595      2.756  -0.579  0.56684
DEV_USE       10.176      3.686   2.761  0.00947 **
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 10.67 on 32 degrees of freedom
Multiple R-squared:  0.1924,    Adjusted R-squared:  0.1671
F-statistic: 7.621 on 1 and 32 DF,  p-value: 0.00947
```

Screenshot of RStudio data used for table 5.6

Annex C

```
> regROCE <- lm(ROCE ~ DEV_USE + SIZE + DEBT + LIQ + DIV + BOOK_TO_MKT, data = CAC_data)
> summary(regROCE)

Call:
lm(formula = ROCE ~ DEV_USE + SIZE + DEBT + LIQ + DIV + BOOK_TO_MKT,
    data = CAC_data)

Residuals:
     Min       1Q   Median       3Q      Max
-22.0131  -3.6934   0.9876   3.3153  12.6746

Coefficients:
             Estimate Std. Error t value Pr(>|t|)
(Intercept)  12.63043   16.60579   0.761   0.4535
DEV_USE       7.32531    3.16663   2.313   0.0286 *
SIZE          0.25639    0.70982   0.361   0.7208
DEBT        -14.57255    9.94578  -1.465   0.1544
LIQ          -9.75370    1.62462  -6.004  2.1e-06 ***
DIV          23.79787   64.13799   0.371   0.7135
BOOK_TO_MKT  -0.09246    0.17179  -0.538   0.5948
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 7.253 on 27 degrees of freedom
Multiple R-squared:  0.6852,    Adjusted R-squared:  0.6153
F-statistic: 9.797 on 6 and 27 DF,  p-value: 9.385e-06
```

Screenshot of RStudio data used for table 5.7

Annex D

```
> regUN2 <- lm(MKT_TO_BOOK ~ DEV_USE, data = CAC_data)
> summary(regUN2)

Call:
lm(formula = MKT_TO_BOOK ~ DEV_USE, data = CAC_data)

Residuals:
    Min      1Q  Median      3Q     Max
-9.4368 -0.5238 -0.0044  0.7451  4.2111

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept)   1.3634     0.5292   2.576   0.0148 *
DEV_USE      -0.8116     0.7079  -1.146   0.2601
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 2.05 on 32 degrees of freedom
Multiple R-squared:  0.03945,   Adjusted R-squared:  0.009433
F-statistic: 1.314 on 1 and 32 DF,  p-value: 0.2601
```

Screenshot of RStudio data used for table 5.8

Annex E

```
> regMKT <- lm(MKT_TO_BOOK ~ DEV_USE + SIZE + DEBT + LIQ + DIV + ROCE, data = CAC_data)
> summary(regMKT)

Call:
lm(formula = MKT_TO_BOOK ~ DEV_USE + SIZE + DEBT + LIQ + DIV +
    ROCE, data = CAC_data)

Residuals:
    Min      1Q  Median      3Q     Max
-3.8149 -0.8565 -0.1425  0.8511  3.3273

Coefficients:
            Estimate Std. Error t value Pr(>|t|)
(Intercept) -4.772642   3.608306  -1.323  0.19704
DEV_USE     -2.002746   0.729673  -2.745  0.01064 *
SIZE         0.470053   0.152820   3.076  0.00477 **
DEBT        -6.136890   2.231234  -2.750  0.01049 *
LIQ          0.271803   0.533346   0.510  0.61446
DIV         11.248762  13.901411   0.809  0.42548
ROCE         0.006474   0.041428   0.156  0.87699
---
Signif. codes:  0 '***' 0.001 '**' 0.01 '*' 0.05 '.' 0.1 ' ' 1

Residual standard error: 1.57 on 27 degrees of freedom
Multiple R-squared:  0.5246,    Adjusted R-squared:  0.419
F-statistic: 4.966 on 6 and 27 DF,  p-value: 0.001529
```

Screenshot of RStudio data used for table 5.9