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HOW CORPORATE HEDGING AFFECTS FIRM VALUE: EMPIRICAL EVIDENCE FROM EUROPEAN EXPERIENCE

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INTRODUCTION

In a decade governed by volatility and unpredictable changes, companies are exposed to a wide range of risks and compelling forces. As a consequence, corporate leaders feel the growing need to enforce their responsiveness to global dynamics and changes.

The purpose of the thesis consists in investigating the rationale underlying the managerial decision to implement specific risk management strategies and the consequential effects on both firm performance and value. The analysis will start with a review of the theoretical and methodological perspectives on corporate risk management with the purpose of presenting a portrayal of the modern financial theory.

In the theoretical assumption of perfect capital markets, the risk management discipline is considered to be irrelevant in terms of value creation. Indeed, the absence of taxes, agency costs, asymmetric information, costly external sources of finance, direct and indirect costs of bankruptcy, makes a company equally likely to perform well regardless its financing choices and risk management decisions. Over time classical assumptions on risk management discipline have been relaxed giving way to the development of new institutional and economic approaches which incorporate additional analytical elements into the analysis.

Risks are difficult to be measured, but it is critically important to get a handle of them. For that reason, the second chapter provides an insight on how risk can be categorized and effectively manage by enterprises. In this context, an important classification between market and corporate risk needs to be operated. While market risk has an exogenous nature and it arises from macroeconomic factors, corporate risk is endogenous and it is related to characteristics that are distinctive and specific for the single business. The outbreak of the Covid-19 pandemic is an outstanding example of risk that affects all market participants at the same time, regardless the business activity carried out. This kind of risk cannot be avoided therefore, enterprises have felt the growing need to closely monitor their critical risk drivers.

To provide an effective evaluation of the systematic and unsystematic risk components, an analysis of the main models for the measurement of risk will be

carried out and a particular focus will be addressed to the Capital Asset Pricing Model and the Value Risk Chain Model. While the Capital Asset Pricing Model is mainly adopted in the process of systematic risk evaluation, the Value Risk Chain Model is usefully implemented for the measurement of the idiosyncratic risk component. The choice concerning the development of a specific methodological approach provides important information on the way in which decision makers evaluate risk and manage uncertain forces by developing proper risk management strategies.

Depending on the nature of the specific risk source, businesses handle risk by adopting financial or operational hedging programs. The implementation of a financial hedging strategy implies the use of derivative instruments and insurance contracts and it is intended to cover the short-term risk exposures. On the other side, operational hedging offers to companies the possibility to mitigate risk by using operational means and, for this reason, it requires superior levels of capital investment. The purpose of the third chapter encompasses the examination of the rationale underlying risk management and the effect of such decisions on the ultimate value of the enterprise. The risk management discipline is more than the purely activity of reducing corporate risk exposure. Successful firms are those that impute their success not to the decision of avoiding risk, but to the choice of seeking out and take up the right risk.

A company that is able to take advantage of its real growth opportunities and, simultaneously, mitigate and control risk can fully benefit from the enhancing value effect of an integrated risk management strategy. In order to understand the rationale underlying risk management decisions and examine whether a particular correlation or pattern among the set of companies operating in the Euro Area actually exists, an empirical analysis will be conducted.

The information added from the European experience provides an insight on the managerial capability to steer companies towards resilience by developing targeted risk management strategies and corporate models. Regardless of the industry sector and the geographical area in which companies operate, it is possible to identify an explicit pattern underlying risk management decisions.

The specific sectoral view concerning risk, the managerial propensity towards risk-taking activities and the business profile defines the set of peculiarities

existing between companies operating in the Euro area. These features are applied in order to aggregate companies into macro categories and operate a clustering of observations in the light of current events.

CHAPTER 1

THEORETICAL AND METHODOLOGICAL PERSPECTIVES ON RISK MANAGEMENT AND CORPORATE HEDGING

1.1. Meeting the trend of increasing risk and uncertainty

The powerful forces, driving the global transformation and evolution, are changing the physiognomy and features of the world at an unprecedent intensity and speed. In a global environment, characterized by rapid changes and a rising probability of major upheavals, humans feel the growing need to resort to some forms of protection, in order to cope with all the unforeseeable and unexpected dynamics governing the world. [1]

In a decade characterized by unpredictability and constant changes, the analytical distinction between the world of risk and world of uncertainty acquires fundamental importance. The distinctiveness among the concepts, originally outlined by Frank Knight and John Maynard Keynes, has resulted in the affirmation of two strands on the topic.[2] On one side, economists are firmly convinced that the world is governed by computable risk. In other terms, risk can be measured and quantified by monitoring the past and making estimates of calculable probabilities. On the other side, there is a group of economic agents who strongly disagree with this perspective. In particular, they believe that the world is not governed only by risk, but it brings interconnectedness among risk and uncertainty.[3]

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[1] ESPAS, European strategy and policy analysis system, "*2030, Tendenze globali fino al 2030: l'UE sarà in grado di affrontare le sfide future?*", 2017.

[2] LeRoy, Stephen F., and Larry D. Singell. "*Knight on Risk and Uncertainty*." *Journal of Political Economy*, vol. 95, no. 2, 1987, pp. 394–406. *JSTOR*, www.jstor.org/stable/1832078.

[3] J. Katzenstein and Stephen Nelson, *Worlds in collision: uncertainty and risk in hard times,* Stato e mercato, 2011, issue 3, 369-394.

As opposed to risk, uncertainty cannot be measured, because it implies a complete lack of knowledge about the repercussions of unpredictable events on human decisions. In presence of uncertainty, economic actors have to complement the rational approach, normally adopted to make decisions, and take into account also social conventions and technologies in the set of risk management models. The most important decisions are taken under conditions of uncertainty by political and economic agents. Since the presence of risk and uncertainty, requires different choice settings, a deeper analysis about the topic will be carried out.[4]

As outlined above, there are substantial differences between risk and uncertainty. Uncertainty is a wider notion and it refers to the incapability of individuals to determine the likelihood that, a particular event, will occur in the future. The concept of uncertainty regards not only the impossibility for economic agents to define a reliable probability distribution, but it also concerns the difficulty in identifying the range of possible outcomes involved in the casuistry.[5]

Mehr and B.A. Hedges have defined risk as: "*the uncertainty concerning the occurrence of loss*". In the definition, authors stressed out an important conception. They assume that risk is made of two fundamental constituents: the uncertainty about the future and the potential risk of loss.[6] Regarding the first point, risk is linked to a condition of partial lack of knowledge and information in the time to come. This characteristic makes it challenging, for economic agents, to provide an accurate measure of the probability distribution concerning a particular event. As opposed to uncertainty, where individuals do not know the potential consequences of an event, in a risky choice setting economists makes estimates on

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[4] Peter J. Katzenstein and Stephen Nelson, *Worlds in collision: uncertainty and risk in hard times,* Stato e mercato, 2011, issue 3, 369-394.

[5] Peter J. Katzenstein and Stephen Nelson, *Worlds in collision: uncertainty and risk in hard times,* Stato e mercato, 2011, issue 3, 369-394.

[6] Gahin, Fikry S. "Review of the Literature on Risk Management." *The Journal of Risk and Insurance*, vol. 38, no. 2, 1971, pp. 309–313. *JSTOR*, www.jstor.org/stable/251507.

a range of expected outcomes. Indeed, the probability distribution is constructed on the basis of past monitoring.[7]

The second important notion presented in the definition of Mehr and B.A. Hedges, is the possibility of incurring a significant loss of value. Since risk arises as a direct consequence of uncertainty about the future, businesses face risk costs regardless the effective manifestation of danger and hazards. Risk costs can be reduced only if the probability about the concretization of a particular outcome is sufficiently accurate. While frequently occurring events are easily predictable, unexpected losses are more difficult to be determined. Therefore, the existence of risk increases the probability for businesses to experience a potential loss of value and the threat is extended both to the frequency of occurrence and the size of the injury.[8]

Having regard to the definition just analyzed, risk can have very negative impacts and consequences on firms that are exposed to it. When risk occurs, businesses are put in a precarious position between safety on the one hand, but also potential destruction and loss on the other. Although risk can have very negative influences, it is also the reason why businesses are compensated with higher returns.[9] In finance, the notion of risk is quite different from the definition provided by Mehr and B.A. Hedges since it implies a close correlation with compensation. More precisely, risk is defined as the likelihood that the effective return, an investor will receive from an investment, will diverge from the expected one.[10]

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[7] Gahin, Fikry S. "Review of the Literature on Risk Management." *The Journal of Risk and Insurance*, vol. 38, no. 2, 1971, pp. 309–313. *JSTOR*, www.jstor.org/stable/251507.

[8] Gahin, Fikry S. "*Review of the Literature on Risk Management.*" *The Journal of Risk and Insurance*, vol. 38, no. 2, 1971, pp. 309–313. *JSTOR*, www.jstor.org/stable/251507.

[9] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

[10] Gahin, Fikry S. "*Review of the Literature on Risk Management.*" *The Journal of Risk and Insurance*, vol. 38, no. 2, 1971, pp. 309–313. *JSTOR*, www.jstor.org/stable/251507.

Whenever reality deviates from expectations, some kind of risk is generated. However, the effective return that the investor will receive can turn to be higher or lower than the expected one. The former situation is defined "upward risk", while the latter is referred to be a form of "downside risk".[11]

Therefore, risk should not be perceived only in a downward perspective because it embodies not only danger, but also the opportunity to make an extra-profit, if it is managed properly and efficiently. Risk and opportunity are strictly linked concepts, not mutually exclusive. Indeed, higher rewards come with the exploitation of opportunities and the ability of subjects to cope with risk and uncertainty.[12]

Economic agents always need to consider the effect of chance in the process of selecting alternative courses of action. Assuming that risk did not exist, an individual would rationally choose the course of action that gives him the highest payoff among alternatives. Since risk exists and it modifies the expected outcome, economic actors need to consider the potential variability of business activities, when they make decisions. The presence of risk and uncertainty requires the development of different decision-making methods by market actors and economic policy-makers. Since humans operate most of the time in the world of uncertainty, many of their choices are made under conditions of ambiguousness. When uncertainty occurs, the decision maker does not have reliable data about the probability of a particular outcome occurring. Indeed, it is not possible to rely on past observations, because uncertainty encompasses the incapacity of determining the probability that a certain event will happen in the future.[13]

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[11] Aswath Damodaran, *Strategic Risk Taking: A Framework for Risk Management*, Pearson Prentice Hall, Chapter 4, 2 ago 2007.

[12] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

[13] KATZENSTEIN, PETER J., et al. "Mondi in Collisione: Incertezza e Rischio in Tempi Difficili." *Stato e Mercato*, no. 93 (3), 2011, pp. 369–393. *JSTOR*, www.jstor.org/stable/24651026.

The impossibility of having a quantifiable measure, for the determination of uncertainty, makes inevitable the need, for economic agents, to have an analytical toolkit that allows them to operate efficiently in the business environment.

1.2. Risk management and the role of corporate hedging for uncertain times

As uncertainty and risk begin to have an impact on the way in which the business is running, a major level of attention needs to be focused on its management. Risk management has become a developed and well-established practice, used by companies, to have an authentic and transparent awareness about the risk they bear. The discipline of risk management includes the processes of identification, evaluation and control of all the potential threats that could harm the capital and profits of the organization. The process starts with the identification and the assessment of all risks to which a holding is exposed.[14]

Since businesses are vulnerable to a comprehensive risk package, theoretical literature provides different ways through which risk can be categorized. In this context, the financial market operates an important classification. More precisely, it acknowledges the double nature of risk and splits it into two different components: the market and corporate risk.

Market risk, also known as systematic risk, has an exogenous nature and it arises from macroeconomic factors. This type of risk cannot be avoided or diversified away and it affects all market participants at the same time. On the other hand, corporate risk has an endogenous nature. This category of risk can be diversified away, because it is related to specific characteristics that are distinctive and specific for the single business.[15]

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[14] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

[15] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

Economic agents and companies are required to develop diversified managerial strategies and mechanisms depending on the nature of risk source. While market risk is usually managed using financial means, corporate risk requires a different managerial treatment. The core principle, used by businesses to reduce their exposure to firm-specific risk, is the implementation of diversification strategies and other operational hedging programs.[16] The real production and operational activities carried out by businesses can effectively influence their exposure to corporate risk. Compared to the decision of using financial instruments, operational hedging requires higher levels of capital investments. However, the higher costs will be compensated in the long-term horizon because this type of risk solution has the potential to create beneficial effects and competitive advantages for companies.[17]

In the analysis of risk and its assessment, it is required to adopt a double perspective: on the one hand there is the side of investors, who are risk-adverse and use asset allocation to craft risk. On the other hand, there is the perspective of managers who should know how the company will react to a particular protective program that is introduced. The different practical perspective, embraced by the subjects for the management of risk, suggests the presence of several challenges between investors and managers, regarding the entitlement of the subject responsible for making decisions.[18]

From an investor point of view, corporate risk can be easily managed through asset allocation. Indeed, investors tailor their portfolios on the basis of their risk profile, personality and attitudes. More specifically, a subject can decide to be committed in a single investment or, in alternative, put together different investments and create a diversified portfolio. By enlarging the number of investments inside their portfolios, investors are able to manage efficiently

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[16] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

[17] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[18] Aswath Damodaran, *Strategic Risk Taking: A Framework for Risk Management*, Pearson Prentice Hall, Chapter 4, 2 ago 2007.

corporate risk.[19] On the other side, businesses have difficulties in diversifying the risk associated with their firm-specific investments. For this reason, companies have incentives to engage and develop proper risk management programs, in order to reduce their risk exposure and exploit opportunities for future development.

Depending on the specific nature of risk, businesses need to implement customized solutions in order to solve specific corporate risk problems. Generally, risk management is considered to be primarily a defensive and protective move. Indeed, the discipline is often associated with the activity of purchasing financial derivatives with the purpose of reducing specific threats and diminishing the downside effects of all the unpredictable forces outside the managerial control. Nevertheless, risk reduction represents just one piece of a wider discipline.[20]

Risk management should be defined more broadly, in order to include not only the traditional use of financially engineered instruments, but also more forceful resolutions.[21] The array of risk management tools is wide and it embraces also specific real productive and operational activities as means of managing risk. An example of forceful resolution is represented by the discretion of the company to move a specific production activity in another country. Such decision has an impact not only on the systematic risk component (it might change the firm exposure to fluctuations of the foreign exchange rates), but it also affects the corporate risk constituent. Producing a specific production line abroad or carrying out a particular activity in another market means dealing concretely with new

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[19] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

[20] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

[21] Damodaran, Aswath. "Value and Risk: Beyond Betas." *Financial Analysts Journal*, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654.

suppliers, new regulations and workforce. It is not only a matter of risk management decision, but it also implies a strategic choice.[22]

Conversely, the use of financial derivative instruments implies a separation between the implications of risk management processes and the operational activities carried out by the company. The two processes do not communicate with each other. Indeed, the purchase of financial derivatives involves the transfer of risk to a third party without affecting the production line activity.[23] Besides the use of traditional risk management tools like derivatives and insurance policies, the managerial ability to exploit risk and find a potential opportunity of development represents a valuable resolution for companies. Indeed, operational hedging can create a source of competitive advantage in respect of competitors and it has the potential to generate future firm value.[24]

As mentioned in the previous paragraph, the world of the future is characterized by a combination of volatile and unpredictable forces. For this reason, businesses are required to adopt interdisciplinary approaches, able to facilitate their response to major challenges and improve their ability to build resilience. In this context, risk management allows companies to proactively manage the risk they are exposed to, while still complying with their long-term objectives.[25]

The increasing uncertainty should not be regarded as a negative aspect, since it can stimulate innovation and creativity paving the way for different risk solutions and operational strategies. Indeed, the complexity can broaden the spectrum of possible actions and remedies increasing the intensity of social and economic

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[22] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

[23] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

[24] Erik Banks, "*Overview of risk management and alternative risk transfer*", Risk management, Volume III, Valuation, Financial Modeling, and Qualitative Tools, 2008.

[25] ESPAS, European strategy and policy analysis system, "*2030, Tendenze globali fino al 2030: l'UE sarà in grado di affrontare le sfide future?*", 2017.

life.[26] Companies need to go beyond the traditional defensive approach characterizing risk management, and they need to adopt a more aggressive stance toward risk.[27] Indeed, if managerial capabilities are used wisely to implement a proper and efficient risk management strategy, risk can become a source of competitive advantage for the business and it can play an important role in the creation of firm value. [28]

1.3. Modigliani-Miller proposition and corporate hedging theory

The basic logic in corporate finance is that companies have to create value for their shareholders. In particular, businesses should try to grow and increase firm value by managing assets well, investing in good projects and avoiding to put money in bad ones. However, this basic mantra is not simple to be implemented, especially if risk and uncertainty come into the picture.

In the assumption of perfect and efficient capital markets, agents act accordingly to the principle of rationality, regardless their subjective preferences. In this hypothetical context, investment decisions should be delegated to the management team, because managers maximize utility by investing in NPV positive projects. [29] In the case of a sole proprietorship, investment preferences and decisions are aligned because the business is owned and run by the same person. Conversely, corporations and large enterprises have a misalignment

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[26] ESPAS, European strategy and policy analysis system, "2030, Tendenze globali fino al 2030: l'UE sarà in grado di affrontare le sfide future?", 2017.

[27] Ehs an Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[28] Ritesh Jain, Fritz Nauck, Thomas Poppensieker, and Olivia White, "*Meeting the future; Dynamic risk management for uncertain times*", November 17, 2020, Article, https://www.mckinsey.com/business-functions/risk/our-insights/meeting-the-future-dynamic-risk-management-for-uncertain-times

[29] A. Soukup, M. Maitah, R. Svoboda, "*The concept of rationality in Neoclassical and behavioral economic theory*", November 2014, Modern applies science, DOI:10.5539/mas.v9n3p1

between the preferences of owners and investment decisions of managers. In this context, Fisher separation theorem argues that the primary goal of a corporation should be profit maximization, rather than the satisfaction of the several preferences of the ownership.[30]

While managers focus their attention on productive and investment opportunities to maximize firm value, shareholders have different investment preferences and diverging objectives. For this reason, the owners of a company should appoint managers to look after their interests. The creation of a management team, separated from the ownership, enables the company to be run and managed by professionals with different skills.[31] Fisher separation theorem hold another important assumption that is the detachment between investing and financing decisions. This principle laid a foundation for the development of the Modigliani-Miller theorem. [32]

According to Modigliani and Miller, the capital structure of a company and the set of contracts concluded to finance operations do not have a direct impact on the final value of the firm.[33] What increase the worth of a company is the sound management of assets and the scale of investments. For that reason, managers should be concerned only about investing decisions.[34] The proposition of Modigliani and Miller is also known as "*irrelevance theorem*", because it demonstrates the irrelevance of choosing between equity and debt, which are the

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[30] R. Macminn, "*The Fisher Model and financial markets*", January 2005, DOI: 10.1142/9789812700971, Publisher: World Scientific Publishing.

[31] Jason Gordon, "Fisher's separation theorem, 2020 Link: https://thebusinessprofessor.com/economic-analysis-monetary-policy/fishers-separation-theorem-definition

[32] Investopedia, "*What is Fisher separation theorem*?", Link: https://www.investopedia.com/ask/answers/09/fisher-separation-theory.asp

[33] Myers, Stewart C. "Merton H. Miller's Contributions to Financial Economics." *The Scandinavian Journal of Economics*, vol. 93

[34] J. E. Parsons, A. S. Mello, "The M-M Proposition of hedging", Betting the business, Financial risk management for non-financial corporations. Link: https://bettingthebusiness.com/2011/07/26/the-m-m-proposition-of-hedging-2/

two main funding sources of a company. The irrelevance principle applies not only to the entire set of financing contracts, but it also includes the array of risk management tools. Therefore, the core of Modigliani and Miller theorem is that not only capital structure is beside the point in terms of value creation, but the irrelevance can be extended also to the entire risk management world.[35]

In developing their theory, Modigliani and Miller have assumed the presence of perfect capital markets. Without taxes, agency costs, asymmetric information, costly external sources of finance, direct and indirect costs of bankruptcy, a company is equally likely to perform well regardless its financing choices and risk management decisions. Therefore, in perfectly efficient markets does not matter how a company is financed, because its capital structure does not affect the performance. Nevertheless, in the real world, this is not the case and the presence of financial market imperfections and frictions makes risk management an important topic of discussion. [36]

The presence of shared risk and financial market imperfections make companies act in a risk-adverse manner. Risk aversion intervenes whenever individuals make decisions and it is defined as the natural tendency of humans to prefer certainty and the preservation of capital over a risky situation that gives the possibility to gain a higher-than-average return. In this context, risk management represents an important discipline because it offers to enterprises the opportunity to explore the implications of financial constraints and deal with the associated risk.[37] Risk management can have a positive effect on firm value, only if it somehow affects the managerial ability to run the business, to manage company's assets well and

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[35] J. E. Parsons, A. S. Mello, "The M-M Proposition of hedging", Betting the business, Financial risk management for non-financial corporations. Link: https://bettingthebusiness.com/2011/07/26/the-m-m-proposition-of-hedging-2/

[36] S. Titman, "*The Modigliani and Miller theorem and market efficiency*", Working Paper 8641 http://www.nber.org/papers/w8641.

[37] Erik Banks, "*Overview of risk management and alternative risk transfer*", Risk management, Volume III, Valuation, Financial Modeling, and Qualitative Tools, 2008.

execute sound investment strategic decisions. According to this logic, risk management can be considered as an indirect source of firm value.[38]

1.4. The first developments on risk management and the modern portfolio theory

As risk started to have an impact on the final performance of companies, a major level of attention has been placed on its control and supervision. The fact that firms have begun to give greater importance to the risk management discipline contravenes the financial irrelevance theory of Modigliani and Miller. As analyzed in the previous paragraph, the principals of the theorem can be applied to any corporate financing decision, including also the field of corporate risk management. The framework assumes a considerable relevance when it is used for the identification of all the conditions under which the development of a risk management program makes sense. Indeed, the theorem provides the basic tools to examine how managerial choices can create or destroy value over time. However, the positive lecture of the theory, concerning the use of targeted hedging instruments, can be derived only relaxing the classical assumptions on which it is built.[39]

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[38] John E. Parsons, Antonio S. Mello, "*The M-M Proposition of Hedging*", Betting the business: Financial risk management for non-financial corporations, https://bettingthebusiness.com/2011/07/26/the-m-m-proposition-of-hedging-2/#:~:text=Hedging%20can%20only%20increase%20value,that%20is%20difficult%20to%20analyze

[39] Gregor Gossy, "*A Stakeholder Rationale for Risk Management*", Implications for Corporate Finance Decisions, 2005.

Regardless the business sector where activities are carried out, companies are susceptible to a number of risks which have the potential to jeopardize the future development of their actions and operations. Risk occurs whenever the outcome of a particular investment project or activity cannot be determined properly and accurately ahead of time. Investment projects encompass a set of interrelated tasks and activities undertaken by the business with the purpose of achieving specific economic or financial goals. Under certain circumstances the outcome, that is expected from the development of a specific investment project, might not manifest itself because superior forces, outside the control of humans, intervene and modify the process of its realization.[40]

Whenever reality deviates from projections, some kind of risk is generated and the actual return, that the individual effectively receive can turn to be higher or lower than the expected one. The greater the potential deviation in the range of possible outcomes, the greater will be the risk sustained by the company. Considering its inherent nature, risks always need to be taken into consideration in the process of investment evaluation, since they might change the results which the company and the management team have planned. Regardless the favorable or unfavorable outcome which follows, reasonably risk is associated to the inability of humans to predict forthcoming events. [41]

In this context, the ability of managers to select, process and interpretate information is extremely important, considering that a complex and strong linkage between information and power actually exists. The success or failure of companies have been determined by the managerial ability to obtain the necessary knowledge, technical skills and transform them into competitive power and strength.[42] If risk did not exist, humans would simply choose the course of action that will guarantee them the highest payoffs. Actually, risk exists and

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[40] Peter J. Katzenstein and Stephen Nelson, *Worlds in collision: uncertainty and risk in hard times, Stato e mercato*, 2011, issue 3, 369-394.

[41] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

[42] J. Black, "The power of knowledge: How information and technology made the modern world", The wall street Journal, 2014.

intervenes in the selection of outcomes. Therefore, the capability of managers to deal with risk and develop a proper hedging strategy represents a crucial aspect that marks the survival of the business, especially during uncertain and turbulent times. The development of a coherent theory able to conceptualize and operationalize risk, has represented an important achievement which laid the foundation for the modern finance theory. The Markovitz's "Portfolio Selection" work represents the founding basis of the model. The theory is focused on the application of mathematical and computing techniques to practical business scenarios in which risk and uncertainty play a central role.[43]

More specifically, the modern portfolio theory is based on two important concepts:

- The final goal of any investor is the maximization of return in relation to a specific risk level,
- Risk can be easily reduced by investors through portfolio diversification. [44]

The concepts just explained are based on the assumption that investors show resistance and disinclination towards risk taking activities. If individuals are risk adverted, they expect to receive a higher return in response to the risk sustained.[45] The directional relationship between risk and expected return is always positive: the larger the risk, the larger the yield expected by the individual.

Since risk is part of any investment, it should be broken into two components. On the one hand, there is the firm-specific risk that is associated to the features of a single and specific investment and it can be reduced through asset allocation. On

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[43] Harry Markowitz, "*Portfolio Selection*", 1952

[44] Harry Markowitz's Modern Portfolio Theory: The Efficient Frontier. Link: https://www.guidedchoice.com/video/dr-harry-markowitz-father-of-modern-portfolio-theory/#:~:text=Markowitz%20created%20a%20formula%20that,resulting%20in%20the%20ideal%20portfolio.&text=MPT%20works%20under%20the%20assumption,a%20given%20level%20of%20return.

[45] Investopedia, "*How does covariance affect portfolio risk and return*", Nov 2019. Link: https://www.investopedia.com/ask/answers/040315/how-does-covariance-impact-portfolio-risk-and-return.asp

the other hand, market risk cannot be diversified away, since it affects all investments or a larger subset of them. When different investments are put together in the same portfolio, several and multiple drivers will contribute positively to the improvement of the final performance and the reduction of the risk that is specific of the single asset.

Each investment is characterized by a certain level of risk and expected return. If an investor decides to be committed to a single investment, he will obtain only the expected return associated with that investment and he will bear the relative risk. However, if the same investor decides not to concentrate all his wealth in a single investment and he diversifies away the portfolio, the same subject will obtain a great benefit coming from the existence of covariances among alternative investment projects. Indeed, diversification gives investors the opportunity to avoid for free the risk that each single and specific investment would provide.[46]

By enlarging the number of investments, investors are able to draw up and obtain the relationship of the optimal portfolio. The optimal investor's portfolio should provide to investors the maximum possible return considering a specific level of risk or, vice versa, it should have the minimum level of risk given a certain level of return.[47] The efficient frontier is a melting pot that collect all portfolios having these two important characteristics. Portfolios that are positioned below the efficient frontier are sub-optimal because the level of risk sustained by the investor is higher than the return provided. Investors manage risk and tailor portfolios on the basis of their risk profile and attitudes.[48]

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[46] *S*.S. Lim, H. Wang*, The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*, *J*. of Economic Behavior & Org. 62 (2007) 640–656.

[47] Investopedia, "*How does covariance affect portfolio risk and return*", Nov 2019. Link: https://www.investopedia.com/ask/answers/041315/how-covariance-used-portfolio-theory.asp#:~:text=Covariance%20is%20used%20in%20portfolio,relationship%20between%20two%20asset%20prices.&text=Negative%20covariance%20means%20assets%20generally%20move%20in%20opposite%20directions

[48] Cotter, John and Hanly, Jim, "*Hedging: Scaling and the Investor Horizon*" (December 2, 2009). Available at SSRN: https://ssrn.com/abstract=1517115 or http://dx.doi.org/10.2139/ssrn.1517115

In this context, three elements become significant in the process of risk assessment and measurement:

- The standard deviation of all potential investments provides a measure of the volatility in the market and the spread of asset prices from an average value. Risk is defined as the likelihood that the effective return an individual will receive from an investment, will diverge from the expected one. The wider the range of possible outcomes, the greater will be the risk. When the return actually obtained is aligned with the outcome that the individual is willing to attain, an investment is riskless. Investors seek to draw up diversified portfolios in order to decrease the standard deviation that is higher for individual securities.[49]
- The expected return of a portfolio measures the probability distribution to obtain a certain return on investments. The value is affected by the weight of each asset on the portfolio as a whole and it is based on historical returns and, therefore, it is not guaranteed.
- Covariance is a statistical measure used to determine how two or more risky assets move in relation to each other. The statistical tool expresses the strength of the correlation between variables and helps investors to create diversified portfolios. The correlation between variables is defined positive, if assets move in the same direction. Vice versa when variables move in opposite sides, the covariance is defined negative. In the construction of a portfolio that includes a mix of distinct assets, it is important to reduce the overall risk and volatility faced by investors, while they strive for positive rates of return. By including assets with negative covariances, the overall risk and volatility of investments will be reduced. [50]

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[49] Akhilesh Ganti, Gordon Scott, "Efficient Frontier", Link: https://www.investopedia.com/terms/e/efficientfrontier.asp

[50] Investopedia, "*How does covariance affect portfolio risk and return*", Nov 2019. Link: https://www.investopedia.com/ask/answers/040315/how-does-covariance-impact-portfolio-risk-and-return.asp

In his work, Markovitz has addressed the issue of investor portfolio selection as a problem related to utility maximization in contexts characterized by a trend of increasing risk and uncertainty. The concept of risk is closely related to insights of portfolio theory and one of its most important advances is the Capital Asset Pricing Model (CAPM). The model points out that the expected return, an investor will receive from the market, is based of two components: the risk-free rate and the risk-premium. Generally, investors are risk-averse and they are inclined to displace a risk-free investment in exchange for a riskier one, only if the expected return is high enough to deal with the associated risk. In other words, the investor is expecting to receive the return for a riskless investment plus an additional yield. The share of increased value is also known as risk premium and its intent consists in paying back the investor for the additional risk he has faced.[51]

The capital asset pricing model offers a formula for the calculation of the risk premium. In detail, the approach comprises two important components: the quantity of risk that is defined by beta of the investment and the unit price of risk, in other terms the market risk premium. The market risk premium is the average access return that an investor will obtain when he invests into the market as a whole. The risk premium is mean-reverted in the long-term horizon, this means that the access return of the market as a whole is quite stable over time, since it has the tendency to go back to the mean value. [52]

The CAPM represents an extension of the normative mean-variance portfolio model implemented by Markowitz and it is widely used by companies in the process of evaluation of systematic risk. The Markovitz model represents the milestone for the foundation of the modern finance theory and it has resulted in the improvement of new capital market models and rationales that will be analyzed in the course of the next paragraph.

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[51] Harry Markowitz's Modern Portfolio Theory: The Efficient Frontier. Link: https://www.guidedchoice.com/video/dr-harry-markowitz-father-of-modern-portfolio-theory/#:~:text=Markowitz%20created%20a%20formula%20that,resulting%20in%20the%20ideal%20portfolio.&text=MPT%20works%20under%20the%20assumption,a%20given%20level%20of%20return.

[52] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7

1.5. The multiple facets theories in the context of corporate risk management

Considering the increasing centrality that risk has assumed on the deliberative and decision-making process, the discipline of risk management has become a meaningful element incorporated into the strategy of the firm.

The rationale behind corporate hedging is the attempt to improve the control of businesses over risky and uncertain situations, through the use of a comparative set of protective instruments. In addition to designating ad hoc techniques for the control of risk sources, companies can also exploit and take advantage of available opportunities for the creation of additional value.[53]

Depending on the nature of risk source, businesses handle risk and uncertainty by adopting financial or operational hedging programs. On the one hand, insurance policies and derivative contracts offer to companies the possibility to reduce their short-term exposure and transfer systematic risk to third-parties. What needs to be emphasized is that risk is not eliminated or extirpated, but it is simply transferred to the counterparty. Both derivative contracts and insurance policies provide a very similar and comparative set of incentives, but there are substantial differences among these two risk management strategies that will be deepened in the course of the next chapter. [54]

While financial derivatives and insurance contracts have been preferred at the firm level for handling respectively market and insurable risk, operational hedging techniques handle the risk associated with the specific characteristics of the business. The core principle of operational hedging is the implementation of diversification strategies and other operating and investing activities in order to

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[53] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

[54] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

reduce the cash flow variability.[55] Operational hedging requires high levels of capital investments, but it has also the potential to create beneficial effects and competitive advantages for companies in the long-term horizon. The exploitation of opportunities requires good managerial capabilities to deal with risk and uncertainty. Indeed, risk management is not only a matter of being reactive when particular risks or disruptive situations occur, but it also prescribes the achievement of organizational resilience by implementing specific programs aimed at managing risk reasonably. [56]

The first theories about corporate risk management rely on classical ceteris paribus assumptions and do not include into the framework factors like: information and control asymmetry, conflicts of interests among different shareholders, the impact of corporate governance on managerial decisions along with the legal and financial systems. Over time classical assumptions have been relaxed giving way to the development of new institutional and economic approaches which incorporate additional analytical elements into the analysis.[57]

For several years, the financial economic approach to the risk management discipline has been the most exploited model, because it was fruitful in terms of both theoretical and empirical research. This approach is built upon the classical assumptions of the Modigliani and Miller theorem, which states the irrelevance of the financial structure and risk management discipline in terms of value creation.[58]

The theoretical framework, presented in the theory, is characterized by the absence of: taxes, costs of financial distress, information asymmetry and transaction costs. In point of fact, the market does not encounter the stringent and

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[55] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[56] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[57] Karol Marek Klimczak, Ph.D., "*Corporate Hedging and Risk Management Theory: Evidence from Polish Listed Companies*", The Journal of Risk Finance, 2008, Vol. 9 (1), pp. 20-39.

[58] Karol Marek Klimczak, Ph.D., "*Corporate Hedging and Risk Management Theory: Evidence from Polish Listed Companies*", The Journal of Risk Finance, 2008, Vol. 9 (1), pp. 20-39.

tight standards of the hypothetical perfectly and purely competitive markets, which are assumed in the MM theorem.

Actually, markets are imperfect. Indeed, they are characterized by the absence of a full and transparent information disclosure about products and prices, high barriers to entry and exit actually are present and, consequently, significant costs need to be sustained by market participants.[59] The current existence of market imperfections provides the rationales in support of the risk management discipline exploitation. According to Smith and Stulz, the practice of corporate hedging needs to be implemented in response to market imperfections and with the purpose to meet the growing need of companies to address the related deficiencies.[60]

According to the financial economic theory, the most significant reason that supports the adoption of corporate hedging is the capacity to reduce the variability and fluctuations of corporate value. The consequential effect concerning a lower risk of change provides the following advantages to companies:

- A greater debt capacity: Risk management improves the capacity of companies to pay back their debts and it enables firms to borrow more in the time to come. Furthermore, it offers them the opportunity to preserve their debt capacity for future financing needs. [61]

[59] Will Kenton, R. C. Kelly, Investopedia, 2020, Link: https://www.investopedia.com/terms/i/imperfectmarket.asp

[60] Clifford W. Smith, Rene M. Stulz, "The determinants of Firm's Hedging Policies", Journal of finance and quantitative analysis.

[61] Higher debt capacity was positively verified by: Nguyen (2002), Graham and Rogers (2002) and Guay (1999). Bessembinder (1991), Graham and Rogers (2002).

- Progressive tax rate system: the company would be able to reduce the volatility of its pre-tax income in presence of a progressive tax system which imposes different tax rates on the basis of the subjective ability to pay.[62]
- Lower expected costs of bankruptcy: The implementation of a risk management strategy can have beneficial effects on enhancing the reduction of expected bankruptcy costs. Indeed, risk management preserves firm value from unexpected fluctuations and reduce the effects of cash flow volatility. Since the bankruptcy threat is lower, also the cost of capital would be reduced.[63]
- Securing internal financing: Since costs of external sources of finance are higher than of internally ones, risk management offers the chance to reduce investment fluctuations, which would otherwise move the financing decision towards solutions of external nature.[64]

The financial economic approach acknowledges the risk management capability to reduce the degree of volatility on firm value, decrease the risk of default and confer higher debt capacity to companies. Moreover, it tests also for internal financing rationale and supports opportunities for corporate growth. Indeed, the rationale, underlying the financial economic approach, implies a negative relationship between the act to implement a specific hedging strategy in front of a specific risk and the company's exposure to that risk source.

The financial economic theory is constructed on classical assumptions which provide a restricted and limited vision on methodological issues concerning the

[62] Smith and Stulz (1985). The positive effect of hedging on taxes was verified positively by Nance, Smith and Smithson (1993), while other studies verified it negatively (Mian, 1996, Graham and Rogers, 2002).

[63] MacMinn (1987), Smithson and Simkins (2005); McShane et al. (2011); Bromiley et al. (2015); Mikes and Kaplan (2015)

[64] Froot et Al. (1993). Internal financing hypothesis was supported also by Guay (1999) and Geczy et al. (1997), while it was rejected by Faff and Nguyen (2002) and Mian (1996).

wider discipline of corporate hedging.[65] In this context, new models have been developed as a consequence of the growing need demonstrated by businesses to adopt a comprehensive view of all the theoretical and methodological approaches in the field of risk management. More specifically, the agency theory explains how agency issues have an influence on the managerial attitude towards risk taking actions and corporate hedging propensities. In particular, information and control asymmetries are two elements which play a central role in the implementation of corporate risk hedging programs as a consequence, they need to be included into the field of analysis. [66]

The need for implementing specific risk management programs or particular policies, depends on the nature of the risk that the company is facing, its risk exposure level and the managerial attitudes to deal with uncertainty.[67] Differences in risk attitudes are related to the single personality of managers, who respond differently to distinct risk stimuli. Risk aversion intervenes whenever individuals make decisions and it plays a prominent role in leading the judgement.[68] Indeed, risk aversion is defined as the natural tendency of humans to prefer certainty over uncertainty. More precisely, the preservation of capital is preferred over a risky situation that gives the possibility to experience a higher-than-average return. Therefore, the degree of risk aversion has an effect on the typology of investment project appointed and the corporate risk hedging program that the management team decides to implement.

Another topic that has been the focus of many empirical studies and researches is the role played by managerial motivation in the decision-making process and its influence on the development of risk management programs. The assumption that

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[65] Karol Marek Klimczak, "*Corporate hedging and risk management theory: evidence from Polish listed companies*", The Journal of Risk Finance · January 2008.

[66] Karol Marek Klimczak, Ph.D., "*Corporate Hedging and Risk Management Theory: Evidence from Polish Listed Companies*", The Journal of Risk Finance, 2008, Vol. 9 (1), pp. 20-39.

[67] Clifford W. Smith, R. M. Stulz, "*The determinants of firm's hedging policies*", Article in Journal of Financial and Quantitative Analysis, DOI: 10.2307/2330757 · Source: RePEc.

[68] Pankaj Gupta, "*A review of corporate hedging models and their relevance in corporate finance*", Theoretical economics letters, 2017, 102-115.

managerial motivation has an effect on the decision to implement specific risk management programs has involved the delineation of different lines of thought. In this context, a negative response, about the correlation of motivation and risk management decisions, was strongly supported by Mac Crimmon and Wehrung in 1990, Geczy in 1997 and afterward by Faff and Nguyen in 2002. On the other side, positive evidence regarding the influence of managerial motivation on investing and corporate hedging choices was strongly sustained by Tufano (1996) in his analysis of the gold mining industry in the US.[69]

Agency theory offers a unique insight about risk, managerial incentives information and control asymmetry. First and foremost, agency risk needs to be properly defined, in order to provide the appropriate instruments to carry on the analysis. Agency risk arises whenever a subject appoints a third-party to act in his behalf. In the present case, the former character is also known as the principal, while the second one is called the agent. The agent should always carry out activities, which meet the best interests of the principal. Nevertheless, in certain circumstances the interests of the principal are not aligned with the preferences of the agent. This misalignment of incentives between the principal and the agent is the beating heart of the agency theory. The agency problem arises from the fact that principals do not have a complete control over agents all the time. That explains the reason why the agent sometimes does not act in the best interest of the principal. The lack of information and control over the set of activities, carried out by the agent, represents a key feature around which the agency problem revolves. [70]

Inside the corporate environment, the characters of the principal and the agent are embodied in the respective figures of the business owner and the management team, which represents the body responsible in making decisions to run the business. The separation between the management team and ownership, typically characterizing corporations and large companies, determines the possible

[69] Karol Marek Klimczak, "*Corporate hedging and risk management theory: evidence from Polish listed companies*", The Journal of Risk Finance · January 2008.

[70] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

mismatch of interests and ultimate objectives between the two subjects involved. In this context, risk management may offer a solution to the agency problem and supports companies in the detection of situations where agency risk is high and needs to be managed.

According to De Marzo, Duffie (1991) and, few years later, Breeden and Viswanathan (1998), companies dealing with high information asymmetry should implement appropriate risk management programs in order to control the agency problem.[71] In contrast with findings supported by De Marzo and Duffie, authors like Geczy, Minton and Schrand have taken a different position about the topic. In particular, they have claimed the need of company's owners to design and implement appropriate structures and organizational models, in order to prevent self-interested behaviors from the managerial side. According to their perspective, information asymmetry can be controlled using institutional ownership. [72]

The different approach, supported by Geczy, Minton and Schrand concerning the treatment of corporate hedging, has resulted in the delineation of a new methodological approach, also known as institutional economic theory. The main feature characterizing the model is represented by the inclusion and scrutiny of the governance processes and institutional arrangements, as elements guiding the process of corporate hedging implementation. In particular, the theory provides an analysis of the way in which institutions modify the available set of choices in response to changes in the surrounding environment.[73]

The institutional economic theory encompasses a multi-dimensional approach and it offers an alternative explanation to corporate behavior. As opposed to the traditional neoclassical theories, which embrace the concept of utility maximization, the new approach to corporate hedging includes into the field of

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[71] Also, Dadalt, Gay and Nam (2002) have examined the capacity of corporate hedging to reduce information asymmetry. They have supported the thesis carried out by De Marzo and Duffies.

[72] Karol Marek Klimczak, "*Corporate hedging and risk management theory: evidence from Polish listed companies*", The Journal of Risk Finance · January 2008.

[73] Williamson (1985), Klein (1983) and Barzel (1982) have taken a similar position.

analysis additional analytical elements like: the corporate governance structure, the market, institutional and foreign investor's evaluations.[74]

Corporate governance is defined as the system of rules, practices and processes by which a company is directed and controlled. The rules of corporate governance are based on both laws and regulations in the legal framework of the country in which the company operates. Different legal systems protect capital providers in distinct ways. Consequently, the surrounding system exerts an influence over the decision of managers on how to run the business and whether it is necessary to implement specific corporate hedging programs. A strong ownership concentration and weak protective systems of shareholder's interests, could exert a negative influence on the process of investment evaluation carried out by local and foreign investors. Since corporate governance has an impact on the broader framework of corporate hedging, the analysis needs to be amplified in order to include this additional element into the field of investigation.[75]

Also, the financial and legal system exert an influence on the decision-making process concerning risk management and the choice to employ specific corporate hedging instruments. As the barriers to trading on global level have dropped and companies have started to expand their field of action, the focus of managers has shifted towards market and country risk. How it will be deepened in the course of the thesis, emerging markets are characterized by unique challenges as opposed to well-developed markets. Their complexity is related to the short history of these economies, the scarcity of data and quality of information disclosure.

A modest reporting quality of information leads to a growing information asymmetry problem which affect not only business owners, but also managers,

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[74] North, Douglass C. "The New Institutional Economics." *Journal of Institutional and Theoretical Economics (JITE) / Zeitschrift Für Die Gesamte Staatswissenschaft*, vol. 142, no. 1, 1986, pp. 230–237. *JSTOR*, www.jstor.org/stable/40726723

[75] Karol Marek Klimczak, "*Corporate hedging and risk management theory: evidence from Polish listed companies*", The Journal of Risk Finance · January 2008.

investors and other stakeholders.[76] Since the exposure to political and economic threats is significant for emerging markets, additional risk is inserted. The exposure to country risk affects directly business operations and managerial decisions, scoring country risk as a critical component that needs to be included into the process of risk management valuation.

Theoretical literature offers different perspectives and methodological approaches about the discipline of risk management and the rationales behind its implementation. The financial economic theory is constructed on classical assumptions which provide a restricted and limited vision on the methodological issues concerning the wider discipline of corporate hedging. An open approach to risk management is required and new determining factors need to be included into the field of analysis.

The contemporary theories concerning risk management fit better with empirical observations, since they acquire elements directly from conceptual and more practical investigations. Particularly, the new institutional economics and agency theory combines with the distinguishing elements of financial economics, form a useful basis to carry out a proper analysis of the risk management discipline and its influence on business performance.[77]

The following chapter will address an in-depth analysis on the double nature of risk, in particular its endogenous and exogeneous components. The purpose of the study entails the delineation of the most appropriate risk management solution to manage efficiently the trend of increasing risk and volatility that characterize the new millennium. Then, the analysis will proceed with the definition of the models employed by companies for the measurement of risk. A particular focus will be addressed to the Capital asset pricing model (CAPM) and the value risk chain

[76] Ayturk, Y., Gurbuz, A.O. and Yanik, S. *Corporate Derivatives Use and Firm Value: Evidence from Turkey*, Borsa Istanbul Review, 16, 108-120, (2016).

[77] Karol Marek Klimczak, "*Corporate hedging and risk management theory: evidence from Polish listed companies*", The Journal of Risk Finance · January 2008.

model (VRC). While the former approach is mainly adopted in the process of systematic risk evaluation, the latter is usefully implemented for the measurement of firm-specific risk. [78]

[78] Developed by Sharpe, (1964), Lintner (1965) and refined by Black (1972).

CHAPTER 2

LEVERAGING RISK MANAGEMENT CAPABILITIES TO DEAL WITH CORPORATE RISK EXPOSURE

2.1) Corporate Exposure and Risk Management Capabilities

Doing business always implies some kind of risk. In order to offer a complete overview of all the potential threats affecting their performance and value, companies should monitor the main sources of danger which intervene throughout their entire life-cycle and influence the whole organizational system. Not all risks that a firm face can be encompassed in a single management system. Indeed, there is a universe of risk categories that must be dealt with specific and targeted management strategies. within this framework, the final purpose of risk management entails the identification and assessment of the main risk sources with the purpose of finding out the most suitable solution. The use of both qualitative and quantitative instruments on the analysis can reveal the potential impact of risk on the budget of projects, the timeline and long-term purposes of the company.[79]

In carrying out their daily activities, businesses are exposed to several risks. The main categories that companies need to cope are: strategic, operational, financial, legal and compliance risks. First and foremost, risk has an impact on the strategic sphere and image of the business. Indeed, the failure to implement a profitable map business, the misalignment with the business plan or the reputational damage are all aspects which exert a negative influence on the image of the company. When risk affects the strategic domain, the business capability to achieve long-term objectives could be compromised.[80]

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[79] Ken lynch, "*Using risk management in your projects*", PM Times 2019.

[80] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7

Risks may affect also the efficiency and effectiveness of operative activities and productive processes carried out by businesses. In particular, the failure to recover from an unexpected disaster or the inability to provide an efficient service are instances of critical factors concerning operational risk. [81]

Risk generates also consequences on the financial sphere of the business. The unfavorable movements and variances of the major market risk sources, for instance the interest rates, foreign exchange rates and commodity prices might jeopardize and harm the financial position of a firm.

Finally, the impact of the legal and compliance risk also needs to be taken into consideration, because it has a direct implication on business processes, the organizational configuration and structure of corporations. For instance, if a company operates in an environment characterized by complex regulation, the risk associated with the misuse of information and the likelihood of changes in tax legislation increase the chance for the business to be exposed to a significant level of legal and compliance risk. [82]

Considering the wide range of risks to which companies are exposed to, managers feel the growing need to develop proactive corporate hedging programs, in order to have the control over risky events and unpredictable forces. Humans have the tendency to consider and evaluate only familiar threats and, consequently, they miss to weigh unfamiliar and relevant sources of disruption. Disruptive forces can entail significant loss in value for even the most successful organizations. Nevertheless, these factors can also create opportunities of future development for those managers who are able to anticipate and manage efficiently their impact on business performance.[83] Often managers monitor only familiar risks and threats, because they have systems in place to measure and assess them. However, the act of relying

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[81] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7

[82] R. Ter Hoeven, C. Kimenai, "*The risk paragraph in the management board's report: good practices*", DELOITTE.

[83] Porter, M., 1985, "*Competitive Advantage: Creating and Sustaining Superior Performance*", The Free Press, New York

on habits and standard measurement instruments lead the team to conduct a far too narrow survey.[84] In order to perceive disruptive forces and include into the field of analysis unscheduled changes, managers need to look for weak signals. More precisely, they should evaluate all macro changes that have the potential to materialize into disruptive forces.

The managerial capability to deal with disruptive risk represents a distinctive and qualitative factor that is necessary for the survival of the business and the acquisition of a larger market share. When a disaster hits the market and threaten all its participants irrespectively, companies that keep serving, when others are not able to do it, will acquire an important competitive advantage. [85] The more recent example of disruptive force is represented by the Coronavirus global pandemic, which has taken a toll on both individuals and companies. The events related to the pandemic outbreaks have caused a widespread lack of productivity, stress, anxiety, and a nationally traumatized workforce. All these factors have increased the extent of risk that companies have to address and cope.[86]

Future always implies a certain degree of uncertainty. Indeed, any company that intends to assert itself in the market on a long-term basis need to cope with risks associated to dynamic environments. Managing risks does not necessarily imply reducing the business exposure to a particular threat, but it rather concerns the activity of weighing up risks against firm profits. A few companies continue to treat the risk management discipline as a cost, rather than a strategic concern.

Nevertheless, the implementation of strong risk management programs and strategies, along with the executive capabilities manifested by the management team, make companies grow faster especially in presence of uncertain and volatile

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[84] Maria Aspan, "*The biggest risk in business right now is grief*", Fortune 2020.

[85] Takashi mitachi, tad roselund, meldon wolfgana "*Taking advantage of risk*", Boston consulting group 2017.

[86] S. Seongyeon Lim, Heli Wang, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Journal of Economic Behavior & Organization Vol. 62 (2007) 640–656

environments. Indeed, the qualification to respond promptly to risky forces can turn disruptive challenges into opportunities to beat competition.

The exploitation of opportunities requires good managerial capabilities to face both risk and uncertainty. The managerial decision to take up risk does not always imply the creation of firm value and competitive advantage. Sometimes, businesses experience the downside effects of taking up risk. This happens when companies are not sufficiently arranged to deal with uncertainty, therefore they turn out to be overwhelmed by the consequences of their programs and decisions.[87] For this reason, managers need to be selective in screening the risks they take up to gain competitive edge and they also need to be sufficiently prepared to deal with the consequences of the programs implemented.

The capability of managers to take up strategic steps in the exploitation of risk is considered to be a fundamental quality in the development of any risk management program. Indeed, the business ability to keep costs under control, be reactive to unpredictable forces and create value are three essential elements for the creation of competitive advantage.[88] Managers need to embrace risk whenever rewards result to be higher than costs.

The benefits brought by a successful exploitation of risk are several:

- The information advantage,
- The knowledge and personal experience of managers,
- The access to resources, and
- The flexibility of the organizational structure.[89]

Information advantage represents a critical and valuable feature, because it creates a strong competitive edge for the company. Having access to certain

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[87] Erik Banks, "*Overview of risk management and alternative risk transfer*", Risk management, Volume III, Valuation, Financial Modeling, and Qualitative Tools, 2008.

[88] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

[89] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

information in advance of other competitors have positive effects on the company, especially during crisis or particularly volatile periods. [90] If an undertaking holds information that other companies do not have, it will have the time to be prepared for what is coming.[91]

Another essential feature is represented by the reaction time. The speed advantage consists on the ability of the business to react quickly to changes. This characteristic gives to the company the ability and capacity to keep serving when other competitors cannot do it.

Also, the personal experience of managers with similar situations, entailing the direct management of risk, represents a distinctive source of competitive advantage that successful risk-taking firms can exploit. Indeed, businesses and managers who have experienced similar risky situations in the past, have the knowledge and the background to rationally exploit particular circumstances for their benefit[92].

The access to resources is another significant feature that gives a considerable competitive advantage to businesses and can mark the gap between survival and destruction. Specifically, the access to resources enables companies to deal with complicated situations which entail devastating effects on competitors. [93] Finally, flexibility and versatility enable companies to dynamically reinvent their business models and strategies according to changes in the business environment.[94]

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[90] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[91] A. Damodaran, "*Strategic Risk Taking: A Framework for Risk Management*", 2007.

[92] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[93] A. Damodaran, "*Strategic Risk Taking: A Framework for Risk Management*", 2007.

[94] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

Risk management is not only a matter of being reactive when particular risks or disruptive situations occur. Risk management implies also the capability of a company to achieve an organizational resilience which results in the managerial capability to continuously anticipate and adjust the business structure and culture, according to the frequent changes of the business world. Risk analysis and evaluation are important tasks of a value-based management, because they help companies to keep a record of all the potential sources of risk and uncertainty existing in the environment and affecting business performance and value. An important widening can be made by taking into account both the systematic and the unsystematic risk components into the field of analysis.[95]

In the following section, an analysis concerning market risk, corporate risk and the relative measurement models adopted for their assessment will be exploited.[96]

2.2) The Double Nature of Risk: The Systematic Component

In carrying out their daily activities, companies face a comprehensive risk package. While some categories of risk are inherent to capital markets and affect all companies, others have an impact on the single performance of the firm. Depending on the specific nature of risk, an important classification needs to be operated between market and corporate risk.

Market risk, also known as systematic risk, is attributable to movements in the market which have the power to affect either negatively or positively the activity carried out by businesses. This risk category has an exogeneous nature and it arises from macro-economic factors that influence the performance of all companies. From the range of risks belonging to this category, a major contribution is exerted by fluctuations of foreign exchange rates, interest rates, inflation and commodity prices. In particular, an increase in the interest rate

[95] A. Damodaran, "*Strategic Risk Taking: A Framework for Risk Management*", 2007.

[96] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

affects negatively all companies operating in the market, albeit at different degrees. Depending on the specific activity carried out, movements in the market affect businesses in different ways. For instance, an economy breakdown will impact negatively all companies, but the cyclical industry will be the most affected sector. [97]

The risk and return model that has been mostly used by companies for the assessment of the systematic risk component is the Capital Asset Pricing Model. According to the approach, the systematic risk component is captured into the beta. Indeed, the coefficient reflects the risk associated with a specific investment and it exhibits the activity of a particular asset in correlation with market volatility. [98]

2.2.1) The Capital Asset Pricing Model and Financial Hedging Decisions

The Capital Asset Pricing Model represents an extension of the normative mean-variance portfolio model implemented by Markowitz and it is widely used by companies in the process of systematic risk assessment.

The capital asset pricing model defines the correlation between the quantity of risk, intrinsic to a particular investment, and the expected return level. As humans are risk-adverse, they expect to obtain a superior return in the face of a higher level of risk sustained.[99] An individual may be inclined to displace a risk-free investment, in exchange for a riskier one, only if the expected return is high enough to face the associated risk. Indeed, a risky investment should provide the same return, guaranteed for a similar and riskless investment, plus an additional returning, also known as the premium. The risk premium is intended to pay back the subject for the additional risk he has faced by investing in a risky asset.

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[97] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7.

[98] Alfonso Novales. Alvaro Chamizo, "*Splitting credit risk into systematic, sectorial and idiosyncratic components*", Journal of risk and financial management, 2 August 2019.

[99] Will Kenton, J. Mansa, "Capital Asset Pricing Model", 2021, Link: https://www.investopedia.com/terms/c/capm.asp

The capital asset pricing model provides a formula for the calculation of the expected rate of return on an asset ER_j, given a specified level of risk.[100]

$$ER_j = R_f + \beta \times (ER_m - R_f)$$

The formula requires the identification of some important components listed below:

- ER_j identifies the expected return on an asset.
- R_f is defined as the return of a riskless investment.
- $\beta \times (ER_m - R_f)$ indicates the risk premium.

The coefficient β assesses the quantity of risk related to a specific investment. In particular, it provides a measure of the risk attached to the asset considered and defines the existing correlation between the market and the related investment. Conversely, the component inside the round parenthesis $(ER_m - R_f)$ reflects the unit price of risk and it describes the risk premium requested by investors for the additional risk they cope. Below each component of the formula will be analyzed with a greater degree of detail.

Capital Asset Pricing Model: The Risk-free rate

The risk-free rate is defined as the return an individual is expected to receive from a riskless investment. In practice, it corresponds to the interest paid on a government treasury bond, that is generally considered the safest investment a company can make. In the common practice, government securities are used for the determination of risk-free rates, because the probability for the government to default on its securities is very low.[101] The risk-free rate has to be defined in the

[100] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7

[101] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

same currency of cash flows considered in the analysis. Furthermore, equivalent terms such as real or nominal values need always to be identified and aligned with terms used in the determination of cash flows.[102]

Capital Asset Pricing Model: The Beta

Beta is one of the most important measures used in the Capital Asset Pricing Model to define systematic risk. Indeed, it effectively reflects the responsiveness of a stock's price in relation to market movements. When the coefficient is equal to one, a positive correlation between the stock and market actually exists. If the stock moves in the same direction of the market, the risk embedded into the security results to be superior in respect of the market risk. Indeed, during a bear market, the volatility on stock would be greater and the loss on securities will have a significant impact. Similarly, as the return on market increases, the yield on securities is expected to be higher in comparison to the market average.[103] Securities are defined aggressive whenever an above than average risk is accepted in pursuit of superior returns with the purpose of achieving a capital growth.

On the other hand, a negative beta is indicator of a lower volatility on stock. In this specific case, securities are defined defensive because they tend to remain stable in value over time, especially during market downturns.

A beta equal to one corresponds to the condition in which the market and stock are perfectly aligned. In other terms, the risk embedded into the investment is consistent with the risk of the market as a whole[104].

Beta is employed to determine the quantity of risk intrinsic into a specific investment. The standard procedure for estimating betas is to regress stock returns against market returns. Assuming that a direct relationship between stock

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[102] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

[103] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7

[104] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

and market return actually exists, the distribution can be graphically traced with a line having the following expression:

$$Rj = a + \beta * Rm$$

Where R_j defines the return on stock and R_m reflects the return on the market. More precisely, R_j measures the volatility of a company's share price in comparison to the market as a whole (R_m). Conceptually β corresponds to the slope of the regression line and it provides a measure of the riskiness inherent the stock. [105]

The direct application of the beta regression method arises some problems. The primary difficulty is related to the current business mix and the leverage taken into consideration. More precisely, the investigated approach considers the business mix and the average financial leverage of the company over the period of regression, rather than the actual and current situation it is daily living. This leads to a backward-looking estimate about risk and a consequential increase of the standard error problem.[106]

Standard error approximates the standard deviation of a statistical sample; indeed, it captures the variation between the mean of a sample and the actual mean of the population. A high standard error indicates that data are more spread out and, consequently, the less likely the sample mean is close to the population mean. When standard error has a significant impact on beta estimation, it is very difficult to determine the reliability of the computational approach. [107]

A possible solution to the regression beta problem is the procedure of changing the parameters used in the estimation and take as a reference point the beta of the industry to which the holding belongs. Consequently, the industry beta should be

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[105] Aswath Damodaran, "*Applied corporate finance*", Fourth edition, Wiley, October 2014, ISBN: 978-1-118-91857-9.

[106] Matthias Schmid , Florian Wickler,Kelly O. Maloney, Richard Mitchell, Nora Fenske, Andreas Mayr "Boosted Beta Regression", April 23, 2013 Link; https://doi.org/10.1371/journal.pone.0061623

[107] Aswath Damodaran, "*Applied corporate finance*", Fourth edition, Wiley, October 2014, ISBN: 978-1-118-91857-9.

adjusted for the operating and financing leverage of the company, in order to define the adjusted beta. The inclusion of the leverage into the computation of beta represents a critical factor in the adjustment process. Indeed, the riskiness is highly dependent on operating activities carried out by the company and the financing sources actually used.[108]

The beta of a levered company does not reflect the financial risk component only, but it also includes the business risk related to its operations. Since levered beta is made of two clusters, having completely different nature, both constituents need to be taken into account in the calculation of systematic risk.

First and foremost, the unlevered beta defines the quantity of risk deriving from operating activities. In particular it is related to the nature of products and services offered by the company to the market. For instance, luxury goods have higher betas than commodities and other basic products. Similarly, cyclical companies hold superior betas in comparison to other businesses, since their earnings are more volatile and fluctuate according to events affecting the entire economy.

The unlevered beta is also affected by the operating leverage of a company. More precisely, the proportion of fixed assets on the total amount exerts an influence on the company's size and structure. For instance, businesses having a greater amount of fixed assets are riskier than similar firms with a greater extent of current assets. Indeed, a significant proportion of fixed assets makes the company cost structure more rigid.[109] The unlevered beta of a specific business can be analyzed against the ones of comparable companies that operate in the same industry. Bu comparing betas, analysts can select the most appropriate coefficient that is representative of the true risk inherent the industry.[110]

While unlevered betas reflect the business risk only, the levered beta includes into the framework of analysis also the financial leverage component. Indeed, the

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[108] P. Fernandez, "*Levered and unlevered beta*", Working paper n. 488, January 2003, IESE Business school.

[109] Aswath Damodaran, "*Applied corporate finance*", Fourth edition, Wiley, October 2014, ISBN: 978-1-118-91857-9.

[110] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

capital structure has an impact on the definition of the value of betas. If a company has a greater proportion of debt in respect of equity, the financing leverage would be higher and consequently the beta. Furthermore, if the company continues to use debt as a funding source, its levered beta could grow up to a value greater than one.

A superior financing leverage would be an indicator of greater volatility on company's stock in respect of the market. High volatility means the price of the stock could swing dramatically in either direction over a short time period. As a consequence, companies raising a great proportion of capital from external sources of finance will be characterized by higher beta levels.[111]

In conclusion, since levered companies struggle both operational and financial risk, the beta needs to be decomposed into these two components. Unlevered betas remove any beneficial or detrimental effects related to firm's capital structure; indeed, they consider only the risk deriving from their operating activities. Therefore, the expected return from operations needs to be calculated on the basis of the unlevered beta, because its value is not influenced by the leverage and financial choices of the firm.

Capital Asset Pricing Model: The Risk Premium

The market risk premium is the additional return a subject is expected to receive for the risk he is taking by holding a critical asset, instead of investing in a risk-free one. Since individuals are risk-averse, they prefer to have the highest possible rate of return in connection with the lowest possible risk level.

A risk-free investment can be displaced in exchange for a riskier one, only if the repayment of the former is high enough to compensate the associated risk. More precisely, a company will be committed to a risky investment, if it would provide the same rate of return for a similar riskless investment plus an additional compensation. Indeed, the supplemental repayment would pay back the subject for the extra risk he faced.[112]

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[111] Adam Hayes, M. Kames, "leverage", march 2021, Link: https://www.investopedia.com/terms/l/leverage.asp

[112] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654. Accessed 24 Apr. 2021.

The risk premium is a function of the expected return on the stock market and it changes with the level of the beta. The Capital Asset Pricing Model provides a formula for the calculation of the risk premium. The expression is indicated below:

$$Risk\ Premium = \left[\frac{E(r_m) - r_f}{sd(r_m)}\right] * \frac{cov\ (r_j; r_m)}{sd\ (r_m)}$$

In the Capital Asset Pricing Model, the value of the risk premium depends on the level of covariance between the return on investment and the return on the market. The ratio that compares the expected excess rate of return and standard deviation of return on the market is also defined Sharpe ratio.

$$S = \left[\frac{E(r_m) - r_f}{sd(r_m)}\right]$$

The Sharpe ratio defines the level of connection between the return on a risk-free asset and the expected return level on a risky one. According to the formula, the equation can be rewritten as follows:

$$Risk\ Premium = SH_r * \frac{cov\ (r_j; r_m)}{sd\ (r_m)}$$

The market risk premium r_m is defined as the average access return that an investor can achieve by investing into the market as a whole. The market risk premium is mean-reverted in the long-term horizon. This means that the return on the market is quite stable over time and it has the tendency to go back to the mean value.[113]

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[113] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

Assuming that the future will reflect the past, the risk premium can be defined historically using prior data. The approach may lose the objectivity of the analysis depending on the period taken as a reference point and the preferred calculation method used. Indeed, it can happen that the output, deriving from the analysis, varies depending on the value assumed by the two variables presented: the beta and the risk-free rate.[114]

When an historical approach is implemented, the result will be an average value of the market risk premium earned by stocks over government bonds. The value calculation will be based on past performance and, for this reason, it will produce the same results in comparison to equivalent indexes considered by analysts. An alternative approach used for the calculation of market risk premium consists in asking to some qualified investors and managers what their expectations about future equity returns are and draw up a resume on the basis of the average results obtained. This approach adopts a forward looking because it extrapolates the market risk premium through escalating future return expectations.[115]

In conclusion, the Capital Asset Pricing Model has been the most used approach for the assessment of the systematic risk component. The model assumes that transaction costs do not exist and individuals have access to the same information sources. Under these assumptions, investors have the possibility to diversify the unsystematic risk component without incurring in additional costs. Therefore, the only risk that companies need to face is the systematic one. The risk premium is a matter of market efficiency and it requires a benchmarking process in order to provide a guideline to companies, define the coverage terms and the relative costs associated to similar organizations. [116]

Since the implementation of a diversification strategy can effectively eliminate the unsystematic risk component, the Capital Asset Pricing Model does not provide a

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[114] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*, www.jstor.org/stable/4480654.

[115] P. Fernandez, "Market risk premium: required, historical and expected", Working paper, IESE Business school.

[116] David W. Mullins, "Does the capital asset pricing model work?", Harvard business school review.

formula for the measurement of corporate risk. However, the restrictive assumptions underlying the model have been viewed with skepticism and new models for the determination and the evaluation of the unsystematic risk component have been developed.

2.2.2) Systematic Risk and Financial Hedging Decisions

According to the specific nature of risk faced by companies, explicit financial and operational hedging programs need to be outlined and implemented. While investors can effectively eliminate corporate risk through portfolio diversification, companies have difficulties in implementing a similar strategy. Even though suppliers and customers can partially diversify their specific risk having multiple transaction partners, it is quite common for a company to be committed to a small number of substantial contracts. As a consequence, companies have the inclination to purchase specific derivative instruments and develop explicit hedging programs, in order to better control and manage the market risk component. In particular, insurance policies and derivative contracts offer to companies the possibility to reduce their short-term exposure and transfer systematic risk to third-parties.[117]

The implementation of a particular corporate hedging program defines a trade-off between the quantity of risk that the business is intended to shift to a third-party and the one it decides to bear. The development of innovative financial instruments has offered to companies the ability to control systematic risk and trade out their individual exposures.

Financial risk management is a set of processes that allows enterprises to control and accurately manage the systematic risk component. The primary sources of market risk are: fluctuations on currency exchange rates and interest rates, changes in the price of commodities and equity. Each risk category requires the implementation of a specific financial hedging strategy able to address and allocate risk efficiently. Over time different approaches have been developed according to

[117] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

business needs and requirements. All facets concerning risk and its management demand the delineation of different procedures.[118]

Among the many theoretical definitions, in the following section financial hedging will be defined in two different ways.

- Corporate hedging as the activity of purchasing insurance contracts in order to deal with risk related to manage property, liabilities and related insurable risks.
- Corporate hedging as the act of holding financial derivatives in order to transfer market risk to a third-party who can bear it more lightly.[119]

Financial Hedging and the Activity of Purchasing Insurance Contracts

Theoretical literature offers different perspectives about the discipline of risk management, nevertheless some studies treat the branch of corporate hedging as the equivalent of acquiring insurance policies. The rationale behind this standpoint is the perception of the business as a set of long-term contracts among different claimholders. More specifically: shareholders, bondholders, employees, suppliers, business partners and customers. [120]

Even if long-term contracts offer the possibility to keep the revenue permanently flowing into the business, they also come with downsides. More precisely, if the relationship with the client falls flat or a key provider fails, the company will be stuck into a deal that is no longer fruitful. Moreover, the firm, having only few stable contracts, will not have developed the flexibility required to replace efficiently the business relation. [121]

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[118] Pankaj Gupta, "*A Review of Corporate Hedging Models and Their Relevance in Corporate Finance"*, Theoretical Economics Letters, 7, pp. 102-115, (2017).

[119] Pankaj Gupta, "*A Review of Corporate Hedging Models and Their Relevance in Corporate Finance"*, Theoretical Economics Letters, 7, pp. 102-115, (2017).

[120] Pankaj Gupta, "*A review of corporate hedging models and their relevance in corporate finance*", Theoretical economics letters, 2017, 102-115.

[121] Marcello Spano, "*Theoretical explanations of corporate hedging*", International Journal of business and social research (IJBSR), Volume 3, No. 7, July 2013.

Since the contracting process implies many inherent risks, companies have matured the need to allocate the risk they are not willing to cope to others. In this context, insurance contracts offer the possibility to transfer the risk to a third party, who has a competitive advantage in bearing it. In this specific case, the third party is represented by the insurance company.[122] Insurance policies are being conceived primarily to offer protection from a number of insurance risks. Some examples are: damages on property, liability settlements or natural disasters like hurricanes, flooding or earthquakes. Insurable risks expose firms to volatility in outcomes and increase the probability to experience a loss in value. The volatility has a downward direction and only in the event of a risky experience, some premiums can be returned to the insured subject.[123]

An insurance policy can be defined as the combination of two distinct moments: the payment of a risk premium from the insured subject and the potential manifestation of the condition, under which the benefit must be paid from the insurer. When a subject decides to insure himself against a specific risk, he transfers a portion of the risk to a third party and he expects to be indemnified if the loss occurs.[124]

In an insurance contract, the risk transferred is always pure in nature. Indeed, the insurer will expect to either have a loss or not a loss. He will experience the loss of the risk premium if the event will not occur. Vice versa, if the risk from which the subject is insured occurs, he will be protected by the insurance contract and he has the right to claim the prize. The insurance policy typically covers a finite number of years and it offers a level of protection set in relation to the risk premium paid by the insurer.[125]

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[122] Marcello Spano, "*Theoretical explanations of corporate hedging*", International Journal of business and social research (IJBSR), Volume 3, No. 7, July 2013.

[123] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

[124] L. Nicholson, "*Derivatives vs insurance*", August 2018. Link: https://medium.com/@larrynic_/derivatives-vs-insurance-3239a640c8ce

[125] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

The practice of purchasing insurance contracts reflects a growing awareness of individuals about risk and it also mirrors the increasing focus of insurers on financial needs of corporations. The act of purchasing an insurance contract offers managers the opportunity to focus their attention to activities which are essential for the creation of firm value. Nevertheless, the insurance contract represents only one of a number of hedging instruments used by companies to manage risk.

In the next section, it will be analyzed another well-developed hedging practice, used by businesses to reduce their level of risk exposure and allocate the financial risk to third parties. More precisely, it will be examined the activity of purchasing and holding financial derivatives. Frequently, the corporate hedging decision to hold derivatives is mistakenly associated with the act of buying an insurance contract. Both insurance and derivatives are widely developed financial hedging instruments employed by firms to reduce risk, but they act in a completely different way. Substantial differences among the two hedging approaches will arise in terms of risk nature, objects and purposes.[126]

Financial Hedging and Derivative Instruments

Depending on the type of risk source, businesses need to tailor their corporate model and adopt the most suitable solution to manage risk properly. From the range of available instruments, derivative contracts are tools widely used in capital markets to manage the systematic risk component.

Systematic risk has an exogenous nature and it arises from macroeconomic factors. Since it is attributable to movements in the market, systematic risk equally affects all businesses. Nevertheless, some enterprises will be more exposed to certain financial fluctuation rather than others, depending on the specific activity carried out. For instance, companies operating in international markets will be more exposed to fluctuations of foreign exchange rates and demand uncertainty. The variability of currencies will affect not only the process of acquisition of raw

[126] Pankaj Gupta, "*A review of corporate hedging models and their relevance in corporate finance*", Theoretical economics letters, 2017, 102-115.

materials and commodities, but also the action of selling the final product to customers. Firms can reduce the exposure to fluctuations of foreign exchange rates by acquiring derivatives, in order to eliminate the negative effects related to adverse oscillation of currencies. [127]

Financial derivatives act in both directions. Indeed, they offer protection against unfavorable market movements like the appreciation of local currency[128], but their use implies also the chance of losing the positive effects deriving from a favorable fluctuation in currency. [129]

As the name suggests, derivatives are financial instruments that derive their value from the performance of an underlying asset.[130] Companies, which are holding risky assets, have the opportunity to transfer the market risk component to a third-party without affecting the firm's optimal pricing and production activities. In other words, risk can be separated from the asset value and be sold for a specific price in the capital market in return for a protective custody.[131]

A derivative contract presupposes an agreement between two parties to buy or sell a certain asset in the future, under predetermined terms and conditions. The party and counterparty involved in the contract have always opposite positions. The counterparty of a hedger will be inevitably a subject who is expected to have either a loss or a potential gain. Like insurance contracts, financial derivatives allow the

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[127] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[128] The appreciation of local currency, increases the costs of export. Since foreigners will find local goods more expensive because of the appreciation of nation's currency, the number of goods exported will be lower. Vice versa imports will be cheaper.

[129] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[130] CFI, Financial Derivatives, Link: https://corporatefinanceinstitute.com/resources/knowledge/trading-investing/derivatives/

[131] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

hedger to transfer the risk he is not willing to bear and take on other kind of risks that the same subject is more suitable to cope. What needs to be emphasized is that risk is not eliminated or extirpated, but it is simply transferred to the counterparty.[132]

Both derivative contracts and insurance policies provide a very similar and comparative set of incentives, but there are substantial differences among these two risk management tools. An insurance contract transfers risk to third parties and it requires the compliance with fundamental norms and terms specified in the policy. In this case, the risk transferred is pure in nature and the insurer expects to either have a loss or not a loss. On the other side, the subject who decides to stipulate a derivative contract can limit the downside risk and enjoy all the upside potentials in the occurrence of the event from which he is protected. In derivative contracts, the risk is not pure in nature like in the case of insurance policies, but it is speculative.[133]

The third party involved in the derivative contract decides to sustain the risk and, in return, he expects to have a loss, not a loss or even a gain. The resulted loss or gain will depend on fluctuations in value of the underlying assets during the contractual terms. The hedger could lose a portion of the investment if the price of the underlying asset will turn to be on his head at the end of the contractual terms. In the opposite case, the hedger will have a potential gain if the risky event, from which he is protected, will occur. Both derivative and insurance contracts are hedging tools deeply used to mitigate the financial risk component, but they have substantial differences in terms of risk nature and motives of the buyer. With

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[132] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[133] L. Nicholson, "*Derivatives vs insurance*", August 2018. Link: https://medium.com/@larrynic_/derivatives-vs-insurance-3239a640c8ce

insurance policies the risk is pure in nature and the buyer never expects to have a gain like in the stipulation of derivative contracts.[134]

The increasing demand for the purchase of derivative contracts by corporations comes from the ability of these instruments to transfer the risk of the market to third parties. To determine the strong attractiveness of financial derivatives is the possibility to deal with: interest rate risk, foreign exchange risk and commodity price risk. The range of derivative instruments that companies can use for hedging purposes is wide in order to suit all business needs and deal with different categories of market risk. [135]

The broad class of financial derivatives include instruments like: futures, forwards, swaps, options and other complex combinations of them. Future and forwards are financial devices widely used by companies to trade assets in the future at a predetermined price. Generally, futures are used to protect the business from fluctuations linked with the price of commodities and special metals. Then, swaps imply the exchange of cash flows on the basis of a notional amount. The purpose of swaps consists in offering protection to the business against the risks related to the interest rate.[136]

Finally, options are financial instruments which imply the choice to buy or sell the asset at an agreed price in the future. Unlike other derivative categories, options shall not be binding on the contracting parties. Actually, options give to subjects the

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[134] L. Nicholson, "*Derivatives vs insurance*", August 2018. Link: https://medium.com/@larrynic_/derivatives-vs-insurance-3239a640c8ce

[135] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

[136] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

opportunity to delay and adjust their investing and operating decisions over time according to market fluctuations as a response to uncertainty[137].

Financial hedging acquires importance in the management of short-term business exposures, since systematic risk is contingent on asset prices. Among the wide set of financial derivative instruments which undertakings have at their disposal, swaps and forwards are the largest derivative category used by notional amount. The rapid growth of derivatives and the related markets, have led to an emphasis on the risk management discipline as a key function of corporate finance.[138]

2.3) The Double Nature of Risk: The Unsystematic Component

In frictionless capital markets, the systematic risk component solely acquires significance in the evaluative process of alternative investment assets. Nevertheless, the exclusive analysis of the systematic part is not sufficient to provide a complete overview of all the potential threats affecting business performance and value. As a consequence, companies have to monitor the main sources of risk which intervene throughout their entire life-cycle and influence the whole organizational system. Since idiosyncratic risk subsists and affects firm's performance, it is necessary to determine the extent of its impact on the managerial ability to run the business properly, manage company's assets well and execute sound investment decisions.[139]

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[137] A. Farley, K. Schmitt, "Derivatives vs options: What's the difference?", March 2021, Link: https://www.investopedia.com/ask/answers/070615/what-difference-between-derivatives-and-options.asp

[138] Neil A. Doherty, "*Integrated risk management: Techniques and strategies for reducing risk*", McGRAW-HILL, INC.

[139] C. Florackis, A. Kanas, A. Kostakis, S. Sainani, "*Idiosyncratic risk, risk-taking incentives and the relation between managerial ownership and firm value*", European Journal of Operational Research 283 (2020), 748-766.

As companies have to bear not only systematic risk, but also the idiosyncratic component as well, the inclusiveness of additional analytical elements into the model of economic decision-making needs to be outlined and properly delineated.[140]

Idiosyncratic risk has an endogenous nature, since it is associated to specific characteristics that are distinctive of the single business. Considering its native essence, this risk component can be easily managed by firms through asset allocation and diversification strategies. Nonetheless, companies have difficulties in implementing efficiently diversification programs, since they are usually committed to few and substantial contracts with their providers and business partners. [141]

In order to define the impact of the unsystematic risk component, specific instruments and tools need to be properly defined. By focusing on the systematic risk solely, investment decisions should be taken accordingly to the asset mix and the exogeneous relationship interesting different risk sources. As opposed to market risk, the nature of the correlation existing between idiosyncratic risk sources is purely endogenous. Endogeneity exerts an influence over covariance and it is determined by the set of decisions taken by the management team to run the business and govern the company as a whole.[142] Considering the different nature of risk sources, the systematic and unsystematic component should be assessed individually for the purpose of capturing the magnitude of their impact on the

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[140] PANOUSI, VASIA, and DIMITRIS PAPANIKOLAOU. "Investment, Idiosyncratic Risk, and Ownership." *The Journal of Finance*, vol. 67, no. 3, 2012, pp. 1113–1148. *JSTOR*, www.jstor.org/stable/23261335.

[141] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[142] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

overall firm performance and value. Ergo, distinct evaluative approaches need to be formulated in the light of this basic distinction. [143]

The Capital Asset Pricing Model, generally adopted to measure the systematic risk component, provides significant inputs and suggestions for the implementation of a new evaluative model related to the assessment of the unsystematic risk cluster. The adoption of a risk-return approach represents a focal point in the value assessment process, because it enables managers to compare the level of risk, related to specific investments with the expected return. Conversely, the application of a purely risk-level measurement approach would make it difficult for managers to assess the magnitude and the extent of risk contamination on the overall company's performance.

The capital asset pricing model offers to managers a benchmarking process empowering them to compare the level of risk effectively sustained with a competitive and tolerable one.[144] Generally, the return that is envisaged from the decision maker should be greater enough to offset the disutility caused by the variance on return values. Another important input provided by the system is the perspective adopted in the field of analysis. While many of the standard financial researches adopt a backward approach, the evaluation system, implemented for the measurement of unsystematic risk, requires a forward-looking pattern. Indeed, the capacity of the company to manage efficiently corporate risk and obtain a return on investment can be observed only looking at the long-term horizon.[145]

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[143] Alfonso Novales. Alvaro Chamizo, "*Splitting credit risk into systematic, sectorial and idiosyncratic components*", Journal of risk and financial management, 2 August 2019.

[144] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[145] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

The evaluative model needs to be improved with the inclusion of the unsystematic risk component into the input set. According to Lintner's seminal work, the accounting system offers the opportunity to use measures and indicators to perform effectively the analysis aiming to assess the impact of risk on return values. Specifically, the risk component is incorporated on margin to capital ratios depicting the input-output relations which represent the basis of the financial analysis.[146]

The actual existence of market imperfections, along with the influence exerted by corporate risk on the final performance and firm value, make companies and managers act in a risk-adverse manner. Generally, decision makers behave on their own probability distribution of return values: for a given level of risk, they expect to obtain a specific rate of return.[147] In order to keep track of the risk aversion tendencies and preferences of rational decision makers, a certainty equivalent approach is implemented. Indeed, the certainty equivalent is defined as the guaranteed amount of money that makes an individual neutral in terms of choice between a risk-free investment and a risky cash flow.[148]

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[146] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[147] M. Pelster, "*Marketable and non-hedgeable risk in a duopoly framework with hedging*", J Econ Finan (2015), DOI 10.1007/s12197-013-9273-z

[148] Hershey, John C., and Paul J. H. Schoemaker. "Probability versus Certainty Equivalence Methods in Utility Measurement: Are They Equivalent?" *Management Science*, vol. 31, no. 10, 1985, pp. 1213–1231. *JSTOR*, www.jstor.org/stable/2631711.

In order to assess the value generated by a firm and provide a measure about the risk sustained, the value measurement technique represents an optimal theoretical solution adopted by corporations.[149]

Investment projects are evaluated on the basis of their capability to generate cash during the time horizon. To incorporate the time value of money into the analysis, each cash flow generated by investment projects is discounted for the remuneration. The discount rate k, used to obtain a measure of the value, examines the level of risk that the company is facing by purchasing the specific asset. In other words, the value of the risky investment is computed by discounting the expected cash flow of the asset over its life at a risk-adjusted discount rate.[150]

The following formula is representative of the net present value of a general investment:

$$NPV = \frac{E(CF_1)}{(1+k)} + \frac{E(CF_2)}{(1+k)^2} + \frac{E(CF_3)}{(1+k)^3} \dots + \frac{E(CF_n)}{(1+k)^n}$$

This approach is important from a practical point of view, because it evaluates companies in an efficient way and take into consideration their capability to create value during time.[151]

An increase in value represents a positive signal which reflects the managerial capability to create additional worth for the firm according to its risk threshold level. The same principle is applied in the opposite case. A reduction in value is

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[149] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[150] Aswath Damodaran, "*Applied corporate finance*", Fourth edition, Wiley, October 2014, ISBN: 978-1-118-91857-9.

[151] A. Damodaran, "*Strategic risk taking: a framework for risk management*", ISBN 978-0-13-199048-7

representative of the incapability of managers to generate value in front of the risk sustained.[152]

Considering the complexity of the topic and the challenging brought by maturity, some basic assumptions need to be established. First of all, the time horizon will be overcome and a steady status of the company will be assumed in order to simplify the model and the consequent calculations.

$$W = \frac{E(CF)}{k}$$

All major investment project decisions should be evaluated on the basis of future cash flows. Since forecasted cash flows reflect an estimation of the future value that the decision-maker is expected to obtain by investing in a specific activity, a discrepancy between the expected and realized value actually exists. This difference in value presupposes the presence of a certain degree of risk and uncertainty in the evaluation process. [153]

In order to purify the realized value from the probability distribution on returns, the risky cash flows can be turned into a certain equivalent. The certainty equivalent is defined as the certain value of cash flow that is equally attractive as the forecasted and uncertain one. Certainty equivalent makes the individual neutral in terms of choice between a risk-free investment and a certain cash flow. The certainty equivalent approach always deals with risk factors and its value is inherently lower than the respective risky equivalent.[154]

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[152] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[153] Aswath Damodaran, "*Applied corporate finance*", Fourth edition, Wiley, October 2014, ISBN: 978-1-118-91857-9.

[154] Zhiqiang Zhang, "*Certainty Equivalent, Risk Premium and Asset Pricing*", Higher Education Press and Springer-Verlag 2010.

Indeed, risky future cash flows are expressed in terms of certain cash flows that individuals are willing to accept.

The certainty equivalent is a threshold of the expected cash flow. For that reason, its value is smaller than the corresponding return that is expected from the cash flow. Therefore, the difference between the expected value and the certainty equivalent, that represents the guaranteed value without risk, is defined as the risk equivalent.[155]

$$Risk\ Equivalent = E(CF) - CE(CF)$$

The Certainty Equivalent is a method of risk analysis which evaluate the return on risky assets in terms of return on a risk-free rate investment that would be its equivalent. The certainty equivalent of a risky cash flow will provide the same expected utility of a similar investment without the occurrence of risk. Indeed, an individual would be indifferent in the process of making decision between a risk-free investment and the certainty equivalent of a risky cash flow. [156] Looking at the formula explained above, $E(CF)$ reflects the expected cash flow produced by the risky asset in the future and $CE(CF)$ is the value guaranteed by the investment when risk does not occur. Since E(CF) reflects the expected level of cash flow and it can diverge from the real value realized, a parameter of variability needs to be included into the formula. [157]

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[155] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[156] Hershey, John C., and Paul J. H. Schoemaker. "Probability versus Certainty Equivalence Methods in Utility Measurement: Are They Equivalent?" *Management Science*, vol. 31, no. 10, 1985, pp. 1213–1231. *JSTOR*, www.jstor.org/stable/2631711.

[157] Hershey, John C., and Paul J. H. Schoemaker. "Probability versus Certainty Equivalence Methods in Utility Measurement: Are They Equivalent?" *Management Science*, vol. 31, no. 10, 1985, pp. 1213–1231. *JSTOR*, www.jstor.org/stable/2631711.

Risk is defined as the uncertainty related to the concretization of a potential deviation in value. Whenever a risky event occurs, the effective value realized can turn to be higher or lower than the expected one. The main purpose of the risk equivalent is to capture the probability distribution of cash flow value which contemplates this element of volatility.[158]

The certainty equivalent specifies the probability of cash flow's actualization and demarcates a level of the expected value. As defined in the formula, the certainty equivalent value is obtained by multiplying the certainty equivalent coefficient p by the expected value:

$$Certainty\ Equivalent = CE(CF) = p * E(CF)$$

The certainty equivalent approach converts expected cash flows into guaranteed ones by defining the probability of their occurrence. Into the formula, p is defined as the certainty equivalent coefficient which represents the cumulative probability under standard normal distribution. The current method used to get the value of the certainty equivalent is an experience-based estimation.[159]

More specifically, a certainty equivalent coefficient is determined on the basis of the correlation between the expected return and the associated level of risk, adjusted for the probability of not receiving the planned and foreseen value. In order to

[158] Hershey, John C., and Paul J. H. Schoemaker. "Probability versus Certainty Equivalence Methods in Utility Measurement: Are They Equivalent?" *Management Science*, vol. 31, no. 10, 1985, pp. 1213–1231. *JSTOR*, www.jstor.org/stable/2631711.

[159] Hershey, John C., and Paul J. H. Schoemaker. "Probability versus Certainty Equivalence Methods in Utility Measurement: Are They Equivalent?" *Management Science*, vol. 31, no. 10, 1985, pp. 1213–1231. *JSTOR*, www.jstor.org/stable/2631711.

obtain the certainty equivalent value, the coefficient should be multiplied by the expected value that is formally projected by the decision maker. [160]

The probability p exhibits the computation of the threshold level on the expected cash flow and it presupposes a value between zero and one. The certainty equivalent coefficient reaches its minimum value of zero and maximum level of one according to the level of the certain forecasted cash flow value and the influence played by two fundamental factors: the volatility of the forecasted value and the time horizon.[161] When the volatility, captured by the standard deviation of the relative change of forecasted value, is equal to zero the cumulative probability under standard normal distribution will be 0,5. In this specific case, the value of the expected cash flow will converge with its certainty equivalent, indeed expectations are equally diverted both upside and downside. In the opposite case scenario, standard deviation tends towards infinite. In that event, the probability under standard normal distribution will be equal to 1. The model demonstrates that the larger the volatility, the greater the risk equivalent and, consequently, the smaller the certainty equivalent.[162]

The certainty equivalent is based on a bottom-up approach that discover investment values without the need to collect huge amounts of data from financial

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[160] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[161] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[162] Zhiqiang Zhang, "*Certainty Equivalent, Risk Premium and Asset Pricing*", Higher Education Press and Springer-Verlag 2010.

markets. In compliance with Lintner's seminal work, this approach gives the possibility to use the accounting system as the basis for the calculation of investment values.[163] As defined in the previous formulas, the value of a risky investment can be estimated by discounting the certain amount of cash flow generated by the asset over its entire life by using the risk-free rate instead of the risk adjusted discounting rate.

Assuming that a risky asset has a determined n life, its value can be determined as follows:

$$W = CE(CF) = \frac{CE(CF_1)}{(1+r_F)} + \frac{CE(CF_2)}{(1+r_F)^2} + \frac{CE(CF_3)}{(1+r_F)^3} \dots + \frac{CE(CF_n)}{(1+r_F)^n}$$

The maturity time, at which the forecasted value occurs, play an important role in the definition of the certainty equivalent coefficient and the relative risk component.[164] As specified above, in the light of the complexity brought by maturity, a steady status of the company will be assumed in order to simplify the model and the consequent calculations.

$$W = \frac{CE(CF)}{r_F}$$

Assuming a steady state company, the correlation between the value of the expected cash flow and its certainty equivalent is reflected on the respective

[163] Hershey, John C., and Paul J. H. Schoemaker. "Probability versus Certainty Equivalence Methods in Utility Measurement: Are They Equivalent?" *Management Science*, vol. 31, no. 10, 1985, pp. 1213–1231. *JSTOR*, www.jstor.org/stable/2631711.

[164] Zhiqiang Zhang, "*Certainty Equivalent, Risk Premium and Asset Pricing*", Higher Education Press and Springer-Verlag 2010.

measures of the risk-free rate.[165] If the value obtained by the ratio between the certainty equivalent and the risk-free rate is compared with the expected value discounted by the risk rate, the resulted correlation will be defined as follows:

$$\frac{E(CF)}{k} = \frac{CE(CF)}{r_F}$$

This is the equation obtained by isolating the certainty equivalent of cash flow:

$$CE(CF) = E(CF)\frac{r_F}{k}$$

According to the formula, the correlation between the value of the expected cash flow and its certainty equivalent is reflected on the ratio between the risk-free rate and the risk discounting rate.[166]

Since Lintner's approach offers the opportunity to use the accounting system as the basis for the calculation of investment values, the joint relation between the expected cash flow and its certainty equivalent can be deeply explained by resorting to return to risk economic ratios. More precisely, a deep focus will be carried out on the return to capital ratios.[167]

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[165] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[166] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[167] Adam Hayes, M. James, "Return on Invested Capital", March 2021, Link: https://www.investopedia.com/terms/r/returnoninvestmentcapital.asp

The return on capital (ROC) refers to the overall return earned by the company on the capital invested in a specific investment project using both internal and external sources of finance. A company that is capable of generating higher returns than costs will earn a risk premium. In this context, it is important to separate the return on existing investments over the profit that is expected from future investing projects. A firm that is expecting to generate positive cash flows in the future by investing in new assets and investment projects, it will experience an increase on value along with a sustainable and positive growth on operative margins. In the opposite case scenario, the company will destroy value when the return generated from investment projects match up to costs.

The value of a firm should be defined as the sum between the value of the capital invested in existing assets and the net present value of all future returns on future investments[168]. The return on capital ascertains the importance to define a linkage between the return achieved and the amount of capital employed.[169]

The return on capital is defined as the ratio between the operating income and the book value of the invested capital. The use of book value instead of market value is justified by two reasons:

- The market value tends to be greater than the book value because it incorporates expectations about the future. The market value includes the expected value of growth assets which cannot generate value today and, for this reason, it will provide a biased return on capital especially for growing firms.[170]

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[168] Aswath Damodaran, Return on Capital (ROC), Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications, Stern School of Business July 2007

[169] Terin Miller, What Is Return on Capital and How Do You Calculate It? When a company makes money, its profitability is measured a number of ways. One of those ways is its return on capital, The Street, APR 15, 2019 11:28 AM EDT. LINK: HTTPS://WWW.THESTREET.COM/PERSONAL-FINANCE/EDUCATION/RETURN-ON-CAPITAL-14926372

[170] Aswath Damodaran, Return on Capital (ROC), Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications, Stern School of Business July 2007

- The second reason is linked to the fact that market value marks up the value of existing assets in order to reflect the earning power of companies. [171]

Market value tends to be greater than book value for profitable firms. Nevertheless, book value results to be the most appropriate measure to use in the computation of investment returns because it reflects the effective value of the business according to its books. In other words, the return on capital should provide a measure of the return earned on the capital invested on all the projects and investments that the firm has on its books. [172]

Being a constant, the book value does not have an impact on the volatility measure.[173] Therefore, including the value into the formula, the same expression can be rewritten as follows:

$$\frac{CE(CF)}{BV} = \frac{E(CF)}{BV} \ \frac{r_F}{k}$$

The ratio between the expected cash flow and book value is also known as ROC, while the fraction between the certainty equivalent and book value is the respective certainty equivalent of return on capital.[174] This is the equation reformulated in the light of the above considerations:

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[171] Aswath Damodaran, Return on Capital (ROC), Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications, Stern School of Business July 2007

[172] Aswath Damodaran, Return on Capital (ROC), Return on Invested Capital (ROIC) and Return on Equity (ROE): Measurement and Implications, Stern School of Business July 2007

[173] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[174] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

$$CE(ROC) = E(ROC)\ \frac{r_F}{k}$$

The return on capital ratio is a financial accounting information that can be easily compared with discounting rates. Since the certainty equivalent approach is strictly linked with the concept of risk premium, the risk-free rate can be rewritten as the difference between the adjusted discounting risk rate and the risk premium.

The following calculations show the individual steps leading to the final result and definition of the certainty equivalent:

$$r_F = k - RP$$

$$CE(ROC) = E(ROC)\frac{k - RP}{k}$$

$$CE(ROC) = E(ROC) - E(ROC)\frac{RP}{k}$$

The risk adjusted discounting rate (k) is defined as the sum between the risk-free rate and the risk premium. The estimation of the risk premium (RP) is usually based on market risk models. As discussed in the previous paragraph, the value of the risk premium depends on the level of covariance between the return on investment in respect of the return on the market[175].

According to the capital asset pricing model, the formula related to the determination of the risk premium can be defined in the following way:

$$RP = SH_r * \frac{cov\ (r_j; r_m)}{sd\ (r_m)}$$

[175] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

As the risk premium is defined as the expected rate of return that is required for a risky investment, by replacing RP with the extended explanation inherent its calculation, the equation can be reformulated accordingly:

$$CE(ROC) = E(ROC) - \frac{E(ROC)}{k} * sd(ROC) * SH_r \frac{cov\,(r_j; r_m)}{sd\,(r_m)}$$

The equation defined above outlines the relation between the expected return on capital and its certainty equivalent. In other words, the formula provides a measure of the unsystematic risk component using as margin to capital ratios the return on capital (ROC).

To sum up, the new evaluation model portrays three elements which are fundamental for the attainment of a reliable measure of the idiosyncratic risk component:

- The correlation between risk and return $\left[\frac{cov\,(r_j;r_m)}{sd\,(r_m)}\right]$ reflects the risk model adopted by the organization according to the standards of the system.
- The benchmarking analysis which reflects the opportunity to invest in a specific corporation. It provided a comparison between the corporate return defined by return on capital measure and the industry return.
- The gap between the certainty equivalent of the return on capital and the expected return on the measure reflects the managerial capability to exploit risk as a complementary input aimed at increasing firm value.[176]

Agents, who deal with risk on a daily basis, attempt to optimize the degree of their satisfaction by maximizing the expected value of the utility and wealth. The

[176] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

reference to a unique benchmark, defined by the Sharpe ratio, simplifies the estimation problem since it avoids the determination of risk aversion attitude of each single agent.

2.3.1) The Value Risk Chain Model and Operational Hedging Choices

Not all risks that a firm face can be encompassed within a single management system. Considering the wide range of risks to which companies are exposed to, the final purpose of risk management consists on the identification and assessment of the main risk sources, in order to find out the most appropriate action and solution to adopt. Within this framework, the use of both qualitative and quantitative instruments on the analysis can reveal the potential impact of risk on the project's budget, the timeline and quality of operational activities carried out by businesses.[177]

Since corporate risk has an endogenous nature, managerial choices have a direct impact on covariances and configured targets. As a consequence, idiosyncratic risk requires a continuous time managerial process that implies the act of crafting inputs, in order to control all disruptive forces affecting organizations. The implementation of an evaluation system, that is comparable to the one adopted for the assessment of the systematic risk component, will not be equally effective in the corporate risk analysis. Indeed, different categories of risks always imply separate evaluative strategies[178].

The modern industrial organizations are characterized by a growing complexity of the processes realized in the value chain. In response to this increasing trend of risk and uncertainty, the development and adoption of an integrated value risk chain

[177] Ken lynch, "Using risk management in your projects", PM Times 2019.

[178] Alfonso Novales. Alvaro Chamizo, "*Splitting credit risk into systematic, sectorial and idiosyncratic components*", Journal of risk and financial management, 2 August 2019.

model has taken hold, since it offers the opportunity to provide an assessment of the impact exerted by the firm-specific risk component on value.[179]

The trend of increasing risk and complexity that is characterizing the new millennium is justified by the following factors:

- An increased level of interconnectedness and interdependence between enterprises operating in the market,
- A greater network complexity caused by the raise in the number of actors operating in the value chain,
- Sophistication of processes and product complexity due to the increased number of components required for its realization,
- Demand complexity due to volatility, market fragmentation and individual preference changes,
- An increase in the competitive rivalry which exerts a significant power in the single business,
- Globalization and the expansion of the business at an international level generate more complexity and make enterprises sensible and susceptible to changes in the environment.[180]

In response to the increasing complexity of operations, the risk management discipline is becoming critical and increasingly challenging in terms of value chain performance, especially in contexts characterized by uncertainty in supply and demand. Risk factors are inherent elements of the value chain and they affect organizations operating not only in international markets, but also those carrying out their activities in the domestic sphere and dimension.[181]

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[179] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[180] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[181] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

With a particular reference to the value chain, risk is defined as the force that threatens to hinder the flow of information, the acquisition of raw material from supplier to clients and the delivery of products and services to final customers. The risk categories which affect the operative activities of a company's value chain are multiple. They range from quality and security problems, supply restrictions, forecasted errors in the definition of the demand or preferences of customers, climate conditions, regulatory and political uncertain forces.[182]

The rationales underlying the application and appointment of the value risk chain model in the process of risk identification and assessment are multiple:

- The enhancement of the business positioning in the market,
- The attempt to strengthen the product growth and improvement,
- The development of new items, products and services,
- The reduction of risk through the implementation of diversification strategies and the enforcement of targeted risk management programs.

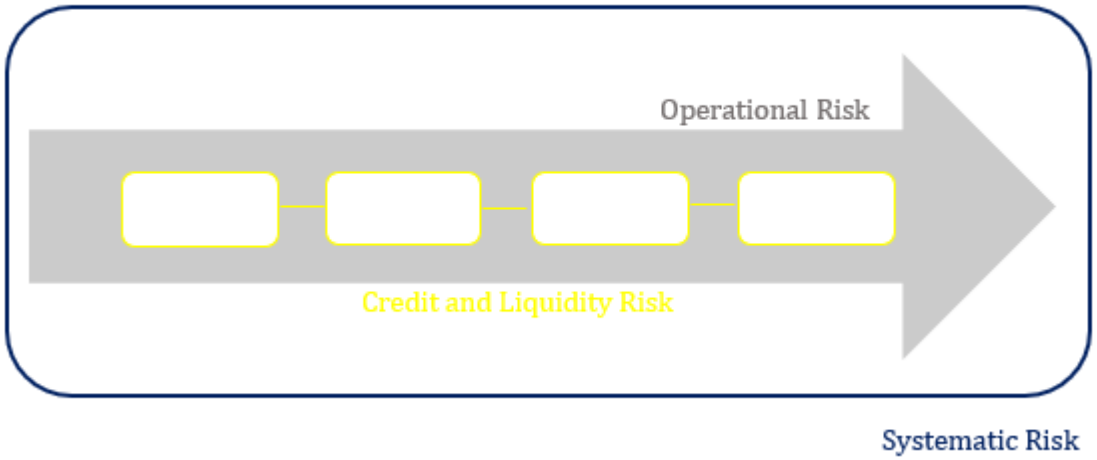
In order to identify the set of activities through which an enterprise is capable of creating value and developing a competitive advantage, it results to be useful to separate the corporate modus operandi into a series of value generating operations. In a value chain, the effectiveness of operative procedures is associated to the performance of business daily activities, processes and functions. Therefore, an increased level of complexity in the productive operative line, along with the multitude of actors involved, results to be a source of potential risk.[183]

Considering the high level of interconnectedness that characterize the business network, enterprises need to amplify their standpoint in terms of risk evaluation with the purpose of including all those risk categories arising from the complex system of interactions between suppliers, customers and other actors. As

[182] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[183] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

illustrated in the underlying figure, the risk that affects the value chain performance can be categorized as systematic, operational, credit and liquidity risks.



Systematic risk exerts an influence at the global level. Indeed, it affects the value chain of all companies regardless the particular industry or business sector in which they operate. On the other side, credit and liquidity risks arise at the level of the specific value chain and they influence the product and information flows throughout the process. Ultimately, the operational risk has an impact on the individual operative activities that characterize the value chain of enterprises. In particular, it exhibits itself in the nodes of the chain and in the relationship between actors involved in daily business operations. [184]

Among the set of drivers contributing to shape the operational risk that affects value chains there are:

- Failures or shortfall in the quantity and quality of inputs,
- Non-compliance with quality standards,
- Productive uncertainty associated to mechanical or technological failures,
- Supply chain uncertainty associated to delays in delivery and transportation,

[184] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

- Administrative uncertainties related to failures in administrative procedures
- Changes in financial structure.

Since operational risk exerts a direct influence on business performance, managers need to implement specific risk management programs and exhibit a particular treatment to those risk categories that affect the value chain.[185]

In 2015, Deloitte has conducted a survey in a sample of 600 large enterprises operating in the international dimension. The result of the study has demonstrated that 71% of companies belonging to the sample have considered risk management as an important feature of the decision-making process. Furthermore, the 64% have expressed their willingness to implement specific risk management strategies in support of their value chain. [186]

In modern industrial organizations, the complexity of the value chain has grown dramatically because of the enhanced interconnectedness between actors and processes. This attribute leads to an increased level in the degree of uncertainty and risk. Risks are diverse in nature and they arise from different sources. Most of the time, they are interconnected throughout the chain, consequently, strategies aimed at resolving specific problems can achieve partial success, since they are not able to restore the same effect on a global dimension.[187]

The operational risk that affects the value chain affects directly the processes which involve the acquisition, production and distribution of items and services. For

[185] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[186] R. Ter Hoeven, C. Kimenai, "*The risk paragraph in the management board's report: good practices*", DELOITTE.

[187] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

instance, logistic operators might be negatively influenced by a decrease in the demand of a product or a service, leading to higher idle capacity and stock. A lower demand and, consequently, a decline in the level of sales can result in an increase of liquidity risk.

Vice versa, an unexpected increase in the demand of goods results in a fall in the supply of goods, the need for wholesalers and retailers to increase their inventories and, consequently, lower sales caused by scarcity of resources.[188] Since the effects of a risky event cannot be allocated to a specific and single node of the value chain, it becomes crucial for companies to implement efficient risk management strategies. The process requires the identification of those risk categories that affect directly the chain, the delineation of probabilities associated to their occurrence and the effects at the global level. Therefore, an integrated risk management approach that includes all participating actors and linkages qualifying the chain needs to be implemented. [189]

Risk management is not only a matter of being reactive when a particular risk occurs, but it also implies the capability of a company to achieve an organizational resilience when disruptive situations take place. The disruptive forces caused by mechanical or technical breakdown, forecasting errors in the acquisition of resources, demand predictability, failures in power and communications can be sustained and hedged by companies in different ways. [190]

Disruptive forces due to mechanical breakdowns and failures have a significant impact on the performance and value of the company. Since component's machine

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[188] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[189] *E*. G. Claypool, B. A. Norman, K. L. Needy, *"Design for supply chain: An analysis of key risk factors", Industrial engineering and management,* Claypool et al., Ind Eng Manage 2015, 4:2 DOI: 10.4172/2169-0316.1000156

[190] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

gradually deteriorates over time, a mitigating action should be implemented in order to overcome the problem. A clear solution would be the retention and maintenance of the plant and the modernization of machineries. These actions can be executed through an extension of the period covered by warranties, the enforcement of technical assistance requirements or, in alternative, the investment in new machineries.[191]

Likewise, an insufficiency in the quantity and quality of inputs provided by suppliers might cause severe problems. In these cases, it can be effective the adoption of a plan capable of improving the coordination between multiple processes. Moreover, the commitment of the enterprise to invest resources on training programs with the purpose of improving the technical skills of employees offer a solution to optimize collaboration among actors operating in the chain and improve the visibility of operations.[192]

A transport infrastructure failure or a disaster due to climate conditions are other examples of critical factors affecting the success of the business. These forces have the potential of deactivating the provision of a lifeline service or product in the market. The implementation of a regulatory reform can mitigate the disruptive magnitude brought by this specific risk category. For instance, in Barbados there is an agreement among local distributors of food establishing the harvest of a sufficient quantity of essential items in stock to last five days. The agreement is intended to guarantee the availability of essential foods in the event of an unexpected disaster and it also eliminates the costs of maintaining food stock for long periods of time.[193]

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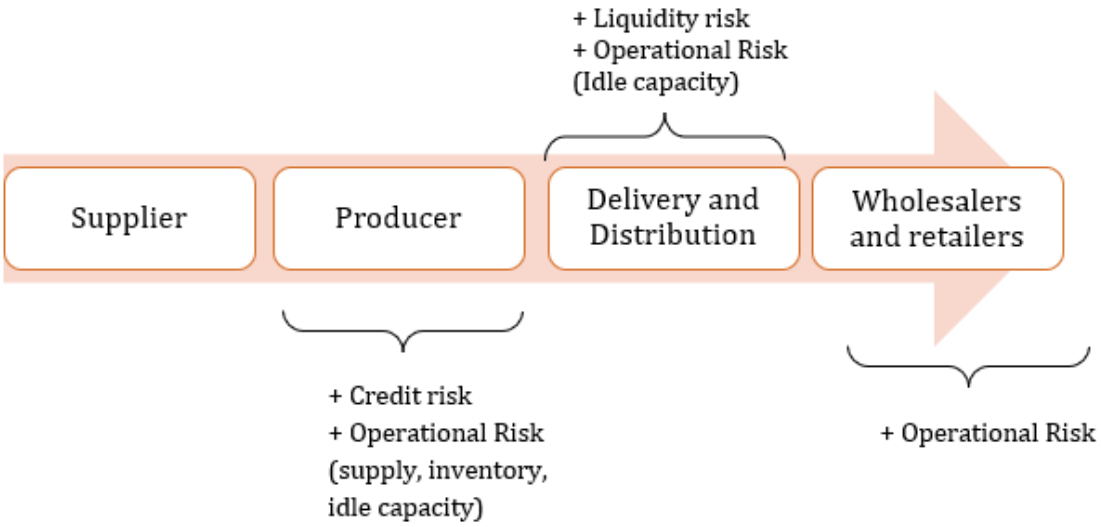
[191] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[192] *E*. G. Claypool, B. A. Norman, K. L. Needy, *"Design for supply chain: An analysis of key risk factors", Industrial engineering and management,* Claypool et al., Ind Eng Manage 2015, 4:2 DOI: 10.4172/2169-0316.1000156

[193] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

Considering that the effects of risk are rarely incorporated into a specific node or linkage of the value chain, managers feel the necessity to address efficiently challenges in order to guarantee the stability of the chain and the optimal performance of the company.[194]

The following figure illustrates the interconnectedness of risks throughout the value chain, the actors involved in each process and the resulting effects:



Future always entails some degree of uncertainty and it presupposes the manifestation of both opportunities and threats. Considering that decision making is future oriented, businesses need to evaluate the impact and the magnitude of these forthcoming forces on their value chain and performance. The capability to proactively manage the potential deviation on outcome makes risk management an instrument to safeguard the opportunity of success. Furthermore, it offers the possibility to improve the quality of planning and generate additional firm value.[195]

In carrying out their daily activities, businesses cope with a dynamic and risky environment which influence their long-term programs and strategic decisions.

[194] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[195] Agustina Calatayud Juan Antonio Ketterer, "Integrated Value Chain Risk Management", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

Since the worth of a company depends both on expected future earnings and costs, an integrated approach to risk management needs to be implemented. To preserve and expand the potential for success, companies need to take up risks consciously. Indeed, their exploitation contributes to the expansion of competitive advantages and sustains the creation of additional corporate value. [196]

A strategic approach to risk management entails the managerial capability to exploit those forces that offer a contribution in terms of future business development and value creation.

[196] Werner Gleibner, "Value-based Corporate risk management", Risk Management Challenge and opportunity, 2005.

CHAPTER 3

UNDERLYING RATIONALE FOR CORPORATE RISK MANAGEMENT AND FIRM VALUATION

3.1) Firm valuation and rationale underlying corporate risk management practice

Risks are difficult to be measured, but it is critically important to get a handle of them. While the Capital asset pricing model (CAPM) is mainly adopted in the process of systematic risk evaluation, the value risk chain model (VRC) is usefully implemented for the assessment of the idiosyncratic component. The choice concerning the development of a specific methodological approach provides important information on the endogenous and exogenous nature and the weight of each component on the overall risk sustained by the company. Indeed, the approach implemented by decision makers for the assessment of each risk component will affect the way in which they manage uncertain forces and develop targeted risk management strategies.[197]

Each company that is involved in risky activities need to estimate the extent of risk to which it is exposed and the impact of its endogenous and exogeneous constituents. Different companies belonging to the same industry might have different risk exposures and, consequently, they deal with these forces accordingly using the most appropriate instrument.[198] On the basis of the measurement system endorsed, decisions makers need to elaborate information resulting from the evaluative process and draw up the most convenient solution to manage efficiently

[197] Developed by Sharpe, (1964), Lintner (1965) and refined by Black (1972).

[198] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

their risk exposure. Indeed, the ability to read data, frame rational conclusions and translate them into actions lead to superior results.[199]

Following the general pattern, the design of an integrated risk management system requires the improvement of three fundamental stages: the identification, prioritization and definition of the risk management strategy. The first stage is related to the activity of identifying all the potential risks to which a firm is exposed to. The range should include not only the macroeconomic forces having an influence on the entire business sector, but also those categories affecting specific nodes of the value chain. Subsequently, risks should be categorized on the basis of their nature and interconnectedness throughout the chain.[200]

The second stage consists on the prioritization of risks using a series of criteria. The most common practice used by companies consists in the selection of risks on the basis of their probability of occurrence and the magnitude of their impact on firm value. In this process, it is critically important to make an inventory of all risks categories and define an order of priority for their management. Indeed, resources held by a company are limited, therefore managers are forced to make a trade-off between different options and alternatives. More specifically, they have to decide which risk they will attempt to manage and which one let it flows. This process enables managers to identify a possible combination of critical risk sources and define the linkage existing among forces.[201]

The last step of the process comprises the definition of the most suitable solution that will mitigate the risks identified and prioritized during the first stages. Value chain programs are based on integrated risk management approaches involving the

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[199] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[200] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[201] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

use of both financial and nonfinancial instruments, since a one size fits all solution does not exist.[202]

For a long time, the risk management discipline was attributed to the activity of reducing the corporate risk exposure. An important contribution that led to the affirmation of this perception is the increasing number of financial derivative instruments used by companies to cover and mitigate their position. Nevertheless, managing risks does not necessarily imply reducing the business exposure to a particular threat, but it also concerns the activity of weighing up risks.

Risks can create opportunities for future development. This chance can be exploited only if managers are capable to respond quickly to external forces and have the capacity to turn disruptive challenges into competitive opportunities. Good risk-taking organizations not only adopt a balanced approach in the assessment of risk, but they also manage risk actively in both good and bad times. More precisely, they need to prepare the plan for forthcoming crises during periods of serenity and look for opportunities during uncertain times. Nevertheless, humans have the tendency to exhibit interest in the risk management during the course of a crisis or just after a disaster and they pay little attention at the discipline in positive times. Indeed, it is inherent the human nature to remember the downside of risk more than the upside one.[203]

As a consequence, the exploitation of opportunities requires good managerial capabilities to deal with risk and uncertainty. The main objective of enterprises should be the implementation of an appropriate risk management system in order to exploit risk and create future opportunities of value creation. [204] Therefore, it is

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[202] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[203] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[204] Clifford W. Smith Jr., "*Managing corporate risk*", University of Rochester, Handbook of corporate finance: empirical corporate finance, Volume 1, North-Holland.

fundamental to identify the conventional drivers of firm value and figure out the effect of any single managerial decision.

As detailed in the previous chapter, the value of a company is defined as the present value of the expected cash flows produced by investment projects in the time to come and discounted for the risk adjusted rate.[205] Indeed, in conventional discounted cash flow models the effect of risk is embedded into the discount rate k. The equation below defines the present value of expected flows of wealth produced by a company:

$$W = \frac{E(CF_1)}{(1+k)} + \frac{E(CF_2)}{(1+k)^2} + \frac{E(CF_3)}{(1+k)^3} \dots + \frac{E(CF_n)}{(1+k)^n}$$

The discounted cash flow model provides an estimation of the expected value that the company is assuming to produce in the future in relation to its revenue, growth and margins. Even though adjustments for risk are narrowly embedded into the discount rate, the potential impact of risk and management system implemented have also an influence on other inputs.[206]

The value of the company can be generally considered as the function of four inputs:

- The cash flow from assets or investment projects. When assets are managed efficiently, the value of cash flows will grow up leading to higher wealth and firm value.
- The growth rate in cash flows. Firms which are committed to reinvestments and, concurrently, they are able to preserve high returns should be worth more than firms that cannot sustain this important balance. The act of

[205] Guido Max Mantovani, Elisa Daniotti, & Paolo Gurisatti, "*In Search of Corporate Risk Measures to Complete Financial Reporting: The case of the "Caldarerie"- Industry",* INTERNATIONAL RESEARCH JOURNAL OF APPLIED FINANCE. 2013.

[206] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

reinvesting in the business is critical, since it enables companies to exploit growth opportunities and take on additional resources and capital. The company's growth does not imply necessarily an increase in value indeed, a firm can experience an important growth without adding additional value to the firm. It usually happens when the cost of capital is greater than the value generated, because of the commitment in new investments. The expected growth rate is strongly influenced by the life cycle of the firm. Indeed, companies that are relatively new and, therefore, they are positioned in the first stages of their life cycle are more likely to reinvest and grow up over time rather than mature ones.[207]

- Growth period before the firm reaches a steady state status. Firms having a sustainable advantage in respect of competition should be worth more. The length of the growth period that a company is able to sustain is influenced by three factors: the size of the firm, the growth rate and the sustainability of competitive advantage. Regarding the first point, high growth rates can increase the company's size. Nevertheless, the size may become a barrier which prevent further growth. On the other side, small firms are able to earn excess returns and maintain this trend over time indeed, they benefit from market potential and have always room for growth. The value of the growth rate also plays an important role in defining the sustainability of the improvement period. Momentum does matter, since companies, reporting rapidly growing revenues, are more likely to experience a positive trend in the near future. Finally, the magnitude and the sustainability of competitive advantage represents the most important point. The presence of barriers to entry, the quality of managerial capabilities, along with competitive benefits increase the length of the growth period experienced by the company.[208]
- The risk adjusted discount rate k. It provides a measure of investment's return and it takes into account the risk that is associated with the project.

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[207] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[208] Aswath Damodaran, "*How long with high growth last*?". Link: https://pages.stern.nyu.edu/~adamodar/New_Home_Page/valquestions/highgrowthperiod.htm

> The level of risk related to a programme can create volatility in the future and affect the expected value of cash flows.[209] For that reason, discount rates need to be adjusted for unpredictability pertaining the time span of cash flows. In the case of a long-term project additional elements like future market conditions, profitability, inflation need to be included into the field of analysis. Holding the first three elements exhibited constant, firms with lower costs of capital will generate superior value in comparison to similar firms with greater costs.

In order to increase their value, companies need to generate superior cash flows from existing assets. Furthermore, they need to support a sustainable growth, extend their growth phase and lower cost of capital. To the extent that risk management contributes to the implementation of these actions, additional value can be generated.

Now let's analyze the contribution of the risk management system for each driver.[210]

3.1.1) The value of cash flow from investment projects

Companies have assets and investment projects in place which are able to generate enduring cash flows in the future. To the extent that these assets are managed efficiently, they can generate more cash flows than expected. The same principle is still valid in the opposite situation. When unexpected forces occur and managers are not able to manage reasonably assets in response of unpredictable changes, the value of cash flow will be lower.[211]

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[209] J. Chen, M. Reeves, "Risk-Adjusted Return", Investopedia, 2020, Link: https://www.investopedia.com/terms/r/riskadjustedreturn.asp

[210] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[211] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

Expected cash flows incorporate an element of risk which takes the form of a divergence between the realized and the expected outcome. High cash flow volatility increases the likelihood of experiencing negative deviations on value and, consequently, it also enhances the perception of firm's default. In order to avoid technical default, a company should have a sufficient amount of liquidity in each period of time in order to cover its debt requirements. If volatility is high, the capability of the company to cover the payment decrease significantly for that reason, managers have incentives in stabilizing the value coming from cash flows. Indeed, consistent and regular cash flows reduce the perception of debtholders that the firm will experience default.[212]

High volatility in operating cash flow leads to a lower amount of discretionary investments in capital expenditures, research and development programs. As a consequence, an underinvestment problem persists. The variability on the value of future cash flows is costly for enterprises, because it exerts an influence not only on firm's investment policy, but it also increases expenditures associated to external sources of finance. Furthermore, volatile cash flows create information acquisition costs that would reduce the value of the firm. Therefore, targeted risk management programs need to be designated with the purpose of mitigating the volatility associated with company's investment projects. [213]

The cash flow derived from operations suggests whether a company is capable to generate enough cash to maintain or even expand its operations, but it can also point out the need of using external sources of finance to do it. Operating cash flows are defined as the difference between EBITDA and the change in working capital which captures the allocation of cash required to sustain firm's operations. In this context, the operational strategy adopted by the firm has a direct impact on liquidity. Indeed, the standards and practices adopted for accounts receivables,

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[212] Pwc, "M*anaging Cash Flows in Volatile Markets – Tools, Techniques and Global Experience*", CFO Conclave 24-26 November 2011. Link: https://www.pwc.in/assets/pdfs/publications-2011/day_2-session_3-kumar_dasgupta.pdf

[213] Pwc, "M*anaging Cash Flows in Volatile Markets – Tools, Techniques and Global Experience*", CFO Conclave 24-26 November 2011. Link: https://www.pwc.in/assets/pdfs/publications-2011/day_2-session_3-kumar_dasgupta.pdf

inventory, and accounts payables will affect the value of cash flowing inside and outside the business.[214]

Also, the availability of corporate finance options exerts an influence on the evaluation process. Small businesses, for instance, may struggle to find investment opportunities that give them the possibility to grow and improve their cash flows. In this context, market conditions have a strong leverage in influencing the availability of such investments, especially during a crisis or market downturns.[215]

One of the largest systematic forces to which enterprises are exposed to, is the fluctuation of exchange rates. This category of risk affects all companies without distinction and makes enterprises vulnerable to transaction, translation and economic exposures. Transaction exposure refers to the effect of exchange rate's volatility on the company's obligation to make or receive payments in foreign currency. Translation exposure arises from the consolidated financial statement and it is related to the existence of foreign subsidiaries. Finally, the economic exposure is associated to unexpected fluctuations of exchange rates on the value of company's future cash flows.[216]

In order to mitigate the effects of exchange rate volatility, companies can intervene by developing different actions. The practice of mitigating systematic risk, using either insurance contracts or derivative instruments, makes the value of the expected cash flow lower. Indeed, the decision of the company to hedge its risk exposure has the effect of trading off risky cash flows, having greater expected

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[214] Michael O'ConnorKeefe, MonaYaghoubi, "*The influence of cash flow volatility on capital structure and the use of debt of different maturities*", Journal of Corporate Finance Volume 38, June 2016, Pages 18-36.

[215] Bernadette A.Mintona, CatherineSchrand, "The impact of cash flow volatility on discretionary investment and the costs of debt and equity financing", Journal of Financial Economics, Volume 54, Issue 3.

[216] Scordis, Nicos A., James Barrese, and Ping Wang. "The Impact of Cash Flow Volatility on Systematic Risk." *Journal of Insurance Issues* 31, no. 1 (2008): 43-71. http://www.jstor.org/stable/41946281.

value, for more stable cash flows with lower value. The same principle is still valid for the practice of buying insurance contracts. Insurances will lower the expected cash flow by the amount of the insurable payment, while making the cash flow more predictable.[217] Risk hedging is not costless and a reduction in cash flow volatility determines also a decrease in earnings. In this case, the cost of equity will not be affected because the risk management strategy operates only on the systematic risk component. Conversely, the cost of debt will be lower, since the risk of default perceived by debtholders is minimal. The direct consequence is an increase in the proportion of debt raised by the firm to finance its operations. Smoothing out the value of cash flow provides also another benefit: the reduction of the amount of taxes paid over time.[218]

Conversely, risk taking actions have the effect of increasing operating margins and the value of cash flows. Risks arising throughout the value chain are multiple and they call for innovative and integrated approaches. Large manufacturing enterprises and distributors of services play an important role in the value risk chain management. Generally, these enterprises hold technical, human and financial capacities to identify risks, develop proper risk management strategies and implement early warning mechanisms and monitoring systems. These companies are closed with the final customers; therefore, they can predict and react quickly to changes in demand and preferences of consumers.[219]

In modern industrial organizations, risk has increased in its complexity and interconnectedness among processes requiring a close collaboration between actors participating in the value chain. In order to overcome risk related to changes in industrial standards and demand, companies can develop strategies aimed at enhancing the collaboration and integration among sectors and actors across the

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[217] Scordis, Nicos A., James Barrese, and Ping Wang. "The Impact of Cash Flow Volatility on Systematic Risk." *Journal of Insurance Issues* 31, no. 1 (2008): 43-71. http://www.jstor.org/stable/41946281.

[218] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[219] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

chain. Among the obstacles that hinder the implementation of an explicit risk management system, there are transaction and financial costs. Nevertheless, the international experience has demonstrated that benefits coming from the development of collaboration programs are superior in respect of the associated costs sustained.[220]

Another example of risk-taking activity developed by companies is the action aimed at mitigating the risk associated to operational inefficiencies and obsolescence of machines and techniques. In this specific case, the commitment to sustain technological advances along with the action of supporting training programs for the personnel offer a contribution towards managing the risk related to operational failures. Even though, such actions involve considerable costs for their implementation, benefits are superior. Indeed, the implementation of the program can lead to an increased exchange of information and knowledge among different organizational levels along with an improvement in the interconnectivity among productive processes.[221]

In conclusion, the practice of reducing cash flow volatility using risk-reducing actions comes with a cost and the result comprises a depletion in the level of earnings over time. On the other side, the implementation of risk-taking activities gives to decision makers the opportunity to exploit occasions and increase operating margin, but it also enhances the potential risk. For this reason, good managerial capabilities are required in order to deal with uncertainty and enjoy the upside risk benefits.

3.1.2) The growth rate in cash flows

Positive growth rates do not necessarily imply an increase in firm value. When a raise in the growth rate is accompanied with positive and cumulative returns, risk-taking actions appear to be more effective. Indeed, the exploitation of successful

[220] Werner Gleibner, "Value-based Corporate risk management", Risk Management Challenge and opportunity, 2005.

[221] Werner Gleibner, "Value-based Corporate risk management", Risk Management Challenge and opportunity, 2005.

managerial actions will have positive effects on growth ratios. These activities support an increased commitment by the company side to be engaged in reinvesting resources into the business with the purpose of taking on a competitive advantage. If the management team does not have the capability to manage risk reasonably and harmful risk-taking actions are carried out, the consequence is the destruction of value and the discontinuation of the growth rate trend. Indeed, a company experiences a positive growth rate, only if managers take on sound investment opportunities which have the potential to generate positive returns compared with the cost of capital effectively sustained. [222]

Conversely, risk hedging managerial actions affect growth rates indirectly. Sometimes managers do not take sound investment decisions because of their risk adverse tendencies. When such circumstances arise, corporate hedging and risk lowering actions enable managers to overcome those concerns. For instance, a company that has historically avoided to be committed in value adding investments in foreign markets because of their adverse tendencies towards risk, will be more willing to invest abroad if its exchange risk exposure is properly covered through derivative instruments. Reducing the company's exposure to particular risk categories makes managers more comfortable and confident in taking up risks and sound investment opportunities.[223]

3.1.3) Length of the Growth Period

The length of the growth period is influenced by the magnitude of the firm competitive advantage. Companies with strong and sustainable competitive edge have developed the ability to exploit certain risks better than competitors and this ability has increased some extra skills and utilities. For instance, they can rely on a greater number of resources and information which give them the possibility to move faster than competition and anticipate actions in view of a crisis. Risk hedging

[222] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[223] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

programs rarely provide a competitive advantage to companies. It may happen only in the event that unique hedging techniques are developed or, in alternative, if the cost sustained for their implementation is lower than the charge endorsed by competitors.[224]

3.1.4) Risk and Discount rate

The level of risk associated to a specific project has an effect on the expected value of future cash flows. The impact of variability is embedded into the risk adjusted discount rate.[225]

Risk hedging activities have the capacity to increase the predictability and stability of cash flows over time. This specific characteristic reduces the cost of capital leading to lower discount rates. Furthermore, it brings also a reduction of the cost of debt for heavily levered firms characterized by significant amount of distress risk. Conversely, risk taking actions have unpredictable effects on the value of the discount rate. Indeed, the impact of such decisions is strictly linked with the risk profile of the company and the specific risk that the management team decides to take. [226]

To conclude, the value of a company is a function of the cash flows generated from its assets, the growth rate, the length of the competitive advantage period and the cost of capital. Therefore, any managerial action that is able to change one or more of the inputs specified above, can affect the ultimate value of the company.

The risk management process, carried out by managers to deal with the downside risk component, are designed primarily to reduce the company's exposure. Vice versa, risk management strategies aiming at dealing with the upside risk

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[224] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[225] J. Chen, M. Reeves, "Risk-Adjusted Return", Investopedia, 2020, Link: https://www.investopedia.com/terms/r/riskadjustedreturn.asp

[226] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

component are generally focused on risk taking activities. Therefore, the activity of purchasing insurance contracts or financial derivatives to cover market risk would be classified as risk hedging actions, whereas programs which imply the introduction of new product lines or the decision to enter into new markets would be categorized as risk-taking actions.[227]

3.2) The role played by managerial motivation in defining the quality of investment decisions

During the decision-making process, managers of a company need to consider the entire set of investment opportunities. Thereafter, they have to select the most advantageous investing decision on the basis of the expected cash flow value and the risk that the project carries along.

In an ideal world, the decision of managers will not be influenced by risk as it can be diversified away through asset allocation. In reality, managers are risk adverse and often they reject even good investments because of the fear to deal with unexpected and unpleasant consequences. While traditional economic theories did not acknowledge a correlation between managerial risk propensities and investment decisions, recent researchers and papers have provided empirical evidence demonstrating the opposite statement. [228]

In compliance with the preference theory, decision makers have different propensities and attitudes towards risk. More precisely, Bertrand and Schoar (2003) have acknowledged the relevant role played by personality on the decision-making process. Indeed, they have emphasized how an increase in the level of risk have a direct effect on the way in which managers make decisions.

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[227] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[228] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

Within this framework, also motivation exerts a considerable influence on the managerial decision to implement specific corporate hedging strategies and take up particular risky investment programs. Generally, a risk adverse attitude of managers results in a lack of consideration of investment opportunities and the implementation of corporate risk hedging strategies. Indeed, managers draw up targeted hedging programs in order to deal with uncertainty and be focused only on business opportunities, regardless the role played by risk and uncertainty. Conversely, an individual with risk propensities will be more inclined to seek out new opportunities for business growth. [229]

In risk management terms, the determining factor that pushes decision makers in performing corporate hedging or risk-taking activities is the incentive system in place in the organizational setting. Plans and budgets affect managerial motivation towards risk-taking activities or corporate hedging programs. Typically, managers are evaluated on the basis of their capacity to reach targets and they are consequently rewarded or punished according to the outcome of their actions and the quality of the processes implemented. In other words, an individual who takes on a risky activity and obtain a favorable and successful outcome will be rewarded with important pecuniary compensation. Conversely, if the outcome of the program does not give the desired result, the same individual will be penalized or get fired.[230] This kind of evaluation demonstrates that motivation has a significant influence on the managerial decision to implement a specific corporate hedging strategy or take up a risky investment. An individual with strong defensive attitudes will implement a corporate hedging strategy, instead of investing in valuable business opportunities, because of the fear of losing his assignment.

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[229] PANOUSI, VASIA, and DIMITRIS PAPANIKOLAOU. "Investment, Idiosyncratic Risk, and Ownership." *The Journal of Finance*, vol. 67, no. 3, 2012, pp. 1113–1148. *JSTOR*, www.jstor.org/stable/23261335.

[230] PANOUSI, VASIA, and DIMITRIS PAPANIKOLAOU. "Investment, Idiosyncratic Risk, and Ownership." *The Journal of Finance*, vol. 67, no. 3, 2012, pp. 1113–1148. *JSTOR*, www.jstor.org/stable/23261335.

In order to improve the quality of the business investment policy, an idea entails the development of an efficient compensation system along with the implementation of a risk management program aimed at increasing the overall company's performance and value. [231]

Similarly, the organizational size and structure play an important role on the decision-making process carried out by managers. While large and layered corporations have the tendency to implement risk-hedging programs, small companies tend to incentivize the development of risk-taking activities. Indeed, multi-level organizations have difficulties in dealing with changes and risk in short periods of time. Instead, young organizations tend to be more agile and flexible in dealing with volatility, but the absence of balances also makes them more susceptible to perils.[232]

The flexibility that some firms obtain by managing risk and uncertain forces gives them an advantage over rigid competitors. Good risk-taking companies gain this status by their design. Flexibility can take different forms, for instance the ability to modify production, operating and marketing processes according to uncertainty and changes in market environment represents an important source of competitive advantage.

3.3) The effect of capital market imperfections on risk management decisions

The stringent and tight standards of the perfect and pure competitive market, portrayed in the Modigliani and Miller proposition, does not reflect the real world in which companies operate and carry out their activities. Indeed, the impact of taxes, the existence of barriers to entry and exit, costs of financial distress,

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[231] Karol Marek Klimczak, "Corporate Hedging and Risk Management Theory: Evidence from Polish Listed Companies" The Journal of Risk Finance, 2008, Vol. 9 (1), pp. 20-39.

[232] PANOUSI, VASIA, and DIMITRIS PAPANIKOLAOU. "Investment, Idiosyncratic Risk, and Ownership." *The Journal of Finance*, vol. 67, no. 3, 2012, pp. 1113–1148. *JSTOR*, www.jstor.org/stable/23261335.

information asymmetry and transaction expenses have an influence on any managerial decision. As a consequence, the ultimate value of the company would be also influenced.[233]

The extent and intensity of these market imperfections effects are amplified by a disproportionate growth of risk and uncertain conditions faced by companies especially over the last few years.[234] When risk and uncertainty occur, the classical assumptions characterizing the more conservative models should be relaxed in favor of the inclusion of additional analytical factors into the field of analysis. The growing awareness of risk and the actual presence of market imperfections, outside the spectrum of perfect competitive market models, have led to the development of new methodological patterns contemplating alternative and more receptive approaches to the risk management discipline. [235]

Endogeneity problems associated to information and control asymmetries, corporate governance, the financial and legal systems began to be considered as critical elements that need be included into the field of analysis. Indeed, they have the potential to influence decisions made by the management team on essential issues concerning the running of the business, the choice related to the sources of capital to raise and the extent of the hedging program that should be implemented.[236]

Over time businesses have demonstrated the necessity of resorting to an integrated and holistic approach for the assessment of risk and the development

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[233]PANOUSI, VASIA, and DIMITRIS PAPANIKOLAOU. "Investment, Idiosyncratic Risk, and Ownership." *The Journal of Finance*, vol. 67, no. 3, 2012, pp. 1113–1148. *JSTOR*, www.jstor.org/stable/23261335.

[234] K. Kenton, R. Kelly, Investopedia, Link: https://www.investopedia.com/terms/i/imperfectmarket.asp

[235] Karol Marek Klimczak, Ph.D., "*Corporate Hedging and Risk Management Theory: Evidence from Polish Listed Companies*", The Journal of Risk Finance, 2008, Vol. 9 (1), pp. 20-39.

[236] Titman, Sheridan. "*The Modigliani and Miller Theorem and the Integration of Financial Markets.*" *Financial Management*, vol. 31, no. 1, 2002, pp. 101–115. *JSTOR*, www.jstor.org/stable/3666323.

of its management programs. This need arises from a growing onset of endogenous problems that enterprises need to face.

More precisely, the main difficulties that companies need encounter are listed below:

- The agency problem. It explains the possible mismatch of goals between shareholders and the management team caused by asymmetries in their personal interests. This is a direct consequence of the fact that shareholders delegate decisions to the management team with the purpose of maximizing their wealth. The separation between ownership and control causes a conflict of interests among actors. While the main purpose of shareholders is profit maximization, managers seek for productive and investment opportunities. [237]
- The information asymmetry problem. Advances in the field of information technology have increased the availability of big data and information. Big data analysis is rapidly becoming a fundamental instrument through which risk and uncertainty can be managed.[238] In transactions, there is an imbalance in the quality of information among actors directly involved in market operations. This asymmetry contributes in creating imbalances of power leading to problems like adverse selection and moral hazard.[239]
- Financial distress and costs of bankruptcy. When a company increases the portion of capital raised using debt sources, the probability of defaulting also heightens. The perception of being considered in trouble makes intermediate costs extraordinarily high. Given the large portion of costs to sustain, it is prudent for companies to protect themselves against risks that may cause distress by hedging against them.

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[237] E. Morellec, Clifford W. Smith, "*Agency conflicts and risk management*", Review of finance, DOI:10.2139/ssrn.281537, 2005.

[238] Agustina Calatayud Juan Antonio Ketterer, "*Integrated Value Chain Risk Management*", Institutions for Development Sector, Capital Markets and Financial Institutions, 2016.

[239] M. Ferreira, P. Laux, "*Corporate governance, Idiosyncratic risk and information flow*", University of Delaware, 2005.

Now let's analyze each single element in detail.

3.3.1) Risk management and the agency problem

Agency risk arises when a subject appoints a third-party to act in his behalf. A misalignment of interests between the owners of the company and the management team, that is the body responsible to make decisions, represents the fundamental problem underlying the conflict among agents. When managers have access to superior information rather than principals, they act in a way that will maximize their personal interests. Since self-interested behaviors are very common, principals need to design appropriate organizational structures and functional models in order to prevent this kind of behavior.[240]

The modern industrial organizations are characterized by a growing complexity of the processes realized in the value chain and composite levels of interconnectedness among actors. This makes companies more sensible and susceptible to the risk of occurrence of the agency problem.

Agency conflicts take different forms and, for this reason, they need to be properly identified and analyzed in order to determine their impact on firm performance and value. The main subjects involved are:

1. Shareholders and managers: according to the economic theory, agency conflicts arise because managers do not invest their best efforts in the maximization of shareholder's utility.
2. Stockholders and bond holders: Conflict of interests occurs because of the different nature of their claims. Bondholders have an order of priority in receiving value rather than shareholders in the event of default.
3. Shareholders and stockholders: Internal and external stakeholders have different interests and priorities that often come in contrast.

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[240] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

Agency conflicts are more likely to occur in large corporations rather than family run businesses. Indeed, small and family-owned companies are characterized by an overlapping between the subject who is in charge and the individual running the business. As a result, at the end of the day both the interests of owners and managers will be satisfied.

When holdings grow in size, company's owners start to delegate activities to the management team. The delegation process might generate problems, because the interests of the person who makes investment decisions not necessarily match with the interests of the owners. Managers, who are the subjects entitled to run the business on behalf of shareholders, are involved in the daily activities of the company and, for this reason, they possess an important information advantage over shareholders.[241]

Principals and agents do not share the same objectives and this fact implies the occurrence of a conflict of interests. While managers have the tendency to hedge their positions and avoid to take risky activities, shareholders have risk propensities. For instance, the management team might decide not to take an investment project that would increase shareholder's wealth because, in the event of failure, they might lose their assignment. If shareholders have reasons to believe that managers do not act on their own interests, they might decide to take proper measures in order to prevent those actions. Nevertheless, shareholders are not able to monitor managers the whole time and the implementation of controlling measures leads to a significant waste of both resources and time. [242]

Within this framework, the agency theory has the purpose of helping companies to identify situations where agency risk is high and needs to be managed. This approach also suggests owners the best way to reduce the agency conflict through the implementation of effective organizational structures and the development of

[241] HAYNE E. LELAND, "Agency Costs, Risk Management, and Capital Structure", THE JOURNAL OF FINANCE * VOL. LIII, NO. 4

[242] R. Carlson, "What is agency cost?", Link: https://www.thebalancesmb.com/what-is-the-agency-cost-for-business-392845

specific risk management programs.[243] Risk management takes on a fundamental importance to the extent that it is able to control the costs related to the agency problem. More specifically, it contributes to the achievement of this function by mitigating the problem related to volatility of free cash flows, asset substitution activities, the underinvestment and overinvestment phenomena. While the overinvestment problem results from the conflict of interests between shareholders and managers, the underinvestment one is the outcome of the turbulent relationship between bondholders and stockholder.[244]

As mentioned above, managers sometimes pursue their own personal interests at the expense of shareholders. Their failures in carrying out activities that are aligned with the interests of principals cover a broad range of behaviors like carelessness, shirking value or the development of inappropriate investment decisions. Managers derive benefits from investments and sometimes they have the tendency to overinvests when the company has positive and high free cash flows. Indeed, large cash flows increase the number of resources available for the reinvestment in positive net present value projects. Conversely, when the value of cash flows is not sufficiently high to finance good and sound investment projects, the need of raising funds from external sources is significant. The direct consequence is an increase in the probability of default along with a raise in underinvestment's costs. In this context, corporate risk management has the ability to decrease the volatility on the value of expected cash flows and, therefore, stabilize firm value.[245]

Let's consider a levered company with assets in place and the possibility to implement new investment opportunities. The determination of the investment

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[243] Elizabeth Sheedy, "*Agency risk: The forgotten element in financial risk management*", Wiley Online Library, 2010.

[244] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[245] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

policy would depend on the set of investment projects selected by the management team along with the level of resources that the company has at its disposal.

To finance a project at time zero a company decides to raise funds either from shareholders or bondholders. The investment project X yields a positive cash flow at the end of the first year. The company's cash flow at time one is the result of the difference between the payoff coming from the investment project at the end of the period (X) and the cost sustained for its implementation (c).

$$CF(X) = X - c$$

Since the yield generated by the project is positive, managers decide to reinvest the value obtained at the end of the first year to finance a further investment. Call it Y.

This decision paves the way for a conflict of interests between managers and shareholders. Instead of distributing dividends to shareholders, managers decide to reinvest the return obtained from X in another investment project with the purpose of generating additional value in the future. Indeed, managers have incentives in reinvesting money, since they receive a private benefit from such decisions.[246]

Furthermore, the benefit for managers increases, if additional investment projects having positive net present value actually exist. In an extreme setting characterized by the presence of optimal and positive net present value projects, managers have always the incentive to invest.[247]

If the return, obtained by the company from the initial investment, is not sufficiently high to finance the optimal investment volume of project Y at the end of the first year, managers might decide to reinvest the yield obtained by X in another project Z that it is not optimal like Y.

$$Z < Y$$

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[246] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[247] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

In other words, managers will prefer an investment volume Z that is lower than the optimal one Y with the purpose of not losing the benefit coming from investments.

The difference between the net present value of cash flow that the company would realize by choosing the project Y (the optimal project) and the cash flow actualized with the lower investment volume Z provides a measure of the agency cost:

$$Agency\ Cost = CF(Y) - CF(Z)$$

This specific example captures the essence of the overinvestment problem and it highlights how it is more likely to manifest when companies possess large cash flows.[248]

Even if managers act in accordance with the interests of shareholder, it might happen that the benefit, deriving from the implementation of the investment project, will satisfy bondholders first. More precisely, when the enterprise value is low and the company is highly levered, the risk of financial distress is severe. In the event of default, bondholders will be reimbursed before shareholders. Therefore, the investing program performed by managers will not provide an increase in the utility and welfare of shareholders.[249]

In this specific case, the problem can be mitigated through the reduction of the amount of outstanding debt or the implementation of specific corporate risk programs without giving up the tax benefit. A lower volatility in expected cash flows would create incentives for the managerial side and it facilitates the implementation of sound and positive investment projects.

An agency problem between bondholders and stockholders arises because of the different nature of their claims. In the event of default, bondholders have always an order of priority in receiving value, while equity holders are the residual

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[248] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[249] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

claimants. Indeed, they receive the market value remaining after bondholders are satisfied. [250]

If the benefit, coming from the managerial decision to reinvest resources in value-enhancing projects, is accumulated in the hands of bondholders, the company will not have incentives to undertake new investments. The underinvestment problem arises when a substantial portion of firm value encompasses future investment opportunities. These phenomena are more likely to occur in companies having major growth opportunities, since their firm value is most affected by misleading decisions related to the implementation of investment projects. Therefore, high growth opportunities along with great leverage ratios should increase the incentives for a company in resorting to corporate hedging strategies.[251]

The proxies indicating the existence of available growth opportunities are research and development expenditures, property, plant and equipment expenses, asset growth rates and acquisition activities.[252] For companies belonging to certain industries like the gold mining, gas, and oil producers also exploration expenditures are relevant elements providing a proxy about potential growth opportunities.[253] Since these proxies provide a measure of the number of resources invested into activities characterized by growth prospect, a positive correlation between these variables and advancement opportunities should exist.[254]

In order to transfer wealth from bondholders to shareholders, managers also carry out asset substitution and risk shifting activities. Indeed, an increase in the value of

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[250] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[251] Aretz, Kevin and Bartram, Söhnke M., "Corporate Hedging and Shareholder Value", Munich Personal RePEc Archive, Lancaster University, Management School, Department of Accounting and Finance, 1 February 2009

[252] Lin and Smith, 2007; Knopf et al., 2002; Allayannis and Ofek, 2001; Gay and Nam, 1998; Howton and Perfect, 1998; Fok et al., 1997; Géczy et al., 1997; Dolde, 1995; Nance et al., 1993

[253] Rajgopal and Shevlin, 2002.

[254] Aretz, Kevin and Bartram, Söhnke M., "Corporate Hedging and Shareholder Value", Munich Personal RePEc Archive, Lancaster University, Management School, Department of Accounting and Finance, 1 February 2009

shareholder's equity is accompanied with a decrease in the value of bondholder's claims, when the firm replaces riskier investment with low risky projects.

Corporate hedging has the potential to mitigate the underinvestment and the asset substitution problem. Using financial derivatives, managers can control the volatility related to cash flows which represents one of the inputs concurring in the determination of firm value. Assuming a constant optimal investment volume, in order to reduce the risk of cash flow volatility, companies implement a hedging strategy aimed at stabilizing the future expected value coming from the investment project. If the corporate hedging program is able to mitigate the risk inherent the possibility for the company to obtain a cash flow value below the optimal expected level, the costs related to the agency problem will be lower.[255]

The benefits of hedging the risk factor are greater when the company has stronger opportunities for growth and tighter financial constraints. Indeed, the presence of such conditions represent a spawning ground for the emergence and the growth of agency conflicts among actors.

The demand for external sources of finance is expected to be positively correlated with the amount of growth opportunities. Assuming that the use of external sources of finance increase the risk of the company of not being able to repay its obligations, the direct consequence is the implementation of corporate hedging strategies.

Financial constraints are larger for firms that invest more capital in intangible assets rather than tangible ones like in the case of plant and equipment expenses. The reason that explains the principle is linked to the fact that capital-intensive companies can collateralize their purchased tangible investments. On the other hand, service firms having a large portion of immaterial assets will find it difficult to collateralize investments since intangible resources like human capital and research and development programs are difficult to be used as a guarantee.[256]

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[255] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[256] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

For that reason, intangible investments are subject to tight financial constraints and, consequently, corporate hedging result to play a fundamental role. Therefore, the higher the portion of intangible resources and the use of external financing, the greater the probability that companies will rely on corporate hedging strategies.[257]

An alternative solution equally effective would be the retention of cash holdings that are meant to reduce the demand for external sources of finance and, thereby, mitigate the underinvestment problem. The practice of raising cash holdings is intended to alleviate the conflict of interests involving stock and bond holders. Indeed, companies characterized by volatile cash flows hold larger cash-reserves to compensate for fluctuations. [258]

3.3.2) Risk management and the asymmetric information problem

Information asymmetry occurs when one party in an economic transaction holds greater material information and knowledge than other parties. Information advantage represents a critical and valuable feature, because it creates a strong competitive edge for the company. Having access to certain information in advance have positive effects on firms, especially during crisis or particularly volatile periods. [259]

According to Porter's framework, information advantage enables companies to deal better with actors belonging to their value chain like suppliers, customers, partners and competitors. More specifically, information advantage can be used to anticipate opponent's moves and speed up reaction times when risk associated to the entrance of new competitors occurs. The ability of a company to collect data improve the quality of information concerning the nature of the threat and its

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[257] Géczy, Minton, and Schrand (1997), Lewent and Kearney (1990) and Nance, Smith, and Smithson (1993)

[258] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[259] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

potential consequences on firm value both in the short and long-term horizon. Companies that are committed in new projects and make investments in their network of contacts develop the capacity of acquiring such knowledge. The consciousness about alternative suppliers and investment opportunities give to companies a considerable utility. In the event that existing providers fail or balk, companies holding information on available alternative sources possess an advantage over competition. Similarly, awareness about consumer's preferences and their willingness to pay can be used in the definition of pricing strategies and the improvement of product offering programs.[260]

To exploit risk better than competitors, a company needs to gain a competitive advantage. The process of getting information can be exploited in different ways. For instance, the rationale behind the decision of acquiring a company involves multiple benefits such as the enhancement of synergies and quality of internal information. Knowledge is difficult to be transferred, since it is embedded into the firm. Therefore, the acquisition of a company, producing a certain product line or carrying out a particular service, increase the consciousness and awareness of the organization and the activity executed. The area of improvement related to such decision enables companies to exploit their operations. In particular they develop new platforms, knowledge, assets, resources in a more effective and efficient way.[261]

Conversely, a backward integration reinforces the position of the firm as compared with suppliers. The acquisition of a firm that manages internally a particular stage of a product life cycle can create value for the company, since it facilitates the access to irreplaceable resources. Obtain the access to capital information and resources

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[260] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[261] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

enable companies to strengthen their position and enhance the process of product implementation within the division. Typically, in these cases the target firm operates in the same industry of the parent, but it possesses more advanced resources in terms of research and development. Finally, the merger or the acquisition of a company can also have the feature of broadening the scope of the company towards new geographies and markets. For instance, the acquisition of a company operating in a specific market offers the opportunity to acquire knowledge and information about different contexts and bypass the risk of entry of new competitors. [262]

Entities dealing with risk and threats have the tendency to adopt a defensive standpoint and develop corporate hedging programs in the short-term horizon. In some instances, risk and uncertainty are better served when companies adopt an open-minded perspective and they look forward to new investment and growth opportunities which represent the source of sustainable competitive advantage. Within this framework, the merger and acquisition of another company offer to firms the opportunity to exploit synergies, get access to knowledge, optimize costs, developing new products, exploit the sale force and the possibility to improve their operations. [263]

3.3.3) Risk management, costs of financial distress and risk of bankruptcy

As long as borrowing creates a tax benefit, companies have incentives in increasing the quota of capital raised through external sources of finance. The decision of the firm to fund its operations through debt increase the risk of incurring in a condition of financial distress or even default. When the probability of default is increasing, the expected value of bankruptcy costs raises as well. The amount of cost related to

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[262] Chen Lin, Micah S. Officer and Beibei Shen, Managerial Risk-Taking Incentives and Merger Decisions, Cambridge, 2018.

[263] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

the risk of incurring in a condition of financial distress is computed by multiplying the probability that the company will experience distress and the related costs of bankruptcy. [264]

$$Costs\ of\ distress = C(V_i) = P_i * C$$

$$C(V_i) < V_i$$

In the overlying equation, P_i reflects the likelihood that the company will experience distress, $C(V_i)$ are the costs of bankruptcy and V_i represents the ultimate value of the firm at the end of period i. Even though the issuance of debt provides to the firm a tax advantage related to the deduction of interest payments, the final valuation of the levered firm remains negatively affected by the present value of expected bankruptcy costs.

Bankruptcy describes the process of freeing the company from obligations that it is not able to pay back. Moreover, it offers to creditors the opportunity for repayment.

When a company is not able to pay back its debts, it has a very limited set of options for its future. Corporate risk management does not affect directly the probability of the company to experience default or bankruptcy. Nevertheless, it reduces indirectly the probability of default by lowering the volatility of cash flows. The implementation of insurance or financial hedging programs appears to have a positive impact on reducing costs related to the bankruptcy threat. Indeed, corporate hedging can support the firm's ability to meet investment commitments and maintain steady its production and employment levels. [265]

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[264] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[265] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

The bankruptcy costs can be divided into two clusters. Direct costs are explicit and easily measurable, since they are related to the legal action taking place when the company is legally defaulted. They are usually related to a specific source like a court, a lawyer or other legal fees associated with insolvency. The second cluster is represented by indirect costs. Indirect costs are multi-faceted, because they are generated by the actual behavior of stakeholders and stem from changes in operational performance and access to financing.[266]

Customers frequently become reluctant to do business with a distressed firm because they doubt the corporate reliability of providing supplies and after-sale services. Employees of a distressed firm also become skeptical about career prospects and look for other opportunities. In turn, competitors take advantage of the situation by taking an advantage over customers and employees of the distressed company.[267]

Let's consider a levered company. If the ultimate value generated by the enterprise (V_f) upon maturity is greater than the value of debt (D), bondholders will be paid back for the full amount. Similarly, shareholders will be compensated with the remaining value after the deduction of debt and tax payments (T).

$$V_f > D$$

$$V_{Shareholders} = V_f - (T * (V_f - D))$$

$$V_{bondholders} = D$$

The opposite scenario contemplates the event in which the value generated by the company is lower than the amount of debt upon maturity. In this specific case, the ability of the company to pay back its obligations is compromised. When a company

[266] Kun Mo,1 Farrukh Suvankulov2 and Sophie Griffiths, "Financial Distress and Hedging: Evidence from Canadian Oil Firms", Bank of Canada Staff Discussion Paper 2019-4 April 2019

[267] Kun Mo,1 Farrukh Suvankulov2 and Sophie Griffiths, "Financial Distress and Hedging: Evidence from Canadian Oil Firms", Bank of Canada Staff Discussion Paper 2019-4 April 2019

experiences default, only bondholders will receive the face value of debt net of bankruptcy costs (D– C).

$$V_f < D$$

$$V_{bondholders} = D - C$$

$$V_{Shareholders} = 0$$

When the probability of company's default increase, the related costs C will be substantive. As a consequence, bondholders will not be paid back for the full amount of debt, but they will receive the remaining value of the difference between the level of debt and the costs of bankruptcy.

Assume that the firm wants to protect itself from the risk of bankruptcy, therefore it decides to set up a targeted financial hedging program. Let the payouts from the firm's hedging contract denoted by H. When the probability to experience bankruptcy is low, the company will pay a negative amount (H<0). Conversely, if the company experiences default, it will receive a positive compensation because of the coverage provided by the financial hedging plan (H>0). The benefits brought by the implementation of a hedging program comprise the reduction of the magnitude of distress costs. Indeed, the value of the firm is hedged at a point that is higher than the value of debt.[268]

Companies have strong incentives in implementing corporate hedging programs when they are closed to financial distress. Among the category of enterprises most encouraged in implementing risk management programs there are highly levered firms and companies having low credit ratings.

By expanding the definition of corporate hedging beyond the traditional use of financial derivatives, other protective actions shall be included into the field of analysis. A more holistic view of risk management demonstrates how the practice of purchasing obligations represents a widely used hedging tool implemented by

[268] Kun Mo,1 Farrukh Suvankulov2 and Sophie Griffiths, "Financial Distress and Hedging: Evidence from Canadian Oil Firms", Bank of Canada Staff Discussion Paper 2019-4 April 2019

companies in order to maintain their level of investments high, even in the condition of financial distress.[269]

Almeida, Hankins, and Williams (2017) have demonstrated empirically how the practice of purchasing obligation has established itself over time as an alternative hedging tool. In support of this thesis, empirical evidence explains that companies entering in a condition of financial distress, appear to change their hedging strategy from the practice of using financial derivatives to the act of purchasing obligations. Indeed, financial constraints and distress limit risk management and hedging options.[270]

Along with financial hedging solutions, Lewellen find out that diversification play a critical role in the reduction of the likelihood of bankruptcy costs. Indeed, companies located in countries having a progressive taxation system have major incentives to hedge, since a convex correlation between the firm's effective tax rate and its pre-tax income actually exists. Enjoining this positive correlation, companies are able to reduce their expected tax liabilities and, consequently, decreasing the variability of cash flow. The tax advantage is brought by the implementation of a financial hedging strategy which imply the use of derivatives in parallel with the implementation of diversification programs. Indeed, the capability to reduce the probability of generating low cash flows enables companies to increase their debt capacity and also the tax benefit of interest deduction. [271]

In conclusion, companies characterized by a higher probability of experiencing financial distress would be the most likely to benefit from hedging. When a company enter in a condition of financial distress, the practice of raising capital

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[269] Almeida, Hankins, and Williams, 2017.

[270] Heitor Almeida, Kristine Watson Hankins, Ryan Williams, "Do Firms Hedge During Distress?", November 2018. Link: https://efmaefm.org/0EFMAMEETINGS/EFMA%20ANNUAL%20MEETINGS/2019-Azores/papers/EFMA2019_0475_fullpaper.pdf

[271] Kun Mo,1 Farrukh Suvankulov2 and Sophie Griffiths, "Financial Distress and Hedging: Evidence from Canadian Oil Firms", Bank of Canada Staff Discussion Paper 2019-4 April 2019

becomes more difficult and expensive. In this context, firms that perceive to face more distress costs are more likely to develop corporate hedging programs.[272]

The implementation of a risk management program has the potential to enhance the reduction of bankruptcy costs. From the capital provider's point of view, an insured company is characterized by a lower bankruptcy threat, therefore the cost of capital will be lower and firm value higher. Furthermore, the implementation of risk management makes cash flows smooth, giving to companies the possibility to gather internal funds in order to exploit growth opportunities and finance investment.

3.4) Understanding corporate risk management practice: A costs and benefit trade-off

Before implementing a particular risk management program, the benefits produced by the plan should be weighted off against the associated costs. Expenditures related to the enforcement of a corporate hedging system range from small to large scales depending upon distinct factors:

- The class of risk that should be managed,
- The time horizon involved to implement the action,
- The specific risk management solution that the company decides to develop.

If costs sustained by the firm to implement the program are considerable, but they produce significant benefits like an increase in the value of future cash flows or a lower discount rate, managers should implement the plan. Conversely, if costs are considerable and they are not compensated with similar benefits, the risk management program should not be enforced.[273]

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[272] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

[273] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

As highlighted in the course of the chapter, risk management is more than the purely activity of reducing corporate risk exposure. Successful firms are those that impute their success not to the decision of avoiding risk, but to the choice of seeking out and take up the right risk.[274] Indeed, exploiting risk affects positively each of these inputs:

- Cash flow from existing assets: risk-taking activities lead to efficient operations and higher cash flow values from existing assets.
- Higher expected growth rates: the implementation of efficient risk management programs result in a superior level of return on capital.
- Length of the growth period: the ability to exploit opportunities and manage efficiently risk give to companies an important competitive advantage.
- Discount rate: risk management programs capable of enforcing the potential upside risk and minimize the downside component are characterized by lower discount rates.[275]

Both financial and operational hedging are intended to offer protection to companies against uncertain situations and give them the possibility to manage efficiently their risk exposures.

Operational hedging offers to companies the possibility to mitigate risk by operational means and, for this reason, it requires high levels of capital investment. The higher costs are compensated by the coverage period. Specifically, operational hedging provides to companies a long-term protection against the firm-specific risk constituent. Furthermore, the operational flexibility achieved through operational means, like the ability to shift the production according to changes in the environment, the capability to differentiate the supply or transfer technologies are considered to be important value-enhancing capabilities owned by companies. The

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[274] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[275] Damodaran, Aswath. "*Value and Risk: Beyond Betas*", Financial Analysts Journal, vol. 61, no. 2, 2005, pp. 38–43. *JSTOR*.

flexibility that some firms hold when they face threats and perils gives them an advantage over their more rigid competitors.[276]

Nevertheless, successful firms find difficulties in remaining flexible as they grow in size. As firms succeed, they become more unwilling to consider innovative strategies that may put their existing business at risk. As a consequence, new and disruptive technologies are more likely to emerge from start-up rather than established businesses.[277]

Conversely, financial hedging mitigates short-term risk exposures of companies like currency and interest rate volatility by transferring the systematic risk component between transacting parties. Reasonably, some risks are hedged more frequently than others. For instance, the exchange foreign risk is the most commonly hedged component, because it exerts a direct effect on the value of accounting earnings. Similarly, commodity risk is at the center of many hedging strategies.[278]

Operational and financial hedging are complementary; indeed, they are used to manage different categories of risk exposures. The former is implemented to offer a long-term protection to the economic risk exposure of companies. The latter is intended to cover the transaction risk exposure in the short-term horizon.[279] In conclusion, a company that is able to take advantage of its real growth opportunities and, simultaneously, mitigate and control risk can fully benefit from the enhancing value effect of an integrated risk management strategy.

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[276] Ehsan Elahi, "*How risk management can turn into competitive advantage: Examples and rationale*", University of Massachusetts Boston, June 2013. http://works.bepress.com/ehsan_elahi/2/

[277] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[278] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

[279] Anca Butnariu, Florin-Alexandru Luca, Andreea Apetrei, "*Mitigating financial risk by using hedging strategies*", SEA Practical application of science, Volume IV, Issue 16 (1/2018).

Since corporate hedging has a number of alternatives and it is suitable for different firms in alternative contexts, in the following chapter an empirical analysis based on the European experience will be conducted. The purpose of the study is to understand the role played by the external and internal environment and their effect on corporate risk management decisions. In particular, the legal and the financial system, the capital structure, the growth cycle and risk premiums will be the keys to understand the rationale under risk management choices and corporate hedging decisions. [280]

[280] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

CHAPTER 4

EMPIRICAL RATIONALE: EVIDENCE FROM EUROPEAN EXPERIENCE

4.1) Sample and Data Sources

In an environment that is growing more volatile, corporate leaders need to steer enterprises towards resilience by exploiting strategic risk capabilities and implementing targeted programs. The purpose of the present analysis consists in understanding the rationale underlying risk management decisions and verifying whether a particular correlation or pattern, among the set of companies operating in the Euro Area, actually exists. The analysis will provide a fruitful set of information and insights on how risk is currently managed across different geographies and organizations. The sample of enterprises will be clustered into three macro categories on the basis of their sectoral view of risk, their risk appetite statement and profile.

The sample comprises 645 companies operating in the European context. Data is extrapolated from Orbis platform, a cross-country database provided by Bureau van Dijk (BvD) that contains financial information coming from the firm's balance sheet and profit and loss accounts. Besides giving information on financial statements, Orbis database contains also data referring to ownership, legal events, national scores and other details about exponents, managers and advisors for around 86 million European firms.[281]

Orbis data follow the disclosure of the annual financial reports and cover a temporal horizon of 10 years. Since data for 2021 is not complete and affordable,

[281] Nicola Benatti, European Central Bank, Francesco Napolitano, European Central Bank, "*An insight into the derivatives trading of firms in the euro area*", Ninth IFC Conference on "Are post-crisis statistical initiatives completed?" Basel, 30-31 August 2018.

the analysis will be carried out from year 2012 up to the latest available and reliable information dated to end-2020.[282]

The criteria defined in the selection and extraction phase to determine the sample are listed below:

- The sample comprises only non-financial companies. Financial firms are excluded from the analysis because their high leverage ratios do not have the same rationale and meaning as for non-financial firms.
- The sample incorporates enterprises with details and information related to their activities, the proactivity towards the risk management discipline, the sectoral view of risk, their short- and long-term objectives.
- The analysis will consider solely companies operating in the European context.
- The BVD sector that is considered in the analysis includes companies operating in the manufacturing and service industry. More precisely, companies belonging to the sample perform mining, quarrying activities and utility services. They also realize industrial, electrical and electronic machineries, chemicals, pharmaceuticals, petroleum, transport means and other manufacturing products. The decision to include within the sample manufacturing enterprises and distributors of services is related to the fact that those companies play an important role in the value risk chain management.
- All companies with known and available financial information over the projection time horizon.

The extraction on the digital platform has returned a wide sample of companies which has been suitably aggregated and clustered into three macro categories defined on the basis of the following characteristics and features:

Group 1	Companies belonging to this category manage their risk exposure by developing efficient differentiation strategies. More precisely, they serve multiple markets and offer several

[282] Bureau Van Dijk, A Moody's Analytics Company, Orbis.

	products and services to customers. They address strategic challenges by allocating an important share of resources in the promotion of research and development activities with the purpose of providing customers with innovative solutions and high-quality services. Enterprises belonging to group 1 have a long history indeed; they are characterized by several and stable relationships within their business network. [283]
Group 2	Enterprises belonging to this category allocate strategically their resources in order to pursue business expansion, enforce the brand value, leverage their position in the market and exploit organic growth opportunities. Companies have been formed more recently compared to the first business category and, for this reason, they strive to improve their margins through enhanced pricing and procurement processes. In order to manage risk efficiently, they differentiate their offer and provide high quality products and services to customers. Indeed, they allocate a significant number of resources in support of the implementation of research and development programs aimed at increasing the operational effectiveness.[284]
Group 3	Companies belonging to the third business category are united by a similar sectoral view concerning risk. Their strategic perspective consists in maximizing firm value and

[283] Bureau Van Dijk, A Moody's Analytics Company, Orbis.

[284] Bureau Van Dijk, A Moody's Analytics Company, Orbis.

	concurrently minimizing the amount of costs and risk associated to their specific investment projects. They aspire to obtain the access to the power generation market in ways that combine operational efficiency along with an optimal allocation of costs and resources. Indeed, companies belonging to the third group are formed recently and they are small in size. Comparatively to the other two business categories, also the proportion of resources allocated in research and development programs is lower.[285]

In view of these considerations, for each business group it will be defined the key risk indicators and the related risk management models implemented by managers in order to deal with risk and market imperfections both in the short- and long-term period.

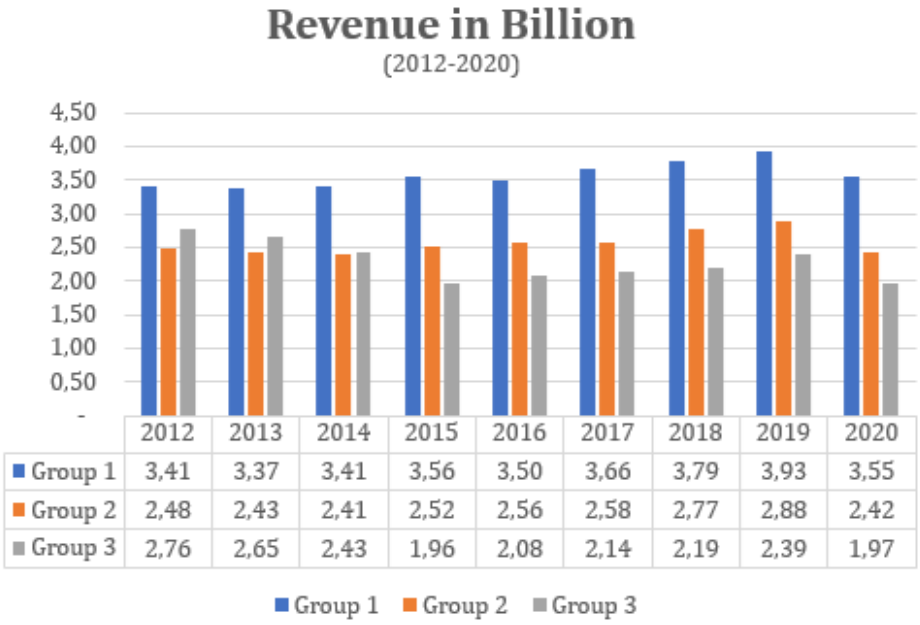
4.2) Valuation and Measurement Techniques

In order to secure the organic growth of the firm and maximize shareholder's return, managers should allocate resources reasonably by investing in good and sound investment projects. Profitability represents a fundamental indicator for the business performance, because it weighs the competitive advantage held by the undertaking in relation to the market. Furthermore, it evaluates the capability of the company to generate a return on capital employed on the basis of its resources and the strategic decisions implemented.[286]

[285] Bureau Van Dijk, A Moody's Analytics Company, Orbis.

[286] Investopedia, "The difference between profit and Profitability", link: https://www.investopedia.com/ask/answers/012715/what-difference-between-profitability-and-profit.asp

The empirical investigation will begin by defining the weight of each business group in terms of revenue generated. As illustrated by the graph below, companies operating in the first group record higher levels of revenue compared to other business categories.



	2012	2013	2014	2015	2016	2017	2018	2019	2020
Group 1	3,41	3,37	3,41	3,56	3,50	3,66	3,79	3,93	3,55
Group 2	2,48	2,43	2,41	2,52	2,56	2,58	2,77	2,88	2,42
Group 3	2,76	2,65	2,43	1,96	2,08	2,14	2,19	2,39	1,97

A critical element of analysis is the sudden slowdown of the sustainable growth trend in revenue experienced by the three classes of enterprises in 2020. The graph demonstrates how the effects of the pandemic have adversely affected all companies of the sample in the same way. The global pandemic is an outstanding example of risk that affects all market participants at the same time, regardless the business activity carried out. This kind of risk cannot be avoided; therefore, enterprises have felt the growing need to closely monitor their critical risk drivers. In the specific case of the pandemic, three decisive factors have exerted an impact on firm value: the political, technological and societal risk. On the political side, many governments have implemented protectionist programs in order to create more self-sustaining economies. Despite the noble intent to protect businesses, such decisions have prevented enterprises to obtain free access to foreign talents and investment projects along with the possibility to exploit targeted merger and

acquisition opportunities.[287] On the technological side, engineering drivers have transformed business interactions, increased cyber risk exposures and created more complex networks. Furthermore, the need for increasing efficiency and reducing on-site labor have pushed the race towards digitalization and expose businesses to unforeseen financial risks. Finally, societal drivers have increased the pressure on industries in relation to environmental, social and governance aspects of business performance and they have also enhances the firm sensibility on environmental topics.[288]

In order to have an insight about the company's profitability, the analysis will proceed with the definition of two important margins: the EBITDA and operating margin. EBITDA margin defines the ratio between the economic indicator EBITDA and total revenue. The index considers the operational activities carried out by a company and it excludes financial items that do not have a direct impact on processes. Since taxes, interests, amortization and depreciation are not taken into consideration in EBITDA, companies operating in distinct countries can be compared more easily. Indeed, the presence of different corporate taxation systems would make the comparative analysis particularly difficult.[289]

The EBITDA margin provides information on the profitability of the business and it defines the impact of savings on operating costs. The objective of a company is to maintain the index as high as possible, since a superior margin would indicate low productive, administrative and personnel costs in relation to a particular level of sales.[290]

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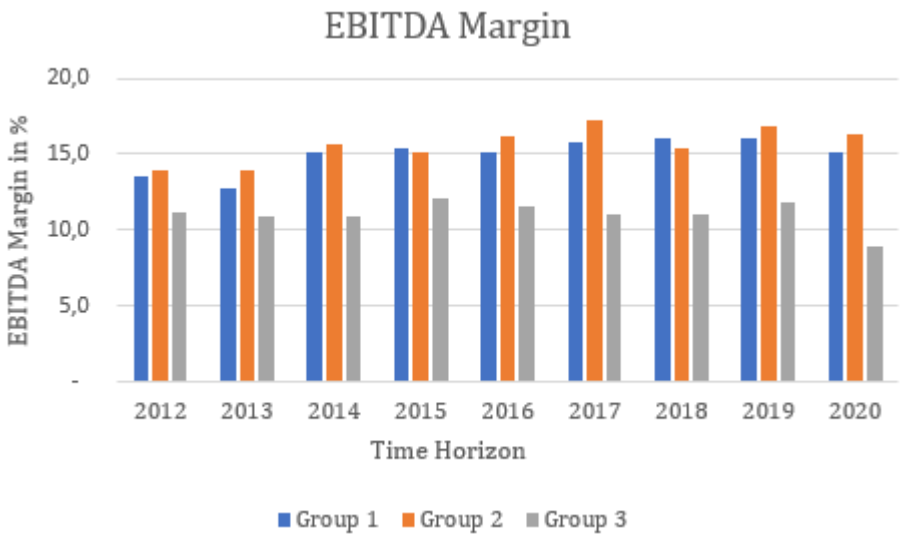
[287] Carolina Klint, "These are the top risks for business in the post-COVID world", The Davos Agenda, 19 Jan 2021. Link: https://www.weforum.org/agenda/2021/01/building-resilience-in-the-face-of-dynamic-disruption/

[288] Carolina Klint, "These are the top risks for business in the post-COVID world", The Davos Agenda, 19 Jan 2021. Link: https://www.weforum.org/agenda/2021/01/building-resilience-in-the-face-of-dynamic-disruption/

[289] Ionos, EBITDA Margin, Link: https://www.ionos.it/startupguide/gestione/ebitda-margin/

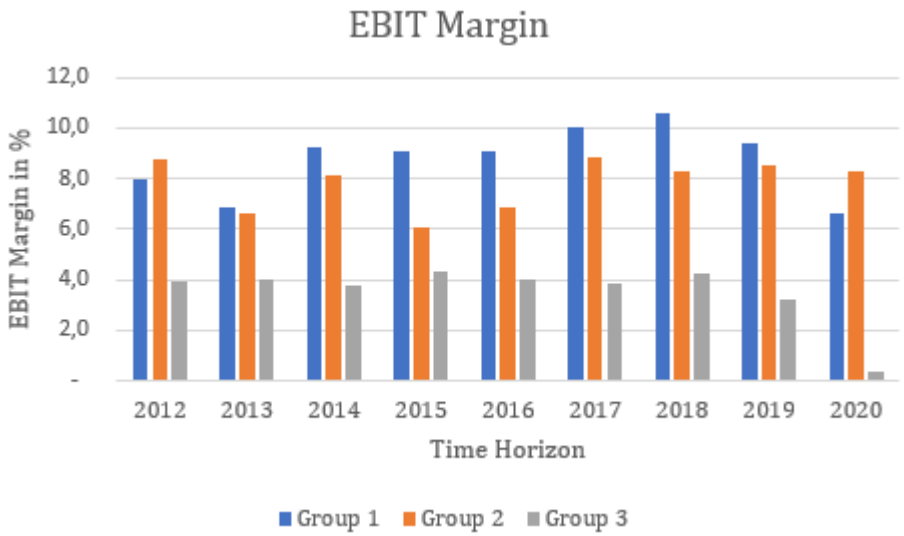
[290] James Chen, David Kindness, Investopedia, Ebitda Margin, 12 April 2021. Link: https://www.investopedia.com/terms/e/ebitda-margin.asp



The above explanatory drawing reveals consistency in the levels of EBITDA margin between the first and second business categories. While companies belonging to the first group have gradually increased their EBITDA margin up to year 2020, those operating in the second cluster show a fluctuating trend over the projection time horizon. As regards to the third business group, the level of the EBITDA margin is lower compared to other categories indeed, companies have been proven to have particularly suffered from the negative effects of the pandemic.

Since the economic environment is constantly changing, companies need to respond with new and sustainable investment projects. The operating margin has the intrinsic characteristic of including depreciation and amortization of tangible assets into the analysis. Production means have a limited useful life and their value has to be amortized over the time horizon.[291] Within this framework, the EBIT margin reflects the percentage ratio of operating income to turnover and it enables to analyze the business structure of companies. Following a chart illustrating the trend of the EBIT margin over the time horizon considered in the analysis:

[291]Ionos, Ebit Margin, Link: https://www.ionos.it/startupguide/gestione/ebitda-margin/



Companies operating in the first group category confirm the predominance of their position in terms of EBIT margin during the time horizon considered in the analysis. Nevertheless, they have recorded a significant decrease in the value of the margin, concurrently with the spread of the pandemic. This result is justified by the configuration of the business cost structure. Indeed, the proportion of fixed and variable costs exert an influence on the degree of operating leverage and, consequently, it also affects the EBIT margin.

Enterprises with higher infrastructure necessities are characterized by a superior operating leverage. Rigid cost structures are distinctive of mature companies provided with superior growth potential, low financial constraints and great demand uncertainty. The weight of fixed assets quota on total value is high especially for companies belonging to the first group category. On the other side, a flexible structure characterized by a substandard quota of fixed costs offers versatility to companies in terms of resource planning.[292] This type of configuration is implemented by enterprises operating in the second and third business category, indeed they are younger and constantly looking for new opportunities.

One more time, the chart above highlights how the global pandemic has led a negative impact especially for companies of the third group. A negative operating

[292] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

margin should be closely monitored, because it might suggest problems within the business model or cost structure of companies.

A further dimension which exerts a significant contribution in defining the company's potential and growth opportunities is the implementation of research and development programs. The development of research and development projects enable companies to improve innovative clusters and boost technological potential. It represents an effective and innovative tool used at managerial level in order to achieve strategic goals and address challenges. The implementation of R&D results offers to companies the competitive advantages of achieving a scientific and technological leadership in the industry where they operate.[293]

The research and development expense to revenue ratio is an index that provides a measure of the proportion of sales allocated by companies for the exploration and investigation of new programs. Usually, pharmaceutical and high-tech enterprises are more likely to have higher ratios compared to other industries.[294] Within the sample, each group of companies employs a part of its own resources in support of the implementation of research and development programs. Below a scheme that graphically represents the implementation of research and development programs among each group of companies.

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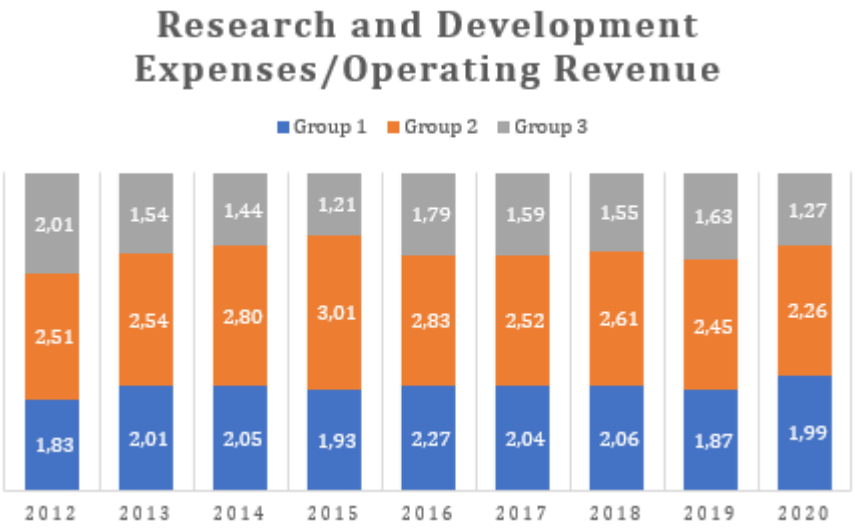
[293] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

[294] YChart, Financial Glossary, Link: https://ycharts.com/glossary/terms/rnd_to_revenue#:~:text=The%20Research%20%26%20Development%20(R%26D),place%20different%20values%20on%20R%26D.



Since the research and development expense to revenue ratio provides a measure of the number of resources invested into activities which have a growth prospect, a positive correlation between these variables and growth opportunities should exist.[295]

As can be deduced from the graph, companies belonging to group 1 and 2 have developed higher levels of research and development programs, demonstrating their willingness to sustain product innovation and promote pioneering services. Conversely, the proportion of resources allocated by companies belonging to the third group is slightly smaller. Investments in product quality and safety standards contribute in generating significant returns on capital. Furthermore, they strengthen the brand reputation for quality with the consequence of boosting the demand for the product or service provided.

Generally, firms that invest more capital on intangible assets rather than tangible investment projects like plant and equipment are characterized by larger financial constraints. While enterprises of the first group have mature profiles and, therefore, they benefit from financial stability, the second category is longer bound and companies are particularly affected by financial limitations.[296] Within this framework, corporate hedging results to play a fundamental role, since the number

[295] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

[296] Leland, Hayne E. "Agency Costs, Risk Management, and Capital Structure." *The Journal of Finance* 53, no. 4 (1998): 1213-243. http://www.jstor.org/stable/117400.

of resources employed to sustain research and development programs is high and intangible projects are difficult to be collateralized.

4.2.1) Financial Leverage and Proactive Risk Management Decisions

Profitability outlines the capability of the company to generate a return on investments on the basis of its resources. It represents a fundamental indicator for the business, because it weighs the competitive advantage held by the undertaking in relation to the market and it provides evidence on business prosperity. [297]

The drivers of profitability are several and they rely upon specificities of the business. Within this framework, the capital structure exerts a key influence on defining the productivity of enterprises in the forms of return on investments, return on capital employed and profit margin. In order to outline the composition of debt and equity in a company, the leverage index will be defined, since it provides a measure of the extent to which firms are reliant on external sources of finance.

Previous researches on capital structure have revealed interesting features concerning the relationship between leverage and profitability. More specifically, the revised theorem of Modigliani and Miller argued that high levels of debt are valuable because of the tax saving stemming from superior interest expenses. According to the principle, enterprises with higher levels of debt will benefit from the tax advantage and, for this reason, a positive relationship between profitability and leverage should exist. On the other hand, the trade-off theory points out that enterprises should increase their level of debt to the degree in which tax savings are offset by the costs of financial distress. [298]

In other words, the benefits of external financing are reduced when debt evens the equilibrium between tax benefits and financial distress.[299]

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[297] Investopedia, "The difference between profit and Profitability", link: https://www.investopedia.com/ask/answers/012715/what-difference-between-profitability-and-profit.asp

[298] Myers (1984)

[299] Alexander Andersson, Joel Minnema, "*The relationship between leverage and profitability A quantitative study of consulting firms in Sweden*", Umeå, 2018-05-16.

The financial variable that provides a measure of the company's leverage is the debt-to-equity ratio. The financial ratio points out the amount of debt a company is using to run the business and it defines the level of risk associated to the capital structure. From the business perspective, debt represents an attractive source of finance because interest expenses are deductible. Nevertheless, the benefits of the tax advantage are significantly reduced when debt evens the equilibrium between tax benefits and financial distress. [300]

The greater the level of capital raised through debt; the higher will be the debt-to-equity ratio. A higher index is a signal that the company might be in a condition of financial distress. Indeed, its repayment capacity might be compromised, because of the risk arising from indebtedness. Conversely, a low ratio may suggest that the company is over-relying on equity to finance its operations. Such decision can be costly and inefficient for the company that is exposed to the risk of leveraged buyout.[301]

The debt-to-equity ratio acts as a leverage, since the financial indebtedness behaves as a positive or negative multiplier of profitability. If the return on investment exceeds the related costs, the higher proportion of capital raised through debt will result in a greater earning opportunity for the company. Indeed, the debt-to-equity ratio will exert a positive leverage effect on firm profitability. Conversely, when costs exceed benefits, the leverage will enforce a negative influence on company's profits.

The table below outlines the debt-to-equity ratios related to each business group over the time horizon considered in the analysis:

Debt-to-Equity Ratio									
Group	**2012**	**2013**	**2014**	**2015**	**2016**	**2017**	**2018**	**2019**	**2020**
Group1	1,47	1,77	1,29	1,63	1,55	1,40	1,34	1,18	1,39
Group 2	1,39	1,73	1,65	1,61	1,35	1,26	1,62	1,33	1,47
Group 3	1,42	1,32	1,66	1,85	2,33	2,23	2,23	2,18	2,15

[300] Adam Hayes, Margaret James, Leverage, Mar 19, 2021, Investopedia. Link: https://www.investopedia.com/terms/l/leverage.asp

[301] Amy Gallo, "A Refresher on Debt-to-Equity Ratio", Harvard Business review. Link: https://hbr.org/2015/07/a-refresher-on-debt-to-equity-ratio

Generally, a debt-to-equity ratio ranging from 1 to 1,5 reflects a good financial structure. As shown in the table, companies belonging to the first two categories have a stable and sustainable financial configuration. Conversely, companies belonging to the third category are characterized by superior debt-to-equity ratios and this status reflects an unbalance financial structure. When a company increases the portion of capital using debt as external source of finance, the probability of experiencing a financial default also heightens. Indeed, if the company is not able to pay back its debts and interests, the lender can force it into bankruptcy. The perception of being considered in trouble makes distress costs extraordinarily high.[302]

As specified above, the benefits of the tax advantage are significantly reduced when debt evens the equilibrium between tax benefits and financial distress. Taking into consideration the legal events experienced by companies during the time horizon considered in the study, the 4% of enterprises have endured a condition of financial distress. The table below outlines for each business group the number of enterprises which have received a message about bankruptcy proceeding or they have obtained a communication signaling the creditor or debtor's intention to appeal to the court with the statement for bankruptcy.

Bankruptcy Proceedings (2012-2020)	**Group 1**	**Group 2**	**Group 3**	**Sample**
Number of Enterprises per Group	257	226	164	647
Enterprises involved in Bankruptcy Proceedings	8	5	12	22
Incidence on Group	3,11%	2,21%	7,32%	3,40%
Incidence on Sample	1,24%	0,77%	1,85%	3,40%

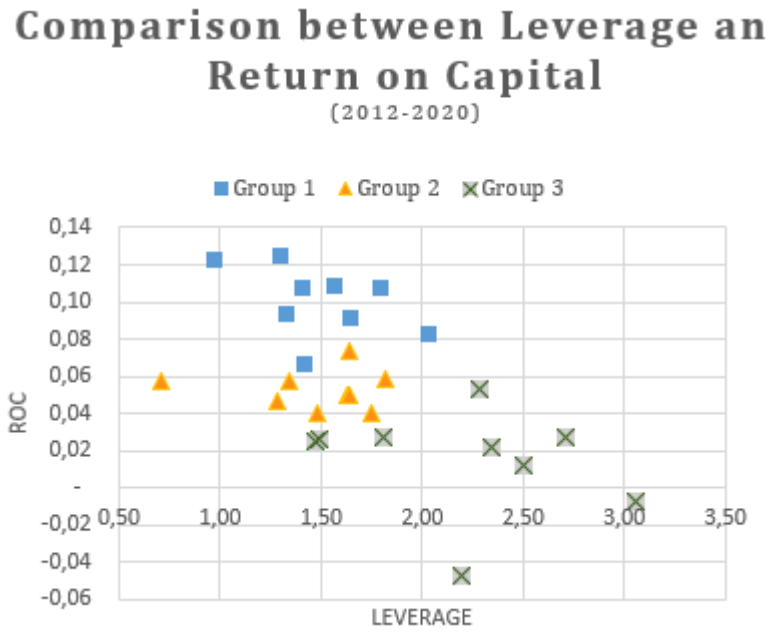
Looking at the table, the majority of enterprises experiencing a bankruptcy proceeding belong to the third business category, confirming itself as one of the riskier clusters.[303] Even though the third group weighs less in proportion to other categories in terms of number of societies, companies involved in a bankruptcy

[302] Adam Hayes, Margaret James, Leverage, Mar 19, 2021, Investopedia. Link: https://www.investopedia.com/terms/l/leverage.asp

[303] Bureau Van Dijk, A Moody's Analytics Company, Orbis.

proceeding exert an incidence of 1,9% on the whole sample. According to the BvD's national information providers, more legal events have been recorded over the last two-year period concurrently with the spread of the pandemic. This information proves that higher debt-to-equity ratios might compromise the repayment capacity of enterprises with the effect of experiencing a condition of financial distress.

To examine the relationship between leverage and return, in the following scheme will be identified the qualitative pattern for each business category during the time horizon considered in the analysis.



As highlighted by the graph above, companies belonging to group 1 and 2 have a sustainable and reasonable proportion of capital raised through debt and they are compensated with a satisfactory return on capital. Within this framework, the inclusion of additional control variables might be helpful to explain the difference in profitability between companies belonging to the first and second groups. Undertakings operating in the first business category are mature and bigger in size indeed, they serve multiple markets and offer several products and services to customers. The implementation of a differentiation strategy along with the strengthening of durable relationships qualifying their business network

represent two critical control variables able to explain the outcome obtained from the comparative analysis.[304]

If the focus of the investigation is moved to the third business category, the circumstances result to be more challenging and composite. Indeed, the relationship between the return on capital and the leverage ratio is negative for some companies belonging to the third group. A negative correlation occurs when the costs sustained to raise debt exceed the return obtained by the implementation of investment projects using external sources of capital. Companies that experience such condition are seen risky to investors, since a negative correlation is signal of financial instability and high risk of financial distress.[305]

To sum up, the debt-to-equity ratio can be operated as an indicator of the level of risk exposure associated to businesses' operations, since it represents a proxy of the firm capability to pay back its loans and satisfy both creditors and debtors. The relationship between return on capital and the leverage ratio identifies a qualitative pattern for each group of companies and it acquires importance when the value generated by investment projects financed through debt exceed the related costs.

4.2.2) Cost Structure and Proactive Risk Management Decisions

The cost structure is a feature that exerts a significant influence on profitability and poses an element of risk on enterprises. In order to be successful, a company should have consciousness about the kind of expenditures that make up its cost structure. Fixed and variable costs are the two main clusters composing the

[304] M. Mazzuccato, M. Tancioni, "*Innovation and idiosyncratic risk: an industry & firm level analysis*", Industrial and corporate change, 2005, DOI 10.1093/icc/dtn024 https://www.researchgate.net/publication/5206520_Innovation_and_Idiosyncratic_Risk_an_Industry_Firm_Level_Analysis

[305] Adam Hayes, Margaret James, Leverage, Mar 19, 2021, Investopedia. Link: https://www.investopedia.com/terms/l/leverage.asp

business cost structure and they are classified on the basis of the relative interconnectedness with fluctuations of sale volumes.[306]

The cost structure of a business changes on the basis of the industry, the firm size and the category of products and services offered to customers. The reason behind the need to differentiate costs is to get an insight about profitability rates, the real bottom lines of a business daily operations and internal processes. The definition of an efficient configuration is decisive, because it enables enterprises to depict those areas where costs can be reduced and effectively controlled with the purpose of ensuring the functionality of the firm business model. The business model implemented by a company can be either cost-driven or value-driven. The former has the purpose of minimizing costs wheresoever it is possible, often implementing a low-price proposition, maximizing the power of automation, or developing an extensive outsourcing. On the other side, a value-driven model work directly on the value chain of the business and it often heightens the degree of personalized services by differentiating the supply.[307]

In order to outline the efficiency of a company's cost structure, the working capital to sales ratio will be defined. Indeed, the index will provide rationales about the firm ability to sustain costs related to new sales, without the need of raising additional capital through debt. Even though the use of external sources of finance supports companies to make new investments and increase their level of sales, an enterprise should also be able to maintain a sufficient amount of liquid assets to finance its ongoing operations and pay back its debts. A company, characterized by high working capital to sales ratios, holds several assets that probably would be better employed to finance new investment projects with the purpose of increasing its size and profitability.[308] Having too little working capital to sales ratios

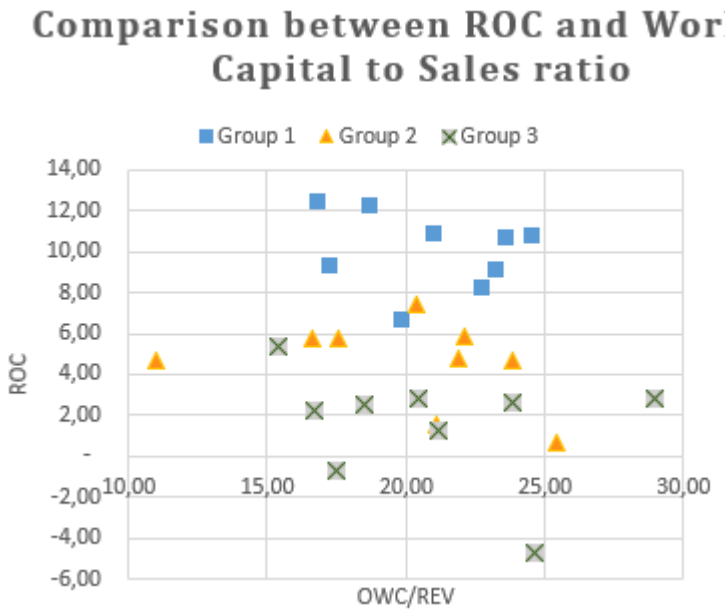
[306] Daniel Pereira, Cost Structure, The business model analyst, December 3, 2020. Link: https://businessmodelanalyst.com/cost-structure-business-model-canvas/

[307] Daniel Pereira, Cost Structure, The business model analyst, December 3, 2020. Link: https://businessmodelanalyst.com/cost-structure-business-model-canvas/

[308] Cynthia Gaffney, Working Capital to Sales Ratio, Link: https://bizfluent.com/info-8647556-working-capital-sales-ratio.html

represents also a danger for the company, since it may cause a cash shortage and bring business activities and operations to cease.[309]

The working capital to sales ratio represents an important token for the company. A value too low or too high of the ratio might signal the necessity for the company to re-design its policy, organizational and cost structure. For instance, low levels of working capital to sales ratio might suggests that competitors perform better in comparison to the targeted enterprise and they make preferable deals with suppliers and buyers. In the occurrence of this specific case, the company needs to look for new rooms of improvement in order to build bargaining power in the market.[310] The diagram below shows graphically the pattern existing for each group of companies by comparing the working capital to sales ratio with the return on capital.



Companies that are located in the upper left of the graph are able to manage risk in the best way, conversely those companies placed in the bottom right of the chart

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[309] Cynthia Gaffney, Working Capital to Sales Ratio, Link: https://bizfluent.com/info-8647556-working-capital-sales-ratio.html

[310] Working Capital to Sales Ratio - Meaning, Formula, Assumptions and Interpretation, Link: https://www.managementstudyguide.com/working-capital-to-sales-ratio.htm

decrease their profitability over time since they are not able to manage risk efficiently. Within this framework, the working capital to sales ratio points out the necessity for the third group to change its cost structure and look forward new room of improvements. In comparison to other groups, companies belonging to the third business category experience a quite composite situation indeed, their return on capital ratios fall below the level marked by the first two categories.

To deliver a profitable growth and manage efficiently risk, the first and second group of enterprises are committed to innovation and product development with the purpose of leveraging their positions in the market and achieve a sustainable improvement. These specific features identify and justify the misalignment with the third business category. According to the BvD's national information providers, enterprises operating in the third business category implement a cost-driven model and disclose their intention to create value in the short run by enhancing operating efficiency, optimizing costs and maximizing profits. On the other side, enterprises operating in the first and second group category have the tendency to develop a value-chain enhancing strategy. This model is usually accompanied by the development and commitment of the company in broadening its network of contacts, strengthen strategic alliances and actively participates in ongoing structural changes of the market. [311]

High levels of working capital to sales ratio are justified by the presence of considerable value work in progress. Indeed, large manufacturing enterprises and distributors of services play an important role in the value risk chain management and they hold a significant proportion of technical, human and financial capacities. For this intrinsic characteristic, enterprises need to identify risks, develop proper risk management strategies and implement early warning mechanisms and monitoring systems.

To sum up, the operative valuation related to resource allocation that is based on the sound assessment of risk and return trade-offs has the potential to create value and maximize shareholder's returns. According to the value risk chain model, for

[311] Bureau Van Dijk, A Moody's Analytics Company, Orbis.

each group it is necessary to evaluate the reactivity of the business model in relation to the main risk indicators affecting companies' performance. Within this framework, the financial leverage and cost structure represent two critical indicators capable to point out potential sources of risk and danger for enterprises. These indicators shall be compared with the business profitability which provides evidence on the company's efficiency and its long-term prosperity. After having analyzed the position of each group to these risk elements, an assessment about the robustness of businesses should be carried out. [312]

By using the methodology explicated in the course of the second chapter, it is possible to carry out an analysis that estimates the value of enterprises for each group. More specifically, return and risk estimations need to be outlined in order to measure the soundness of industrial and financial classifications.

Decision makers manage risk and implement specific corporate hedging strategies on the basis of their risk profile and attitudes. Such differences are reflected on the corporate strategic decisions and risk management programs implemented by each group of companies. Within this framework, three elements become significant in the process of risk assessment and measurement: the expected return on capital, standard deviation and the correlation index (R squared).

The table below provides an indication of the expected return on capital and the respective standard deviation derived from the regressions of data for each business category.

Expected ROC and Volatility				
	G1	**G2**	**G3**	**Sample**
$E_{(ROC)}$	11,1%	9,0%	1,7%	8,5%
σ_{ROC}	14,6%	17,1%	22,8%	19,0%
R-squared	0,55	0,46	0,43	0,48
Beta	0,67	0,62	0,65	0,65

[312] Sonya Seongyeon, Heli WANG, "*The effect of financial hedging on the incentives for corporate diversification: The role of stakeholder firm-specific investments*", Singapore Management University Institutional Knowledge at Singapore Management University, 2007.

The expected return on capital measures the expected value of the probability distribution of returns and it is affected by the weight of investment decisions and projects implemented by the company. The first group of companies is expecting to generate a positive value in the light of its risk operating model and strategic decisions. It is followed by the second group and finally by the third business category, characterized by a value below the average.

Then, the standard deviation associated to the potential return on investment is used to measure the volatility of the market and evaluate the spread of actual returns from an average value. The wider the range of possible outcomes, the greater will be the risk. In this specific case, companies belonging to the third business category are characterized by a standard deviation higher than the average of the sample. The value demonstrates that enterprises have to deal with the risk of experiencing a significant divergence between that the effective return on investment and the expected one.[313] The riskiness is highly dependent on the operating activities carried out by companies belonging to the sample, the financing sources used and the specific country and legal risks.

Finally, the correlation index, also known as R squared, measures the strength of the linear relationship between independent and dependent variables included into the regression model. R squared values range from zero to one and a stronger relationship among variables indicates a lower dispersion of data around the regression line. In other words, a value close to one indicates that the business performance moves relatively in line with the variables considered. In this specific case, the correlation coefficient has an average value of less than 0,5 and this result could depend on fewer isolated cases occurring within the model. These anomalous values are justified by the presence of a number of dependent variables within the regression system.[314]

The graph below offers a graphical representation of the numerical values presented in the table above.

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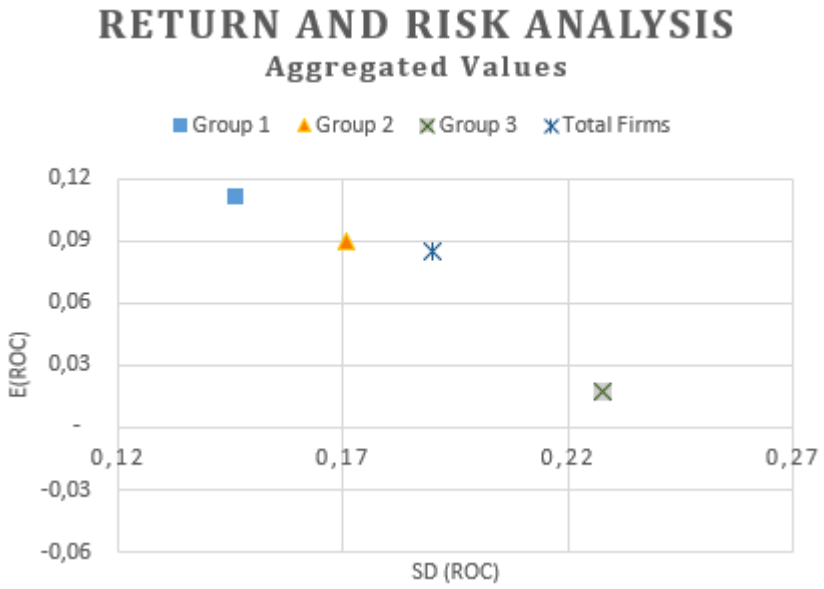
[313] Akhilesh Ganti, Gordon Scott, "Efficient Frontier", Link: https://www.investopedia.com/terms/e/efficientfrontier.asp

[314] Jim Frost, "how to interpret R-squared in regression analysis", Link: https://statisticsbyjim.com/regression/interpret-r-squared-regression/



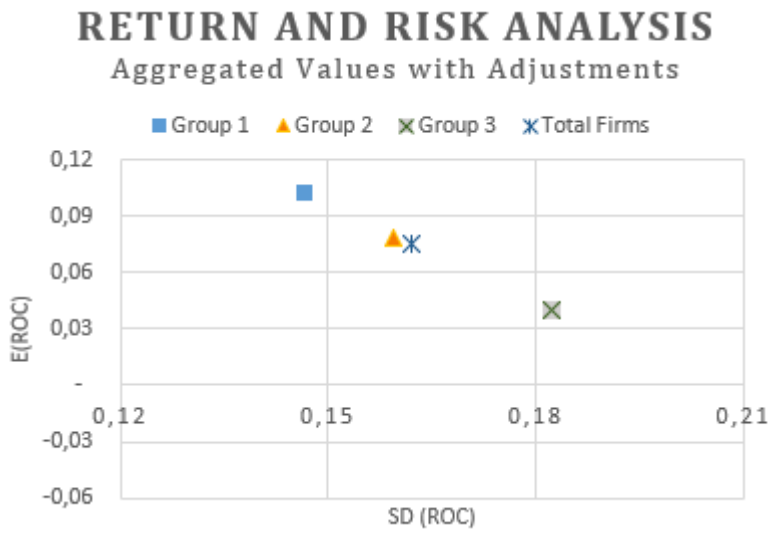
When standard error has a significant impact on estimations, it is difficult to determine the reliability of computational data. Therefore, the direct application of the regression analysis supports decision makers in the process of defining a clear and reliable picture of the risk-return framework. With the aim of strengthening the reliability of data extrapolated from the sample, the following section will repeat the calculations just performed by taking off from the sample the company's piece of information which report anomalous indexes.

The following table outlines the expected return on capital, the standard deviation and correlation index in the light of the above considerations.

Expected ROC and Volatility				
	G1	**G2**	**G3**	**Sample**
$E_{(ROC)}$	10,2%	7,9%	4,0%	7,5%
σ_{ROC}	14,7%	16,0%	18,2%	16,2%
R-squared	0,778	0,698	0,645	0,707

The expected return on capital identified for each business group is approximately aligned with the average value of the sample. Even though companies operating in the first category confirm their superiority in terms of both industrial and financial positioning. The volatility, captured by the standard deviation of the relative change of forecasted value, confirms results presented in the previous model. However, what stands out the most is the higher correlation index. An index greater than 0,5

would indicate that data are less spread out and, consequently, results returned by the sample mean are more representative of the population mean. The scheme below summarizes graphically the risk and return trade-offs classification of each group through the regression output.



After the exclusion of anomalous indexes from the data sample and the assessment of risk and return trade-offs, the new regression line returns a more reliable value. The larger value of R squared enhances the capacity of the explanatory variable to predict the values of the dependent variable considered and give the possibility to produce a more efficient estimation of the return on capital ratio and its volatility. In the light of the explanatory investigation, the results of the analysis confirm the higher levels of expected return on capital for the first two business groups. Group 1 gives evidence of its superior industrial and financial positioning in terms of both firm valuation and risk considerations. Indeed, companies belonging to this category portray a higher expected level of return compared to the average value of the whole sample. The classification confirms also the positive financial and strategic positioning of the second category, followed ultimately by group 3.

4.3) Macro-economic factors as drivers of risk management decisions

Results from the empirical analysis have demonstrated the importance of implementing an integrated and efficient approach to corporate risk management.

The inclusion of both qualitative and quantitative elements has returned relevant information concerning the implementation of targeted risk management programs, quality controls and operational processes.

The qualitative assessment, constructed on the set of information provided by BVD's national providers, has been accompanied by the quantitative research related to return on capital estimations. The quantitative analysis provides evidence confirming the superior financial results of companies operating to the first two business categories. Indeed, enterprises belonging to the mentioned group demonstrate to have a different sectoral view of risk compared to the third business category.

The rationale behind the decision to improve specific risk management programs is related to the attempt of strengthening the control of businesses over risky and uncertain situations. Indeed, a risk management approach can mitigate the risk of supply chain disruption and lead to more efficient and effective processes.

To build a robust and effective risk management system, it is necessary to develop an effective operating model able to identify risks across the organizational structure. The development of a governance and accountability structure around these processes assist companies in building a robust operational system from the business up to the board levels. In order to be successful, the process should be addressed with strategic emphasis by corporate leadership and daily management activities. To provide clarity on risk definitions as well as policy controls and reporting, a company should clearly define risks to which it is exposed. Taxonomies are usually defined by firm specific characteristics, including into the framework also the business model and geographic footprints. The purpose is to capture and incorporate into the analysis also specific country and legal risks. [315]

Since the world has become increasingly integrated, a pressing need exists to bridge the international gap living across countries. The ability of managers to shape the character and magnitude of the impact of macroeconomic variables is

[315] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

extremely important since it contributes to create a clear and defined picture on company's competitiveness and long-term profit sustainability. [316]

The increased economic and financial integration requires managers to pay more attention to the linkage between fluctuations of macroeconomic variables and company's performance. The objective of this section is to understand how risk is managed across companies operating in different European contexts. In particular, divergencies in risk management practices will be analyzed on the basis of the legislative and regulatory framework in place. As regards to the effects of volatile macroeconomic environments, three different scenarios will be presented: well-developed, emerging and frontier markets. In order to weigh the impact of changes in each system, a comprehensive approach need to be performed.

- Developed countries are characterized by mature capital markets, established infrastructures, advanced economies and higher standards of living.
- Emerging markets are in the process of rapid growth. Indeed, they consist on relatively recent economies that are transitioning from a low-to-middle-income towards a complete and more integrated configuration.
- Frontier markets refer to smaller and less advanced economies characterized by a greater level of risk. These countries are generally marked by a condition of political instability, poor liquidity, substandard financial reporting and large market fluctuations.[317]

It is critical to emphasize the existence of substantial international differences in risk among companies operating in similar industries and having comparable organizational models. As opposed to well developed nations, emerging and frontier markets are characterized by high levels of volatility. For a company, operating in one of these markets it means experiencing superior variability in

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[316] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[317] Mark P. Cussen, "*The difference between emerging and Frontier markets*", Investopedia. Link: https://www.investopedia.com/articles/investing/092013/difference-between-emerging-and-frontier-markets.asp

outcome, cope with political issues, non-specific reporting requirements and capital controls. [318]

Listed below are the major markets on which the analysis is performed:

Developed Markets	Emerging Markets	Frontier Markets
Austria	Czech Republic	Bulgaria
Belgium	Greece	Cipro
Denmark	Hungary	Croatia
Finland	Poland	Island
France	Russia	Lithuania
Germany	Turkey	Malta
Ireland		Romania
Italy		Slovenia
Netherlands		
Norway		
Portugal		
Spain		
Sweden		
Switzerland		
UK		

Emerging markets present different risks and opportunities in respect of well-developed countries. The specific nature of risk that characterizes emerging and frontier economies tends to increase the value of local knowledge. Indeed, opportunities in recent economies bring global innovation in areas such as e-commerce, technology, biotechnologies and consumption.[319]

[318] MSCI 2021 Global Market Accessibility Review. Link: https://www.msci.com/market-classification

[319] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

Taking into consideration the business model and geographic footprints of companies belonging to the sample, it emerges that the majority of enterprises operates in well-developed markets (roughly the 79% of the whole sample) and only a modest percentage of them carry out their daily activities in emerging or frontier markets. The diagram below offers an insight into the specific weights of financial markets for the single business category.

Analysis	**Number of Enterprises**			**Incidence in %**		
Market	Group 1	Group 2	Group 3	Group 1	Group 2	Group 3
Developed Market	198	187	126	31%	29%	20%
Emerging Market	36	31	31	6%	5%	5%
Frontier Market	24	9	3	4%	1%	0%
Total	**258**	**227**	**160**	**40%**	**35%**	**25%**

4.3.1) Different settings among developed and emerging markets

The costs associated with the implementation of specific risk management programs increase as the risk becomes more unique and distinctive for the company and the business environment in which it operates. Risks in emerging and frontier markets can be both overestimated or underestimated by companies and economic actors coming from the outside.

Generally, decision makers have the tendency to overestimate risks they never had to handle and underestimate real and more familiar threats. Within the framework of emerging markets, decision makers act in a state of uncertainty and they allocate a greater weight to new risk categories they have never managed. These perceptions can be relieved only by building a full and complete knowledge of the single market that is considered. To be useful, the information should enable intertemporal and cross-sectional comparisons in terms of risk and opportunities.[320]

[320] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

All undertakings and sectors of economy deal with political and strategic risk. These risk categories expose companies to the chance of experiencing a lower-than-expected return on capital, as a result of changes in governance, legislative bodies, market dynamics, planning and resource allocation. Emerging and frontier markets have inherently superior levels of political risk as opposed to developed and established contexts. Indeed, they are characterized by important scales and dynamics of change in their government policies and political systems.[321]

This risk category requires a prompt response of the business to changes at macro-political level, for that reason an intensive observation of the market, its dynamics and developments is required. The primary response to political risk consists on monitoring and testing market conditions, including competitor analysis and customer needs. Companies that operate in volatile political environments should take active steps to improve their communication with local governments and political parties. Indeed, they need to stay informed about new movements in the economy with the purpose of raising the company view.

The size of the compliance, risk and legal functions of non-financial enterprises reflects the capability of companies to devote their risk and control resources in sector-specific areas. In addition, the property of relevant resources and information represent a critical factor in defining the success and prosperity of the business. In order to improve the quality of information, companies operating in well-developed markets have the tendency to build a dense network of relationships directly through businesses and trade associations.[322]

Considering the sample, approximately the 6% of the companies have experienced an enhancement in their partnership agreements over the past two years, concurrently with the spread of the pandemic. The need to be informed about new developments influencing the business environment and financial world appears to be essential, especially during periods characterized by high volatility.[323] With

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[321] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[322] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[323] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

the purpose of reducing information asymmetry, companies take advices from consultants, independent consulting agencies, lawyers and accountants.

The table below exhibits the average number of consulting subjects on which undertakings have relied on their support.

Developed markets	
Austria	8,2
Belgium	8,4
Denmark	6,7
Finland	3,6
France	8,7
Germany	13,2
Ireland	7,4
Italy	7,7
Netherlands	5,9
Norway	2,3
Portugal	7,2
Spain	9,2
Sweden	2,9
Switzerland	4,7
UK	14,0

Emerging Markets	
Czech Republic	3,0
Greece	8,7
Hungary	18,7
Poland	8,6
Russia	18,5
Turkey	8,0

Foreign Markets	
Bulgaria	6,5
Cipro	5,0
Croatia	7,7
Island	7,0
Lithuania	5,3
Malta	4,0
Romania	3,5
Slovenia	3,2

The chart highlights that countries like Hungary, Russia, Germany and UK count on a higher number of political consultants and specialized agencies rather than other geographical contexts.

The role played by the government represents an additional and essential element in the definition of the corporate organizational structure. Within this specific framework, enterprises can take up active steps in order to strengthen relationships with government departments and political parties and stay up-to-date on new potential developments. The preponderance of the government regulation in sectors like chemicals, pharmaceuticals, petroleum, plastics, means of transport and business services is high and, for that reason, political changes are perceived more by those companies. [324]

Along with macro-political issues, financial risk represents one of the major challenges for local companies. Financial risk includes changes in currency, liquidity, credit risk, and business capital structure. While developed companies

[324] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

typically operate in more than one market and have opportunities for future development, the management of financial risk represents a significant issue for emerging companies. Especially, if they have relationships with developed market enterprises.

When companies are involved in important third-party relationships, they are exposed to credit risk as well. In order to cover their credit risk exposure and guarantee the creditworthiness of their debt security, some companies have started to use financial derivative instruments. More precisely, credit default swaps, also known as CDS. Considering the sample object of the analysis, companies that have acquired this specific category of derivative contracts operate only in developed markets. In particular, they are located in Germany, Sweden, United Kingdom, Switzerland and France.

The degree of implementation of financial hedging solutions is inferior for emerging and frontier markets because of the features characterizing these environments. The first reason which explains the lower presence of derivatives is related to the implementation of operational and natural hedging as alternative risk management solutions.[325] The second explanation concerns the disclosure quality. Most companies report limited information on their derivative's use in emerging and frontier markets. The direct consequence of a lower reporting quality is an increase in the risk of information asymmetry between managers, shareholders and investors. Indeed, investors find it difficult to extrapolate information concerning the risk management strategy adopted by the company from financial reports. Furthermore, they are not able to estimate the risk propensity of managers and the reasons underlying their strategic decisions.[326]

Considering the changeable risk profiles inherently emerging markets, it is essential to perform an adequate assessment of risk. This analysis should be done

[325] Ayturk, Y., Gurbuz, A.O. and Yanik, S. *Corporate Derivatives Use and Firm Value: Evidence from Turkey*, Borsa Istanbul Review, 16, 108-120, (2016).

[326] Ayturk, Y., Gurbuz, A.O. and Yanik, S. *Corporate Derivatives Use and Firm Value: Evidence from Turkey*, Borsa Istanbul Review, 16, 108-120, (2016).

periodically in order to be sure that changes in the environment can be registered and effectively addressed.[327] Indeed, the investor community demonstrate to appreciate the commitment of companies to manage properly their firm specific and systematic risk along with a clear and transparent evidence of the processes carried out. A definite value chain in terms of both compliance and transparency led the foundations for the development of good risk management systems. Furthermore, the act of framing and articulating the strategy for risk management in emerging markets is an essential element for a company seeking to obtain a hedging premium from investors.[328]

4.5) Legal system and governance

A robust governance has the ability to maintain a strong risk culture inside the business model of companies and it has also the ability to reinforce the compliance to risk management programs. The risk governance structure differs on the basis of the nature of risk drivers. While financial risks are usually managed centrally, operational risks are deeply embedded into company's processes. More precisely they are managed through product development and operative production programs. The adequacy of operational risk management needs to be balanced with the business compliance to technical standards and control systems. In order to be prepared for crises, companies need to ensure that risk management efforts and objectives are led by the board and senior managers.[329]

Since corporate governance tends to be less rigid in emerging contexts, a greater emphasis should be given to local knowledge. Companies should regularly provide the board of directors and senior executives with insights on risk. moreover, they

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[327] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[328] Ayturk, Y., Gurbuz, A.O. and Yanik, S. *Corporate Derivatives Use and Firm Value: Evidence from Turkey*, Borsa Istanbul Review, 16, 108-120, (2016).

[329] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

need to identify those risk categories which have the potential to affect significantly corporate performance. The objective is to ensure a comprehensive risk view encompassing all levels of the organization. In point of fact, the decision-making process needs to be supported by qualitative risk disclosure and the reporting practice should provide to outsiders a clear and explicit idea of the character and magnitude of macroeconomic variables on corporate performance. Therefore, the definition of a risk culture properly aligned with the organizational configuration of the company set the foundation for the development of an efficient risk management system. [330]

Although each country is characterized by its own governance code, companies exhibit a certain degree of consistency and alignment within the continental European context. Generally, companies operating in well-developed markets have diversified ownerships and they are supported by complementary institutions which legally protect small shareholders. [331]

Continental European countries differ from Anglo-Saxon regions in terms of corporate governance, ownership structure, financial and legal systems. More specifically, countries with a common law legal system, like the United Kingdom, are characterized by a strong protection of both investors and shareholders. In presence of this legal framework, the ownership structure of companies is concentrated. Conversely, countries in the continental Europe adopt a civil-law system. Within this framework, companies are not controlled by one owner, but there are multiple holders especially in settings characterized by improved governance and high firm valuation. Since, firm ownership is dispersed and governed by capital markets, companies internalize the risk management discipline. [332]

The internalization of risk management encourages the implementation and development of diversification strategies and the decentralization of units

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[330] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[331] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[332] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

responsible to manage locally specific risks.[333] Decentralized structures are characterized by strong risk culture. Indeed, each department is held responsible for the operational and technical risk of its competence and it relies on the knowledge of managers who are experts in the field.

A decentralized approach may deliver faster and more operative responses, but it needs to be compensated with an effective communication system. [334]

Conversely, in centralized structures the risk function is closely controlled by owners. This kind of organizational configuration ensures consistency and efficiency in the implementation of hedging programs and it facilitates the comparability of risks throughout the organization. When ownership concentration is high and investor protection is weak, the incentive to implement risk management programs is lower. Environments characterized by weak investor's protection, high ownership concentration and low risk management incentives are Turkey, Bulgaria, Poland and Slovenia. [335]

The focus on governance is motivated by the economic theory which identifies ownership as one of the determining factors guiding managerial behaviors. The underlying table provides an insight into the importance concerning the presence of the management team in business daily activities. For each geographical area, the average number of managers running the business is specified below.

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[333] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[334] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

[335] Ayturk, Y., Gurbuz, A.O. and Yanik, S. *Corporate Derivatives Use and Firm Value: Evidence from Turkey*, Borsa Istanbul Review, 16, 108-120, (2016).

Average Number of managers

Developed markets	
Italy	85,3
Switzerland	58,8
Portugal	58,0
Germany	55,2
Ireland	48,6
Finland	46,1
Netherlands	44,8
France	44,6
Belgium	42,1
UK	39,2
Austria	38,2
Spain	31,6
Norway	31,5
Denmark	28,7
Sweden	27,5

Emerging Markets	
Hungary	116,3
Russia	53,6
Turkey	28,0
Greece	27,6
Poland	21,0
Czech Republic	8,0

Foreign Markets	
Romania	41,8
Croatia	34,9
Lithuania	28,3
Island	25,5
Cipro	24,0
Slovenia	23,2
Malta	17,0
Bulgaria	9,5

Companies operating in Nordic countries like Norway and Denmark are characterized by a low number of managers compared to other countries. Nordic companies have a high level of interchangeability of ownership. Indeed, analyzing the sample of companies, it emerges that enterprises operating in Norway and Denmark have been the protagonists of numerous corporate transformations in terms of ownership added, ceased and changes.[336]

To sum up, data suggests an important pattern. More centralized models are used in the Eastern Europe in contrast with a more de-centralized approach that is favored in Continental and Western Europe. The high average number of managers which characterized countries like Hungary, Switzerland, Portugal and Italy reflects the powerful force exerted by managers on company's operations. It also suggests the implementation of a strong decentralized system and the affirmation of risk culture.

[336] Ernst & Young, "*Risk management in emerging markets*", EYG No. AU0069. Link: https://www.finyear.com/attachment/67799

CONCLUSION

The global economic impact caused by the spread of the Covid-19 pandemic has demonstrated that many companies are not prepared to deal with events marked by intense and long-lasting influences.

The outbreak of the disease has shifted the worldwide economy and it has influenced all companies indiscriminately. In order to face the consequences of the crisis, business leaders need to exhibit strong risk management propensities and decision-making capabilities. Indeed, a forceful risk management approach supports enterprises to safeguard the welfare of the organization as a whole and also protect the wellness of its employees, clients, partners and stakeholders.

Uncertainty around the spread of the global pandemic has forced companies to reinforce their approach to risk management in response to international business interruptions, a healthcare system overload, supply chain deficit and cyber security threats. The information added from the European experience provides an insight on the managerial capability to steer companies towards resilience by developing targeted risk management strategies and corporate models. Regardless of the industry sector and the geographical area in which companies operate, it is possible to identify an explicit pattern underlying risk management propensities for each business group. The empirical analysis proves evidence that companies with mature risk culture profiles outperform their peers in face of external challenges. Indeed, a risk mindset features distinctly inside the organizational structures in moments of high uncertainty and it holds executives accountable for business weaknesses and strengths. Considering the high level of interconnectedness characterizing the business network, enterprises need to amplify their perspective on risk assessment and connect the risk mindset with their daily operational activities. Within this framework, the first two business categories prove to be less impacted by operational deficiencies during the spread of the Covid-19 pandemic. Indeed, the development of an integrated value risk chain model offers them the opportunity to mitigate the effects of the firm-specific risk component. On the other side, companies operating in the third business category have the tendency to maintain a static and stereotyped standpoint concerning risk. As a consequence, they do not monitor regularly changes in the market and do not keep track of the impact related to the occurrence of unexpected risk forces.

Enterprises have to deal with risk and uncertainty in a daily basis. Therefore, they need to prevent paralysis of the system by building organizational resilience and addressing bottom-up efforts. Handling risk and uncertainty demand robust governance structures and forceful management procedures. As highlighted by the empirical analysis, companies belonging to the third cluster clearly demonstrate of not being prepared to handle the risks of the pandemic. The reason underlying the adverse performance experienced by the group is related to the risk culture embedded into companies. An approach focused on developing initiatives aimed at minimizing the risk associated to specific investment projects and transferring potential detrimental forces creates risk itself. Considering that risks arise from different sources and they are interconnected throughout the value chain, enterprises cannot rely for a long time on reflexive muscles to control risk and uncertainty. Indeed, strategies aimed at minimizing risk and governing specific problems can achieve partial success, since dedicated and explicit programs are not able to restore the same effect on a global business level. As a consequence, the need for executives to enforce the transmission of a risk mindset throughout the organization increases with the purpose of supervising uncontrollable forces and respond quickly to changes in the business environment. Sometimes companies require response speed because they do not have the time to execute an in-depth analysis aimed at detecting and preventing specific risk sources. The Covid-19 pandemic is a clear demonstration of this fact.

During uncertain times companies face multiple risks at the same time, therefore the development of specific risk management processes and tools is required in order to guarantee the long-term sustainability of the firm. With the purpose of managing risk efficiently and leveraging their strategic position in the market, enterprises of the third cluster need to rethink their organization. This process of revision is supported by an advantageous organizational cost structure that characterize businesses.

Enterprises of the third cluster are formed recently and have agile structures which encourage flexibility in terms of both resource and production planning. Considering these specific features, the prospect of reimagining a sustainable operative line and delineate a competitive advantage becomes immediately concrete. Taking into consideration the effects of the crisis and the resultant supply chain disruption, adaptability embodies an indispensable attribute in a world marked by regular changes. Indeed, the capability of companies to change their ecosystems and ponder

unconventional partnerships throughout the supply chain give them substantial competitive advantages and offers the transformational premises for growth and development.

In the analysis that compares the return on value and the working capital to sales ratios, it emerges that companies belonging to the third group category experience a quite composite situation. In some cases, their return on capital ratios falls below the level marked by the first two categories. Then there are instances where enterprises are placed in a potentially attractive and favorable position. Within this framework, the analysis reveals a devised opportunity for the third group to leverage its status in the market and increase the degree of return on capital employed. In order to enforce the risk culture throughout the organizational setting, a solution could be the settlement of a risk management task force that directly respond to senior executives. The role of the cross-functional team would be the settlement of a strategic direction aimed at providing an immediate response to changes and dynamics governing the business environment. More specifically, the definition of a crisis roadmap would support companies in handling risk and disruption, for instance sudden natural disasters, administrative restructuring, breach and theft of data.

To plan effective management actions, enterprises need to appoint a team of experts responsible to make decisions and run efficiently the business when disruptive forces occur. Following the occurrence of a traumatic event, it is important for companies to retain a formal debriefing and monitoring system in order to correct what has gone wrong. More specifically, a periodic monitoring system reinforce the integrity of the response plan and enables companies to address efforts towards the correct action with the purpose of overtaking potential disruption. The process implemented after the occurrence of a crisis help enterprises to repair the damage suffered and it works in the direction of reestablishing a positive image of the business. The possibility to work through predetermined communication lines facilitates and accelerates the decision-making process since corporate efforts are addressed in the correct direction. The reinforcement of a planning emergence system provides to the third category the possibility to take the control of the business and restructure the operating divisions that result to be particularly susceptible to uncertainty.

The decision to set up a risk management task force represents only a step in the direction of building up operational resilience and strengthen the risk culture within

the third cluster. In order to leverage their strategic positioning in the market, undertakings need to rationally allocate their resources in favor of research and development programs. Investments in product quality and safety standards contribute in generating significant returns on capital and strengthen brand reputation for quality. The direct consequence results in an increment of the demand for products and services afforded. By increasing the quota of resources addressed to research and development programs, the third business category would be able to gain the access to knowledge and exploit assets in a more effective and efficient way. In particular, the use of data and analytics will enable enterprises to improve the information technology productivity, with the consequence of reducing costs and developing flexible digital solutions.

Strictly the most successful enterprises will be able to reinvent the role of their operations and generate value by meeting customer's requirements, accelerating product development and experience innovation. An operating model designed to prosecute a purpose-driven customer analysis is fundamental to understand what clients value in the aftermath of the crisis and develop a targeted experience based on the insights acquired from the analytical process.

Companies always have to deal with risk and uncertainty. When a crisis strikes, the focus on factors over which companies have the control might prevent paralysis of the operative system and give employees an objective to be achieved. By addressing efforts in the correct direction, undertakings of the third cluster could be able to recover from the crisis and strengthen their strategic position in the market. Indeed, a risk-taking culture and a strategic allocation of resources confer to businesses the potential to improve their responsiveness to external challenges. The convergence towards a risk-taking mindset gives a boost to the third group to ride the wave of success and reach the second business level category.

A volatile world requires the development of agile operating models capable of reshaping the organizational modus operandi in relation to the latest consumer's necessities and requirements. Drastic movements in industry trends and customer expectations create the need for equally radical changes in the corporate strategy. Companies belonging to the second cluster reply to high levels of uncertainty and volatility by adapting their organizational structure to market movements and

implementing forceful management solutions. The revenue valuation and operating margin analysis have demonstrated the capability of companies operating in the second group category to respond promptly to movements in the economic environment with new and sustainable investment projects. The ability to manage risk properly creates time for companies of the second group to see beyond the critical situation produced by the crisis and build resilience for the future. Indeed, their specific organizational setting and corporate risk model confer to the group a substantial competitive edge especially during volatile periods.

Adaptability to changes is all about vulnerability but, in the race to changes enterprises must keep the sight of the future. As market evolves, enterprises need to be focused on their long-term objectives and reorganize their product development processes appropriately with the corporate model. A crisis can empower the organization to take distinctive and meaningful actions only if the enterprise has awareness about its core values. For that reason, a deep knowledge of the current performance and the range of all potential investing opportunities is required in order to secure the sustainability of the business in the long run. Within this framework a benchmarking analysis can be useful, since it compares similar businesses and offers to executives the opportunity to reveal potential strengths and weaknesses within the organizational structure. Bottom-up efforts give access to knowledge about business necessities and enable undertakings of not be completely overwhelmed by movements and changes in the market. On the other side, market research and trend analysis support enterprises in discovering fruitful investing opportunities of business development at a large scale. In the light of the knowledge acquired through the development of trend analysis, strong performers should improve their core functions, make sound investments and reduce costs in preparation of upcoming crisis. Drawing up specific guidelines enables enterprises to keep track of long-term objectives and adjust their operating activities accordingly.

In order to secure the sustainability of the business, the second cluster should find an equilibrium between its long-term prospects and the necessity to adapt to market movements. The convergence towards a broadminded approach to risk management requires the engagement of a constructive dialogue between managers and leaders in order to delineate a coherent image of the company's business model, strategy and objectives. Communication is fundamental because it encourages workforce's

feedback and improve the disclosure of information throughout the organization. In an environment that is growing more volatile, companies deal with an increased level of expectations from the side of employees, customers, shareholders, governments, and society at large. Having regard to the broad spectrum of forces that exist, companies are expected to act lawfully and develop a sense of sensitivity in relation to social issues. Indeed, they have an ethical and moral imperative in respect of the society in which they operate.

Although financial results are narrow in relation to the levels reached by the first group, the rebounding ground that generates the worthwhile outcome of the second cluster derives from the business commitment to sound and valuable investing opportunities. To deliver a profitable growth and manage risk efficiently, the second group is strongly committed to the implementation of research and development programs. The investment in product quality and safety standards contribute in consolidating the brand reputation with the consequence of boosting the demand for products and services provided. Since Covid-19 crisis has accelerated the shift to digitalization, the second group category has gained a competitive advantage in expanding and enhancing the power of its digital channels. In particular, the use of advanced analytics has enabled enterprises to combine new sources of data with their insights and accelerate the decision-making process. By investing in business improvements and advancements, the second group category has been able to ride the wave of digitalization and leverage its position in the market.

The managerial capability to reinvent business operations, reach customer's requirements and accelerate product development offer a superior innovative experience to companies. To support the business expansion and the commitment to research and development programs, enterprises belonging to the second cluster possess a favorable and advantageous configuration characterized by a substandard quota of fixed costs. Rely upon a flexible cost structure offers to undertakings versatility in terms of production and resource planning. Furthermore, it assists business leaders in breaking through an unpredictable future where changes come quickly and frequently. These distinctive features confer to the second cluster a fundamental competitive advantage that will leverage the group in the years to come.

The practical research has classified the first cluster as the most performing in the entire sample. The reason underlying the categorization is related to companies' maturity, size and stability of relationships within the business network. As a matter of fact, larger companies have access to the power generation market share and they can resort to external sources of finance because of their liquid position. Enterprises belonging to the first group category serve multiple markets and they offer a wide range of products and services to their customers. Diversification, both in terms of products and services afforded, confers to companies a distinct competitive advantage. In the event that a particular market segment is affected by crisis, large and differentiated companies can still derive their cash flows from other segments. Another distinctive and significant aspect is represented by the network of contacts with which the enterprise interfaces. Larger companies have invested more time and pecuniary investments in enforcing their brand reputation and the quality of their relationships with clients, partners and suppliers. Typically, a higher degree of trust and confidence supports the business ecosystem and guide new commercial arrangements in order to secure future supply and alliances.

Nevertheless, the maturity and size of enterprises operating in the first cluster makes adaptation to changes particularly difficult and it lengthens the time period required by managers to make decisions. Indeed, the superior quota of tangible assets and infrastructure necessities make the operating leverage relevant and confer rigidness to the entire organizational structure, making transformation challenging. Considering the rapid pace at which the business environment is currently changing, the rigidity of operational processes can lead to detrimental results in the long-term horizon. The process of risk and response assessment is constantly changing and priorities evolve on the basis of the necessities, for that reason enterprises require a dynamic and flexible configuration in order to outpace competitors and deal with uncertainty.

In order to conserve their strategic positioning in the market, enterprises operating in the first business group need to mitigate the drawbacks related to the rigidity of their operational structure. Even though, a rigid configuration gives to companies strength and financial stability, innovation and progress need to be constantly supported in order to guarantee a durable sustainability. For that reason, executives have to consider business' weaknesses and strengths on the basis of which they need to

ponder alternative investment opportunities. Since companies of the first business group are financially stable and record higher levels of revenue compared to other business categories, they can decide to improve their performance by acquiring a target company. Indeed, the process of merger or acquisition involves multiple benefits such as the enhancement of synergies and quality of internal information. Knowledge is difficult to be transferred, since it is embedded into the firm. Therefore, the acquisition of a company, producing a certain product line or carrying out a particular service, increase the consciousness and awareness of the organization and the activity executed. Furthermore, it facilitates the access of companies to irreplaceable resources.

The merger or the acquisition of a company can also have the feature to extend the scope of the company towards new geographies and markets. For instance, the acquisition of an enterprise operating in a specific market sector offers to companies belonging to the first cluster the opportunity to acquire knowledge and information about different contexts and bypass the risk of entry of new competitors. Nowadays mergers and acquisitions are events that occur with a certain frequency in the business world. Through strategic merger and acquisition transactions corporate leaders are capable of capturing external innovative developments and reduce the threat of business loss due to the increased competition in the market. Therefore, these transactions constitute an optimal and efficient tool intended to overcome the crisis.

The complexity associated to the heterogeneousness of business scenarios makes corporate risk measurement a critical instrument in the process of delineation of the operating model. When companies are able to exploit opportunities and take advantage of their real options, they can fully benefit from the enhancing effects of integrated risk management systems. The capability of managers to take up strategic steps in the exploitation of risk, keep costs under control and be reactive to unpredictable outcomes are three essential elements for the creation of competitive advantage. Companies belonging to the first two business categories are selective in screening the risks they take up and the implementation of a strong risk management system, make enterprises grow faster especially in presence of uncertain and volatile environments. Indeed, the capacity to respond rapidly to risky forces can turn disruptive challenges into opportunities to beat competition.

The activity of building up a risk-taking mindset and acquire knowledge from the resolution of decision-making processes offer a valuable contribution to companies in the reinforcement of their business. The reasons underlying the decision to take-up risk are several:

- Accelerate the cumulative success of the business,
- Address strategic challenges by capitalizing on corporate strengths,
- Allocate efficiently resources in order to increase the operational effectiveness and create a source of competitive edge in respect of other market participants,
- Improve managerial skills and acquire constructive knowledge that will help the company to increase the impact of its decisions in the future.

The success is the result of multiple decisions and it represents the product of an ongoing learning being doing process. The ability to track down tailwinds and headwinds enable companies to decide which risk to take. While tailwinds help enterprises to identify macro-economic trends surrounding the industry, headwinds individuate situations that might create challenges and opportunities for advancement. In choosing a challenging situation the company addresses the strategic challenge by capitalizing on its strengths with the purpose of acquiring faster learning, responsibilities or other chances for future impact. On the other side, risk aversion reduces the efficiency and efficacy of the risk management intervention tools and turn down the attempt of managers to find a tradeoff between risk control and efficient business restoration.

In view of recent events, enterprises have been enforced to radically transform the mode in which they have regularly conducted their business up to that moment and they start to feel the growing need to closely monitor the movement of external sources of change. Since companies are actually experiencing the initial stages of the Covid-19 crisis, they feel the necessity to be prepared for the consequences of its forthcoming consequences. Within this framework, results from the empirical study offer an important contribution in support of the rationale underlying risk management decisions and how the risk model affects the performance of companies.

Risk occurs whenever the outcome of a particular investment project or activity cannot be determined properly and accurately ahead of time. Therefore, it is important

to define an evaluative measure in order to assess the impact of its occurrence. Businesses typically approach decisions with a reasonable risk-versus-return mindset which provides a criterion to define the risk that companies endure and their impact in terms of profitability. The choice concerning the use of specific risk indicators is done accordingly to a process of identification of critical drivers affecting the market and the business world. Beyond revenue and operating margins, there are certain business characteristics which improve the proficiency of the business to deal with uncertainty and perform successfully. For instance, the commitment to research and development programs, the flexibility of the organizational cost structure and the business ability to adapt to environmental changes increase the firm resilience. Similarly, the employment of technology, innovation and digitalization have become particularly relevant attributes especially during the outbreak of the Covid-19 pandemic as a way of offsetting the physical remoteness imposed by the social distancing.

To conclude, the policy applications that can be drawn from the analysis are the following:

- Agile organizational structures are beneficial for sustenance because they make companies flexible and adaptable to changes in the business environment.

- A solid risk management approach is required in order to safeguard the welfare of the organization and the community network.

- Innovation, research and digitalization support companies to leverage their position in the market by offering products and services with superior quality standards.

- Improve communication in order to encourage a continuous knowledge exchange both inside and outside the organization.

- Strengthen the risk culture in order to exploit opportunities and gain competitive advantage over competition.

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