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**"Corporate Diversification and Firm Value During Crisis Periods:
Evidence from European Listed Firms During the COVID-19 Crisis"**

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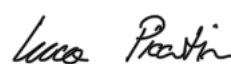


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1. Introduction

Corporate diversification is an important strategic choice through which firms expand their activities beyond a single business area. This strategy may offer several advantages. For example, diversified firms can operate in different markets, share resources across divisions and transfer financial resources internally. At the same time, diversification may make the firm more difficult to manage and may create problems in the allocation of capital across business units. For this reason, the effect of diversification on firm value has been widely studied in the corporate finance literature. Many empirical studies find that diversified firms tend to have lower market valuations than focused firms. This phenomenon is commonly referred to as the conglomerate discount. Early contributions document lower Tobin's Q or lower market values for diversified firms compared with focused firms or with the estimated stand-alone value of their business segments (Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996). These findings suggest that the potential benefits of diversification may not always be sufficient to offset its costs, including greater organizational complexity, agency problems and inefficient allocation of resources across divisions. Previous studies show that the estimated discount can change depending on the methodology used, the treatment of self-selection and the inclusion of firm-specific effects (Campa and Kedia, 2002; Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012). The conglomerate discount should therefore be interpreted as an empirical relationship whose magnitude and meaning may depend on the sample, the valuation measure and the econometric specification adopted.

The economic context may also affect the relative costs and benefits of diversification. Under normal market conditions, internal capital markets may be less valuable because focused firms can obtain financing externally. During periods of financial stress, however, access to external credit may become more difficult or expensive. In this environment, diversified firms may benefit from the ability to transfer liquidity and financial resources across divisions. They may also have greater debt capacity because the cash flows generated by their different activities are not perfectly correlated. These mechanisms suggest that diversification could become relatively more valuable during crisis periods. Previous evidence from the 2007–2009 global financial crisis provides support for this interpretation. Kuppuswamy and Villalonga (2016) find that the diversification discount decreased during the crisis, as diversified firms benefited from greater financing capacity and more effective internal capital allocation. Matvos and Seru (2014) similarly show that internal capital markets helped conglomerates respond to disruptions in external financial markets. Nevertheless, the evidence is not uniform across countries and institutional settings. Dell'Acqua, Etro, and Correra (2013) continue to document a

conglomerate discount during the years surrounding the financial crisis, although they find that its magnitude became smaller in 2008. Rudolph and Schwetzler (2013) also show that the effect of the crisis differed across regions and was not statistically significant in Continental Europe. These studies suggest that diversification does not produce the same valuation effect in every crisis or geographical setting.

The COVID-19 pandemic provides a particularly relevant context in which to reconsider the relationship between diversification and firm value. Unlike the 2007–2009 crisis, it originated as a health emergency and affected firms through lockdowns, supply-chain disruptions and sudden changes in demand. Its impact also varied substantially across industries, creating different conditions for firms operating in different sectors. The pandemic also created strong liquidity pressure. For many firms, revenues declined rapidly, while costs, debt payments and other financial commitments could not adjust immediately. As a result, cash holdings, financial flexibility and access to external finance became particularly important. However, external financing did not collapse as it had during the global financial crisis. Banks, capital markets and public support measures continued to provide liquidity, supported by extensive fiscal and monetary interventions. The benefits of internal capital markets may therefore have been less important than during a crisis originating directly in the financial system. At the same time, diversified firms may have faced additional difficulties. Their business units could have been exposed to different restrictions, supply-chain problems and demand shocks, increasing coordination and resource-allocation challenges. Stronger divisions may also have been required to support weaker activities. Diversification may therefore have helped corporate groups absorb losses, but it may also have increased organizational and allocation costs. Its overall effect on firm value during the pandemic cannot be determined in advance and remains an empirical question.

This thesis examines the relationship between corporate diversification and firm value in this specific context. The analysis focuses on listed non-financial firms from European Union countries and other developed European markets, including the United Kingdom, Switzerland and Norway. The period considered is 2018-2021, allowing a comparison between the two years preceding the pandemic and the years 2020 and 2021, which are treated as the COVID period. The European setting is particularly relevant because much of the traditional literature on the conglomerate discount is based on U.S. firms. European companies operate in different institutional, ownership and financial environments, and previous research shows that the value of diversification may vary across regions.

The thesis addresses three main valuation questions. First, it examines whether diversified firms are valued differently from focused firms over the full sample period. Second, it investigates whether this valuation difference changed during the COVID-19 crisis. Third, it considers whether the valuation effect differs between related and unrelated diversification. Related diversified firms operate across different activities that remain within the same broad economic sector, while unrelated diversified firms operate across more distant sectors. This distinction is relevant because activities that share technologies, resources or markets may generate greater synergies and may be easier to coordinate than activities belonging to very different industries. Before examining firm value, the thesis analyses which observable characteristics are associated with diversification status. A firm-level logit model tests whether size, profitability, leverage and liquidity are related to the probability of being diversified. Since the data do not identify when each firm originally diversified, the model is not interpreted causally. Instead, it describes the baseline differences between diversified and focused firms and supports the interpretation of the subsequent valuation analysis.

The empirical analysis is based on firm-level data collected from Orbis, provided by Moody's/Bureau van Dijk. Firms are classified as diversified when their reported activities belong to more than one NACE 2-digit division. Tobin's Q is used as the main measure of firm value because the dataset does not provide the detailed segment-level information required to construct an excess value measure. The valuation models are estimated using firm-year observations and include controls for size, profitability, leverage and liquidity, together with industry and country fixed effects. The main specification also includes a COVID dummy and its interaction with the diversification dummy, allowing the analysis to examine whether the valuation difference between diversified and focused firms changed during the pandemic. Several robustness checks are also performed. Diversification is first defined more broadly using NACE sections, with industry fixed effects specified at the same level. Market-to-book is then used as an alternative measure of firm value, and the main model is repeated on a balanced panel including only firms observed in every year from 2018 to 2021. Finally, diversified firms are divided into related and unrelated groups. These additional analyses test whether the results are sensitive to the industry classification, the valuation measure, the composition of the sample and the economic distance between firms' activities.

The thesis provides additional evidence on the relationship between corporate diversification and firm value in a European context. The analysis focuses on listed firms from several European countries, where the evidence on the conglomerate discount is less extensive and more mixed than in the United States. It also considers the COVID-19 pandemic, a crisis that

differed from the financial shocks examined in much of the previous literature. In addition, the analysis uses both detailed and broader NACE classifications and examines the observable characteristics associated with diversification status. The results are interpreted in light of the limitations of the available data and research design, without assuming that the estimated relationships represent causal effects.

The remainder of the thesis is organized as follows. Chapter 2 reviews the theoretical and empirical literature on corporate diversification, the conglomerate discount and the behaviour of diversified firms during crisis periods. It also develops the hypotheses tested in the empirical analysis. Chapter 3 describes the European institutional setting and discusses the COVID-19 crisis, with particular attention to its effects on economic activity and firms' financing conditions. Chapter 4 presents the data source, the sample selection process, the construction of the variables and the econometric models. Chapter 5 reports and discusses the empirical results, including the main valuation models and the robustness checks. Chapter 6 concludes the thesis by summarizing the main findings, discussing the limitations of the analysis and presenting possible directions for future research.

2. Literature Review and Hypotheses

2.1 Corporate diversification and conglomerates

Corporate diversification can be described as a strategic approach through which firms expand the scope of their activities in order to improve performance and generate additional revenue. This expansion can take different forms, but it is commonly associated with the introduction of new products, the provision of new services, or entry into new markets (Damarcheli and Kalantari, 2024). When this diversification takes place under a common organizational structure, it can lead to the formation of a conglomerate. In this sense, conglomeration refers to the combination of different activities under a common corporate umbrella, with diversification representing its key feature (Ulst, 2005). On this basis, conglomerates can be interpreted as a specific organizational form through which corporate diversification is implemented (Damarcheli and Kalantari, 2024; Ulst, 2005).

An early formal definition of conglomerates was provided by the U.S. Federal Trade Commission (FTC), which described a conglomerate as the union of firms without a buyer–seller relationship in production or distribution (Leontiades, 1986). More recent definitions describe conglomerates as firms composed of multiple business units operating across different industries or markets (Crystal, 2003). These definitions highlight the key characteristic of conglomerates, that is the diversification of activities beyond a single line of business.

The development of conglomerates has followed different patterns over time and across regions. In the United States and Europe, conglomerates became particularly widespread during the 1960s and 1970s, driven by merger waves and the search for growth opportunities. In the United States, emblematic examples included ITT, Gulf & Western, and Ling-Temco-Vought (LTV), all of which expanded rapidly through acquisitions across unrelated industries during the conglomerate wave of the period (Time, 1968). However, their relevance declined in subsequent decades, partly due to stricter antitrust regulation and increasing skepticism about their efficiency (Davis, Diekmann, & Tinsley, 1994). In contrast, conglomerates have remained more prominent in emerging markets, particularly in Asia, where institutional environments and political connections have often favored diversified business groups. (Davis, Diekmann, & Tinsley, 1994; Pham, 2018).

Conglomerates may take different organizational forms, in particular, Ulst (2005) identifies three main models. The first is the universal model, in which all activities are conducted within a single legal entity. The second is the parent–subsidiary model, where activities are carried out

through separate controlled companies under a parent entity. The third is the holding company model, in which legally distinct entities are owned by a single parent company, which acts as an umbrella structure for the group. Although these organizational forms differ in structure, they all reflect the same underlying logic of coordinating multiple activities within a single corporate framework.

One of the main arguments traditionally used in favor of corporate diversification is **risk reduction**. By operating in different business segments whose cash flows are not perfectly correlated, a diversified firm can reduce overall volatility and make its income stream more stable over time. This also lowers the firm's exposure to shocks affecting only one specific line of business (Amihud and Lev, 1981; Servaes, 1996). From this perspective, a conglomerate structure may help firms stabilize performance over time and, at least in principle, reduce the likelihood of financial distress. In addition, lower cash-flow volatility may increase debt capacity, as the imperfect correlation among divisional cash flows reduces default risk relative to a comparable portfolio of stand-alone firms (Lewellen, 1971; Kuppuswamy and Villalonga, 2016).

Another key advantage is the presence of **internal capital markets**, which enable conglomerates to allocate financial resources across divisions more efficiently than external capital markets, especially in the presence of financial constraints (Stein, 1997). In particular, corporate headquarters may create value by reallocating scarce funds from lower-return uses to divisions with better investment opportunities, a mechanism described as “winner-picking” (Stein, 1997). More specifically, when external finance is constrained, internal capital markets may allow firms to direct cash flows, collateral, or internally generated funds toward the projects with the highest expected returns, thereby improving resource allocation within the firm (Stein, 1997; Kuppuswamy and Villalonga, 2016). In addition, diversification may generate operational synergies, such as economies of scope, knowledge transfer, and shared resources across business units (Teece, 1980). Disney provides a well-known example of this mechanism. As discussed by Kumar and Upadhyay (2024), Disney has been able to exploit the same creative assets across multiple business areas, including film and television, theme parks, cruises, consumer products, and streaming platforms. In this way, content developed in one division can generate multiple revenue streams and also produce cost synergies in marketing and promotion, since Disney can leverage its own distribution channels and then extend successful characters and storylines into merchandise and park attractions (Kumar and Upadhyay, 2024).

Despite these potential benefits, diversification also presents important drawbacks. A central concern in the literature is that diversification may intensify agency problems, as managers may pursue diversification strategies to increase firm size and personal power rather than shareholder value (Jensen, 1986). This may lead to inefficient investment decisions, including overinvestment in low-return projects. Furthermore, internal capital markets may suffer from misallocation of resources, as funds may be diverted from high-performing divisions to underperforming ones (Rajan, Servaes, and Zingales, 2000). These inefficiencies are often cited as key explanations for the observed conglomerate discount documented in the empirical literature.

Consistent with these concerns, in recent years a growing tendency toward corporate refocusing has emerged across several international markets, with many conglomerate firms divesting assets or spinning off divisions that are no longer considered central to their strategy. These restructuring choices are usually driven by the need to simplify complex business models, concentrate resources on the most important business units, and, in some cases, obtain liquidity to support core activities during periods of market difficulty (Dell'Acqua, Etro, and Correra, 2013). This development is evidenced by the increasing number of asset sales and spin-offs of corporate divisions, as well as by repeated announcements from management concerning the disposal of assets and business units regarded as non-strategic, as can also be seen in Figure 1, which shows the growing volume of corporate divestiture activity in Europe and North America over the 2002–2010 period (Dell'Acqua, Etro, and Correra, 2013). This trend is particularly relevant in the context of conglomerates, as it reflects the increasing preference for more focused corporate configuration compared to broadly diversified organizational structures (Dell'Acqua, Etro, and Correra, 2013). A recent example is Unilever, which in 2024 announced the separation of its ice cream business, including brands such as Ben & Jerry's and Magnum, into a stand-alone company. This decision was part of a broader restructuring plan aimed at simplifying the group structure, increasing strategic focus on its core businesses, and improving margins (Naidu and Mathews, 2024).

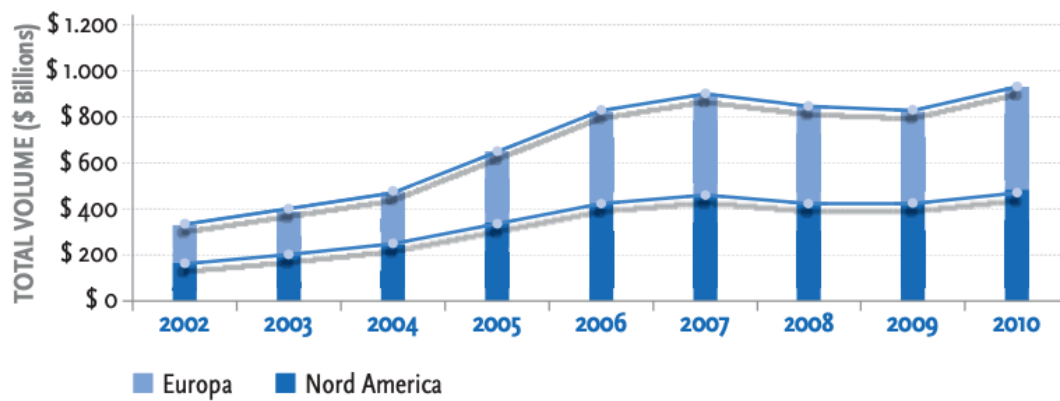


Figure 1: Trend of corporate divestiture from 2002 to 2010 (Dell'Acqua, Etro, Correrà, 2013)

Despite extensive research, the motives behind conglomerate mergers remain only partially understood, especially given that no obvious economic benefit or clear synergistic gain is generally expected from the combination of functionally unrelated businesses. As discussed above, risk reduction through diversification initially appeared to offer a natural explanation for the conglomerate merger phenomenon. However, it has been convincingly argued that, in perfect capital markets, such risk reduction should not create value for shareholders, since they can achieve the desired level of risk independently through portfolio diversification (Levy and Sarnat, 1970; Amihud and Lev, 1981). In other words, corporate diversification may replicate at the firm level a benefit that investors can already obtain on their own, and often at a relatively low cost, through diversified financial portfolios. For this reason, the risk-reduction argument is generally seen as more compelling from a managerial perspective than from a shareholder-value perspective, unless market imperfections make external diversification significantly more costly or less effective (Amihud and Lev, 1981). Even when market imperfections, such as transaction costs, are taken into account, the benefits of conglomerate mergers in terms of risk reduction remain questionable from the shareholders' perspective, given the relatively low cost of diversification in capital markets (Amihud and Lev, 1981). This suggests that the rationale for corporate diversification cannot be explained by risk reduction alone. More broadly, the theoretical framework points to a trade-off between potential benefits, such as improved internal capital allocation and possible synergies, and significant costs related to agency problems and organizational complexity. This ambiguity provides the basis for the empirical debate on the conglomerate discount, which is examined in the following section.

2.2 Conglomerate discount: definition and empirical evidence

The concept of conglomerate discount became central in the corporate finance literature with the work of Lang and Stulz (1994) and Berger and Ofek (1995), although earlier contributions had already introduced the sum-of-the-parts logic and the relationship between diversification and firm valuation (LeBaron and Speidell, 1987; Wernerfelt and Montgomery, 1988). Building on this early literature, Lang and Stulz (1994) and Berger and Ofek (1995) helped establish the idea that diversified firms may trade at lower valuations than focused firms. This lower valuation is generally interpreted as being driven mainly by the value-creation side of the firm, rather than simply by a higher risk discount. In other words, the discount is usually linked to lower expected cash flows or lower operating efficiency, for example because diversified firms may allocate capital to weaker divisions, overinvest in low-return segments, or face higher organizational and coordination costs (Berger and Ofek, 1995; Rajan, Servaes, and Zingales, 2000). The term conglomerate discount refers to this tendency of diversified or multi-segment firms to be valued less than comparable focused firms. In the corporate finance literature, the concept generally describes the gap between the observed market value of a diversified company and the value that the same company would be expected to have if its individual business segments were operated and valued as stand-alone firms. In this sense, the conglomerate discount captures the idea that diversification may be associated with a lower market valuation rather than a premium (Lang and Stulz, 1994; Berger and Ofek, 1995; Villalonga, 2004).

The concept became central in the literature following the development of empirical measures aimed at comparing the valuation of diversified firms with that of specialized firms. Early studies such as Lang and Stulz (1994) documented that diversified companies tend to exhibit lower market-based valuation ratios, particularly Tobin's Q, than focused firms operating in a single line of business. Another important metric used in the literature is excess value, introduced by Berger and Ofek (1995), which captures the extent to which the market value of a diversified firm differs from the imputed sum of the values of its segments based on comparable single-segment firms. Although the empirical methods differ, the underlying intuition is common: if diversification created value through risk reduction, internal capital markets, or synergies, diversified firms should trade at a premium, or at least at valuations comparable to focused firms. The presence of a discount suggests instead that the costs of diversification may outweigh its benefits.

At the same time, the notion of conglomerate discount should not be interpreted too mechanically. The observation that diversified firms trade at lower valuations than focused firms does not automatically imply that diversification itself destroys value. Rather, the discount should first be understood as an empirical finding. Its interpretation depends on the methodology employed and on whether alternative explanations are properly taken into account. For example, as emphasized by Villalonga (2004), firms may self-select into diversification, meaning that diversified firms may already differ from focused firms before the diversification decision itself. In a similar way, later studies show that the estimated discount may either disappear or remain significant depending on how endogeneity and firm-specific heterogeneity are treated (Ammann, Hoechle, and Schmid, 2012). This distinction is important because it separates the definition of the phenomenon from the debate over its causes. The literature on conglomerate discount is therefore concerned not only with whether diversified firms trade at lower valuations, but also with whether this discount reflects inefficient diversification or pre-existing firm characteristics. Moreover, some authors argue that part of the discount may be related to organizational complexity itself rather than to diversification across industries alone (Sanzhar, 2006).

The conglomerate discount has been measured in different ways in the empirical literature. The two most common approaches are the excess value methodology and market-based valuation ratios, especially Tobin's Q. The excess value approach, widely used after Berger and Ofek (1995), compares the actual market value of a diversified firm with an imputed stand-alone value of its segments, usually based on valuation multiples of comparable focused firms. By contrast, Tobin's Q compares the market value of a firm with the value of its assets and is commonly used to test whether diversified firms trade at lower valuations than focused firms (Lang and Stulz, 1994; Servaes, 1996). Some studies also use market-to-book or related ratios as alternative measures or robustness checks (Villalonga, 2004; Rudolph and Schwetzler, 2013).

These measures are not identical. Excess value is more directly based on a sum-of-the-parts logic, while Tobin's Q provides a broader market-based measure of firm value. For this reason, the estimated size of the conglomerate discount may depend on the valuation measure adopted, the quality of segment-level data, the industry benchmark used, and the econometric specification (Villalonga, 2004; Laeven and Levine, 2007; Ammann, Hoechle, and Schmid, 2012). Since this thesis uses Tobin's Q as the main measure of firm value, the detailed construction of the variables and the empirical model are discussed in Chapter 4.

A large body of empirical work has documented the existence of a conglomerate discount. Among the earliest and most influential studies based on Tobin's Q, Lang and Stulz (1994) show that diversified firms are valued less than specialized firms and conclude that shareholder wealth would increase, on average, if diversified firms could be dismantled and their divisions valued like specialized firms in the same industries. In particular, they report a valuation discount of 0.15 in their 1979 regression model. Focusing on the conglomerate merger wave of the late 1960s and early 1970s, Servaes (1996) provides further support for the existence of a diversification discount by showing that diversified firms were not valued at a premium even during a period in which diversification strategies were particularly widespread. It should be noted, however, that the Tobin's Q results reported by Servaes (1996) are not directly comparable to the 0.15 estimate associated with Lang and Stulz, since some of Servaes's figures refer to raw differences in average q ratios rather than to regression coefficients. In particular, his evidence based on average q ratios shows valuation differences between single-segment and diversified firms ranging from about -0.34 in 1970 to -0.73 in 1967, confirming that the discount was economically meaningful during that phase. At the same time, when using a regression framework for 1979, Servaes (1996) reports a valuation discount of about 0.16, which is very close to the 0.15 estimate associated with Lang and Stulz. (1994). Using a more direct sum-of-the-parts framework, Berger and Ofek (1995) document a significant discount through the excess value methodology. In particular, they find mean discounts of 10.8% when excess value is calculated using asset multipliers and 9.5% when it is calculated using sales multipliers, with even larger median discounts. Later studies often summarize the standard estimates in the literature as pointing to an average discount of about 10–15% (Burch, Nanda, and Narayanan, 2000).

At the same time, later contributions began to question whether the observed discount should be interpreted as causal evidence that diversification destroys value. A central concern in this debate is the endogeneity of the diversification decision: firms do not diversify randomly, and those that choose to diversify may already differ systematically from focused firms in ways that also affect their valuation. For example, firms that decide to diversify may already have weaker growth opportunities in their core business, lower past performance, or other characteristics that lead the market to value them less even before diversification takes place (Campa and Kedia, 2002; Villalonga, 2004). In this case, the observed conglomerate discount may reflect the type of firms that choose to diversify, rather than the diversification decision itself. Using methods designed to compare diversified firms with similar focused firms and to correct for the non-random nature of the diversification choice, Villalonga (2004) argues that the traditional

discount should not be interpreted too mechanically and shows that, once selection effects are taken into account, the discount may disappear. This methodological challenge led to a more nuanced literature. On the one hand, several studies confirmed that endogeneity and self-selection are central issues and that raw comparisons between diversified and focused firms can be misleading (Campa and Kedia, 2002; Villalonga, 2004; Kuppuswamy and Villalonga, 2016). On the other hand, later work shows that the issue is not fully settled. Ammann, Hoechle, and Schmid (2012), for example, find that although the discount may vanish in some specifications that explicitly address self-selection, it remains statistically and economically significant once firm fixed effects are included. In their estimates, the discount is still in the range of roughly 11–21%, depending on the specification, and remains economically meaningful both in the full sample and in the post-1997 period (Ammann, Hoechle, and Schmid, 2012).

An additional and particularly interesting contribution is offered by Sanzhar (2006), who studies so-called pseudo-conglomerates, namely multi-division firms whose divisions all operate in the same narrowly defined industry. Since these firms are not diversified across unrelated businesses, the evidence cannot easily be explained by the traditional argument that cross-industry differences in opportunities lead to inefficient internal capital allocation. Yet Sanzhar (2006) still finds a large and statistically significant discount of about 11%, compared with the roughly 15% often documented for unrelated conglomerates. He therefore argues that the conglomerate discount may be more appropriately interpreted as an organizational discount, linked not only to diversification across industries but also to the complexity of multi-divisional structures themselves. This line of reasoning is consistent with a broader set of studies suggesting that lower valuations may depend not only on diversification across industries, but also on organizational frictions within multi-division firms. In this perspective, the conglomerate discount is not simply a penalty for operating in multiple industries, but may also reflect internal power struggles over resource allocation, agency-related distortions, and firm characteristics that are associated both with a lower market valuation and with a greater propensity to diversify (Rajan, Servaes, and Zingales, 2000; Campa and Kedia, 2002; Sanzhar, 2006).

The evidence is also not limited to non-financial firms. Laeven and Levine (2007) extend the analysis to financial conglomerates and find a diversification discount in this context as well. More specifically, they show that the market values financial institutions engaged in multiple activities, such as lending and non-lending financial services, less than if those same activities were carried out by specialized intermediaries. Their contribution is particularly relevant because financial conglomerates are often considered a setting in which economies of scope

should be especially strong, given the potential complementarities between lending, underwriting, brokerage, and other financial services. However, their results suggest that these potential benefits are not sufficiently large to offset the costs associated with diversification. In particular, Laeven and Levine (2007) interpret their findings as being consistent with theories that emphasize intensified agency problems within complex financial institutions, where monitoring becomes more difficult and insiders may have stronger incentives to pursue diversification even when it does not enhance market value. In this sense, their study reinforces the broader view that diversification can be associated with a valuation discount even in environments where synergies would, at least in principle, be expected to be substantial (Laeven and Levine, 2007).

Overall, the empirical literature provides substantial evidence of lower valuations for diversified firms, but much less consensus on the precise interpretation of this result. In some studies, the discount is large and robust; in others, it disappears once endogeneity is properly controlled for; in still others, it reappears when fixed effects, organizational complexity, or the correct treatment of debt are taken into account. This divergence suggests that the conglomerate discount should not be regarded as a single universally stable phenomenon, but rather as an empirical outcome that depends on the interaction between firm characteristics, measurement choices, and the institutional or economic context.

The table below provides a summary of the main findings documented in the literature to date.

Table 1 - Main findings about Conglomerate Discount in the literature

Study	Main measure	Sample / setting	Main result
Lang and Stulz (1994)	Tobin's Q	U.S. firms	Diversified firms are valued less than specialized firms. A valuation discount of 0.15 is reported for the 1979 regression model.
Berger and Ofek (1995)	Excess value	U.S. multi-segment firms	Mean discount of 10.8% using asset multipliers and 9.5% using sales multipliers; median discounts are even larger.
Servaes (1996)	Tobin's Q and sales multipliers	U.S. firms during the conglomerate	Finds no evidence that diversified firms were valued at a premium during the merger wave. The discount

		merger wave of the late 1960s and early 1970s	is economically meaningful during the late 1960s, and q-ratio valuation differences between single-segment and diversified firms range from about -0.34 in 1970 to -0.73 in 1967.
Rajan, Servaes, and Zingales (2000)	Excess value (using q and market-to-sales)	U.S. diversified firms, 1980–1993	Evidence consistent with a diversification discount. Mean excess value is -0.120 using q and -0.113 using market-to-sales, with median values of -0.156 and -0.184, respectively.
Campa and Kedia (2002)	Excess value	US firms	Median discount of 10.9% using sales multipliers and 11.6% using asset multipliers. In OLS, the diversification dummy is about -0.13 with sales multipliers and -0.12 with asset multipliers.
Villalonga (2004)	Excess value, industry-adjusted q, and related measures	U.S. firms	Once selection effects are taken into account, the traditional diversification discount disappears.
Sanzhar (2006)	Excess value	Pseudo-conglomerates	Still finds a statistically significant discount of about 11%, versus roughly 15% often documented for unrelated conglomerates. Suggests an organizational discount, not only an industry-diversification discount.
Laeven and Levine (2007)	Tobin's Q	Financial conglomerates	Finds a diversification discount in financial conglomerates as well. The market values institutions engaged in multiple activities less than specialized intermediaries

Ammann, Hoechle, and Schmid (2012)	Excess value	U.S. firms	In some specifications that correct for self-selection, the discount disappears; however, once firm fixed effects are included, it remains statistically and economically significant, in the range of about 11%–21%. They also report a discount of about 11.5% in the post-1997 period and nearly 13% over the full sample period.
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Overall, the literature reviewed above shows broad agreement that diversified firms often appear to trade at lower valuations than focused firms, but much less agreement on how this evidence should be interpreted. Early empirical contributions document a significant conglomerate discount and establish it as one of the central stylized facts in the literature on corporate diversification (Lang and Stulz, 1994; Berger and Ofek, 1995). At the same time, later studies show that the meaning of this discount is far less straightforward. For some authors, it reflects inefficient internal capital allocation, agency conflicts, and the organizational complexity associated with multi-division firms. For others, it is partly or largely the result of self-selection, measurement choices, or structural characteristics of the firms that decide to diversify (Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012). The literature therefore suggests that the conglomerate discount should not be viewed as a single and unambiguous phenomenon, but rather as the outcome of several mechanisms that may operate simultaneously.

This debate is particularly relevant for the present thesis. If the conglomerate discount were a fixed and purely structural characteristic of diversified firms, one would expect it to remain broadly stable across time and economic conditions. If, instead, it depends on the relative costs and benefits of diversification in specific environments, its magnitude may vary substantially when the external context changes. For this reason, before turning to the specific role of crises, it is essential to establish both how the discount is defined and how the empirical evidence on its existence has evolved over time.

2.3 Conglomerate discount during economic crises

The literature on the conglomerate discount during crisis periods is still relatively limited compared with the broader literature on diversification and firm value. However, the studies that do address this issue generally start from a common intuition: when external capital markets become severely disrupted, the potential benefits of diversification may increase relative to its usual costs. In particular, if external financing becomes more costly or even temporarily unavailable, diversified firms may rely more heavily on internal capital markets and on the debt coinsurance benefits of combining businesses with imperfectly correlated cash flows (Kuppuswamy and Villalonga, 2016; Rudolph and Schwetzler, 2013). A similar argument has also been extended to financial conglomerates, for which diversification may become relatively more attractive in crisis periods because larger and more diversified institutions may benefit from lower bankruptcy risk, broader funding capacity, and stronger perceived support in stressed financial environments (Lee, 2014). However, the literature does not support a uniformly positive interpretation. Dell’Acqua, Etro, and Correra (2013), for example, continue to find a conglomerate discount in a large international sample covering the years surrounding the global financial crisis, even though they acknowledge that diversification may still be useful for the internal management of financial resources in periods of turbulence. More recent studies also note that earlier crisis research often points to a reduction in the diversification discount during downturns, but they simultaneously stress that this pattern cannot be generalized across all types of shocks and institutional settings (Fruehling, Beyer, and Goeddeke, 2023).

Kuppuswamy and Villalonga (2016) provide the main reference in this area by examining whether the value of diversification changed during the 2007–2009 financial crisis. They focus on this episode because it offers a particularly suitable setting for analysis: unlike many earlier downturns, the crisis originated outside the corporate sector and generated a sudden and severe disruption in external capital markets, making it easier to study how firms responded to an exogenous financing shock (Kuppuswamy and Villalonga, 2016). Their results show that the diversification discount was reduced by about 7–9% during the crisis. In relative terms, this implies that the discount fell to about half of its pre-crisis size during the early phase of the crisis and to almost one third during the later phase (Kuppuswamy and Villalonga, 2016). They interpret this result through two complementary channels. The first is the more-money effect, according to which diversified firms benefit from greater debt capacity and better access to credit because the combination of imperfectly correlated cash flows across divisions reduces default risk and increases debt coinsurance. The second is the smarter-money effect, according to which internal capital markets become more efficient when external financing constraints

tighten, allowing headquarters to reallocate scarce resources toward divisions with better investment opportunities (Kuppuswamy and Villalonga, 2016). Consistent with this interpretation, the authors show that diversified firms became more leveraged relative to focused firms and that the efficiency of internal capital allocation increased significantly during the crisis. They also show that the main result remains robust after controlling for self-selection, which strengthens the view that the increase in the relative value of diversification was linked to real financing and investment advantages rather than to changes in investor sentiment alone (Kuppuswamy and Villalonga, 2016).

This interpretation is reinforced by related work on internal capital markets. In particular, diversified firms may be better able to cope with periods of financial market disruption because they can move resources across divisions when access to external funding becomes more difficult (Matvos and Seru, 2014). Consistent with this view, internal capital markets are shown to provide an important force countervailing financial market dislocation, and internal resource allocation helped diversified conglomerates offset financial market stress during the recent financial crisis (Matvos and Seru, 2014). The same study also shows that, as external market conditions tightened, conglomerates became relatively more valuable than comparable stand-alone firms and that capital expenditures in diversified firms became more sensitive to productivity, especially in firms with greater dispersion in productivity across divisions (Matvos and Seru, 2014). A broader perspective is provided by evidence showing that firms tend to increase their scope during periods of high external capital market frictions, such as the Great Recession, and that diversified firms also increase the diversification of investment needs and cash flows across industries (Matvos, Seru, and Silva, 2018). Although this latter paper is not a direct test of the conglomerate discount, it is consistent with the view that internal capital markets become relatively more valuable when external markets are disrupted (Matvos, Seru, and Silva, 2018).

A more cautious perspective is offered by Dell’Acqua, Etro, and Correra (2013). Using a large international sample of listed firms from the United States, the United Kingdom, and Continental Europe over the 2006–2010 period, they examine the value effects of diversification during the years surrounding the 2008 financial crisis with the excess value methodology seen before and first used by Berger and Ofek (1995). Their results show that firms present in more than one segment display a persistent conglomerate discount relative to focused firms throughout the sample period. At the global level, the average discount is about 15.2%, while it is more pronounced in the United States, with a median value of 18.8%, and lower in the United Kingdom and Continental Europe, at 13.1% and 12.5%, respectively

(Dell'Acqua, Etro, and Correra, 2013). At the same time, their evidence also shows that the discount becomes more limited in 2008, the year of highest capital market volatility, which is consistent with the idea that diversification may become relatively more useful when access to external capital is more difficult. In addition, they find that the discount is smaller for related diversified firms and increases as the correlation among business segments declines. In 2008, related diversified firms even exhibit a value premium in Europe, possibly reflecting the role of synergies across business segments. Globally, the average discount is about 9.8% for related diversified firms but rises to 15.3% for firms with moderately correlated segments and to 19.1% for firms with weakly correlated segments (Dell'Acqua, Etro, and Correra, 2013). Their results therefore differ from the stronger conclusions of Kuppuswamy and Villalonga (2016): they do not show that the discount disappears during crisis periods, but they do suggest that crisis conditions may reduce its magnitude and leave room for some positive effects of diversification, especially when business segments are more closely related (Dell'Acqua, Etro, and Correra, 2013).

Rudolph and Schwetzler (2013) extend the analysis of the 2008–2009 financial crisis to a cross-regional setting and show that the effect of the crisis on the conglomerate discount differs across regions. Using a sample of 68,330 firm-year observations from developed Asia Pacific, the British Isles, Continental Europe, and North America over the period 1998–2009, they estimate firm fixed-effects regressions in which excess value is explained by a diversification dummy, a crisis indicator for 2008–2009, their interaction, and a set of firm-level controls. Their excess value measure is based on an amended Berger and Ofek approach, using enterprise values and geometric mean industry multipliers (Rudolph and Schwetzler, 2013). Before the crisis, they find significant conglomerate discounts in Asia Pacific (-6.7%), the British Isles (-10.4%), and North America (-5.3%), whereas in Continental Europe the diversification coefficient is close to zero and statistically insignificant. During the crisis, the discount decreases significantly in Asia Pacific, the British Isles, and North America by 10.9, 5.8, and 4.7 percentage points, respectively; in the Asia Pacific sample, it even turns into a premium. For Continental Europe, by contrast, the interaction between diversification and the crisis indicator remains insignificant. This is the central result of the paper: while the crisis appears to increase the relative value of diversification in regions with more developed capital markets, the same effect is not detected in Continental Europe, which the authors describe as the region with the least developed capital markets and the lowest legal investor protection in their sample. Their conclusion is therefore that the U.S.-based findings of Kuppuswamy and Villalonga cannot be easily transferred to other regions and that the effect of crisis periods on the conglomerate

discount depends strongly on the institutional environment in which firms operate (Rudolph and Schwetzler, 2013).

The evidence is also not limited to non-financial firms. As discussed above, financial conglomerates are also valued at a discount relative to specialized intermediaries, a result that has been interpreted as being consistent with intensified agency problems and insufficiently strong economies of scope (Laeven and Levine, 2007). Building on this line of research, Lee (2014) examines U.S. bank-based financial services firms over the period 1998–2012 and studies both the existence of a diversification discount and the possibility of a crisis premium on diversification. Using a sample of listed U.S. banks with total assets above \$100 million, Lee measures diversification through both a diversification dummy and a continuous degree-of-diversity variable, and relates these measures to bank value across three major crisis episodes: the 1998 Russian debt crisis, the 2000–2002 dot-com crash and September 11 attacks, and the 2007–2009 subprime crisis (Lee, 2014). His results confirm the existence of a statistically significant diversification discount and show that the discount tends to be deeper for banks with a higher degree of diversity. At the same time, the paper finds only weak evidence of a crisis premium on diversification: even if some interaction terms suggest that diversified banks may be less severely affected during crisis periods, this effect is too small and unstable to offset the already present diversification discount. Lee therefore concludes that, even in the case of financial conglomerates, the crisis-related benefits of diversification are not strong enough to overturn the broader evidence of discount in a clear and consistent way (Lee, 2014).

A more recent contribution is provided by Damarcheli and Kalantari (2024), who examine how a major shock can affect the relationship between diversification and firm value in an emerging-market setting. Using a sample of 172 firms listed on the Tehran Stock Exchange over the period 2012–2021, they estimate a fixed-effects regression model in which firm value, measured by Tobin's Q, is related to diversification, a COVID-period indicator, and the interaction between the two, together with firm-level controls such as board size, leverage, firm size, board independence, and dividend policy. Their results suggest that diversification is positively associated with firm value in the baseline analysis, but that this positive relationship becomes weaker during the COVID period. In this sense, the paper does not document the pattern found in part of the earlier crisis literature, where an existing diversification discount tends to decrease during periods of financial distress. Instead, it points in the opposite direction, showing that the pandemic reduced the favourable effect of diversification on firm value. This makes the study useful as additional evidence that the valuation effect of diversification is not

constant over time but may change depending on the nature of the shock and the institutional setting considered. At the same time, the evidence should be interpreted with some caution, since the analysis is based on a relatively small sample of 172 firms from the Tehran Stock Exchange and therefore refers to a regional setting that differs substantially from the U.S. and European markets examined in most of the earlier literature (Damarcheli and Kalantari, 2024).

The table below provides a summary of the main findings documented in the literature to date.

Table 2 - Main findings about Conglomerate Discount during crisis in the literature

Study	Sample	Crisis examined	Main result
Dell’Acqua, Etro, and Correr (2013)	Listed firms from the United States, the United Kingdom, and Continental Europe, 2006–2010	2008 financial crisis	Find a persistent conglomerate discount throughout the sample period. The average global discount is about 15.2%, with higher values in the U.S. and lower values in the U.K. and Continental Europe. The discount becomes more limited in 2008, and related diversified firms show smaller discounts.
Rudolph and Schwetzler (2013)	68,330 firm-year observations from developed Asia Pacific, the British Isles, Continental Europe, and North America, 1998–2009	2008–2009 global financial crisis	Show that the crisis effect differs across regions. Before the crisis, significant discounts exist in Asia Pacific, the British Isles, and North America, but not in Continental Europe. During the crisis, the discount decreases significantly in the first three regions, while for Continental Europe the effect is insignificant.
Matvos and Seru (2014)	US firms	2007–2009 financial crisis	Show that internal capital markets help diversified firms offset financial market stress by about 16%–30%. As external market conditions tighten, conglomerates become relatively more valuable than comparable stand-alone

			firms, and investment becomes more sensitive to productivity.
Lee (2014)	5,158 observations on NYSE- and NASDAQ-listed U.S. bank-based financial services firms, 1998–2012	1998 Russian debt crisis; 2000–2002 dot-com crash and September 11; 2007–2009 subprime crisis	Confirms a diversification discount in financial institutions and finds that the discount tends to be deeper for banks with a higher degree of diversity. Evidence of a crisis premium on diversification is only weak and generally insufficient to offset the initial discount.
Kuppuswamy and Villalonga (2016)	U.S. non-financial firms	2007–2009 global financial crisis	Find that the diversification discount declines significantly during the crisis. In relative terms, the discount falls to about half of its pre-crisis size in the early phase and to almost one third in the later phase. They explain this through better access to financing and more efficient internal capital allocation in diversified firms.
Damarcheli and Kalantari (2024)	172 firms listed on the Tehran Stock Exchange, 2012–2021	COVID period (2019–2021)	Do not document the pattern found in part of the earlier crisis literature, where an existing discount tends to shrink in crisis periods. Instead, they show that the pandemic weakened the favourable relationship between diversification and firm value.

Overall, the literature reviewed in this section suggests that, in many cases, the conglomerate discount tends to become less pronounced during crisis periods, especially when external financing constraints become stronger and internal capital markets gain importance. This is the main conclusion of Kuppuswamy and Villalonga (2016), and it is broadly reinforced by Matvos and Seru (2014), who show that internal resource allocation can help diversified firms offset a weaker external financial market. At the same time, the evidence is far from unanimous. Dell’Acqua, Etro, and Correra (2013) continue to find a persistent conglomerate discount

during the years surrounding the global financial crisis, although they also show that the discount becomes more limited in 2008 and that diversification may still provide some internal financial benefits, particularly when business segments are more closely related. Rudolph and Schwetzler (2013) also reach a similar intermediate conclusion, they found that the discount decreases significantly in Asia Pacific, the British Isles, and North America, but not in Continental Europe, where the crisis effect is statistically insignificant. Evidence for financial institutions also remains cautious, since Lee (2014) confirms a diversification discount and finds only weak support for a crisis-related advantage for diversified firms. More recent work, such as Damarcheli and Kalantari (2024), points in the same direction of heterogeneity, showing that the effect of diversification can change with the type of shock and the institutional setting rather than following a single common pattern. Taken together, these studies suggest that the most common result in the literature is not the disappearance of the conglomerate discount, but rather its possible reduction under certain crisis conditions. Whether this happens, however, appears to depend on the nature of the shock, the structure of internal capital markets, and the institutional environment in which firms operate. This is precisely why it remains important to test the issue in the specific context of the COVID-19 crisis and, in particular, in the European market setting considered in this thesis.

2.4 Hypothesis development

The previous sections show that the relationship between corporate diversification and firm value is complex and depends on both the methodology used and the economic context considered. A large part of the empirical literature documents that diversified firms tend to trade at lower valuations than comparable focused firms, giving rise to the conglomerate discount. This evidence is usually explained by the potential costs of diversification, such as inefficient internal capital allocation, agency problems, and organizational complexity (Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996; Rajan, Servaes, and Zingales, 2000). At the same time, the literature also shows that the discount is not always easy to interpret. It may partly depend on the type of firms that choose to diversify, rather than on diversification itself. Moreover, its size may change depending on the empirical method used (Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012).

This thesis therefore aims to examine these issues in the context of European listed firms and, more specifically, during the COVID-19 crisis. Building on the literature reviewed above, the analysis first investigates whether diversified firms in the sample are valued differently from focused firms. It then examines whether this valuation difference changed during the crisis

period. In this way, the thesis connects the traditional debate on the existence of the conglomerate discount with the more recent question of whether diversification becomes more or less valuable under conditions of economic stress.

Before examining the effect of diversification on firm value, it is important to consider that firms do not diversify randomly. The decision to operate in several business activities may be associated with observable firm characteristics, such as size, market valuation, profitability, leverage and liquidity. Larger firms, for example, may have more resources, organizational capacity and access to finance, making it easier for them to expand into additional industries. Profitability and liquidity may provide the internal resources necessary to support diversification, while leverage may affect the firm's ability to finance a broader set of activities. Industry and country characteristics may also influence the probability of diversification because firms operate in different competitive, institutional and financial environments. Analysing these determinants is useful because diversified and focused firms may already differ before the valuation effect of diversification is estimated. Identifying these differences provides a clearer description of the firms that are more likely to diversify and helps interpret the subsequent empirical results. This leads to the following hypotheses concerning the determinants of diversification:

H0₀: Firm characteristics are not associated with the probability of being diversified.

H1₀: Firm characteristics are associated with the probability of being diversified.

Then the first set of hypotheses concerns the existence of the traditional conglomerate discount in the sample considered in this thesis. This baseline test is important because most of the seminal evidence on the conglomerate discount is based on U.S. firms, while the evidence on European firms is more limited and less uniform. Earlier studies establish the discount mainly in the U.S. context, showing that diversified firms tend to trade at lower valuations than comparable focused firms (Lang and Stulz, 1994; Berger and Ofek, 1995; Servaes, 1996). However, evidence from Europe and international samples suggests that the size and even the relevance of the discount may vary across institutional settings and time periods. For example, Dell'Acqua, Etro, and Corra (2013) document a conglomerate discount in the United States, the United Kingdom, and Continental Europe, while Rudolph and Schwetzler (2013) show that the effect of diversification differs across regions and that European evidence is not always directly comparable to U.S. results. Therefore, before examining whether the conglomerate discount changed during the COVID-19 crisis, it is necessary to test whether diversified firms

in the sample are valued differently from focused firms in the first place. This leads to the first set of hypotheses:

H0₁: There is no difference in firm value between diversified and focused firms.

H1₁: Diversified firms exhibit lower firm value than focused firms.

The second valuation hypothesis concerns the behaviour of the conglomerate discount during crisis periods. The literature suggests that economic and financial crises may change the relative costs and benefits of diversification. When external financing becomes more difficult or expensive, diversified firms may benefit from internal capital markets, debt coinsurance and the possibility of reallocating resources across divisions. These characteristics may allow diversified firms to support divisions facing temporary financial difficulties, rely less on external capital markets and make more flexible use of internally generated funds. From this perspective, diversification may become more valuable during periods of financial stress, leading to a reduction in the conglomerate discount. This mechanism is supported by Kuppuswamy and Villalonga (2016), who find that the diversification discount declined during the 2007–2009 financial crisis. Similarly, Matvos and Seru (2014) show that internal capital markets helped diversified firms respond to disruptions in external financial markets. However, the empirical evidence is not fully consistent. Dell’Acqua, Etro, and Corra (2013) continue to find a persistent conglomerate discount during the years surrounding the global financial crisis, although they also report that the discount decreased in 2008. Rudolph and Schwetzler (2013) show that the effect of the crisis differs across regions: the discount decreases significantly in Asia Pacific, the British Isles and North America, while the effect is insignificant in Continental Europe. More recent evidence also suggests that the impact of economic shocks on the relationship between diversification and firm value may depend on the nature of the crisis and the institutional context considered (Damarcheli and Kalantari, 2024). Despite these differences, the potential advantages of internal capital markets and greater financial flexibility provide a theoretical basis for expecting diversified firms to be relatively less penalized during a crisis. If diversified firms were better able to absorb the COVID-19 shock, manage liquidity internally and rely less on external financing, the valuation gap between diversified and focused firms should have decreased. This leads to the second valuation hypothesis:

H0₂: The conglomerate discount does not decrease during the COVID-19 crisis.

H1₂: The conglomerate discount decreases during the COVID-19 crisis.

A final distinction concerns the type of diversification. Diversified firms may operate across business activities that are relatively similar or across industries that are economically more distant. Related diversification may allow firms to share resources, knowledge, technologies and distribution channels across business units. These common elements may create operational synergies and make coordination and internal capital allocation easier. By contrast, unrelated diversification may increase organizational complexity and make it more difficult for managers to monitor divisions and allocate resources efficiently. It may also make the firm harder for external investors to evaluate, because the company combines activities with different technologies, markets and risk profiles. These factors may increase the costs of diversification and lead to a larger valuation discount. This distinction is consistent with previous evidence. Dell'Acqua, Etro, and Correra (2013), for example, find that the valuation discount tends to be larger when diversification occurs across unrelated business segments, while it is lower when firms operate across related activities. Therefore, the valuation effect of diversification may depend not only on whether the firm is diversified, but also on how distant its activities are from one another. This leads to the third valuation hypothesis:

H0₃: Unrelated diversified firms do not exhibit a larger valuation discount than related diversified firms.

H1₃: Unrelated diversified firms exhibit a larger valuation discount than related diversified firms.

The variables and econometric models used to examine the determinants of diversification and test the three valuation hypotheses are described in Chapter 4, while the empirical results are presented in Chapter 5.

3. Institutional setting

3.1 Conglomerate Firms in Europe: Structure and Relevance

Although much of the early empirical evidence on corporate diversification is based on U.S. firms, diversification and conglomerate structures are also relevant in European markets. International evidence extends the analysis to countries such as Germany and the United Kingdom, showing that the organization and valuation of diversified firms cannot be understood only from a U.S. perspective (Lins and Servaes, 1999). The European context differs from the U.S. in several important aspects. In particular, Western European listed firms are often characterized by concentrated ownership, family control, and control-enhancing mechanisms (Faccio and Lang, 2002). These features are relevant because they shape the institutional environment in which diversified firms operate and may influence how corporate groups are organized.

The relevance of diversified firms in Europe is also confirmed by more recent international evidence. Using a large sample of publicly traded firms over the period 1998–2009, Rudolph and Schwetzler (2013) show that conglomerate firms represented a significant share of corporate observations in European regions. In their sample, conglomerate observations accounted for 22.2% of the Continental European sample and 20.8% of the British Isles sample, compared with only 10.8% in North America. This suggests that diversified firms were relatively more widespread in European markets than in the United States during the period considered. Figure 2 summarizes the regional distribution of conglomerate observations reported in their study.

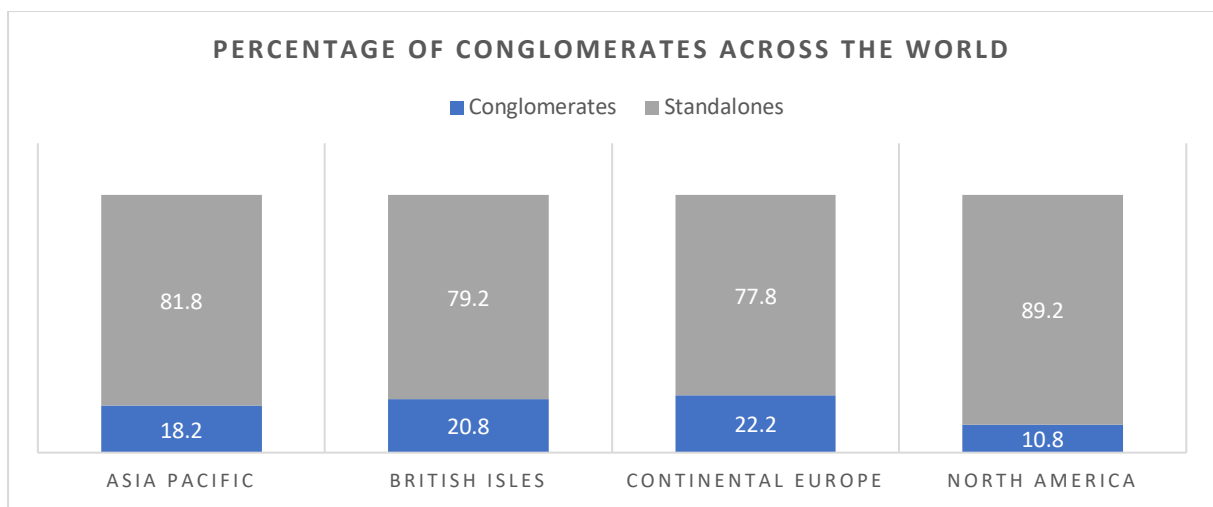


Figure 2. Share of conglomerate observations by region, 1998–2009. Source: Rudolph and Schwetzler (2013).

At the same time, the European evidence also shows substantial heterogeneity across countries. As reported by Rudolph and Schwetzler (2013), the share of conglomerate observations varied significantly within Europe, ranging from around 10% in Portugal to almost 30% in Belgium and France. Germany, Italy, the Netherlands, and Spain showed intermediate values, while countries such as Finland and Switzerland also displayed relatively high shares of conglomerate observations. These differences suggest that diversification patterns within Europe are not homogeneous, but may depend on country-specific industrial structures, ownership characteristics, and market environments. Figure 3 reports the distribution of conglomerate observations across European countries in the sample analyzed by Rudolph and Schwetzler (2013).

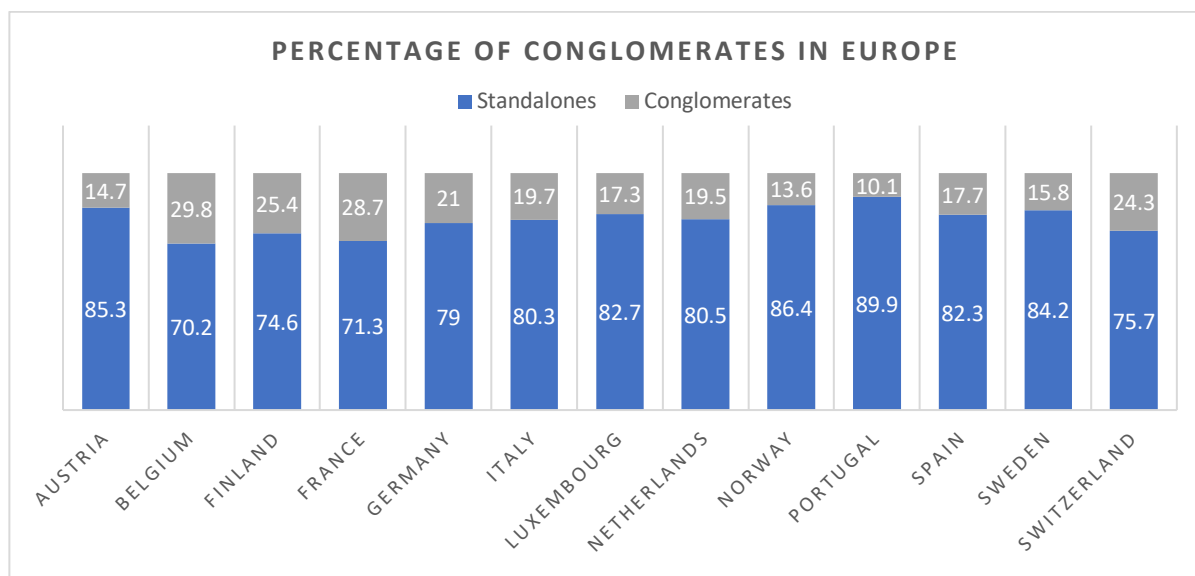


Figure 3. Share of conglomerate observations across Continental European countries, 1998–2009. Source: Rudolph and Schwetzler (2013).

More recent evidence from Eurostat also confirms the economic relevance of diversified group structures in Europe. According to the European Groups Register (EGR), in 2023 approximately 55% of multinational enterprise groups operating in Europe carried out more than one economic activity at the NACE division level. More specifically, 47% operated in two to four economic activities, while 9% operated in more than five economic activities. Eurostat also reports that multi-activity and diversified organizational structures play an important role in the European economy, in fact, most employment is concentrated in highly diversified groups: around 73% of total employment was associated with multinational enterprise groups active in more than five economic activities (Eurostat, 2024).

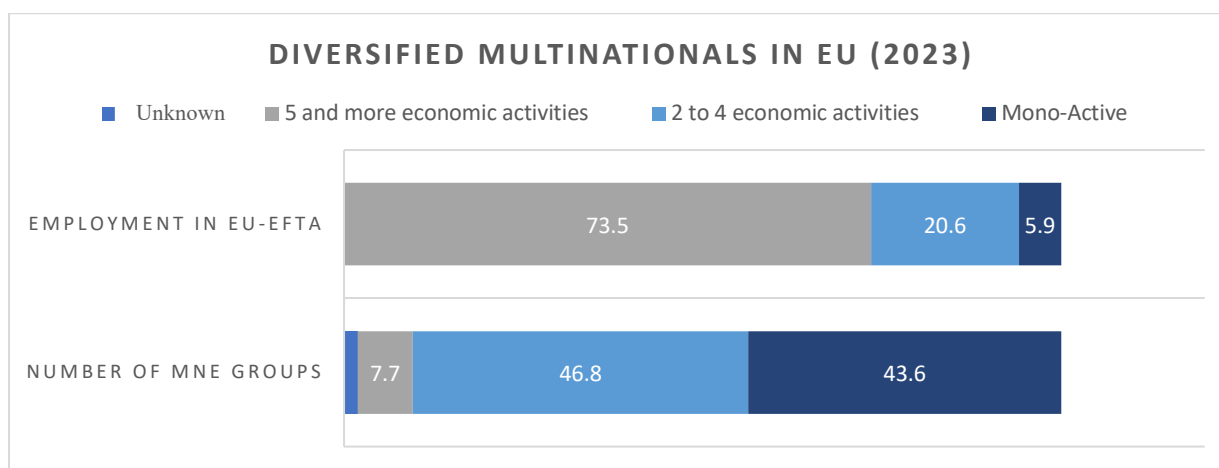


Figure 4. Multinational enterprise groups by number of economic activities, EU/EFTA, 2023. Source: Eurostat (2024).

A first important feature of the European setting is the ownership structure of listed firms. Faccio and Lang (2002) analyse the ultimate ownership and control of 5,232 listed corporations in 13 Western European countries and show that European firms are often either widely held or family controlled. In their sample, 36.93% of firms are widely held, while 44.29% are family controlled. However, this pattern differs substantially across countries: widely held firms are more common in the United Kingdom and Ireland, whereas family-controlled firms are more important in Continental Europe (Faccio and Lang, 2002). This evidence shows that European listed firms cannot be treated as a homogeneous group and that their governance environment differs from the dispersed ownership model usually associated with the U.S. market.

Faccio and Lang (2002) also show that corporate control in Western Europe is often organized through mechanisms that separate voting rights from cash-flow rights. These mechanisms include dual class shares, pyramidal structures, multiple control chains, and cross-holdings. Their evidence is relevant in this section because it confirms that European listed firms are often embedded in ownership structures that are more complex than a simple widely held corporation. This is particularly important for describing the European setting, where family control and concentrated ownership are more common in Continental Europe than in the United Kingdom and Ireland (Faccio and Lang, 2002).

A further element that helps explain the European context is the process of market integration associated with the creation of the Single European Market. According to Rondi and Vannoni (2002), one expected effect of stronger competitive pressure within an integrated European economy was that firms would reduce excessive product diversification and refocus on their core business. However, their evidence suggests that this process was not simply a uniform move from diversification to single-business specialization. Using a database of 223 leading

manufacturing firms operating in the European Union over the period 1987–1997, they analyze whether EU leaders reduced diversification and whether they reorganized their activities around more central business areas (Rondi and Vannoni, 2002). Their results show that European firms reduced some activities but did not necessarily abandon diversification altogether. In their sample, the number of firms remained unchanged at 223, while the number of diversified firms decreased only slightly, from 175 in 1987 to 170 in 1997. By contrast, the number of firm-industry operations fell more substantially, from 1,079 to 810. This reduction was driven by non-leading activities, which decreased from 744 to 475, while leading activities remained unchanged (Rondi and Vannoni, 2002). This evidence suggests that European firms mainly reduced activities in industries where they did not hold a leading position, rather than simply becoming single-business firms. In this sense, the European restructuring process can be interpreted as a reorganization of activity portfolios rather than as a complete rejection of diversification. This distinction is useful for the present thesis because it shows that diversified firms in Europe may take different forms. Some firms may operate across unrelated activities, while others may remain diversified around activities that are closer to their core business. Rondi and Vannoni (2002) emphasize that looking only at the level of diversification may be misleading, because firms may reduce marginal activities while maintaining a multi-business structure.

Financial conglomerates provide a useful example of how diversified group structures have been treated in the European institutional setting. They do not represent all diversified firms, but they are relevant because, unlike most non-financial conglomerates, they have been explicitly recognized and supervised at EU level. In the financial sector, conglomeration usually refers to the combination of banking, insurance, and securities-related activities within the same group. In Europe, this has often taken the form of banking-insurance groups, or bancassurance, where firms try to exploit common distribution channels, cross-selling opportunities, and broader customer relationships. This process has been supported by deregulation, technological development, globalization, consolidation, and the search for economies of scale and scope (Ulst, 2005). At the same time, this example also shows that diversification can create organizational and supervisory problems. Financial conglomerates may become more complex and less transparent, and risks can move from one entity to another within the same group through intra-group transactions, reputational links, or centralized management functions. For this reason, the literature highlights potential problems such as internal contagion, conflicts of interest, regulatory arbitrage, and difficulties in supervising groups that operate across different financial sectors (Ulst, 2005; Madsen, 2006). Therefore, financial conglomerates are useful in

this section not because they represent the whole sample of this thesis, but because they clearly show the double nature of diversified group structures in Europe: they may create operational advantages, but they may also increase complexity and risk.

The relevance of financial conglomerates is also reflected in the European regulatory framework. The main specific EU framework is Directive 2002/87/EC, commonly known as the Financial Conglomerates Directive. This directive introduced supplementary supervision for regulated entities belonging to financial conglomerates, in addition to the solo supervision of individual regulated entities and the sectoral supervision already applying to banking and insurance groups (Gruson, 2004). This framework is important because it shows that European institutions recognize that conglomerate structures can generate both potential benefits and additional risks, especially when activities are carried out across different sectors within the same group.

For non-financial conglomerates, the situation is different. There is no single EU law that regulates industrial conglomerates as a specific organizational form in the same way as the Financial Conglomerates Directive regulates financial conglomerates. Non-financial diversified firms are instead subject to general company law, accounting and disclosure rules, securities market regulation, and competition law. In this respect, EU merger control is particularly relevant when conglomerate structures are created or expanded through acquisitions. Neven (2005) explains that conglomerate effects in EU merger control refer to potential anti-competitive effects arising across different markets, for example through bundling, tying, full-line forcing, or the use of a strong position in one market to affect competition in another. Therefore, while non-financial conglomerates are not regulated as a separate corporate category, their formation and expansion may still be scrutinized under EU competition law when a merger may affect market competition (Neven, 2005).

Overall, the evidence reviewed in this section shows that diversification is a relevant feature of the European corporate environment, but also that it takes place in a context that differs from the U.S. one. Diversified firms are present across European markets, as shown by international and regional evidence on conglomerate observations and EU manufacturing firms (Rudolph and Schwetzler, 2013; Rondi and Vannoni, 2002). At the same time, European firms are not homogeneous: ownership structures, corporate control mechanisms, and industrial conditions differ across countries, especially between Continental Europe and more market-based systems such as the United Kingdom (Faccio and Lang, 2002; Rudolph and Schwetzler, 2013). For this

reason, the valuation of diversified firms in Europe cannot simply be interpreted as a direct extension of the U.S. evidence.

This section therefore provides the institutional background for the empirical analysis of the thesis. The objective is not to assume that all European diversified firms behave in the same way, but to examine whether, in this specific setting, diversified listed firms trade at different valuations from focused firms. The following sections complete this framework by discussing the COVID-19 crisis and its effects on firm financing conditions, before turning to the empirical analysis.

3.2 COVID-19 crisis as an economic shock

The COVID-19 pandemic was one of the most severe economic shocks of recent decades, with a sudden impact on countries, firms, and industries. In Europe, the crisis caused a sharp contraction in economic activity and triggered unprecedented policy responses aimed at limiting both the health emergency and its economic consequences (de Vet et al., 2021). Its short-term impact on the Euro Area was particularly strong and, according to the literature, already larger than that of the 2008–2009 financial crisis (Ehnts and Paetz, 2021). However, COVID-19 was different from a traditional financial crisis. Unlike the 2007–2009 crisis, it did not originate within the financial system but started as a global health emergency and then rapidly affected the real economy. The shock was driven by the spread of the virus, the containment measures adopted to limit contagion, and the restrictions imposed on mobility and economic activity. For this reason, the crisis was largely external to firms' normal investment and financing decisions and was strongly influenced by non-economic factors, such as public health conditions and government responses (Borio, 2020). This difference also matters when comparing COVID-19 with the crises usually studied in the diversification literature. The 2007–2009 financial crisis mainly affected firms through credit markets and financing constraints, while COVID-19 first disrupted firms through lockdowns, mobility restrictions, supply chain interruptions, and changes in consumer behavior. Early stock market evidence is consistent with this interpretation: in the first phase of the pandemic, firms more exposed to international trade, especially with China, performed worse, suggesting that the initial impact of COVID-19 was closely linked to real economic disruptions and global trade exposure (Ramelli and Wagner, 2020).

COVID-19 has been described as a “rare disaster” because its impact was sudden, severe, and widespread across firms and financial markets (Pagano and Zechner, 2022). In the first months of 2020, firms and investors had limited information about the duration of the pandemic, the

possible development of vaccines, and the timing and effectiveness of policy responses. This made it difficult to evaluate firms' future prospects and contributed to the sharp reaction of financial markets during the early phase of the crisis (Pagano and Zechner, 2022). A second important feature of the COVID-19 crisis is that it did not affect all industries in the same way. The shock was strongly linked to social distancing and to the possibility of continuing activities without physical interaction. Some sectors were almost completely stopped during lockdowns, such as air travel, hospitality, and other services requiring direct contact with customers. By contrast, other sectors, such as online retail and software services, benefited from the increase in demand for digital solutions. For this reason, COVID-19 has also been described as a "reallocation shock", because it shifted demand, labor, and economic activity across industries and firms (Pagano and Zechner, 2022).

This asymmetric impact is particularly visible in the European context. A report prepared for the European Parliament shows that the COVID-19 crisis had an abrupt impact on the EU27 economy, but also that the severity of the shock differed significantly across sectors. Digital industries and healthcare performed relatively well, while sectors based on human contact and mobility, such as cultural and creative industries and aerospace, were much more severely affected. The same report also highlights that the pandemic accelerated existing trends, especially digital transformation, and tested the resilience of European value chains, particularly at the beginning of the crisis, when closed borders and closed manufacturing sites created supply shortages (de Vet et al., 2021). This sectoral asymmetry is also confirmed by a European Commission Economic Brief, which describes the pandemic as the largest and most abrupt contraction in economic activity in recent European history. The data reported in the figure below show that, in the second quarter of 2020, the fall in value added was much stronger in contact-intensive sectors: trade, transport, accommodation and food services fell to around 75% of their pre-pandemic level, while arts, entertainment and other services showed a similarly sharp decline. By contrast, sectors such as information and communication, finance and insurance, and real estate remained much closer to their pre-crisis levels, and some of them had already returned to or exceeded their late-2019 levels by the first half of 2021 (Canton et al., 2021). The figure also shows that the recovery was not linear: after the rebound in the third quarter of 2020, some sectors weakened again at the end of the year, when infections increased and containment measures were reintroduced. This confirms that the COVID-19 shock was closely linked to the evolution of the health emergency and to the restrictions adopted to contain it, rather than to a single financial event (de Vet et al., 2021).

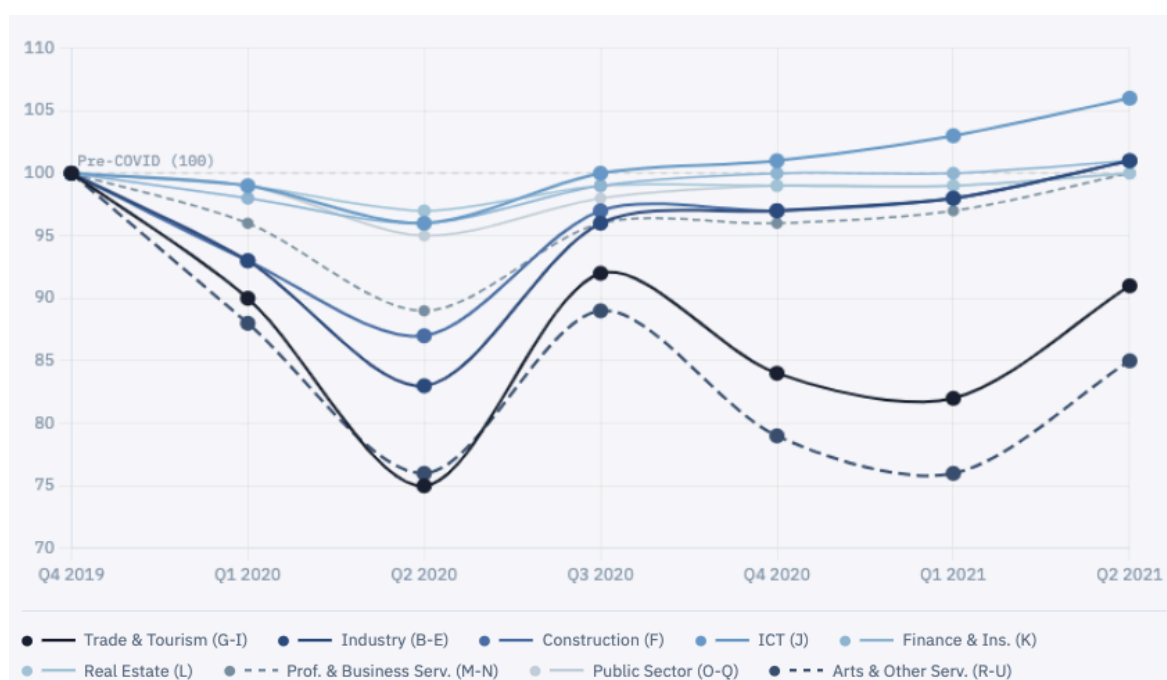


Figure 5 Sectoral value added in the EU27 during the COVID-19 crisis, Q4 2019–Q2 2021. Source: Author's elaboration based on European Commission, Economic Brief 069, using Eurostat data.

The severity of the COVID-19 shock was also visible in the immediate fall in economic activity. In the Euro Area, the economic impact of the shutdown was already very strong in the first months of the pandemic and, according to the literature, the short-term decline was larger than the one observed during the 2008–2009 financial crisis. At the same time, the effects of the crisis were difficult to predict because they depended on the evolution of the health emergency and on the policy responses adopted by governments and central banks (Ehnts and Paetz, 2021). Evidence based on high-frequency indicators confirms the sudden nature of the shock. Using electricity consumption, mobility data, and other real-time indicators, several authors show that countries and regions with more severe outbreaks also experienced larger economic losses. In Europe, electricity usage declined sharply during the first phase of the pandemic, especially in the countries most affected by the health crisis. Moreover, the fall in economic activity was closely related to the reduction in people's mobility, suggesting that the pandemic affected the economy both through formal restrictions and through changes in individual behavior (Chen et al., 2020).

The impact of the pandemic also differed across euro area countries. This was not only due to the intensity of the health crisis, but also to differences in containment measures and in the structure of national economies. In the first quarter of 2021, euro area real GDP was still below its pre-pandemic level, but the distance from pre-pandemic levels varied strongly across countries. Spain, Portugal, Italy, Austria, and Malta were among the most affected economies, partly because of their greater exposure to tourism and high-contact services (Muggenthaler,

Schroth, and Sun, 2021). This pattern is visible in the figure below, which relates the share of high-contact services to the change in value added during the crisis period. Countries with a larger weight of high-contact activities generally experienced a stronger decline in value added, confirming that the impact of COVID-19 depended not only on the health shock itself, but also on the sectoral composition of each economy (Muggenthaler, Schroth, and Sun, 2021).

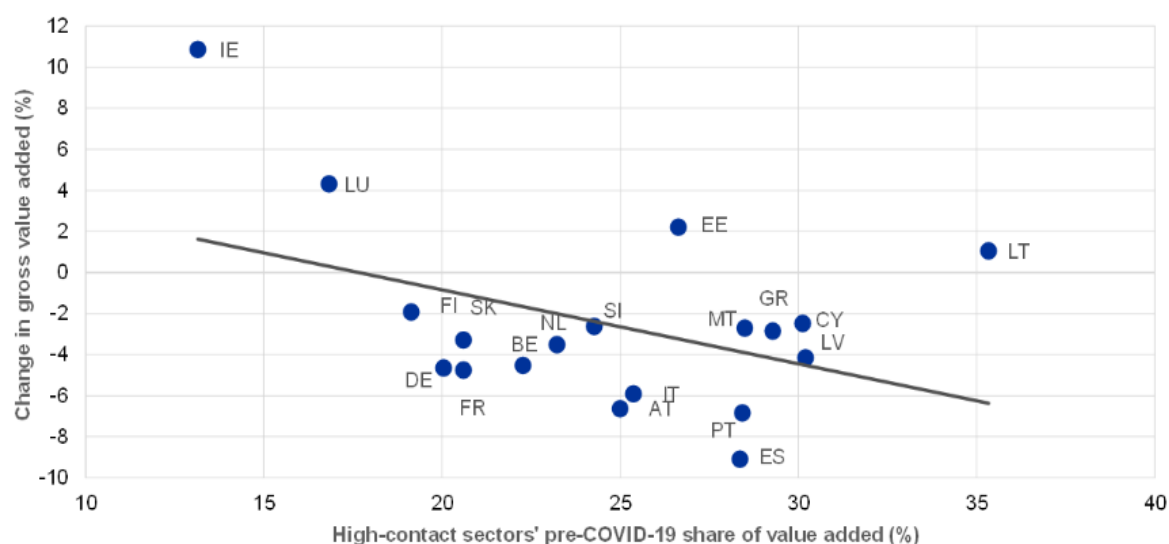


Figure 6 High-contact services and change in value added across euro area countries during the COVID-19 crisis. Source: Muggenthaler, Schroth, and Sun (2021), ECB Economic Bulletin.

Taken together, the evidence discussed in this section shows that the COVID-19 crisis was not a uniform macroeconomic shock. Its impact differed across sectors and countries, depending on exposure to social distancing, mobility restrictions, and the structure of each economy. This is particularly relevant for the analysis of diversified firms, because diversified companies operate across more than one business activity and may therefore be exposed to different parts of the shock at the same time. However, this does not imply that diversification was necessarily beneficial during the pandemic. Rather, it means that the effect of diversification on firm value during COVID-19 is an empirical question, since the same firm could be exposed to both more resilient and more affected activities.

Overall, the COVID-19 crisis provides a relevant setting for this thesis because it combined three main elements: a sudden external shock, high uncertainty, and a strongly asymmetric impact across sectors and countries. These characteristics make it different from a traditional financial crisis and help explain why the valuation of diversified firms during the pandemic cannot be assumed in advance. The pandemic also affected firms through falling sales and rigid costs, creating pressure on liquidity needs and linking the real economic shock to firms' financial positions (Bellucci et al., 2022). This last aspect will be examined in the following section, which focuses on how COVID-19 affected firms' financing conditions.

3.3 Effects on firms' financing conditions

The COVID-19 crisis affected firms not only through the fall in economic activity, but also through their financing needs. The restrictions introduced to contain the pandemic reduced revenues for many firms, while several costs and financial commitments could not adjust immediately. This created a direct pressure on liquidity, because firms still had to meet payments to suppliers, employees, lenders, and investors even when sales declined sharply (Demmou et al., 2021). In this sense, the pandemic transformed a real economic shock into a financing problem for many companies.

Evidence from Italian non-financial firms provides a clear example of how the COVID-19 shock translated into liquidity pressure. One study focuses on firms with revenues up to EUR 50 million and fewer than 250 employees, a group that includes many businesses directly affected by restrictions on economic activity. The study estimates firms' liquidity needs before and after government support measures, showing that the problem was mainly driven by the fall in sales combined with costs and financial commitments that could not adjust immediately. Without public support, 38.1% of firms would have been in liquidity crisis at the end of 2020, with total liquidity requirements of EUR 83.7 billion. Government interventions reduced these figures to 18.2% and EUR 26.5 billion, respectively, while public guarantee schemes on loans would have further reduced the liquidity deficit to EUR 18.5 billion and the share of firms in liquidity crisis to 13.5% (Bellucci et al., 2022). A broader OECD study confirms the same mechanism on a larger sample. Using firm-level balance sheet data for 14 countries and a simple accounting model, the study estimates how quickly firms could run out of liquidity after the introduction of confinement measures. Without policy intervention, 18% of firms in the sample would have faced liquidity shortfalls after one month, 26% after two months, and up to 38% after ten months. The impact was also very different across sectors: accommodation and food services, transport, and arts, entertainment and recreation were among the most exposed, while utilities, information and communication, and professional services were in a stronger position. This evidence reinforces the idea that the COVID-19 shock created liquidity pressure especially where revenues collapsed and firms had limited ability to adjust costs in the short run (Demmou et al., 2021).

These findings are important because they show that the financing problem was not limited to firms that were already weak before the pandemic. Many firms could become illiquid simply because the shock suddenly reduced revenues while payments remained due. The OECD analysis also stresses that some firms facing liquidity shortfalls were still potentially solvent,

but could have had difficulties in obtaining additional debt because of limited collateral or already high leverage. Therefore, the main issue was not only profitability, but also the ability to absorb a temporary cash-flow shock without being forced into financial distress (Demmou et al., 2021).

These liquidity pressures help explain why financial flexibility became a key firm characteristic during the pandemic. In this literature, financial flexibility refers to the ability of a firm to cover a cash-flow shortfall without immediately falling into financial distress. A study on listed industrial firms measures this flexibility through higher cash holdings, lower short-term debt, and lower long-term debt before the crisis. The results show that, during the stock market collapse in early 2020, firms with high financial flexibility experienced a stock price decline that was 26%, or 9.7 percentage points, lower than firms with low financial flexibility. This suggests that investors valued firms that had more internal liquidity and less debt pressure when revenues suddenly declined. The study also finds that cash holdings were especially important for firms more directly exposed to the COVID-19 shock, and that the weaker performance of less flexible firms persisted even during the market rebound (Fahlenbrach, Rageth, and Stulz, 2021). A related study on early stock market reactions to COVID-19 reaches a similar conclusion. During the first phase of the pandemic, the market reaction was mainly linked to firms' exposure to international trade, especially with China. However, when the virus spread to Europe and the United States, investors started to focus more on firms' financial position. In particular, companies with higher leverage and lower cash holdings suffered more during the most intense phase of the market reaction. This suggests that the initial real shock was expected to create stronger difficulties for firms with weaker balance sheets, because these firms had less room to absorb a sudden fall in revenues. Therefore, the pandemic did not only affect expected sales and operating activity, but also made liquidity and debt more important for market valuation (Ramelli and Wagner, 2020).

At the same time, the COVID-19 crisis did not lead to a generalized collapse in external financing. This is an important difference from the 2007–2009 financial crisis, when the shock originated within the financial system and directly weakened the ability of financial intermediaries to provide credit. During the pandemic, the initial shock came from the real economy, but banks and capital markets were still able to provide funding to firms. Despite the sharp fall in activity, firms expanded their balance sheets and increased liquidity by raising funds from banks, bond markets, and equity markets. This response was supported by stronger bank balance sheets at the beginning of the crisis and by rapid monetary and fiscal policy

interventions, which helped banks provide liquidity to firms without entering distress themselves (Pagano and Zechner, 2022).

Evidence from public capital markets also shows that external funding did not disappear during the pandemic. A study on debt and equity issuance during the first phase of COVID-19 shows that corporate bond issuance increased substantially after the start of the crisis. This increase was especially strong for firms with higher credit ratings, but it was also present for BBB-rated or lower-rated bonds. The same study shows that firms issued bonds with longer maturities than in normal periods, which suggests that some firms used bond markets to reduce refinancing risk during a period of high uncertainty. Equity issuance followed a different pattern: it slowed down in the first weeks of the pandemic, partly because of withdrawn IPOs, and then recovered. However, the amount of capital raised through equity remained much smaller than the amount raised through bond issuance, equal to around 5% of bond financing during the crisis period considered (Halling, Yu, and Zechner, 2020).

Public policy also played a central role in supporting firms' financing conditions during the pandemic. The OECD analysis shows that different measures did not have the same effect on firms' liquidity. Support to wage payments was the most effective tool in reducing liquidity shortages, followed by debt moratoria, while tax deferrals had a smaller estimated impact. The reason is simple: when revenues suddenly fall, measures that directly reduce firms' immediate cash outflows are more effective in preventing liquidity problems. In this sense, public intervention helped reduce the risk that a temporary liquidity shock would turn into a wave of bankruptcies among otherwise viable firms (Demmou et al., 2021).

In the euro area, firms were also supported by a broad set of fiscal and monetary measures. Fiscal support included direct support schemes for firms and self-employed workers, subsidies, tax deferrals, public guarantees on bank loans, and moratoria on loan payments. Monetary policy also helped preserve favorable financing conditions: the Pandemic Emergency Purchase Programme contributed to downward pressure on lending rates, while targeted longer-term refinancing operations offered attractive funding conditions to banks, which could then be passed on to firms and households (Battistini et al., 2021). However, this support also had consequences for firms' balance sheets. Listed firms generally reduced leverage during the pandemic, while unlisted European firms increased leverage in 2020, especially smaller firms. This suggests that policy support helped firms survive the shock in the short run, but in some cases it also left them with higher debt levels and possible debt-overhang risks in the medium term (Pagano and Zechner, 2022).

Overall, the evidence reviewed in this section shows that the COVID-19 shock affected firms' financing conditions through a channel that was different from a traditional financial crisis. The initial shock came from the real economy: revenues fell suddenly, while many costs and financial commitments could not adjust immediately. This created liquidity pressure and made balance-sheet strength more important for firms' ability to absorb the shock. In this context, diversification becomes particularly interesting. During periods of uncertainty and liquidity pressure, diversified firms may benefit from internal capital markets, cash-flow diversification, and greater financial flexibility. However, the evidence also shows that external financing did not completely collapse during COVID-19, since banks, capital markets, and public support measures helped many firms obtain liquidity. For this reason, it cannot be assumed in advance that diversification necessarily became more valuable during the pandemic. Whether diversified firms were valued differently from focused firms, and whether the conglomerate discount decreased during the COVID-19 crisis, remains an empirical question that will be tested in the following chapters.

4. Data and methodology

4.1 Data and sample selection

The second part of this thesis presents the empirical analysis aimed at investigating the relationship between corporate diversification and firm value during the COVID-19 crisis. After reviewing the theoretical and empirical literature on the conglomerate discount, the analysis now turns to the construction of the dataset and the empirical sample. This section describes the data source, the sample selection process, the cleaning procedures, the construction of the panel dataset, and the preliminary descriptive statistics.

The empirical analysis presented in the following sections is based on firm-level data collected from Orbis, a company database provided by Moody's / Bureau van Dijk. Orbis provides accounting, market and ownership information for a large number of private and listed companies across different countries, making it suitable for cross-country empirical analyses. For this thesis, Orbis was used to collect data on listed European firms. The sample includes firms from European Union countries and from other developed European markets, such as the United Kingdom, Switzerland and Norway. These countries were included because they represent relevant and highly developed European stock markets, with a significant number of listed firms and strong availability of financial data. The analysis covers the period 2018–2021. This time window was selected in order to compare the two years before the outbreak of the COVID-19 crisis, 2018 and 2019, with the crisis period, represented by 2020 and 2021. In this way, the dataset allows for a comparison between the pre-crisis period and the years affected by the pandemic.

Financial firms were excluded from the sample using the primary NACE classification. In particular, firms with primary NACE codes 64, 65 and 66 were excluded, as these codes refer to financial and insurance activities. This choice is consistent with previous empirical studies on the conglomerate discount. For example, Villalonga (2004), following the sample selection criteria of Berger and Ofek (1995), excludes firm-years with financial segments from her analysis. Similarly, Rudolph and Schwetzler (2013), in their study of the diversification discount during the 2008–2009 financial crisis, exclude firms with segments in the financial services sector. The reason is that banks, insurance companies and other financial institutions have balance-sheet structures that are not directly comparable with those of non-financial firms. Measures such as leverage, debt and Tobin's Q may therefore have a different interpretation for financial firms, potentially biasing the empirical results.

The data were downloaded using consolidated financial statements when available, and unconsolidated statements otherwise. This choice was made in order to maximize the availability of firm-level observations while retaining a broad sample of listed companies. The variables downloaded from Orbis include accounting data, market-based variables and industry information. In particular, the dataset contains total assets, market capitalization, Tobin's Q, shareholders' equity, net income, revenues, debt, cash and cash equivalents, ROA, leverage/gearing, country, consolidation code, primary NACE code and secondary NACE activities.

Before importing the data into R, a first cleaning step was performed directly on the Excel file downloaded from Orbis. The initial dataset contained 6,046 firms. First, 386 firms were removed because they did not report any relevant financial or market information needed for the analysis. Second, 965 firms were excluded because Tobin's Q and market capitalization were missing for every year in the period considered. In other words, these firms did not provide any usable market-based valuation data between 2018 and 2021. The cleaned Excel dataset was then processed in R. The original data were organized in wide format, with separate columns for each variable and year. Using R, column names were standardized, completely empty columns were removed, numerical variables were converted into a consistent format, and the dataset was reshaped into long panel format for the years 2018, 2019, 2020 and 2021. As a result, the 4,695 firms generated a raw panel of 18,780 potential firm-year observations, where each row corresponds to one firm observed in one specific year. Before defining the final empirical sample, missing values were analyzed on this raw panel in order to assess the availability of the main variables used in the analysis.

Table 3 - Missing values in the raw panel

Variable	2018	2019	2020	2021
Tobin's Q	824 (17.55%)	637 (13.57%)	487 (10.37%)	68 (1.45%)
ROA	501 (10.67%)	356 (7.58%)	236 (5.03%)	112 (2.39%)
Total assets	383 (8.16%)	232 (4.94%)	133 (2.83%)	25 (0.53%)
Gearing	608 (12.95%)	514 (10.95%)	419 (8.92%)	262 (5.58%)

Market capitalization	823 (17.53%)	637 (13.57%)	485 (10.33%)	66 (1.41%)
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As shown in the table, data availability is not constant across years. Missing values are more frequent in the first years of the sample, especially for market-based variables such as Tobin's Q and market capitalization, while data availability improves substantially in 2021. This preliminary check is important because it shows why a further cleaning step was necessary before constructing the final sample used in the descriptive and empirical analysis. After the raw panel was created, a second cleaning step was applied in R at the firm-year observation level. This means that firms were not automatically removed if data were missing for some years; instead, each yearly observation was kept only when the variables required for the analysis were available. In particular, observations were excluded if Tobin's Q, total assets, ROA, leverage/gearing, diversification status, country or the primary NACE code were missing. Observations with non-positive Tobin's Q or non-positive total assets were also excluded, because these values cannot be meaningfully used in the analysis. The R code also extracted the primary and secondary NACE codes associated with each firm and prepared the information required to classify firms as focused or diversified. After this procedure, the final main sample included 4,554 firms and 15,659 firm-year observations.

Table 4 - Sample cleaning process

Step	Number of firms
Initial firms downloaded from Orbis	6,046
Firms with all relevant data not available	386
Firms with Tobin's Q and market capitalization not available for all years	965
Firms remaining after preliminary Excel cleaning	4,695
Firms excluded after firm-year cleaning because they had no valid observations remaining	141
Firms in main sample	4,554

The final sample is constructed as an unbalanced panel. This means that firms are retained in the sample even if they are not observed for all four years between 2018 and 2021. This choice is useful because data availability is not constant across years, especially for market-based variables such as Tobin's Q and market capitalization. Using an unbalanced panel therefore allows the analysis to preserve a larger number of observations and to exploit all available

information, rather than restricting the sample only to firms with complete data for the entire period. The final main sample includes 4,554 firms and 15,659 firm-year observations, while 3,308 firms have complete observations for all four years. For this reason, the baseline analysis is based on the unbalanced panel, while the balanced panel will be used later as a robustness check.

Table 5 - Number of firms and firm-year observations

Description	Firms	Firm-year observations
raw dataset after preliminary Excel cleaning	4,695	18,780
Main sample	4,554	15,659
Complete observations for all years 2018–2021	3,308	13,232

Figure 7 reports the distribution of firm-year observations in the main sample between 2018 and 2021. The number of usable observations increases over time, from 3,628 in 2018 to 4,340 in 2021, reflecting the greater availability of data in the most recent years. In each year, focused firms represent the largest part of the sample, while diversified firms account for a smaller share. The number of diversified observations remains relatively stable, moving from 699 in 2018 to 745 in 2021. In percentage terms, diversified firms represent 19.27% of the observations in 2018, 18.81% in 2019, 18.18% in 2020 and 17.17% in 2021. This shows that, although the sample is mainly composed of focused firms, diversified firms are consistently present across the entire period analyzed.



Figure 7. Firms observation by year

The classification of firms as focused or diversified is based on the NACE activities reported in Orbis. In particular, a firm is classified as diversified when it reports activities in more than one NACE 2-digit division. By contrast, a firm is classified as focused when all its reported activities belong to the same NACE 2-digit division. Using the 2-digit level allows the analysis to avoid classifying as diversified firms that operate in different very specific activities but still within the same broader industry. For example, a firm with two activities belonging to the same NACE 2-digit division would still be considered focused, while a firm with activities in two different NACE 2-digit divisions would be classified as diversified.

Table 6 reports the diversification status of the firms included in the main sample. The first row reports the total number of firms in the final sample, equal to 4,554. Among these firms, 3,781 are classified as focused, corresponding to 83.03% of the sample. This means that most firms in the sample operate within a single NACE 2-digit division. Diversified firms are 773, representing 16.97% of the sample. This group includes firms that report activities in more than one NACE 2-digit division and therefore represents the main treatment group in the empirical analysis. The table also reports the number of unrelated diversified firms. This category identifies a stricter form of diversification. While the main Diversified dummy is based on the presence of activities in more than one NACE 2-digit division, the unrelated measure considers whether the firm's activities belong to different broad NACE sections. For example, a firm operating in two different manufacturing divisions would be classified as diversified, but not as unrelated diversified. By contrast, a firm operating in manufacturing and in information and communication would be classified as unrelated diversified. In the sample, 602 firms are classified as unrelated diversified firms, equal to 13.22% of total firms.

This distinction will be useful later in the analysis, because diversification may not have the same meaning when activities are close to each other or when they belong to very different sectors. The broader sectoral composition of the sample is discussed in the following part, where firms are grouped according to their NACE sections.

Table 6 – Diversification status of firms

Category	Firms	% of total firms
Total firms	4,554	100.00%
Focused firms	3,781	83.03%
Diversified firms	773	16.97%
Unrelated diversified firms	602	13.22%

The sample shows a broad sectoral composition. Since the empirical analysis relies on the firms' primary NACE classification, the distribution of firms was examined both at the level of NACE 2-digit divisions and at the broader NACE section level. The NACE 2-digit classification provides a more detailed industry breakdown and is the main classification used in the empirical analysis. The broader NACE section classification is instead useful to describe the general sectoral composition of the sample and will also be considered later in the robustness analysis. The NACE sections included in the sample, together with their corresponding letters and descriptions, are reported in Appendix Table 1. Figure 8 reports the distribution of firms by broad NACE section. Manufacturing is by far the most represented sector, with 1,734 firms, corresponding to 38.08% of the sample. Other relevant sectors include information and communication, trade, professional services and real estate activities. This confirms that the sample is not concentrated in a single sector, although manufacturing has a particularly important weight among European listed firms.

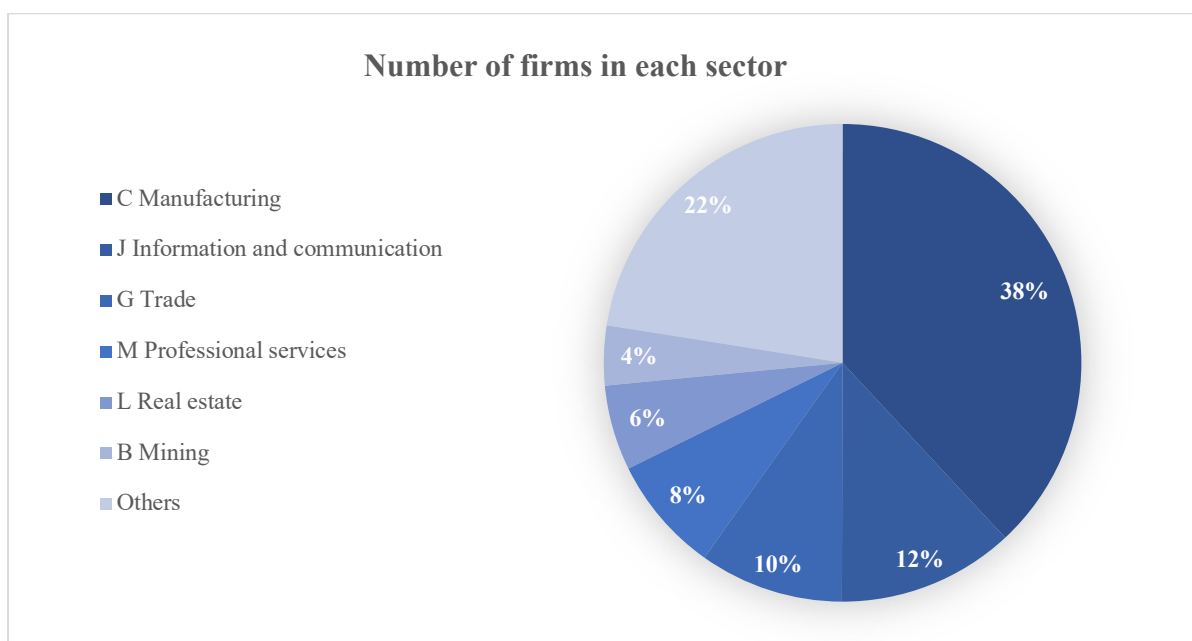


Figure 8. Number of firms by sector

To provide a more detailed view of the industry composition, Figure 9 reports the main NACE 2-digit divisions in the sample. The largest division is wholesale trade, except of motor vehicles and motorcycles, with 264 firms, followed by real estate activities, with 263 firms. Other important divisions include the manufacture of computer, electronic and optical products, computer programming and consultancy, machinery and equipment, and pharmaceutical products. The remaining firms are distributed across a wide range of other NACE 2 divisions.

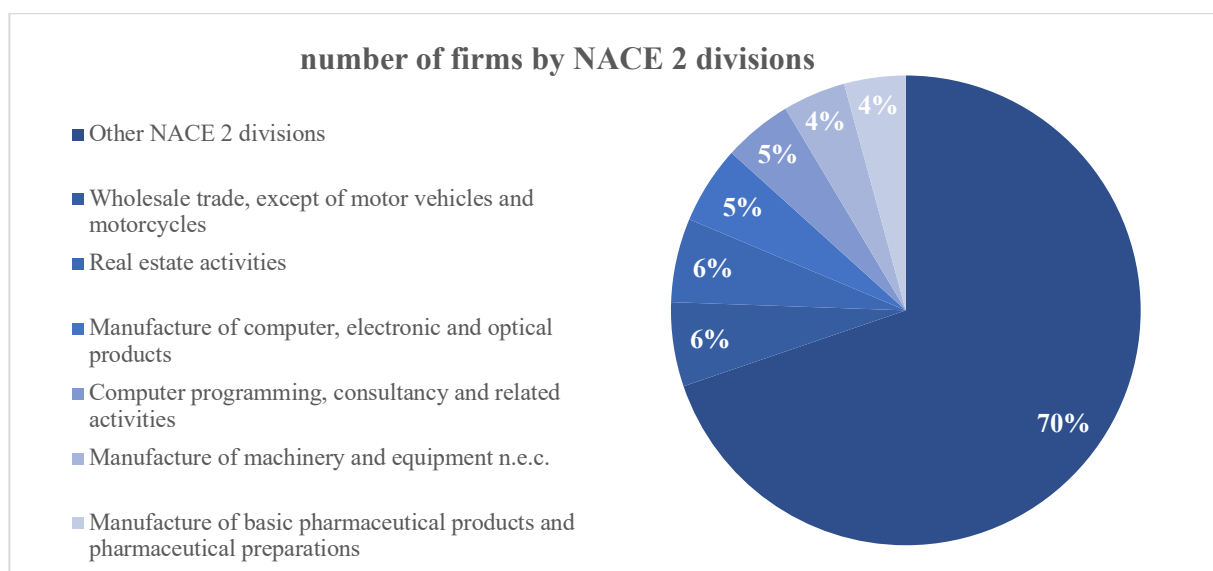


Figure 9. Number of firms by NACE 2 divisions

This distinction is relevant because firm value and diversification patterns may differ across industries. For this reason, the empirical analysis uses industry information to account for sectoral heterogeneity. In particular, the NACE 2-digit classification allows for a more precise identification of the firm's main activity, while the broader NACE section provides a less detailed but more general industry grouping, which will be used later to test whether the results are robust to a different sectoral classification. The sample includes firms from a wide range of European countries. The most represented country is the United Kingdom, with 863 firms, corresponding to 18.95% of the sample. Sweden represents 14.05% of the sample, followed by Poland, France, Germany and Romania. Italy accounts for 227 firms, corresponding to 4.98% of the sample. The cross-country structure of the dataset supports the need to control for country-level differences in the econometric analysis, since institutional conditions, market development and corporate governance may differ across countries.

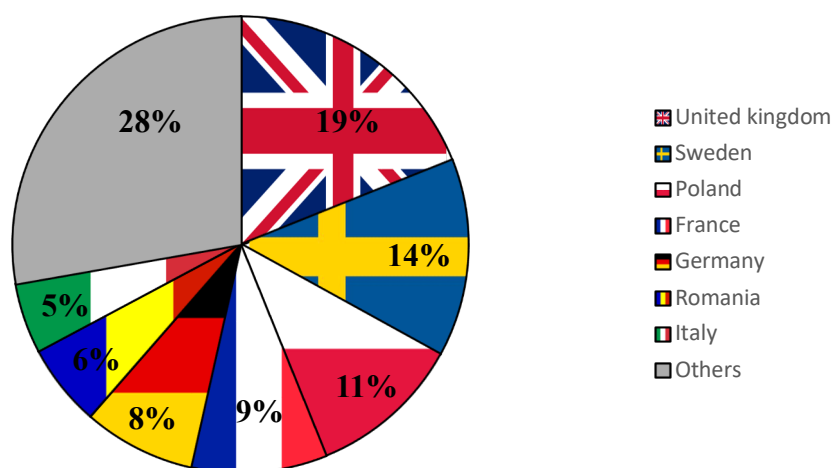


Figure 10. Number of firms by country

The next step consists of analyzing the descriptive statistics of the main variables directly retrieved from Orbis or used as inputs for the construction of the variables employed in the empirical analysis. Table 7 reports the descriptive statistics before winsorization. The table includes Tobin's Q, ROA and gearing, which are directly used in the empirical analysis, together with total assets, market capitalization, shareholders' equity and cash and cash equivalents. Part of these variables are reported because they are used to construct additional measures in the following section. In particular, total assets will be used to compute firm size, market capitalization and shareholders' equity will be used to construct the market-to-book ratio, and cash and cash equivalents will be used to construct the liquidity ratio. The descriptive statistics show that the dataset contains some extreme observations, especially among market-based and size-related variables. For example, Tobin's Q has a mean of 1.64 and a median of 0.78, but reaches a maximum value of 158.18. Similarly, total assets and market capitalization show very large maximum values compared to their medians, reflecting the presence of a small number of very large listed firms in the sample. These differences between means, medians and maximum values indicate that the distribution of several variables is highly skewed and that extreme observations may influence the empirical analysis if not properly treated. Cash and shareholders' equity are reported as raw accounting variables because they are used as inputs to construct other measures in the following section. For this reason, winsorization is not applied directly to these raw accounting items in this section. Instead, where appropriate, winsorization will be applied to the final constructed variables used in the empirical analysis, such as market-to-book and liquidity.

Table 7 – Descriptive statistics before winsorization

Variable	Mean	Std. dev.	P25	Median	P75	Min	Max
Tobin's Q	1.64	3.52	0.40	0.78	1.69	0.00	158.18
ROA	-0.79	17.22	-2.43	2.68	6.59	-99.97	93.52
Leverage/gearing	77.09	106.33	12.23	45.70	98.44	0.00	996.30
Total assets	3.5B	21B	19.7M	133.8M	930.8M	18,042	938.7B
Market capitalization	2.5B	12B	16.7M	109.6M	743.8M	7,342	367B
Cash	567.7M	14.8B	2M	13.9 M	88.9M	-337,673	931.8B
Shareholders' equity	1.2B	5.2B	11M	66.8M	399.9M	2,000	106.2B

As discussed above, the descriptive statistics before winsorization show the presence of extreme observations in some of the main variables. For this reason, the continuous variables directly used in this section were winsorized at the 1st and 99th percentiles. Winsorization is a common data-cleaning procedure used to reduce the influence of outliers without removing observations from the sample. More specifically, values below the 1st percentile are replaced with the value of the 1st percentile, while values above the 99th percentile are replaced with the value of the 99th percentile. This procedure preserves the number of observations while limiting the effect of unusually large or small values.

In this section, winsorization is applied to Tobin's Q, ROA and leverage/gearing. These variables are important because they describe firm value, profitability and financial structure. Other accounting variables, such as total assets, market capitalization, shareholders' equity and cash and cash equivalents, are not winsorized here. The reason is that these variables are mainly used as inputs to build other measures in the next section. For example, total assets are used to construct firm size, market capitalization and shareholders' equity are used to construct the market-to-book ratio, and cash is used to construct the liquidity ratio. For these variables, winsorization will be applied later to the final constructed ratios, rather than to the single raw components. Table 8 shows how winsorization changes the minimum and maximum values of the winsorized variables. The effect is clear for Tobin's Q, whose maximum value decreases from 158.18 to 12.52. ROA and leverage/gearing are also reduced in their extreme values. This confirms that winsorization limits the impact of outliers while keeping the number of observations unchanged.

Table 8 – Minimum and maximum values before and after winsorization

Variable	Min		Max	
	before	after	before	after
Tobin's Q	0.00	0.06	158.18	12.52
ROA	-99.97	-72.93	93.52	32.52
Leverage/gearing	0.00	0.00	996.30	549.98

Table 9 reports the descriptive statistics after winsorization. The median values remain unchanged, which means that winsorization mainly affects the extreme tails of the distribution and does not change the central part of the data. Overall, the variables become less affected by very large or very small observations, making the descriptive analysis more reliable.

Table 9 - Descriptive statistics after winsorization

Variable	Mean	Std. dev.	Median
Tobin's Q	1.52	2.07	0.78
ROA	-0.81	16.21	2.68
Leverage/gearing	75.37	96.02	45.70

After winsorization, the comparison between focused and diversified firms provides a first descriptive indication of the differences between the two groups. As reported in Table 10, diversified firms show a lower Tobin's Q than focused firms. The mean Tobin's Q is 1.61 for focused firms and 1.12 for diversified firms. The median value is also lower for diversified firms, equal to 0.64 compared to 0.82 for focused firms. This preliminary evidence is consistent with the possible presence of a conglomerate discount. Diversified firms also appear to be more leveraged. Their mean leverage/gearing is 97.36, compared to 70.44 for focused firms, while the median leverage is 67.28 for diversified firms and 41.50 for focused firms. At the same time, diversified firms show a higher average ROA than focused firms, although this result should be interpreted carefully because it is only descriptive. Overall, these descriptive statistics are coherent with the literature: diversified firms appear to have higher leverage, but at the same time they show lower valuation than focused firms.

Table 10 - Descriptive statistics by diversification status after winsorization

Variable	Non-diversified	Diversified
Firm-year observations	12,793	2,866
Firms	3,781	773
Mean Tobin's Q	1.61	1.12
Median Tobin's Q	0.82	0.64
Mean ROA	-1.48	2.21
Median ROA	2.46	3.27
Mean leverage	70.44	97.36
Median leverage	41.50	67.28

The descriptive statistics were also computed by separating the pre-COVID period from the COVID period. The pre-COVID period includes 2018 and 2019, while the COVID period includes 2020 and 2021. As shown in Table 11, average Tobin's Q increases during the COVID period for both focused and diversified firms. This result may seem surprising, since COVID-19 is considered as a crisis period in this thesis. However, this pattern can partly be explained

by the nature of the data. Tobin's Q and market capitalization are available in Orbis on an annual basis, and the values used in the dataset refer to year-end observations. Therefore, the 2020 values do not capture only the immediate market shock of March 2020, when the pandemic first strongly affected financial markets, but also the subsequent recovery that occurred during the rest of the year. Quarterly data for market capitalization and Tobin's Q were also checked in Orbis, but these variables were not available at quarterly frequency. For this reason, it was not possible to conduct a more detailed quarterly analysis. Although Tobin's Q increases during the COVID period for both groups, the increase is stronger for focused firms. In the pre-COVID period, focused firms have an average Tobin's Q of 1.37, while diversified firms have an average Tobin's Q of 1.04. During the COVID period, focused firms reach an average Tobin's Q of 1.82, while diversified firms increase to 1.20. As a consequence, the average valuation gap between diversified and focused firms increases from approximately -0.33 in the pre-COVID period to approximately -0.62 during the COVID period. This pattern suggests that the valuation difference between diversified and focused firms may have widened during the COVID-19 period. However, this evidence is purely descriptive and does not allow for causal interpretation. The econometric analysis in the following sections will test whether this difference remains after controlling for firm characteristics and other relevant factors.

Table 11 - Descriptive statistics by period and diversification status after winsorization

Variable	Pre-COVID		COVID period	
	Non-diversified	Diversified	Non-diversified	Diversified
Firm-year observations	5,994	1,409	6,799	1,457
Firms	3,162	723	3,694	759
Mean Tobin's Q	1.37	1.04	1.82	1.20
Median Tobin's Q	0.73	0.63	0.91	0.67
Mean ROA	-1.43	2.47	-1.52	1.95
Median ROA	2.72	3.34	2.21	3.16
Mean leverage	69.67	94.43	71.12	100.20
Median leverage	41.98	66.79	40.94	68.54

Finally, Figure 11 provides a yearly view of average Tobin's Q by diversification status. The graph confirms the pattern already observed in the previous table: focused firms have a higher average Tobin's Q than diversified firms in every year of the sample. The gap is present before COVID-19 and appears wider in 2020 and 2021, suggesting that the valuation difference between the two groups may have increased during the crisis period. This evidence is still descriptive and will be tested more formally in the following econometric analysis.

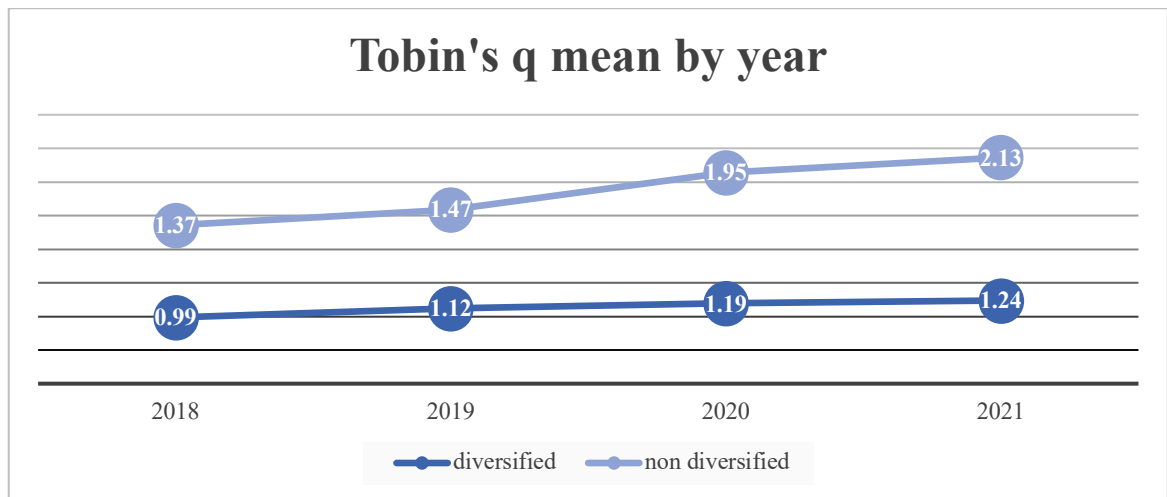


Figure 11. Average Tobin's Q by year and diversification status

Overall, the data construction process provides a broad panel of European listed non-financial firms observed over the period 2018–2021. The final sample includes 4,554 firms and 15,659 firm-year observations. The descriptive analysis shows that diversified firms represent a smaller but still relevant part of the sample. Compared to focused firms, they show higher leverage and a lower average Tobin's Q, which is consistent with the possible presence of a conglomerate discount. The comparison between the pre-COVID and COVID periods also suggests that the valuation gap between focused and diversified firms may have widened during the crisis period. However, these results are only descriptive and cannot be interpreted as causal evidence. For this reason, the following sections describe the construction of the variables and the econometric models used to test these relationships more formally.

4.2 Variables construction

This section describes the variables used in the empirical analysis. The main objective of the analysis is to study whether diversified firms trade at a lower value than focused firms and whether this valuation difference changes during the COVID-19 period. For this reason, the variables can be divided into four main groups: dependent variables, diversification variables, crisis variables and control variables.

The dependent variable used in the empirical analysis must capture firm value, since the objective is to investigate whether diversified firms trade at a discount relative to focused firms. As discussed in Chapter 2, the conglomerate discount has been measured in different ways in the literature. However, two approaches are particularly relevant for this thesis. The first is the excess value methodology, which compares the actual value of a diversified firm with an

imputed benchmark representing the stand-alone value of its business segments. The second uses market-based valuation ratios, especially Tobin's Q, to compare the valuation of diversified and focused firms.

The excess value measure, originally popularized by Berger and Ofek (1995), is based on a sum-of-the-parts logic and has been widely used in subsequent studies (Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012; Kuppuswamy and Villalonga, 2016). Under this approach, the value of each segment of a diversified firm is imputed by applying industry median valuation multiples from comparable single-segment firms to the segment's assets or sales. The firm's imputed value is then obtained by summing the imputed values of all segments. Finally, excess value is calculated as the logarithm of the ratio between the firm's actual value and its imputed value. A negative excess value implies that the diversified firm trades at a discount relative to its stand-alone benchmark, while a positive value indicates a premium. In practical terms, the measure compares the observed market value of a diversified firm with the hypothetical value it would have if its divisions were valued as separate focused firms. Although the label "excess value" is used broadly in the literature, the measure can be constructed in slightly different ways, most commonly using asset multipliers or sales multipliers, and, in related applications, through an industry-adjusted q approach (Villalonga, 2004)

$$EV_i = \ln \left(\frac{MV_i}{IV_i} \right)$$

where EV_i is the excess value of firm i , MV_i is the actual market value of the firm, and IV_i is the imputed value of the firm, obtained as the sum of the imputed stand-alone values of its segments:

$$IV_i = \sum_{j=1}^n IV_{ij}$$

where each segment's imputed value is calculated by multiplying the segment's assets or sales by the median market-to-assets or market-to-sales ratio of comparable single-segment firms in the same industry.

A second major approach uses Tobin's Q, which will also be the main measure of firm value adopted in this thesis. Tobin's Q is broadly defined as the ratio of the market value of the firm to the value of its assets, traditionally intended as their replacement cost and, in empirical applications, often approximated by their book value (Lang and Stulz, 1994; Servaes, 1996;

Laeven and Levine, 2007). Lang and Stulz (1994) use Tobin's Q to show that diversified firms tend to exhibit lower q ratios than comparable specialized firms. More generally, Tobin's Q is particularly useful because it provides a broad market-based measure of valuation and allows researchers to compare diversified and focused firms even when a full segment-level decomposition is not available. It should also be noted that Tobin's Q and excess value do not capture exactly the same dimension of diversification. While Tobin's Q reflects both the valuation effect of diversity and that of the firm's mix of activities, excess value is more directly designed to isolate the effect of diversity itself (Laeven and Levine, 2007). For this reason, although it differs from the excess value methodology, Tobin's Q remains one of the most widely used indicators in the empirical literature on the conglomerate discount (Lang and Stulz, 1994; Servaes, 1996; Laeven and Levine, 2007).

$$Q_i = \frac{MV_i}{BVA_i}$$

where Q_i is Tobin's Q for firm i , MV_i is the market value of the firm, and BVA_i is the book value of total assets. In empirical applications, the book value of assets is commonly used as a practical approximation of the replacement value of assets, which is not directly observable.

However, neither of these approaches is free from limitations. In the case of excess value, the results depend critically on the quality of segment data, the choice of industry matching criteria, and the treatment of debt in the calculation of total firm value (Villalonga, 2004; Kuppaswamy and Villalonga, 2016). For example, the imputed value of each segment is typically based on comparable single-segment firms in the same industry, but the benchmark may vary depending on how narrowly or broadly industries are defined. If the classification is too broad, segments that are in fact different may be treated as comparable; if it is too narrow, the number of suitable focused firms may become too small. As noted by Villalonga (2004), researchers usually compute industry averages and medians at the most precise SIC level for which a minimum number of single-segment firms is available. In addition, Ammann, Hoechle, and Schmid (2012) show that replacing the book value of debt with an imputed market value of debt reduces the measured discount somewhat, although not enough to eliminate it in more robust specifications. They also show that the estimated size of the discount depends on the econometric framework used and on how endogeneity and firm fixed effects are treated (Ammann, Hoechle, and Schmid, 2012). Tobin's Q also has its own limitations. Since it is a broader market-based measure, it does not isolate the effect of diversification as directly as excess value. In particular, Tobin's Q may reflect not only diversification itself but also

differences in firms' activity mix, size, or other characteristics that affect market valuation. As argued by Laeven and Levine (2007), Tobin's Q incorporates both the market's valuation of diversity and the valuation of the firm's mix of activities, whereas excess value is more directly aimed at isolating the effect of diversity itself. Overall, this suggests that the measured size and even the interpretation of the conglomerate discount may partly depend on methodological and technical choices in the construction of the benchmark and in the estimation strategy

For this thesis, Tobin's Q is preferred to the excess value methodology for both practical and data-related reasons. First, Tobin's Q represents a simpler and more direct measure of firm value, based on firm-level information that is more easily available and comparable across companies. Second, the dataset used in this analysis is based on Orbis, which provides primary and secondary NACE activities but does not provide detailed accounting information for each individual business activity. In particular, Orbis does not report sales, assets or profits separately for each NACE activity. Therefore, it would not be possible to construct a reliable excess value measure following the Berger and Ofek methodology, which requires segment-level information and comparable focused firms for each industry segment. For this reason, Tobin's Q is considered more suitable for the present analysis, as it allows firm valuation to be studied using available and consistent firm-level data.

A few studies also consider market-to-book or related market-based ratios as alternative valuation measures or as robustness checks. In particular, Villalonga (2004) reports results not only for excess value and industry-adjusted q, but also for unadjusted market-to-book, showing that different valuation measures may lead to different estimated magnitudes of the diversification discount. In other studies, market-to-book is used less as a direct measure of the discount itself and more as a proxy for growth opportunities or industry conditions, as in Burch, Nanda, and Narayanan (2000) and Rudolph and Schwetzler (2013). These measures are therefore useful in testing whether the main findings are robust across alternative definitions of firm value or in capturing related dimensions of firm valuation when segment-level data are incomplete or when researchers do not rely exclusively on the imputed stand-alone value framework.

$$MTB_{it} = \frac{MC_{it}}{BVE_{it}}$$

where MTB_{it} is the market-to-book ratio for firm i in year t , MC_{it} is the market capitalization of the firm, and BVE_{it} is the book value of shareholders' equity. The ratio compares the market value of equity with its accounting book value and is used as an alternative market-based

measure of firm valuation. In this thesis, the market-to-book ratio is used as an alternative measure of firm value. Like Tobin's Q, it captures a market-based dimension of valuation, because it compares the market value assigned by investors with an accounting measure of firm value. However, while Tobin's Q is used as the main dependent variable, market-to-book is included as a robustness measure. The objective is to verify whether the results obtained using Tobin's Q remain consistent when firm value is measured through an alternative valuation ratio. Both market capitalization and shareholders' equity are retrieved from Orbis, as described in Section 4.1.

After retrieving market capitalization and shareholders' equity from Orbis, the market-to-book ratio was constructed in R by dividing market capitalization by shareholders' equity for each firm-year observation. Since the ratio is calculated from two accounting and market variables, it can be strongly affected by extreme values, especially when shareholders' equity is very low. For this reason, after being constructed, the market-to-book ratio was winsorized at the 1st and 99th percentiles. Table 12 reports the descriptive statistics of market-to-book before and after winsorization. The effect of the procedure is clearly visible in the maximum value, which decreases from 2054.76 before winsorization to 25.47 after winsorization. The mean also decreases from 3.43 to 3.03, while the median and the 25th and 75th percentiles remain unchanged.

Table 12 - Market-to-book ratio before and after winsorization

Market-to-book	Mean	Std. dev.	25th	Median	75th	Min	Max
Pre winsorization	3.4275	18.2053	0.8720	1.6266	3.4047	0.0032	2054.7592
Post winsorization	3.0327	4.0410	0.8720	1.6266	3.4047	0.1236	25.4693

The main explanatory variable used in the model is the diversification dummy. This variable identifies whether a firm is focused or diversified. It is constructed using the primary and secondary NACE codes reported in Orbis. This approach is consistent with previous literature on the conglomerate discount, where industry classification codes are commonly used to distinguish focused firms from diversified firms. For example, Servaes (1996) classifies single-segment firms as firms operating in one two-digit SIC code industry and multiple-segment firms as firms operating in two or more two-digit SIC code industries. Since this thesis focuses on European firms, the same logic is applied using NACE codes, which represent the European industry classification system.

More specifically, all NACE activities associated with each firm are considered and then reduced to their first two digits. A firm is classified as diversified if it operates in more than one NACE 2-digit division. By contrast, it is classified as focused if all its reported activities belong to the same NACE 2-digit division. Formally:

$$Diversified_i = \begin{cases} 1 & \text{if firm operates in more than one NACE division} \\ 0 & \text{otherwise} \end{cases}$$

Using the NACE 2-digit level allows the analysis to identify diversification across different industry divisions, without classifying a firm as diversified only because it reports very similar activities within the same broader industry. For example, a firm operating in two different manufacturing activities within the same NACE 2-digit division would still be considered focused. Instead, a firm operating in two different NACE 2-digit divisions would be considered diversified. The descriptions of the NACE 2-digit divisions included in the sample, together with their corresponding broader NACE sections, are reported in Appendix Table 2.

After defining the diversification dummy, the second key dummy variable identifies the crisis period. Since the sample covers the years 2018–2021, the period is divided into two parts: 2018 and 2019 represent the pre-COVID period, while 2020 and 2021 represent the COVID period. This variable allows the analysis to distinguish normal years from the years affected by the pandemic and will later be interacted with the diversification dummy to test whether the valuation effect of diversification changed during the crisis. The variable is defined as follows:

$$COVID_t = \begin{cases} 1 & \text{if year } t \text{ is 2020 or 2021} \\ 0 & \text{if year } t \text{ is 2018 or 2019} \end{cases}$$

The interaction between diversification and the COVID period is then constructed as:

$$Diversified_COVID_{it} = Diversified_i \times COVID_t$$

This interaction term is central to the analysis because it allows testing whether the valuation effect of diversification changes during the COVID-19 crisis. A negative coefficient on this interaction would suggest that the valuation gap between diversified and focused firms increases during the COVID period. A positive coefficient would suggest that the gap decreases.

Several control variables are included in the empirical analysis in order to account for firm characteristics that may influence firm value. This is important because diversified and focused firms may differ systematically in terms of size, profitability, leverage and financial flexibility. The use of these controls is consistent with previous studies on the conglomerate discount. For example, Sanzhar (2006) controls for firm size, profitability and leverage in regressions on excess value, using variables such as the logarithm of book assets, profitability and leverage. More recently, Kuppuswamy and Villalonga (2016) include cash holdings, leverage, operating income and the logarithm of total assets in their analysis of diversification during the 2007–2009 financial crisis.

In this thesis, the main firm-level control variables are size, liquidity, profitability and leverage. These variables are included to account for differences in firms' characteristics that may affect firm value independently from diversification. Size and liquidity are constructed from the accounting data retrieved from Orbis, while profitability and leverage are directly based on Orbis variables. More specifically, profitability is measured through ROA, and leverage is measured using the leverage/gearing variable already described in Section 4.1. The first control variable is firm size, which is measured as the natural logarithm of total assets:

$$Size_{it} = \ln (Total\ Assets_{it})$$

The logarithmic transformation is used because total assets are highly skewed, as shown in the previous section, and because firm size may influence valuation. Larger firms may have different access to capital markets, different risk profiles and different valuation levels compared to smaller firms. Since size is already measured as the natural logarithm of total assets, it is not winsorized. The log transformation already reduces the impact of extremely large firms and makes the distribution less affected by outliers. Therefore, the variable is kept unchanged in the empirical analysis.

Table 13 - Descriptive statistics of firm size

Variable	Mean	Std. dev.	25th	Median	75th	Min	Max
Size	18.7769	2.6825	16.7974	18.7119	20.6516	9.8005	27.5677

The second control variable constructed in the analysis is liquidity, measured as cash and cash equivalents divided by total assets. Both variables are retrieved from Orbis, as described in Section 4.1. This variable measures the amount of cash available relative to the size of the firm.

Liquidity is especially relevant in the context of COVID-19, because firms with higher cash holdings may have been better able to absorb the shock and deal with uncertainty.

$$Liquidity_{it} = \frac{Cash_{it}}{Total\ Assets_{it}}$$

After constructing the liquidity ratio, the variable was winsorized at the 1st and 99th percentiles to reduce the effect of extreme observations. As shown in Table 14, winsorization has only a limited effect on the distribution of liquidity. The mean decreases slightly from 0.1730 to 0.1725, while the median and the 25th and 75th percentiles remain unchanged. The main effect is visible in the minimum and maximum values: the minimum increases from 0.000005 to 0.0007, while the maximum decreases from 1.0000 to 0.9023.

Table 14 - Liquidity ratio before and after winsorization

Liquidity	Mean	Std. dev.	25th	Median	75th	Min	Max
Non winsorized	0.1730	0.1934	0.0435	0.1062	0.2254	0.000005	1.0000
Winsorized	0.1725	0.1913	0.0435	0.1062	0.2254	0.0007	0.9023

The other numerical control variables are profitability and leverage. Profitability is measured using ROA, which is directly retrieved from Orbis. ROA captures the firm's ability to generate accounting returns from its assets and is included because more profitable firms are generally expected to have higher valuation ratios. Financial leverage is measured using the leverage/gearing variable downloaded from Orbis. Different measures of leverage were initially downloaded, but leverage/gearing was selected because it provided the highest data availability and the lowest number of missing values. Leverage is included because capital structure can affect both firm risk and firm value. This control is particularly relevant in a study on diversification, since diversified firms may have different debt capacity and financial risk compared to focused firms.

Finally, industry and country information are also included as control variables. Industry is based on the firm's primary NACE classification, using the first two digits of the NACE code, consistently with the construction of the diversification dummy. Including industry controls is important because firm valuation may differ across sectors due to differences in growth opportunities, risk, profitability and capital intensity. This is consistent with previous studies on the conglomerate discount, which control for industry effects when comparing diversified

and focused firms. For example, Lang and Stulz (1994) account for industry effects by comparing diversified firms with portfolios of specialized firms operating in the same industries. Country information is included to account for differences across European markets, such as institutional setting, financial development and corporate governance environment. This is relevant because the value of diversification may depend on the country or regional context. For instance, Rudolph and Schwetzler (2013) show that the impact of the financial crisis on the diversification discount varies across regions and is related to differences in capital market development. Both industry and country data are retrieved from Orbis, as described in Section 4.1.

To conclude the variable construction section, Tables 15 and 16 summarize the descriptive statistics of the variables used in the empirical analysis. Table 15 reports the two dependent variables, Tobin's Q and market-to-book, while Table 16 reports the main numerical control variables: size, liquidity, ROA and leverage/gearing.

These statistics refer to the variables after the cleaning and winsorization procedures described above, with the exception of size, which is not winsorized because it is already expressed as the natural logarithm of total assets.

Table 15 - Summary statistics of dependent variables

Variable	Mean	Std. dev.	25th	Median	75th	Min	Max
Tobin's Q	1.52	2.07	0.40	0.78	1.69	0.06	12.52
Market-to-book	3.03	4.04	0.87	1.63	3.40	0.12	25.47

Table 16 - Summary statistics of numerical control variables

Variable	Mean	Std. dev.	25th	Median	75th	Min	Max
Size	18.78	2.68	16.80	18.71	20.65	9.80	27.57
Liquidity	0.17	0.19	0.04	0.11	0.23	0.0007	0.9
ROA	-0.81	16.21	-2.43	2.68	6.59	-72.93	32.52
Gearing	75.37	96.02	12.23	45.70	98.44	0	549.98

4.3 Model specification

The empirical analysis is designed to examine the relationship between corporate diversification and firm value during the COVID-19 period. The dataset is structured as a firm-year panel covering the years 2018–2021. This allows the analysis to compare the pre-COVID period, represented by 2018 and 2019, with the COVID period, represented by 2020 and 2021.

The empirical strategy follows two main steps. First, a model is estimated to analyse the determinants of diversification. Second, the valuation effect of diversification is tested using Tobin's Q as the main dependent variable.

The first step addresses the fact that diversification is not randomly distributed across firms. Diversified firms may already differ from focused firms before the valuation analysis is performed. For example, they may be larger, more profitable, more leveraged or have different levels of liquidity. Consequently, an observed difference in firm value may partly reflect the characteristics of the firms that are diversified rather than diversification itself. Previous studies have highlighted this self-selection problem and have used models of the probability of diversification to examine the observable differences between diversified and focused firms. Villalonga (2004), for example, estimates the propensity to diversify through a probit model, while Ammann, Hoechle and Schmid (2012) use firm, industry and time characteristics, including current values, lagged values and historical averages of several firm-level variables. For this reason, before estimating the valuation models, the analysis examines which firm-level characteristics are associated with the probability of being diversified. This first empirical test is related to hypothesis H0_o, developed in Chapter 2. Since the dependent variable is binary, equal to 1 for diversified firms and 0 for focused firms, the determinants model is estimated using a logit regression. The selection of the predictors is guided by the previous literature and by the theoretical mechanisms that may influence the ability of a firm to operate across multiple activities. Firm size is included because larger firms may have greater financial resources, organizational capacity and opportunities to expand into additional business areas. The logarithm of total assets is also commonly included in previous models of the diversification decision (Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012). Profitability is measured through ROA and is included because the availability of internally generated resources may facilitate expansion into new activities. However, the expected relationship is not necessarily unambiguous, since firms with limited growth opportunities in their original business may also diversify in search of alternative sources of growth. Leverage is included because the firm's financial structure may either facilitate diversification through greater debt capacity or constrain it when indebtedness is already high. Finally, liquidity measures the availability of internal financial resources that may be used to support expansion into additional activities. This variable is conceptually similar to the cash-to-assets measure used in previous studies of diversification and financial flexibility, including Kuppuswamy and Villalonga (2016).

The firm-level predictors included in the model are therefore size, ROA, leverage and liquidity. Industry and country are also included in the specification, but they are not treated as

determinants whose individual coefficients represent the main focus of the analysis. Instead, NACE 2-digit and country fixed effects are included as controls. Industry fixed effects absorb systematic differences in the average probability of diversification across sectors. As a result, the coefficients of the firm-level predictors are estimated by comparing firms operating within the same primary NACE 2-digit industry. Country fixed effects similarly account for persistent differences across European institutional and financial environments. The analysis therefore examines whether firm characteristics are associated with diversification within industries and after controlling for country-level differences.

Since the diversification dummy is defined at firm level and does not vary across the years covered by the dataset, the determinants model is estimated using one observation per firm. The predictors are measured in 2018, the first year of the sample, rather than being calculated as averages over the entire 2018–2021 period. This choice ensures that the model uses firm characteristics observed at the beginning of the sample and avoids using values from 2020 and 2021 that may already have been affected by the COVID-19 crisis. However, the 2018 variables cannot be considered genuinely lagged relative to the original decision to diversify. The NACE information available in Orbis does not vary annually and does not identify the year in which each firm changed from focused to diversified. It is therefore not possible to construct a dynamic model in which diversification in year t is explained by firm characteristics observed in year $t - 1$. The determinants model should consequently be interpreted as an analysis of the baseline firm characteristics associated with diversification status, rather than as a causal model of the original decision to diversify. The model is specified as follows:

$$\Pr(\text{Diversified}_i = 1) = \Lambda(\alpha + \beta_1 \text{Size}_{i,2018} + \beta_2 \text{ROA}_{i,2018} + \beta_3 \text{Leverage}_{i,2018} + \beta_4 \text{Liquidity}_{i,2018} + \gamma \text{Industry}_i + \delta \text{Country}_i + \varepsilon_i)$$

where Λ represents the logistic cumulative distribution function. A positive and statistically significant coefficient indicates that higher values of the corresponding firm characteristic are associated with a greater probability of being diversified, holding the other variables and the industry and country effects constant. By contrast, a negative coefficient indicates an association with a lower probability of diversification. The purpose of this model is not to explain the diversification decision perfectly or to establish a causal relationship. Instead, it examines whether diversified firms exhibit systematically different observable characteristics at the beginning of the sample period. For example, a positive and significant coefficient on size would indicate that larger firms are more likely to be diversified, while significant

coefficients on leverage or liquidity would suggest that financial structure and financial flexibility are associated with diversification status.

Starting from this valuation model, the analysis is conducted using firm-year observations from the panel dataset. To test this hypothesis, a first valuation model is estimated using an OLS regression on panel data. In all OLS specifications, standard errors are made robust to heteroskedasticity and clustered at the firm level, in order to account for repeated observations of the same firm over time. Tobin's Q is used as the dependent variable, while the diversification dummy is the main explanatory variable. This model tests the presence of a conglomerate discount over the full sample period, before considering whether the effect changes during COVID-19. The regression also includes firm-level controls, industry controls, country controls and year controls. The model can be written as follows:

$$TobinQ_{it} = \alpha + \beta_1 Diversified_i + \beta_2 Size_{it} + \beta_3 ROA_{it} + \beta_4 Leverage_{it} + \beta_5 Liquidity_{it} + \gamma Industry_i + \delta Country_i + \lambda Year_t + \varepsilon_{it}$$

In this model, the coefficient of interest is β_1 . If β_1 is negative and statistically significant, the result would suggest that diversified firms have a lower Tobin's Q than focused firms, after controlling for firm characteristics, industry, country and year effects. This would be consistent with the presence of a conglomerate discount. If β_1 is not statistically significant, the null hypothesis of no valuation difference between diversified and focused firms cannot be rejected.

After testing for the general presence of a conglomerate discount between diversified and focused firms, the analysis moves to the main empirical model. This model examines whether the conglomerate discount changes during the COVID-19 period by adding the COVID dummy and its interaction with the diversification dummy. This step is central to the thesis because it allows the analysis to test whether the valuation effect of diversification becomes stronger or weaker during the crisis. The model is related to hypothesis H0₂, developed in Chapter 2.

To test this hypothesis, the previous OLS model is extended by adding the COVID dummy and the interaction between the diversification dummy and the COVID dummy. The interaction term is the key variable in this model, because it shows whether the valuation difference between diversified and focused firms changes during the crisis period. The model can be written as follows:

$$TobinQ_{it} = \alpha + \beta_1 Diversified_i + \beta_2 COVID_t + \beta_3 Diversified_COVID_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Leverage_{it} + \beta_7 Liquidity_{it} + \gamma Industry_i + \delta Country_i + \varepsilon_{it}$$

The coefficient β_1 measures the valuation difference between diversified and focused firms in the pre-COVID period. The coefficient β_2 captures the average change in Tobin's Q during the COVID period for focused firms. The key coefficient is β_3 , which is associated with the interaction between diversification and the COVID period. This coefficient shows whether the valuation difference between diversified and focused firms changes during the crisis. Therefore, the overall valuation effect of diversification during the COVID period is given by $\beta_1 + \beta_3$. If β_3 is positive and statistically significant, this would indicate that the conglomerate discount decreases during the COVID-19 period, supporting H1₂. In other words, a positive interaction coefficient would mean that diversified firms become relatively less discounted compared to focused firms during the crisis. By contrast, if β_3 is negative or not statistically significant, the null hypothesis cannot be rejected.

The first robustness check repeats the baseline valuation model using a broader sector classification. In the main analysis, diversification is defined using NACE 2-digit divisions. This is a relatively detailed classification, because it distinguishes firms according to more specific industry divisions. For example, within the broad manufacturing section, different 2-digit divisions identify different types of manufacturing activities, such as food products, chemicals or motor vehicles. However, firms classified as diversified at the NACE 2-digit level may still operate within the same broad sector. For this reason, the robustness check uses NACE sections, which represent a less specific and broader industry classification. Under this alternative definition, a firm is classified as diversified only if its activities belong to more than one broad NACE section. Therefore, this measure is more conservative, because it identifies only firms operating across more distant sectoral areas. For example, a firm operating in two different manufacturing divisions would be classified as diversified in the baseline analysis based on NACE 2-digit divisions, but not in the robustness check based on NACE sections. By contrast, a firm operating both in manufacturing and in information and communication would be classified as diversified under both definitions. This robustness check is useful to verify whether the results depend on the level of detail used to define diversification. The baseline OLS model is re-estimated by replacing the original diversification dummy with the broader diversification dummy based on NACE sections. The model can be written as follows:

$$TobinQ_{it} = \alpha + \beta_1 BroadDiversified_i + \beta_2 COVID_t + \beta_3 BroadDiversified_COVID_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Leverage_{it} + \beta_7 Liquidity_{it} + \gamma Industry_i + \delta Country_i + \varepsilon_{it}$$

In this robustness check, β_1 measures the valuation difference between broadly diversified firms and focused firms in the pre-COVID period. The coefficient β_3 shows whether this valuation difference changes during the COVID period. If the signs and statistical significance of β_1 and β_3 are similar to those obtained in the baseline model, the results can be considered robust to the use of a less specific sector classification. This would suggest that the findings are not driven only by the use of the NACE 2-digit definition of diversification.

The second robustness check repeats the main valuation regression using the market-to-book ratio as an alternative dependent variable instead of Tobin's Q. As explained in the previous section, Tobin's Q is the main measure of firm value used in the thesis, while market-to-book is introduced as an alternative market-based valuation ratio. The purpose of this test is to verify whether the results are driven only by the specific use of Tobin's Q or whether they remain similar when firm value is measured in a different way. The baseline OLS model is re-estimated by replacing Tobin's Q with the market-to-book ratio as the dependent variable. The model can be written as follows:

$$Market_to_book_{it} = \alpha + \beta_1 Diversified_i + \beta_2 COVID_t + \beta_3 Diversified_COVID_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Leverage_{it} + \beta_7 Liquidity_{it} + \gamma Industry_i + \delta Country_i + \varepsilon_{it}$$

In this model, β_1 measures the valuation difference between diversified and focused firms in the pre-COVID period using market-to-book as the valuation measure. The coefficient β_3 shows whether this difference changes during the COVID period. If the sign and statistical significance of β_1 and β_3 are similar to those obtained in the Tobin's Q model, the results can be considered robust to the use of an alternative measure of firm value. This would strengthen the interpretation of the baseline results, because the evidence would not depend only on one specific valuation ratio.

The third robustness check repeats the baseline regression using a balanced panel instead of the unbalanced panel used in the main analysis. As explained in Section 4.1, the baseline sample is an unbalanced panel, meaning that firms are kept in the sample even if they do not have available observations for all four years. This choice allows the analysis to preserve a larger

number of firms and firm-year observations. However, the use of an unbalanced panel may raise the concern that the results are partly influenced by changes in sample composition across years. For example, some firms may appear only in certain years because of missing data. For this reason, the robustness check is performed using a balanced panel, which includes only firms with complete observations for the entire period 2018–2021. The baseline OLS model is re-estimated using only firms observed in all four years of the sample. The model can be written as follows:

$$TobinQ_{it} = \alpha + \beta_1 Diversified_i + \beta_2 COVID_t + \beta_3 Diversified_COVID_{it} + \beta_4 Size_{it} + \beta_5 ROA_{it} + \beta_6 Leverage_{it} + \beta_7 Liquidity_{it} + \gamma Industry_i + \delta Country_i + \varepsilon_{it}$$

The specification is the same as in the baseline model, but the sample is restricted to firms with complete data for 2018, 2019, 2020 and 2021. In this way, the comparison between the pre-COVID and COVID periods is based on the same group of firms over time. In this robustness check, β_1 measures the valuation difference between diversified and focused firms in the pre-COVID period within the balanced sample, while β_3 measures whether this difference changes during the COVID period. If the sign and statistical significance of these coefficients remain similar to the baseline results, the findings can be considered robust to the use of a balanced panel. This would suggest that the results are not mainly driven by changes in the composition of the sample across years.

The final robustness check distinguishes between related and unrelated diversification. The objective is to understand whether all diversified firms behave in the same way, or whether the valuation effect depends on how distant the firm's activities are from each other. This distinction is consistent with previous literature on the conglomerate discount. For example, Dell'Acqua, Etro and Correr (2013) argue that the valuation discount tends to be larger when diversification occurs across unrelated business segments, while it is lower when diversification takes place across related business segments. This distinction is relevant because diversification across similar sectors may be easier to manage and may allow the firm to exploit synergies, shared capabilities and common resources. By contrast, diversification across very different sectors may increase coordination costs, organizational complexity and the risk of inefficient internal capital allocation. Following this logic, this thesis applies a similar distinction using the European NACE classification. The procedure is based on two steps. First, as in the baseline analysis, NACE 2-digit codes are used to identify whether a firm is diversified or focused. A firm is classified as diversified if it operates in more than one NACE 2-digit division, while it is classified as focused if all its activities belong to the same NACE 2-digit division.

Second, only the firms already classified as diversified are divided into related and unrelated diversified firms. To do this, the broader NACE section is used. A firm is classified as related diversified if it operates in more than one NACE 2-digit division, but these activities still belong to the same broad NACE section. For example, a firm operating in two different manufacturing divisions would be considered related diversified, because both activities are still part of the manufacturing section. By contrast, a firm is classified as unrelated diversified if its activities belong to different NACE sections, for example manufacturing and information and communication.

Therefore, the NACE 2-digit classification is used to identify the presence of diversification, while the broader NACE section is used to distinguish whether diversification occurs within similar sectors or across more distant sectors. This final robustness check is related to hypothesis H0₃, developed in Chapter 2. To test this hypothesis, the baseline OLS model is modified by replacing the general diversification dummy with two separate dummy variables: one for related diversified firms and one for unrelated diversified firms. Focused firms remain the reference group. The model can be written as follows:

$$TobinQ_{it} = \alpha + \beta_1 RelatedDiversified_i + \beta_2 UnrelatedDiversified_i + \beta_3 COVID_t + \beta_4 RelatedDiversified_COVID_{it} + \beta_5 UnrelatedDiversified_COVID_{it} + \beta_6 Size_{it} + \beta_7 ROA_{it} + \beta_8 Leverage_{it} + \beta_9 Liquidity_{it} + \gamma Industry_i + \delta Country_i + \varepsilon_{it}$$

In this model, β_1 measures the valuation difference between related diversified firms and focused firms in the pre-COVID period, while β_2 measures the valuation difference between unrelated diversified firms and focused firms. The coefficients β_4 and β_5 show whether these valuation differences change during the COVID period. If unrelated diversified firms show a more negative coefficient than related diversified firms, this would suggest that the market penalizes diversification more strongly when firms operate in distant sectors. On the other hand, if the coefficients are similar, this would indicate that the valuation effect of diversification does not differ substantially between related and unrelated diversification in this sample.

Overall, this section has presented the empirical models used to test the relationship between corporate diversification and firm value. The analysis first examines the determinants of diversification, in order to understand whether diversified firms differ systematically from focused firms. It then tests the presence of a conglomerate discount and, through the main model, investigates whether this discount changes during the COVID-19 period. Finally, several robustness checks are introduced to verify whether the results remain stable when

alternative measures of firm value, sector classifications and sample structures are used. The following section presents the empirical results obtained from these models. The results will first be discussed for the determinants of diversification, then for the baseline valuation models, and finally for the robustness checks.

5. Empirical Results

5.1 Main Empirical Results

This section presents the main empirical results obtained from the models described in Section 4.3. The analysis begins with the determinants of corporate diversification and then examines the relationship between diversification and firm value. More specifically, the valuation analysis first tests for the general presence of a conglomerate discount and subsequently investigates whether this discount changes during the COVID-19 period.

The first model examines which firm characteristics are associated with the probability of being diversified. This preliminary analysis is important because diversification is not randomly distributed across firms. Diversified firms may differ systematically from focused firms in terms of size, profitability, leverage and liquidity. Identifying these differences provides useful information on the characteristics associated with diversification status and supports the interpretation of the subsequent valuation results. As described in Section 4.3, the determinants model is estimated through a firm-level logit regression. The dependent variable is the diversification dummy, which is equal to 1 for diversified firms and 0 for focused firms. Since the diversification status available in Orbis does not vary annually, the model uses one observation per firm. The explanatory variables are measured in 2018, the first year of the sample, rather than being calculated as averages over the entire 2018-2021 period. This choice avoids using firm characteristics that may already have been affected by the COVID-19 crisis and provides a clearer baseline for the analysis. The firm-level predictors included in the model are firm size, ROA, leverage and liquidity. Industry and country fixed effects are included as controls to account for systematic differences across NACE 2-digit divisions and European countries. Therefore, the coefficients of the firm-level variables capture their association with diversification status after controlling for sectoral and geographical differences. A positive coefficient indicates that higher values of the corresponding variable are associated with a greater probability of being diversified, while a negative coefficient indicates a lower probability. Since logit coefficients are expressed in log-odds, the discussion focuses mainly on their direction and statistical significance. The model identifies associations between baseline firm characteristics and diversification status and should not be interpreted as establishing

causal determinants of the original decision to diversify. Table 17 reports the results of the determinants of diversification model. Heteroskedasticity-robust standard errors are reported in parentheses, while *, ** and *** indicate statistical significance at the 10%, 5% and 1% levels, respectively.

Table 17 – Determinants of corporate diversification

Variable	Probability of being diversified
Firm size	0.3128*** (0.0262)
ROA	0.0053 (0.0039)
Leverage/gearing	0.0009 (0.0005)
Liquidity	0.6662** (0.3368)
Industry fixed effects	Yes
Country fixed effects	Yes
Baseline year	2018
Number of firms	3,628
Pseudo R-squared	0.2122

The dependent variable equals 1 for diversified firms and 0 for focused firms.

Firm characteristics are measured in 2018. Heteroskedasticity-robust standard errors are reported in parentheses.

Industry and country fixed effects are included as controls.

** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

The results reported in Table 17 show that some baseline firm characteristics are significantly associated with diversification status. The estimation sample consists of 3,628 firms for which complete information on all variables is available in 2018. These observations correspond to the 2018 cross-section described in Chapter 4, after excluding firms with missing values for one or more variables included in the determinants model.

Firm size has a positive coefficient of 0.3128 and is statistically significant at the 1% level. This indicates that larger firms are more likely to be diversified, after controlling for the other firm characteristics and for systematic differences across industries and countries. The result is consistent with the idea that larger firms generally possess greater financial resources, organizational capacity and managerial structures, which may make it easier to operate across several business activities. Liquidity also has a positive coefficient and is statistically significant at the 5% level. This suggests that firms with greater cash and cash equivalents relative to total assets are more likely to be diversified. Greater liquidity may provide the financial flexibility and internal resources required to support operations across different industries. However, this

result should be interpreted as an association rather than evidence that liquidity directly causes firms to diversify. ROA has a positive coefficient, but it is not statistically significant at conventional levels. Therefore, the model does not provide sufficient evidence that profitability is systematically associated with diversification status. Similarly, the coefficient on leverage/gearing is positive but not statistically significant. After controlling for the other firm characteristics and for industry and country fixed effects, there is therefore no clear evidence that more highly leveraged firms are more likely to be diversified.

Overall, the results indicate that diversified firms differ from focused firms mainly in terms of size and liquidity. They tend to be larger and to hold more liquid resources, while no statistically significant differences emerge with respect to profitability or leverage. Since at least some firm characteristics are significantly associated with diversification status, the results provide evidence against hypothesis H0₆, according to which firm characteristics are not associated with the probability of being diversified. Nevertheless, the findings should not be interpreted causally, since the model identifies baseline characteristics associated with diversification status and does not observe the original year in which each firm decided to diversify. The pseudo R-squared of 0.2122 also suggests that the model captures a relevant, although necessarily incomplete, part of the variation in diversification status.

After examining the characteristics associated with corporate diversification, the analysis turns to the relationship between diversification and firm value. The first valuation model tests hypothesis H1₁, developed in Chapter 2, according to which diversified firms are expected to exhibit a lower firm value than focused firms. The model is estimated using OLS on firm-year observations, with winsorized Tobin's Q as the dependent variable and the diversification dummy as the main explanatory variable. Firm size, ROA, leverage and liquidity are included as controls, together with industry, country and year fixed effects. Standard errors are clustered at the firm level. Table 18 reports the results of this first valuation model.

Table 18 – OLS estimates of the conglomerate discount

Variable	Tobin's Q
Diversified	-0.1351** (0.0568)
Firm size	-0.1070*** (0.0118)
ROA	0.0056** (0.0025)
Leverage/gearing	-0.0018*** (0.0002)

Variable	Tobin's Q
Liquidity	2.7201*** (0.1905)
Industry fixed effects	Yes
Country fixed effects	Yes
Year fixed effects	Yes
Firm-year observations	15,659
Number of firms	4,554
R-squared	0.2964
Adjusted R-squared	0.2910

The dependent variable is winsorized Tobin's Q. Standard errors clustered at the firm level are reported in parentheses.

Industry, country and year fixed effects are included.

** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

The results reported in Table 18 provide evidence of a conglomerate discount in the sample. The coefficient on the diversification dummy is negative and statistically significant at the 5% level. More specifically, diversified firms have a Tobin's Q that is, on average, 0.1351 points lower than that of focused firms, after controlling for firm size, profitability, leverage, liquidity, industry, country and year effects. This result supports hypothesis H1₁ and allows the null hypothesis of no valuation difference between diversified and focused firms to be rejected at the 5% significance level. However, the coefficient should be interpreted as a conditional association rather than as a causal effect of diversification on firm value.

The control variables also show significant relationships with Tobin's Q. Firm size has a negative and statistically significant coefficient at the 1% level, suggesting that larger firms tend to have lower valuation ratios, after controlling for the other variables included in the model. ROA is positively associated with Tobin's Q and is statistically significant at the 5% level, indicating that more profitable firms tend to receive higher market valuations. Leverage/gearing has a negative and statistically significant coefficient at the 1% level. This suggests that firms with higher leverage tend to have lower Tobin's Q, which may reflect the higher financial risk associated with greater indebtedness. By contrast, liquidity has a positive and strongly significant coefficient. Since liquidity is measured as cash and cash equivalents divided by total assets, the result indicates that firms with greater cash availability relative to their assets tend to have higher valuations. For example, an increase of 0.10 in the liquidity ratio is associated with an increase of approximately 0.272 points in Tobin's Q, holding the other variables constant.

The R-squared is 0.2964, indicating that the model explains approximately 29.6% of the variation in Tobin's Q. Overall, the findings show that the lower valuation of diversified firms remains visible even after accounting for observable firm characteristics and systematic differences across sectors, countries and years.

The analysis then moves to the main empirical model of the thesis, which examines whether the valuation difference between diversified and focused firms changes during the COVID-19 period. Compared with the previous specification, this model adds the COVID dummy and the interaction between diversification and the COVID period, while keeping the same firm-level controls and industry and country fixed effects. The interaction term is the main coefficient of interest because it captures whether the conglomerate discount becomes smaller or larger during the crisis. A positive and statistically significant coefficient would indicate that diversified firms became relatively less discounted during the COVID-19 period, while a negative coefficient would suggest that the valuation gap widened. The model therefore provides the main test of hypothesis H1₂. Table 19 reports the results of this specification.

Table 19 – Diversification and firm value during COVID-19

Variable	Tobin's Q
Diversified	-0.0306 (0.0571)
COVID period	0.3097*** (0.0257)
Diversified × COVID	-0.2055*** (0.0393)
Firm size	-0.1069*** (0.0118)
ROA	0.0055** (0.0024)
Leverage/gearing	-0.0018*** (0.0002)
Liquidity	2.7162*** (0.1903)
Industry fixed effects	Yes
Country fixed effects	Yes
Firm-year observations	15,659
Number of firms	4,554
R-squared	0.2963
Adjusted R-squared	0.2909

The dependent variable is winsorized Tobin's Q. Standard errors clustered at the firm level are reported in parentheses.

Variable	Tobin's Q
<i>Industry and country fixed effects are included. Year fixed effects are not included because the COVID dummy captures the difference between the pre-COVID and COVID periods.</i>	
<i>* $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.</i>	

The coefficient on the diversification dummy is negative but not statistically significant. Since this coefficient refers to the pre-COVID period, the result indicates that, after controlling for firm characteristics, industry and country effects, there is no statistically significant valuation difference between diversified and focused firms before the crisis in this specification. The coefficient on the COVID dummy is positive and statistically significant at the 1% level. More specifically, the Tobin's Q of focused firms increases by approximately 0.3097 points during the COVID period compared with the pre-COVID period, holding the other variables constant. This result is consistent with the descriptive evidence presented in Section 4.1, which showed an increase in average Tobin's Q during 2020 and 2021.

The main coefficient of interest is the interaction between diversification and the COVID period. The coefficient on Diversified $\times$ COVID is negative and statistically significant at the 1% level, with an estimated value of -0.2055. This indicates that the increase in Tobin's Q during the COVID period was significantly smaller for diversified firms than for focused firms. In other words, the valuation gap between the two groups widened during the crisis.

The overall estimated valuation difference between diversified and focused firms during the COVID period is given by the sum of the Diversified coefficient and the interaction coefficient. This produces an estimated difference of approximately -0.2361 points in Tobin's Q. Similarly, while the estimated increase in Tobin's Q during the COVID period is 0.3097 for focused firms, the corresponding estimated increase for diversified firms is approximately 0.1042, obtained by summing the COVID coefficient and the interaction term. These results suggest that both groups experienced an improvement in valuation, but the increase was substantially weaker for diversified firms.

Therefore, the results do not support hypothesis H1₂, which predicted that the conglomerate discount would decrease during the COVID-19 crisis. Instead, the negative and statistically significant interaction coefficient provides evidence in the opposite direction: diversified firms became relatively more discounted compared with focused firms during the crisis.

The control variables remain consistent with the results of the previous model. Firm size and leverage are negatively and statistically significantly associated with Tobin's Q, while

profitability and liquidity show positive and statistically significant coefficients. In particular, liquidity remains strongly associated with higher firm valuation, which may reflect the importance of financial flexibility during a period of high uncertainty. The R-squared is 0.2963, indicating that the model explains approximately 29.6% of the variation in Tobin's Q.

The complete country and industry fixed effects included in the main model are reported in Appendix Tables 3 and 4. These estimates confirm the presence of substantial geographical and sectoral differences in firm valuation. For example, among countries with relatively large samples, Sweden and Denmark display higher fixed effects than the United Kingdom, which represents the reference country, while Romania, France and Italy show lower values. At the industry level, relatively high fixed effects are observed for NACE divisions such as other manufacturing, publishing activities, information service activities and scientific research and development, while lower values are observed in sectors such as travel agency activities, water transport and activities of membership organisations. However, these effects are included mainly as controls, are normalized for identification and should not be interpreted as independent causal effects.

Overall, the main empirical results show that diversified firms are valued less than focused firms and that this valuation gap becomes larger during the COVID-19 period. The following subsection presents a series of robustness checks to verify whether these findings remain stable when alternative sector classifications, valuation measures and sample structures are used.

5.2 Robustness check

This section presents a series of robustness checks aimed at assessing whether the main empirical result remains stable under alternative methodological choices. In particular, the analysis examines whether the negative relationship between diversification and firm value during the COVID-19 period depends on the sector classification adopted, the measure used to represent firm value, the structure of the panel or the type of diversification considered. The robustness checks therefore replicate the main empirical specification while changing one element at a time, allowing the results to be compared directly with those reported in Table 19.

The first robustness check uses a broader sector classification for both the definition of diversification and the industry fixed effects. In the main model, a firm is classified as diversified when it operates in more than one NACE 2-digit division, while industry fixed effects are based on the firm's primary NACE 2-digit division. Although this approach provides a detailed classification, firms operating across different divisions may still remain within the

same broader economic sector. In the robustness model, a firm is therefore classified as broadly diversified only when its activities belong to more than one NACE section. Firms whose activities remain within a single NACE section form the reference group, even when they operate across multiple NACE 2-digit divisions. The detailed NACE 2-digit industry fixed effects are also replaced by the broader NACE section fixed effects. Tobin's Q remains the dependent variable, while the same firm-level controls, country fixed effects and firm-level clustered standard errors are retained.

Table 20 - Robustness check using broader sector classification

Variable	Tobin's Q
Broad Diversified	-0.0357 (0.0579)
COVID period	0.3015*** (0.0251)
Broad Diversified × COVID	-0.2096*** (0.0398)
Firm size	-0.1134*** (0.0115)
ROA	0.0036 (0.0024)
Leverage/gearing	-0.0019*** (0.0002)
Liquidity	3.0777*** (0.1882)
Industry classification	NACE sections
Industry fixed effects	Yes
Country fixed effects	Yes
Firm-year observations	15,659
Number of firms	4,554
R-squared	0.2619
Adjusted R-squared	0.2593

The dependent variable is winsorized Tobin's Q. Standard errors clustered at the firm level are reported in parentheses.

Industry fixed effects are based on the broader NACE Rev. 2 sections rather than NACE 2-digit divisions.

Country fixed effects are included. Year fixed effects are not included because the COVID dummy identifies the crisis period.

** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 20 reports the results obtained using this broader diversification definition and sector classification. The coefficient on the broad diversification dummy is negative but not statistically significant. Since this coefficient refers to the pre-COVID period, the result indicates that firms operating across multiple NACE sections did not exhibit a statistically

significant valuation difference from firms whose activities remained within a single NACE section before the crisis, after controlling for the other variables included in the model.

The coefficient on the COVID dummy is positive and statistically significant at the 1% level. Its estimated value of 0.3015 indicates that firms operating within a single NACE section experienced an increase in Tobin's Q during the COVID period compared with the pre-COVID period, after controlling for firm characteristics and systematic differences across countries and broad economic sectors. More importantly, the interaction between broad diversification and the COVID period remains negative and statistically significant at the 1% level. Its estimated coefficient is -0.2096, which is very close to the coefficient of -0.2055 obtained in the main model. This indicates that the increase in firm valuation during the COVID period was significantly weaker for firms operating across multiple NACE sections than for firms operating within a single section.

The estimated overall valuation difference between the two groups during the COVID period, obtained by summing the broad diversification coefficient and the interaction term, is approximately -0.2453 points in Tobin's Q. In addition, while the estimated increase in Tobin's Q during COVID is 0.3015 for firms operating within a single NACE section, the corresponding increase for broadly diversified firms is approximately 0.0919. These estimates therefore indicate that both groups experienced an improvement in valuation, but that the increase was substantially smaller among firms diversified across broad economic sectors. The control variables are generally consistent with the main results. Firm size and leverage are negatively and statistically significantly associated with Tobin's Q, while liquidity remains positive and significant at the 1% level. ROA has a positive coefficient but is not statistically significant in this specification. The R-squared is 0.2619, which is lower than in the main model. This difference is consistent with the use of broader NACE section fixed effects, which capture less detailed industry-level variation than the NACE 2-digit fixed effects included in the main specification.

Overall, this robustness check confirms the main empirical finding. The interaction between broad diversification and the COVID period remains negative and statistically significant, with a magnitude very similar to that obtained in the main model. The conclusion that diversified firms experienced a weaker valuation improvement during the COVID-19 period therefore remains unchanged when diversification is defined more conservatively as operating across multiple NACE sections and industry differences are controlled for at the broader section level.

The second robustness check replaces Tobin's Q with the winsorized market-to-book ratio as the dependent variable. This alternative specification is useful because it verifies whether the main finding depends on the specific valuation measure adopted. The model maintains the same explanatory variables, NACE 2-digit and country fixed effects, and firm-level clustered standard errors used in the main specification.

Table 21 - Robustness check using market-to-book ratio

Variable	Market-to-book
Diversified	-0.1615 (0.1150)
COVID period	0.6392*** (0.0537)
Diversified × COVID	-0.3680*** (0.0865)
Firm size	-0.2375*** (0.0255)
ROA	0.0089* (0.0046)
Leverage/gearing	0.0084*** (0.0007)
Liquidity	3.4670*** (0.3479)
Industry fixed effects	Yes
Country fixed effects	Yes
Firm-year observations	15,659
Number of firms	4,554
R-squared	0.2194
Adjusted R-squared	0.2134

The dependent variable is the winsorized market-to-book ratio. Standard errors clustered at the firm level are reported in parentheses.

Industry and country fixed effects are included. Year fixed effects are not included because the COVID dummy identifies the crisis period.

** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 21 reports the results. The coefficient on the diversification dummy is negative but not statistically significant. Therefore, as in the main model, there is no clear evidence of a statistically significant valuation difference between diversified and focused firms during the pre-COVID period once the other variables are controlled for. The COVID coefficient is positive and statistically significant at the 1% level. Its estimated value of 0.6392 indicates that the market-to-book ratio of focused firms increased during the COVID period relative to the pre-COVID period. The larger numerical magnitude compared with the corresponding coefficient in the Tobin's Q model reflects the different scale and distribution of the two

valuation measures. The main coefficient of interest, $\text{Diversified} \times \text{COVID}$, remains negative and statistically significant at the 1% level. The estimated coefficient of -0.3680 indicates that the increase in the market-to-book ratio during the COVID period was significantly smaller for diversified firms than for focused firms. This result is consistent with the main analysis based on Tobin's Q and confirms that the relative valuation of diversified firms worsened during the crisis.

The estimated overall valuation difference between diversified and focused firms during the COVID period is approximately -0.5295, obtained by summing the diversification coefficient and the interaction term. Moreover, while the estimated increase in the market-to-book ratio during the COVID period is 0.6392 for focused firms, the corresponding increase for diversified firms is approximately 0.2712. These estimates again suggest that both groups experienced an increase in valuation, but the improvement was substantially weaker for diversified firms. The control variables are also mostly statistically significant. Firm size is negatively associated with the market-to-book ratio, while ROA has a positive coefficient that is significant at the 10% level. Liquidity remains positively and strongly associated with firm valuation. Unlike the Tobin's Q specifications, leverage has a positive and statistically significant coefficient. This difference should be interpreted cautiously because the market-to-book ratio is constructed using the book value of equity as its denominator, and its relationship with capital structure may therefore differ from that observed for Tobin's Q. The R-squared is 0.2194, indicating that the specification explains approximately 21.9% of the variation in the market-to-book ratio. The lower explanatory power compared with the Tobin's Q model may reflect the different characteristics and greater variability of the alternative valuation measure.

Overall, the robustness check supports the main empirical conclusion. The negative and statistically significant interaction between diversification and the COVID period remains present when firm value is measured through the market-to-book ratio. Therefore, the finding that the conglomerate discount increased during the COVID-19 crisis is not driven exclusively by the use of Tobin's Q as the dependent variable.

The third robustness check estimates the main model using a balanced panel. The sample is restricted to firms with complete observations in each year from 2018 to 2021. This test verifies whether the main findings are influenced by changes in sample composition or by the presence of firms observed only in some years.

Table 22 - Robustness check using a balanced panel

Variable	Tobin's Q
Diversified	-0.1154** (0.0571)
COVID period	0.2203*** (0.0242)
Diversified × COVID	-0.1229*** (0.0352)
Firm size	-0.0722*** (0.0118)
ROA	0.0133*** (0.0031)
Leverage/gearing	-0.0018*** (0.0002)
Liquidity	2.8171*** (0.2283)
Panel structure	Balanced panel
Industry fixed effects	Yes
Country fixed effects	Yes
Firm-year observations	13,232
Number of firms	3,308
Observations per firm	4
R-squared	0.3004
Adjusted R-squared	0.2942

The dependent variable is winsorized Tobin's Q. The balanced panel includes only firms with complete observations in each year from 2018 to 2021.

Standard errors clustered at the firm level are reported in parentheses.

Industry and country fixed effects are included. Year fixed effects are not included because the COVID dummy identifies the crisis period.

** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 22 reports the results. The balanced panel includes 3,308 firms and 13,232 firm-year observations, with exactly four observations for each firm. The coefficient on the diversification dummy is negative and statistically significant at the 5% level. Its estimated value of -0.1154 indicates that diversified firms had a lower Tobin's Q than focused firms during the pre-COVID period, after controlling for firm characteristics and industry and country effects. Unlike the main model, where the pre-COVID diversification coefficient was not statistically significant, the balanced-panel specification therefore provides evidence of a conglomerate discount already before the crisis. The coefficient on the COVID dummy is positive and statistically significant at the 1% level. The estimated value of 0.2203 indicates that focused firms experienced an increase in Tobin's Q during the COVID period relative to the pre-COVID period.

The interaction between diversification and the COVID period remains negative and statistically significant at the 1% level. Its coefficient of -0.1229 shows that the increase in Tobin's Q during the crisis was significantly smaller for diversified firms than for focused firms. Although the magnitude of the interaction is lower than in the main model, its sign and statistical significance remain unchanged. The overall estimated valuation difference between diversified and focused firms during the COVID period is approximately -0.2383, obtained by summing the diversification coefficient and the interaction term. Moreover, while the estimated increase in Tobin's Q during the COVID period is 0.2203 for focused firms, the corresponding increase for diversified firms is approximately 0.0974. Therefore, diversified firms experienced a positive change in valuation, but the improvement was considerably weaker than that observed among focused firms. All control variables are statistically significant in this specification. Firm size and leverage are negatively associated with Tobin's Q, while ROA and liquidity show positive coefficients. These relationships are consistent with the general pattern observed in the previous models. The R-squared is 0.3004, indicating that the model explains approximately 30.0% of the variation in Tobin's Q. This value is slightly higher than in the main unbalanced-panel specification.

Overall, the balanced-panel analysis also confirms the main empirical conclusion. The negative and statistically significant interaction between diversification and the COVID period remains present after restricting the analysis to firms observed throughout the entire sample period. Therefore, the finding that diversified firms became relatively more discounted during the COVID-19 crisis does not appear to be driven by missing observations or changes in the composition of the sample across years.

The final robustness check distinguishes between related and unrelated diversification. Unlike the previous robustness tests, which modify the sector classification, valuation measure or sample structure, this specification changes the definition of the main explanatory variable. Diversified firms are divided into two groups according to the economic distance between their activities. Related diversified firms operate in multiple NACE 2-digit divisions belonging to the same broader NACE section, while unrelated diversified firms operate across different NACE sections. Focused firms remain the omitted reference group.

Table 23 - Related and unrelated diversification

Variable	Tobin's Q
Related diversification	-0.0042 (0.1150)
Unrelated diversification	-0.0384

Variable	Tobin's Q
	(0.0589)
COVID period	0.3097***
	(0.0257)
Related diversification × COVID	-0.1909**
	(0.0798)
Unrelated diversification × COVID	-0.2096***
	(0.0404)
Firm size	-0.1068***
	(0.0118)
ROA	0.0055**
	(0.0024)
Leverage/gearing	-0.0018***
	(0.0002)
Liquidity	2.7169***
	(0.1904)
Unrelated – related: pre-COVID	-0.0342
	(0.1174)
Unrelated – related: COVID period	-0.0530
	(0.1174)
Reference group	Focused firms
Industry fixed effects	Yes
Country fixed effects	Yes
Firm-year observations	15,659
Number of firms	4,554
R-squared	0.2963
Adjusted R-squared	0.2908

The dependent variable is winsorized Tobin's Q. Focused firms represent the omitted reference group.

Related diversified firms operate in multiple NACE 2-digit divisions within the same NACE section. Unrelated diversified firms operate across different NACE sections.

Standard errors clustered at the firm level are reported in parentheses. Industry and country fixed effects are included.

The rows 'Unrelated – related' report direct tests of the valuation difference between the two types of diversification.

** $p < 0.10$; ** $p < 0.05$; *** $p < 0.01$.*

Table 23 reports the results of this specification. In the pre-COVID period, the coefficients on both related and unrelated diversification are negative but not statistically significant. The estimated coefficient is -0.0042 for related diversification and -0.0384 for unrelated diversification. Therefore, after controlling for firm characteristics and industry and country effects, neither type of diversification shows a statistically significant valuation difference relative to focused firms before the crisis. The coefficient on the COVID dummy is positive and statistically significant at the 1% level. As in the main model, this coefficient indicates that focused firms experienced an increase in Tobin's Q during the COVID period relative to the pre-COVID period.

The interaction coefficients show that both types of diversified firms experienced a significantly weaker valuation increase than focused firms during the crisis. The coefficient on Related diversification $\times$ COVID is -0.1909 and is statistically significant at the 5% level. The coefficient on Unrelated diversification $\times$ COVID is slightly more negative, equal to -0.2096, and is statistically significant at the 1% level. These results indicate that the relative valuation of both related and unrelated diversified firms worsened during the COVID period. The overall estimated valuation difference during COVID is approximately -0.1951 for related diversified firms, obtained by summing the related diversification coefficient and its interaction with COVID. For unrelated diversified firms, the corresponding estimated difference is approximately -0.2480. Similarly, the estimated increase in Tobin's Q during COVID is approximately 0.1188 for related diversified firms and 0.1001 for unrelated diversified firms, compared with an increase of 0.3097 for focused firms. Therefore, both forms of diversification are associated with a substantially weaker valuation improvement during the crisis.

However, the individual interaction coefficients do not directly establish whether unrelated diversification performs significantly worse than related diversification. For this reason, the model also reports direct tests of the difference between the two diversification types. Before COVID, the estimated difference between unrelated and related diversified firms is -0.0342, but it is not statistically significant. During the COVID period, the estimated difference becomes slightly more negative, equal to -0.0530, but it remains statistically insignificant. This distinction is important. Although the coefficient for unrelated diversification during COVID is numerically more negative than the coefficient for related diversification, the direct comparison shows that the difference between the two groups is not statistically distinguishable from zero. Therefore, the analysis provides evidence that both related and unrelated diversified firms became relatively more discounted than focused firms during the crisis, but it does not provide sufficient evidence that unrelated diversification produced a significantly larger discount than related diversification.

The control variables remain consistent with the main model. Firm size and leverage are negatively and statistically significantly associated with Tobin's Q, while ROA and liquidity have positive and significant coefficients. The R-squared is 0.2963, almost identical to that of the main model, indicating that separating diversified firms into related and unrelated groups does not materially change the overall explanatory power of the specification.

Overall, this final analysis confirms that the worsening relative valuation of diversified firms during COVID is observed for both types of diversification. However, it does not support

hypothesis H1₃, according to which unrelated diversified firms should exhibit a significantly larger valuation discount than related diversified firms. The null hypothesis of no difference between the two forms of diversification therefore cannot be rejected. This result suggests that, in the sample considered, the increased discount during the COVID-19 crisis was associated with diversification in general rather than being driven exclusively by diversification across economically distant sectors.

5.3 Discussion of results

The empirical analysis provides several findings concerning the characteristics of diversified firms, the presence of a conglomerate discount and the way in which this valuation difference changed during the COVID-19 crisis. Taken together, the results suggest that diversified firms differ systematically from focused firms, are generally associated with lower market valuations and experienced a weaker valuation improvement during the pandemic. At the same time, the interpretation of these results requires caution because the estimated coefficients identify conditional associations rather than causal effects.

The determinants model provides an initial indication that diversification is not randomly distributed across the firms included in the sample. Firm size is positively and significantly associated with the probability of being diversified, while liquidity also displays a positive and significant relationship with diversification status. By contrast, profitability and leverage do not show statistically significant associations once the other firm characteristics and the industry and country fixed effects are considered. The positive relationship between size and diversification is consistent with previous studies that identify firm size as an important predictor of the propensity to diversify, since larger firms generally possess greater organizational capacity and a broader resource base with which to manage multiple business activities (Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012). Diversification may involve additional monitoring, coordination and information-processing costs, which larger organizations may be better able to sustain. Similarly, the positive association with liquidity is consistent with the idea that internally available financial resources increase a firm's flexibility and its ability to support activities across several business areas without relying entirely on external financing (Stein, 1997; Kuppuswamy and Villalonga, 2016).

These results are broadly consistent with the literature on the nature of the diversification decision. Previous studies show that diversified and focused firms may differ before the valuation consequences of diversification are considered and that firm characteristics can affect both diversification status and firm value (Campa and Kedia, 2002; Villalonga, 2004; Ammann,

Hoechle, and Schmid, 2012). The significance of size and liquidity therefore supports the rejection of hypothesis H0₆, according to which firm characteristics are not associated with the probability of being diversified.

However, the determinants model should not be interpreted as identifying the factors that causally induced firms to diversify. The model uses firm characteristics observed in 2018 and a diversification classification that does not vary annually. Since the Orbis data do not identify the year in which each firm entered or exited a particular activity, it is not possible to establish whether size and liquidity preceded the original diversification decision or were themselves partly affected by the diversified organizational structure. The analysis therefore shows that diversified firms were larger and more liquid at the beginning of the sample period, but it cannot demonstrate that these characteristics caused them to diversify.

The baseline valuation model provides evidence of a conglomerate discount over the full 2018-2021 period. After controlling for firm size, profitability, leverage, liquidity, industry, country and year effects, diversified firms exhibit a Tobin's Q approximately 0.135 points lower than that of focused firms. The coefficient is statistically significant at the 5% level, supporting hypothesis H1₁ and rejecting the null hypothesis of no valuation difference between diversified and focused firms. This result is consistent with the traditional empirical literature on the conglomerate discount. Lang and Stulz (1994), Berger and Ofek (1995) and Servaes (1996) find that diversified firms tend to trade at lower valuations than comparable focused firms. Rajan, Servaes, and Zingales (2000) connect this lower valuation to possible distortions in internal capital allocation, particularly when divisions differ substantially in their resources and investment opportunities. More generally, the negative coefficient is consistent with the argument that the costs of diversification, including agency problems, organizational complexity and inefficient cross-subsidization, may exceed the potential benefits generated by internal capital markets and economies of scope.

The magnitude of the coefficient should be interpreted cautiously when compared with previous studies based on Tobin's Q. Lang and Stulz (1994) also use Tobin's Q to examine the relationship between diversification and firm value, but their results are not perfectly comparable with those obtained in this thesis because the sample, period, geographical setting, variable construction and econometric specification differ. The coefficient estimated here therefore represents the conditional difference in Tobin's Q between diversified and focused firms within the specific European sample considered. Nevertheless, its negative sign and

statistical significance are consistent with the broader empirical finding that diversified firms tend to be valued less than focused firms.

The baseline result should nevertheless be interpreted as a conditional association rather than as evidence that diversification directly causes lower firm value. The determinants model shows that diversified and focused firms differ in some observable characteristics, particularly size and liquidity, confirming that diversification is not randomly distributed across firms. Although the valuation model controls for these and other characteristics, unobserved differences may still influence both diversification status and Tobin's Q. This caution is consistent with previous literature showing that the estimated conglomerate discount may partly reflect self-selection and can vary depending on how endogeneity is addressed (Villalonga, 2004; Ammann, Hoechle, and Schmid, 2012).

The main contribution of the empirical analysis concerns the behaviour of this valuation difference during the COVID-19 crisis. The interaction between diversification and the COVID period is negative and statistically significant at the 1% level. This indicates that diversified firms experienced a significantly weaker increase in Tobin's Q during 2020 and 2021 than focused firms. While both groups experienced an improvement in their average valuation, the increase was substantially smaller among diversified firms. The overall estimated valuation difference between the two groups during the COVID period was therefore more negative than in the pre-COVID period. This result does not support hypothesis H1₂, according to which the conglomerate discount was expected to decrease during the COVID-19 crisis. Instead, the negative and statistically significant interaction indicates that the valuation gap widened during the crisis. Therefore, the evidence supports the conclusion that the conglomerate discount did not decrease and, more specifically, suggests that it increased during the COVID period.

The main result is consistent with the evidence provided by Damarcheli and Kalantari (2024), who show that COVID-19 weakened the relationship between diversification and firm value. Although their sample and institutional setting differ from those considered in this thesis, their findings also suggest that diversified firms did not obtain the relative valuation advantage observed during some previous crisis periods. These results contrast with Kuppuswamy and Villalonga (2016), who find that diversification became relatively more valuable during the 2007–2009 financial crisis. Overall, the comparison indicates that the effect of diversification during periods of economic stress may depend on the nature of the shock and cannot be assumed to be the same across different crises. Part of this difference may reflect the specific nature of the COVID-19 crisis, but it may also be influenced by the frequency of the data used in this

thesis. The analysis relies on annual observations and classifies both 2020 and 2021 as COVID years. As a consequence, it cannot distinguish between the initial market shock, the introduction of restrictions, the subsequent policy interventions and the gradual recovery. These phases may have affected diversified and focused firms differently. By contrast, studies using quarterly data, such as Kuppuswamy and Villalonga (2016), are able to identify changes in the diversification discount more precisely across different stages of a crisis. The results obtained here should therefore be interpreted as the average valuation difference during the 2020–2021 period, rather than as a precise estimate of the immediate market response to the outbreak of COVID-19.

The results can also be compared with Rudolph and Schwetzler (2013), who show that the effect of the 2008–2009 crisis differed across regions. They find that the conglomerate discount decreased in Asia Pacific, the British Isles and North America but did not change significantly in Continental Europe. Their findings indicate that the crisis benefits of diversification depend on the development of external capital markets and the institutional environment. In the European COVID-19 setting considered in this thesis, the interaction is instead negative and statistically significant: rather than remaining unchanged, the valuation difference became less favourable for diversified firms.

Several factors may help explain this result. Diversified firms may have faced greater coordination difficulties during the pandemic because their business units were exposed to different restrictions, supply-chain problems and changes in demand. In addition, internal capital markets may have been used to transfer resources from stronger divisions to weaker ones, which could have supported the group operationally but reduced its overall market valuation (Rajan, Servaes, and Zingales, 2000). More generally, the result may reflect the costs of managing a complex multi-division structure. This interpretation is consistent with Sanzhar (2006), who argues that part of the conglomerate discount may derive from organizational complexity itself, rather than only from diversification across distant industries.

The robustness checks provide substantial support for the main finding. When the detailed NACE 2-digit fixed effects are replaced by broader NACE sections, the interaction between diversification and COVID remains negative and statistically significant, with a magnitude very close to that of the main model. This indicates that the result is not driven by the specific level of industry classification adopted. The market-to-book specification reaches the same conclusion using a different measure of firm value. Although Tobin's Q and market-to-book have different constructions and scales, the interaction term remains negative and statistically

significant. This reduces the concern that the result is specific to the definition of Tobin's Q used in the main analysis.

The balanced-panel test also confirms the main finding after restricting the sample to firms observed in each year from 2018 to 2021. The interaction coefficient remains negative and statistically significant, although its absolute magnitude is smaller. Therefore, the result does not appear to be caused by changes in the composition of the unbalanced sample or by the presence of firms with observations missing in some years. The consistency of the interaction coefficient across these specifications is important. The detailed sector classification, the alternative valuation measure and the balanced-panel structure each address a different methodological concern. The fact that the sign and significance of the interaction remain stable provides evidence that the main conclusion is not dependent on a single modelling choice.

The final analysis distinguishes between related and unrelated diversification. Both related and unrelated diversified firms experienced a significantly weaker valuation increase than focused firms during COVID. The interaction is negative and significant for both groups, although its numerical magnitude is slightly larger for unrelated diversified firms.

However, the direct difference between unrelated and related diversified firms is not statistically significant, either before or during the COVID period. Hypothesis H1₃, according to which unrelated diversified firms should exhibit a larger discount than related diversified firms, is therefore not supported. The result does not imply that the two types of diversification are identical. Instead, it indicates that the available data do not provide sufficient evidence to conclude that their valuation effects differ systematically. This pattern is broadly consistent in direction with Dell'Acqua, Etro, and Correra (2013), who find a smaller discount for related diversified firms. In the present analysis, the estimated valuation effect is also slightly more negative for unrelated diversification, but the direct difference between the two groups is not statistically significant. The evidence therefore points in the same direction but is not sufficiently strong to conclude that unrelated diversification is systematically more harmful to firm value. The fact that both groups experience a weaker relative valuation during COVID is also consistent with Sanzhar's (2006) argument that organizational complexity may affect multi-division firms even when their activities are relatively similar.

The measurement of diversification represents an important limitation of the analysis. The classification is based on the primary and secondary NACE codes reported in Orbis and identifies whether a firm operates across multiple activities, as well as whether those activities

fall within the same broad NACE section or across different sections. This approach is transparent and consistent, but it does not measure the relative economic importance of each activity. A minor secondary activity is therefore treated in the same way as a major business segment, and the broad NACE sections may not fully capture the actual technological or commercial similarity between activities. In addition, the diversification classification is time-invariant and does not reflect acquisitions, divestitures, spin-offs or changes in business scope during 2018–2021. As a result, the analysis cannot construct more detailed continuous measures of diversification or identify the exact year in which a firm became diversified. This limitation is particularly relevant for the related–unrelated comparison and for the determinants model, since the 2018 firm characteristics cannot be considered genuinely lagged predictors of the original diversification decision.

The determinants model provides evidence of observable differences between diversified and focused firms, but it does not correct the valuation regressions for self-selection in the same way as a Heckman model, propensity-score matching approach, switching regression or instrumental-variable design. Unobservable characteristics may still affect both diversification status and firm value. For example, managerial quality, governance, innovation capacity, growth opportunities and organizational culture may differ between diversified and focused firms but are not directly captured by the model. Industry and country fixed effects control for systematic differences across sectors and national contexts, but they cannot account for all characteristics specific to individual firms. Firm fixed effects cannot be included in the current models because diversification status does not change over time and would therefore be absorbed by the firm-specific effects. Future research using annual information on diversification status could examine changes within the same firm when it becomes more or less diversified and provide a stronger control for unobserved firm characteristics.

Another limitation is that Tobin's Q and market-to-book are aggregate firm-level valuation ratios. They do not directly estimate the difference between the consolidated value of a diversified firm and the sum of the values of its individual segments. Future research with segment-level revenue, assets and profitability data could apply the excess value methodology of Berger and Ofek (1995). This would improve comparability with much of the conglomerate-discount literature and would allow the economic contribution of each business unit to be considered.

Future research could therefore extend the present analysis in several directions. First, future studies could use quarterly data, especially for market-based variables such as Tobin's Q and

market capitalization. This would make it possible to better capture the timing of the COVID-19 shock and to distinguish the initial market reaction from the subsequent policy response and recovery phase. Annual data, by contrast, only allow the analysis to estimate an average effect over the 2020–2021 period.

Second, future research could address the issue of endogeneity in more detail. Propensity-score matching could be used to compare diversified firms with focused firms that are similar in terms of observable characteristics. A Heckman selection model or a switching regression could also be used to model the diversification decision and firm value jointly. In addition, if a valid instrument were available, an instrumental-variable approach could help isolate variation in diversification that is less affected by firms' own characteristics.

Third, future studies could investigate more directly the mechanisms behind the change in the diversification discount. Segment-level investment and cash-flow data would make it possible to test whether diversified firms reallocated capital toward stronger divisions during COVID or instead supported weaker business units. Additional information on debt issuance, credit access and cash holdings could also help distinguish between the financing and internal capital allocation channels discussed in the literature.

Fourth, future research could improve the measurement of diversification itself. In this thesis, diversification is based on the NACE activities reported in Orbis. This provides a clear and consistent classification, but it does not measure the economic weight of each activity within the firm. A minor secondary activity is therefore treated in the same way as a major business segment. Moreover, the available NACE information does not allow the diversification status to be reconstructed year by year, because changes in the group structure, subsidiaries or business activities cannot be observed reliably over time. Future studies using historical data on subsidiaries, segment revenues or the relative importance of each activity could provide a more precise and dynamic measure of diversification.

Overall, the results show that diversification was associated with lower firm valuation in the European sample and that this disadvantage became more pronounced during the COVID-19 period. Diversified firms experienced a smaller increase in value than focused firms, and this conclusion remains unchanged when alternative sector classifications, valuation measures and sample structures are used. During the COVID period, both related and unrelated diversified firms experienced weaker valuation increases than focused firms, although the difference between the two forms of diversification was not statistically significant. These findings suggest

that, during the pandemic, the potential benefits of diversification were not sufficient to compensate for the costs linked to managing multiple business activities. However, the results should be interpreted as strong and consistent conditional associations rather than definitive causal evidence, given the limitations concerning the measurement and timing of diversification, the annual frequency of the data and the possible presence of unobserved differences between diversified and focused firms.

6. Conclusion

This thesis examined the relationship between corporate diversification and firm value during the COVID-19 crisis. The analysis focused on listed non-financial firms from European countries over the period 2018-2021, using data collected from Orbis. The main objective was to understand whether diversified firms were valued differently from focused firms and whether this valuation difference changed during the pandemic. The study also considered the characteristics associated with diversification status and distinguished between related and unrelated forms of diversification.

The starting point of the thesis was the literature on the conglomerate discount. Previous studies often show that diversified firms trade at lower valuations than focused firms, although the interpretation of this result remains debated. On the one hand, diversification may create benefits through internal capital markets, risk reduction and possible synergies across business units. On the other hand, it may also increase organizational complexity, agency problems and inefficient allocation of resources. These opposing mechanisms make the effect of diversification on firm value an empirical question. The COVID-19 crisis provided a relevant setting in which to reconsider this relationship. Unlike previous financial crisis, the pandemic did not originate in the financial system, but started as a health emergency and affected firms through restrictions, supply-chain disruptions, changes in demand and liquidity pressure. At the same time, the crisis affected sectors and countries in different ways. This made the role of diversification particularly interesting, since diversified firms could have been exposed to both more resilient and more severely affected activities.

The empirical analysis first examined the observable characteristics associated with diversification status. The results show that diversified firms are more likely to be larger and more liquid than focused firms, while profitability and leverage are not significantly associated with the probability of being diversified. This confirms that diversification is not randomly distributed across firms and that diversified and focused firms differ in some baseline characteristics. For this reason, the subsequent valuation models include firm-level controls and fixed effects to account for observable differences across firms, industries and countries.

The first valuation model provides evidence consistent with the presence of a conglomerate discount in the European sample. Over the full period considered, diversified firms show a lower Tobin's Q than focused firms, after controlling for size, profitability, leverage, liquidity, industry, country and year effects. This result supports the idea that diversified firms are associated with lower market valuation, in line with much of the previous literature on the

conglomerate discount. However, the result should be interpreted as a conditional association rather than as definitive causal evidence that diversification itself destroys value.

The main empirical model then examined whether the valuation difference between diversified and focused firms changed during the COVID-19 period. The results do not support the hypothesis that the conglomerate discount decreased during the crisis. Instead, the interaction between diversification and the COVID period is negative and statistically significant, indicating that the valuation improvement observed during the pandemic was weaker for diversified firms than for focused firms. In other words, diversified firms did not appear to obtain a relative valuation advantage during the pandemic; rather, the valuation gap between the two groups became more pronounced. This conclusion is also supported by the robustness checks. The main result remains consistent when diversification is defined more broadly using NACE sections, when market-to-book is used as an alternative measure of firm value, and when the analysis is restricted to a balanced panel. These additional tests suggest that the finding is not driven only by the specific industry classification, valuation measure or sample structure used in the main model. These findings differ from the evidence provided by Kuppuswamy and Villalonga (2016) for the 2007–2009 financial crisis, where diversification became relatively more valuable when external capital markets were disrupted. However, they are more consistent with studies showing that the crisis-related benefits of diversification are not always uniform. In particular, Rudolph and Schwetzler (2013) find that the effect of the financial crisis differed across regions and was not significant for Continental Europe. More recent evidence by Damarcheli and Kalantari (2024) also suggests that the COVID-19 period weakened the relationship between diversification and firm value. Overall, the results of this thesis are therefore consistent with the idea that the value of diversification during crises depends on the type of shock and on the institutional setting considered.

The analysis then distinguished between related and unrelated diversification, in order to verify whether the valuation effect differed according to the type of diversified activity. Both related and unrelated diversified firms experienced a weaker valuation increase than focused firms during the COVID period. However, the difference between the two types of diversification is not statistically significant. Therefore, the thesis does not find sufficient evidence to conclude that unrelated diversification was significantly more penalized than related diversification. This suggests that the increased discount observed during the pandemic was associated with diversification in general, rather than being driven only by diversification across more distant sectors.

Overall, the empirical evidence suggests that diversification was associated with lower firm valuation in the sample of European listed firms and that this disadvantage did not decrease during the COVID-19 crisis. The potential benefits of diversification, such as internal capital allocation and financial flexibility, do not appear to have translated into a relative valuation advantage during the pandemic. Instead, the evidence is more consistent with the view that the organizational and allocation costs of diversification remained relevant, and possibly became more important, in a context of high uncertainty and uneven sectoral shocks.

The analysis has some limitations. First, diversification is measured using the NACE activities reported in Orbis. This provides a clear and replicable classification, but it does not measure the economic weight of each activity within the firm. A minor secondary activity is therefore treated in the same way as a major business segment. Second, the diversification measure is time-invariant, because the available data do not allow the precise reconstruction of changes in diversification status year by year. As a result, the analysis cannot observe when a firm originally diversified or whether its scope changed during the sample period. Third, the analysis is based on annual data rather than quarterly data. This means that the models cannot capture the immediate market reaction to the outbreak of COVID-19 or distinguish precisely between the initial shock, the subsequent policy interventions and the recovery phase.

These limitations mean that the results should not be interpreted as causal evidence. The empirical models control for several observable characteristics and fixed effects, but unobserved firm-level factors may still affect both diversification status and firm value. Future research could address this issue by using historical segment-level data, annual information on subsidiaries and business activities, or methods designed to better account for self-selection into diversification. More detailed time-series data would also be useful, especially quarterly or higher-frequency market data, as they would make it possible to distinguish the immediate market reaction to the outbreak of COVID-19 from the subsequent policy response and recovery phase. A more detailed dataset would also allow future studies to examine whether firms changed their diversification strategy during the pandemic and whether internal capital was allocated toward stronger or weaker business units.

Despite these limitations, the thesis provides useful evidence on the relationship between corporate diversification and firm value in a European setting during the COVID-19 crisis. The results show that the effect of diversification during crisis periods cannot be assumed to be the same across different types of shocks. While diversification may create advantages in some financial crises, its role during the COVID-19 pandemic appears more complex. In the sample

analysed, diversified firms did not benefit from a reduction in the conglomerate discount. This suggests that the value of diversification depends not only on the existence of internal capital markets, but also on the nature of the crisis, the structure of the firm and the costs of managing multiple business activities.

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Appendix Table 1 - NACE Rev. 2 sections included in the sample

NACE section	Sector description
A	Agriculture, forestry and fishing
B	Mining and quarrying
C	Manufacturing
D	Electricity, gas, steam and air conditioning supply
E	Water supply; sewerage, waste management and remediation activities
F	Construction
G	Wholesale and retail trade; repair of motor vehicles and motorcycles
H	Transportation and storage
I	Accommodation and food service activities
J	Information and communication
L	Real estate activities
M	Professional, scientific and technical activities
N	Administrative and support service activities
O	Public administration and defence; compulsory social security
P	Education
Q	Human health and social work activities
R	Arts, entertainment and recreation
S	Other service activities

Appendix Table 2 - NACE Rev. 2 divisions included in the sample

NACE 2-digit	Section	Official description
01	A	Crop and animal production, hunting and related service activities
02	A	Forestry and logging
03	A	Fishing and aquaculture
05	B	Mining of coal and lignite
06	B	Extraction of crude petroleum and natural gas
07	B	Mining of metal ores
08	B	Other mining and quarrying
09	B	Mining support service activities
10	C	Manufacture of food products
11	C	Manufacture of beverages

12	C	Manufacture of tobacco products
13	C	Manufacture of textiles
14	C	Manufacture of wearing apparel
15	C	Manufacture of leather and related products
16	C	Manufacture of wood and products of wood and cork, except furniture; manufacture of articles of straw and plaiting materials
17	C	Manufacture of paper and paper products
18	C	Printing and reproduction of recorded media
19	C	Manufacture of coke and refined petroleum products
20	C	Manufacture of chemicals and chemical products
21	C	Manufacture of basic pharmaceutical products and pharmaceutical preparations
22	C	Manufacture of rubber and plastic products
23	C	Manufacture of other non-metallic mineral products
24	C	Manufacture of basic metals
25	C	Manufacture of fabricated metal products, except machinery and equipment
26	C	Manufacture of computer, electronic and optical products
27	C	Manufacture of electrical equipment
28	C	Manufacture of machinery and equipment n.e.c.
29	C	Manufacture of motor vehicles, trailers and semi-trailers
30	C	Manufacture of other transport equipment
31	C	Manufacture of furniture
32	C	Other manufacturing
33	C	Repair and installation of machinery and equipment
35	D	Electricity, gas, steam and air conditioning supply
36	E	Water collection, treatment and supply
37	E	Sewerage
38	E	Waste collection, treatment and disposal activities; materials recovery
39	E	Remediation activities and other waste management services
41	F	Construction of buildings
42	F	Civil engineering
43	F	Specialised construction activities

45	G	Wholesale and retail trade and repair of motor vehicles and motorcycles
46	G	Wholesale trade, except of motor vehicles and motorcycles
47	G	Retail trade, except of motor vehicles and motorcycles
49	H	Land transport and transport via pipelines
50	H	Water transport
51	H	Air transport
52	H	Warehousing and support activities for transportation
53	H	Postal and courier activities
55	I	Accommodation
56	I	Food and beverage service activities
58	J	Publishing activities
59	J	Motion picture, video and television programme production, sound recording and music publishing activities
60	J	Programming and broadcasting activities
61	J	Telecommunications
62	J	Computer programming, consultancy and related activities
63	J	Information service activities
68	L	Real estate activities
69	M	Legal and accounting activities
70	M	Activities of head offices; management consultancy activities
71	M	Architectural and engineering activities; technical testing and analysis
72	M	Scientific research and development
73	M	Advertising and market research
74	M	Other professional, scientific and technical activities
75	M	Veterinary activities
77	N	Rental and leasing activities
78	N	Employment activities
79	N	Travel agency, tour operator reservation service and related activities
80	N	Security and investigation activities
81	N	Services to buildings and landscape activities
82	N	Office administrative, office support and other business support activities
84	O	Public administration and defence; compulsory social security

85	P	Education
86	Q	Human health activities
87	Q	Residential care activities
88	Q	Social work activities without accommodation
90	R	Creative, arts and entertainment activities
91	R	Libraries, archives, museums and other cultural activities
92	R	Gambling and betting activities
93	R	Sports activities and amusement and recreation activities
94	S	Activities of membership organisations
95	S	Repair of computers and personal and household goods
96	S	Other personal service activities

Appendix Table 3 - Country fixed effects in the main model

Country	Number of firms	Firm-year observations	Fixed effect
Austria	44	169	-0.509782301
Belgium	98	349	-0.401582628
Bulgaria	10	19	-1.315068080
Cyprus	44	161	-0.955667555
Croatia	2	3	10.643280216
Denmark	108	352	0.471410495
Estonia	22	70	-0.232692995
Faroe Islands (Denmark)	2	6	0.447459135
Finland	141	473	-0.098041739
France	439	1,600	-0.671674013
Germany	358	1,317	-0.282903197
Greece	82	301	-0.689377697
Ireland	54	177	-0.008021899
Italy	227	761	-0.619183466
Latvia	5	17	-0.640143165
Lithuania	25	95	-0.701502523
Luxembourg	34	122	-0.226065670
Malta	23	82	0.393410833
Norway	151	443	0.096282925
Netherlands	98	324	0.068196714
Poland	492	1,664	-0.340544499
Portugal	28	102	-0.533481430
United Kingdom	861	2,959	0.000000000

Czech Republic	12	34	-0.347268548
Slovak Republic	12	36	-0.910848795
Réunion (France)	3	12	-0.862712975
Romania	263	879	-0.956676086
Slovenia	10	40	-0.931939132
Spain	85	312	-0.223094986
Sweden	639	2,068	0.435268445
Switzerland	145	544	0.130668743
Hungary	27	91	-0.366970431

Appendix Table 4 - NACE 2-digit fixed effects in the main model

NACE 2-digit	Number of firms	Firm-year observations	Fixed effect
1	43	146	2.757788
2	3	12	2.841859
3	15	34	4.249575
5	6	21	2.810339
6	42	142	2.993968
7	53	165	2.835766
8	20	71	2.611469
9	63	209	2.627206
10	103	372	3.286131
11	64	232	3.508486
12	5	19	2.800963
13	41	149	2.736628
14	40	150	3.494398
15	12	43	3.718402
16	24	85	2.752188
17	35	133	2.781799
18	34	118	2.643389
19	15	59	3.168729
20	112	401	3.500931
21	192	645	3.799467
22	48	184	3.288130
23	61	230	2.934707
24	85	313	2.819915
25	82	296	2.908110
26	242	887	3.561765
27	84	291	3.596711
28	197	718	3.034021

29	53	192	2.968141
30	41	147	3.055837
31	19	64	2.806098
32	132	424	4.944100
33	7	22	3.083839
35	131	455	3.398266
36	11	38	3.201810
37	3	6	3.372817
38	10	30	2.806032
39	3	12	3.477910
41	84	305	2.739696
42	50	180	2.588594
43	17	55	2.646731
45	31	100	3.480634
46	264	878	3.243045
47	150	487	3.299895
49	24	87	2.752915
50	26	98	2.470099
51	14	38	2.892322
52	59	210	3.033447
53	4	16	3.118990
55	42	145	3.069578
56	21	74	2.919271
58	172	535	4.225192
59	19	59	3.485135
60	21	76	2.884090
61	99	350	3.343805
62	216	726	3.581539
63	18	63	4.209060
68	263	918	2.746616
69	13	45	3.502726
70	94	310	3.106155
71	41	135	3.025394
72	88	270	4.106786
73	45	155	3.058273
74	74	239	3.481012
75	4	13	4.310182
77	22	75	2.744462
78	16	63	2.721808

79	25	87	2.410318
80	23	74	3.179206
81	10	34	2.869763
82	30	92	2.819702
84	22	69	2.676409
85	8	21	3.872044
86	83	252	3.539291
87	2	8	3.279463
88	2	2	3.164543
90	1	4	2.693366
91	1	4	3.621275
92	6	24	2.721522
93	56	183	2.915094
94	142	476	2.540957
95	4	7	3.203874
96	7	25	3.892677