Department of Business and Management

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ZOMBIE FIRMS AND MEGA CORPORATIONS:

RELATIONSHIP BETWEEN DEFAULT RISK AND SHARE VALUE

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INTRODUCTION

Attention on the viability status of companies has become essential to be understood and, therefore, related risks must be included in the business valuation due to the high levels of leverage that is present in companies starting from the years before the Global Financial Crisis; firms can indeed be classified based on the going and gone concern conditions, where the default of the firm is what separates the two states existing before and after.
In the near-bankruptcy case, insolvency procedures are central, and the various methods used to estimate the probability of insolvency are now quite similar to those used to estimate the equity value: in fact, default risk is predominant in the sub-investment grade zone, whereas market risk is predominant when approaching the valuation of the equity cost of capital for companies in the investment grade zone.

Investments in distressed debt have become particularly appealing in recent decades, primarily for private equity and distressed hedge funds, which have emerged as the primary players in the field; within the vast sphere where financially distressed companies are, zombie firms can be identified.
The first phenomenon of creation of zombie firms was analyzed by Caballero et al (2008) in the event of zombie lending that characterized the Japanese *Lost Decade* and are companies that are not able to cover costs of debt with current profits and hence depend on creditors to continue to carry on their operations and business activity. Furthermore, they produce and invest less in both tangible and intangible capital, growing at a slower pace related to other companies.

This research is focused on the relationship that links value creation and share price on one side, and credit and default risk on the other, but since common papers explained such phenomenon as it happens with small-to-medium enterprises, within which more often the companies in distress and zombie firms can be identified, this one is more focused on the case of Mega Corporations.

The work is divided in four chapters. The first one is an overview of the phenomenon of zombification, based on previous literature, explaining what they are, how the zombie firms can be identified, what is the zombie lending and the drivers and consequences on the economy after the proliferation of zombies.

The second chapter gives a glance on the current outlook on equity markets provided by investment managers and companies for the three areas that are related to the subsequent analysis, and

furthermore reports previous studies on how the default and credit risk are related to the valuation of the equity and share price, mostly conducted on non-listed companies, or SMEs.

The third and fourth chapter are focused on the research side. The former defines mega corporations based on parameters as market capitalization, geographic areas, and ratios as the ROA, Net Debt/EBITDA, Interest Coverage Ratio, and default probabilities, while the last chapter gives evidence of the results coming from the analysis conducted on the sample of 420 listed mega companies: the idea is to investigate which of the four variables above was able to predict future share price of the companies.
We ranked firms based on each parameter each time, from the lowest to highest value of the variable (as of December 31st, 2011), and made an average of the price on December 31st, 2021, for the first 20% and last 20% of the sample, that was afterwards compared with the average 2021 price for the whole sample.

The same test was carried out based on the price to book ratio, in order to look at the different behavior of mega corporations' share price in the long run, that results to be opposite as to that of SMEs and zombie firms.

CHAPTER 1 – FINANCIAL DISTRESS AND ZOMBIE ANATOMY

1. Investing in distressed debt

In the past couple of decades, investments in distressed debt have turned out to be particularly attractive mostly for private equity and distressed hedge funds, that became the main players in the field. Investors of such kind are located mostly in the U.S. and Europe and manage around $120-$150 billions of private capital (Jain, 2011), but attention is being also reversed in other emerging countries as the Covid-19 pandemic in 2020 forced businesses to face serious challenges and many found themselves dealing with cash flow issues.

In the first decade of 2000s, around $50 to $70 billion was collected by dedicated funds looking for distressed opportunities – the peak of which was reached in 2008.

Scanning the landscape of companies with unstable capital structures and negative worth has proven to yield interesting returns, even though this is not free from high risk. Given the fact that this type of investing is usually restricted to special and prepared investors, and demand for these instruments is somewhat not elastic (large institutional buyers are not allowed to invest in these), there is large room of access to big opportunities.

In order to achieve a successful investment in the industry, on the other hand, it is needed to deal with financial and legal complexity, that is exceptionally high, creating entry barriers for potential participants.

Opportunities in this peculiar sector of investment are directly related with downturns in the economy – this is because in periods of slowdown, there might be more bonds available at cheaper prices due to increase in default rates, as it happened in 2009 after the Global Financial Crisis.

What funds mainly do is to acquire and trade debt securities and purchasing these at low prices compared to their face value allows them to become main creditors of the company and to obtain eventually significant negotiation powers.

Target companies for this activity are usually those undergoing some restructuring or in Chapter 11 proceedings, and the appealing securities under valuation are bank debt, second lien debt, mezzanine debt, other debt-like public and private securities, preferred stocks, and trade claims. So, the assets in which credit mangers invest in may be both public or privately held – bank loans and trade claims, as well as non-liquid securities and troubled company assets, which can therefore be obtained at a quite high discount to their underlying value. The window of opportunity that managers need to exploit depends on the lifecycle of the distressed company, that lasts up to 8 years, and on the ability of the fund to scan, identify and capture such value.

There are mainly two types of strategies that best describe the relationship that an investor wishes to pursue toward such kind of target companies – a *control-oriented* strategy or a *trading-oriented* one:

- The former is characterized by a gentler way of looking at the company that is undergoing difficult times and has the aim to enter in the management and obtain control, without taking into account the seniority of the positions acquired. Following this strategy, funds enter considering the enterprise or liquidation value and afterwards convert their investments in equity; obtaining control will allow investors to impact and increase the value of the securities, also gaining a control premium upon exit.

  Such active position is common in private equity funds, that accumulate debt positions through junior securities bearing high risk/return outline.
- The latter is profiled by a passive way of holding the securities – which have senior claims – and the value is maximized during the bankruptcy processes. Risk in this way is minimized and the investment is pursued at a later stage when the company is almost broken, the value of the debt is very low, but with a prospect of recovering in a near future (in this way prices will rise, and the securities will be sold by debtholders with greater margins).

Many of the risks that make this practice not usual to pursue are not easily predictable, and this is why credit managers need to be very skilled when deciding whether or not to invest in these assets and in which particular security.

The typical risks that can be instead managed are those specific to the company, or illiquidity problems, fluctuations in mark-to-market values and increase in credit spreads. Additional risks that need to be considered are *reputation risk* – mostly resent in passive strategies, where funds have no control over managers' activity and deployment of capital, *process risk* – given that the process is complex and long, it requires a lot of parties to be involved and identification of credit issues must happen at the beginning, and *market liquidity risk* – due to the fact that prices are volatile and affected by interest rates and presence of new investors, leading to difficulties when reselling the securities because their actual value may not be perceived by buyers.

Indeed, a lot of these companies under valuation that are in financial distress, might be viable in the long run – meaning that after recovering they will be able to keep in operation the activity, exiting from this dangerous stage after a restructuring or turnaround proceeding, or after improvements from a macroeconomic outlook.

Within this huge sphere where distressed companies locate themselves, *zombie firms* can be identified.
What is highlighted from Alvarez et al. (2021) is that financial difficulties are necessary but not sufficient as conditions to exist, and what follows is that zombies are seen as a subset of companies in distress.

2. What are zombie firms?

Focusing on the definition of these peculiar, but also common type of corporates, zombie firms are companies that are not able to cover costs of debt with current profits and hence depend on creditors to continue to carry on their operations and activity – therefore to remain viable. Furthermore, they produce and invest less in both tangible and intangible capital, grow at a slower pace related to other companies.

Considering the current post-Covid crisis situation, when analyzing and classifying companies and the relative policy that best suits each of them, policymakers should do it based on their viability status: this is what M. Draghi and R. Rajan suggest in their paper focused on the best policies that should be followed after the current period where businesses struggled to survive. Every government should identify its own priorities and design very selective policies, because not all businesses should be supported; it is fundamental to save those that will be profitable after the pandemic - with special attention paid to small and medium-sized businesses, which have less "bargaining power" with governments but are still valuable in terms of employment and production - and action should be taken only when market failures are present, which can result in high social costs.

Five categories of firms are identified according to which different policies and financial aids suit best: healthy firms, financially constrained companies, liquidity challenged, liquidity solvent and categorically and structurally unsound companies.
Focusing on the last two classes of corporates, zombie firms lie in between of those companies that are too much leveraged and can’t bear more debt (but need support in terms of equity or hybrid instruments – also through bankruptcy procedures improvements) and those that have no possibility of recovery.

Different definitions can be found according to different studies.

Banerjee and Hoffman (2021) classify them as companies with a "*persistent lack of profitability*" and "*low stock market valuations*": their inability to generate profits for a long period and their growth potential is reflected in market prices as well, based on the investors' ideas that also in the future these corporates will not be able to fully recover, and should hence exit the market at some point in time.

Zombie firms have a determined life cycle that allows them to be identified a priori, some years before they even are classified as such, displaying lower profitability, employment, and productivity – assets, capital stock and intangibles are low, asset disposals instead start increasing in the few years before zombification.

The two years before their categorization are crucial and it is the period in which they are identified due to drastic worsening in performance.

After they are classified as non-profitable zombie firms and leverage starts to decrease, the performance rises, but even years after, productivity and profitability still remains impaired. Nonetheless the ability to generate cash improves and the market gives good signals perceiving the company as being able to recover in the long run, if it continues to stay alive.

The continuity in this status of low performance and profits is fundamental to avoid classifying by mistake firms as zombies when they are not, as for example because they are subject to fluctuations in prices and profits, or in the case of start-ups, which are characterized by an initial launching period made of warming up and losses, before reaching some growth and establishment stage with more stable results.

This is why, in previous literature, age can be found as a requirement for firms to be classified as zombies, that however could be misleading and a too-strong a priori categorization, as it is in the definition of zombie firms from the OECD (2017), where companies need to be aged at least 10 years in order to be classified as zombies.

Usually, zombies tend to be minor in size related to non-zombie firms, where size is defined in terms of economic importance.

Banerjee and Hofmann (2021) find that within listed small to medium enterprises (SMEs) the share of zombie firms in assets, capital and debt is greater than the respective percentages in the total share in zombie firms. This implies that if the whole spectrum of SMEs (listed and not listed – where the SMEs that are not listed represent the major part) is considered, the overall amount of zombie firms may be larger than those that emerge being in the population of companies listed on the stock market.

Statistical analysis was conducted by Banerjee and Hoffman (2021) on financial statements of companies from 14 developed countries, both in a zombie status and not, reporting the median and extreme quartile values to see if there was a difference and if this difference was significant.
As preannounced above, zombies tend to have assets, capital stock (property, plant, and equipment) and employment levels which are three times lower than their non-zombie counterparts. Lower levels of investments are explained by the amount of capital expenditure in tangible and intangible assets as R&D (0.5% and 1.2% respectively).
These are productive as half as their non-zombie peers, both in labor (real output/real wage bill) and total factor productivity (TFP), and 1% increase in the number of zombie companies in the economy has effects on the whole, lowering aggregate productivity growth by 0.1%.
Also, dividends are not paid by such companies due to their reduced profitability; in fact, the median value is 0.

One of the features that characterizes zombie firms is that they receive credit, even when they should not because, eventually, they are not able to repay interest expenses fully. Even though these are much riskier companies to which provide and extend loans to, financial charges on total assets are higher only by 0.1% relative to healthy companies, and such values results not statistically significant as one would expect.
While more debt is issued at the beginning, at some point it is reduced at a 7% annual rate, which can be perceived a signal of trying to obtain credit at more favorable terms – the level of leverage however remains high above that of other healthy and profitable companies.

Zombie firms also issue more equity (relative to total assets) when debt starts to diminish, driven by few and substantial equity issuances, but following a continuous pattern except for when they turn into zombie.

Exit from the market is another fundamental issue to analyze when dealing with zombie firms given the fact that their presence may lower the profitability of others and distorts equilibrium: the probability that they exit however is very high and more than double compared to other companies (around 9 %).
There are actually differences between zombies that are about to exit and those that instead decide to remain in the market with subsidized credit: exiting zombies are more productive and bear smaller losses, but on the other hand present more leverage and have to pay more in terms of financial expenses – the latter consideration happens also in the case of exiting healthy companies, leading to

the conclusion that exit is driven more by the presence of leverage and high interests rather than being a zombie or not.

3. Identification of zombie firms

Prioritizing the two mentioned above requirements according to which zombies are identified, low profits and low share price, the financial parameters connected to these conditions are the Interest Coverage Ratio (ICR) and the Tobin's Q, that are set to the following conditions:

1) $ICR = \frac{Earnings\ Before\ Interests\ and\ Taxes}{Financial\ Charges} < 1$

2) $Tobin's\ Q\ = \frac{Market\ Value\ of\ Assets}{Accounting\ Value\ of\ Assets} < median\ of\ the\ industry$

The former, being the ratio of EBIT on interests paid, expresses the high leverage situation of the company showing the condition in which costs of debt are so high to outweigh earnings for a predetermined period, while the second identifies low performance through the value of the physical assets relative to the peers and the sectors in which the company operates. The Tobin's Q indeed gives a sense of whether the assets are over or undervalued, considering the replacement costs to substitute them at a specific point in time relative to current market prices.
Tobin's Q is usually applied to private markets and not to listed companies.

However, even if generally accepted by most of the academics, such metrics are sometimes questioned, and assessments about their accuracy do exist, as the study carried on by Rodano and Sette, in the Occasional Papers of Banca d'Italia in 2019, that queries the use of EBIT as a proper measure to express operating profits in the ICR, in favor of EBITDA.
The matter lies in the fact that EBIT results much lower relative to EBITDA for companies that amortize a lot during specific periods of time taken under consideration and this gap can be even higher in period of crises when revenues are reduced.
Also, there might be and there are differences in tax treatments for assets that require amortization, and these discrepancies exist both across and within countries. In the end, EBITDA expresses more an idea of cash flow than EBIT does, and in the talking about solvency issues and the repayment of interest expenses is a central concept it is a central concept.

Using this different, and of higher value, measure, that is not biased by the amortization and depreciation amounts, that would be subtracted, could give a more reliable assessment of the real amount of the existing zombie firms in the economy.
Moreover, the study finds that the EBITDA measure is at the same time better at predicting the exit of these companies, while the EBIT, being net of depreciation and amortization expenses, might provide errors due to the belief that the firm invested a lot.

Another accepted and shared definition of zombie firms requires different parameters in order to identify zombie firms.
As we will see below, the status of banks that provide loans has an impact on companies about their probability to turn, or not, into zombies, and Schivardi et al. (2017) in their research defined at first zombie firm as *"a firm for which the expected marginal return of capital is below the risk adjusted market cost of capital".*
To account for the fact that expected marginal return of capital is not observable, they used another parameter that explains poor profitability, the Return On Assets (ROA) expressed as:

$$ROA = \frac{EBITDA}{Total\ Assets}$$

that measures the average gross return on capital.
It is a measure of profitability, giving a sense of how efficiently the company generates profits from the assets it holds in the balance sheet.
More precisely, the EBITDA is a moving average capturing average changes over the previous three years, needed as a proxy measure for expected profitability in the future.
ROA is compared to a measure called PRIME rate, explaining the cost of capital for borrowers with low risk of default, based on the Altman Z-score – safest firms are those with values 1 or 2, when it ranges from 1 (safest) to 9 (riskiest).
The Altman Z Score is indeed a metrics developed by Edward Altman in the 1960s to measure the financial stability of a company and was used as a way to predict distress and bankruptcy situations.
Zombie firms are then recognized when the PRIME rate is above the ROA and when Leverage exceeds a predetermined threshold, where Leverage is defined as

$$Leverage = \frac{Total\ Financial\ Debt}{Total\ Assets}$$

This definition stems from the idea that if zombies have also high risk of default together with low profitability, and firms with more debt are more prone and at risk to default than sound companies given that lenders are less incentivized to offer their capital.

The OECD researchers, Adalet McGowan et al., add age as an important factor when classifying zombie companies: a firm must be aged 10 years or older in 2013 (the year of under analysis) and it needs to have an ICR less than one for three consecutive years (2011-2013).
The restriction on age, as anticipated above, is important to be considered due to difficulties to differentiate real zombie firms from young start-ups – errors and misclassification can happen when analysis is only based on profitability measures.
Continuity in such stage (3-year requirement) is needed, as the definition of Caballero (2008) requires, in order to cancel the effects of business cycles on the number of zombie firms – to show the robustness of the results windows of time have also been increased as well as age requirement.
Banerjee and Hoffman (2021) require a 2-year persistence in such stage, with both ICR lower than 1 and Tobin's Q lower than median of the sector.

4. Zombie lending

The classification of these type of firms as *zombies* comes from the paper and studies of Caballero et al. (2008), that analyzed the depressed restructuring and lending to insolvent borrowers in Japan in the early 1990s – the so-called *Lost Decade*, a period characterized by a macroeconomic stagnation that culminated in the asset price bubble collapse in 1991.
The bubble was driven by the increase in asset prices, economic expansion, and money supply all at the same time.
Stock prices started to increase and boomed after 1986, followed by land prices, that never experienced increasing trends as high as in that period (the increase in land prices was induced by the shortage of office space in Tokyo after the increase in business activity due to the internationalization and expansion of Japanese businesses).
In addition, money supply and credit expanded together, which led bank borrowing and funding from capital markets to rise, within the process of financial deregulation and the appreciation of the yen against the dollar.
Most of Japanese firm balance sheets were backed by assets during the period, so when asset prices started to fell, liabilities started to grow as well as difficulties to reduce the debt ratios, leading to a reluctance on the part of the private sector to boost investments.

The government continued to bailout failing banks and businesses that were losing money, making it impossible for more efficient businesses to compete. Large Japanese banks provided a flood of loans to otherwise insolvent borrowers, restructuring their debt positions.
This situation went on for more than a decade, with the result that Japan's economy, dominant at the time, remained completely stagnant.
The government's main response was to massively expand infrastructure investment while also attempting to get the Japanese to spend less and save more. Japan's *Lost Decade* of economic growth costed the country more than 20% of its GDP (Forbes, 2009).

So, banks persisted providing loans to companies that were however insolvent, being largely unconstrained by the regulators. The only exception was that financial lenders were required to comply with the international standards based on minimum capital requirements (the so-called Basel capital standards) – when calling in a nonperforming loan, they had to write off existing capital, resulting in the end above the minimum capital requirements.
Afraid of falling below capital requirements, many banks continued to offer credit to insolvent debtors, betting that they would eventually recover, leading to what is called "*evergreening*" phenomenon.
Restructuring debts in such a way allowed banks to avoid classifying these positions as risky ones, and therefore to avoid setting aside a quite high percentage of the loan value as reserves in order to cover the potential loss from the insolvency of the borrower; in the end they only set 15% of the value of the borrowings within reserves, instead of 70% (Caballero et al., 2008).
Also, public outrage would be triggered by the fact that banks were contributing to that recession period by not rolling over the loans in order to sustain companies that were actually in need; so, after 1998, the government urged banks to increase lending to small and medium-sized businesses in order to alleviate the apparent *credit crunch*.
The banks in this way were able to distort competition throughout the economy by keeping these insolvent borrowers alive. The distortions manifested in a variety of ways, including decreasing market pricing for their products, rising wages by retaining workers whose productivity at present enterprises had dropped, and, more broadly, congesting the markets these companies engaged in.

The analogy of the name 'zombie' is connected to the fact that these companies were kept alive, with higher probabilities of default, also having effects on other sound firms.

Given that the Japanese episode was the starting point that led a lot of scholars in the field to focus on this particular topic, investigations were carried out using other various samples as well.

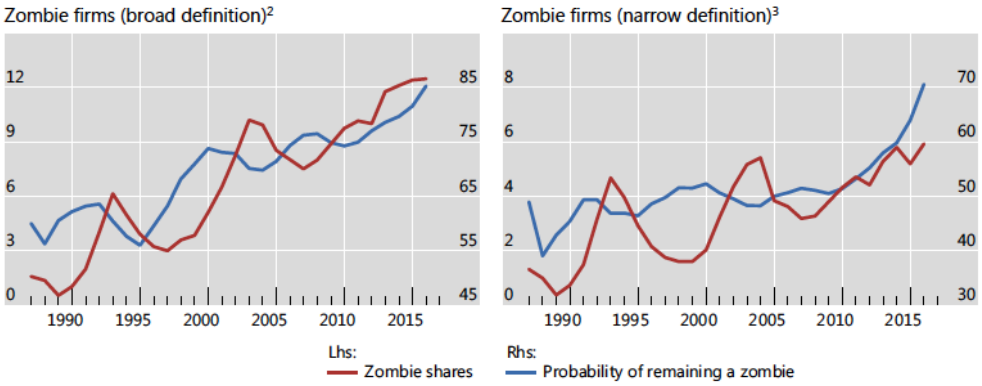
The ECB researchers, Andrews et al. (2019), based on data of companies from eleven European countries, found that weak banks are more connected to zombie firms as compared to healthy banks. So, the results are coherent with the logic that the problem of zombification of companies in Europe might derive for some parts from *forbearance*: creditors of banks, as depositors, are supported by the government through guarantees or through liquidity support from the central bank, and at the same time the recognition of loans, both stressed and non-performing, on banks' balance sheets is postponed.

Increased survival of zombie enterprises congests marketplaces and limits the growth of more productive firms, reducing overall productivity growth. Bank health is responsible for around a third of the impact of zombie congestion on capital misallocation, and in nations where business restructuring is not inhibited by insolvency regimes, gains in bank status may be connected with a decline in the number of zombies (Andrews, 2019).
In fact, barriers to restructuring do exist, and they may result in low enough recovery rates that even healthy institutions have little incentive to initiate a default, preferring to forbear to zombies instead; the situation of NPLs will not be well managed if insolvency regimes are not focused on efficient company restructurings.

In the United States side as well, the FED analyzed the role that weak banks have related to zombie lending. Nevertheless, the research conducted on American banks from 2015 to 2019 showed that banks instead of benefiting these companies with advantageous terms, asked for more collaterals, and provided loans with shorter maturities. Zombies are also classified with higher default probabilities and hence lower credit ratings than normal companies (Favara, 2021).

5. Zombie share

In order to measure the existence of zombies across the world's main countries overtime, Banerjee and Hoffman (2018) investigated the rise of these kind of companies, spanning the period from the 1990s to the 2010s using data from Australia, Belgium, Canada, Denmark, France, Germany, Italy, Japan, the Netherlands, Spain, Sweden, Switzerland, the United Kingdom and the United States.



(Banerjee and Hoffman, 2018)

Under both the broad and the narrow definition – 'broad' means that the company remains in a zombie status for 3 years with an ICR < 1 and is 10 year old, while 'narrow' references to the Tobin's Q measure – there has been an increase in the rise of zombie firms from the 1990s, with advanced economies' zombie share starting from 2% in the early years of the time span to 12% in the end (for the broad definition) and from 1% to 6% using the other measure (for the narrow definition).
In another paper drafted in 2021, the same authors found out that the number of zombies increased to 15% of all listed firms in these countries under analysis by 2017 from 1980s; they also investigated and came up with the result that the countries in which the zombie share is highest are Anglo-Saxon countries, while in Europe the percentage numbers are way lower (10%-15% compared to 30%).
In Japan as well, the zombie share is about 3%.
The decrease in the presence of these firms in Japan, even though this phenomenon was first notified there, was due to the banking system reforms that were carried on in the first years of the 2000s.

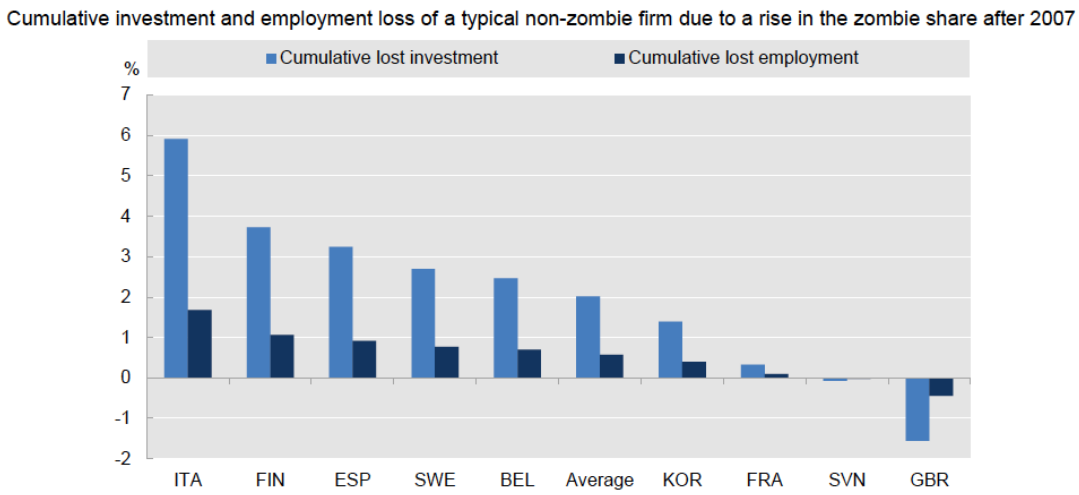
On the other hand, in the United States, the FED notified that such a situation is not peculiar within the American economy, provided that zombie firms are small and few, and their expansion in terms of units across the years (spanning 20 years from 2000 to 2020) was quite narrow and fluctuations were related to ups and downs in business cycles and industry shocks. At the end of 2019, listed zombie firms were highly condensed in the manufacturing sector, while those not listed were more relative to non-zombie firms in the retail trade sector, manufacturing and in the mining, oil, and gas industry (Favara, 2021).

The patterns shown in the graph above are not steady: the rise in the number of zombie firms went and goes along with cycles of the economy such as recession and booms, and consequently the probability of not being able to exit this status went up as well in these periods: this is mainly linked

to the fact that increase in zombie share is associated with low productivity and scarce investment possibilities.

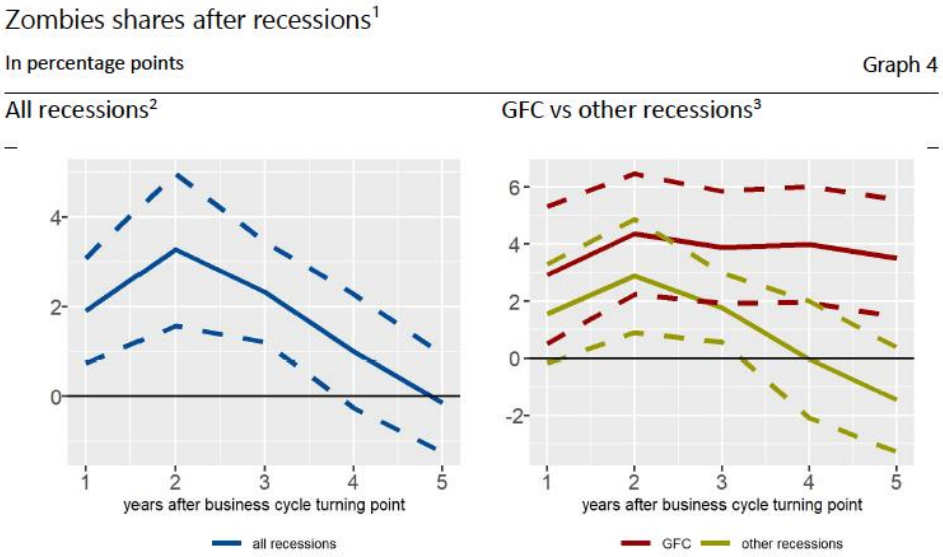
Distinct crises and recession moments, as the Global Financial Crisis, are potential elements that might explain the condition of non-viability of firms and why companies are drawn down into this status.

Bad economic conditions increase indeed the probability of companies to be classified as zombies and changes in economic landscape can explain a rise in the number of zombie firms (Alvarez et al., 2021). Indeed, studies from OECD researchers confirmed that the number of zombie firms out of the total population of companies increased a lot after the GFC in advanced economies (Adalet McGowan et al, 2017). They got to such results observing how much an ordinary company would have invested or increased employment if number of zombies stayed the same at 2007 level. Employment and investment would have been much higher if zombies didn't proliferate after the crisis (e.g., 1,5% and 6% higher in Italy). Cumulative loss, according to this study for these 9 OECD countries was 2% and 0.7% respectively. The only country where investment increased in the aftermath of the financial crisis is the United Kingdom, that however has an efficient insolvency framework to sustain companies in need.



(Adalet McGowan, 2017)

Nevertheless, the Great Financial Crisis, being different from other precedent crises, gave a major effect in terms of creation of zombie firms. The reason for this can be found in the fact that the recession came from a financial issue, and the policy response, with unprecedented favorable monetary conditions by central banks in the aftermath, allowed unsound or almost broken companies to remain alive, paving the way for the number of zombie firms to rise.



(Banerjee and Hoffman, 2021)

The chart indeed shows the deviation from the country-specific mean in number of zombie firms in the period after peak in business cycles, and the effects from the GFC are evident relative to other recessions: the red dark line for the GFC in the right graph stays almost flat, indicating that the zombie share remained quite high across all the years after business cycle turning point (the peak).

Similar conditions that eased the birth of these type of firms can be outlined from the situation of the last two years, with the economic crisis from the Covid-19 spread that has led the world towards serious corporate solvency issues in a lot of nations, by completely altering consumer patterns and business operations. Apart from policies that directly boost employment, the earliest policy responses to help firms were largely focused on liquidity difficulties.

Extraordinary measures were carried on, such as public credit guarantee programmes, direct lending, debt moratoria, lending from central bank and the softening of cautious supervisory rules.

The World Bank Group put at disposal of 100 developing countries $160 billion in grants and financial support over a 15-month period to help these respond to the health, social and economic damages (World Bank, 2020).

However, the risk is to create zombie masses that will barely survive by maintaining an inefficient allocation of resources and so the scarcity of available resources requires a stricter approach to the management of firms.

If we consider the current situation of low (or negative interest rates) as a consequence of the pandemic and the continuous support for governments mainly to small-to-medium enterprises, that

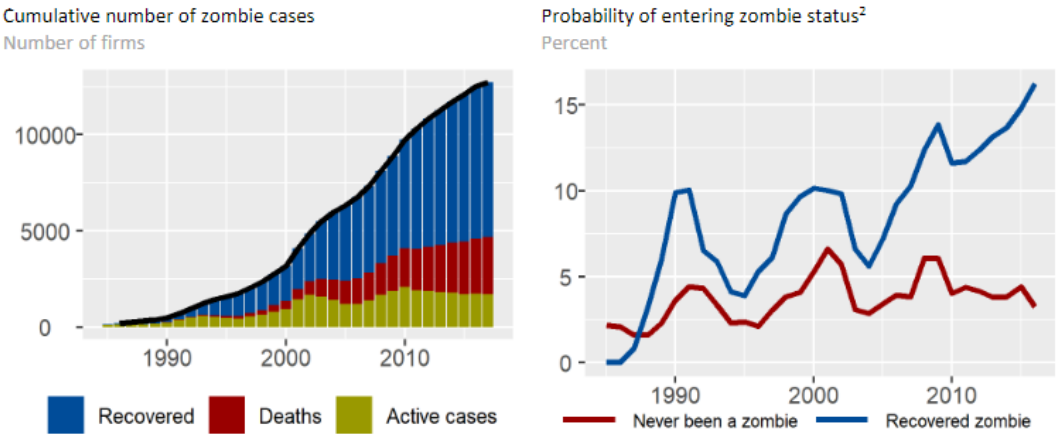
do struggle to survive and carry on their operations without targeted aids, the probability and risk of creation of new zombie corporates increases as well, and the pandemic indeed created new ones.

In an interview conducted by the CNBC Television to Torsten Slok, the Deutsche Bank Securities Chief Economist, he discussed about the general pending debt situation back in 2020 and the moves pursued by the FED to save the US economy, explaining that "on a daily basis there's 1600 companies, on the normal circumstances, that could corrupt but now there is a significant support not only from the Federal Reserve but also broadly speaking from the ocean of support that have been coming into the corporate sector, and this gave a significant lift in issue and a significant lift also in credit conditions; this has meant that financing has been readily available, and it was a problem because it sort of changed the creative destruction that normally happens that some companies go under and new companies appear".
He then continued arguing about how funds are then used by companies, because "whilst years ago companies used those proceeds to buy back stock, this time what these big borrowing companies are doing with the proceeds of the loans they're taking, is to use it to make their liquidity position on their balance sheet look better even though the loan is debt owed and it's not really an asset".
The issue is that when the economy is shut down the revenue that normally comes in, doesn't anymore and some other financing is needed to keep the payroll going.
"So, the dollars and the money that's been raised at the moment is like a replacement for the revenue that you will normally get but it's not much a type of replacement because this is something that needs to be paid back."
Therefore, it is not money to keep, but loans that needs to be paid back and "this just magnifies some of these issues about leverage and about debt levels" (CNBC Television, 2020).

Such events as global economic and financial crises had an effect, among all corporate sectors, on those zombie firms that somehow recovered after some years.
Indeed, exit is not the only option for a distressed company, because in the end recovery is possible, even if damages are left: the productivity levels and soundness of the firm will always be lower than that of a company that was never classified as a zombie and in addition of being less productive and dynamic, these healed companies will display lower asset disposal, investment level and will have a reduced number of employees opposed to another stronger and profitable firm.
What came out by the research of Banerjee and Hofmann (2021) was that falling back in such status for companies that already recovered once is much more probable, due to the fact that they remain weaker and more apt to slide back in it.

What is also interesting to reflect upon is the probability of a company in a zombie status to remain as such once it enters this critical stage; the growth in number of zombies was hence mainly driven by the fact that also the probability of remaining this status intensified as well, given that the probability of remaining a zombie went from 70% in the 80s to 85% in 2017.

Such consequence is much more evident in the Global Financial Crisis than in other previous crises and recessions, and in fact around 13% of companies that became zombies in that period, were already rated as zombie firms before.



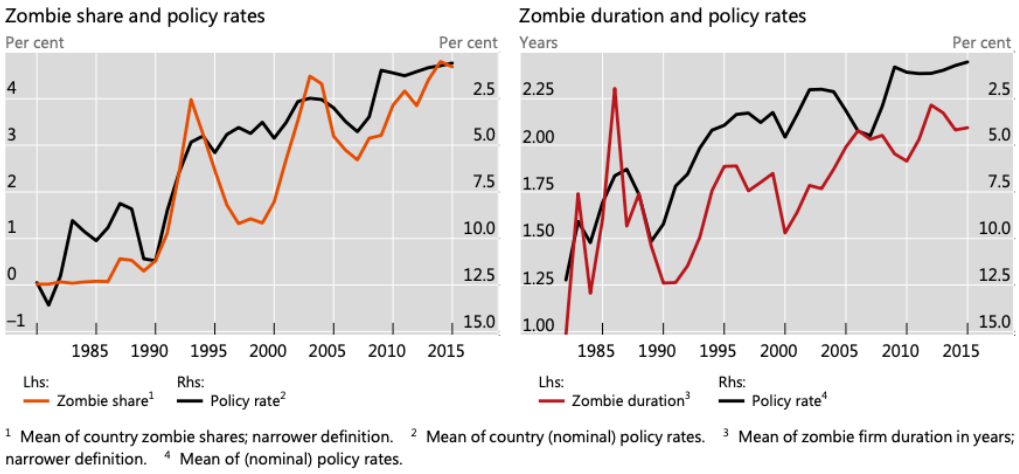
(Banerjee and Hoffman, 2021)

6. Drivers and consequences

As already hinted before, within the main causes that can spur this phenomenon, low interest rate levels and weaker banking systems are central.

What low rates do is that they reduce the cost of debt companies have to bear and make debt burdens more sustainable for debtholders, allowing a lot of them to benefit from leverage.
Low financial charges mean a higher Interest Coverage Ratio (all else being equal) and this also permits creditors to have more cleaned-up financial statements, without risking incurring in limitations when rolling over loans to zombies, and it leads to reductions in risk when making other hazardous investments.
Studies by De Martiis et al. (2021), covering twenty-eight years (1990-2018) for eight European countries, found a negative relationship existing between interest rates and zombie status, due to the effect of rates on the probability that a company is categorized as one.

The same result is achieved by Borio (2018) that came out with results solving the question on why zombie firms in the 2000s have been able to handle debt better. The matter is that they had less pressure to cut debt in those years, rather than in the 80s and 90s, allowing firms to survive for longer periods, and this is explained by the decline in nominal interest rates, and in fact, the profitability of the company lasts for more as rates fall.



[1] Mean of country zombie shares; narrower definition. [2] Mean of country (nominal) policy rates. [3] Mean of zombie firm duration in years; narrower definition. [4] Mean of (nominal) policy rates.

(Borio, 2018)

On the other hand, as already seen above from the Japanese experience, fragile and undercapitalized banks are frequently accused of prolonging the recession by lending to fragile businesses on the moving towards failure while denying credit to healthy ones.

However, the assessment regarding the impact of credit allocation and economic activity of banking systems is quite hard and can lead to different results.

There is a negative correlation between bank's health status and the number of zombie firms, that, still, is much more an episodic link, in the event of crises and periods of downturn.

Keeping all businesses (even if they aren't profitable) during a downturn, on the other hand, may alleviate the unfavorable general equilibrium effects of aggregate demand failures and, thus, the negative economic consequences of inefficient credit allocation (Schivardi et al., 2017)

When examining the issue about weak banking systems, an essential argument lies in the concept of credit misallocation and the subsequent impact on productivity and growth of other healthier companies, because exaggerate competition is created and resources become scarce. The marginal value product of inputs and revenue productivity would be equalized across enterprises by assigning factors of production to firms in the economy. Zombie financing reduces the efficiency of the resource allocation process by keeping inefficient businesses alive (or preventing them from dying) while making it more difficult for healthy businesses to grow.

Also returns from capital that is misallocated could yield higher returns and produce more in terms of output, if these were invested elsewhere.

New entrants in the market (and healthy existing ones) must compete with zombies for goods, labor, and funds, but this may make it difficult for newcomers to gain access to these resources because zombies are somewhat protected and do not have to worry because they are backed by their current workforce and financial resources. Competition with zombies can eventually put incumbents out of business, or perhaps turn them into zombies because zombies do not adjust to shocks, and newcomers must bear all of the necessary modifications and are forced to change much more according to the new equilibrium.
Some potential entrants may decide not to enter the market at all due to the necessity to compete with zombies, while some healthy incumbents may decide to abandon their expansion ambitions. Overall production suffers when more productive firms are compelled to cut back.

Such discussions started from the evidence of the Japanese situation with the research conducted by Caballero et al. (2008) that however considered only Japanese firms during the stagnation period in the 90s and its aftermath: the findings highlighted how credit was directed by weaker undercapitalized banks towards zombie firms and not to other companies as well, impacting productivity, investments, and employment, congesting eventually the market.

Acharya et al. (2016) investigated the same phenomenon in the European debt crisis during 2010, and the effect of the popular "Whatever it takes" by Mario Draghi during its speech at the ECB, while he was introducing the Outright Monetary Transaction (OMT) program: it allowed the central bank to buy sovereign bonds of distressed European countries, without limitations, lowering their spreads and allowing recapitalization of banks that held such bonds in their balance sheet, after their increase in value. However, capital was then supplied through loans to non-viable firms, i.e., zombies, with already existing relationships. Provided that such firms do not contribute to the overall economic value creation, do not invest and are not even willing to exit the market, there was no impact on investment or employment, but on the other hand this credit misallocation slowed down the recovery. What happened is that the recapitalization of banks was not tailored to specific needs of each bank, so those who remained with low capital levels, directed loans towards companies with poor credit-worthy conditions, evergreening loans, instead of realizing losses on other outstanding credits. Moving capital in this way blocked access to healthier firms and lowered overall recovery and growth.

From 2012 to 2016 a lot of firms were not covering their current debt expenses with their operating cash flow, but still received loans with an interest rate of on average less than 1%. The share of these zombie firms increased by 2 percentage points to 6.5%.

The ‘wrong’ allocation of resources, intended as capital in form of credit, has also proven to have effects on innovation in addition to market competition – when equilibriums are haltered, exit of zombies is not granted, as well as the entrance of new players in some sectors. The number of filings for patent application of zombie companies related to healthy ones in normal industries diminishes as also patent stocks. (Schmidt et al., 2020)

A research carried on by professor Schivardi (2017) including almost all Italian bank-firm relationships from 2004 to 2013, showed that when lending is provided by weaker banks to zombie firms, during periods of financial turmoil, these tend to survive while healthy firms do not and go bankrupt; statistically significant results show that the failure rate of zombies is lower when there are more undercapitalized institutions and non-zombies experience the reverse effect. In terms of size, raising all banks' capital ratios above the median would increase the rate of default of zombies by 0.4% and safe businesses would have a 0.8% lower rate than zombies.

Still, the relationship between under-capitalized banks (those not holding enough resources to cover unexpected risks) and zombie firms weights more on the speed at which zombie firms grow rather than having effects on the slowdown of development of healthy firm.
So, no proof is found such that the development of standing healthy firms is hurt by bank weakness, but rather they grow at a slower pace than zombie firms, which are subsided by the evergreening of loans. The reasons for this are in the fact that sound companies can cover short-term working capital needs with other forms of capital as liquidity or equity, and do not need extra capital from the banking system, but zombies need lending and external support to carry on daily operations and ordinary business activity.
In contrast with findings from others, undercapitalization of banks does not impede or reduce the entry of other companies in a market – the period under analysis however extends up until 2013, without considering the aftermath of the crisis and the recovery years, where instead also healthy firms start demanding for some credit.

Other more variables are key in this framework when assessing the main causes in the rise of zombie share and the differences that exist across countries.

The research carried on by Banerjee and Hofmann (2021) recognizes tax regimes' differences among countries as one important factor that provokes the zombification of companies and supports the idea that being interest expenses tax deductible, companies are incentivized to prefer debt over equity in tax systems where corporate tax rates are higher.
Higher interest charges lead to lower interest coverage ratio and hence the country with that particular tax system might result in having a big number of zombie firms.

7. Insolvency regimes and frameworks

What happens when a company enters the status of zombie firms is that either they recover eventually still maintaining lower performing levels, or they go bankrupt and exit the market.
Exiting requires a defined process which should be supported by a strong insolvency framework and regime. Having a well-functioning exit system allows enhancement in productivity growth due to the replacement of non-performing companies by new firms, being the productivity level higher in the new entrants. Once obsolete companies exit, resources such as labor and capital can be reallocated in a more efficient and productive way, benefiting the overall economy with the creation of value.
Inability of insolvency regimes to properly work can increase the share of zombie firms, given that these are not able to exit the market, and it can explain the differences in the number of zombie firms that exist across countries, provided that insolvency regimes around the world differ (Adalet McGowan et al., 2017).

What happens is that, given that companies are different from one another, there doesn't exist one predetermined regime or easy solution that can solve any situation, but the regime should be tailored according to different market imperfections, participants, and parties involved in the deal.

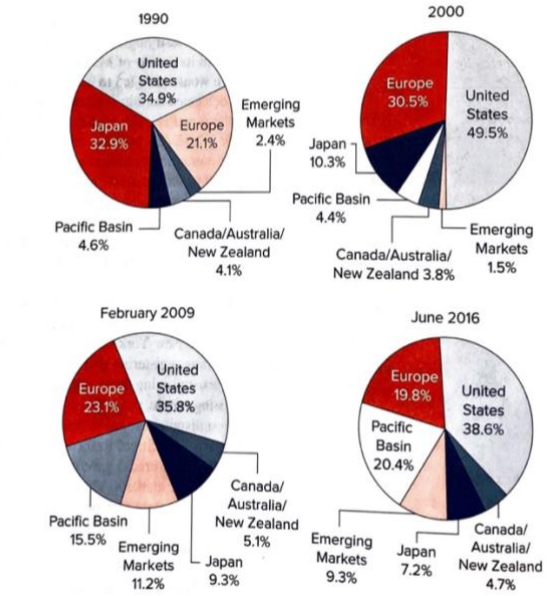
Insolvency and restructuring regimes can vary in a multitude of aspects.
First of all, these can be debtor to creditor-friendly, yielding to different conclusions: in some nations, liquidation is the most-likely-to-happen solution while in others restructuring is preferred.
The United States could be classified as a mixed and hybrid country, where there are clear laws that support both liquidation (based on Chapter 7 proceeding) and restructuring (assisted by Chapter 11 proceeding) (Adalet McGowan et al., 2016).

What is fundamental for an insolvency regime to lead to success depends on a variety of factors, such as:

- The possibility to start the restructuring in the hands of both creditors and debtors (while debtors are allowed to do that in all OECD economies, creditors are not allowed to do that everywhere, but there are some cross-country misalignments).
- Seniority rules and priority – there may be some stakeholders other than secured senior creditors whose rights to be repaid differ across regimes.
- Allowing current management to stay in charge of daily activities and operations, rather that forcing new and more skilled management to succumb, working problems out. If the incumbent management is not correctly supported and covered by the rules and regime, this could impact productivity and the chance for the restructuring to solve issues and to lead to future gains. While in the US Chapter 11 allows current managers to remain in charge of operations, across other countries it could depend on the powers given to the insolvency director (costs may increase when such decisions are taken by a Court).
- Delay of the proceeding can harm the restructuring, and this is very much the case when there are dissenting counterparties as creditors. The possibility to *cram down* creditors (i.e., to approve the plan only with the 'necessary' majority) allows to speed up the process, delivering higher chances of recovery. As before, voting rights differ across jurisdictions where in some cases either the possibility of cram-down doesn't exist, or it does but with restrictions on some types of creditors.
- The involvement of a Court is another fundamental feature when distinguishing among different insolvency regimes. Carrying on the process in front of a judge can give more protections for the parties involved, but for sure increases time and costs associated with it. When, however, the plan is pursued in front of a Court, final decisions taken by judges vary not only across countries, but also across courts.

CHAPTER 2 – STOCK MARKETS: CREDIT RISK AND SHARE VALUE

1. Current outlook on World Stock Markets



Worldwide stock market capitalization (Saunders and Cornett, 2019)

The stock markets have always been dominated by U.S. markets, especially in the last decades. However, other markets (as the European) started to gain importance across the years from the implementation of the euro currency in 2002, as well as emerging and developing countries and relative markets that grew in those same periods.

U.S. dominance peaked in 2000 and reached the bottom in 2009, due to the financial crisis and other factors, as the pass of the Sarbanes-Oxley regulation (2002) needed after multiple fraud scandals as the WorldCom or Enron case that, having damaged investors, lead to increase in the cost of operation in the United States and also to significant low numbers in public offerings of foreign companies in the country.

A serious drop in the US subprime mortgage market was also a major element in the country's poor growth of that period.

During this time, growth in most other major countries improved, and for the first time since 2002, growth in the euro area outpaced that of the United States in 2007.

Stock markets in Europe, Asia Pacific and Emerging Markets went from 21.1 percent in 1990 to 30.5 percent in 2000.

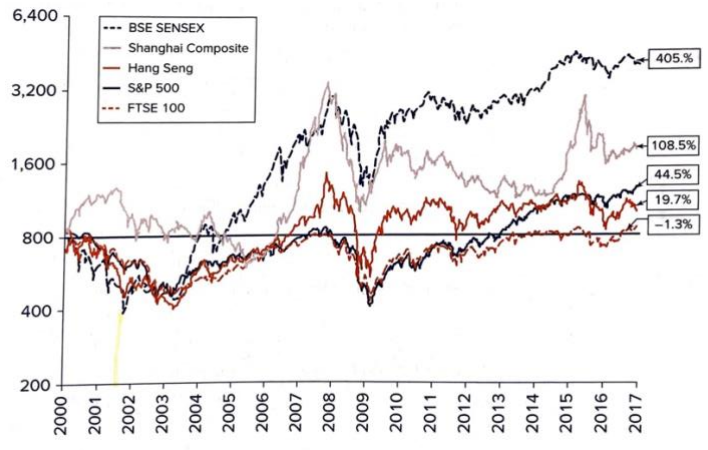
Then the Global Financial Crisis and the Sovereign Debt Crisis came (in 2009), and markets fell, as the European markets, that dropped to 23.1 percent of the world total).

In 2016 the United Kingdom exited the European Union, with the Brexit that became reality, and repercussions were felt again on European markets (down to 19.8 percent) and British markets.

Asia and Emerging Markets were not affected as much as the western countries by the financial crisis, but the Asian Economic Crisis in 1997 lead to a decrease in market capitalization in both 1990 and 2000, that was however recovered late by 2016.

In terms of absolute numbers in market capitalization – relative to the total value of all domestic companies listed on that particular stock exchange – and volume of shares traded according to different stock exchanges, the NYSE and Nasdaq place themselves at the first place back in 2017, according to both measures.

Markets usually do move together, but such movements are not perfectly aligned. Correlations in stock returns between the United States and a mix of euro area and Japanese equities peaked at 0.93 in 2003 and then dropped to 0.63 by 2007. By 2013, stock return correlations had returned to a range of 0.85 to 0.90.
Having international stock markets therefore is an interesting matter, because investors can assume different positions in order to eliminate risk, by diversifying their portfolios.



Correlation of the S&P 500 with Global Stock Indexes (Saunders and Cornett, 2019)

Nowadays economic and financial integration and connectivity is at very high levels, with much more frequent trade among countries, and also by the increased presence of agents in different markets. Indeed, investors have taken advantage of financial globalization to accomplish cross-country risk diversification as the number of restrictions in emerging economies has decreased.

Apart from the benefit of reducing risk, increased equity prices and abnormal returns, this new financial structure carries risks in countries with both weak and sound fundamentals, and the crises generated can spillover through links such as real links, trade and financial links, or market imperfections.

As fear of a global recession due to the pandemic in 2020 overwhelmed organizations and people, a great turmoil characterized financial markets. The risks related to the economy are interconnected to financial risks and the long-lasting duration of the health crisis led to real damages in the global economy.
When markets react to news of this scale and eventually fall, most of the investors have less money at disposal to invest, cutting spending and therefore slowing economy.
A major negative contribution to economy and financial markets is given also by failing companies, those who saw their cash flows suddenly stopped, and that even before the crisis may have struggled to pay interests and are now surviving by issuing more debt.
Companies must deal with uncertainties made of slow economic growth, inflation and supply chain issues, but those with consistent perspective in earnings growth and settled market positions may handle better such pressures.

The MSCI ACWI Index – that represents performance of the full set of large and mid-cap stocks across developed and emerging markets, for a total of 47 markets – rose to 7.9% annualized return from 2010 and to 6,1% since 1987, according to Blomberg Intelligence researchers (Bloomberg Intelligence, 2022).

2021 was an excellent year for stock markets globally, that ended the year with two-digit gains consecutively for three years. Reasons are to be found in the easing monetary policies and fiscal stimulus, and investors started the year bullish as the conditions were favorable for an economic recovery after the pandemic. Demand surpassed supply and companies were able to deal with increase in prices and reach very high earnings, nonetheless shortage of goods, inflation and political conflicts. The biggest contribution was given by the United States companies where companies also doubled their stock prices and technology giant companies contributed to this rise thanks to their size relative to other players.

Global IPOs experienced record numbers in 2021, following the pandemic restrictions, but had a slowdown in the first quarter of 2022: the motives for such change of course are to be found in a

multiplicity of causes as geopolitical tensions, stock market volatility, concerns about increased commodity prices, as well as energy's, but the effect of inflation and potential interest rate hikes, and the COVID-19 pandemic risk delaying a full economic recovery globally (EY, 2022).
Initial public offerings of cross-border, mega (companies with above US$1 billion proceeds), unicorn and SPAC type all declined sharply together with worldwide IPO activity.

In 2022 global equities are expected to perform well following the momentum from the previous period, even though markets were shaken by the diffusion of the new Omicron variant hitting confidence of investors, given the high contagion rate and the fear of the past.

For the first quarter of 2022 forecasts were that emerging markets would display an increase in fair value of 10,8%, according to the macro model, but for the U.S., given the pressure exerted on price-earnings due to high rates, only a 2,6% increase in fair value was expected, and EU's increase in fair value expectations would be around 9,4%. (Bloomberg Intelligence, 2022)

2. Current outlook on US, EU, and Asia

United States

Analysts from the most important investment companies and banks have been providing throughout the year quarterly and yearly outlooks on future economic and financial situation of different continents and countries.

Morgan Stanley analysts recognize the outperformance of US stocks across the years from the aftermath of the financial crisis in 2009 but are now starting to believe that a rotation in leadership will happen in the coming years. Such beliefs are supported by the presence of more backing policies in Europe and real yields that will rise more in the U.S. than in other parts of the world (these will exert pressure on equity valuations and growth stocks). (Dyer and Kirwan, 2022)

Similar thoughts are shared by analysts of Bloomberg Intelligence, that recognize above-average returns for global stocks in the current year, but a lower U.S. contribution to such value, due to the tight policies. The Fed Chair Jerome Powell also announced that the Central Bank might accelerate the plan to reduce financial support as inflation stays at such high levels.
"The S&P 500 has returned 12.7% annualized since 2010, but our model implies merely 2.6% upside as higher rates pressure P/E", and the "U.S. stocks trading 1.7 standard deviations above average P/E

(since 2010), while the model suggests a 10.7% contraction is warranted, to 0.65 standard deviation higher than average." (Bloomberg Intelligence, 2022)

From Lazard AM's April US outlook on equities what is central to be accounted for is the volatility that characterizes this paradigm shift coming from inflation and monetary policy. Higher quality companies will be able to deal with these difficulties thanks to healthiest balance sheets, competitive advantage, and probable benefits from acquiring distressed assets if interest rates allow to, also due to the pricing power to pass increased costs through consumers.
However, companies that bear higher costs, as those selling commodities, or those with high levels of leverage will instead grieve more: the cost of debt will not be lowered by refinancing positions for long, and covenants will be triggered by decreasing debt-service coverage ratios, as profits might be reduced for these companies with little power to raise prices against a rise in costs to be covered.

Europe

Graham Secker, Head of Morgan Stanley's European Equity Strategy Team, announced what is to be expected in the upcoming periods regarding the eurozone. Geopolitical risks due to the Russia-Ukraine war as well as increasing stagflation and pressure on corporate margins could be the most underrated risks equities trading in EU markets will be subject to.
"Historically, European margins have been positively correlated to inflation. Which likely reflects the index's sizable exposure to commodity sectors, and also the fact that the presence of inflation itself tends to signal both a strong topline environment and a positive pricing power dynamic for companies. In this regard, we note the consensus sales revisions for European companies are currently close to a 20-year high. However, the influence of inflation on the bottom line depends much more on its relative relationship with real GDP growth. Put simply, when inflation is below real GDP growth margins tend to rise, but when inflation is above real GDP growth, as it is now, margins and profitability in general tend to fall."
For now, however, the market appears to be ignoring these warning signs, as well as the deep supply chain crisis coming from the COVID lockdowns in China.

Trends for the MSCI Europe Index are still going up by more than the expectations for both U.S. and Emerging Markets. Even if rises in equity prices usually offset market performance from precedent periods of downturns, they remain skeptical that actually price-earnings will rise as central banks remain hostile.

Lazard Asset Management current outlook in Europe recognizes that fundamental analysis when valuing companies is crucial, provided that current times and unexpected proofs allowed valuations to be detached from fundamentals and returns are scattered across sectors and firms.

Asia

Asian markets experienced in general in 2021 a great dispersion of returns, the highest in ten years notwithstanding the slowdown brought in the area by China due to lockdown situations, inflation and tight policies; such trend is believed to persist also in 2022 according to the view of growing earnings of companies that will be able to survive turbulent times and swings in cycles, with strong fundamentals and business models (HSBC, 2022).

"The MSCI Asia ex Japan is decreased 2.2 percent year to date (as of October) – but when looking at country/region performance, India is up 29.0 percent and Taiwan is up 17.7%, while mainland China is down 14.0 percent, making it Asia's poorest performing market." (Duggal, 2022).
As recently Asia saw drastic lockdown measures being applied (the 'zero-Covid' lockdown) in crucial centers of the region as Shanghai, stocks started to fall steeply – as it never happened in 6 years – due to concerns about China missing its growth target.
As of April 27th (2022), traders started to get rid of Chinese equities, fearing other tough lockdown situations, and the CSI300 benchmark fell down by 10% in April.

Zero-Covid's Threat to growth hits Chinese stocks (Lockett, 2022)

However, while global investors are not ready to re-enter in the game, some traders remain confident that Chinese stocks represent the best opportunity in the region.

To conclude, the Asian markets have increased 9.36 percent and 9.08 percent, respectively, over the last year, 2021. However, much of this increase occurred near the close of 2020, as these markets have made minimal progress since the start of 2021, rising only 0.65% and 1.93% respectively.
China, which lost 15.72 percent year over year, accounts for much of the worse performance in the emerging world. Regulatory crackdowns in the technology sectors, energy shortages, rising inflation, and slowing GDP have all contributed to a deterioration in Chinese public opinion (Marshall, 2021).

3. How credit risk impacts on share value

As hinted in the previous chapter, companies can be differentiated according to their viability status, where the default of the firm is what separates the two conditions existing before and after the event. Insolvency procedures in case of default are fundamental in the near-bankruptcy case and the different methods that are used to estimate the probability of insolvency are now quite similar and necessary to those needed to estimate equity value.
This is because when computing the value of a company at a precise point in time, the value of the entity in a going concern situation (i.e., viable status) is the starting point, but the firm value needs to take into account also the other side of the coin – the eventual gone concern status.

So, the Firm Value can be expressed as a weighted average of the going and gone concern conditions, each weighted by the probability of, respectively, survival and default. If the company goes bust and is forced into liquidation, the gone concern value for equity holders (hence their recovery value) is zero – given the priority of payments they will be last to receive something, that in most of the case is nothing.
Hence, the equation becomes:

$$Firm\,Value = Going\ concern\ value * Probability\ of\ survival + 0$$

where the probability of survival is the opposite of the probability of default (1 – probability of default).

The gone concern value of a company is very low, so the higher the default probability, the higher the impact in terms of reduction in the firm's value.

Probability of survival of companies can be estimated using credit ratings, provided by agencies (as S&P, Moody's or Fitch) in a residual way as opposite to cumulative ten-year default probability, and results (Oricchio, 2012) show that in the sub-investment grade (high yield) area, from B to D grades, computing equity value without taking into account probability of insolvency leads to material errors; such issue doesn't happen with companies with ratings from AAA to BB, or at least it does but with marginal and immaterial deviations in value, because business risk is already considered in the computation of the premium within the discount rate, when valuing expected cash flows.

Table 1.3 Cumulative 10-year probability of default

Rating	Cumulative prob. of default (%)	10-year prob. of survival (%)	Equity value
AAA	0.07	99.93	Going concern
AA	0.50	99.5	Going concern
A	0.65	99.35	Going concern
BBB	7.5	92.5	Going concern
BB	20	80	Going concern
B	37	63	Going concern
CCC	60	40	Going concern
CC	67	33	Going concern
C	80	20	Going concern
D	100	0	Gone concern

Source: Author's estimate on cumulative corporate default rates.

Cumulative 10-year probability of default (Oricchio, 2012)

Starting from rating classes of Moody's and S&P, for each rating class, the 10-year default probability (PD) is taken from mortality tables and subtracting it from 100% will yield the cumulative 10-year survival probability.

As numbers show in the table above, PD is very low for AAA, AA, and A grades. From BBB it starts being around 7,5%. Looking at survival probabilities for AAA to A and BBB, it is higher than 90%, while from BB, the survival probability is 80%, and going down it is lower and lower for a lot of going concern situations and until there is the default and gone concern status.

To show that the default risk is already included when valuing companies with high ratings, the Gordon Formula is used by the author, that takes into account the survival probability (as a measure for credit risk), the price-earnings ratio, the equity risk premium, the risk-free rate and the growth rate:

$$Survival\ probobability * \frac{P}{E} = \frac{1}{r + ERP - g}$$

What happens is that, as probability of survival diminish, as well as the rating, the risk premium increases a lot in high yield area, until the company is classified as defaulted, and probability of

survival is 0. So, failing to consider credit risk when computing discount rates leads to important errors when dealing with speculative grades.

Table 1.4 Ten-year probabilities of survival and economic risk premium consistency (assuming P/E equals 10x and growth rate equals zero)

Rating	10-year probability of survival (%)	ERP	Equity value
AAA	99.93	7	Going concern
AA	99.5	7.1	Going concern
A	99.35	7.1	Going concern
BBB	92.5	7.8	Going concern
BB	80	9.5	Going concern
B	63	12.9	Going concern
CCC	40	22	Going concern
CC	33	27.3	Going concern
C	20	47	Going concern
D	0	Na	Gone concern

Ten-year probabilities of survival and economic risk premium consistency (Oricchio, 2012)

Market risk is predominant when approaching to the valuation of the equity cost of capital for companies in the investment grade area, and default risk is instead primary in the case of sub-investment grade zone.
What follows from such results is that credit risk and default rates are central when dealing with equity prices and the factors according to which movements in value can be explained

This topic has become essential to be understood and included in valuations due to the high levels of leverage in companies starting from the years before the GFC, when low rates allowed to bear them.

Credit default swap (CDS) spread is what can be used to include credit risk with derivative-implied risk factors to explain stock returns (Steiger, 2010).

The analysis starts from the idea that the Capital Asset Pricing Model (CAPM) for the estimation of the cost of equity doesn't fully hold or reflect real situations, and there are abnormal returns (captured by alpha) that are not explained by the beta factor – it captures only the systematic risk to which excess return is fully sensitive.
Black, Jensen and Scholes (1972) show that the alpha factor, intended as the stock's abnormal return – the difference between the stock return and market return multiplied by sensitivity of the stock to the market (beta) – is not zero, hence there is a part of return that is not considered by the beta and the model.

To overcome this issue, multi-factor models have been developed, in order to include other risk factors to the market risk premium within the formula to estimate the cost of equity, as the Arbitrage Pricing Theory (APT) – according to which the linear relationship between the asset's expected return and a variety of macroeconomic indicators that capture systematic risk can be used to predict the returns – or the model from Fama & French, including controls for both size and value effects with the small-minus-big (SMB) and high-minus-low (HML) portfolios.

As derivative markets expanded and developed throughout the years, the advantages of the use of such instruments as implied risk factors within the multi-factor model started to be clear and evident. Derivatives have a lot of benefits as they allow to trade risks in a separate way one from each other using different instruments, are less complex, bear less transaction costs and are able to absorb and react faster to news than cash markets (as bond markets).
Given all these advantages that derivative instruments claim, CDS are widely used to assess a company credit risk in terms of probability of default, provided that are used a lot by companies (so that liquidity and data availability are granted).

Steiger (2010) builds a model based on multivariate regression analysis that is based first on the computation of the risk premium for stocks with high CDS spreads (RMU portfolio), and then regressing this against quantile portfolios of stocks (sorted according to market-to-book ratios from the lowest to the highest).
To construct the RMU portfolio, companies are ranked according to their CDS spreads – those with lower spreads below the 25^{th} percentile of all spreads, being less risky, constitute the unrisky portfolio (U), while the others above the 75^{th} percentile form the risky one (R). The CDS premium is obtained from the difference of returns of respectively high and low risk portfolios (R – U), so the Risky Minus Unrisky portfolio (RMU) results from shorting the not risky one and being long on the risky position, rolling it over and regenerating it for the period: the risky shares indeed perform better than the safest ones in terms of CDS spreads by on average 5,8% per year.

$$R_P = \alpha_P + c_P RMU$$

Results show that when the MB quantiles are regressed against the premium for credit default spreads (RMU), values are statistically significant and higher for the lower quantiles and decrease in value moving to the last quantile that includes growth stocks (with high MB ratios): companies with low MB ratios (value stocks) are usually in a condition of financial distress, and in fact bear more credit risk – this is highlighted by the larger factor loadings.

"It seems that the credit risk has a very high explanatory power for portfolios or stocks with high credit risk, but only a very modest explanatory power for stocks with lower credit risk. This is an indication that the credit risk of a specific company has a high influence on the stock price when the company is in financial distress, but only low influence on companies that are in financially stable condition. As soon as a company's financial situation improves, the credit risk is no longer an important determinant of stock returns." (Steiger, 2010).

Shareholders do care about credit risk when it is very high, almost leading the company into bankruptcy, while when it is not, it is perceived as negligible and more important in the determination of stock returns. In this case, as the financial performance improves, returns are left to be explained by market movements because companies are not in distress or generally in trouble and not affected largely by credit risk, but more by other kinds of risk as those regarding business and macroeconomic issues (market and systematic risk, that is not diversifiable).

Source: Bespoke Investment Group, July 2008

As it can be seen by this graph showing CDS and share price of Lehman Brothers in the period range including the Global Financial Crisis, the negative relationship that links credit risk and share price is evident: there is a constant increase in the credit risk from May 2007 explained through the derivative instrument, up to the peak in March 2008, with a constant and progressive reduction in stock price, that can be perceived as a clear signal that the bank was going to default.

Another interesting finding is shown when also the return of the whole sample is taken as independent variable and added to the regression: in this case the RMU factor loadings turn negative, expressing

the idea that if shareholders request a premium for stocks bearing high credit risk, those that do not, receive a negative return premium.
Such result can be linked to CDS spreads in order to price stock returns: high CDS spreads are usually peculiar of companies that earn higher returns (because they bear more risk), than those with lower credit risk. For distressed companies it is much more evident, and, since they display lower MB ratios, what can be drawn is that shares of businesses with higher MB ratios, that bear low credit risk, don't generate premium returns, but instead earn discounts due to their safer positions.

This brought the author to another conclusion, by looking at the marginal difference between consecutive deciles, rather than in percentiles: the gap in value between the first and the second decile is greater than the gap from the ninth to the tenth. The qualitative explanation for this happening is that moving towards less risky areas and safer companies, credit risk doesn't influence anymore the stock return of a company. After a certain doorstep, what matters is not if the company turns from a low to a lower risk profile, but rather when it turns from high to medium, or low, risk.

Distressed companies are usually valued less from investors relative to a company with a stronger financial performance and prospects, and such status is reflected in the market-to-book (MB) ratio or price-to-book (PB) ratio, among other parameters.
A MB ratio lower than one usually belongs to weaker and distressed firms (whose stocks are called *value stocks*) for which equity instruments tend to be undervalued, and a MB ratio greater than 1 to healthier firms (whose shares are called *growth stocks*), subject to overvaluation: such distinction is based on the fact that investors do not actually see the value that exists and is trapped in companies with such features, as distressed ones, but just value their equity lower than what the books display.

Piotroski (2000) shows how instead, by keeping only value stocks in a portfolio – these correctly chosen based on the fundamental analysis and an accounting-based strategy – can actually increase the return of the portfolio (at least 7.5% annually) and shift the mean to the right, increasing its return average value. The selected companies are small-to-medium enterprises, with low share turnover and no analyst following, and however are financially strong ones: the success of the few will outweigh the losses coming from the poor ones.
Fundamental analysis is the key when investing in such companies because financial information in statements is the most trustworthy and accessible, provided that analysts, not covering such types of investment, do not issue recommendations or forecasts on the future development of the company.

Also, as said before, low price-to-book ratios are coherent with a company that is in distress, and the only way to inspect the current status of distress is through analysis of objective data as leverage, liquidity, and profitability from the books.

The success of the strategy depends on predicting accurately the firm performance and the ability of the investors to perceive such patterns and eventual the value creation.

Once this is done, firms with poor performance can be eliminated from the portfolio of low price-to-book ratios, and the remaining ones will yield the strongest returns.

CHAPTER 3 – MEGA-CORPORATION DATA ANALYSIS

As anticipated, this research is focused on the relationship that links value creation and share price on one side, and default risk on the other.
Common papers and studies explained such phenomenon as it happens with small-to-medium enterprises, where more often the companies in distress can be identified; related to this subset all that is stated and explained so far, holds.

In the previous chapter we saw how fundamentals and objective data are necessary in the case of valuation of zombie firms, given that they are usually underpriced (the price to book ratio is lower than one) and that the value that is created is captured, and evidenced, more in the long run than in the short run – having strong value stocks in a portfolio in the end will outweigh the poor performing ones.

As opposed to the small firms, there exist the universe of the so-called Mega Corporations.
We decided to explain and analyze the universe of the mega corporations by looking at some fundamental ratios as the Return On Assets, the Net Debt/EBITDA, and the Interest Coverage Ratio, meaning EBIT/Interest Expenses.

The Mega Corporations taken under consideration in this analysis are within a set of 420 non-financial listed companies, from different countries in Europe, Asia, and America – the majority of which belongs to the US and Japan, of which the breakdown per country is shown blow:

AMERICA				**ASIA**			
CANADA	24			HONG KONG	1		
UNITED STATES	193			ISRAEL	3		
				JAPAN	111		
				SINGAPORE	5		
EUROPE							
AUSTRIA	2	FRANCE	4	ITALY	9	PORTUGAL	2
BELGIUM	1	GREAT BRITAN	7	LUXEMBOURG	2	SPAIN	6
DENMARK	4	GERMANY	24	NETHERLANDS	4	SWEDEN	7
FINLAND	1	IRELAND	3	NORWAY	4	SWITZERLAND	3

The sample also includes companies that have been recently delisted, for example because of mergers and acquisitions during the period and for this reason financial statements were not available as of 2021.

Data are considered as at the end of the fiscal year, on December 31st, and the period taken under consideration covers a decade, from 2011 to 2021, with common currency set on USD.

Being mega, the size of the companies is fundamental, and explanation based on market capitalization is displayed below according to the different areas under analysis, with average numbers.
The United States has the highest value as it includes the biggest as Apple or Amazon, and some other big players in different sectors.

(*USD*)

	MARKET CAPITALIZATION	
	2021	*2011*
AMERICA	122.251.905.342,30	40.315.302.788,19
ASIA	29.255.092.144,31	15.892.203.415,79
EUROPE	59.860.199.553,08	37.457.601.933,00

All the values of this research are extracted from Refinitv Eikon database, and the variable '*Company Market Capitalization'* represents the sum of market value for all relevant issue level share types: the market value at the issue level is computed by multiplying the share type by the most recent closure price.

The ratios have been computed at first for every single company of the sample, and then averaged, for American, Asian, and European part of the world.

	RETURN ON ASSETS (ROA)	
	2021	*2011*
AMERICA	2,62%	7,39%
ASIA	2,06%	3,78%
EUROPE	2,74%	5,90%

The ROA values are obtained by dividing Net Income After Taxes by Total Assets of the company (as the sum of Total Current and Non-Current Assets).

	EBITDA/TOTAL ASSETS (ROA)	
	2021	*2011*
AMERICA	12,48%	16,19%
ASIA	7,83%	11,47%
EUROPE	10,02%	14,19%

The Return on Assets measure has been computed on the sample also according to the definition used by Schivardi et al. (2017), as the ratio of EBITDA on Total Assets.
Values are higher under this definition of ROA, as the EBITDA is higher than Net Income; however, the trend is decreasing across the decade under both cases, as the Total Assets value increased more than EBITDA or Net Income in the period that goes from 2011 to 2021.

	NET DEBT/EBITDA		ICR	
	2021	*2011*	*2021*	*2011*
AMERICA	2,52	1,11	10,42	21,84
ASIA	2,19	2,06	217,33	283,85
EUROPE	2,49	1,39	16,27	51,80

The variable Net Debt has been computed as the difference between Gross Debt (short term and long-term debt) and Cash & Cash Equivalents.

These are the measures according to which zombie firms can be identified and what can be highlighted is that in fact the ICR is on average never lower than 1, as instead it happens with SMEs – most of the zombie firms are indeed SMEs.
This indicator is however commonly used by lenders, creditors, and investors to determine the how much risk lending capital to a firm carries.

Net Debt on EBITDA is the common ratio that is used by credit rating agencies and investors as potential corporate buyers (through mergers or acquisitions), to understand the financial difficulty of a company to repay creditors, depending on liquidity and earnings at disposal.

According to the Corporate Finance Institute, the Net debt-to-EBITDA ratio of less than three is generally reputed as sufficient.

The smaller the ratio, the more likely the company will be able to repay its debt positions; while ratios greater than 3 or 4 are considered as warning signals, meaning that the company may face financial difficulties in the future.

Of course, the Net Debt to EBITDA ratio isn't the only trustworthy predictor of a company's financial health and profitability, because if the company invests in assets as properties or equipment, the debt for the year will most certainly be high.

Although the investment may deliver stronger sales in the future fiscal year (increasing EBITDA as well), in the current FY increased Net Debt will boost the value of the ratio, while the denominator stays constant. In this case, combining it with other ratios or measures as the ICR would be ideal.

	AVERAGE PD (per geographic area)
	2011
AMERICA	1,55%
ASIA	0,77%
EUROPE	1,81%

In addition to the data above, default probabilities as of 2011 (PD) have been analyzed for the companies of the sample, even though some were not available (five out of 420).

European companies of the sample display on average the highest default probabilities, ranging from 0% to 12,25%. Companies in Asia range from 0% to 6,84% and in the US and Canadian firms, PDs go from 0% to 18,82%.

CHAPTER 4 – MEGA-CORPORATION VALUE CREATION ANALYSIS AND MODELLING

In order to analyze the sample for the research, four tests have been carried to try and understand which variable could be the most related to and predictive of share value.
We ranked the companies according to four parameters (PD, Net Debt/EBITDA, ICR and ROA) whose values were as of 2011 and compare the value creation (in terms of closing price) of the front and last 20% of companies in 2021.

The results that were obtained are the following:

(USD)

		Average Closing Price	
		2021	*2011*
PD (2011)	*low 20%*	121,52	38,39
	high 20%	88,49	33,72
	change	33,03	4,68
		2021	*2011*
NET DEBT/EBITDA (2011)	*low 20%*	180,40	44,69
	high 20%	54,28	31,15
	change	126,13	13,53
		2021	*2011*
ICR (2011)	*low 20%*	55,80	26,50
	high 20%	150,04	47,32
	change	94,24	20,82
		2021	*2011*
ROA (2011)	*low 20%*	59,35	29,91
	high 20%	163,74	53,06
	change	104,39	23,15

As expected, companies with low default probability (PD) have on average the highest share price, relative to the upper side, and the same happens with companies with high NET DEBT/EBITDA, while the opposite (as it should) happens with ICR and ROA, in both 2021 and 2011.

Afterwards we investigated which was the variable among these four ones that could best predict share price (on average terms) in 2021.

The average value of the share prices in 2021, considering the whole sample is 125,04 USD.

Therefore, the variable that best predicts in 2011 the value creation and share price in 2021 is the default probability, for which the average price value of the companies of the lowest 20% shows an average, after ten years, of 121,52 USD.

If we instead consider the division per geographic area, the results are the following:

(USD)

AMERICA (US and Canada)		*Average Closing Price*	
		2021	*2011*
PD (2011)	*low 20%*	137,04	43,36
	high 20%	132,50	39,87
		2021	*2011*
ROA (2011)	*low 20%*	85,76	38,20
	high 20%	192,41	52,73
		2021	*2011*
NET DEBT/EBITDA (2011)	*low 20%*	205,25	43,48
	high 20%	88,61	38,92
		2021	*2011*
ICR (2011)	*low 20%*	95,01	34,11
	high 20%	93,28	207,43

The average share price of companies, considering only the United States and Canada, is 145,02 USD in 2021.

From the results shown above, the variable that best predicted share value creation after ten years is again the probability of default (137,04 USD).

(USD)

ASIA		*Average Closing Price*	
		2021	*2011*
PD (2011)	*low 20%*	120,94	38,46
	high 20%	22,51	0,03
		2021	*2011*
ROA (2011)	*low 20%*	28,20	20,84
	high 20%	141,82	57,36
		2021	*2011*
ICR (2011)	*low 20%*	24,61	22,95
	high 20%	107,04	39,79
		2021	*2011*
NET DEBT/EBITDA (2011)	*low 20%*	162,65	46,25
	high 20%	20,59	16,26

In the case of Asian countries, it seems like no variable is able to grasp and predict correctly the share value of 2021, as of 2011. Indeed, the average share price considering all companies is 63,80 USD, and no value in the table above is quite near that.

(USD)

EU		*Average Closing Price*	
		2021	*2011*
PD (2011)	*low 20%*	79,22	35,74
	high 20%	33,33	21,70
		2021	*2011*
ROA (2011)	*low 20%*	47,24	25,59
	high 20%	104,36	37,30
		2021	*2011*
ICR (2011)	*low 20%*	39,69	18,78
	high 20%	116,34	56,58
		2021	*2011*
NET DEBT/EBITDA (2011)	*low 20%*	117,34	45,15
	high 20%	49,83	29,33

In the last analysis per geographic area, value creation in European Countries is best predicted by Net Debt/EBITDA and ICR, given that the average 2021 price considering all EU companies is **154,15**, even though it is not perfectly matching or close, as it happens in the general case of the overall sample or with the US case.

(USD)

		Average Closing Price	
		2021	*2011*
P/B (2011)	*low 20%*	123,21	49,76
	high 20%	178,63	48,23

What was also analyzed is the price to book ratios of the companies.

Since it includes mega corporations and not small to medium enterprises, or zombie firms, the results are different from those that Piotroski (2000).

After sorting companies based the price-to-book ratio (from lower to higher values), the average closing price of the shares of the companies with a low MB ratio show a lower increase in price in the long run (10 years) relative to the increase of the upper 20%.

What stems from this results is that mega corporation value stocks do not create value in terms of share price in the long run, as it happens with SMEs.

Studies from Barclays report that such change in direction is to be found starting from 2007, when value stocks were too expensive – if the discount of stocks is too high relative to past times, it eventually tends to shrink and the stocks will outperform in future periods (months or years), but on the contrary if the valuation itself is too high relative to history, value stocks could probably underperform in the long run.

Value stocks today already trade at discount relative to more expensive stocks, (55% discount of high-priced stocks) while before the discount was very thin (Barclays, 2016).

CONCLUSION

We started this analysis from the definition and concept of zombie firms, and the troubles that they reverse on the economy in general, as well as the way to identify them through well-defined ratios as the Interest Coverage Ratio, the Net Debt/EBITDA and the Tobin's Q ratio, which is widely used on the non-listed companies.

To consider the high levels of debt that characterize companies in distress is mandatory, because of the increased risk that investors could bear when investing in these, given that the event of default is not remote, and remuneration should be provided for the hazard. In fact, while market risk drives part of price of equity when we talk about safe companies, default risk and credit risk do the same when we deal with distressed businesses.

Fundamentals and objective data are required in the valuation of zombie and distressed firms because their equity is typically underpriced (the price to book ratio is lower than 1) and the value created is captured and shown more in the long run than in the short run – having strong value stocks in a portfolio will eventually compensate the poor performing ones – when there is a portfolio made up of stocks like these, value investing is the way to go.

What comes out from the results of this research is that default risk does play an important role even when the focus shifts towards large, listed corporations, and not only for companies that are in financial troubles.

Indeed, after having ordered companies based on ascending default probabilities, those that had the lower value at 2011 (lower 20% of the sample), ended up having, on average, the price that reflected the whole sample average price in 2021.

Being the probability of default the variable that, among all others, best predicts value creation and share price in the long run for listed companies tells a lot about current valuation methods and the need of these to be integrated, considering not only the going concern status but also the gone concern one.

In addition, Mega Corporations go against the rule of value investing, that is a feature of companies with price-to-book ratio lower than one: in fact, they do not create value in the long run, but those with high price to book ratio (growth stocks) do. The reason for this weird behavior can be found at the inversion of direction and the undervaluation of value against growth that started from 2007.

Value investing has therefore proven not to work as expected in this case even though it has been one of the most popular investment strategies and value traps needs to be avoided by considering for example earnings momentum compared to the market.

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EXECUTIVE SUMMARY

This thesis, and the related research, are focused on the relationship that links value creation and share price on one side, and credit and default risk on the other, but since common papers explained it as it happens with small-to-medium enterprises, within which more often the companies in distress and zombie firms can be identified, this one is more focused on the case of the so-called Mega Corporations.

Attention on the viability status of companies has become essential and, therefore, related risks must be included in the business valuation due to the high levels of leverage that is present in companies starting from the years before the Global Financial Crisis; firms can indeed be classified based on the going and gone concern condition, where the default of the firm is what separates the two states existing before and after the event.
In the near-bankruptcy case, insolvency procedures are central, and the various methods used to estimate the probability of insolvency are now quite similar and necessary to those used to estimate equity value: in fact, default risk is predominant in the sub-investment grade zone, whereas market risk is predominant when approaching the valuation of the equity cost of capital for companies in the investment grade zone.

Investments in distressed debt have turned out to be particularly appealing in recent decades, primarily for private equity and distressed hedge funds, which have emerged as the primary players in the field; scanning the landscape of companies with unstable capital structures and negative worth has proven to yield interesting returns, even though this is not free from high risk.
What funds mainly do is to acquire and trade debt securities and purchasing these at low prices compared to their face value allows them to become main creditors of the company and to obtain eventually significant negotiation powers.

Within the vast sphere where financially distressed companies are, zombie firms can be identified.
The first phenomenon of creation of zombie firms was analyzed by Caballero et al. (2008) in the event of zombie lending that characterized the Japanese *Lost Decade* and these are companies that are not able to cover costs of debt with current profits and hence depend on creditors to continue to carry on their operations and business activity; furthermore, they produce and invest less in both tangible and intangible capital, growing at a slower pace related to other companies.

By the literature, they are generally defined as companies having a "*persistent lack of profitability*" and "*low stock market valuations*": their inability to generate profits for a prolonged period and their growth potential is reflected in market prices as well, based on the investors' ideas that also in the future these corporates will not be able to fully recover, and should hence exit the market at some point in time. Zombie firms have a determined life cycle that allows them to be identified a priori some years before they even are classified as such, displaying lower profitability, employment, and productivity – assets, capital stock and intangibles are low, asset disposals instead start increasing in the few years before zombification.
After they are classified as non-profitable firms and leverage starts to decrease, the performance rises, but even years after, productivity and profitability remains impaired. Nonetheless the ability to generate cash improves and the market gives good signals perceiving the company as being able to recover in the long run, if it continues to stay alive.
Banerjee and Hofmann (2021) find that within listed small to medium enterprises (SMEs) the share of zombie firms in assets, capital and debt is greater than the respective percentages in the total share in zombie firms. This implies that if the whole spectrum of SMEs (listed and not listed – where the SMEs that are not listed represent the major part) is considered, the overall amount of zombie firms may be larger than those that emerge being in the population of companies listed on the stock market.

Prioritizing the two mentioned above requirements according to which zombies are identified, low profits and low share price, the financial parameters connected to these conditions are the Interest Coverage Ratio (ICR) that needs to be lower than one and the Tobin's Q, lower than the median value of the industry they operate in.

The Japanese lost decade cited previously is a clear example characterized by the proliferation of zombies, where, due to a multitude of factors happening at the same time, the economy stayed stagnant because undercapitalized and weak banks continued restructuring loans to insolvent borrowers to comply with capital requirements, instead of writing off the books exiting capital. The banks in this way were able to distort competition throughout the economy by keeping these insolvent borrowers alive. The distortions manifested in a variety of ways, including decreasing market pricing for their products, rising wages by retaining workers whose productivity at present enterprises had dropped, and, more broadly, congesting the markets these companies engaged in.

The number of zombie firms across the years is linked usually to periods of ups and downs and business cycles in the economy, and consequently the probability of not being able to exit this status

went up as well in these periods: this is mainly linked to the fact that increase in zombie share is associated with low productivity and scarce investment possibilities. Clear examples of this are to be found in the GFC and the Covid 19 pandemic.
Even though a lot of scholars study such phenomenon, it is not still well defined which are the factors that spur it, however the majority agrees on the importance of low interest rates and weak undercapitalized banks, the latter leading to credit misallocation and distortion of equilibriums in the market. The impact is on productivity and growth of other healthier companies, because exaggerate competition is created and resources therefore become scarce.
Zombie financing reduces the efficiency of the resource allocation process by keeping inefficient businesses alive (or by preventing them from dying), while making it more difficult for healthy businesses to grow. New entrants in the market (and healthy existing ones) must compete with zombies for goods, labor, and funds, but this may make it hard for newcomers to gain access to these resources because zombies are somewhat protected and do not have to worry since they are backed by their current workforce and financial resources.
Also, a role is played by different tax regimes and insolvency frameworks.

All the literature review about zombie firms and financial distress explaining the particular phenomenon was needed in order to understand the behavior of such companies and oppose them to the listed big firms.
The listed companies under analysis belong to different stock markets and geographic areas, whose current outlook has been provided by investment managers and banks.

The stock markets have always been dominated by U.S. markets, especially in the last decades. However, other markets (as the Europeans) started to gain importance across the years from the implementation of the euro currency in 2002, as well as emerging and developing countries and relative markets that grew in those same periods.
2021 was an excellent year for stock markets globally, that ended the year with double-digit gains consecutively for three years. Reasons for such success can be found in the easing monetary policies and fiscal stimulus that characterized the period, and investors indeed started the year bullish as the conditions were favorable for an economic recovery after the pandemic. Demand surpassed supply and companies were able to deal with increase in prices and reach very high earnings, nonetheless shortage of goods, inflation, and political conflicts. The biggest contribution was given by the United States where some companies also doubled their stock prices and technology giants contributed to this rise thanks to their size relative to other players.

Global IPOs experienced record numbers in 2021, following the pandemic restrictions, but had a slowdown in the first quarter of 2022: the reasons for such change of course are to be found in a variety of causes as geopolitical tensions, stock market volatility, worries and alarms about rising commodity prices, and also energy's, the impact of inflation and of potential interest rate movements, and the delay of the full global economic recovery due to the still existing COVID-19 pandemic risk (EY, 2022).
Initial public offerings of cross-border, mega (companies with above US$1 billion proceeds), unicorn and SPAC type all declined sharply together with worldwide IPO activity.
In 2022 global equities are expected to perform well following the momentum from the previous period, even though markets were shaken by the diffusion of the new Omicron variant hitting confidence of investors, given the high contagion rate and the fear of the past.
For the first quarter of 2022 forecasts were that emerging markets would display an increase in fair value of 10,8%, according to the macro model, but for the U.S., given the pressure exerted on price-earnings due to high rates, only a 2,6% increase in fair value was expected, and EU's increase in fair value expectations would be around 9,4%. (Bloomberg Intelligence, 2022)

As leverage has been gaining importance as a tool to obtain capital not only for SMEs but for all companies as well, it is fundamental when valuing the equity to grasp not only the going concern side, but also the gone concern one, and to include the probability of default within the premium in the cost of capital when discounting cash flows.
From previous studies it results that market risk is predominant when approaching to the valuation of the equity cost of capital for companies in the investment grade area, and default risk is instead primary in the case of sub-investment grade zone.
Credit default swap (CDS) spread is what can be used to include credit risk with derivative-implied risk factors to explain stock returns, and the research conducted by Steiger (2020) provides that for portfolios or stocks with high credit risk, it has a very high explanatory power, but only a very small explanatory power for equities with reduced credit risk. This indicates that a firm's credit risk has a significant impact on its stock price when the company is in financial troubles, but only a minor impact on companies that are financially sound.

Another point that needs to be highlighted and that is analyzed within our sample as well is about the Price/Book ratio: keeping good value stocks (those with low Price/Book ratio) in portfolio will generate value in the long run, shifting the mean to the right. Usually, the companies that display a low price to book ratio are the SMEs, where zombie and distressed companies are identified.

The idea is that holding in a portfolio few good and financially strong value stocks will outweigh the poor performing ones. The success of the strategy depends on predicting accurately the firm performance and the ability of the investors to perceive such patterns and eventual the value creation. Once this is done, firms with poor performance can be eliminated from the portfolio of low price-to-book ratios, and the remaining ones will yield the strongest returns.

As said before, the research conducted in this thesis goes against the majority of papers about default and credit risk and equity value already present, which are focused on the small to medium enterprises that most of the times are not listed. As opposed to the small firms, there exist the universe of the Mega Corporations.
We decided to explain and analyze such group of companies by looking at some fundamental ratios, in addition to the market capitalization, as the Return On Assets, the Net Debt/EBITDA, and the Interest Coverage Ratio, meaning EBIT/Interest Expenses.

The Mega corporations taken under consideration in this analysis are organized in a set of 420 non-financial listed companies, from different countries in Europe, Asia, and America (precisely 217 for US and Canada, 120 for Asia countries among Hong Kong, Israel, Japan, and Singapore, and 83 for EU countries – Austria, Belgium, Denmark, Finland, France, Great Britain, Germany, Ireland, Italy, Luxembourg, Netherlands, Norway, Portugal, Spain, Sweden, and Switzerland.
All the values are expressed in USD and are on average terms, with some analysis divided per geographic area.

Being mega, the size of the companies is fundamental and expressed in terms of market capitalization; the United States has the highest value as it includes very big and important firms as Apple or Amazon, and some other key players in different sectors as in technology.
The ROA value are set on average range values of 2,06% to 2,74% in 2021 and on higher numbers (3,78% to 7,39%) in 2011.
Net Debt on EBITDA and ICR display on normal and acceptable values, meaning that average Net Debt/EBITDA is less than three and average ICR is more than one, for all the three geographic areas. These ratios are important even when we deal with large, listed companies as they are used by credit rating agencies and investor to understand the financial difficulty of the company to pay down debt depending on liquidity and earnings at disposal.

Also default probability is provided (as of 2011) for our companies, with average values ranging from 0,77% to 1,81% (this last higher number is for Europe – it could be linked to the sovereign debt crisis that hit European countries in those years).

The results of the research are quite interesting because what comes out is that default risk does play a significant role even when the focus shifts towards large, listed corporations, and not only companies that are in financial troubles, within the valuation of equity and therefore share price.
Indeed, after having sorted companies based on ascending order for each of the variables, the test conducted with default probabilities is the most meaningful one: companies that had the lower value at 2011 (lower 20% of the sample), ended up having, on average, the price that reflected the whole sample average price in 2021.
Indeed, the average price comprehending all the companies in 2021 is 125,04 USD, while the average 2021 price coming only from companies with lowest PD in 2011 is 121,52 USD.

Of course, and as expected, companies with low default probability (PD) have on average the highest share price, relative to the highest side, and the same happens with companies with high NET DEBT/EBITDA, while the opposite (as it should) happens with ICR and ROA, in both 2021 and 2011.

Such study was carried out also for the other parameters, but being the probability of default the variable that, among all others, best predicts value creation and share price in the long run tells a lot about current valuation methods and the need of them to be integrated, considering not only the going concern status but also the gone concern one.
The test was executed also for the companies divided per geographic area, but the results were not as clear as for the overall general case.
In the American one, default probability is again the best predictor of share value (137,04 USD against an average sample price of 145,02 USD).
In Europe the Net Debt on EBITDA and ICR are those that are closer to the average share price in 2021 (respectively $117,34 and $116,34 against $154,15), but the evidence is not strong, while in Asia it seems like no parameter is able to grasp the creation of value.

In addition, Mega Corporation have proven to go against the rule of value investing, that is the preferred investment strategy of companies with price-to-book ratio lower than one: in fact, while for SMEs, holding good value stocks will generate value in the long run, big companies with low P/B do not create value in the long run, but those with high price to book ratio (growth stocks) do.

The reason for this weird behavior could be found at the inversion of direction and the undervaluation of value against growth.
Studies from Barclays report that such change in direction is to be found starting from 2007, when value stocks were too expensive – if the discount of stocks is too high relative to past times, it eventually tends to shrink and the stocks will outperform in future periods (months or years), but on the contrary if the valuation itself is too high relative to history, value stocks could probably underperform in the long run.
Value stocks today already trade at discount relative to more expensive stocks, (55% discount of high-priced stocks) while before the discount was very thin.

Value investing has therefore proven not to work as expected in this case even though it has been one of the most popular investment strategies and value traps needs to be avoided by considering for example earnings momentum compared to the market.