LUISS

Department
of Business Management

Course Corporate Restructuring and Turnaround

Corporate Zombies in European Private Markets: Classification, Types of Intervention and Analysis on the future performance of recovered firms

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Introduction

The Pandemic caused by Covid-19 has hit the world in several aspects, affecting the health of populations, radically changing our habits, and also impacting the global economy. Due to the restrictions adopted for contrasting the virus, enterprises suffered the shocks in both demand and supply. The generated economic crisis had completely different aspects from the previous ones: depending on a virus, it was more unpredictable in terms of duration and extent. On the other hand, it seems to have accelerated existing trends, like the use of technology and online services, leaving behind businesses that were already becoming obsolete.

Moreover, this crisis seems to have amplified problems that in the last few years resulted already widespread in the corporate sector, like the high levels of leverage among firms.

The interventions of Governments and Central Banks have been widespread and relevant, however, the need to buffer the liquidity problems of companies, has led to the creation of poorly targeted supports based mainly on credit measures. The fear that this could cause damages during the next years is widespread among economists, which predict serious insolvency problems and an excessive public spending that will burden on taxpayers.

In this context, the theme of zombification of enterprises, appeared at various historical moments of the Contemporary Era, seems to be current again. After having revised the related literature, focusing principally on the BIS study about the definition, the characteristics, and the life cycle of zombie firms, we will then carry out our empirical analysis. We will study the situation focusing on European Countries, more precisely, we will try to quantify the presence of zombie firms among unlisted SMEs, entities of extreme interest to Europe given their economic importance in terms of employees, value generated and contribution to the GDP.

After carrying out the empirical analysis to find the number of zombie firms among 27 States of Europe, we will deepen the topic of recovered zombies, trying to understand the quantity and quality of recoveries. This information will allow us to better understand the severity of the problem and also to hypothesize the extension of the decisions suggested by the G30 about the theme of unviable firms and creative destruction.

Chapter 1 - The G30 and the measures for the corporate sector post-Covid

1.1 - The situation

Alongside the dangerous damages to people's health, the virus has brought also grave effects on the global economy. Started from China, the health crisis subsequently spread in Europe (Italy as the first one) as well as in America, causing a sharp and massive supply shock and a dramatic change of consumption patterns. The virus and the associated restrictions contributed to limit the expenditures of consumers to essential products and services. Governments adopted different responses to the pandemic: Italy, Spain and France chose to institute a rigorous lockdown next to the shutdown of non-essential activities, in other countries like Germany the measures were less strict, up to the case of Sweden which chose the softest way. "*Sweden response to COVID-19 has been almost unique in the European context. In fact, it is the one of few European countries that adopted a more relaxed approach to the issue: no lockdown for the population, no border closure, non-essential businesses still operating and no bans for public gatherings. Still some measure has been enforced like remote work and social distancing, closing of universities and colleges (but schools remain open).*" (Cerved Rating Agency, May 2020)

Some industries were facing sustained impacts due to the acceleration of the growth in demand for online services, in fact *"the shift to digital persists across countries and categories as consumers in most parts of the world keep low out-of-home engagement. Food and household categories have seen an average of over 30 percent growth in online customer base across countries.".* (McKinsey survey, 26/08/2020)

Clearly, the importance of digital technologies has become undeniable during the pandemic: just think to the role that smart working, e-learning and e-commerce had in 2020, and that probably will continue to have during the next years. "*The boom in online shopping is mainly about basic necessities, followed by household goods, clothing, with a preference for sportswear, home fitness equipment, games and toys. Within consumer electronics, sales of accessories such as webcams, monitors, headphones and microphones have grown in association with the diffusion of e-learning and remote work. Social distancing has boosted sales of vacuum cleaner robots, smart home devices. However, the health emergency has caused a decline in e-commerce sales of clothing, furniture, footwear and, to a significant extent, in the tourism sector.*" (Cerved Rating Agency, May 2020)

However, the sectors of energy, travel and leisure, and airlines have suffered the more severe blow "*The Travel & Tourism sector suffered a loss of almost US$4.5 trillion to reach US$4.7 trillion in 2020, with the contribution to GDP dropping by a staggering 49.1% compared to 2019; relative to*

a 3.7% GDP decline of the global economy in 2020. In 2019, the Travel & Tourism sector contributed 10.4% to global GDP; a share which decreased to 5.5% in 2020 due to ongoing restrictions to mobility" (WTTC annual research, 2020)

More in general, the pandemic caused a widespread and extreme crisis, accelerating underlying trends and generating immense uncertainty. The World Economic Outlook of April 2020 of IMF shows a relevant decrement of the World real GDP in 2020, in particular, Italy registered a -9.1%, while the European Union the real GDP contracted by 6.4 % in 2020.

Thus, the 2020 has seen the drop of revenues for many firms, leading to relevant losses and liquidity problems which required impellent measures for the sake of the business continuity. Many sectors, in particular those with an more fixed costs, have suffered important liquidity pressures. Globally, the companies' financial reports of 2019 suggested that 50% of them had not enough cash to pay interests and related costs of their debts for the next year.[1]

"In the short-run, the Covid-19 shock challenges corporate liquidity by impairing corporate cash flows, which will likely go deeply negative for many firms as they are unable to cut their costs in line with plunging revenues. In addition, a number of factors compound this problem. First, facing restrictions on commercial activity, firms may struggle to sell existing inventories, or even borrow against them. Second, trade credit can freeze as firms seek to defer payments; depriving the corporate sector of a vital source of lubrication which keeps it ticking. Third, existing credit lines could provide firms with additional resources to help them meet short-term liquidity needs. However, credit lines often have a short-maturity and under the current stressed conditions banks may be reluctant to renew them." (BIS Bulletin n° 10, 28/04/2020)

For this reason, the first response of governments has been to launch large credit support for companies, especially for small and medium-sized enterprises. Excepting from the United Kingdom, where the Corporate Debt Purchase Programme amounted to a quarter of all credit support offered to businesses, the credit support of the other European nations has been mostly in the form of loan guarantees.

In addiction, between March and April 2020, the central banks used the complete set of crisis management policies at their disposal. They all offered new lending operations and either extended or inaugurated asset purchase programs.[2] (Figure 1)

[1] "This survey is based on a sample of 40,000 listed and large unlisted non-financial firms across 26 advanced and emerging economies, with aggregate revenues totalling around 60% of GDP in the median economy". (BIS Bulletin n° 10, 28/04/2020)

[2]The ECB introduced the Pandemic Emergency Purchase Programme, originally a program of 750 billion, increased by €600 billion in June 2020 and by €500 billion in December 2020, for a total of €1,850 billion. It includes purchases of all the asset categories eligible under the existing purchase program (APP).

"The first Central Bank to move was the Chinese Central Bank (PBOC) that launched a first stimulus of 1000 billion yuan (132 billion euros) at the beginning of the crisis and went even further on mid-February cutting interest rates as its economy was threatened by an outbreak of a deadly COVID-19." (Cerved Rating Agency, May 2020)

The Federal Reserve, the Bank of Canada and the Bank of England also cut interest rates, while in the euro area they were already negative.

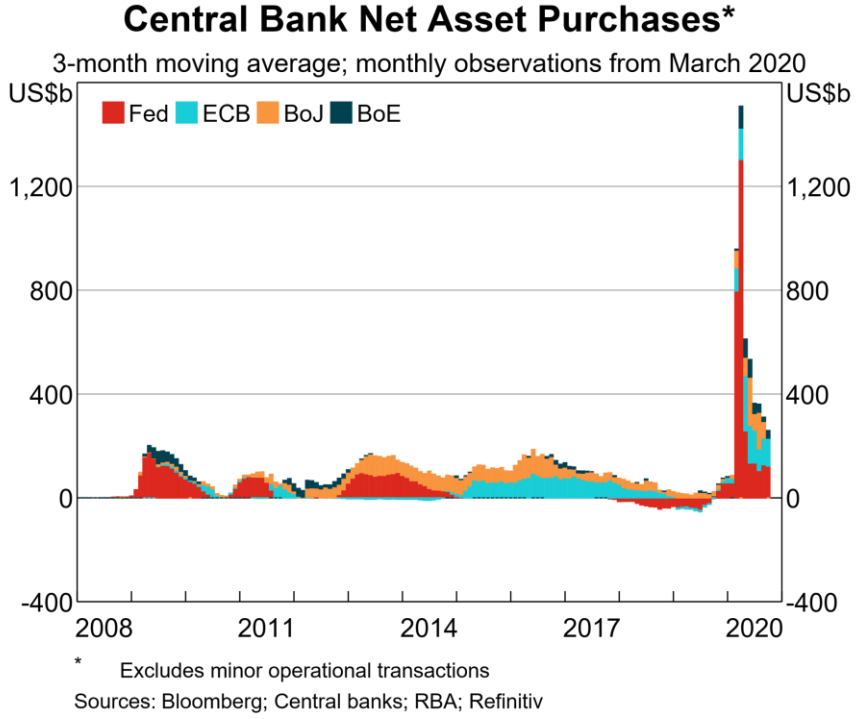


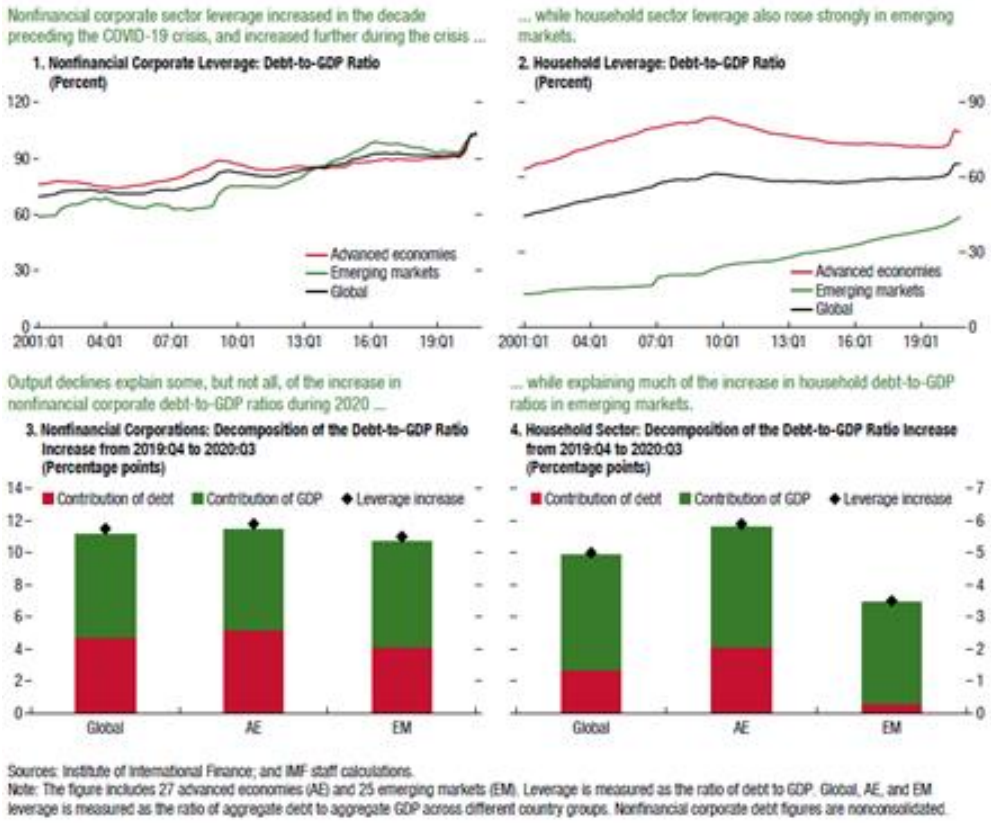
Figure 1

Clearly, the priority was to rapidly inject liquidity, and credit-support measures have been the main instruments to face the crisis, but even if they helped companies in the short term, in the long run they could generate a serious danger. "*This strategy is not without risks, however, as the long-term viability of borrowers can now be hard to gauge, and fiscal space to support the guarantees may be limited in some cases*" (Baudino, April 2020).

Focusing on Italy, among the various supports for the credit system and the supply of liquidity to firms planned into the emergency decree "Cura Italia", we can mention the suspension of mortgage and loan instalments and the increase of the PMI Guarantee fund. Moreover, with "Garanzia Italia", the instrument envisaged by the Liquidity decree, Italy sustained the granting of loans to Italian economic and business activities up to 200 billion of Euros.[3] For contrasting liquidity issues, it has been also established a delay of tax payments and contributions.

[3] The public guarantee for new loans disbursed to firms will be issued by SACE with the State as counter-guarantee.

Returning to a global outlook, it must be said that unfortunately, even before the coronavirus recession, many companies had already unusually high levels of leverage. The figure 2 shows the increase of leverage of nonfinancial companies in the decade preceding the COVID-19 Crisis:

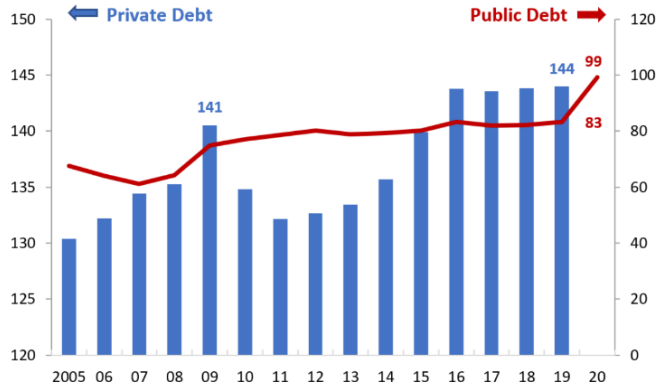


Sources: Institute of International Finance; and IMF staff calculations.
Note: The figure includes 27 advanced economies (AE) and 25 emerging markets (EM). Leverage is measured as the ratio of debt to GDP. Global, AE, and EM leverage is measured as the ratio of aggregate debt to aggregate GDP across different country groups. Nonfinancial corporate debt figures are nonconsolidated.

Figure 2

Since the global financial crisis of 2008, advanced-economy public debt ratios rose sharply and with a sudden step, passing from a debt equal to the 53% of GDP at end of 2007 to a percentage of 80% at the end of 2012. (Figure 3)

Debt: a pre-existing condition
Before COVID-19 struck, public and private debt were already high and rising in most countries.
(percent of GDP, weighted average)



Sources: IMF Global Debt Database, IMF World Economic Outlook Database and IMF Staff Calculations.
Note: The aggregate public debt-to-GDP series is based on data of 189 countries, and the aggregate private debt-to-GDP series is based on 159 countries, weighted by GDP in US dollar.

Figure 3

In addition, the cheap and readily available funding of the last decade encouraged borrowing: after 2008 the average yield on corporate bonds has decreased drastically, due to the significant monetary boost of the European Central Bank (ECB) and other central banks, which allowed negative deposit rates and longer-term refinancing operations. "*While the accumulation of public debt was generally for good reasons (averting an economic or banking system collapse), the fact remains that most advanced economies have built up large stocks of debt but have little or no more public infrastructure to show for it."* (Ostry et al, June 2015)

Thus, the growing corporate insolvency was already a concern and the worsening caused by the Covid-19 crisis had required an extreme attention.

Being dependent from a biological phenomenon, the peculiarity of the pandemic crisis can be found also in the difficulty of predicting its duration, it is also complicated to catch the difference between the changes in consumption that will disappear with the end of the pandemic and that changes that will remain permanent. This aspect complicates the prediction of the viability firms in the long run.

According to the study of Cerved Rating Agency of April 2021, the portfolio of outstanding ratings of Italian non-financial companies showed that the Speculative grade[4] ratings increased by 13.2% in 2020, this general negative trend of rating migrations is due to higher expected riskiness of companies.

[4] Within the rating system the entities' scores can be divided in Investment grade and Speculative grade. The latter indicates that the firm is less likely to be able to repay its debts compared to a firm with an investment-grade rating.

Moreover, the study states that the historical probability of default[5] could increase up to + 34% in December 2021, starting from a 4.48% of February 2020 and arriving to a 6% at the end of 2021.
These data are anyway comfortable in comparison to those expected by the research of May 2020, in which had been ideated three possible scenarios that differed in terms of the gravity of the impact of the virus and the likelihood of its happening: the softest scenario expected a PD of 7,7%, and a passage from Investment to Speculative grade of the 16% of the portfolio.

1.2 - The role of G30 and the "Reviving and Restructuring the Corporate Sector Post-Covid" report

In this context of crisis and uncertainty, the Group of Thirty's Steering Committee, composed by Mario Draghi and Raghuram Rajan, and the Working Group on Corporate Sector Revitalization published in December 2020 a report ideated for providing to policymakers a toolkit to use for contrasting the crisis of the corporate sector.
The Group of Thirty (G30)[6] is an international body composed by personalities belonging to the world of Finance and academic environments, it addresses economic issues, by discussing and investigating the consequences of decisions taken by policymakers.
It is worth to specify that the G30 can be considered a Think Tank, i.e. an entity of consulting and reflection, in which the decisions are neither binding nor executive. Nevertheless, the prestige and the importance of its members make this group very influential. The group consists in fact of thirty members among which we can find former and current presidents of several Central Banks as well as the heads of private banks and many other relevant economists. In particular Mario Draghi has been the President of the European Central Bank and since February 2021 is the Prime Minister of Italy, while Raghuram Rajan has been the Governor of the Reserve Bank of India.
The paper aims at answering three main questions: Which firms should be supported? Who takes this decision? How to support them?
Thus, it is possible to distinguish the three different themes connected to these questions: targeting, governance, and design and implementation. In this thesis we will focus on the targeting and the design and implementation, leaving out the aspect of the governance, that although it is very important for policymakers, is out of our scopes.
Within its work, the Group of Thirty guides policymakers towards decisions that are based on clear priorities.
By analyzing their words, it is possible to say that the first concern of the economists is addressed to taxpayers: governments should avoid an excessive public spending because it will require a

[5] The probability of default is intended as the expected probability to incur in a default within 12 months
[6] The group meetings are based in Washington, D.C.

significant contribution of current and future taxpayers. Thus, to avoid an immoderate fiscal pressure, governments must reduce interventions.

Another concept that emerges within the paper is the orientation towards alternative forms of aid: the credit support should be reduced to make room for equity. The paper suggests policymakers to facilitate the access to equity or equity-like investments. "*Equity or equity-like instruments can provide funding to companies and insulate them from shocks to their revenue streams, unlike loans, which can increase balance sheet fragility. Complementing lending with equity capital (or equity-like instruments) can help reduce the risk of viable companies failing, thereby destroying "going concern" value, or continuing to operate in zombie form"* (Group of Thirty, December 2020)

Always with the reduction of public intervention in mind, the opinion of the economists is that governments should also rely more significantly on the private sector capabilities. Considering the idea that the private operators are more able than public institutions to prioritize and administer good investments, the use of the private expertise must be preferred especially in Countries with a solid financial institutions and advanced capital markets. Instead, the public intervention must be necessarily addressed to market failures.

"*Virtually every serious analyst recognizes that governments face severe practical and political constraints in targeting loans and investments to firms that will be viable in the long term but need support now. Banks and private sector investors usually have substantially more expertise in evaluating viability, and they certainly face less political pressure as they make those decisions (…) Properly functioning markets can help allocate resources (and costs) using existing expertise and funding channels. Governments are usually less able to pick winners and losers and to structure funding injections that properly align incentives.*

(Group of Thirty, December 2020).

The report suggests a combination of public and private intervention which will cooperate by relying, where possible, on entities like Sovereign Wealth Funds and development banks. *"Harnessing private sector expertise is also likely to reduce adverse selection problems. When combining private and public sector expertise and resources, often the optimal solution will be to provide government incentives to encourage or channel private sector investment. Some states additionally have substantial investment expertise and financial resources in long-term capital pools, including sovereign wealth funds and development banks, that can complement private sector expertise*" (Group of Thirty, December 2020).

Another predominant idea is that of preferring a relocation of resources instead of the preservation of the status quo. In fact, according to the economists, resources should not be wasted for not economically viable firms: *"by accepting that some firms should be allowed to fail, governments*

will need to ensure their social safety nets are robust and provide support for retraining and entrepreneurship" (Group of Thirty, December 2020).

This concept is widespread throughout the paper: for the sake of economy, it is necessary to ease the change of trends even at cost of making companies fail. The idea of transformation of sectors and transition of resources to viable firms is named "creative destruction"[7]. Clearly, it is essential to define which are the criteria to determine the not economically viable firms that will be subject to this creative destruction.

For this reason, and with the aim of shaping the kind of intervention for each type of situation, the report offers a guideline for the classification of firms.

1.3 - Classification and types of intervention

One of the most important recommendations of the G30 is that of targeting supports: governments should decide upon more targeted measures instead of a broad and indiscriminate support, so that the limited public resources will be allocated efficiently, addressing them to companies able to preserve and create value.

"Allowing jobs and resources to flow from unsuccessful firms to ones that are better suited for the new economy". (Group of Thirty, December 2020).

The report underlines also the attention on the different size of firms, specifying that the SMEs represent a sensitive issue to take into consideration, we will dedicate a chapter on this theme at the end of this essay.

The chapter four of the report addresses the topic of targeting. It suggests a classification scheme composed by five broad categories of firms:

1. healthy firms
2. financing-constrained firms
3. liquidity-challenged firms
4. solvency-challenged firms
5. structurally unsound firms

Healthy firms are defined as those companies that are considered economically viable, have a low level of leverage[8] and that can easily approach to any forms of financing. Focusing on economic viability, a project is considered economic viable when it is sustainable regarding all expected revenues, the latter will be in fact greater than all current and planned expenditures. We can broaden

[7] The concept of creative destruction can be referred to theory of economic innovation of the economist Joseph Schumpeter. He defined it as the "process of industrial mutation that continuously revolutionizes the economic structure from within, incessantly destroying the old one, incessantly creating a new one".

[8] The leverage refers to the amount of debt in a company's capital structure.

this concept to the entire firm: a company can be considered economically viable when it is able to financially support itself with its operations.

Thus, the first category of firms, being able to generate sufficient revenues, having low level of indebtedness and access to financing, clearly does not need public support. It is essential to exclude these firms from aids which would represent "unjustified windfalls" for them and an excessive burden for the society.

The second category is that of financing-constrained firms. These companies have an economically viable business model, generally with low leverage, but do not have an easy access to financing. Typically, this is the case of small firms and startups, for that which concerns startups, despite they usually have a good potential of growth, they have not easy access to credit because of the lack of substantial tangible assets in their balance sheets that could have been used as collaterals. Also small firms, in comparison to larger ones, register problems in the access to financing *"10% of SMEs stated that access to finance is one of their main concerns(...) 20% of SMEs did not manage to get the full bank loan they had planned for during 2020, although only 6% of loan applications were rejected (...) SMEs consider the depressed economic outlook has negatively affected their access to finance by -40% in net terms - the lowest figure EVER in the history of the survey* (SAFE, 2020)

The paper suggests that in this case it will be appropriate to address them better-targeted credit programs, because these companies are fundamentally sound and the debt would be affordable, the only restraint is that currently they present excessive risk for lenders. Thus, the policies should aim to improve the risk/return tradeoff for private lenders.

The third category is that of liquidity-challenged firms i.e. firms that are economically viable but that result to have liquidity problems. The difference between the third and the fourth category can be found through the definition of liquidity[9] and solvency[10] issues. Liquidity refers to an enterprise's ability to meet short-term obligations, the concept it is strictly connected to the capability of matching the timing of obligations payments with that of cash inflows and also to the company's capability to sell assets quickly to raise cash.

On the other hand, solvency refers to a company's capacity to meet its obligations in the long run. This second problem must be considered more structural and permanent, which questions the possibility of the fir to continue operating into the future.

[9] Liquidity refers to the ability of a firm to repay its short term obligations through its cash and cash equivalents. The most popular ratios to measure liquidity are the current ratio and the quick ratio.

[10] Solvency ratios consider the company's financial structure and its stability in the long-run. Most popular solvency ratios are: the debt to equity (D/E) ratio, the debt to assets ratio, and the interest coverage ratio.

Unfortunately, the pandemic recession has already stimulated the passage of lot of liquidity-challenged firms towards the "Solvency-challenged" category.

According to Euler Hermes Global Insolvency Index, insolvencies continued to rise in 2019 for the third time in a row: +9% y/y, the index considers 44 countries that represent the 87% of global GDP.

Thus, the economists urge to provide liquidity or encourage its provision, the intervention should be geared towards providing specific forms of credit mixed with equity or equity-like investments able to repair the balance sheets of liquidity-challenged firms. By choosing the capital increases, companies are more protected from unexpected drop in sales, while in case of loans, the firms are more exposed to the risk of not be able to meet obligations.

Solvency-challenged firms belong instead to the fourth category, this is the case of those firms that have an economically viable business model but that have a level of indebtedness so high and so persistent that they are deemed to be insolvent.

Clearly, in this case it would not be appropriate to facilitate their access to additional debt, it should opt for supporting equity investments while improving restructuring procedures. "*Governments can get the most "bang for their buck" by encouraging that balance sheet restructuring through incentives for new equity and quasi-equity in these targeted firms or by making such investments themselves. Properly structured, these government initiatives can generate substantial investment earnings to partially or fully offset the cost of the incentives or the losses governments incur from firms that collapse."* (Group of Thirty, December 2020).

In addiction the report makes a specification on policy interventions for the firms of the second and the fourth category: the measures should be ideated according to the different needs of both the groups for getting all the policy objectives in an efficient and effective way. With this clarification, the economists probably want to underline the importance of distinguish between large and SMEs firms and among different business sectors.

Finally, the last category considered includes all firms that are not economically viable according to their actual business model. In this case, it is opinion of the G30 that it is necessary to encourage business adjustments or even the closure of the companies. This would help to avoid the proliferation of corporate zombies.

From its words we can hypothesize that the G30 places the corporate zombies into the fifth group, leaving out of this issue the other four categories of firms. It is essential now to pay attention to this last category, trying to understand which are, in the opinion of the G30, the boundaries between companies with an adjustable business model and corporate zombies and which are the characteristics to consider for defining them.

The report concludes the classification of firms with another suggestion which almost creates a subgroup of firms: there are, in fact, some structurally unsound firms that requires intervention *"Additional policy interventions may be justified, including for "structurally unsound" firms, if the social externality costs of failure that would otherwise materialize are judged to be sufficiently high."* (Group of Thirty, December 2020)

It should be useful to verify which, among the corporate zombies, will be recipient of the additional interventions mentioned by this passage.

1.4 - Interventions in practice

The two main categories of intervention mentioned above are credit and equity programs.

Going deeper throughout the application of the advised measures, the report makes several practical suggestions on both the types. We have already said that the credit programs should be destinated to financing-constrained and liquidity challenged firms, while equity and equity-like investments are indicated for liquidity-challenged and solvency-challenged firms.

Regarding credit support, the initial aids adopted in response of the pandemic should be modified in order to maximize the trade-off between return and risk for private lenders.

In the table below, we can observe major credit programs in different Countries: the credit programs shown, are all guarantees on bank loans with a high coverage. (figure 4)

The report suggests that it must be lowered the guarantee percentage that during the period of first response to the pandemic has been, in certain cases, up to 100 percent of the debt. Now, this level of guarantees will result in an excessive public intervention.

	UNITED STATES	UNITED KINGDOM	GERMANY	FRANCE
NAME	Paycheck Protection Program	Coronavirus Business Interruption Loan Scheme	Wirtschaftsstabilisierungsfond + KfW Special Program	Prêt garanti par l'état
PRINCIPLE	Government-financed bank loans to SMEs, convertible to grants if employer retains or rehires workers	Guarantees on bank loans	Guarantees on bank loans + subsidized KfW credits	Guarantees on bank loans
COVERAGE OF GUARANTEE	100 %	100% up to £250,000, then 80%	90% for small firms, 70% for larger ones	90% for small firms, 80% for larger ones
RATE	1% fixed rates; lenders compensated by government	Interest holiday for 12 months, thereafter terms set by lender	Several subschemes with different rates	Interest holiday for 6 months, low rates thereafter
MATURITY	2 years	Up to 6 years	Up to 5 years	1 year, extendable to 5 years
ELIGIBILITY	Eligibility SMEs (fewer than 500 employees)	SMEs	All firms	All firms

Source: Peterson Institute for International Economics, 2020

Figure 4

The government could differentiate the guarantee' levels by sector with the attempt to rank their different levels of uncertainty; it also could use different percentages of guarantee to reflect government priorities for certain sectors, inducing firms to take socially efficient decisions.

This last advice can have several meanings, it could refer to ESG[11] concept: the government can in fact influence firms towards more sustainable investments and operations. This could spread the concept of "creative destruction" and the passage of resources will be not only from non-viable firms to viable ones, but also from non-sustainable businesses to sustainable ones.

Another suggestion of the G30 is for the government to ideate guarantee against extreme negative outcomes on loan portfolios instead of those of individual loans, this will promote the diversification of risk.

Governments can also opt for using a wider range of credit spreads, that should be more similar to those of private institutions, in order to have a more risk-sensitive loan pricing system. The administration of these programs should be assigned to banks by ideating for them appropriate incentives. This would encourage reliable borrowers to ask for loans, leaving out weaker borrowers which should receive types of intervention different from credit ones.

Moreover, the policies should have stricter minimum credit underwriting standards.

[11] ESG means Environmental, Social and Corporate Governance and it is a recent phenomenon connected to the sustainability of investments. Nowadays, there has been ideated some metrics for measuring the social impact of companies' businesses based on ESG data.

An example of the passage to a stricter standard can be found in Germany, where the Kreditanstalt für Wiederaufbau (KfW) 2020 Special Program mentioned in the Table 3 has been replaced with the Quick Loan Program[12]. In fact, after the first phase in which the credit guarantee was destinated to all-sized companies, the German government decided to opt for a more specific measure destinated only to SMEs.

Regarding the theme of equity and equity-like investments, the idea of the G30 consists in three different options for the governments:

-giving incentives, where possible, to the private sector in order to encourage investments

-co-investing or drive investments in long-term equity funds

-operating directly, only in circumstances where private expertise is limited, with the cooperation with sovereign wealth funds if it is possible. Government direct investments should be the last choice to opt for in case of market failures.

To give incentives for private investments the governments can use several policies: it may invest in funds that concentrate their activity on equity (or equity-like instruments) in preferred industries, boost equity investments thorough preferential treatments of taxes using deduction, or by providing government subsidies or dividends to investments in determined sectors or under certain conditions. Government could also opt for paying an annual dividend or offering a partial tax credit on the original investment.

Government co-investment is likely to be most desirable in certain industries that experience a strong capital deficiency, including the sectors characterized by high uncertainty due to the Pandemic. This type of co-investment could be carried out with direct or indirect investments.

The direct investments can be made in different ways: the government can convert its loans in equity instruments or can decide to purchase total or relevant stakes in companies.

"The advantage for shareholders or firm owners would be to improve their balance sheet by lowering debt and increasing the equity buffer. The advantage for the state would be to improve the viability of firms and lower the risk of costly defaults." (Policy Brief 20-8)

Converting loans may be useful cause there is yet a relevant number of government-guaranteed loans, this conversions could take the form of redeemable preferred equity or, in case of smaller firms, in form of an agreements to pay higher taxes in the future in exchange for investment now. *This option might be preferred to proper equity as the latter requires more monitoring and there is*

[12] : The KfW was introduced in March 23, 2020, it provided between 80% and 90 % of credit guarantee with low interest rates. The Quick loan program was introduced in April 6, 2020 and provided the full coverage of loans up to €800,000 with a 3% of interest.

a limit to the extent to which the state can manage a large number of small equity claims. (Policy Brief 20-8)

All these credit and equity measures should be associated also to adjustments to restructuring procedures. Policymakers should introduce new restructuring schemes that would facilitate contractual debt restructuring for firms that would otherwise go under bankruptcy procedures. The idea is to preserve the going concern of viable firms, in fact, it is opinion of the G30 that many countries have yet a punitive approach in their bankruptcy systems that destroys instead of creating value. *"Most jurisdictions have insolvency procedures that essentially assume a firm with an unsound balance sheet is a structurally unsound business. Recognizing that many firms with unsustainable businesses are still fundamentally sustainable firms encourages a different approach to insolvency."* (Group of Thirty, December 2020)

In conclusion, we can say that the report offers a clear explanation of the targeting criteria and the related implementation policies, however, it leaves it open the interpretation of certain definitions. Within our work, we will try to give a definition of corporate zombies, with the aim of identifying the limits of the measures for Covid-19 Crisis.

Chapter 2 - Zombie firms: revision of the theme

2.1 - Definition and boundaries of zombie firms

We have previously seen how the Covid-19 crisis has worsened the situation of many firms, creating shocks of the demand of goods and services, causing significant liquidity problems, which in certain cases will turn in an excessive level of indebtedness. We have also seen that this crisis has worsened a situation that was already present in the economy, in fact, in some cases the Covid-19 has only accelerated trends and increased problems already known by the corporate sector. Meanwhile, the policies adopted by governments to support companies, which consisted mainly in credit aids, might turn out harmful for the entire system in the long run, therefore, they need to be adjusted. "*Government financial relief programmes have been enacted during the COVID-19 crisis to prevent corporate bankruptcies. Credit subsidies have protected companies from COVID-19 related insolvency – that is both companies with a viable business model but also non-viable firms.*" (Swiss Re Institute, SONAR 2021)

In this scenario the phenomenon of zombie firms has become more relevant and current.

There is some evidence in Germany, were the government suspended the obligation to file for bankruptcy in case a company was experiencing insolvency problems that could be directly related to the pandemic crisis.

The German Economic Institute in Cologne (IWK) estimates that this measure would have produced 4,300 additional zombie firms. In general, *"Low interest rates have enabled these fragile businesses to accumulate more debt, thus increasing the risks that more of these unprofitable businesses become "zombie" firms", particularly those non-listed SMEs that are heavily reliant on bank loans as their main financing avenue"* (IIF,2020)

Thus, it is common opinion that this pandemic could bring a new wave of zombies, but what are them? Essentially, zombie firms are companies that, over an extended period, are unable to repay debt and its expenses using the profits of their businesses, therefore, they are condemned to depend on creditors for their continued existence. In general, in comparison to other companies, zombie firms have tinier dimensions, are more leveraged but less productive and they record a smaller growth in terms of tangible and intangible assets and in terms of employment.

However, before deepening the subject, it is necessary to individuate the boundaries of this phenomenon.

Our first step is to arrive to a more specific definition of this kind of firms.

We find the first references to the term "zombie firms" during the first decade of 2000, when some academics dealt with the Japanese crisis of '90s, the so called "Lost Decade". The term referred to companies supported by Japanese banks after the collapse of the Japanese asset price bubble.

In 2005, Peek and Resengren, with the paper "Unnatural Selection: Perverse Incentives and the Misallocation of Credit in Japan" illustrated the problem of credit misallocation that troubled banks carried out towards low-quality firms. By continuing to support unviable firms, the banking system made in a way an unnatural selection which caused the stagnation of the Japanese economy.

Afterwards, in 2008 Ricardo J. Caballero[13] called these low-quality firms "zombies", this macabre term is effective for calling back the characteristics of companies that remains between life and death, with the constant need to devour resources.

Within its work, Caballero chose to identify these companies as those who received "subsidized" credit, i.e. forms of credit at rates that were below the level of those of the most creditworthy companies. Caballero based this definition on the fact that only unviable firms would have received subsidized credit, because otherwise they would have used regular funding with normal conditions *"We depart from past studies by classifying firms as zombies only based on our assessment of whether they are receiving subsidized credit, and not by looking at their productivity or profitability"* (Caballero, Ricardo J., Takeo Hoshi, and Anil K. Kashya. 2008)

Share of zombie firms in Japan

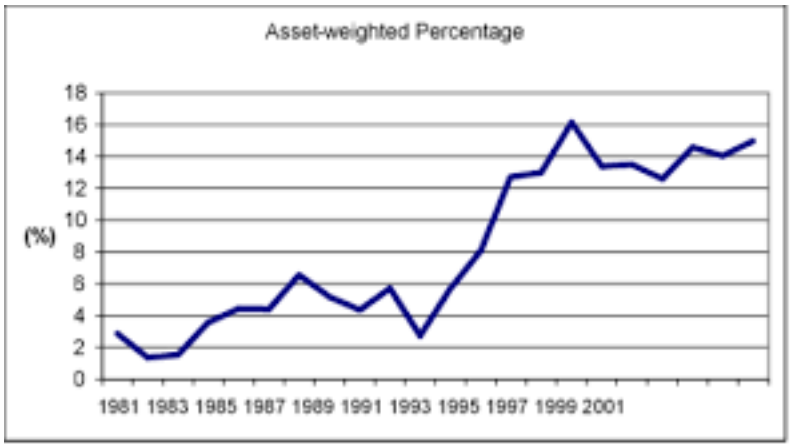


Figure 5

Source: -Caballero et al, 2008 American Economic Review 98 (5): 1943–1977 2008

Even though this choice could be useful for the aim of the work of the NBER, can't be taken as a general rule for identifying zombie firms. In fact, it should face some difficulties when, especially nowadays, interest rates are diffusely very low and in certain cases negative so that the boundaries between subsidized and normal credit are very confused.

[13] Ricardo Jorge Caballero is a Chilean macroeconomist, among other topics, he studied the Schumpeterian theories of technological progress through creative destruction.

Subsidized credit may be granted also to encourage particular forms of activity, for instance, for the growth of entrepreneurship among minority groups.

Moreover, there are cases in which banks may grant credit at generous conditions to clients for other reasons than covering their unviability. For instance, the client could have a long-standing credit relationship with a specific bank and this can lead to a preferential treatment independently from the condition of unviability of the firm.

In 2017, Adalet McGowan[14] defined a zombie firm that firm with a life of 10 years or more and an ICR[15] less than one for three consecutive years. Instead of referring to the behavior of external entities, like banks and governments which decide or not to give subsidized credits, this approach uses internal information of the firm, more precisely its operating characteristics. *"We employ a zombie classification based on the interest coverage ratio definition in the baseline analysis. This choice is driven by three main reasons: i) interest coverage ratios are better comparable across countries; ii) interest coverage ratios are less endogenous to productivity than negative profits; and iii) interest coverage ratios encompass channels other than subsidised credit through which zombie firms may be kept alive (e.g. non-performing loans, government guarantees to SMEs, weak insolvency regimes)"* (McGowan et al. 2020)

A few months later, in the working paper "Breaking the shackles: zombie firms, weak banks and depressed restructuring in Europe only", Andrews and Petroulakis defined zombie firms as incumbent firms (i.e. older than 10 years), based on the ICR measure and also on a complementary approach: the NRI, which takes into account the debt service capacity and the return on assets or investment. If the firm register a low debt service capacity and a negative return on assets or negative investment for three years in a row, then it can be considered a zombie. The choice of introducing this complementary approach can be seen redundant but it derived from a practical issue of the authors, since the interest coverage ratio required data on interest payments, which could have been difficult to find for some countries object of the report of Andrews and Petroulakis like Denmark and Estonia. However, the choice of considering only firms aged ten years or more underlines an important aspect: firms at their first stages cannot be classified as zombies by looking at their profitability, because in general they are not expected to be profitable within the first years of their lives. Some of them are start-ups that initially have little or no revenues but that instead

[14] Adalet MCGowan is a senior economist and chief of the Spain/Belgium Economics Department at the OECD.

[15] The interest coverage ratio is considered as debt and profitability ratio, it gives information on the ability of a company to repay interest on its debts. The ICR can be calculated as a ratio between a company's EBIT and its interest expense during a given period. Although the desired level may vary by industry, the higher the coverage ratio is the better is the ability of the firm to repay its debts.

have operating losses because they are likely to make investments that will be profitable only during the following years.

However, if including early-stage firms in the group of zombies only taking into account their profitability should be a mistake, also considering only firms older than 10 years could lead to an excessive simplification.

For this reason, among others, we chose to follow the definition of zombie firms given by Banerjee and Hofmann[16] in the BIS working paper "Corporate zombies: Anatomy and life cycle" of 2020.

The authors define zombie firm a company basing the analysis on two characteristics: a persistent lack of profitability and a low market valuation. These two measures can be considered as present and future indicators of the capability of the firm to generate profits.

This definition appears to be more objective and independent from external conditions, moreover, considering also the low market valuation for judging a company as zombie, can overpass the problem of low profitability of first stage firms which otherwise should be excluded a priori from this kind of valuation.

Going in depth, the profitability is analyzed through the interest coverage ratio, calculated as earnings before interests (EBIT) over interest payments, and the market valuation through the relative Tobin's q. The latter is calculated as a ratio between assets' market value and their replacement cost[17]. A company is considered zombie if, over a period of two years, it registers an ICR below one and a Tobin's q below the median of the sector. The choice of referring to a period of two years can be motivated by the need of a certain degree of persistency in the situation of unprofitability of the firm, in order to attenuate the effects of transitory fluctuations. For the same reason the economists require an equal grade of persistency also for the inverted process, a firm must in fact record a rising of interest coverage for two consecutive years to be considered a recovered firm. It is interesting to observe that, in comparison to that of McGowan, the requirement of persistency of Banerjee and Hofmann has been reduced of 1 year.

But what do these ratios mean?

An adequate level of interest coverage ratio is reputed important by creditors, investors and shareholders. The optimal level of interest coverage varies between sectors but also between different firms. Generally, as a rule of thumb, the minimum acceptable level of ICR is two, but analysts prefer to see a coverage ratio equal or greater than three. Clearly, having an ICR below one is a strong signal that profits are insufficient to cover interest payments on debt. This can depend by

[16] Members of the Bank for International Settlements

[17] The replacement cost is the amount of money that an entity would currently spend to replace an essential asset with a similar one which same functions as the original asset.

two aspects: the capability of the firm to generate profits is compromised, and also the cost of interests is too burdensome because of the excessive leverage of the firm. We will see how, according to Banerjee and Hofmann, both the characteristics are in line with the general lifecycle of a zombie firm.

On the other hand, when the Tobin's ratio is relatively low, it shows that the market is underestimating the firm in comparison to others of the same sector. When the ratio is between 0 and 1, the stock is undervalued because the cost of replacing a firm's assets results to be greater than the value of its stock. The choice of Banerjee and Hofmann of using a relative instead of an absolute criterion for Tobin's q makes possible to prevent stock market fluctuations affecting the results. Through the Tobin's q it is possible to individuate what is the expectation that the market has on the future profitability of the firm. Therefore, if a firm is experiencing losses so that the ICR results to be below one, but the market expects a recovery and a successively capability of generating earnings so that the Tobin's Q is relatively near the median of its panel, then the firm can be excluded from the group of zombie firms.

2.2 - Origins and causes of zombie firms

We have already anticipated that the term "zombie firms" was born on occasion of the studies about Japanese firms of the Lost Decade. After a strong economic growth ended at the beginning of 1990, with the 1991 asset price bubble's collapse started a period of slowdown for Japan, that between 1991 and 20003 registered a GDP growth of only 1.14 % annually, much smaller than that of other OECD countries, and equal to the 25% of the 4% annual average growth rate of Japan in the 1980s. Next to the collapse of stock prices and real estate markets, Japan suffered also from both a credit crisis and a liquidity trap[18]. "*The asset price collapse created problems for the banking system by impairing loan collateral and eroding bank capital (…) Firms—which had borrowed heavily to finance expansive business strategies in the bubble years—found themselves with massive excess debt and capacity in the face of the ensuing economic slowdown."* (Callen and Ostry, IMF, 2003)

Economists argued that the crisis was worsened also by the misallocation of credit of the banking sector towards weak firms. Troubled Japanese banks continued funding firms that were already insolvent with the aim of avoiding to record losses on their financial reports, *"This leads to a policy of banks "evergreening" loans, whereby a bank extends additional credit to a troubled firm to enable the firm to make interest payments on outstanding loans and avoid or delay bankruptcy. By*

[18] With liquidity trap we refer to the scenario in which households and investors sit on cash, mainly due to lost of confidence in investments. The liquidity trap is usually associated to a period of deflation, in which people prefer to retain cash because they wait to consume because they expect goods to be cheaper in the future.

keeping the loan current, the bank's balance sheet looks better, since the bank is not required to report such problem loans among its nonperforming loans." (Joe Peek, Eric S. Rosengren, 2005)

Japanese return on assets

Sources: Ministry of Finance; and IMF staff calculations.

Figure 6

It is clear that, to make it possible, the government played a role in this mechanism, it put pressure on banks to extend credit to impaired firms in order to avoid a massive wave of failures. Moreover, the government decided to not admit the necessity of a reform of the banking sector. *"Just as forbearance by bank regulators has allowed the banks to be slow to restructure, bank support for troubled and noncompetitive firms has prevented the needed restructuring of nonfinancial firms. Thus, while the evergreening of loans in Japan insulated many severely troubled Japanese firms from market forces and may have prevented a bank capital crunch, that behavior nonetheless exacerbated economic problems for the economy by promoting the allocation of an increasing share of bank credit to many of the firms least likely to use it productively* (…) *such a misallocation of credit, by inhibiting the needed restructuring of the economy, would adversely impact the long-run growth prospects of the Japanese economy*" (Joe Peek, Eric S. Rosengren, 2005)

In this way the unviable firms continued to remain in the market contributing to the economic stagnation.

Caballero, Hoshi, and Kashya's (2008) analysis indicates that the presence of zombie firms caused for the underperformance of the Japanese economy in terms of employment growth, average industry productivity and investment. Looking at industries where the presence of zombie firms was stronger, the prices were in average lower and there were higher wages, these aspects were an obstacle also for the growth of healthy and new firms.

We can easily detect from the Japanese situation the main aspects of zombie firms' phenomenon: the persistency of non-profitability of firms which remain in the market surviving only through misallocated credit.

A striking example of Japanese zombie firm is Daiei, one of the largest supermarket chains in Japan that expanded greatly during the period leading to the 1990 crash. Despite there have been several circumstances in which the company should have been allowed to fail, the Japanese monster has been judged "too big to fail", enjoying several bailouts.

Subsequently, the concept of zombie firms has been used in several contexts, for instance in Adalet McGowan et al (2017) has been shown that the prevalence of such firms has increased significantly among non-financial companies during the financial crisis. Other references have been made for the Chinese economy, when following the economic downturn in 2016 some industrial companies experienced gross overproduction capacity problems[19] that led to the proliferation of zombie firms. More recently, the phenomenon seems to interest also Europe: *"There are a lot of unvital signs that Europe's weak economic recovery is a repeat of Japan's "zombie lending" experience in the 1990s (...) For example, in 2013, in Portugal, Spain and Italy, 50%, 40% and 30% of debt, respectively, was owed by firms which were not able to cover their interest expenses out of their pre-tax earnings."* (Acharya, Eisert, Eufinger, Hirsch, 2019). Also in this case, credit policies play an important role for the proliferation of zombie firms. For that which concerns Italy, Adalet McGowan et al. (2017a and 2017b) state that the share of capital stock of zombie firms has increased, passing from the 7% in 2007 to 19% in 2013 *"zombie firms could account for perhaps one-quarter of the actual decline in private nonresidential business investment in Italy between 2008 and 2013".* From the study of Banerjee and Hofmann of 2018, across 14 advanced economies, emerges that the share of zombies has increased significantly from around 2% in the late 1980s to some 12% in 2016. (figure 7)

In this period, the peaks of growth of zombie share are connected with economic downturns and lower interest rates policies.

[19] In China, for industrial firms overcapacity rose from 0% in 2007 to an average of 13% by 2015.

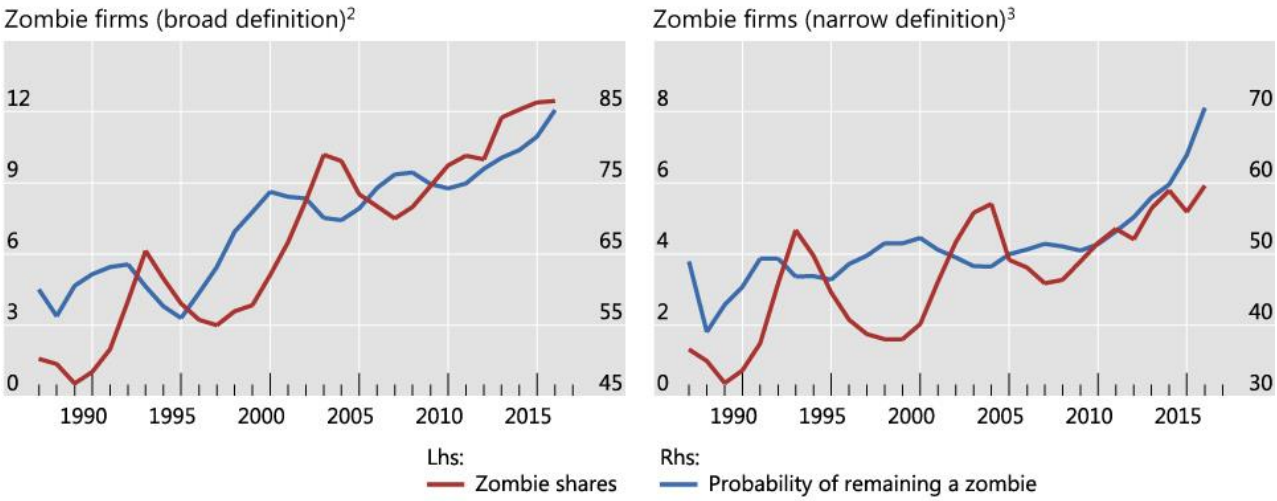


Figure 7

Source: Banerjee and Hofmann, 2018 BIS Quarterly Review, September 23

Many studies assert that also in Europe the presence of zombies invalidates the economy and the performance of healthy firms. For instance, Acharya et al affirm that high-quality firms are negatively affected in terms of employment growth and investment if they belong to industries where the presence of zombies is relevant. *"The resulting excess capacity puts downward pressure on firms' markups and product prices. In equilibrium, zombie credit causes a decrease in product prices, markups, firm default, entry, and productivity, and an increase in aggregate sales, number of active firms, and firm input costs"*. (Acharya at al, 2009)

Several analyses have also focused on the causes of zombie firms' phenomenon, first among all the already mentioned role of weak banks, analyzed by Caballero, but also by Storz et al (2017) and Schivardi et al (2017). More specifically, the analysis of Storz suggests that this correlation between stressed banks and risky lending to distressed firms is more likely to happen in poorly performing economies. The highest percentage of zombie firms has been detected in Portugal, followed by Spain and Greece. In addiction, Schivardi analyzed the situation of Italian firms during the euro area sovereign debt crisis, it has been found that weak banks with a low capitalization were less likely to cut lending to weak firms.

Another possible cause of the proliferation of zombies, hypothesized by Banerjee and Hofmann, is the general decrease of interest rates happened since 1980: the reduced financial pressure has helped zombie firms to remain afloat instead of exiting from the market.

In general, data shows how the topic is increasingly acquiring attention, the figure below (figure 8) shows the cumulative times in which the zombie firms appear online in newspapers, blogs, board entries and new magazines.

The public debate about zombie firms

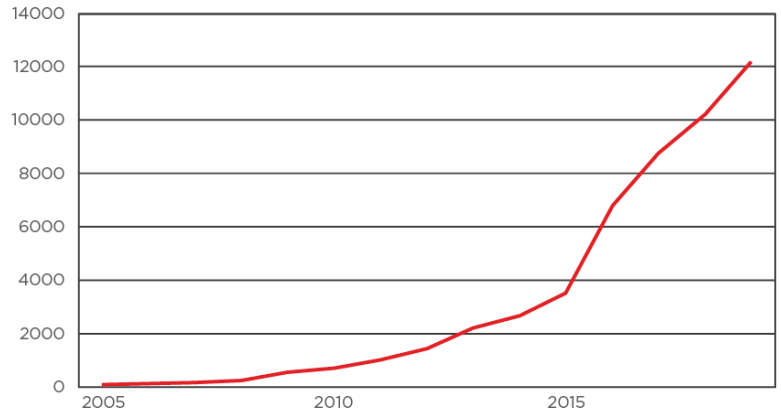


Figure 8

Source: "Corporate zombies: Anatomy and life cycle", September 2020

Thus, the phenomenon seems to be widely relevant, and clearly the Covid crisis and the related debt burdening the corporate sector contributed to enrich its weight, especially if negative consequences for the entire economic recovery are expected after the proliferation of zombies.

2.3 - BIS study: features and lifecycle

The economists Banerjee and Hofmann have written two fundamental work papers of the Bank of International Settlements about zombie firms: "The rise of zombie firms: causes and consequences" has been written in 2018 and "Corporate zombies: Anatomy and life cycle" in September 2020.

In particular, the second paper aims at defining a general profile of corporate zombies and at describing the characteristics of their lifecycle. About the anatomy of a zombie firm, the results show that, on average, it is three times smaller than the others in terms of assets, capital stock and employment.

Clearly, for definition, zombie firms have a low Tobin's q and register on average a negative ICR. Compared with other firms, zombies have lower capex and invest less in intangible assets. It is important to underline that to not invest adequate resources in intangibles like research and development (R&D) is a negative signal for the future profitability of the firm. These kinds of investment are in fact very important to remain competitive in the market by innovating products and by improving business processes and customer services. However, this data is not very surprising considering that in general a healthy firms is more likely to invest in intangibles because it can bear their present costs, while for firm with already a low profitability this could be very difficult.

"Investment in intangibles differs from investment in physical capital in two important respects. First, while expenditures on physical capital are initially capitalized on the firm's balance sheet

and then depreciated over time, expenditures on intangibles are expensed immediately and, therefore, have a direct impact on firm profitability. Second, while investments in physical capital tend to scale with sales in an approximately linear fashion, multiple years of intangible investment are often required before yielding positive increments to sales and, ultimately, profits" (McKeon, 2017)

On the other hand, the analysis of Banerjee and Hofmann shows that zombie firms have higher asset disposal and a negative employment growth rate, both signs of a loss of operativity. Clearly, the lack of profitability results also in negative cash flows and lower dividends compared to other companies. It is intuitive to think that a firm with insufficient cash flows from operations tends to sell assets in order to compensate the liquidity needs.

Another important result has been found in interest paid: taking into consideration the higher riskiness and the lower profitability of zombies, and considering also that usually ICR is one of the main indicators to define the rate of interest on debt, the interests paid by zombie firms should be significantly higher than those of non-zombies. Instead, from the results of Banerjee and Hofmann emerge that the interest paid relative to assets is only 0.1 percentage point higher for zombie firms. This information leads to the conclusion that these firms actually have received subsidized credit. That bring us to the conclusion that there is a strict correlation between the group of firms included by the definition of Banerjee and Hofmann and that of Caballero.

In addiction, despite their leverage is higher than that of other firms, zombies also issue more equity relative to their total assets. Clearly, when the cash flow is insufficient, companies need to cover their losses looking for forms of financing, this cash-in derives from credit but also from equity issuances usually realized through private placements "*The combination of increased issuance frequency and increased rate of private placements among negative cash flow firms is consistent with the view that negative cash flow firms face substantial frictions in the equity issuance market. These frictions are potentially mitigated by a staging of capital infusions much like what is observed for private firms receiving venture capital financing. Consistent with this notion, we find that 60% of the private placements for which we have investor identities are characterized by a repeat investor"* (McKeon, 2017)

Within the BIS analysis, there are also results about the lifecycle of zombie firms. The economists analyzed the key indicators of the firms during the periods before and after achieving the zombie status.

As we could guessed, the so called "zombification" is not a sudden event, before arriving to an ICR below one which will remain at this level for a period of two years, a firm experiences generally a decrease of productivity several years earlier. As the productivity and the profitability decline more

than the level of interests paid, so the cash flow decreases and the firm tends to sell asset, reaching a level of asset disposal significantly greater than that of its peer. To stay afloat, the firm increases its debt while decreasing its investments, especially in intangibles and employment. *"Up to two years before being classified as a zombie, a firm's indebtedness grows strongly relative to that of its non-zombie peers. Subsequently, debt accumulation drops significantly and continues to fall after the firm became a zombie."* (Banerjee, Hofmann, 2020)

As already mentioned, another form of funding used by the firm is equity, the issuances increase before and after the year of the zombification. Other two indicators observed by Banerjee and Hofmann are the Tobin's q and the book leverage: during the years that precede the zombification the first one decreases, while the second increases because of the pauperization of the value of the assets, due also to the relevant disposals of assets.

The years after the zombification are very particular: it seems that the productivity of these firms tends to increase slightly and the Tobin's q increases year after year, probably related to the growing expectation of the market for the recovery of the firm. However, the value of assets continues to fall. The analysis focuses on the four years after zombification, when data shows that the at that point the Tobin's q finally reaches the same level of previous eight years, but anyway it continues to be far below the average of the non-zombie peer as productivity, which remains more than 1 percentage point below that of the non-zombies.

Finally, an important information is about the recovery of zombie firms: the BIS analysis argues that after four years more than 60% of firms recovers from zombie status, we will deepen this topic later.

2.4 - Consequences of intervention

At this point it is necessary to merge the set of principles suggested by the Group of Thirty and the theoretical studies on zombie firms, with the purpose of individuating the effective margins of action of the policies which will follow the pandemic crisis.

From the BIS analysis emerges that zombie firms amounted to 15% of listed companies in 2017, while among listed SMEs, the percentage of zombie firms reached about 30%-40%.

We would like also to remind that, in the light of damages that the Covid crisis have caused for the economy, the Group of Thirty suggested in their report a classification of firms where four categories have been created with the purpose of targeting supports, while the fifth category has been made to include all structurally unsound firms which should be the recipients of the "creative destruction" and so that should be allowed to fail.

The key question now is: does the fifth category of firms coincide with the group of zombie firms?

It is clear that different answers would carry with them significantly different consequences.
Therefore, we can make several hypotheses about it:

- assume that the structurally unsound firms of category five coincide with the whole group of zombie firms
- assume that from the category five it must be excluded the portion of zombie that after several years are meant to exit from zombie status
- assume that the fifth category refers to a narrower group of zombie firms, in particular only those that after several years will exit the market in any case

Built in this way, these three alternatives will include gradually less and less firms.
Basing on the analysis of Banerjee and Hofmann, among the total number of zombie cases observed, about 60% recovered from the zombie status, 25% of zombie companies exited the market and about 15% remains afloat without a proper recovery. (figure 9)

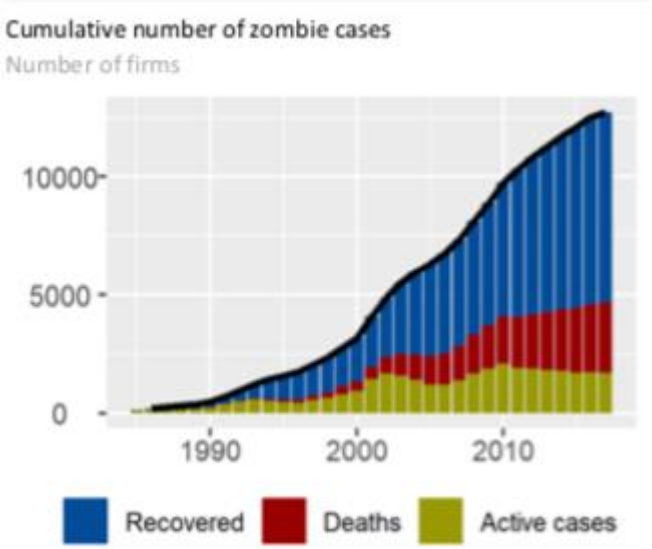


Figure 9

Source: "Corporate zombies: Anatomy and life cycle", 2020

Assuming the first hypothesis as true would consist in leaving without aids the 30-40% of listed SMEs and about 15% of listed firms of 14 advanced economies. We must consider also that, to these numbers, should be added the percentage of zombies among unlisted companies, which have been excluded from the analysis of the BIS for statistical reasons, but that nonetheless would broaden the phenomenon. "*Because our analysis focuses on listed companies which allows us to cover a much longer time span of data and to take into account in our zombie definition the perceived future growth potential as reflected in equity prices (…) Our analysis does therefore in particular not cover unlisted small and medium-sized enterprises (SMEs)(…) If SMEs are more susceptible to zombification, then our analysis may understate the number and the economic weight of zombie firms.*" (Banerjee, Hofmann, 2020)

Thus, if the unsound firms of the fifth category coincided with all zombie firms, it would mean that also firms that are expected to recover in four years should be anyway excluded from financial supports.

Instead, the second hypothesis supports the idea zombie firms are a group that is larger than that of structurally unsound category. More specifically, the 60% of zombie firms that will recover in four years are not structurally unsound and they probably need targeted support. It is more likely to think that this portion of firms should be supported with forms of aids belonging to those of the fourth category of the G30 classification. In fact, zombie firms are certainly solvency-challenged firms for which should be not appropriate credit supports, but that instead can be recipients of equity investments and restructuring procedures.

Finally, the third hypothesis further shrinks the application of the "creative destruction", addressing it to the 25% of zombie firms which are expected in any case to exit the market in four years. This would mean that the supports to firms should be larger, and that about 75% of zombie firms would be helped.

While there is no doubt that the 25% of zombie firms which are expected to exit the market are included in the group of structurally unsound firms, it should be useful to understand if the group contains also the remaining 75% of zombies. Moreover, we would like to understand if there is a significant difference between the recovered firms and those which remains in the market at zombie status, in order to investigate what should be the damage for the economy in helping one or both of them.

Within the next chapter we will analyze the SMEs issue, then we will take a sample of European SMEs, and after having individuated the percentage of zombies, we will focus on those that recover from this status. Subsequently, we will study the characteristics of recovered firms in order to investigate the quality of their recover and their likelihood of reaching the investment grade.

To conclude this reflection on the field of actions of support measures for the Corporate Sector, we would like also to remind that from paper of the Group of Thirty of December 2020 has emerged the need of individuating another subgroup of firms that probably belong to zombie firms but that nonetheless requires to be assisted: the firms whose failures will lead to relevant social externality costs. We wonder if this kind of firms is meant to be saved also in case of structurally unsound situations and, in this case, aren't we perhaps returning to the anachronistic idea of "too big to fail"?

Chapter 3 - The SMEs issue: empirical analysis of the European Private Market

3.1 - The SMEs issue

In Europe, the category of micro, small and medium-sized enterprises (SMEs) is defined in the EU recommendation 2003/361. It is composed by enterprises which employ fewer than 250 persons and which have an annual turnover not exceeding EUR 50 million, and/or an annual balance sheet total not exceeding EUR 43 million of euros.

SMEs represent around 99.8% of all businesses of the European Union, while large companies have only a marginal share. More specifically, micro enterprises represent alone the 93,3 of all firms, while the total SMEs have around 100 million of employees (close to 65.0% of total EU-27 NFBS employment) and they account for more than half of Europe's GDP. (figure 10)

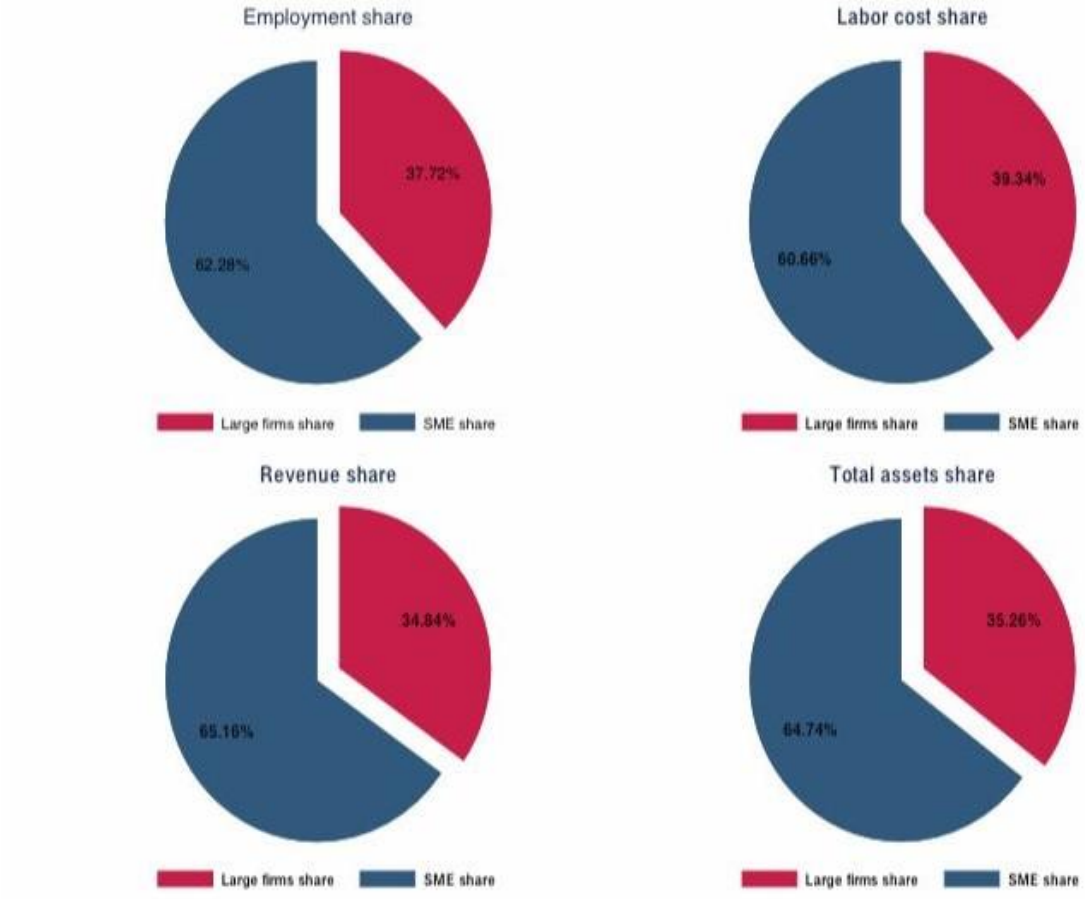


Figure 10

Source:"Covid-19 and SME Failures." NBER Working Paper 27877, September.

Apart from these relevant numbers, SMEs are also important for grating the competitiveness of markets, avoiding the bad effects that few large firms have on it. Moreover, many small firms have relevant intangible and relational capital which contribute to create value for the economy.

Therefore, it is very important that policymakers pay attention and adopt "ad hoc" measures for supporting this category for avoiding severe damages for the whole system: "*policy interventions will therefore also differ significantly between large corporates and the small and medium-sized enterprises (SMEs) that provide a substantial share of employment and whose failure may have significant economic and social costs*". (Group of Thirty, December 2020)

SMEs tend to have less cash buffers than larger firms, and as we have already said, one of the most significant peculiarity of small firms consists in their fewer options of financing, that in hard times could lead to severe financial constraints. In fact, although investments in intangible assets are a key element for the success of small firms, usually these items cannot be used as warranties, and small firms usually don't have strong collaterals because the value of their tangible assets could be insufficient to obtain credit also from banks, that are the primary source of funds for these firms.

Traditionally, this segment relies on "relationship banking", but in hard times this relation can be dangerous also for the "everyday bank", which could take too much risk in case of systematic crisis. In some cases, government must grant a part of the credit to help viable firms in obtaining the right amount of financing, especially when these firms are facing a status of crisis deriving from a widespread shock of the markets. This is the case of Covid- 19 crisis, which has required a prompt intervention *"Should a wave of SME failures occur, the efforts to contain the economic consequences of the pandemic would have failed – furloughed workers or those on temporary layoff would become unemployed; banks would experience large losses on their C&I loan books, raising the risk of a financial crisis; and fiscal costs of containing the crisis would continue to rise. Government policies to address SMEs' liquidity shortages were thus seen as essential to ensure a smooth economic recovery"* (NBER Working Paper 27877, September 2020)

3.2 – European SMEs and Covid-19 Crisis

Clearly, the Pandemic crisis has represented an unusual shock for European small and medium enterprises in terms of supply, demand, and productivity. "*On average, about 90% of SMEs report to be economically affected. In particular, the most impacted sectors are services (60%-70%), construction and production, the food sector follows with an impact of 10%-15%. Moreover, 30% of total SMEs report that their turnover is suffering at least an 80% loss, with an EU average which is about 50% loss. For instance, Belgium reports a decline of in turnover for 72% of SMEs and for 28% of SMEs a loss of more the 75%; Germany reports a decline of 50%, France and Spain a decline of 80% and 75% in sectors confined"*. (SME United, April 2020)

The study of the National Bureau of Economic Research of 2020 affirms that COVID-19 could have pushed a relevant portion of small and medium enterprises (SMEs) into failure and if there

were not government interventions, the rate of SMEs failures would have almost doubled. Figure 11 shows the change in bankruptcy rates and change in NPL rate of SMEs deriving by the Covid situation, it appears clear that Italy took a hard hit given by the crisis of its small and medium enterprises, in fact, a survey of CNA of 2020 shows that in Italy, more than 70% indicated they were directly affected by the crisis.

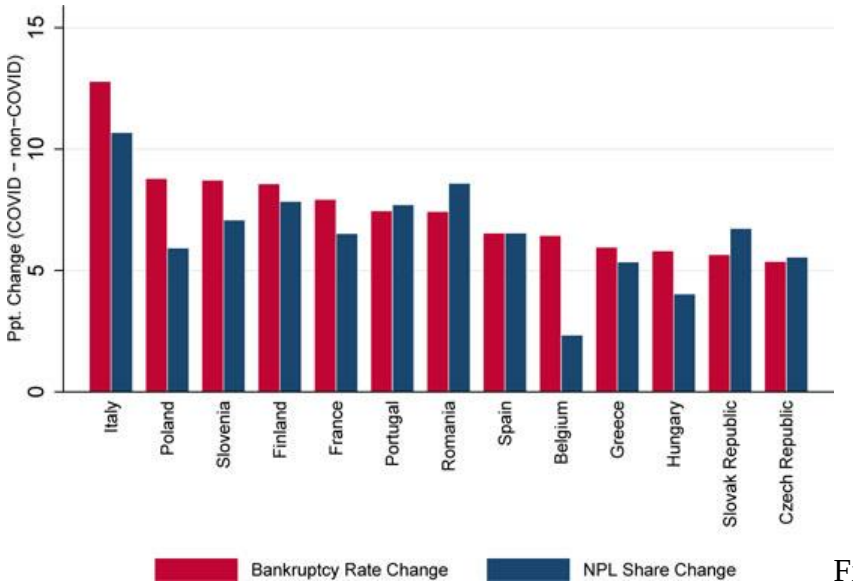


Figure 11

Source: IMF Working Papers 2020

As we have already said in Chapter 1, in response to the Pandemic crisis, in Europe there have been measures at national and supranational level. Some of these supports were directly addressed to SMEs, others to a wider category of non-financial enterprises. Credit guarantees (figure 12) have been the most relevant form of support for helping enterprises to prevent liquidity shocks that otherwise would have led to relevant insolvency problems. Previously, we have talked about Germany's and Italy's guarantee programs, we have already covered the "Garanzia Italia" and we have said that in general Italy adopted several forms of support for mitigating liquidity and solvency threats. SMEs have benefited from the total 250 billion of funds destinated for guarantees to all firms from the 100 billion destinated to the "Fondo Centrale di Garanzia" for SMEs. We have also talked about the wider decree "Cura Italia", among several measures, this Decree have fixed a moratorium for SMEs, as for professionals and sole proprietorships, which overall enjoy of a moratorium on an total volume of loans of around 220 billion euros.

Moreover, the "Rilancio" decree of May 2020 established the "Fondo Patrimonio PMI", a fund managed by Invitalia, through which SMEs that had strengthened their capital enjoyed for the subscription of their newly issued bonds or debt securities.

Germany destinated in total 550 billion to loan financing and credit guarantees, however 400 billion have been mainly destinated to large corporations. In Chapter 1, we have mentioned the Quick Loan

program of April 2020 which offered loans up to €800,000 with a full guarantee and 3 percent interest to SMEs.

Instead in France, the "Prêt garanti par l'état" offered 300 billion for bank loan guarantee for all firms, the main difference between the treatment reserved to large and to small firms can be found in the percentage of coverage of the guarantee: small firms beneficed of up to 90% of coverage on loans while larger firms beneficed of 80-70% of coverage. Also Spain has used a credit guarantee provided by the "Instituto de Crédito Oficial" for a total budget of 184 billion with a coverage of 80% for SMEs and 60-70% for larger firms.

Country	Responsible body	Facilities	Date announced (2020)	Headline envelope (€ billion)
France	Ministry of Economy and Finance, via BPIfrance	70%-90% guarantees on loans	March 25	307
Germany[2]	Ministry of Finance (Bundesministerium der Finanzen, or BMF), via the Economic Stabilisation Fund (WSF)	Up to 90% guarantees on loans mainly to large corporations	March 23 but only approved by the European Commission on July 8 (Commission approval came within days for the other programmes in this table)[8]	400
	KfW	80%-100% guarantees on loans (including financing); syndicated loans	March 23; coverage increased to 100% on April 15	150
Italy[3]	SACE export credit agency (part of CDP group)	70%-90% guarantees on loan and other credit to large corporations and SMEs	April 8	250
	Central fund for SME guarantees (Fondo Centrale di Garanzia PMI)	80%-100% guarantees on loan and other credit to SMEs and mid-caps	March 17	100
Spain[4]	ICO	60%-80% guarantees on loans; 70% on promissory notes	March 24; extended to promissory notes on May 5; envelope increased on 3 July	179

Figure 12

Covid loan guarantees in France, Germany, Italy and Spain

Source: Anderson, Papadia, Véron, Working Paper March 2021

3.3 - Empirical analysis

We want now indagate the situation of European countries in terms of zombie firms.

To complete the picture of the BIS analysis, we would like to focus our attention on firms that have been excluded by their research. More specifically, we would like to analyze among firms with small or medium dimensions, the situation of unlisted companies. Regarding listed SMEs, the outcome of the BIS analysis was that around 30-40% of them resulted zombies, a percentage far above that of large companies. This information left room for the idea that probably the situation of unlisted firms was even worse.

Another difference from the analysis of Banerjee and Hofmann is about Countries: while the BIS took as reference companies of the first 14 advanced economies, we would like to focus our attention on European Union, including in our sample firms of the 27 States.

For our scope, we use Orbis database set from BvD-Moody's, the most appropriate data resource to study global private companies. We analyze a period of 9 years, with data available from 2012 to 2020. The choice of including 2020 allows us to explore, albeit to a small extent, the situation affected by Covid-19 crisis.

Our first goal is to individuate the percentage of zombie among European unlisted firms with small and medium dimensions. For this purpose, we have chosen as zombie criteria the already mentioned interest coverage ratio (ICR), while the Tobin's q has been excluded because it cannot be applied to unlisted firms. The ICR has been computed as ratio between earnings before interests and taxes and interest expenses. In particular, to be considered a zombie, the firm must register an ICR smaller than 1 for two consecutive years.

ICR= EBIT/Interest expenses < 1 for 2 years

By establishing a continuity of two years, we aim at excluding extraordinary situations that temporary could affect the profitability of the firm.

Moreover, we have excluded early-stage companies, in particular we have included in our sample only firms born before 2009. This choice takes in consideration the fact that early-stage firms are not deemed to be profitable during at least the first three years of their lives.

Thus, we select from the database a sample of European unlisted SMEs that in 2012 were at least three years old.

For our analysis, we select small and medium firms as from Orbis definition[20]. Moreover, in order to have a sample appropriate for our scopes, we also select only firms for which the value of ICR is available for the entire period of reference.

We obtain a sample of 303,871 enterprises. The most frequent nationality among the firms of our sample is Italy, that with 95227 firms represents alone more than 31% of the group, followed by Sweden, Spain and Portugal. (figure 13). It is useful to underline that the populousness of firms of the single Countries can depend both on the reality both on the availability of data into the database related to the authorizations and accounting rules of the single State. For instance, the number of German firms seems to be too small for representing the real situation, despite we can consider this sample useful for representing the general situation of the European Countries, we will avoid to analyze the specific percentages of poorly represented Countries like Germany, focusing on Countries like France, Spain and Italy, which appear to be highly represented by our sample.

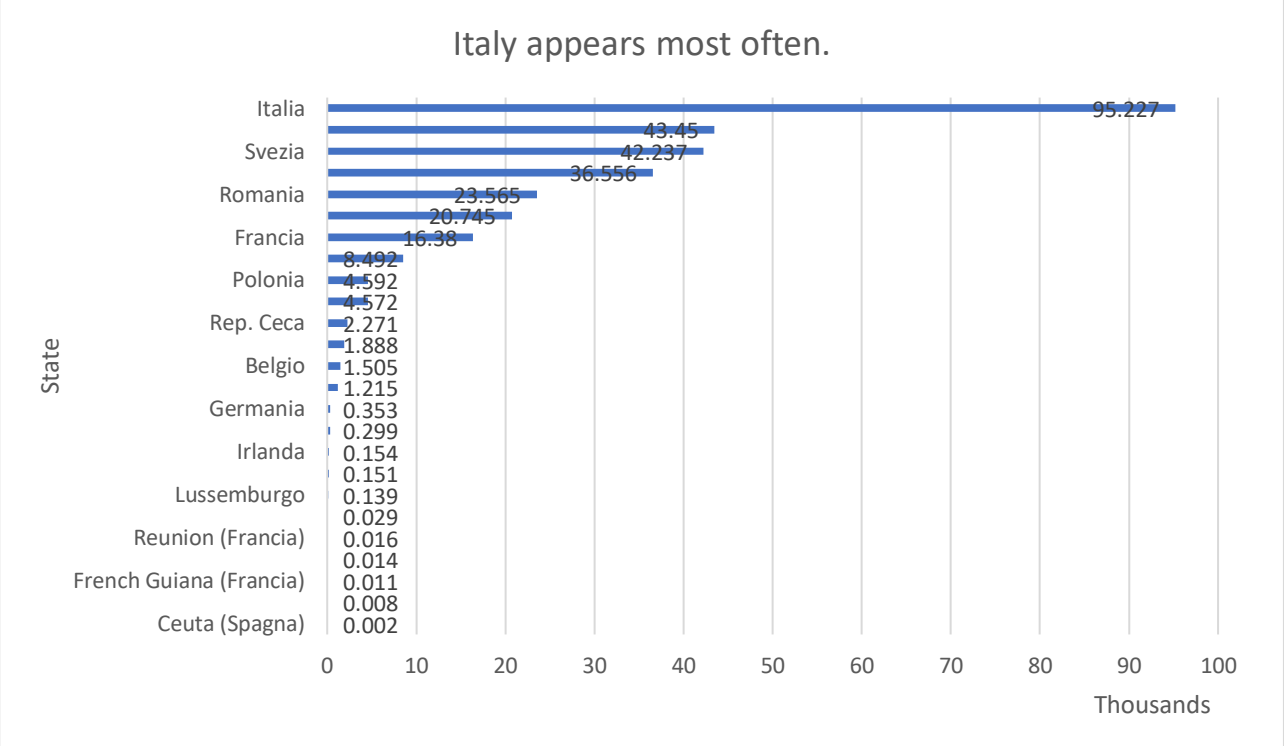


Figure 13

In order to proceed with our analysis, we select all firms which, during the period between 2012 and 2020, have experienced an ICR smaller than one for two consecutive years, these firms represent the category of zombie firms. From the 303 871 analyzed, we find that 114 322 firms can be

[20] Orbis criteria in terms of dimensions are the following: Medium firms (M): All firms excluded from large and very large categories which correspond at least to one of these conditions: annual revenues > = 1 mln, total balance sheet valvalue >= 2 mln, employees>=15 Are instead considered of small size all firms excluded from the categories of medium, large and very large firms.

considered zombie. (figure 14) Thus, the category of zombie firms represents around the 38% of our sample.

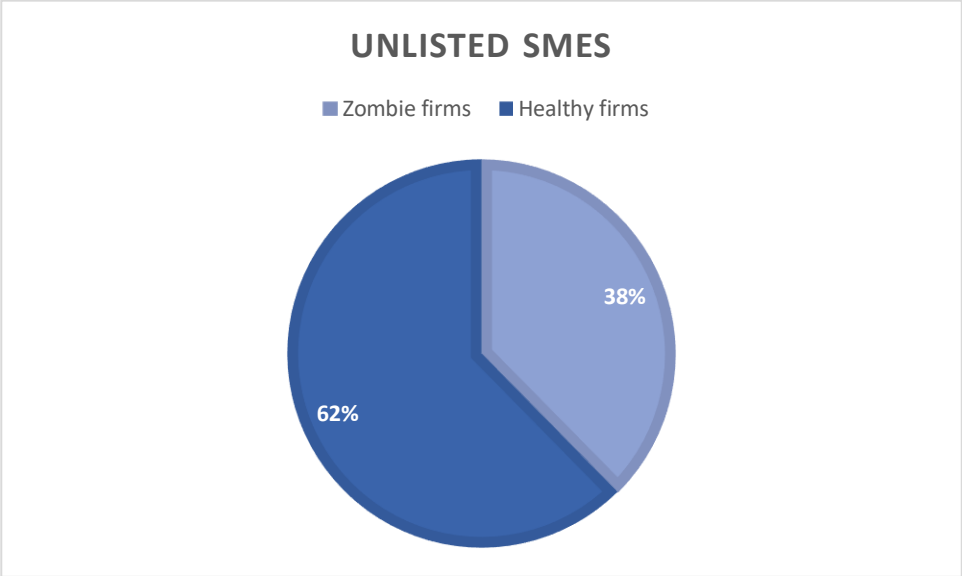


Figure 14

Taking as reference Italian, French and Spanish firms, we observe, even if near the average of the Europe, different percentages of zombies: France seems to have the higher one (42%), followed by Spain (38%) and Italy (36%). (table 1)

Country	Number of Zombie	Perc. Of sample
Italy	34029	0,357
France	6955	0,425
Spain	16732	0,385

Table 1

Moreover, it is important to understand how consolidated this status of crisis is, in order to realize what is the relevance of the zombie phenomenon.

Thus, we would like to know what is the percentage of zombies that will recover from this status. For this purpose, in line with the BIS study, we consider the recovery as a specular situation to that of reaching the zombie status: a firm will be considered recovered if, after having been zombie, registers 2 consecutive years of an ICR greater than one. Also here, a requirement of continuity seems useful for eliminating cases of recoveries that derive from temporary and extraordinary events. Therefore, we proceed to extract from our group of zombies the percentage of recovered ones.

We find that between 2012 and 2020 the 49% of zombie firms have recovered from this status and amount to 58059 against the 56263 of zombies for which there is not a recovery yet. (figure 15)

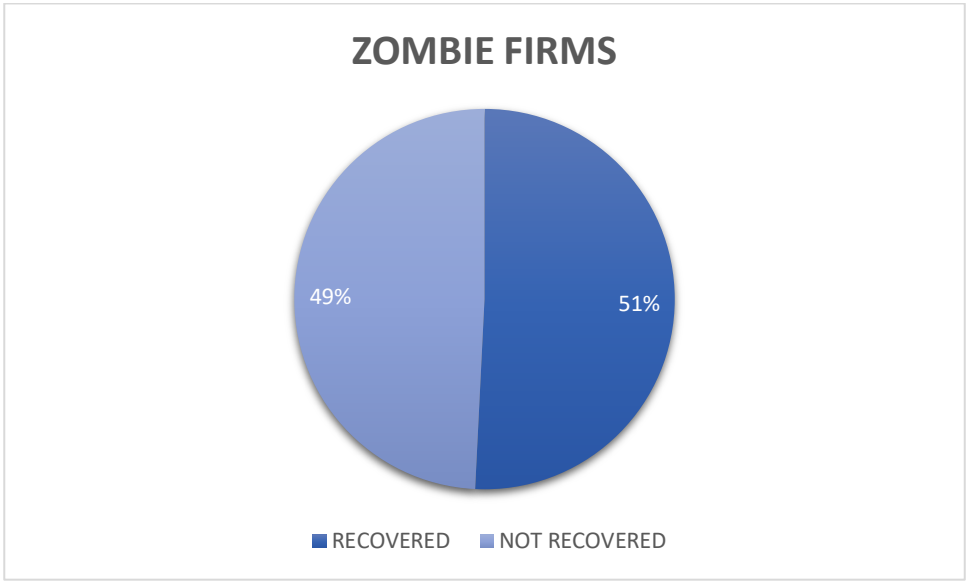


Figure 15

The percentage of recoveries is smaller than that considered by the BIS study on its sample of listed companies, however, it can be considered significant.

Looking at the situation of Italy, France and Spain, we observe also here different situations: the percentage of recoveries of Spain in relation to the number of zombies is 64%, followed by Italy with a 52% and France with 38%. (table 2)

Country	Recoveries	Perc. On Zombie
Italy	17695	0,52
France	2629	0,38
Spain	10737	0,64

Table 2

We remind that, together with the purpose of indagating on the magnitude and the severity of the zombification among unlisted SMEs, we would like also to reach an answer about the quality of recovery from this status in order to understand if there is a relevant difference between recovered firms and those that remain in the market as zombies.

To do that, we want to discover if these recovered firms have earned an adequate stability. For this purpose, we want to verify how many of them have been able to reach the investment grade after the recovery. Therefore, we base our requirement of stability by taking into account their theoretical rating. The rating is a system for ranking firms depending on their creditworthiness, more precisely, we take as reference the classification of Professor Damodaran (figure 16) for small firms.

DAMODARAN		
ICR and Ratings:		
>12,5	AAA	
9,5-12,5	AA	
7,5-9,5	A+	
6-7,5	A	
4,5-6	A-	
4-4,5	BBB	
4-4,5	BB+	INVESTMENT GRADE
3-3,5	BB	SPECULATIVE GRADE
2,5-3	B+	
2-2,5	B	
1,5-2	B-	
1,25-1,5	CCC	
0,8-1,25	CC	
0,5-0,8	C	
<0,5	D	

Figure 16

Source: https://pages.stern.nyu.edu/~adamodar/

This table shows the relationship between ICR levels and rating, the rating goes from the best grade that is equal to AAA, to the worst one that is equal to D. It is essentially divided in two main categories of ranks: investment grade and speculative grade. All firms with an ICR smaller than 4 are considered as speculative investments.

For our purpose, we want to find what percentage of recovered firms has reached the investment grade, thus, we select from the subgroup of recovered only those that, during the years after the zombification, have registered an ICR greater than 4. Data show that 33760 recovered firms against 24299 have reached this requirement, equal to the 58% of recovered firms. (figure 17)

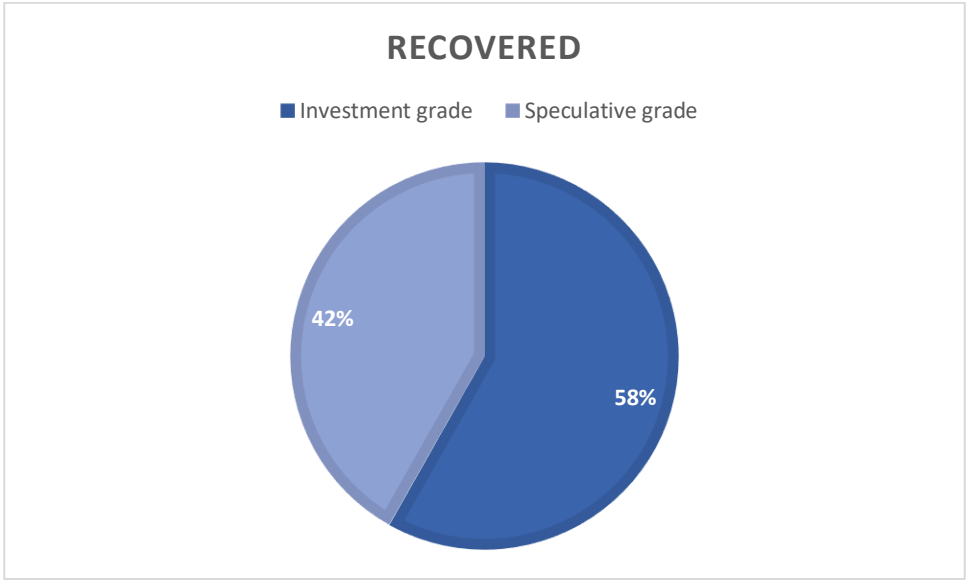


Figure 17

Focusing on our three Countries of reference, we see that France record a 78% (20% higher than the average of European Countries) of firms that reach the investment grade after the recovery.
Spain follows with a percentage of 60% and Italy with 54%. (table 3)

Country	Investment grade	Perc. on Recovered
Italy	9505	0,54
France	2050	0,78
Spain	6117	0,6

Table 3

3.4 – Interpretation of results

We have carried out the analysis of unlisted SMEs of 27 States of the European Union taking as reference a period of 9 years (2012-2020). We started from a question: do zombie firms coincide with the unviable firms which, according to G30, should be excluded from any form support?
To answer the question, we started by investigating what the percentage of zombies was, and according with our results, the category of zombie firms represents around the 38% of our sample. This means that in 9 years the 38% of firms recorded for two consecutive years an EBITDA not sufficient to repay interest expenses. This result can be considered in line with the affirmation of Banerjee and Hofmann about SMEs. As we could have figure, the percentage of zombie firms is greater among unlisted SMEs than that of listed companies with a higher capitalization.
We have also found that Italy, France and Spain firms experienced a similar level of Zombification, with France recording the highest level (42%), followed by Spain (38%) and Italy (36%).
It seems evident that 38% represents a relevant percentage of SMEs for Europe, that if left without supports would cause relevant damages to the economy. However, to validate the idea that this percentage cannot correspond to the fifth category of firms ideated by the G30, we have also found the dimension of recovered firms among zombies: they represent the 49% of all zombies in Europe, the 64% of zombies in Spain, and respectively the 52 % and 38% in Italy and France. Therefore, almost half of zombie firms recovers from this status, with a high quality of recovery, proved by the ability of reaching the investment grade by the 58% of recovered firms in Europe. Another interesting finding is about the quality of recovery of French firms: the percentage of investment grade firms reach the 78%, 20% higher than the average of European Countries, followed by Spain with a percentage of 60% and Italy with 54%. Thus, despite France records the most worrying level

of zombies and the lowest rate of recovery in comparison to Spain and Italy, it also shows a very higher quality of its recoveries.

All these results suggest us that, under the used definition, the category of zombie firms does not coincide with that of unviable firms. Moreover, the percentage and the quality of recoveries suggest that there is room for supporting these firms, and that unviable firms represent only a stricter category.

Conclusion

Undoubtedly, the crisis generated by the Covid-19 health emergency has had a strong impact on European non-financial companies. The shocks in demand and supply occurred especially during the restrictions that various States adopted for limiting the infection, in particular, the 90% of SMEs reported to be affected by the crisis.

The measures adopted by Central Banks and Governments to contrast the liquidity problems of companies have helped to mitigate the effects in the short term.

However, in certain cases these measures could be dangerous in the long run, because they could fuel the problem of the proliferation of zombies within the Corporate Sector.

In fact, the phenomenon of zombie firms is directly connected to the misallocation of credit. Thus, it is necessary to ideate targeted interventions instead of supporting firms regardless of their situation. In particular, it must avoid giving credit supports for firms that result already heavily indebted, preferring other forms of aids like equity investments. Moreover, it should be useful to allow unviable firms to fail, by excluding them from any form of support that, at the end, will turn out to be wasted.

However, this does not mean that zombie firms don't deserve any kind of intervention. In fact, according to the BIS study, more than 60% of zombies recover in four years. This result has been obtained through a study on listed companies. To complete the picture, we have decided to carry out our empirical analysis on unlisted SMEs.

The outcomes of our study suggest a slightly more critical situation: among European unlisted SMEs, the percentage of zombies is higher than that of larger firms. While within the BIS study the percentage of zombies reached the 15% of listed firms, in our analysis emerged a percentage of 38% of zombies. The result could depend on the greater difficulties faced by private SMEs in accessing to finance and on the higher cost of fundings. In addiction, our analysis suggests that just under half of the zombies recover from this status. Also in this case, the percentage is a bit more worrying if compared to that of listed firms. However, 49% of recoveries among zombies cannot be considered an insignificant number, especially if we consider that zombie firms are the 38% of SMEs, category that in Europe represents the 99,8% of total firms.

Another data in favor of the idea that unviable firms do not coincide with the whole group of zombie firms, is about the quality of the recoveries.

Our analysis shows that, on average, the 58% of recovered firms are able to reach a level of ICR such as to be able to reach the investment grade. This performance presents some differences among Countries, for instance in France, despite there is an higher level of zombification in

comparison to Spain and Italy, the quality of the recoveries appears much higher, with the 78% of recovered firms reaching the investment grade.

In conclusion, it cannot be considered correct to state that all zombie firms should be excluded from public supports, because a large percentage of them is able to recover well from the zombie status, that appears as a temporary condition. Unviable firms are then a subcategory of zombie firms, and public institutions should use the expertise of private entities to better individuate them.

Regarding zombie firms, surely, the credit support is not the most appropriate form of aid for this category, because they have demonstrated signs of financial constraints. Thus, public institutions should opt for policies aimed at facilitating to these firms the access to equity and equity-like investments.

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Summary

Covid-19 brought to light the weaknesses that already existed in the context of non-financial companies.
Some businesses were becoming obsolete, others were already catching on, when the Pandemic arrived to turn our lives upside down. The shocks suffered by firms of Europe, America and Asia generated severe liquidity problems which required to governments and central banks significant interventions.
However, the supports adopted could have amplified the problem of an excessive leverage among the Corporate Sector, increasing the risk of default among companies.
Moreover, such broad public assistance will increase the public debt burdening taxpayers in the future, it is therefore necessary to put some limits on public measures.
The first reaction of governments has been to launch credit supports. European nations offered different forms of loan guarantees for enterprises, while the ECB offered its support through the asset purchase programs and lending operations. In Italy, through the emergency decree "Cura Italia", have been adopted measures like the suspension of mortgage and loan instalments and the increase of the PMI Guarantee fund. In addition, with the Liquidity decree Italy sustained the granting of loans to Italian economic and business activities. For contrasting liquidity issues, it has been also established a delay of tax payments and contributions. Moreover, SMEs have benefited from a moratorium on loans and from the "Fondo Patrimonio PMI", through which the enterprises that had strengthened their capital enjoyed for the subscription of their newly issued bonds or debt securities.
Instead, Germany destinated in total 550 billion to loan financing and credit guarantees, and through the Quick Loan program it offered loans with a full guarantee to SMEs.
Also France offered a 300 billion bank loan guarantee, the "Prêt garanti par l'état", with different percentages of coverage for small firms (up to 90% of coverage on loans) and for larger firms (80-70%). Moreover, Spain provided a credit guarantee through the "Instituto de Crédito Oficial" for a total of 184 billion with a coverage of 80% for SMEs and 60-70% for larger firms.

All these measures based on a broad credit assistance, have raised the fear of the corporate zombification. In fact, it is common opinion that the Pandemic, associated to subsidized credits, could bring to a new wave of zombies: firms which, over an extended period, are unable to repay debt and its expenses using the profits of their businesses, and that therefore depend on creditors for staying alive.

The phenomenon of zombie firms has been quoted also within the report of the Group of Thirty published in December 2020. The G30 wrote a paper providing to policymakers a toolkit to use for contrasting the crisis. The text is essentially divided in three blocks: the first one aids to understand how to better target the supports, the second explains who should take this kind of decision and the last one shows the ways of implementing the suggested measures.

The report includes essentially two main categories of supports: credit and equity programs.

Regarding credit support, it suggests governments to lower the guarantee percentages. In fact, during their first response to the crisis, Countries offered to enterprises, on average, guarantees equal to the 90% of the debt, arriving in certain cases up to 100 %. These high levels of guarantees cannot be sustainable in the long run. Moreover, different guarantee levels should be assigned to various sectors by governments, according to their social importance.

Governments should also use a wider range of credit spreads in order to have a more risk-sensitive loan pricing system. Always for limiting the riskiness of the operations, the policies should have stricter minimum credit underwriting standards.

Regarding equity and equity-like investments, the report suggests governments to decide among alternative maneuvers: they could decide to give incentives, where possible, to the private sector in order to encourage investments, otherwise they could co-invest or drive investments in long-term equity funds; and as the last alternative, to operate directly, only in circumstances where private expertise is limited.

All these credit and equity measures should be associated also to adjustments of the restructuring procedures, that would facilitate contractual debt restructuring for firms that would otherwise go under bankruptcy procedures.

About targeting, the G30 suggests a classification of firms in 5 categories:

The first one includes healthy firms that do not need public support, the second is that of financing-constrained firms, companies that have an economically viable business model, with low leverage, but poor access to financing. In this case it will be appropriate to address them better-targeted credit programs. The third category is that of liquidity-challenged firms, economically viable, but with liquidity problems. For these firms it should be better to provide specific forms of credit mixed with equity or equity-like investments. Solvency-challenged firms belong instead to the fourth category, these firms have an high level of indebtedness, and they are deemed to be insolvent. In this case it should opt for facilitating their access to equity investments while improving restructuring procedures.

The category that requires the most attention is the fifth one: it includes all firms that are not economically viable according to their actual business model. In this case, the report suggests that it is necessary to encourage business adjustments or even the closure of the companies in order to avoid the proliferation of zombies. But the question is: do all zombie firms belong to the fifth category?

To answer the question, our first step is to get to a specific definition of this kind of firms.
The term of zombie was associated for the first time by referring to Japanese firms of the "Lost Decade". In 2008 Ricardo J. Caballero identified these companies as those who received "subsidized" credit, while in 2017 Adalet McGowan defined them as firms with a life of 10 years or more which record an ICR less than one for three consecutive years. Finally, Banerjee and Hofmann offered us another definition based on two characteristics: a persistent lack of profitability and a low market valuation. In particular, the profitability is analyzed through the interest coverage ratio (ICR), while the market valuation through the relative Tobin's q. A company is considered zombie if, over a period of two years, registers an ICR below one and a Tobin's q below the median of the sector. Clearly, having an ICR below one is a strong signal that profits are insufficient to cover interest payments on debt. On the other hand, when the Tobin's ratio is relatively low, it shows that the market is underestimating the firm in comparison to others of the same sector, this depends on the expectations that the market has on the future profitability of the firm.

Looking at the origins of the phenomenon of zombification can give us relevant information.
In 2005, Peek and Resengren, illustrated the problem of credit misallocation that worsened the crisis of Japan in 1991.The troubled banks carried out credit towards weak firms, by continuing to fund companies that were already insolvent, the banking system and the government supported unviable firms causing the stagnation of the Japanese economy. For this reason, the Japanese economy underperformed in terms of employment growth, average industry productivity and investment.
It has been also found that there was a significant correlation between the presence of the zombies and the decrease of prices among industries.
Several years later, Adalet McGowan et al (2017) talked about the increase of zombie firms among non-financial companies during the financial crisis.
The proliferation of zombies has been also associated to the Chinese crisis of 2016 and more recently to the situation of European firms. For instance, Adalet McGowan et al. (2017a and 2017b) state that the share of capital stock of zombie firms has increased in Italy, passing from the 7% in 2007 to 19% in 2013.

In general, from the study of Banerjee and Hofmann of 2018 across 14 advanced economies, emerges that the share of zombies has increased significantly from around 2% at the end of 1980 to 12% in 2016. In this period, the peaks of growth of zombie share are correlated to the periods of economic downturns and lower interest rates policies.

But, what are the causes of this phenomenon? The first cause lies on the role of the banking sector: in 2017, Storz et al (2017) suggests that there is a correlation between stressed banks and risky lending to distressed firms. Moreover, this phenomenon is more likely to happen in poorly performing economies.
According to Banerjee and Hofmann, another possible reason for the proliferation of zombies is the general decrease of interest rates happened since 1980: this situation helped weak firms to stay alive by limiting their financial pressure.

As well as providing a clear definition of them, Banerjee and Hofmann tried to outline the profile of zombie firms and at to describe the characteristics of their lifecycle. According to their results, on average, they are three times smaller than the others in terms of assets, capital stock and employment, they have lower capex and invest less in intangible assets. On the other hand, zombie firms have higher asset disposal and a negative employment growth rate, both signs of a loss of operativity. In addition, their lack of profitability causes also negative cash flows and lower dividends. Zombie firms also issue more equity, principally in form of private placements.
From the analysis on the lifecycle of a zombie emerges that the zombification is the result of a slow process in which a firm records for several years a decrease of the productivity and the profitability. To meet its obligations, the firm tends to sell assets, to increase its indebtedness and to decrease its investments in intangibles and employment.

According to the BIS analysis, zombie firms amounted to 15% of listed companies in 2017, while among listed SMEs, the percentage of zombie firms reached about 30%-40%.
Remembering what said before, zombie firms could be part of the fifth category of firms derived from the classification of the Group of Thirty. However, if the phenomenon is so widespread as to affect the 30%-40% of SMEs, it is necessary to understand better where the boundary lies between unviable firms and zombie firms, even for the purpose of individuating which firms should be recipients of supports and which should be allowed to fail. Assuming that the structurally unsound firms coincide with the whole group of zombie firms would consist in leaving without support a large part of SMEs, this statement seems to be too extreme.

An alternative could be to assume that we must exclude from the category 5 of the G30's classification the portion of zombies that after several years are meant to exit from this status. In fact, basing on the analysis of Banerjee and Hofmann, among the total number of zombie cases observed, about 60% recovered from the zombie status in four years. Being a high portion, these firms probably deserve to be helped.
There is also another alternative: the fifth category of unviable firms could refer to a narrower group of zombie firms, in particular only those that after several years will exit the market in any case. According to the BIS study, this group is equal to the 25% of zombie companies.
The remaining 15% of zombie firms doesn't reach a proper recovery in four years, but if we embraced this last alternative of thinking, they could be recipients of assistance.

To arrive at a satisfactory solution, we have decided to carry out our own empirical analysis on zombie firms, in order to understand if there is a significant difference between the recovered firms and those which remains in the market at zombie status and, basing on this result, we could have an idea on what should be the damage for the economy in helping one or both of them.

We have decided to focus our attention on European small and medium enterprises, because they represent around 99.8% of all businesses of the European Union.
The importance of this category of companies is undeniable: with around 100 million of employees, they account for more than half of Europe's GDP.
SMEs these companies also have their own particular weaknesses: compared to larger firms, they tend to have less cash buffers and fewer options of financing, that in hard times could lead to severe financial constraints.
For this reason, policymaker should adopt ad hoc measures for SMEs. Governments must grant a part of the credit to help viable firms in obtaining the right amount of financing, especially when these firms are facing a status of crisis like that of Covid-19.

In Europe, according to a survey of April 2020 of SME United, about the 90 percent of small and medium enterprises have been somehow affected by Covid-19 emergency. Certainly, the intervention made by the authorities averted the worst, at least in the short term. Some supports ideated for preventing liquidity and insolvency problems were directly addressed to SMEs, others to a wider category of non-financial enterprises. In particular, about loan guarantees, European Countries generally granted to SMEs higher percentages of guarantees compared to larger enterprises, in order to meet the need of a greater protection of these enterprises.

Our empirical analysis aims to investigate the situation of European countries in terms of zombie firms, focusing on unlisted SMEs, a category which had been excluded by the research carried out by Banerjee and Hofmann. We remember that another important difference from the analysis of Banerjee and Hofmann is about Countries: while the BIS took as reference companies of the first 14 advanced economies, we would like to focus on a sample of firms of the 27 States of the European Union.

For our scope, we have used Orbis database and we have analyzed a period of 9 years, from 2012 to 2020.

To find the percentage of zombies among European unlisted firms with small and medium dimensions, we have chosen the same criteria of the BIS research: the interest coverage ratio (ICR), on the other hand, we have excluded the Tobin's q because it cannot be applied to unlisted firms. In particular, we have established that to be considered a zombie, the firm must register an ICR smaller than 1 for two consecutive years.

ICR= EBIT/Interest expenses < 1 for 2 years

We have decided to exclude from the sample early-stage companies, in particular those born after 2009. This choice takes in consideration the fact that early-stage firms are not deemed to be profitable during at least the first three years of their lives.

Then, we have selected small and medium firms for which the value of ICR was available for the entire period of reference, we have obtained a sample of 303,871 enterprises.

We observed that the most frequent nationality of the sample was Italy, that with 95227 firms represents alone more than 31% of the group, followed by Sweden, Spain and Portugal.

Instead, the number of German firms seemed to be too small for representing the real situation of the Country, this is due to the different rules of access of the database to accounting data.

Among the 303 871 firms analyzed, we have found that 114 322 firms could be considered zombie, representing around the 38% of our sample. In particular, in France the percentage of zombie is 42%, while in Spain is 38% and in Italy 36%.

To understand how consolidated this zombification is, we analyzed the percentage of zombies that recover from this status.

For doing that, in line with the BIS study, a firm is considered recovered if, after having been zombie, registers 2 consecutive years of an ICR greater than one.

We have found that between 2012 and 2020 the 49% of zombie firms have recovered from this status and amount to 58059 against the 56263 of zombies for which there has not been a recovery.
We observed also the percentage of recoveries of Spain, that record the 64% of recoveries, followed by Italy with a 52% and France with 38%.

Subsequently, in order to discover information on the quality of the recoveries, which should allowed us to understand if there is a relevant difference between recovered firms and those that remain in the market as zombies, we investigated if these recovered firms had earned an adequate level of stability.
For this purpose, we verified how many of them had been able to reach the investment grade after the recovery.
To do that we used as reference the classification of Professor Damodaran about the rating of small firms.
The classification showed the relationship between ICR levels and rating, dividing the ranks in two main categories: those of investment grade and those of speculative grade.

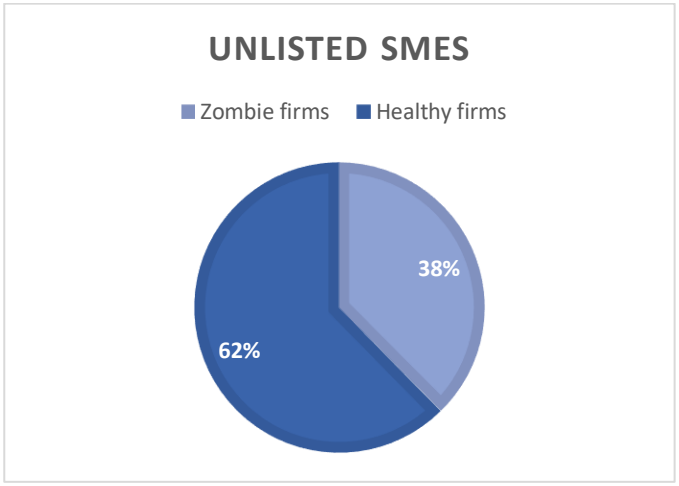
DAMODARAN		
ICR and Ratings:		
>12,5	AAA	
9,5-12,5	AA	
7,5-9,5	A+	
6-7,5	A	
4,5-6	A-	
4-4,5	BBB	
4-4,5	BB+	INVESTMENT GRADE
3-3,5	BB	SPECULATIVE GRADE
2,5-3	B+	
2-2,5	B	
1,5-2	B-	
1,25-1,5	CCC	
0,8-1,25	CC	
0,5-0,8	C	
<0,5	D	

Source: https://pages.stern.nyu.edu/~adamodar/

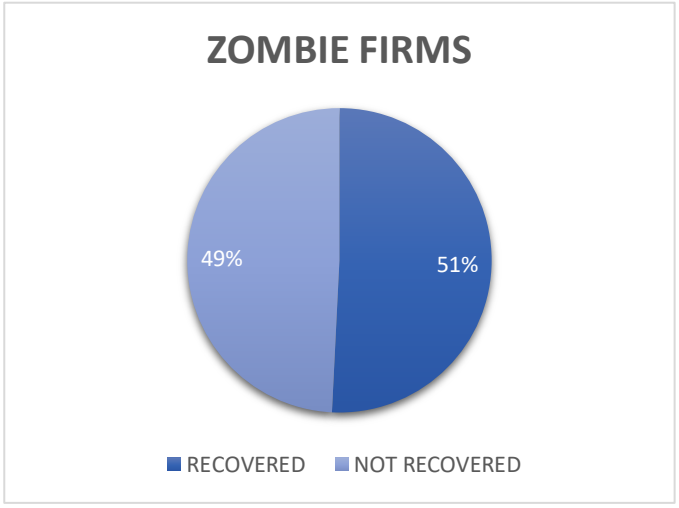
All firms with an ICR smaller than 4 are considered as speculative investments.
Thus, we selected from the subgroup of recovered only those that, during the years after the zombification, have registered an ICR greater than 4. Data showed that 33760 recovered firms against 24299 have reached this requirement, equal to the 58% of recovered firms. It is important to

underline the particular situation of France: it recorded a 78% of firms that reached the investment grade after their recoveries, this percentage is 20% higher than the average of European Countries. Instead, Spain recorded a 60% and Italy a 54% of investment grade recovered firm.

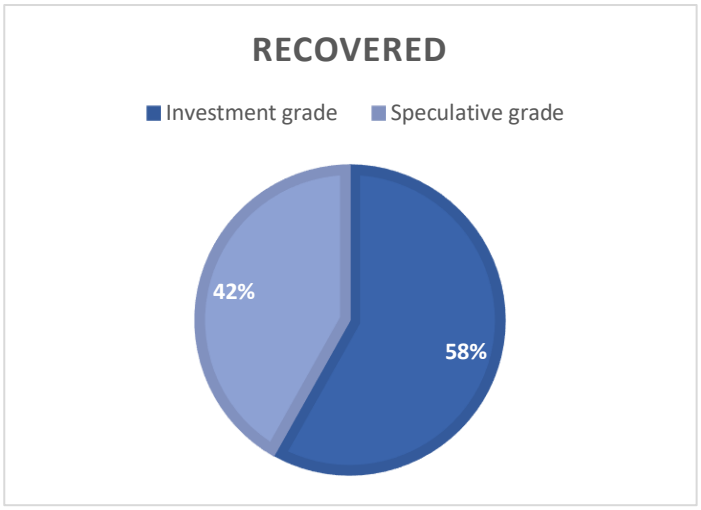
Summary of results



Country	Number of Zombie	Perc. Of sample
Italy	34029	0,357
France	6955	0,425
Spain	16732	0,385



Country	Recoveries	Perc. On Zombie
Italy	17695	0,52
France	2629	0,38
Spain	10737	0,64



Country	Investment grade	Perc. on Recovered
Italy	9505	0,54
France	2050	0,78
Spain	6117	0,6

We remind that our analysis started from a question: do zombie firms coincide with the unviable firms which, according to G30, should be excluded from any form support?

We have found that the category of zombie firms represents around the 38% of our sample, a percentage even greater than that found by Banerjee and Hofmann among listed SMEs. Thus, it seems evident that 38% represents a portion of enterprises too significant to be left without supports, this decision would cause relevant damages to the economy. This thought seems to consolidate even more when we look at the dimension of recovered firms found among zombies: 49% of all zombies in Europe, 64% of zombies in Spain, and respectively 52 % and 38% in Italy and France.

Therefore, almost half of zombie firms recovers from this status, with a high quality of recovery, proved by the ability of reaching the investment grade by the 58% of recovered firms in Europe. Without considering then the case of French firms, which despite record the most worrying level of zombies and the lowest rate of recovery in comparison to Spain and Italy, they also show a very higher quality of its recoveries.

All these results suggest us that, under the used definition, the category of zombie firms does not coincide with that of unviable firms. Moreover, the percentage and the quality of recoveries suggest that there is room for supporting these firms, and that unviable firms represent only a stricter category.

In conclusion, we can say that the Covid emergency has also caused a strong crisis in the Corporate Sector, and that most small and medium-sized enterprises have suffered a significant impact, due to the shocks in demand and supply occurred in particular during the restrictions that various States adopted for limiting the infection.

As stated by the Group of Thirty, the measures adopted by the authorities, despite having helped firms in the short run, must be modified in order to contrast another danger: the proliferation of zombie firms.

Taking as example what happened in Japan, we have seen in fact, that the phenomenon of zombie firms is directly connected to the misallocation of credit.

For this reason, it must be avoided the choice of giving broad credit support, without appropriately targeting them according to the specific situation of borrower firms.

In particular, to continue lending to firms that result already heavily indebted can be severely harmful to the entire system. Therefore, policymaker should opt for other forms of assistance like the incentives to equity investments.

Moreover, it should be useful to allow unviable firms to fail, by excluding them from any form of support that, at the end, will turn out to be wasted.

However, this does not mean that zombie firms don't deserve any kind of intervention. In fact, the outcomes of our study suggest that in Europe the percentage of zombies is too high to be left to die without any form of support, even because almost a half of zombie firms heals from its status, with an high quality of recovery.

Unviable firms are then a subcategory of zombie firms, that require to be well individuated in order to not waste public resources. Public institutions should use the expertise of private entities to better discover unviable businesses.

As regards the assistance to zombie firms, we can say that, among all, the credit support is not the most appropriate form of aid for this category, because they are firms which recorded signals of financial constraints. Thus, public institutions should opt for policies aimed at facilitating them the access to equity and equity-like investments.