Escaping Zombiness: Does Corporate Governance Have the Elixir of Life?

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This study investigates the influence of corporate governance on firms' transition into and out of zombiness. We underscore the beneficial role of external members in the corporate governance structure and long-tenured chief executive officers (CEOs) in facilitating access to the external resources that firms need to be successful. Using a sample of European listed firms over the period 2008–2018, we adopt a dynamic view of zombiness by identifying shifts in the state from zombie to non-zombie and vice versa. The results show that board independence is a twofold panacea against zombies, prompting zombie recovery and preventing healthy firms from becoming zombies. By contrast, leadership independence, materialized by separating the CEO and chairperson roles, hampers the recovery of zombies, probably because the cost of lacking unified leadership may exceed the benefits of external dependence minimization. Finally, the results suggest that longer CEO tenure helps healthy firms avoid zombiness. When considering a broader array of stakeholders, government bailout programmes impair zombie recovery, and stronger trade unions help healthy firms escape zombiness. Overall, this study brings a ray of hope to the zombie problem and provides a better appraisal of when supporting zombies might be worthwhile vis-à-vis saving promising firms and bringing them back to life.

Introduction

Zombie firms are financially weak borrowers whose operating cash flows persistently fall below their interest payments and that are, therefore, unable to face debt servicing costs over an extended period (Goto and Wilbur, 2019; Hoshi, 2006; Hu and Varas, 2021). The zombie problem is becoming chronic (Laeven, Schepens and Schnabel, 2020), particularly in Europe, for a number of reasons. First, government and central bank interventions are subsidizing some non-viable firms (Acharya et al., 2020). Second, persistently low interest rates have distorted companies' investment decisions, triggering debt overhang problems (Laeven, Schepens and Schnabel, 2020). Finally, there are incentives for weak banks to lend to non-viable firms to avoid further capital deterioration (Altman, Dai and Wang, 2022).

Our research explores the factors that drive firms to transition into and out of zombiness, highlighting corporate governance. Easing lending standards during economic downturns revitalizes zombie lending (Altman, Dai and Wang, 2022; Ellul, Erel and Rajan, 2020; Schivardi, Sette and Tabellini, 2020). Specifically, it involves extending credit to impaired borrowers—zombie firms—under advantageous conditions in order to provide them with the liquidity required to stay alive and meet their loan payment obligations (Acharya et al., 2019, 2020; Caballero, Hoshi and Kashyap, 2008; Goto and Wilbur, 2019). Financial support for zombie firms is controversial because it generally does not lead to better ex post firm performance. Excessive indebtedness is an obstacle to investments in firm recovery (Acharya et al., 2019; Barbiero, Popov and Wolski, 2020; Ellul, Erel and Rajan, 2020).

To date, one well-explored research path has examined the antecedents of zombies, primarily focusing on which lenders (e.g. weakly capitalized banks) are more prone to engage in zombie lending (Acharya et al., 2019; Peek and Rosengren, 2005; Schivardi, Sette and Tabellini, 2022; Storz et al., 2017). However, few studies have investigated the recovery of zombie firms in terms of which firm characteristics, apart from those directly related to their financial health, may help them overcome zombiness (Carreira, Teixeira, and Nieto-Carrillo, 2022; Fukuda and Nakamura, 2011). Such studies are vital for legitimizing the *raison d'être* of zombie lending and elucidating whether financial resources flow towards promising firms that need temporary support to

survive or, in contrast, whether they artificially keep unviable businesses alive. Despite the crucial role of top managers and boards in firm survival during financial distress (Daily and Dalton, 1994a, 1994b; Dowell, Shackell, and Stuart, 2011; Gales and Kesner, 1994; Platt and Platt, 2012; Sudarsanam and Lai, 2001), there is insufficient understanding in this regard. Top managers are key decision-makers, and boards play monitoring and advisory roles, which are critical in preserving corporate solvency (Mangena, Priego and Manzaneque, 2020; Platt and Platt, 2012). Because the effectiveness of governance mechanisms is contingent on a firm's circumstances (Dowell, Shackell and Stuart, 2011), making universal prescriptions is far from advisable. Thus, furthering our knowledge of zombiness will shed light on how firms can overcome this problem, meaning that considering the unique circumstances of zombie firms is key.

Our investigation fills the research gap by examining the role that corporate governance plays in escaping zombiness. We study whether a firm's governance structure (i.e. board independence, leadership independence and CEO tenure, which can shape the relevance of agency conflicts and facilitate access to critical resources) influences its transition into and out of zombiness. How does (board and leadership) independence affect the chances of zombie firm recovery? How do board independence and CEO tenure influence the avoidance of zombiness in healthy firms? Additionally, following Turnbull (1997), we expand our view of governance by exploring three categories of stakeholders that may play a non-trivial role in zombie firms and shape some of their unique circumstances: bank lenders (i.e. capital strength), government (i.e. the relevance of government bailout programmes) and unions (i.e. trade union strength). We apply the agency (Fama and Jensen, 1983; Hillman and Dalziel, 2003) and resource dependence (Aldrich and Pfeffer, 1976; Pfeffer and Salancik, 1978) theories to elaborate our hypotheses. These theories complement each other in explaining the core functions of governance, namely monitoring and advising (Hillman and Dalziel, 2003; Kroll, Walter, and Wright, 2008; Pugliese, Minichilli, and Zattoni, 2014). To the best of our knowledge, only San José, Urionabarrenetxea and Garcia-Merino (2022) have addressed how corporate governance shapes the severity of zombiness. Moreover, the problem of zombie recovery remains unresolved. Following Carreira, Teixeira and Nieto-Carrillo (2022), we adopt a dynamic view of zombiness by identifying a shift in state (from zombie to non-zombie and vice versa) between consecutive yearly periods.

We posit that board and leadership independence enhances the likelihood of zombie firms recovering, and that board independence and CEO tenure curb healthy firms' transition to zombiness. From the resource depen-

dence logic, boards are collaboratively involved in firm operations (Boyd, Haynes and Zona, 2011), and outside directors are critical resource providers for managing external interdependencies (Chen, Hsu and Chang, 2016; Dalziel, Gentry and Bowerman, 2011; Haynes and Hillman, 2010; Schaedler, Graf-Vlachy and König, 2022). From an agency-based view, such directors have stronger incentives to safeguard shareholders' interests and oversee managerial behaviour to develop their reputations as experts in decision control (Fama and Jensen, 1983; Zattoni and Cuomo, 2010). Therefore, we posit that greater board independence curbs zombification in two ways: (1) by prompting the recovery of zombie firms and (2) by curbing the transition of healthy firms to zombiness. Additionally, leadership independence (e.g. separating the CEO and chairperson roles) might help zombie firms recover by weakening agency conflicts and achieving richer advisory capabilities, thus bringing a fresh perspective and reversing financial distress, which cannot be achieved if only one person holds full control (Krause, Bakker and Knoben, 2022). Finally, we propose that having a long-tenured CEO decreases the likelihood of healthy firms becoming zombies. Long-tenured CEOs achieve a stronger alignment with shareholder interests and accrue superior firm-specific knowledge, skills and social capital to better manage stakeholder relationships, thereby providing the critical resources needed to deal with the external environment (Darouichi et al., 2021; Hillman and Dalziel, 2003; Hillman, Withers and Collins, 2009; Pfeffer and Salancik, 1978; Zhang et al., 2016).

We test our hypotheses using a sample of European listed companies from 2008 to 2018. The results reveal that board independence is a key panacea against zombiness as it makes zombie firms more likely to recover and increases the likelihood of healthy firms remaining healthy. Contrary to our expectations, separating the CEO and board chairperson roles is detrimental, as it makes zombie firms less likely to overcome their predicaments. CEO duality positively affects zombie recovery likelihood, albeit very weakly. Healthy firms with longer-tenured CEOs are more likely to remain healthy. Government bailout programmes impair zombie recovery, and stronger trade unions help healthy firms escape zombiness.

The paper proceeds as follows. We first review the literature, and then develop the hypotheses. Next we explain the empirical design and the results, before ending with a summary and conclusions.

Literature review

The term 'zombie firm' was originally coined to refer to lost decades in the Japanese economy (Caballero, Hoshi and Kashyap, 2008; Hoshi, 2006). Recently, the

zombie problem has been studied in Europe (Acharya et al., 2019; Schivardi, Sette and Tabellini, 2022; Urionabarrenetxea et al., 2018) and worldwide (Altman, Dai and Wang, 2022; McGowan, Andrews and Millot, 2018). The latest research characterizes zombie firms as one subset of distressed borrowers who continue to receive credit from their lenders (Álvarez, García-Posada and Mayordomo, 2023). This key feature distinguishes zombie firms from the broader population of financially distressed companies.

Most research attributes zombie lending to the suppression of the normal competitive fundraising process and regards it as a capital misallocation problem (Fukuda and Nakamura, 2011). However, providing liquidity to zombies is a double-edged sword (Chang et al., 2021; Hoshi, Kawaguchi and Ueda, 2023). On the one hand, advocates prioritize its short-term benefits, such as curbing bankruptcy waves and thereby mitigating adverse spillover effects (Schivardi, Sette and Tabellini, 2020) and disruptions in input–output relationships (Bernstein et al., 2019; De Jonghe, Mulier and Samarin, 2022). On the other hand, many studies have highlighted several side effects of providing liquidity to zombie firms that artificially prolong their lifespans. First, the provision reduces job creation and aggregates productivity (Acharya et al., 2019, 2020; Caballero, Hoshi and Kashyap, 2008; McGowan, Andrews and Millot, 2018). Second, the misdirection of credit towards zombies crowds out credit for productive firms (Acharya et al., 2019; Douch, Edwards and Mallick, 2023; Hu and Varas, 2021; McGowan, Andrews and Millot, 2018; Schivardi, Sette and Tabellini, 2020). The more advantageous credit conditions afforded to zombie firms distort market competition, prompt downward pressure on all firms' product prices and employee salaries, and cause excess production capacity (Acharya et al., 2019, 2020; Hoshi, 2006; Schivardi, Sette and Tabellini, 2020). This, in turn, affects the performance of healthy firms, triggering poor resource allocation and reducing investment and employment growth (Caballero, Hoshi and Kashyap, 2008; Hoshi, 2006; Schivardi, Sette and Tabellini, 2020). These conditions also deter market entry into zombie-dominated industries (Acharya et al., 2019, 2020; Caballero, Hoshi and Kashyap, 2008; McGowan, Andrews and Millot, 2017, 2018).

Zombie firms face major hurdles in terms of either overcoming their distress or exiting the market, which results in them becoming entrenched (Carreira, Teixeira and Nieto-Carrillo, 2022). Nevertheless, the extant literature suggests that some may escape zombiness (Carreira, Teixeira and Nieto-Carrillo, 2022). Carreira, Teixeira and Nieto-Carrillo (2022) and Goto and Wilbur (2019) reported that downsizing and debt restructuring increase the likelihood of zombie firm recovery. Other studies emphasize the importance of corporate leaders. Fang et al. (2020) showed that a greater presence of female executives prevents zombiness. By contrast, the presence of executives with previous appointments to government agencies and financial institutions increases firms' odds of becoming zombies. Fukuda and Nakamura (2011) noted that curtailing bonus payments to executives worsened zombie recovery after the 1990s recessions in Japan. Altogether, this emerging evidence encouraged us to delve into the role of governance in both zombie recovery and zombie prevention and inspired our research.[1]

Hypotheses

Board independence: a two-fold panacea against zombiness?

Zombie recovery and prevention are two positive scenarios through which firms succeed in overcoming financial problems. Expanding our knowledge of the factors that contribute to these successful events is crucial for providing firms with useful guidance on how to succeed when facing zombiness. However, there are few studies so far.

Agency and resource dependence theories offer insightful lenses through which to understand the relevance of governance structures to firms. Corporate governance and power distribution within firms are essential for firm performance, especially in distressed companies (Jensen and Warner, 1988) such as zombies. Boards perform two functions: monitoring and advising (Hillman and Dalziel, 2003; Kroll, Walters and Wright, 2008; Pugliese, Minichilli and Zattoni, 2014). Agency theory presents boards of directors as central internal governance mechanisms (the watchdog function) that alleviate shareholder–manager conflicts (Fama and Jensen, 1983; Hillman and Dalziel, 2003) and are ultimately responsible for a firm's long-term financial health and survival (Daily and Dalton, 1994b). Among the various categories of directors, outside directors are the most effective monitors of managerial behaviour because they are not involved in the management team and exhibit strong reputation concerns. Consequently, they may exercise their function of oversight over the firm's CEO more effectively, thereby demonstrating a greater ability to avoid zombiness (Fama and Jensen, 1983).

Regarding the advisory function of boards, outside directors can help firms stay financially healthy as a result of their better connections with external resources

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[1]The existing literature on financial distress (Dowell, Shackell and Stuart, 2011) studies the influence of corporate governance on firm survival in such a troubled situation, which may not necessarily imply that the firm is supported by its lenders (as zombie firms) through additional credit provision. Nor do the authors identify transition paths when studying financially distressed companies through a longitudinal dynamic analysis.

(Johnson, Daily and Ellstrand, 1996). Such resource provisions make it easier for firms to face contingencies which, if not resolved successfully, may push them towards zombiness. Resource dependence theory claims that firms depend on resources from their external environment to survive (Aldrich and Pfeffer, 1976; Pfeffer and Salancik, 1978). From this perspective, boards offer a critical link to the environment by providing resources that are not otherwise available, thereby reducing external dependence and environmental uncertainty (Gales and Kesner, 1994; Krause, Semadeni, and Withers, 2016; Pfeffer and Salancik, 1978). In particular, outside directors provide valuable advice and counsel for strategic decision-making, strengthen legitimacy, supply relational capital to facilitate inter-firm relations, and grant preferential access to resources (Boyd, Haynes and Zona, 2011; Daily and Dalton, 1994a; Hillman, 2005; Pfeffer and Salancik, 1978). Outside directorships are a key source of valuable resources (e.g. legitimacy or advice) that are lacking internally and essential for firms experiencing impaired performance (Daily and Dalton, 1994a; Gales and Kesner, 1994; Pugliese, Minichilli and Zattoni, 2014).

Thus, populating boards with a greater proportion of outside directors might ensure that they provide a more effective oversight of managerial behaviour while simultaneously favouring appropriate management of dependence on the external environment and preserving firm solvency (Daily and Dalton, 1994b). We hypothesize:

H1: *Greater board independence makes healthy firms less likely to become zombies.*

Outside directors have a superior ability to alleviate agency conflicts and minimize potential managerial opportunism in a principal–agent setting (Fama and Jensen, 1983). Agency theory attributes corporate failures to weak governance. Indeed, the literature agrees on the importance of boards in predicting bankruptcy. Earlier studies associate poor board independence with financial distress and the likelihood of firm survival (Daily and Dalton, 1994b; Dowell, Shackell and Stuart, 2011; Gales and Kesner, 1994; Platt and Platt, 2012). Outside directors strengthen board financial expertise to better manage financial risk (García-Meca and Sánchez-Ballesta, 2010).

As stated above, outside directors provide boards with valuable advice, expertise and human capital, which are particularly beneficial for firms with impaired performance (Daily and Dalton, 1994a, 1994b; Gales and Kesner, 1994) seeking to re-establish their financial health. Human and relational capital brought in by outside directors can offset potential managerial deficiencies in decision-making and aid firm survival (De Maere, Jorissen and Uhlane, 2014). Pugliese, Minichilli and Zattoni (2014) and Hillman and Dalziel (2003) reported that poor firm performance intensifies a board's

advisory role, which becomes crucial when redesigning a firm's strategic direction, depending on how the environment evolves. Conversely, the departure of outside directors in troubled companies generates additional organizational instability, which may trigger a downward spiral (Hambrick and D'Aveni, 1988). Based on these arguments, we hypothesize:

H2: *Greater board independence makes zombie firms more likely to move out of zombiness.*

Leadership independence and recovery from zombiness

CEO duality can provide excessive power to the CEO, thus aggravating agency problems caused by CEO self-interest and inefficient resource allocation (Aktas et al., 2019), which can be exceedingly detrimental for zombie firms that struggle to stay afloat. Moreover, it may be problematic to rely solely on managers to repair financially distressed situations because they are usually the ones most responsible for organizational failure as a result of poor decision-making, self-interested behaviour, or failure to actively prevent economic losses (Altman, 1993; Khanna and Poulsen, 1995). Owing to the imminent risk of failure, financially distressed companies feel pressured to implement changes in their governance to prevent them from losing key stakeholder support (Daily and Dalton, 1995). Daily and Dalton, 1994a, 1994b) found that bankrupt firms are more likely to have CEO duality than are their healthy counterparts. Adopting a split CEO–chair board structure has become commonplace, a tendency furthered by the Sarbanes–Oxley Act of 2002 in the United States. Separating these corporate roles dilutes CEO power (Gupta, Wowak and Boeker, 2022) and promotes more effective monitoring (Daily and Dalton, 1995).

From an alternative viewpoint, resource dependence theory also points to leadership independence as a remedy for zombiness owing to the enriched spectrum of perspectives on problem-solving. It underscores the collaboration between the board and the CEO (Boyd, Haynes and Zona, 2011) and the idea that leaders bring valuable human and social capital to their companies, especially during crises (Krause, Semadeni and Withers, 2016; Schaedler, Graf-Vlachy and König, 2022). Boards consider their chairs a valuable resource, mainly owing to the human capital they provide (Krause, Semadeni and Withers, 2016). From a resource dependence standpoint, appointing a board chair different from the current CEO can foster advising and collaboration among corporate leaders and improve communication between the CEO and other board members (Krause, Semadeni and Withers, 2016, 2022). This expands the firm's advisory capabilities and brings fresh perspectives to support strategy formulation and overcome financial problems, which cannot be achieved if

one individual wields total control (Krause, Semadeni and Withers, 2016, 2022) and lacks the openness to offer the independent perspective required to move the firm out of the financial distress spiral (De Maere, Jorisen and Uhlaner, 2014). We hypothesize:

H3: *Leadership independence makes zombie firms more likely to move out of zombiness.*

CEO tenure and preventing zombiness

Combining resource dependence and agency perspectives, we hypothesize that CEOs who have held office for longer periods may help healthy firms avoid zombiness through two channels: (1) by reducing dependencies on the external environment and (2) by building more trustworthy stakeholder relationships to better align with shareholders' interests and gain greater access to key external resources. Resource dependence theory postulates that leaders can alleviate environmental dependence by bringing critical resources (e.g. firm-specific expertise and knowledge) to the firm (Conyon et al., 2019; Hillman, Withers and Collins, 2009; Pfeffer and Salancik, 1978; Schaedler, Graf-Vlachy and König, 2022). Supporting this view, Conyon et al. (2019) demonstrated that the specialized foreign expertise provided by CEOs provides firms with a competitive advantage in their internationalization strategy. Simsek (2007) argued that long-tenured CEOs accumulate comprehensive knowledge about the firm's environment and gain firm- and job-specific skills, which are critical resources for avoiding zombiness. The literature supports the importance of CEO tenure during distress. Gallucci et al. (2023) provided evidence that longer CEO tenure curbs the probability of default in Italian small-to-medium-sized enterprises (SMEs).

Regarding the second channel, CEO tenure signals a long-standing relationship with the company, which enhances the confidence of the firm's stakeholders and board of directors in the CEO's abilities. This facilitates better alignment between the interests of the CEO and those of the shareholders, who are represented by directors and will, therefore, foster a CEO-friendly board with superior advising ability (Adams and Ferreira, 2007) owing to weaker agency conflicts.[2] Moreover, improved CEO–stakeholder relationships produce an atmosphere of trust and collaboration that favours the CEO in making good strategic decisions (Nicholson and Kiel, 2007), such as those concerned with a firm's financial health, which may reduce the likelihood of it becoming a zombie. CEOs build essential social capital during their tenure, which enables them to influence their relationships with stakeholders (Darouichi et al., 2021). Thus, a longer CEO tenure creates a more favourable environment and makes it easier for the CEO to attract outside resources for the firm, such that, in line with the resource dependence logic, they play a key role. CEOs who have been in their positions longer are more likely to have forged stronger relationships with board members, which might promote collaboration between the CEO and the firm's directors (Boyd, Haynes and Zona, 2011). Therefore, we hypothesize:

H4: *A longer CEO tenure makes healthy firms less likely to become zombies.*

A broader governance perspective into the unique circumstances of zombies: lenders, government and unions

Earlier works (Dowell, Shackell and Stuart, 2011) note that the effectiveness of governance mechanisms is contingent on firm circumstances. Multiple stakeholders are involved in a firm's business operations and ability to exist (Turnbull, 1997). Mangena, Priego and Manzaneque (2020) confirm the key role of stakeholders such as banks in the survival of financially distressed companies. We broaden our governance perspective by focusing on three stakeholder groups that could be key to shaping the unique circumstances of zombie firms: bank lenders (i.e. capital strength), government (i.e. the relevance of government bailout programmes) and unions (i.e. trade union strength).[3]

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[2] A longer tenure might exacerbate CEO entrenchment in some instances. More entrenched CEOs are prone to reduce firm leverage (Lee and Yeo, 2010), which also leads us to expect firms to be more likely to avoid zombiness. We thank an anonymous reviewer for raising this complementary argument.

[3] Our study's core theories support the convenience of considering these three variables. First, a country's banking sector with a weak capital base may be more prone as a whole to avoid reporting impaired loans as non-performing, which in turn might trigger adverse selection or moral hazard problems. Zombie firms will jeopardize these lenders' interests, as revealed by financial resource allocation flowing towards purposes that are not aligned with the initially agreed terms. These arguments are aligned with agency theory. Second, country government bailouts can also foster moral hazard problems if banks feel pressure to comply with government mandates and provide zombie firms with more advantageous lending conditions under the assumption that the government will intervene to rescue those firms if necessary. These contentions are consistent with the agency view. Moreover, in agreement with resource dependence theory, banks' support to zombie firms may endow them with stronger government endorsement if the latter regulations and policies are intended to support those struggling organizations as zombie firms. Finally, as far as country trade unions are concerned, stronger unions improve access to information, thereby curbing information asymmetries and potential agency conflicts. Also, forging good relationships between corporate boards and trade unions within a country can produce a valuable intangible resource for companies (and in particular for zombie firms, which are in a more alarming situation). These three variables provide a very interesting avenue for

First, as explained above, banks are central to keeping zombie companies afloat because they are reluctant to report impaired loans as non-performing (Barbiero, Popov and Wolski, 2020; Caballero, Hoshi and Kashyap, 2008; Peek and Rosengren, 2005; Schivardi, Sette and Tabellini, 2022). Instead, they prefer to roll over credit, especially for borrowers with whom they have a long lending relationship, in the hope of regaining solvency (Acharya et al., 2019, 2020). By doing so, weakly capitalized banks avoid additional loan charge-offs and loan loss provisions that would deteriorate their capital bases (Albuquerque and Moa, 2023; Peek and Rosengren, 2005; Schivardi, Sette and Tabellini, 2020, 2022). We expect a stronger bank capital base in each firm's country to curb zombiness. Second, government bailouts are financial resources injecting capital into banks. Greater government financial support may encourage banks to engage in capital misallocation when granting credit and so persist in zombie lending to a greater extent, thereby aggravating zombiness (Laeven, Schepens and Schnabel, 2020; San José, Urionabarrenetxea and García-Merino, 2022; Schivardi, Sette and Tabellini, 2020). Finally, unions might have important implications for agency relationships within companies. Ursel and Zhong (2022) document that unions support boards to monitor underperforming CEOs. Boodoo (2020) reveals that stronger unions encourage firms to engage in socially responsible practices. Such better governance might curb zombiness. We thus hypothesize:

H5a: *A stronger country bank capital base makes zombie (healthy) firms more (less) likely to move out of (fall into) zombiness.*

H5b: *Greater country government bailouts make zombie (healthy) firms less (more) likely to move out of (fall into) zombiness.*

H5c: *Stronger country trade unions make zombie (healthy) firms more (less) likely to move out of (fall into) zombiness.*

Research design

Sample and data

Our sample comprises listed companies from European countries during the period 2008−2018. This choice provides an interesting setting and complements previous research in Japan. Data were compiled from multiple sources. Governance data were extracted from the NRG Metrics database. This database contains hand-collected information obtained via expert analysts from corporate annual reports since 2007, and the literature acknowledges its good coverage of listed European companies (Attig et al., 2021). We match these

data with financial data from Worldscope, through the Eikon platform. Additionally, we collect country-level data from the International Monetary Fund (i.e. the average capitalization levels of the banking sector), Eurostat (i.e. government bailout programmes) and the International Labor Organization (ILOSTAT) (i.e. trade union strength).

We implement several of the usual sample selection filters. First, we exclude firm-year observations from the finance, insurance and real estate industries (SIC 6000−6999) owing to their regulatory idiosyncrasies (Azofra, Rodriguez-Sanz and Velasco, 2020). Second, we omit firm-year observations with zero or negative asset and sales values. We require data availability for our binary variables to classify firms into zombie and non-zombie categories. Dynamically tracking them requires at least two consecutive observations for each firm to determine whether it changes categories. Finally, we winsorize our firm-level financial variables at the 1% level. However, we do not do so with governance- and country-level variables because they do not have significant extreme values. Because some of our explanatory variables capture yearly change vis-à-vis the previous year, our analysis sample starts in 2008. These filters result in a final sample of 14,625 firm-year observations for 1824 unique companies from 24 European countries. The countries with the broadest representation in the sample are the UK (16.75%), Germany (13.26%), France (10.17%), Greece (9.15%) and Italy (7.41%).

Measures[4]

Dependent variables. To categorize our firm-year observations into zombie and non-zombie categories, we use a binary variable (*ZOMBIE1*). A firm is classified as a zombie if it meets the following criteria (Storz et al., 2017): (1) negative return on assets (ROA), (2) negative net investment (the change in total fixed assets relative to the previous year) and (3) debt servicing capacity (EBITDA over total financial debt) below 5%. For robustness, we construct two alternative dummy variables (*ZOMBIE2* and *ZOMBIE3*) to identify zombie firms based on more restrictive conditions.[5]

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further research. We acknowledge one anonymous reviewer for this suggestion.

[4]See Appendix A for a summary.

[5]We thank the anonymous reviewers for their insightful comments in this regard. In addition to criteria (1) to (3), *ZOMBIE2* requires the firm to be 5 years old or older and to have received further credit in year *t* (i.e. a total debt increase between *t* and *t* − *1*). These additional filters promote a better distinction between zombie firms and the wider set of distressed firms and also correct for the potential misclassification of young startups as zombie firms (Álvarez, Garcia-Posada and Mayordomo, 2023). One commonly used age threshold identifies start-ups as firms younger than 5 years old (Colombelli, Grilli, Minola and Mrkajic, 2020; Heyman, Norback, Persson and Andesson, 2019). *ZOMBIE3* relies on the same criteria as *ZOMBIE2* but

Having identified zombie and non-zombie companies, we construct two dependent variables by tracking firms annually, which requires at least two consecutive observations.[6] To investigate zombie recovery, we first compute a dummy variable (*transitionZOMBIE*), which equals one if the firm was a zombie firm in the previous year ($t - 1$) and becomes a healthy firm in the current year (t) and zero if the firm was a zombie firm in $t - 1$ and remains a zombie in t. Depending on the proxy used to identify zombies and non-zombies, this variable is labelled as *transitionZOMBIE1*, *transitionZOMBIE2* or *transitionZOMBIE3*. Second, to identify the transition path followed by healthy firms, we build a dummy variable (*transitionHEALTHY*) that equals one if the firm was a non-zombie (healthy) firm in $t - 1$ and remains healthy in t and zero if the firm was healthy in $t - 1$ and becomes a zombie in t. Again, *transitionHEALTHY1*, *transitionHEALTHY2* and *transitionHEALTHY3* draw on *ZOMBIE1, ZOMBIE2* and *ZOMBIE3*, respectively.

Explanatory variables. Our main proxy for board independence is the ratio of the number of independent directors to the number of board directors, *INDEPENDENT_BOARD* (Platt and Platt, 2012). As recovery from zombiness is likely to force zombie firms to undertake certain reforms in their governance, we also compute this variable in yearly variation terms to match this measure with the dynamic perspective of our dependent variables based on the transition paths that companies follow. Recent research (Vallelado and García Olalla, 2022) emphasizes the need to account for governance changes over time. We calculate the difference between the number of independent directors between t and $t - 1$ and then divide this by the number of independent directors in $t - 1$ ($\Delta INDEPENDENT\_BOARD$). For robustness, we employ the number of non-executive directors divided by the total number of directors as a proxy for board independence (Peel and Clatworthy, 2001).

Leadership independence is another explanatory variable. Again, we use two proxies (Cheng, Smith and Tanyi, 2018): a static proxy, which is based on the existence or absence of CEO duality; and a dynamic proxy, which is based on whether the firm changes from having CEO duality to eliminating it, and vice versa (between $t - 1$ and t). Regarding the former, we measure leadership independence using a binary variable (*CEOduality*) equal to one if the CEO and board chair positions are held by the same person and zero otherwise. This constitutes an inverse proxy for the leadership independence that occurs in the absence of CEO duality (*CEOdual-*

ity = 0). Alternatively, we compute the corresponding dynamic variable capturing changes in leadership independence, namely the separation of the CEO and chairperson roles, which is measured by a dummy variable (*CEOChairSplit*) equal to one if the firm transitioned from having CEO duality at $t - 1$ to having the roles of CEO and chair held by different people (Gupta, Wowak and Boeker, 2022). Finally, CEO tenure (*CEOtenure*) is captured by the natural logarithm of CEO tenure (years).

We enter three explanatory variables at the country level to account for the role of multiple outside stakeholders: (1) the average strength of the capital base of banks from the firm's country (*BANKTIER1*), which is the average percentage of Tier 1 capital to total risk-weighted assets of all banks operating in the country of each firm; (2) the relevance of government bailout programmes to support financial institutions (*BAILOUT*), captured by the natural logarithm of one plus the amount of government bailout funds in the firm's country; and (3) trade union strength (*UNIONS*), proxied by the percentage of collective bargaining coverage in the firm's home country.

Control variables. We consider a variety of control variables that can affect the transition between zombie and non-zombie states (Carreira, Teixeira and Nieto-Carrillo, 2022; Daily, 1996; Daily and Dalton, 1994a; Goto and Wilbur, 2019). We control for a firm's profitability (*PROFITAB*), given by the ROA (percentage); a firm's age (*AGE*), computed as the natural logarithm of the firm's age in years; a firm's size (*SIZE*), proxied by the natural logarithm of the book value of total assets; operational restructuring, calculated as the yearly percentage change in the number of employees relative to the previous year ($\Delta EMPLOYEES$); and whether a firm's CEO has financial expertise (the dummy *FINCEO*).

Additionally, corporate culture[7] exerts a powerful influence on firm policies (e.g. financing) and might, therefore, affect the transition into and out of zombiness. Because a firm's culture is likely to mirror the values, national culture and social norms of its country of origin (Lievenbrück and Schmid, 2014), we classify firms into Anglo-American, Eastern, Nordic and Continental (Põder and Kerem, 2011), and we add three binary variables: *ANGLOCULTURE*, *EASTCULTURE* and *NORDCULTURE*.

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[6]has an additional requirement: a firm's average interest rate paid for its total debt must be below the mean interest rate for debt financing paid by firms operating in the same industry and country in t. The latter filter accounts for more advantageous credit conditions for zombie firms.

[6]Consequently, 2008 does not enter our estimations.

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[7]We thank an anonymous reviewer for this suggestion. We proxy for corporate culture based on the culture of the country where the firm is headquartered, which is likely to drive the strongest influence in firm policies. A finer-grained measurement of corporate culture could be accomplished by collecting data concerning firm stakeholders' personal views and values by implementing interview- and survey-based approaches (Graham, Grennan, Harvey and Raigopal, 2022), which lies beyond the scope of this study. We propose it as a future research avenue.

Regressions with the *transitionZOMBIE* proxies also incorporate zombie duration (*durationZOMBIE*) as an additional control variable, approximated by the natural logarithm of one plus the years during which the firm had been a zombie in $t-1$.

Estimation method

To test Hypotheses 2 and 3, we examine the determinants of zombie recovery (e.g. the transition path of zombie firms):

$$
\begin{aligned}
transitionZOMBIE_{i,t} &= \beta_0 + \beta_1 \cdot BOARDINDEPENDENCE_{i,t} \\
&+ \beta_2 \cdot LEADERSHIPINDEPENDENCE_{i,t} + \beta_3 \\
&\cdot BANKTIER1_{i,t} + \beta_4 \cdot BAILOUT_{i,t} + \beta_5 \cdot UNIONS_{i,t} \\
&+ \beta_6 \cdot CONTROLS_{i,t} + \beta_7 \cdot COUNTRY_j + \beta_8 \cdot INDUSTRY_k \\
&+ \beta_9 \cdot YEAR_t + \varepsilon_{i,t}
\end{aligned}
\tag{1}
$$

where i denotes each firm, *CONTROLS* represents the vector of control variables, and $\varepsilon_{i,t}$ is the error term. The subscripts j, k and t denote country, industry and year, respectively. Accordingly, *COUNTRY*, *INDUSTRY* and *YEAR* are the three sets of dummies that control for country-, industry- and year-fixed effects,[8] respectively. To identify the core industry in which each firm operates, we rely on a division classification scheme based on two-digit SIC codes from the US Department of Labor.

To test Hypotheses 1 and 4 concerning the determinants that prevent healthy firms from becoming zombies, we estimate:

$$
\begin{aligned}
transitionHEALTHY_{i,t} &= \gamma_0 + \gamma_1 \cdot CEOTENURE_{i,t} \\
&+ \gamma_2 \cdot BOARDINDEPENDENCE_{i,t} + \gamma_3 \cdot BANKTIER1_{i,t} \\
&+ \gamma_4 \cdot BAILOUT_{i,t} + \gamma_5 \cdot UNIONS_{i,t} + \gamma_6 \cdot CONTROLS_{i,t} \\
&+ \gamma_7 \cdot COUNTRY_j + \gamma_8 \cdot INDUSTRY_k + \gamma_9 \cdot YEAR_t + \mu_{i,t}
\end{aligned}
\tag{2}
$$

where $\mu_{i,t}$ represents the error term.

One commonality between the two regression models is the dichotomous nature of the dependent variables. We apply logistic estimation. To rule out concerns about potential serial correlations in the errors within each firm and to account for unobserved firm-specific effects, standard errors are clustered at the firm level (Petersen,

2009). We do not cluster them at the country level because this involves a smaller number of clusters, which might bias our estimates.[9]

Results

Univariate analyses

Table 1 shows the sample distribution between the zombie and non-zombie categories by industry and year. Panel A shows that zombie firms comprise approximately 3.5−13% of firm-year observations, depending on the degree of restrictiveness of the zombie measurement. Based on *ZOMBIE1*, Panel B reveals the industry divisions in which the largest proportions of zombie firms are concentrated in the sample: mining (18.57%), construction (13.77%), wholesale trade (13.73%), agriculture, forestry and fishing (13.45%) and services (13.08%). Panel C shows that the presence of zombie firms increased between 2011 and 2014 and peaked in 2013, at almost 17% of firm-year observations. This was likely a long-term consequence of the recent financial crisis.

Table 2 summarizes the descriptive statistics. The number of observations of the dependent variables of *transitionZOMBIE* is significantly lower than that of the rest of the variables because the former lies on the premise of being a zombie in year $t-1$, and zombie firms comprise a lower number of observations. Moreover, this set of variables cannot be computed if the zombie firm in $t-1$ does not appear in the sample in t. Should this be the case, we would have no data available for either this variable or the remaining control variables in the regressions. Therefore, to identify firms' transition path, we need to discard firm-year observations that do not include two consecutive observations. At least 51.7% of zombie firms in the previous year recovered and emerged from being considered zombies in the subsequent year.[10] Similarly, at most 8.30% (91.70%) of healthy firms in the previous year became (avoided

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[8]This set of year dummies—in addition to the country dummies—allows us to account for the business cycle, which may differ geographically. The wide variety of countries in our sample means that we cannot consider a specific business cycle dummy. Moreover, our sample period is limited to 10 years in order to ensure a more homogeneous institutional environment. Our period does not, therefore, provide a long enough time window to identify many different stages in the business cycle. We propose this as a future research avenue.

[9]We rule out fixed-effect logit because it suffers from an incidental parameter problem owing to its non-linear nature, which produces inconsistent estimates (Cruz-Gonzalez, Fernández-Val and Weidner, 2017; Neyman and Scott, 1948). It is worth noting that potential endogeneity from reverse causality is not a concern in our model because our dependent variable is a dynamic one computed on the basis of its evolution between the current year (t) and the previous year ($t-1$). Similarly, many of our explanatory and control variables are calculated in terms of variations, which mitigates simultaneity causality. We do not consider taking further lags for these variables because they would not be informative about which reforms (e.g. in a firm's governance structure) have been implemented by companies to impact the zombie firm and healthy firm transition path between $t-1$ and t.

[10]Please note that a significant portion of the recovery of zombie firms can be attributed to the fact that we do not account for the scenario of a zombie firm in $t-1$ that exits and no longer

Table 1. Zombie and non-zombie firms: Distribution by year, industry and country

Panel A: Distribution of zombie and non-zombie firms (full sample)

	N	Zombie firm-year obs. ($ZOMBIE1 = 1$)	Non-zombie firm-year obs. ($ZOMBIE1 = 0$)
Full sample	14,625	1893 (12.94%)	12,732 (87.06%)
N Zombie firm-year obs. Non-zombie firm-year obs.	**N**	**Zombie firm-year obs. ($ZOMBIE2 = 1$)**	**Non-zombie firm-year obs. ($ZOMBIE2 = 0$)**
Full sample	14,611	772 (5.28%)	13,839 (94.72%)
	N	**Zombie firm-year obs. ($ZOMBIE3 = 1$)**	**Non-zombie firm-year obs. ($ZOMBIE3 = 0$)**
Full sample	13,154	458 (3.48%)	12,696 (96.52%)

Panel B: Distribution of zombie and non-zombie firms by industry

Industry divisions	N	Zombie firm-year obs. ($ZOMBIE1 = 1$)	Non-zombie firm-year obs. ($ZOMBIE1 = 0$)
Division A: Agriculture, Forestry, and Fishing	171	23 (13.45%)	148 (86.55%)
Division B: Mining	754	140 (18.57%)	614 (81.43%)
Division C: Construction	726	100 (13.77%)	626 (86.23%)
Division D: Manufacturing	6835	880 (12.87%)	5955 (87.13%)
Division E: Transportation, Communications, Electric, Gas, and Sanitary Services	2254	260 (11.54%)	1994 (88.46%)
Division F: Wholesale Trade	648	89 (13.73%)	559 (86.27%)
Division G: Retail Trade	852	89 (10.45%)	763 (89.55%)
Division I: Services	2385	312 (13.08%)	2073 (86.92%)

Panel C: Distribution of zombie and non-zombie firms by year

Year	N	Zombie firm-year obs. ($ZOMBIE1 = 1$)	Non-zombie firm-year obs. ($ZOMBIE1 = 0$)
2008	1166	111 (9.52%)	1055 (90.48%)
2009	1205	173 (14.36%)	1032 (85.64%)
2010	1239	148 (11.95%)	1091 (88.05%)
2011	1185	159 (13.42%)	1026 (86.58%)
2012	1482	228 (15.38%)	1254 (84.62%)
2013	1450	245 (16.90%)	1205 (83.10%)
2014	1433	212 (14.79%)	1221 (85.21%)
2015	1416	182 (12.85%)	1234 (87.15%)
2016	1399	155 (11.08%)	1244 (88.92%)
2017	1350	163 (12.07%)	1187 (87.93%)
2018	1300	117 (9.00%)	1183 (91.00%)

Table 2. Descriptive statistics

	N	Mean	SD	p25	Median	p75
ZOMBIE1	14,625	0.1294	0.3357	0	0	0
ZOMBIE2	14,611	0.0528	0.2237	0	0	0
ZOMBIE3	13,154	0.0348	0.1833	0	0	0
Dependent variables						
transitionZOMBIE1	1592	0.5169	0.4999	0	1	1
transitionHEALTHY1	11,075	0.9170	0.2759	1	1	1
transitionZOMBIE2	637	0.8006	0.3998	1	1	1
transitionHEALTHY2	12,018	0.9548	0.2077	1	1	1
transitionZOMBIE3	387	0.8475	0.3599	1	1	1
transitionHEALTHY3	10,975	0.9691	0.1730	1	1	1
Explanatory variables						
INDEPENDENT_BOARD	14,625	0.5854	0.2655	0.4000	0.5700	0.7700
ΔINDEPENDENT_BOARD	14,129	0.0212	0.3145	0	0	0
NONEXECUTIVE_BOARD	14,625	0.7204	0.1818	0.6000	0.7273	0.8571
ΔNONEXECUTIVE_BOARD	14,566	0.0111	0.1548	0	0	0.0070
CEOduality	14,583	0.1601	0.3667	0	0	0
CEOChairSplit	14,583	0.0173	0.1303	0	0	0
CEOtenure	14,625	1.7911	0.9115	1.0986	1.7917	2.4849
BANKTIER1	14,625	13.2367	3.3422	10.7360	13.1491	15.4911
BAILOUT	14,625	2.5887	3.6802	0	0	6.6088
UNIONS	14,625	65.0966	27.6403	34.5	67	90
Control variables						
PROFITAB	14,519	4.1817	8.9150	1.6900	4.6500	7.8900
AGE	14,604	3.8436	0.8937	3.1780	3.9120	4.5539
SIZE	14,625	13.9635	1.9578	12.6115	13.9505	15.2867
ΔEMPLOYEES	12,374	0.2651	5.1572	−0.4005	0.1418	0.8316
FINCEO	14,625	0.8236	0.3812	1	1	1
durationZOMBIE1	14,625	0.1224	0.3423	0	0	0
durationZOMBIE2	14,611	0.0410	0.1797	0	0	0
durationZOMBIE3	13,154	0.0262	0.1414	0	0	0
ANGLOCULTURE	14,625	0.1797	0.3839	0	0	0
EASTCULTURE	14,625	0.0626	0.2422	0	0	0
NORDCULTURE	14,625	0.1650	0.3712	0	0	0

becoming) zombies in the following period. On average, the sample observations indicate that 58% of directors on boards were independent, with this percentage rising to 72% if non-executive directors are also considered. In approximately 16% of firm-year observations the CEO and board chair roles were assumed by the same person.

Appendix B presents the difference-of-means tests between non-zombie and zombie observations. On average, zombie firms display lower board independence, greater CEO duality, more changes in leadership independence, and shorter CEO tenure. Zombie and non-zombie companies also exhibit a dissimilar profile in financial characteristics; on average, zombie firms are younger, less profitable, smaller and make weaker operational restructuring changes (in terms of assets and employees). Moreover, zombie firms operate in countries which, on average, have weaker capitalized banks and

more sizeable government bailout programmes. This supports the conjecture that such a country's institutional conditions stimulate the proliferation of zombie firms.

Panels A and B in Appendix C detail the distribution of transition rates by industry and year, respectively. If we assess the transition path followed by firms that were zombies in the previous year (*t − 1*), Panel A shows that the industry divisions in which a greater portion of zombie firm recovery was evident were agriculture, forestry and fishing (61.11%); transportation, communications, electric, gas and sanitary services (55.80%); retail trade (54.93%); and construction (54.05%). As for the transition path followed by firms that were healthy in the previous year (*t − 1*), the primary sector has a higher concentration of cases of firms that become zombies. Finally, Panel B shows that zombie prevalence (by remaining in the zombie state or becoming a new zombie) increased after the financial crisis. The zombie recovery rate was lower during the 2011−2013 time window, and during this period there was a peak in the emergence of new zombies among firms that were healthy in the previous year.

exists in *t*. We are unable to consider this transition path because we would not have data available in *t* (after the transition, on which our model is based). This constitutes one limitation of our study, which could be addressed in future case-based or event-based research studies.

Recovery from zombiness: board independence and leadership independence

Table 3 reports the estimation results of Equation (1) to test Hypotheses 2 and 3 regarding the influence of board independence and leadership independence (both in static and dynamic terms) on zombie firm recovery, in addition to testing of the Hypothesis 5 set concerning external stakeholders. We draw on the notion of board independence based on the figure of the independent director. Consistent with the idea that zombiness is a state of severe deterioration in financial health, more profitable zombie firms are more likely to reverse their financial woes. Panel A uses *transitionZOMBIE1* as the dependent variable and considers how board independence and leadership independence shape zombie firm recovery. We find that the stronger the portion of independent directors, the more likely zombie firms are to transition to a healthy state ($\beta = 0.7544$, $p < 0.05$). In dynamic terms, increasing the presence of independent directors between two consecutive years enhances the likelihood of zombie recovery ($\beta = 0.5000$, $p < 0.10$). These findings strongly support Hypothesis 2: board independence helps to overcome zombiness. They tie in with evidence from earlier studies, such as Daily and Dalton (1994a, 1994b, 1995), Gales and Kesner (1994), Dowell, Shackell and Stuart (2011) and Platt and Platt (2012), which suggests that a greater presence of independent directors aids reorganizational success. The first two columns of Panels B and C replicate these analyses with *transitionZOMBIE2* and *transitionZOMBIE3* as alternative dependent variables. Overall, the results remain similar with respect to the positive influence that board independence plays (in static terms) in overcoming zombiness, even with a larger economic size effect. However, board independence as a yearly variation possesses no statistical significance in these regressions based on more restrictive criteria to identify zombies.

Table 3 reports the evidence for the effect of leadership independence on zombie recovery. In Column (1), the estimated coefficient of *CEOduality* presents no statistical significance ($\beta = 0.3436$, $p > 0.10$). This persists in most regressions, except for those based on *transitionZOMBIE3* (Panel C). However, the dynamic proxy *CEOChairSplit* is negatively and statistically significantly related to the likelihood of zombie firm recovery ($\beta = -0.9629$, $p > 0.05$). Interestingly, in Columns (9) and (10), based on *transitionZOMBIE3*, *CEOduality* gains statistical significance, albeit only borderline ($\beta = 1.0923$, $p < 0.10$), tepidly suggesting that concentrating the CEO and board chairperson roles in a single person increases the likelihood of zombie firms overcoming financial challenges. Altogether, Table 3 confirms that stronger board independence positively affects zombie recovery, with the results being statistically significant across all cases. Assigning the CEO and board chair roles to one person can favour zombie recovery when applying the most restrictive notion of a zombie firm (*ZOMBIE3*). Thus, implementing governance reforms aimed at separating these two roles hampers the chances of zombie recovery, as indicated by the negative coefficient of *CEOChairSplit* ($\beta = -0.9629$, $p < 0.05$). This lack of support for Hypothesis 3 can be explained by the fact that the cost of not having a unified leadership voice may exceed the potential agency cost reduction and the benefits of minimizing resource dependence by utilizing the fresh perspectives of outsiders. CEOs from zombie firms need sufficient power to force immediate and decisive decision-making actions, which could prove easier to achieve under CEO duality (Sundaramurthy and Lewis, 2003). Additionally, results using *transitionZOMBIE1* show that *BAILOUT* impairs zombie recovery, thus supporting Hypothesis 5b. The remaining groups of stakeholders play a non-significant role in overcoming zombiness.

Altogether, this evidence lends strong support to the beneficial role of board independence in saving zombie firms from difficult situations and restoring them to a state of financial health. The results reveal that when a firm suffers from zombiness, changing the leadership structure by allocating the CEO and board chair roles to two different people has a pervasive counterproductive effect that hampers the firm's recovery from financial problems. This agrees with the latest evidence on entrepreneurial ventures, which are also subject to a high risk of failure (Krause, Bakker and Knoben, 2022). Consistent with our results, some studies underline the benefits of having a CEO with decision-making power and the ability to face major strategic challenges (Brockmann et al., 2004; Dowell, Shackell and Stuart, 2011). Our evidence is consistent with that of previous works (Krause, Semadeni and Cannella, 2013), which point out that the value of director expertise is context-dependent.

Preventing healthy firms from becoming zombies: board independence and CEO tenure

This section empirically tests Hypotheses 1 and 4 concerning the effects of CEO tenure and board independence on preventing healthy firms from becoming zombies (Equation 2), in addition to Hypothesis 5 regarding the role of external stakeholders. Panels A, B and C of Table 4 draw on different proxies to identify zombies and non-zombies and indicate their transition paths (*transitionHEALTHY1*, *transitionHEALTHY2* and *transitionHEALTHY3*). Regarding the control variables, superior profitability, younger age, and asset restructuring curb healthy firms' transition to zombiness.

Table 3. Recovery from zombiness: The influence of board, leadership independence and external stakeholders

	Panel A: Dependent variable: *transitionZOMBIE1*				Panel B: Dependent variable: *transitionZOMBIE2*				Panel C: Dependent variable: *transitionZOMBIE3*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	1.9101 (1.2839)	2.5309** (1.2425)	1.9806 (1.2893)	2.5572** (1.2455)	-0.4705 (2.9746)	0.7522 (2.8737)	-0.3086 (2.9384)	0.8207 (2.8913)	-2.1206 (4.2968)	-0.3041 (3.9198)	-0.9549 (3.9180)	0.6161 (3.7088)
Board independence												
INDEPENDENT_BOARD	0.7544** (0.3461)		0.7369** (0.3458)		1.2582* (0.6551)		1.2345* (0.6377)		1.9906** (1.0087)		1.8002* (1.0002)	
ΔINDEPENDENT_BOARD		0.5000* (0.2899)		0.5244* (0.2978)		0.7437 (0.5928)		0.6848 (0.6059)		0.6196 (0.7130)		0.3603 (0.6673)
Leadership independence												
CEOduality	0.3436 (0.2114)	0.2788 (0.2135)			0.2285 (0.4284)	0.2088 (0.4265)			1.0923* (0.6284)	1.0639* (0.6245)		
CEOChairSplit			-0.9629** (0.4097)	-1.0517** (0.4166)			-1.3281* (0.7787)	-1.2865* (0.7709)			-1.5005 (1.2041)	-1.3593 (1.1788)
External stakeholders												
BANKTIER1	0.0056 (0.0538)	-0.0087 (0.0541)	0.0035 (0.0535)	-0.0108 (0.0539)	0.0867 (0.1188)	0.0660 (0.1201)	0.0814 (0.1186)	0.0617 (0.1197)	0.1849 (0.1807)	0.1674 (0.1788)	0.1506 (0.1714)	0.1349 (0.1728)
BAILOUT	-0.0487* (0.0258)	-0.0496* (0.0260)	-0.0514** (0.0258)	-0.0518** (0.0261)	-0.0486 (0.0506)	-0.0533 (0.0496)	-0.0482 (0.0483)	-0.0544 (0.0479)	-0.0236 (0.0773)	-0.0172 (0.0743)	-0.0308 (0.0699)	-0.0242 (0.0687)
UNIONS	-0.0093 (0.0088)	-0.0083 (0.0090)	-0.0075 (0.0087)	-0.0065 (0.0089)	0.0130 (0.0167)	0.0183 (0.0166)	0.0122 (0.0170)	0.0173 (0.0169)	0.0165 (0.0213)	0.0161 (0.0217)	0.0152 (0.0230)	0.0152 (0.0235)
Controls												
PROFITAB	0.1486*** (0.0214)	0.1450*** (0.0211)	0.0189*** (0.0216)	0.1448*** (0.0212)	0.0646*** (0.0127)	0.0650*** (0.0126)	0.0645*** (0.0128)	0.0649*** (0.0128)	0.0720*** (0.0171)	0.0676*** (0.0162)	0.0699*** (0.0698)	0.0662*** (0.0167)
AGE	0.0338 (0.0852)	0.0288 (0.0885)	0.0247 (0.0839)	0.0196 (0.0881)	-0.0810 (0.2097)	-0.0814 (0.1969)	-0.0907 (0.2119)	-0.0948 (0.1989)	0.2427 (0.3282)	0.1452 (0.2885)	0.2171 (0.3148)	0.1194 (0.2760)
SIZE	-0.0276 (0.2466)	-0.0298 (0.2556)	-0.0316 (0.2417)	-0.0312 (0.2485)	0.0629 (0.0969)	0.0248 (0.0972)	0.0553 (0.0928)	0.0209 (0.0952)	0.0306 (0.1370)	0.0216 (0.1440)	-0.0012 (0.1351)	-0.0094 (0.1437)
ΔEMPLOYEES	0.0377** (0.0188)	0.0424** (0.0199)	0.0379** (0.0189)	0.0424** (0.0201)	-0.0047 (0.0241)	-0.0073 (0.0245)	-0.0058 (0.0239)	-0.0078 (0.0242)	-0.0093 (0.0310)	-0.0111 (0.0315)	-0.0134 (0.0345)	-0.0131 (0.0353)
FINCEO	0.1279 (0.2343)	0.1194 (0.2495)	0.0942 (0.2380)	0.0871 (0.2534)	0.7418 (0.4866)	0.6926 (0.4814)	0.6729 (0.4725)	0.6379 (0.4715)	0.9697 (0.8484)	0.8274 (0.8482)	0.5603 (0.6787)	0.4757 (0.7100)
durationZOMBIE	-0.4454* (0.2466)	-0.4638* (0.2556)	-0.4473* (0.2417)	-0.4603* (0.2485)	-0.3237 (0.6648)	-0.1987 (0.6988)	-0.2688 (0.6779)	-0.1251 (0.7184)	0.0055 (1.2207)	0.1726 (1.2581)	-0.0291 (1.1485)	0.1244 (1.1971)
ANGLOCULTURE	-0.3174 (0.5177)	-0.3104 (0.5117)	-0.2971 (0.5068)	-0.2922 (0.5038)	-1.4810* (0.8910)	-1.3532 (0.9487)	-1.3668 (0.8737)	-1.2385 (0.9303)	-1.0080 (1.5529)	-0.9206 (1.6600)	-0.8421 (1.5315)	-0.7041 (1.5826)
EASTCULTURE	-1.214* (0.6953)	-0.8653 (0.6121)	-1.2714* (0.6797)	-0.9212 (0.6021)	-0.8717 (1.4294)	-1.0722 (1.3680)	-0.8009 (1.4254)	-0.9782 (1.3643)	-2.5207 (1.8605)	-2.4507 (1.8171)	-2.3233 (1.8527)	-2.2026 (1.7808)
NORDCULTURE	0.2754 (0.6875)	0.4081 (0.6793)	0.1407 (0.6725)	0.2816 (0.6691)	-0.1448 (1.1637)	-0.0493 (1.2231)	-0.1098 (1.1575)	-0.0071 (1.2127)	-3.7767* (1.9488)	-2.8885 (1.9735)	-3.5020* (1.8357)	-2.6499 (1.8422)

Table 3. (Continued)

	Panel A: Dependent variable: *transitionZOMBIE1*				Panel B: Dependent variable: *transitionZOMBIE2*				Panel C: Dependent variable: *transitionZOMBIE3*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered std errors by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1197	1160	1197	1160	476	464	476	464	245	240	245	240
Wald Chi2	220.23***	-	211.87***	-	115.26***	117.40***	118.06***	117.28***	145.13***	138.57***	129.93***	133.35***
Log pseudolikelihood	−596.28	−581.34	−595.42	−579.71	−189.42	−186.11	−188.55	−185.26	−91.64	−92.56	−92.64	−93.56
Pseudo R2	0.2778	0.2735	0.2788	0.2756	0.1894	0.1846	0.1932	0.1883	0.2157	0.2008	0.2072	0.1922

This table reports the results of the pooled logit regressions for the likelihood of recovery from zombiness. The dependent variable is *transitionZOMBIE*, which equals one (zero) if the firm was a zombie in the previous year and becomes a non-zombie (stays a zombie) in *t*. Depending on which proxy we use to identify zombie and non-zombie firms (*ZOMBIE1*, *ZOMBIE2* or *ZOMBIE3*), we label this variable as *transitionZOMBIE1*, *transitionZOMBIE2* or *transitionZOMBIE3*, respectively. *INDEPENDENT_BOARD* (the ratio of independent directors to total directors) and ΔIN-*DEPENDENT_BOARD* (yearly change in *INDEPENDENT_BOARD* relative to its level in the previous year) proxy board independence and change in board independence, respectively. Leadership independence is measured by *CEOduality* (a dummy variable equal to one if the CEO and chair of the board positions are held by the same person and zero otherwise) and *CEOChairSplit* (a dummy variable that indicates the split of CEO–board chair roles in each year). External stakeholders' role is accounted for by: a country's bank capital base strength (*BANKTIER1*), a country's government bailout programme relevance (*BAILOUT*), and a country's trade union strength (*UNIONS*). The vector of control variables comprises firm profitability (*PROFITAB*), firm age (*AGE*), firm size (*SIZE*), operational change in terms of change in the number of employees ($\Delta EMPLOYEES$), CEOs' financial expertise (*FINCEO*), zombie duration (*durationZOMBIE*, which is based on the same zombie proxy as the dependent variable of each regression is based on) and corporate culture (*ANGLOCULTURE*, *EASTCULTURE*, and *NORDCULTURE*). Industry-, year- and country-fixed effects are considered in all regressions. Standard errors are shown in parentheses and are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 4. Avoiding zombiness: The influence of board independence, CEO tenure and external stakeholders

	Panel A: Dependent variable: *transitionHEALTHY1*		Panel B: Dependent variable: *transitionHEALTHY2*		Panel C: Dependent variable: *transitionHEALTHY3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	2.8144***	3.1716***	4.0434***	4.6567***	4.9664***	5.9004***
	(0.9468)	(0.9392)	(1.0744)	(1.0676)	(1.1611)	(1.1673)
Board independence						
INDEPENDENT_BOARD	0.5000*		0.5496*		0.7471**	
	(0.2855)		(0.3428)		(0.3755)	
ΔINDEPENDENT_BOARD		0.4006*		0.6405**		0.7880*
		(0.2414)		(0.3157)		(0.4293)
CEO tenure						
CEOtenure	0.2884***	0.2965***	0.3515***	0.3678***	0.2036**	0.2150***
	(0.0637)	(0.0652)	(0.0738)	(0.0750)	(0.0810)	(0.0812)
External stakeholders						
BANKTIER1	0.0041	0.0066	–0.0036	–0.0044	–0.0277	–0.0341
	(0.0373)	(0.0378)	(0.0400)	(0.0408)	(0.0466)	(0.0482)
BAILOUT	0.0053	0.0071	0.0146	0.0116	0.0098	0.0030
	(0.0182)	(0.0185)	(0.0196)	(0.0200)	(0.0237)	(0.0241)
UNIONS	0.0111**	0.0104**	0.0005	–0.0016	–0.0045	–0.0059
	(0.0049)	(0.0050)	(0.0063)	(0.0066)	(0.0069)	(0.0070)
Controls						
PROFITAB	0.2773***	0.2714***	0.1312***	0.1296***	0.1092***	0.1095***
	(0.0244)	(0.0243)	(0.0086)	(0.0083)	(0.0067)	(0.0065)
AGE	–0.1916**	–0.1840**	–0.1463*	–0.1356	–0.0179	–0.0043
	(0.0755)	(0.0761)	(0.0859)	(0.0866)	(0.0979)	(0.0984)
SIZE	–0.0209	–0.0182	–0.0234	–0.0271	–0.0629	–0.0744
	(0.0370)	(0.0380)	(0.0405)	(0.0413)	(0.0453)	(0.0455)
ΔEMPLOYEES	0.0710***	0.0708***	0.0197	0.0211	–0.0102	–0.0102
	(0.0219)	(0.0228)	(0.0174)	(0.0175)	(0.0199)	(0.0198)
FINCEO	–0.2127	–0.1830	–0.2867	–0.3156	–0.4456*	–0.5078**
	(0.2086)	(0.2092)	(0.2261)	(0.2279)	(0.2491)	(0.2535)
ANGLOCULTURE	0.3543	0.1373	0.1033	–0.1759	0.3567	0.0774
	(0.4113)	(0.4374)	(0.4955)	(0.5240)	(0.5063)	(0.5297)
EASTCULTURE	–0.2428	–0.4872	–0.2688	–0.2425	1.1506	–0.0218
	(0.5353)	(0.5319)	(0.5829)	(0.6318)	(1.1333)	(0.7724)
NORDCULTURE	–0.0873	–0.1865	–0.1674	–0.2344	0.5065	0.4059
	(0.5929)	(0.6087)	(0.6118)	(0.6273)	(0.5999)	(0.6051)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered std errors by firm	Yes	Yes	Yes	Yes	Yes	Yes
N	9445	9155	10,155	9797	9956	9543
Wald Chi2	493.10***	486.49***	470.09***	464.82***	487.21***	501.17***
Log pseudolikelihood	–1497.51	–1461.82	–1276.79	–1236.17	–1011.77	–976.45
Pseudo R2	0.4179	0.4146	0.2778	0.2792	0.2284	0.2296

This table reports the results of the pooled logit regressions for the likelihood that non-zombie firms remain healthy. The dependent variable is *transitionHEALTHY*, which equals one (zero) if the firm was a non-zombie in the previous year and remains healthy (falls into zombiness) in *t*. Depending on which proxy we use to identify zombie and non-zombie firms (*ZOMBIE1*, *ZOMBIE2* or *ZOMBIE3*), we label this variable as *transitionHEALTHY1*, *transitioHEALTHY2* or *transitionHEALTHY3*, respectively. *CEOtenure* proxies for the tenure of a firm's CEO. *INDEPENDENT_BOARD* (the ratio of independent directors to total directors) and Δ*INDEPENDENT_BOARD* (yearly change in *INDEPENDENT_BOARD* relative to its level in the previous year) proxy for board independence and change in board independence, respectively. External stakeholders' role is accounted for by: a country's bank capital base strength (*BANKTIER1*), a country's government bailout programme relevance (*BAILOUT*) and a country's trade union strength (*UNIONS*). The vector of control variables comprises firm profitability (*PROFITAB*), firm age (*AGE*), firm size (*SIZE*), operational change in terms of change in the number of employees (Δ*EMPLOYEES*), CEOs' financial expertise (*FINCEO*), and corporate culture (*ANGLOCULTURE*, *EASTCULTURE* and *NORDCULTURE*). Industry-, year- and country-fixed effects are considered in all regressions. Standard errors are shown in parentheses and are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Stronger board independence prevents healthy firms from becoming zombies, although the effect of economic size suggests that board independence plays a less important role in zombie firms' recovery. *INDEPENDENT_BOARD* has a positive coefficient ($\gamma = 0.5000$, $p < 0.10$) and is statistically significant. Its corresponding dynamic variable capturing change in board independence, $\Delta INDEPENDENT\_BOARD$, is also positively related to the likelihood of a healthy firm avoiding zombiness and is significant beyond the 5% level. This supports Hypothesis 1 insofar as only a change in board independence helps keep firms healthy. The results remain robust across alternative proxies for the zombie transition. A one standard deviation increase in $\Delta INDEPENDENT\_BOARD$ leads to an approximately $0.13-0.25\%$ increase in the likelihood of a healthy firm avoiding becoming a zombie.

The results in Table 4 confirm that the longer the CEO tenure, the more likely it is that a healthy firm will remain financially healthy over time. The estimated coefficient of *CEOtenure* is positive and statistically significant ($\gamma = 0.2884$, $p < 0.01$), thereby supporting Hypothesis 4. This finding is robust across the regressions. To better assess the economic significance of this coefficient, we compute the marginal effect, which measures the effect of a one-unit change in the corresponding explanatory variable on the dependent variable. A one standard deviation increase in *CEOtenure* results in an increase of approximately $0.18-0.33\%$ in the likelihood of a non-zombie firm remaining healthy. This evidence aligns with earlier research stressing the benefits of having longer-tenured CEOs in terms of accumulating firm-specific knowledge, expertise and social capital, which help curb potential financial distress problems (Gallucci et al., 2023). Our evidence suggests that long-tenured CEOs help firms preserve their financial health and avoid zombies. Conversely, board independence is less prominent in this case. Additionally, stronger trade unions help firms escape zombiness—supporting Hypothesis 5c. Bank lenders and government are not relevant stakeholders in terms of keeping healthy firms away from zombiness through capital lending and bailouts, respectively.

Robustness checks

We employ an alternative, broader definition of board independence based on the presence of non-executive directors, who could be either strictly independent directors or non-independent non-executive directors who hold no management position in the firm but who may still have some personal economic interests within the firm (i.e. hold a stake in ownership) (Hsu and Wu, 2014; Zattoni and Cuomo, 2010). Specifically, we use the ratio of non-executive directors to total directors (*NONEXECUTIVE_BOARD*) and its corresponding dynamic measure ($\Delta NONEXECUTIVE\_BOARD$). Tables 5 and 6 present our estimates. Earlier findings remain robust, although this broader proxy for board independence sometimes reduces its statistical significance compared with that based on independent directors. The results in Table 5 confirm that separating the CEO and board chair roles reduces the chance of zombie recovery, particularly when a broader notion of zombie firms is applied. Table 6 again confirms that longer CEO tenure plays a more relevant role than board independence in preventing healthy firms from falling into zombiness. When we look at non-executive directors, this broader notion of board independence lends partial support to Hypothesis 1; this variable decreases its statistical significance compared to baseline regressions based on independent directorships.

To ensure that zombie status is not exclusively driven by business cycle fluctuations, we assessed the robustness of our findings by discarding firms that do not have at least three consecutive years of data. The results remain similar.[11] In addition, we conducted robustness estimations using the Cox (1972) proportional hazard model.[12] This survival analysis models the probability of failure occurring in a healthy population (i.e. falling into zombiness) or the probability of a cure in a diseased population (i.e. a zombie firm recovering to financial health). Appendix D reports these results, which are robust. In the former situation, our dependent variable is *transitionFAILURE*, which equals one if the firm was a non-zombie in *t – 1* and becomes a zombie in *t*, and zero otherwise (this binary variable thus reverses the assignment of zero values compared with *transitionHEALTHY*) (Panels B, D and F). Board independence and CEO tenure display hazard ratio coefficients below one, indicating that they reduce the probability of falling into zombiness. For the second situation of a cure in a diseased population, we rely on *transitionZOMBIE* as the dependent variable (Panels A, C and E). Board independence and CEO duality exhibit hazard ratios greater than one, suggesting that they increase the probability of a zombie being cured. A CEO duality split reduces the likelihood of overcoming zombiness. Finally, the results hold when we rerun the estimations by applying the propensity score matching procedure and pseudo-two-stage instrumental variable estimations to address endogeneity concerns (Dutta and Mallick, 2023). Corporate governance variables are instrumented using their mean variables within the firm's industry and each year (Liu et al., 2015; Usman et al., 2022). Our evidence persists.[13]

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[11]Results are available upon request.

[12]We thank the Associate Editor and anonymous reviewers for this suggestion.

[13]Results are available upon request. Moreover, we conducted additional analyses by implementing pseudo-two-stage IV

Table 5. Recovery from zombiness: Robustness analyses

	Panel A: Dependent variable: *transitionZOMBIE1*				Panel B: Dependent variable: *transitionZOMBIE2*				Panel C: Dependent variable: *transitionZOMBIE3*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Constant	1.5083 (1.2806)	2.4546** (1.2283)	1.5597 (1.2816)	2.5098** (1.2285)	−0.0528 (2.9718)	0.4310 (2.8429)	0.0582 (2.9855)	0.5771 (2.8403)	−2.3520 (4.1214)	−0.5597 (4.1601)	−1.3035 (3.9072)	0.4704 (3.8039)
Board independence												
NONEXECUTIVE_BOARD	1.4351*** (0.4959)		1.4326*** (0.4980)		0.7590 (0.9107)		0.7666 (0.9361)		2.5026* (1.3171)		2.3908* (1.4487)	
ΔNONEXECUTIVE_BOARD		1.2283** (0.4914)		1.0227** (0.4937)		1.3982 (0.8741)		1.3268 (0.9032)		2.0492* (1.1711)		1.5049 (1.3425)
Leadership independence												
CEOduality	0.3242 (0.2075)	0.3211 (0.2128)			0.2270 (0.4212)	0.2860 (0.4254)			1.1181* (0.6539)	1.2489* (0.6415)		
CEOChairSplit			−0.9439** (0.3976)	−0.9453** (0.4025)			−1.3279* (0.7934)	−1.3412* (0.7496)			−1.5828 (1.2585)	−1.4610 (1.1368)
External stakeholders												
BANKTIER1	0.0078 (0.0542)	0.0101 (0.0542)	0.0062 (0.0538)	0.0080 (0.0539)	0.0853 (0.1198)	0.0831 (0.1184)	0.0793 (0.1197)	0.0781 (0.1184)	0.2240 (0.1821)	0.1878 (0.1904)	0.1764 (0.1743)	0.1470 (0.1770)
BAILOUT	−0.0527** (0.0258)	−0.0502* (0.0260)	−0.0556** (0.0257)	−0.0529** (0.0260)	−0.0415 (0.0499)	−0.0367 (0.0503)	−0.0426 (0.0482)	−0.0374 (0.0482)	−0.0128 (0.0729)	0.0095 (0.0716)	−0.0271 (0.0689)	−0.0075 (0.0675)
UNIONS	−0.0088 (0.0088)	−0.0077 (0.0087)	−0.0072 (0.0087)	−0.0062 (0.0086)	0.0149 (0.0166)	0.0167 (0.0168)	0.0140 (0.0168)	0.0158 (0.0170)	0.0193 (0.0230)	0.0201 (0.0222)	0.0178 (0.0248)	0.0186 (0.0238)
Controls												
PROFITAB	0.1504*** (0.0216)	0.1474*** (0.0214)	0.1504*** (0.0218)	0.1472*** (0.0215)	0.0625*** (0.0119)	0.0636*** (0.0120)	0.0624*** (0.0120)	0.0632*** (0.0121)	0.0796*** (0.0181)	0.0734*** (0.0171)	0.0769*** (0.0182)	0.0705*** (0.0175)
AGE	0.0139 (0.0869)	0.0268 (0.0860)	0.0045 (0.0861)	0.0172 (0.0849)	−0.1088 (0.2041)	−0.0858 (0.2040)	−0.1227 (0.2061)	−0.1013 (0.2055)	0.1907 (0.2940)	0.2124 (0.2970)	0.1619 (0.2885)	0.1701 (0.2796)
SIZE	−0.0604 (0.0454)	−0.0347 (0.0438)	−0.0640 (0.0449)	−0.0379 (0.0433)	0.0315 (0.0957)	0.0437 (0.0951)	0.0271 (0.0928)	0.0375 (0.0921)	−0.0402 (0.1492)	0.0115 (0.1455)	−0.0589 (0.1481)	−0.0186 (0.1461)
ΔEMPLOYEES	0.0417** (0.0199)	0.0405** (0.0192)	0.0420** (0.0201)	0.0407** (0.0194)	−0.0016 (0.0243)	−0.0029 (0.0239)	−0.0025 (0.0240)	−0.0042 (0.0236)	−0.0136 (0.0356)	−0.0084 (0.0324)	−0.0159 (0.0397)	−0.0114 (0.0365)
FINCEO	0.2997 (0.2488)	0.1296 (0.2370)	0.2680 (0.2532)	0.0945 (0.2402)	0.7657 (0.5003)	0.6848 (0.4868)	0.7076 (0.4901)	0.6276 (0.4718)	1.1317 (0.8884)	0.9962 (0.8537)	0.7526 (0.7286)	0.5736 (0.7018)
durationZOMBIE	−0.4362* (0.2489)	−0.4435* (0.2513)	−0.4383* (0.2435)	−0.4428* (0.2455)	−0.3175 (0.6655)	−0.3470 (0.6825)	−0.2565 (0.6810)	−0.2951 (0.6942)	−0.1746 (1.2301)	−0.1035 (1.2534)	−0.1611 (1.1946)	−0.0807 (1.1946)
ANGLOCULTURE	−0.1634 (0.4830)	−0.4398 (0.4962)	−0.1421 (0.4754)	−0.4125 (0.4869)	−1.3283 (0.9101)	−1.4721 (0.9357)	−1.2136 (0.8894)	−1.3626 (0.9110)	−0.6607 (1.6154)	−1.0817 (1.6488)	−0.4609 (1.5411)	−0.8126 (1.5674)
EASTCULTURE	−1.0025 (0.7036)	−1.2105* (0.6751)	−1.0566 (0.6886)	−1.2562* (0.6611)	−0.4848 (1.4084)	−1.0230 (1.4000)	−0.4146 (1.4048)	−0.9437 (1.3962)	−1.4548 (1.8241)	−2.8758 (1.7816)	−1.3009 (1.8361)	−2.5392 (1.7474)
NORDCULTURE	0.2237 (0.6689)	0.1584 (0.6650)	0.0957 (0.6568)	0.0408 (0.6524)	−0.0349 (1.1806)	−0.1203 (1.2191)	0.0067 (1.1733)	−0.0931 (1.2072)	−3.4063* (2.0051)	−3.2708 (2.0321)	−3.0709* (1.8393)	−2.9242 (1.8567)

Table 5. (Continued)

	Panel A: Dependent variable: *transitionZOMBIE1*				Panel B: Dependent variable: *transitionZOMBIE2*				Panel C: Dependent variable: *transitionZOMBIE3*			
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Clustered std errors by firm	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
N	1197	1193	1197	1193	476	476	476	476	245	245	245	245
Wald Chi2	231.65***	226.15***	227.25***	219.22***	120.40***	116.85***	123.77***	120.18***	134.82***	128.05***	131.15***	128.12***
Log pseudolikelihood	−594.54	−595.09	−593.60	594.12	−190.49	−189.75	−189.58	−188.93	−91.5256	−92.01	−92.44	−93.34
Pseudo R2	0.2799	0.2770	0.2810	0.2782	0.1849	0.1880	0.1888	0.1915	0.2167	0.2125	0.2088	0.2011

This table reports the results of the pooled logit regressions for the likelihood of recovery from zombiness. The dependent variable is *transitionZOMBIE*, which equals one (zero) if the firm was a zombie in the previous year and becomes a non-zombie (remains a zombie) in *t*. Depending on which proxy we use to identify zombie and non-zombie firms (*ZOMBIE1*, *ZOMBIE2* or *ZOMBIE3*), we label this variable as *transitionZOMBIE1*, *transitionZOMBIE2* or *transitionZOMBIE3*, respectively. *NONEXECUTIVE_BOARD* (the ratio of non-executive directors to total directors) and Δ*NONEXECUTIVE_BOARD* (yearly change in *NONEXECUTIVE_BOARD* relative to its level in the previous year) proxy for board independence and change in board independence, respectively. Leadership independence is measured by *CEOduality* (a dummy variable equal to one if the CEO and chair of the board positions are held by the same person and zero otherwise) and *CEOChairSplit* (a dummy variable that indicates the split of CEO–board chair roles in each year). External stakeholders' role is accounted for by: a country's bank capital base strength (*BANKTIER1*), a country's government bailout programme relevance (*BAILOUT*), and a country's trade union strength (*UNIONS*). The vector of control variables comprises firm profitability (*PROFITAB*), firm age (*AGE*), firm size (*SIZE*), operational change in terms of change in the number of employees (Δ*EMPLOYEES*), CEOs' financial expertise (*FINCEO*), zombie duration (*durationZOMBIE*), which is based on the same zombie proxy as the dependent variable of each regression is based on) and corporate culture (*ANGLOCULTURE*, *EASTCULTURE* and *NORDCULTURE*). Industry-, year- and country-fixed effects are considered in all regressions. Standard errors are shown in parentheses and are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Table 6. Avoiding zombiness: Robustness analyses

	Panel A: Dependent variable: *transitionHEALTHY1*		Panel B: Dependent variable: *transitionHEALTHY2*		Panel C: Dependent variable: *transitionHEALTHY3*	
	(1)	(2)	(3)	(4)	(5)	(6)
Constant	3.0744***	3.1604***	4.1172***	4.4110***	4.9692	5.4907***
	(0.9802)	(0.9229)	(1.0536)	(1.0306)	(1.1530)	(1.1324)
Board independence						
NONEXECUTIVE_BOARD	0.1995		0.5497		0.8067	
	(0.3857)		(0.4585)		(0.5222)	
ΔNONEXECUTIVE_BOARD		0.5613*		0.7957*		0.8755
		(0.2985)		(0.4820)		(0.5899)
CEO tenure						
CEOtenure	0.2874***	0.2852***	0.3558***	0.3485***	0.2116***	0.1969**
	(0.0648)	(0.0641)	(0.0739)	(0.0742)	(0.0810)	(0.0813)
External stakeholders						
BANKTIER1	0.0046	0.0082	−0.0043	0.0015	−0.0278	−0.0226
	(0.0375)	(0.0375)	(0.0399)	(0.0397)	(0.0468)	(0.0462)
BAILOUT	0.0070	0.0064	0.0154	0.0158	0.0106	0.0106
	(0.0183)	(0.0182)	(0.0197)	(0.0198)	(0.0238)	(0.0237)
UNIONS	0.0111**	0.0115**	0.0005	0.0011	−0.0046	−0.0042
	(0.0049)	(0.0049)	(0.0063)	(0.0063)	(0.0069)	(0.0068)
Controls						
PROFITAB	0.2767***	0.2769***	0.1314***	0.1310***	0.1091***	0.1087***
	(0.0243)	(0.0245)	(0.0084)	(0.0085)	(0.0065)	(0.0064)
AGE	−0.1974***	−0.1922**	−0.1618*	−0.1560*	−0.0391	−0.0262
	(0.0756)	(0.0757)	(0.0862)	(0.0868)	(0.0987)	(0.0982)
SIZE	−0.0245	−0.0219	−0.0332	−0.0222	−0.0749	−0.0616
	(0.0374)	(0.0370)	(0.0423)	(0.0405)	(0.0473)	(0.0452)
ΔEMPLOYEES	0.0707***	0.0702***	0.0199	0.0196	−0.0101	−0.0108
	(0.0214)	(0.0220)	(0.0175)	(0.0177)	(0.0194)	(0.0194)
FINCEO	−0.1972	−0.2232	−0.2226	−0.2847	−0.3535	−0.4706*
	(0.2209)	(0.2077)	(0.2354)	(0.2249)	(0.2653)	(0.2497)
ANGLOCULTURE	0.2908	0.2534	0.0929	−0.0327	0.3510	0.1951
	(0.4106)	(0.4092)	(0.4987)	(0.4942)	(0.5107)	(0.5074)
EASTCULTURE	−0.2088	−0.3225	−0.1787	−0.3537	1.2847	1.0885
	(0.5365)	(0.5307)	(0.5874)	(0.5928)	(1.1301)	(1.1406)
NORDCULTURE	−0.1138	−0.1550	−0.1922	−0.2642	0.4652	0.3965
	(0.5895)	(0.5904)	(0.6087)	(0.6109)	(0.5935)	(0.5964)
Industry-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Country-fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Clustered std errors by firm	Yes	Yes	Yes	Yes	Yes	Yes
N	9445	9409	10,155	10,115	9956	9917
Wald Chi2	501.67***	490.79***	481.33***	479.46***	499.92***	498.61***
Log pseudolikelihood	−1499.08	−1494.65	−1277.64	−1275.39	−1012.78	−1011.89
Pseudo R2	0.4173	0.4166	0.2773	0.2779	0.2276	0.2276

This table reports the results of pooled logit regressions for the likelihood that non-zombie firms remain healthy. The dependent variable is *transitionHEALTHY*, which equals one (zero) if the firm was a non-zombie in the previous year and remains healthy (becomes a zombie) in *t*. Depending on which proxy we use to identify zombie and non-zombie firms (*ZOMBIE1*, *ZOMBIE2* or *ZOMBIE3*), we label this variable as *transitionHEALTHY1*, *transitioHEALTHY2* or *transitionHEALTHY3*, respectively. *NONEXECUTIVE_BOARD* (the ratio of non-executive directors to total directors) and Δ*NONEXECUTIVE_BOARD* (yearly change in *NONEXECUTIVE_BOARD* relative to its level in the previous year) proxy for board independence and change in board independence, respectively. *CEOtenure* proxies for the tenure of a firm's CEO. External stakeholders' role is accounted for by: a country's bank capital base strength (*BANKTIER1*), a country's government bailout programme relevance (*BAILOUT*), and a country's trade union strength (*UNIONS*). The vector of control variables comprises firm profitability (*PROFITAB*), firm age (*AGE*), firm size (*SIZE*), operational change in terms of the change in the number of employees (Δ*EMPLOYEES*), CEOs' financial expertise (*FINCEO*) and corporate culture (*ANGLOCULTURE*, *EASTCULTURE* and *NORDCULTURE*). Industry-, year- and country-fixed effects are considered in all regressions. Standard errors are shown in parentheses and are clustered at the firm level. ***, ** and * indicate statistical significance at the 1%, 5% and 10% level, respectively.

Summary and conclusions

Utilising agency and resource dependence theories, this research elucidates which governance attributes help firms avoid becoming zombies or recover after falling into zombiness. Using a sample of European listed companies (2008–2018), the results reveal that board independence is a twofold panacea for promoting zombie firm recovery and preventing healthy firms from becoming zombies. Long-tenured CEOs were found to enhance the likelihood of healthy firms not becoming zombies. In contrast, leadership independence, a consequence of allocating the CEO and board chair roles to two different people, reduces the chances of zombie recovery.

Our study adds to the extant literature in several ways. First, we delve into the transition both into and out of zombiness by adopting a longitudinal perspective, thereby answering recent research calls (San José, Urionabarrenetxea and García-Merino, 2022) and overcoming the static analysis of zombiness. We underscore the important role of outside directors, whose beneficial effect is greater for zombie firms overcoming financial trouble than it is for healthy firms. More effective monitoring and securing key resources (e.g. legitimacy and advice) are of paramount importance to firms' success. Similarly, our results suggest that longer-tenure CEOs are helpful for zombie firms, thus revealing that CEO entrenchment is not a concern for troubled firms, and that CEO superior firm-specific expertise prevails. This brings a ray of hope in terms of encouraging optimal policies for safeguarding company survival while also providing a better appraisal of when extending support to zombie firms is worthwhile vis-à-vis prompting the recovery of promising companies that would otherwise go bankrupt. Our evidence implies that one part of zombie lending behaviour may, in part, be a rational decision-making process by banks and other credit institutions when the companies to be rescued exhibit good prospects for recovery. Additionally, we contribute to exploring corporate governance in financially troubled situations. In particular, we show that the agency and resource dependence views are complementary in this regard and highlight the relevance of both the monitoring and advising functions of governance mechanisms to promote a firm's financial health. Contrary to expectations, separating the CEO and chair roles is detrimental to zombie firms. This reveals the importance of empowering the CEO to make immediate decisions and for the leadership to speak with one voice. Given the more severe career concerns of CEOs in zombie firms, their personal interests are likely to align with firm survival. We expand the perspective to address zombiness by considering not only internal governance mechanisms but also external stakeholders that shape the unique circumstances of zombie firms: lenders, government and unions. We find that government bailout programmes curb zombie recovery, and that stronger trade unions prevent healthy firms from falling into zombiness.

Second, we extend the longitudinal analysis of zombie firm recovery and conversion to healthy firms by exploring the opposite route; that is, a healthy firm becoming a zombie. This goes a step further in identifying which governance attributes prove more effective in terms of preventing companies from becoming zombies—a by no means trivial question. Finally, we expand the empirical evidence to Europe and offer an insightful complement to most of the current research, which primarily addresses Japan. The European setting is characterized by the prevalence of bank debt in corporate financing and by governance structures that differ from those found in Japan. These issues might provide interesting insights into the zombie phenomenon.

This study has interesting practical implications. First, we provide managers with useful guidance on which structural changes are required to safeguard the financial health of their companies and prevent firms from becoming zombies or, if this is unsuccessful, to rescue them and reverse financial distress. Given that zombie firms can return to life in certain instances, it makes more sense to explore the diversity of the zombie firm universe rather than to advocate for their complete elimination. Second, our research encourages firms to boost the presence of outsiders on their boards and be aware of the need to minimize CEO turnover and retain (good) CEOs longer. This latter point is important in terms of promoting firm-specific expertise, which plays a key role in decision-making for firm survival and in enhancing the alignment of interests among managers, shareholders and other stakeholders.

This study highlights several directions for future research. First, it is important to look more closely at the evolution of zombie firms across business cycles. It is necessary to consider a longer time period to identify the different cycle stages. This would be helpful in unveiling the cyclical patterns of zombie formation and recovery. Among recent crises, the COVID-19 pandemic offers an enlightening setting in which to explore zombie recovery. It is likely that many zombie firms during this crisis suffered only temporary liquidity shortages and are, in fact, viable firms lying in a dormant state owing to public health safety restrictions (Laeven, Schepens and Schnabel, 2020). Hence, establishing the likelihood of zombie recovery becomes even more important for preventing viable companies with good

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estimations. These further estimations are also available upon request. However, because in most cases the test for exogeneity leads to the null hypothesis of exogeneity (at the 5% level of statistical significance) not being rejected, non-instrumental estimations will be more efficient. We thank an anonymous reviewer for this suggestion.

prospects from going bankrupt (Hoshi, Kawaguchi and Ueda, 2023). Another investigation opportunity involves categorizing outside directors based on their backgrounds and prioritizing them according to each company's specific situation. The value of director expertise and social capital is not universal across firms but rather is context-dependent (Krause, Semadeni and Cannella Jr., 2013). This may prove enlightening when considering additional CEO background traits that may play a key role in the struggle against the zombie phenomenon. Further research is needed to explore a firm's culture in greater depth as this is deemed to affect its financing policies. Cultural values and norms may also be antecedents of firms' approaches to or avoidance of zombiness. Interview- and survey-based approaches favour a comprehensive appraisal of corporate culture (Graham et al., 2022). Moreover, our study invites researchers to take a closer look at the roles of lender status, government programmes and unions in the evolution of zombie firms.

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