Surviving beyond expiry: a systematic literature review of zombie firms

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Abstract

Purpose – This paper reviews the literature on zombie firms to provide a holistic view by delineating their formation, impact, widespread nature, prevention and policy implications.

Design/methodology/approach – This paper uses a systematic literature review methodology, in which 76 papers published in journals ranked on the Australian Business Deans Council (ABDC) 2022 list were reviewed. The study period was from 2000 to 2022.

Findings – Among the main findings, the widespread problems of zombie firms were evident. The authors found that consistent support, either in the form of government grants or a weak financial framework, was responsible for their formation. The suboptimal performance of factors of production, depressed job creation, low innovation and overall negative impact on economic activity are the consequences of zombification. This can be controlled by ensuring better bankruptcy codes, focused on government assistance, technology use and better due diligence by banks.

Practical implications – This review serves as a reference point for future researchers as a cohesive and holistic study presenting a full picture of the problem, so that the proposed solutions are robust and tenable.

Originality/value – This review is among the initial attempts to comprehensively study published work on zombie firms in terms of analyzing their region-specific nature, with an emphasis on definition, causes, impact and prevention.

Keywords Zombie firms, Evergreening, Financial assistance, Systematic literature review

Paper type Literature review

1. Introduction

Although the term "zombie" was first introduced by Kane (1987), it gained traction in the mid-2000s when academics began to evaluate Japan's economic slowdown (Hoshi, 2006). The Japanese government engaged in knee-jerk responses to protect private enterprises. However, as elucidated by Hoshi and Kashyap (2010), these were short-sighted, and it took the Japanese more than a decade to recognize systemic issues and make amends. This laxity in corrective economic policy actions weighs heavily on the Japanese economy. This phenomenon was then witnessed in the Chinese market, especially in infrastructure and related businesses (Tan, Huang, & Woo, 2016). The Chinese problem of zombie firms led to excessive supply-side challenges due to the government's blanket support, leading to heavy stress on government finances, among other socioeconomic impacts. With the fall of the Soviet Union, post-Soviet countries also faced the

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problem of zombification in the new market economy (Papava, 2010), given that firms were treading on the same road as state-supported enterprises. Although zombification recurs in countries with relatively high government involvement, it has been identified in many developed market-based economies (McGowan, Andrews, & Millot, 2018) for different reasons. In the aftermath of the COVID-19 pandemic, zombie firms have been on the rise in many countries because governments are under pressure to stabilize their economies. This recurrence of the zombification phenomenon across major economies serves as the primary motivation for studying it in detail, given its varied impacts on government finances.

In their seminal work on zombie firms, Caballero, Hoshi, and Kashyap (2008) explain zombie firms in detail and propose an identification model using data on listed Japanese firms. As the literature expanded, many reasons were identified for their continuance, such as sovereign support, weak banking institutions, employment-related challenges, poor bankruptcy codes and the mitigation of societal impacts (Hoshi, 2006; Hoshi & Kashyap, 2010). A firm can turn zombie because of any of these reasons or a combination of others. Zombie firms have a far-reaching impact on the competitive landscape of the geography where they are found (Blažková and Dvoulety, 2022; Yu, Liu, & Zhou, 2022). A zombie firm exists because it has some institutional support, which forces healthy firms to move out of the market. Zombie firms present a classic case of deciding on the viability of a failing firm and choosing not to close it because short-term interests become dominant at the cost of long-term implications.

Given the worldwide developments related to zombie firms in the last 30 years, we have not come across a comprehensive study encompassing relevant facets of the phenomenon, and the following questions remain largely unanswered:

(1) What are the prevailing definitions of zombie firms?

(2) Which countries do they affect?

(3) How are zombie firms formed?

(4) What are their features?

(5) How do they impact economies?

(6) In what way is zombification related to the COVID-19 pandemic and how can it be prevented?

As mentioned by Acharya, Eisert, Eufinger, and Hirsch (2019) as well as Hoshi and Kashyap (2010), with increasing financial uncertainty and regulatory concerns expressed by various governments regarding industrial stability, it is imperative to study the existing scientific work in this domain. It provides the essential tentativeness required to actively engage in policy reforms to identify and administer corrective actions such as proper legislative and legal resolutions for the timely and efficient disposal of zombies so that limited financial, human and technological resources can be released and allocated for better use.

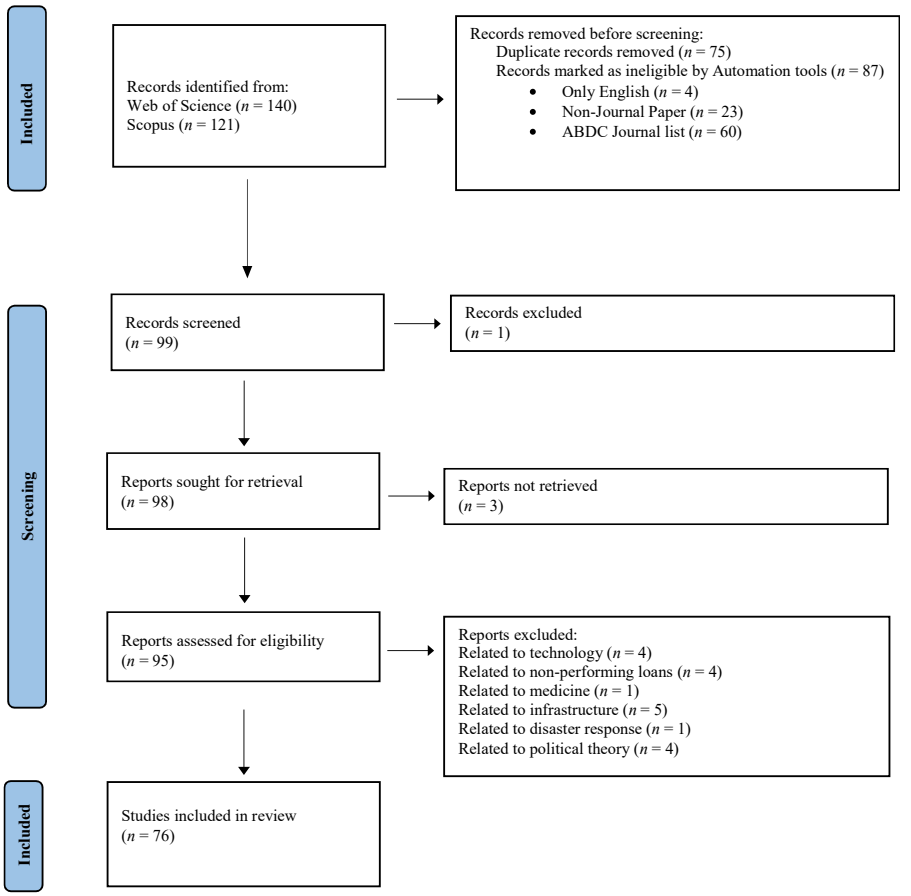
This paper provides a holistic analysis of the issues raised and contributes to the evolution of the literature on zombie firms so that future scholars can effectively build upon this study and present effective solutions, having economic and policy implications. The remainder of the paper is structured as follows: Section 2 presents the methodology used to carry out this literature review; Section 3 presents a review of the papers studied; Section 4 presents the main findings of the review; Section 5 provides concluding remarks; and Section 6 points out the limitations and future scope.

2. Methodology and descriptive analysis

This study uses a systematic literature review to evaluate zombie companies. The development of an orientation toward review is based on the approach of Linnenluecke,

Marrone, and Singh (2020) and Xiao and Watson (2019). Preferred Reporting Items for Systematic Reviews and Meta-Analyses (PRISMA) protocol, as mentioned in Page *et al.* (2021), is used to explain the information flow, as shown in Figure 1. We used the Web of Science (WoS) and Scopus databases to search for relevant papers to conduct the literature review. Both WoS and Scopus are among the most widely used subscription-based databases hosting a wide range of extensively curated content relevant to academic research. These databases maintain the quality of the sources and allow for a large repository of reputable journals, ensuring reliability. Their filtering and search techniques provided by them are highly advanced and assist in filtering relevant papers based on specific input criteria.

In the *Identification* stage, 140 articles were retrieved from WoS and 121 articles were taken from Scopus. After implementing various filtering criteria, as shown in Figure 1, we identified 99 articles at the start of the *screening* stage. During this stage, an additional 23 articles were excluded due to nonrelatedness. Additionally, three studies were excluded due to nonaccessibility. Finally, 76 articles were reviewed at the end of the *inclusion* stage.



Source(s): Content by authors based on PRISMA framework protocol

Figure 1.
PRISMA protocol explaining the information flow

Table 1 presents a Descriptive Analysis of the research papers included in the review. The papers were categorized in terms of the regions on which they focused. The share of papers published from the perspective of Japan, China, the OECD and Europe stands at 15 (approximately 20%), 32 (approximately 42%) and 25 (approximately 33%), respectively. Other details such as paper title, journal details with contributing authors, publishing year, and nature of contribution are also provided. Studies that have primarily used a mathematical model or conceptual framework based on different theories derived from multiple domains of management to conduct their analysis have been categorized as *Theoretical* in their nature of contribution, given the novelty in the manner of the inquiry. It should be noted that few studies have used empirical justification to solidify theoretical constructs. Papers categorized as *Empirical* primarily focused on testing hypotheses and causal relationships based on existing literature, albeit with minor tweaks to suit the requirement(s) of the hypotheses or empirical regression model(s). Based on these criteria, 58 (approximately 76%) papers were empirical and 18 (approximately 24%) were theoretical. Referring to the period chosen for the review, there is a consistent increase in the number of papers published on zombie firms every year, starting with one paper each in 2005 and 2006, to 29 papers published in 2022. As can be seen, 38% of all papers were published in 2022, indicating a growing interest in the scientific community.

A tweak to the Systematic Literature Review (SLR) protocol, based on Briner and Denyer (2012) was used. For a broader coverage of all related articles in the domain of zombie firms, we have used the keywords "zombie*", "compan*", "firm*" and "restruct." The approach covers articles written in the literature on economics, finance, accounting, the environment and business in the context of zombie firms to provide a comprehensive and holistic analysis, covering all relevant dimensions. We used Boolean operators like "AND" and "OR" to improve the search results. The research equation is as follows: "zombie* AND compan* OR zombie* AND firm* OR restruct* firm*", as shown in Table 2.

The search equation searches the title, abstract, author keywords and keyword plus. We also focused on articles written in English. We only focused on articles published in journals and excluded conference papers, and book chapters. To ensure the quality of the review, the 2022 ABDC list was used to filter out journals, and only verified journal papers were studied.

3. Literature review

3.1 Existing definitions of zombie firms

Kane (1987) explains that zombie firms are enterprises that should have gone out of the market because they lost economic viability but were sustained because of noneconomic factors such as government subsidies and assistance from financial institutions. However, after Japan's stock market crash in the 1990s, the government stemmed the catastrophe (Ahearne & Shinada, 2005; Hoshi, 2006) by allowing financial institutions to evergreen the loans of firms that were unable to settle their debt obligations. The Japanese economy was stagnant for 10 years, with the lowest productivity level (Kwon, Narita, & Narita, 2015), lowest employment growth and poor level of corporate restructuring (Hoshi, 2006). Therefore, in essence, a zombie firm is one that has lost its economic basis to be in the marketplace but continues in the economy because of support from forces external to the market. These forces could be political (He, Li, & Zhu, 2020), social (Han, Li, Lubrano, & Xun, 2020) or economic. Among the initial studies in this domain, Ahearne and Shinada (2005) used the interaction of production factors, such as labor, multifactor productivity (MFP) and capital, to evaluate whether a firm is a zombie. However, this did not yield a practical model. Schivardi, Sette, and Tabellini (2022) propose zombie identification using two criteria: *profitability* and *default risk*. If *profitability*—calculated as the ratio of 3 years moving average of EBITDA [1] to total assets—is less than the low-risk interest rate, and *default risk*—calculated as total debt to

Focal region	Research paper	Authors	Source title	Nature of contribution	Publication year
Japan	Zombie firms and economic stagnation in Japan	Ahearne A.G.; Shinada N.	International Economics and Economic Policy	Theoretical	2005
	Economics of the living dead	Hoshi, T	Japanese Economic Review	Empirical	2006
	Zombie Lending and Depressed Restructuring in Japan	Caballero, RJ; Hoshi, T; Kashyap, AK	American Economic Review	Theoretical	2008
	The new main bank system	Kobayashi, M; Osano, H	Journal of the Japanese and International Economies	Theoretical	2011
	Why Did 'Zombie' Firms Recover in Japan?	Fukuda, S; Nakamura, J	World Economy	Empirical	2011
	When did firms become more different? Time-varying firm-specific volatility in Japan	De Veirman, E; Levin, AT	Journal of the Japanese and International Economies	Empirical	2012
	Debt Restructuring of Japanese Corporations: Efficiency of Factor Allocations and the Debt-Labor Complementarity	Iwaisako, T; Fukuoka, C; Kanou, T	Hitotsubashi Journal of Economics	Empirical	2013
	Resource reallocation and zombie lending in Japan in the 1990s	Kwon, HU; Narita, F; Narita, M	Review of Economic Dynamics	Empirical	2015
	Should zombie lending always be prevented?	Jaskowski, M	International Review of Economics & Finance	Theoretical	2015
	A panel study of zombie SMEs in Japan: Identification, borrowing and investment behavior	Imai, K	Journal of the Japanese and International Economies	Empirical	2016

(*continued*)

Table 1.
Descriptive analysis of the research papers used for the SLR

Table 1.

Focal region	Research paper	Authors	Source title	Nature of contribution	Publication year
	Relationships Matter: The Impact of Bank-Firm Relationships on Mergers and Acquisitions in Japan	French, JJ; Yan, JX; Yasuda, Y	Journal of Financial Services Research	Empirical	2019
	Unfinished business: Zombie firms among SME in Japan's lost decades	Goto, Y; Wilbur, S	Japan and the World Economy	Theoretical	2019
	The Effects of M&A on Corporate Performance in Japan: DID Analysis in the Era of Corporate Governance Reform	Fukuda, A	Japan and the World Economy	Empirical	2020
	Are Bank Mergers Good News for Shareholders? The Effect of Bank Mergers on Shareholder Value in Japan	Montgomery, H; Takahashi, Y	International Review of Finance	Empirical	2020
	The impacts of policy measures on Japanese SMEs during the pandemic	Fukuda, A	Applied Economics Letters	Empirical	2022
China	Zombie Firms and the Crowding-Out of Private Investment in China	Tan, YY; Huang, YP; Woo, WT	Asian Economic Papers	Empirical	2016
	Zombie firms and over-capacity in Chinese manufacturing	Shen, GJ; Chen, BK	China Economic Review	Empirical	2017
	Zombie firms in China's coal mining sector: Identification, transition determinants and policy implications	Dai, XY; Qiao, XL; Song, L	Resources Policy	Empirical	2019
	The impact of government subsidies on the capacity utilization of zombie firms	Liu, GQ; Zhang, XJ; Zhang, WT; Wang, D	Economic Modelling	Empirical	2019
	Can environmental regulation promote the governance of excess capacity in China's energy sector? The market exit of zombie enterprises	Du, WJ; Li, MJ	Journal of Cleaner Production	Empirical	2019
	Zombie firms, external support and corporate environmental responsibility: Evidence from China	Han, SZ; You, WH; Nan, SJ	Journal of Cleaner Production	Theoretical	2019
	Listed zombie firms and top executive gender: Evidence from an emerging market	Fang, JC; Gozgor, G; Lau, CKM; Wu, WS; Yan, C	Pacific-Basin Finance Journal	Empirical	2020
	Lie of the weak: Inconsistent corporate social responsibility activities of Chinese zombie firms	Han, SZ; Li, GM; Lubrano, M; Xun, Z	Journal of Cleaner Production	Theoretical	2020

(*continued*)

Focal region	Research paper	Authors	Source title	Nature of contribution	Publication year
	Zombie Firms and Soft Budget Constraints in the Chinese Stock Market	Zhang, CY; Chen, YQ; Zhou, HY	Asian Economic Journal	Empirical	2020
	Political connection and the walking dead: Evidence from China's privately owned firms	He, Q; Li, XY; Zhu, WY	International Review of Economics & Finance	Empirical	2020
	Do credit squeezes influence firm survival? An empirical investigation of China	Zhang, DY	Economic Systems	Empirical	2020
	Efficiency and equity in regional coal de-capacity allocation in China: A multiple objective programming model based on Gini coefficient and Data Envelopment Analysis	Ma, G; Li, X; Zheng, JP	Resources Policy	Theoretical	2020
	How does government intervention affect the formation of zombie firms?	Chang, QQ; Zhou, YSH; Liu, GQ; Wang, D; Zhang, XJ	Economic Modelling	Empirical	2021
	How do zombie firms affect China's industrial upgrading?	Geng, Y; Liu, W; Wu, YZ	Economic Modelling	Empirical	2021
	How do zombie firms affect debt financing costs of others: From spillover effects views	Yu, M; Guo, YM; Wang, D; Gao, XH	Pacific-Basin Finance Journal	Empirical	2021
	Going Bankrupt in China	Li, B; Ponticelli, J	Review of Finance	Empirical	2021
	The heterogeneity of agglomeration effect: Evidence from Chinese cities	Wang, WW	Growth and Change	Theoretical	2021
	The Financing and Investment Crowding-out Effect of Zombie Firms on Non-zombie Firms: Evidence from China	Wang, YQ; Zhu, YY	Emerging Markets Finance and Trade	Empirical	2021
	Can Government Funding Revive Zombie Enterprises? Evidence from Listed Chinese Manufacturing Enterprises	Yang, YD; Qi, Y; Yang, S	Journal of Business Economics and Management	Empirical	2021
	How Can FinTech Reduce Corporate Zombification Risk?	Jin, L; Pan, CC; Li, Y; Liu, XM	Emerging Markets Finance and Trade	Empirical	2022
	Fiscal stress and the formation of zombie firms: Evidence from China	Cai, GW; Zhang, XJ; Yang, H	China Economic Review	Empirical	2022

(*continued*)

Table 1.

Table 1.

Focal region	Research paper	Authors	Source title	Nature of contribution	Publication year
	The Effects of Zombie Firms on the Financial Information Transparency of Other Firms	Yu, HS; Liu, XW; Zhou, YSH	Emerging Markets Finance and Trade	Empirical	2022
	How do zombie firms affect innovation: from the perspective of credit resources distortion	Qiao, XL; Song, L; Fan, XM	Asian-Pacific Economic Literature	Empirical	2022
	Zombie enterprises, crowding out effect, and total factor productivity: Empirical evidence from Chinese manufacturing listed companies	Shao, W; Sun, YY; Bai, X; Naeem, MA; Taghizadeh-Hesary, F	International Journal of Finance & Economics	Theoretical	2022
	Tax incentives and the formation of zombie firms	Yang, S; Qi, Y; Yang, YD	Applied Economics Letters	Empirical	2022
	Do zombie firms crowd out healthy firms and slow their growth? Evidence from China	Guo, XH; Ye, JL; Su, WH; Luo, DM; Jin, XR	Development Policy Review	Empirical	2022
	Does bank competition inhibit the formation of zombie firms?	Zhang, XQ; Huang, B	International Review of Economics & Finance	Empirical	2022
	Zombie firms and corporate savings: Evidence from Chinese manufacturing firms	Feng, L; Lang, HN; Pei, TT	International Review of Economics & Finance	Empirical	2022
	How do political connections affect the formation of zombie firms? Evidence from Chinese manufacturing listed enterprises	Shao, W; Chen, ZQ; Liu, HY	Asian-Pacific Economic Literature	Empirical	2022
	Can pay-performance sensitivity cure zombie firms? Evidence from China	Wu, YM; Pan, HY	Managerial and Decision Economics	Empirical	2022
	Fostering firm productivity through green finance: Evidence from a quasi-natural experiment in China	Kong, GW; Wang, S; Wang, YA	Economic Modelling	Empirical	2022
	Government subsidies, enterprise operating efficiency, and “stiff but deathless” zombie firms	Qiao L.; Fei J.	Economic Modelling	Empirical	2022

(*continued*)

Table 1.

Focal region	Research paper	Authors	Source title	Nature of contribution	Publication year
OECD & Europe	Will the US bank recapitalization succeed? Eight lessons from Japan	Hoshi, T; Kashyap, AK	Journal of Financial Economics	Theoretical	2010
	Lending activity and credit supply in Croatia during the crisis	Broz, T; Ridzak, T	Journal of Policy Modeling	Empirical	2017
	The walking dead? Zombie firms and productivity performance in OECD countries	McGowan, MA; Andrews, D; Millot, V	Economic Policy	Empirical	2018
	Living with zombie companies: Do we know where the threat lies?	Urionabarrenetxea, S; Garcia-Merino, JD; San-Jose, L; Retolaza, JL	European Management Journal	Theoretical	2018
	Zombie Board: Board Tenure and Firm Performance	Huang, S; Hilary, G	Journal of Accounting Research	Empirical	2018
	Whatever It Takes: The Real Effects of Unconventional Monetary Policy	Acharya, VV; Eisert, T; Eufinger, C; Hirsch, C	Review of Financial Studies	Empirical	2019
	Does your neighbour know you better? The supportive role of local banks in the financial crisis	Barboni, G; Rossi, C	Journal of Banking & Finance	Empirical	2019
	COVID-19: guaranteed Loans and Zombie Firms	Zoller-Rydzek, B; Keller, F	Cesifo Economic Studies	Theoretical	2020
	Covid-19 and the credit cycle	Altman, EI	Journal of Credit Risk	Empirical	2020
	Zombie firms: Prevalence, determinants, and corporate policies	El Ghoul, S; Fu, ZW; Guedhami, O	Finance Research Letters	Empirical	2021
	How do zombie firms affect the financialization of normal firms?	Qi, Y; Lyu, SM; Yang, S; Dong, SY	Applied Economics Letters	Empirical	2022
	Zombies: Who are they and how do firms become zombies?	Blazkova, I; Dvoulety, O	Journal of Small Business Management	Empirical	2022
	Are zombies for real? Evidence from zombie dynamics	Nurmi, S; Vanhala, J; Viren, M	International Journal of Industrial Organization	Theoretical	2022
	Giving zombie firms a second chance: An assessment of the reform of the Portuguese insolvency framework	Nieto-Carrillo, E; Carreira, C; Teixeira, P	Economic Analysis and Policy	Theoretical	2022
	Corporate zombies: anatomy and life cycle	Banerjee, R; Hofmann, B	Economic Policy	Empirical	2022

(*continued*)

Table 1.

Focal region	Research paper	Authors	Source title	Nature of contribution	Publication year
	Distribution of COVID-19 government support and its consequences for firm liquidity and solvency	Lalinsky, T; Pal, R	Structural Change and Economic Dynamics	Empirical	2022
	Heterogeneous corporate borrowing behaviours during the COVID-19 pandemic: evidence from Korea	Hyun, J	Applied Economics Letters	Empirical	2022
	Zombies at Large? Corporate Debt Overhang and the Macroeconomy	Jorda, O; Kornejew, M; Schularick, M; Taylor, AM	Review of Financial Studies	Empirical	2022
	Credit Misallocation during the European Financial Crisis	Schivardi, F; Sette, E; Tabellini, G	Economic Journal	Empirical	2022
	On-Site inspecting Zombie Lending	Bonfim, D; Cerqueiro, G; Degryse, H; Ongena, S	Management Science	Empirical	2022
	Zombie Lending: Theoretical, International, and Historical Perspectives	Acharya, VV; Crosignani, M; Eisert, T; Steffen, S	Annual Review of Financial Economics	Empirical	2022
	Zombie Firms during and after Crisis	Blažková I.; Chmelíková G.	Journal of Risk and Financial Management	Empirical	2022
	Bank credit allocation and productivity: stylised facts for Portugal	Azevedo N.; Mateus M.; Pina Á.	Studies In Economics and Finance	Empirical	2022
	Non-Performing Loans and Macroeconomics Factors: The Italian Case	Foglia M.	Risks	Empirical	2022
	Recovery and exit of zombie firms in Portugal	Carreira, C; Teixeira, P; Nieto-Carrillo, E	Small Business Economics	Empirical	2022
Post-Soviet Bloc	Economy of post-Communist capitalism under the financial crisis	Papava V.	Studies In Economics and Finance	Theoretical	2010
Miscellaneous	The Limits to Credit Growth: Mitigation Policies and Macroprudential Regulations to Foster Macrofinancial Stability and Sustainable Debt	van der Hoog, S	Computational Economics	Theoretical	2018
	Are zombie firms more incentivized to financialize?	Wu H.; Yang M.; Gu J.	China Journal of Accounting Research	Empirical	2021
None	Micro-Level Misallocation and Selection†	Yang M.-J.	American Economic Journal: Macroeconomics	Theoretical	2021

Source(s): Created by authors

Background motivation	• Growing financial uncertainty • Understanding risk implications on the financial system • Growing focus from a regulatory standpoint
Objectives	• To document literature development in the study field of zombie firms • To understand the widespread nature of the zombie firm problem and how different countries are dealing with it • To understand the reasons and consequences of the response in context of zombie firms
Criteria for considering studies for this review	• Studies have documented the zombie firms in any aspect like causes, formation, features, impact, etc. • Qualitative and quantitative studies • Studies from areas of finance, accounting, economics, environment, and business
Search strategy for identification of studies	• Databases scanned - Web of Science and Scopus • The period between 2000–2022 • Search terms and keywords — "zombie*", "compan*", "firm*", "restruct*" • Language restriction — only studies in English • No unpublished data will be sought

Eligibility	• The inclusion criteria
	  • Credit misallocation
	  • Overcapacity
	  • Subsidies
	  • Evergreening
	  • Bankruptcy/insolvency
	  • Only academic journal articles
	• The exclusion criteria
	  • Technology
	  • Disaster responses
	  • Medicine
	  • Political theory
	  • Non-performing loans

Assessment of methodological quality	• Academic Journal Guide Australian Business Deans Council (ABDC) list of 2022
Synthesis	• Aggregation, synthetization, and interpretation

Source(s): Content by authors based on Briner and Denyer (2012)

Table 2.
Systematic literature review (SLR) protocol

total assets—is above the median in the existing zombie firms' group, then the firm will be classified as a zombie. However, Shen and Chen (2017) define zombie firms as those that can obtain more debt even when their debt-to-equity ratio is more than 0.5 and have negative operating incomes for three consecutive years. Hoshi (2006) focuses on a binary approach to declaring a firm's *zombiness* based on criteria such as profitability, structure, size, location, industry and debt. Caballero *et al.* (2008) were the first to provide a model to identify a zombie firm where they approached only from the perspective of whether the firm received subsidized loans, and combined all types of debt (short-term, long-term and commercial) to determine the interest obligation, comparing it with the actual interest being paid out. If the latter was lower than the former, the firm was considered a zombie. They used a membership function approach that provided a continuum for zombie detection rather than a binary approach, as mentioned by Hoshi (2006). However, the flaw in this approach is that healthy firms receive credit easily when compared to others, many firms have made large down payments compared to the loans taken, and intermediate interest rate fluctuations could have misclassified them as zombies. To resolve these issues, Fukuda and Nakamura (2011) included *profitability* and *evergreening* criteria, along with the previously mentioned

subsidized credit criterion. They propose the following three conditions for a firm to be identified as a zombie:

(1) Earnings before interest and tax (EBIT) less than interest expense

(2) The loan is 50% of the total asset

(3) The loan has increased from the previous period

To avoid the inclusion of young firms like start-ups that find achieving profitability in the initial years of their operation difficult, a simple method used by McGowan *et al.* (2018) is the interest coverage ratio (ICR), which is the ratio of interest expense to operating income. McGowan *et al.* (2018) defined a zombie firm as having an average life of 10 years and ICR of less than one for three consecutive years. Another addition was developed by European researchers Urionabarrenetxea, San-Jose, and Retolaza (2016), who used the negative equity method to evaluate zombie firms across the European Union. Following this, Blažková and Dvouletý (2022) used it to evaluate the zombie firms in the Czech Republic. Finally, Banerjee and Hofmann (2022) used a combination of ICR and Tobin's q, defined as the ratio of a firm's market value to an asset's replacement cost, to assess *zombiness* in 14 Organization of Economic Cooperation and Development (OECD [2]) countries. They conditioned an above-median value for Tobin's q for two consecutive years in their dataset of 32000 publicly listed firms, along with the previously mentioned ICR-related conditions in McGowan *et al.* (2018) for a firm to be declared a zombie.

3.2 Zombie firms: A global evaluation

3.2.1 Japan. In the 1990s, after the stock market crash, zombie firms first came to academic attention during the *Lost Decade* of Japan, when the government was under tremendous pressure to stabilize the market. The first companies to be affected were the housing finance companies called *Jusen*, whose nonperforming assets (NPAs) were surmounting and were eventually liquidated by the government. Although attempts have been made to rescue them, all have failed (Milhaupt & Miller, 2000). To protect banking institutions from eventual collapse, the government passed a deposit insurance scheme, virtually freeing financial agents from all fiduciary responsibilities. During the 1990s, consistent capital forbearance and evergreening of loans were carried out to protect financial institutions (Caballero *et al.*, 2008) because it was seen as a national duty for the *Main Bank* to set up a rescue package for defaulting firms (Hoshi, 2006). Land prices, which served as collateral for many borrowing firms, began to collapse, and banks did not want to trigger a chain reaction (Jaskowski, 2015), thereby evergreening loans. As per Ahearne and Shinada (2005), export-oriented industries performed better and were healthier than the asset-heavy, non-trade-based industries such as transport and construction. In 1998, to determine banks' weaknesses, the government recapitalized banks for the first time and subsequently in 1999. This was essential because the government did not want banks with weak balance sheets to astray from the BASEL [3] norms. However, as the government mandated the provision of credit to medium and small businesses (Imai, 2016), the situation did not improve. Finally, with the arrival of Heizo Takenaka, Minister of the Financial Services Agency (FSA), the issue of NPAs became a priority, and mass clean-ups started, leading to recovery until 2008.

3.2.2 China. China experienced tremendous growth over 30 years until 2015, growing at an average rate of approximately 10% each year (IMF, 2010). During the 2008 Global Financial Crisis (GFC), the economy began to slow down. Additionally, the country's per capita income rose dramatically over the years (Lin, Wan, & Morgan, 2016), leading to a reduced growth rate. State-owned enterprises (SOEs) were supported by the government through state-owned banks (SOBs) (Chang, Zhou, Liu, Wang, & Zhang, 2021). Tan *et al.* (2016)

and Wang and Zhu (2021) found evidence that this directly led to the crowding out of private firms in the market, as loss-making SOEs were protected.

A distinctive feature of zombie formation in China is the state's political interference (He *et al.*, 2020; Zhang, Chen, & Zhou, 2020). Owing to the decentralized fiscal model, all district-level government functionaries competed for projects. Firms appointed ex-government officials to exert closeness with the government to obtain contracts (Fan, Wong, & Zhang, 2007). In turn, government officials pursued the state agenda rather than profitability and sustenance. The government was induced to push for soft budget constraints wherein it finances zombie SOEs since, such SOEs obliged government directives of employment and maintaining financial and economic stability, especially in the context of personal motivations of local politicians to keep the zombies alive for their promotion (Shao *et al.*, 2023), maintaining BASEL norms for banks, and also carrying this "social burden" where firms could have restructured by laying off excess employees but were unable to do so. Excess employees adversely affect the asset turnover ratio, leading to poor management and overall inefficiency, and they are not laid off because they allow for the demand of subsidies. Such a large number of employees make the firm too large for bankruptcy. Some zombie SOEs may be the pillars of the local community. Hence, they are difficult to dispose. This has led to severe overcapacity in the mining sector, as evidenced by Dai, Qiao and Song (2019), where the capacity in the mining sector grew by 100% between 2016 and 2017. To maintain supply chain stability, the government funds zombies at the cost of healthy suppliers, further distorting the market (Schivardi *et al.*, 2022). In Han, You, and Nan (2019) and Han *et al.* (2020), evidence was provided that zombies have severe environmental and social impacts. It was identified that zombies have low performance in corporate environmental responsibility (CER) compared to nonzombies and proved that firms that received state subsidies for their revival on their production front changed the way they respond to environmental concerns.

3.2.3 OECD and other European countries. McGowan *et al.* (2018) present the first comprehensive analysis of zombie firms in OECD countries, using cross-country firm-level data to find that the presence of zombie firms crowds out growth firms. Another observation was that the misallocation of capital significantly affects productivity (Gopinath, Kalemli-Ozcan, Karabarbounis, & Villegas-Sanchez, 2017). This creates a distorted market in which firms that do not opt for innovation and technological improvements remained in the market, depressing the space for healthy firms. Acharya *et al.* (2019) explained the loose monetary policy as the primary reason for the phenomenon when Greece, Ireland, Italy, Portugal and Spain (GIIPS) witnessed difficult economic conditions. The European Central Bank (ECB) resorted to quantitative easing measures to stabilize these countries' financial standing and, in turn, the Euro. As investment and employment were reduced in the long run, the creative destruction process was depressed. A 2% differential in investment could have been found if there was no zombie lending, which was similar to the findings of Tan *et al.* (2016) in the Chinese context. It was also observed that an increase in capital stock in zombie firms resulted in the inability of nonzombies to attract fresh capital and a negative relationship between the share of zombie firms in an industry and labor productivity (McGowan *et al.*, 2018). Carreira, Teixeira, and Nieto-Carrillo (2022) analyzed zombie firms in Portugal for the 2004–17 period when the country faced a negative real annual gross domestic product (GDP) growth rate of 1.3%. Extending this work, Nieto-Carrillo, Carreira, and Teixeira (2022) evaluated Portuguese firms on the effectiveness of institutional reforms for zombie resolution and found that reforms and better bankruptcy laws helped. Foglia (2022) analyzes the impact of credit misallocation and the relationship between economic performance and zombie firms in Italy. The same relationship, from the perspective of *evergreening*, has been identified in Croatia (Broz & Ridzak, 2017).

3.2.4 Post-Soviet bloc. Papava (2010) wrote about the transitional difficulty of countries belonging to the erstwhile Soviet Bloc in a market-based economy owing to the legacy impact of state support and fear. The occurrence of zombification in these countries was not due to market-based actions, as in Japan and the OECD countries. Additionally, it is distinct from the Chinese zombification issue because, even though the phenomenon began to be documented after 2015, it gave China a consistent annual growth rate of 10 % for 30 years. However, in postcommunist countries, owing to faulty institutions, this feature was part of the nature of the economy, which he called the *necroeconomy*. Subsequently, Papava (2017) expounded the lack of technology for product advancement for such firms, leading them to become zombies because of state support.

3.3 Zombie formation

As discussed in the preceding section, the existence of zombie firms is not unique. However, their formation across countries has some common traits. In Japan, the primary reason was the evergreening of credit to sick firms allowed by the government so that firms do not default (Ahearne & Shinada, 2005; Caballero *et al.*, 2008). One primary reason for allowing such practices is the Japanese national temperament of not allowing firms to fail (Hoshi, 2006). The sentiment that the main bank must provide rescue service packages to pull firms to the brink of bankruptcy (Kobayashi & Osano, 2011) was particularly strong in the Japanese financial system. It was observed that Japanese main banks, that is, the prime creditors of the consortium responsible for extending loans to firms, raised capital from the market to keep sick firms afloat. Evidence reveals that this specific banking action was a response to the weak balance sheets of many small and medium banks that were undercapitalized and would have gone under, if forced to recognize losses (Fukuda & Nakamura, 2011). This presented a tough situation in which, if the banks did not provide loans to zombies, they would have to realize losses in their books, leading to the bankruptcy of the borrowing firms; if the banks provided additional credit to the zombies, they simply perpetuated the problem. Thus, credit misallocation was identified, as documented by Peek and Rosengren (2005) and Kwon *et al.* (2015). Of course, this credit misallocation problem led to heavy capital losses for many banks in Japan, and eventually, the government had to recapitalize such financial entities (Caballero *et al.*, 2008; Fukuda & Nakamura, 2011). As Kane (1987) pointed out, in the American context, a sovereign pull-out of sick financial entities was seen in Japan. Later, with the GFC, a repetition of similar acts by the US government was observed, with the issuance of the Troubled Asset Relief Program (TARP [4]), wherein the US government preferred equity in stressed banks and recapitalized them to contain the crisis after the fall of Lehman Brothers in early 2008. The quantitative easing measures undertaken by the US government were part of the loose monetary policy implementation, where investment banks were protected under the so-called *Too Big to Fail* header. Consequently, though noble in its cause, this action led to the protection of many financial institutions that securitized various assets, primarily home mortgages, and sidelined risk assessments (Hoshi & Kashyap, 2010). This specific strategy of bailing out financial institutions was headed up in Europe in the form of Outright Money Transactions (OMT [5]). In the aftermath of the GFC and as a consequence of bad economic policies, specifically in GIIPS countries, the European Central Bank (ECB) announced the OMT program where the ECB ensured all sovereign debt, providing protection to the failing financial system, thus enabling banks to continue lending to weak European firms (Acharya *et al.*, 2019; Hoog, 2018).

As we saw earlier, capital injection, loose monetary policy and deposit insurance schemes were the go-to measures that led to the creation of zombies in OECD countries and Japan. However, China's zombie formation differed. This was led by direct state involvement in the form of subsidies and allotment of projects to weak firms (Tan *et al.*, 2016). Political influence

played a crucial role since fiscal decentralization gave a lot of power to local functionaries, who in turn prioritized government goals rather than chase the profitability and sustainability of business (He *et al.*, 2020; Li, Hu, & Yang, 2021). Imai (2016) pointed out that subsidies provided by the government led to banks being irresponsible in extending credit. This is similar to government intervention in post-Soviet countries, where the same loss-making firms before the dissolution of the Soviet Union continued to receive support, even after the breakup of the union (Papava, 2010). It was also observed that tax cuts provided by governments were responsible for the zombification of firms (Chang *et al.*, 2021).

Another important cause of zombification is the poor bankruptcy and insolvency procedures for weak firms. Jaskowski (2015) explained that poor bankruptcy laws made banks focus more on the collateral placed by the borrower because litigation may take a long time for them to recover. Carreira *et al.* (2022) provided evidence that weak bankruptcy laws forced banks to make evergreen loans because zombie exits were difficult. Poor bankruptcy laws are responsible for causing many firms in the post-Soviet Bloc to remain afloat.

From a corporate governance perspective, weak financial reports also contribute to zombie formation because they reduce transparency in the system and the positive effect of government assistance (Liu, Zhang, Zhang, & Wang, 2019). In the Chinese context, it is also observed that since zombies have state patronage, they are less transparent in their disclosures, which consequently leads to less transparency in normal firms as well, forcing them to engage in earnings management to obtain resources (Yu *et al.*, 2022). From a gender perspective, women in leadership positions take on less-risky projects and ensure transparency, thereby improving the firm's financial position (Fang, Gozgor, Lau, Wu, & Yan, 2020).

Common themes leading to the formation of zombies are job protection and ensuring social stability in economies. This phenomenon is widespread in many countries, leading to the creation and sustenance of zombies in Japan (Caballero *et al.*, 2008; Fukuda & Nakamura, 2011; Hoshi, 2006), China (Zhang *et al.*, 2020), Switzerland (Zoller-Rydzek & Keller, 2020), Portugal (Azevedo, Mateus, & A lvaro, 2022), Italy (Foglia, 2022), Spain (Urionabarrenetxea *et al.*, 2016) and other OECD countries (Banerjee & Hofmann, 2022; McGowan *et al.*, 2018).

4. Findings from literature

4.1 Impact and features of zombie firms

(a) Unemployment: Zombie firms have been widely observed to cause a loss of employment opportunities. As we first saw in Japan, one of the reasons the zombies were perpetuated was to avoid heavy unemployment (Hoshi, 2006). Although existing jobs were protected, eventual employment prospects fell sharply (Ahearne & Shinada, 2005). Although zombies initially ensured employment, in the long run, good talent was locked into them and could not be released, leading to flaccid job creation (Caballero *et al.*, 2008; Jaskowski, 2015). Low job creation is coupled with low productivity and profitability (Imai, 2016).

(b) Reduced Credit Availability: Kwon *et al.* (2015) produced evidence using the Aggregate Productivity Growth (APG) metric that, due to credit misallocation, the performance of production inputs, specifically labor, fell. Since credit misallocation is central to zombie formation, it leads to the natural consequence of less credit availability to healthy firms (Wang, 2021). This topic has been covered extensively in the context of many economies. For example, in China, given the state support, SOBs primarily prioritize SOEs and leave little room for private firms to raise capital (Guo, Ye, Su, Luo, & Jin, 2022; Tan *et al.*, 2016), resulting in low capital formation and reduced industrial output. Even in developed markets, healthy firms find it difficult to raise capital due to crowd out growth (McGowan

et al., 2018). Consequently, this has led to increased corporate savings by non-zombies (Feng, Lang, & Pei, 2022).

(c) Liquidity Concerns: From a liquidity perspective, as a policy suggestion, an increase in the capital adequacy ratio to fulfill BASEL norms would further reduce credit availability for healthy firms (Hoog, 2018). Further evidence shows that crowding out leads to massive market distortion because zombies do not have to abide by market dynamics, leading to the movement of nonzombies from the marketplace (Shao *et al.*, 2023). One major market implication is the distortion of the value chain caused by zombies. Since zombies also use trade credits for working capital requirements, there is a high probability that this problem will move up the value chain and displace healthy suppliers, disturbing market dynamics (Schivardi *et al.*, 2022).

(d) Underperformance and Impact on Market: Imai (2016) and McGowan *et al.* (2018) provide proof that investments made by zombie firms as well as financial institutions funding zombies underperform. The former elucidated that small and medium-sized enterprises (SMEs) could not fetch the desired profitability through their investments (the capital provided to them was under the sovereign mandate of loan evergreening), whereas the latter calculated a decrease in investments due to zombies in OECD countries. Hoog (2018) took this thesis a little further and focused on the creation of credit bubbles due to reckless lending by financial institutions. These findings are supported by Hoshi and Kashyap (2010) and are substantiated by Acharya *et al.* (2019). Evidence has shown that zombie firms have conservative investment and dividend policies, they are at higher risk and borrow excessively (Ghoul, Fu, & Guedhami, 2021). A unique market reaction to zombie firms is that when they increase in number, market volatility decreases and vice versa. Corporate action moderates this relationship through its cleansing effect but not necessarily (Veirman & Levin, 2012).

(e) Overcapacity: In the Chinese context, the major side effect of crowding out is overcapacity. Liu *et al.* (2019) evaluated the impact of government subsidies in this context in light of three factors: *government intervention, ownership type,* and *quality of the financial report.* They concluded that the negative impact of government subsidies decreases in the presence of strong government intervention and high-quality financial reporting. Excessive overcapacity is a rampant issue in the Chinese coal sector, and the government is trying to clean it up (Dai *et al.*, 2019). Similar evidence of overcapacity is found in the heavy chemical industry (Shen & Chen, 2017) and the real-estate/ infrastructure sector (Geng, Liu, & Wu, 2021). This excessive overcapacity has led to poor capacity utilization, contributing to low productivity (Liu *et al.*, 2019).

(f) Impact on the Environment: From environmental and sustainability point of view, zombies have adversely impacted the environment through excessive pollution since state support shields them from all regulatory policing (Han *et al.*, 2019). This paper provides evidence that firms that received state subsidies to revive their production front responded casually to environmental regulations. They regularly flouted environmental considerations that were more pronounced if the firm belonged to a heavily polluting industry or was an SOE with an adverse environmental impact, thereby hindering the achievement of sustainable growth objectives. In conclusion, a gap exists between CSR disclosure and fulfillment (Han *et al.*, 2020).

(g) Financialization: Financialization is a new activity that zombie firms have resorted to in order to restore order to the house. Since the Chinese government's policy decision to resolve the zombie problem by either providing them with credit to improve, merging them with other healthy firm(s) or forcing them to exit (IMF Country Report, 2015).

Zombies have been under tremendous pressure to show short-term performance, and many nonfinancial firms have begun to invest in capital markets (Hoog, 2018). This has created a distorted capital market scenario in which risk is transferred from the manufacturing sector to the financial sector. This can lead to high market speculation, increased market uncertainty and reduced availability of resources for productive business activities (Wu, Yang, & Gu, 2021).

(h) Impact on Innovation: The combination of these factors significantly affects the innovation. The natural course of a functioning market is creative destruction, in which non-viable firms move out and capable firms fill the void (Schumpeter & Opie, 1934). The existence of zombies is an indictment of this. As documented by Geng *et al.* (2021), a 1% increase in zombie firms' assets decreases industrial upgradation by 0.85%. The unavailability of capital with zombie firms leads to a reduction in innovative capabilities (Yang, Qi, & Yang, 2021). Qiao and Fei (2022) document the negative effects of government subsidies to zombies on innovation. This affects the patents secured by healthy firms and has a severe negative impact on high-tech firms that require sustained fresh funding to innovate.

4.2 COVID-19 and zombification

The impact of the COVID-19 pandemic on zombie firms deserves a separate analysis, owing to its *once-in-a-lifetime* occurrence. As Zoller-Rydzek and Keller (2020) explained in their paper, the event led to worldwide closure and the consequent deterioration of economic activities. To support businesses, the Swiss government engaged in guaranteed federal loan programs stemming from unemployment and other societal imbalances. This higher public spending, although benevolent in the short term, could lead to the creation of zombies. However, Fuhrer, Ramelet, and Tenhofen (2021) provided evidence that firms' indebtedness levels did not affect their participation in the Swiss COVID-19 program and that zombie firms were similar to other firms. These conflicting findings suggest that more comprehensive research on the long-term impact of the pandemic remains obscure and requires closer analysis. The US government reduced interest rates to record lows to ensure capital liquidity, leading to the highest levels of nonfinancial borrowing. This is indicative of credit misallocation, given that the knee-jerk reaction caused zombification, especially for firms that had weak financial status before the pandemic (Altman, 2020). This is similar to Hoshi, Kawaguchi, and Ueda (2023) findings where the credit provided by the Japanese government and other financial institutions resulted in a non-negligible proportion to firms that were already struggling before the pandemic. This incessant borrowing behavior has been observed in South Korea, albeit with some caution (Hyun, 2022). Although lenders in a few countries have been cautious because the external shock from the pandemic is large, and its quantum is still being computed, a fair chance exists for zombification (Lalinsky & Pal, 2022).

As suggested earlier in this section, given the recency of the pandemic, more research is required to comprehensively assess its impact on the issue of zombie firms.

4.3 Preventing zombification and policy implications

Given the ubiquity of this phenomenon, solving the zombie problem has taken center stage in global economic policy circles. As Japan was the first country to experience the zombie phenomenon, it led the way to rectify this situation. In the early 2000s, massive cleanup of firms started. Banks were forced to stop lending to weak firms and recognize the losses caused by evergreening (Hoshi & Kashyap, 2010). This was a major development in which the government clearly departed from the old corporate governance policies, and forced firms to recognize their nonperformance and take rectifying actions. Many firms were asked to

restructure and reduce their corporate debt (Iwaisako, Fukuoka, & Kanou, 2013; Yang *et al.*, 2021). Better debt enforcement and loss realization removed banks' incentives to loan zombie firms (Bonfim, Cerqueiro, Degryse, & Ongena, 2020). Consequently, this leads to better factor allocation and firm performance. This was a major development because improvements in the insolvency and bankruptcy codes restricted sick firms' additional borrowing from financial institutions and enforced strict fiduciary responsibility for banking institutions. Evidence shows that zombies that reduce employee strength and sell unutilized fixed assets facilitate recovery, while improved accounting standards ensure transparency (Fukuda & Nakamura, 2011). This suggests that honest capacity and performance audits of distressed firms can go a long way to recognize problems and consequently work on solving them. In Chinese and post-Soviet countries, reduced government intervention has been proposed to reduce their occurrence and improve resource allocation (He *et al.*, 2020; Liu *et al.*, 2019; Papava, 2010). Similarly, Fang *et al.* (2020) proposed that the decoupling of SOBs and local governments in China would reduce their sustenance. The findings emphasize that maintaining a strict regulatory position by the state will allow for better functioning of the market forces and, hence, for the unbiased resolution of zombie firms. Evidence has been provided that involving females in corporate boardrooms, such as chief financial officers (CFOs), leads to better risk assessment and, hence, avoids zombie occurrence. Diversity in the boardroom allows for a variety of views and, consequently, better risk management. In Japan, Fukuda (2020) provided that mergers and acquisitions reduce the probability of bankruptcy for zombies and improve shareholder value. However, this was significant only when a Japanese zombie was acquired by a non-Japanese firm. This suggests that mergers and acquisitions are not the *silver bullet*, and country-specific analysis is warranted considering them as an overarching solution. It has been proposed that an increase in specialized bankruptcy codes can assist in the cleanup of zombie companies. Specialized courts not only improve the pace at which verdicts are rendered but also overcome the knowledge barrier of judges who need specialized training to deal with bankruptcy cases (Li *et al.*, 2021). Carreira *et al.* (2022) evaluation of the 2012 Portugal bankruptcy reforms revealed that they assisted in recovery. It was also observed that resources locked by zombies could be effectively released when a firm exits the market, allowing for better allocation of scarce resources since zombies failed to optimally utilize them. Focused government assistance can help revive zombies when innovation and production are the key objectives. The correct identification of zombies that hold the potential for recovery and the administration of firm-specific resolution mechanisms could provide the desired breakthrough. Chen (2022) evaluated the *Green Credit* policy implemented in China to encourage poorly performing and highly polluting zombie firms to innovate and improve their efficiency, and found supporting evidence. This also contributed to a reduction in overcapacity and energy consumption. It has also been proposed as a policy tool to stop lending to erring zombie firms in terms of environmental and pollution parameters (Kong, Wang, & Wang, 2022). Given the prominent position that China holds globally to improve environment-related considerations (Wang, Wang, Guan, & Taghizadeh-Hesary, 2023), it is of the utmost importance for the government to ensure that zombies do not undo their efforts. Shao *et al.* (2023) provide evidence that zombie firms depress innovation; hence, governments must be aware of this while extending subsidized credit to them. Financial technology (FinTech) has proven to be useful in reducing information asymmetry for targeted financial assistance, optimizing banks' risk assessment mechanisms, and mitigating market distortion to provide a synergistic effect, leading to overall improvement (Jin, Pan, Li, & Liu, 2022). It has also been observed that the strong competition among banks can reduce zombie formation because banks will have to focus more on due diligence and find highly credit-worthy borrowers (Zhang & Huang, 2022). To reduce agent-principal misalignment, Wu and Pan (2022) analyzed Pay–Performance Sensitivity (PPS), a policy

that links managers' incentives to firm performance. This encourages managers to improve their firm's competitiveness and make better financing and investment decisions.

It is important to realize that the various nuances of zombies are contextual and based on the polity of the region, prevailing insolvency and tax regimes, and the strengths of financial institutions and market regulators. Researchers should assist policymakers in identifying zombies that have the potential for recovery and provide appropriate resolutions. These resolutions include capital restructuring, which refers to regulate the borrowing obligations of firms; corporate restructuring, which refers to broad changes in the firm concerning organizational structure, reporting mechanisms, audit systems, and reporting transparency; market exits, which refers to leaving markets that have declined or where the firms have become marginal players; and liquidation mechanisms to assist in swiftly closing down firms that have lost all financial viability.

5. Concluding remarks

The phenomenon of zombie firms has been consistently observed in developed and developing economies, at different times. Japan, which was a leading economic power, could never regain its global economic status after the stock market crash of the 1990s. Although there are multiple other socioeconomic reasons, poor economic and legal policies lead to the zombification of firms and ultimately to an economic downturn. The same goes for China, which consistently grew at 10% until 2015 for 30 years and is now facing severe economic stress, where the state protection of zombie firms is crippling the cleanup process. Western economies have a fair share of zombification, and government bailouts have been widely used to pacify the economy in the short run without focusing on systemic improvements.

The review hints that to continue sustained economic development, allowing for appropriate remediation of firms, which are manifestations of the economic policies of a nation, is critical. Hence, comprehensive knowledge regarding the same, such as the different zombie experiences that nations have faced, proposed economic solutions to improve the situation, new legal frameworks being used and the manner in which political influence is used to allow a well-regulated and competitive market, is necessary. Governments worldwide face the challenge of deciding whether to liquidate such firms or support them in hope of recovery. Given the multitude of stakeholders involved, prioritizing short-term interests over long-term gains, especially in a dynamic economic environment, clutters the decision-making process. Zombie firms affect employment opportunities in the marketplace, aggravate environmental concerns, deter innovation capabilities and reduce market competitiveness, posing a critical challenge for many countries' governments to deal with the issue of priority. Although considerable improvements concerning bankruptcy laws, environmental regulations, banking reforms and the sociopolitical milieu related to firm functioning have been carried out in some economies, much work needs to be done. The COVID-19 pandemic has forced policymakers and researchers to examine the issue of zombie firms in this changed landscape. This situation warrants additional research with the expectation of forming an informed outlook on the phenomenon, specifically in the economic landscape. Therefore, the focus should be on long-term systemic changes and sound feedback mechanisms. This will provide a critical framework to deal with the zombie problem, so such firms do not continue beyond expiry.

6. Limitations and future scope

To conduct this review, only research papers published in ABDC 2022 ranked journals were considered. As the time frame chosen was 2000 to 2022, papers published in 2023 were also not reviewed. This review covers journal articles published in English only, excluding related

works published in other languages. Finally, this review focuses only on published works; editorials, conference papers, opinion pieces and book chapters were not considered.

The zombie phenomenon has evolved since 2005, as evidenced by an increasing number of related publications. Researchers are interested in analyzing and measuring its impact on various aspects of the economy and markets. Given its recency and widespread nature, the impact of COVID-19 on the creation of new and further deterioration of old zombie firms should be analyzed to assess the quantum of damage. As seen in this paper, China has an overcapacity problem in its energy and infrastructure sectors, and the Belt and Road Initiative (BRI [6]) is seen as a potential solution to this zombie issue (Ni, Lu, & Xue, 2021). An empirical analysis of the extent to which the BRI has been able to alleviate this issue should be undertaken. This has major implications as it could assist in shaping future roadmaps for governments with similar excess supply side problems. As this study suggests, zombie firms also engage in market speculation to show short-term profits, thus distorting financial markets. This needs to be studied from the Agency Theory (Bendickson, Muldoon, Liguori, & Davis, 2016) perspective on contract design, adverse selection and moral hazard to gain a better understanding of managers' decision-making processes. Another potential area of evaluation is the Ukraine–Russia conflict, which disturbed the global energy supply chain, especially in Europe, and consequently led to the market distortion, which needs to be examined in more detail.

Notes

1. EBITDA- Earnings Before Interest, Taxes, Depreciation, and Amortization
2. For more information on OECD, please refer to: https://www.oecd.org/
3. For more details on BASEL norms and framework, please refer to: http://www.bis.org/
4. For more information on TARP, please refer to: https://home.treasury.gov/
5. For more information on OMT, please refer to: https://www.ecb.europa.eu/
6. For more information on BRI, please refer to: http://www.gov.cn/beltAndRoad/

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