Why Zombies Refuse to Die: The Politics of Firm Exit

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Abstract

A hallmark of the market economy is the exit of uncompetitive firms. However, it has been demonstrated empirically that a substantial number of unproductive firms who should exit the market based on economic fundamentals manage to persist across developed countries (McGowan, Andrews, and Millot 2017a; Andrews, McGowan, and Millot 2017). The survival of this class of firms known as zombie firms presents an important puzzle as they are a drag on aggregate productivity and the broader economy. I argue zombie firm survival is driven by political actors who provide protection to zombie firms through a number of potential channels including policy change, the selective nonenforcement of laws and regulations, or the provision of government contracts or below-market financing. In turn, political actors benefit from this arrangement because of the characteristics of zombie firms. These zombie firms tend to be larger and employ more people meaning their survival prevents short-term negative shocks to growth and employment which would be politically unpopular. Additionally, political actors may receive private benefits including campaign contributions or post-electoral employment. I combine firm-level data to identify zombie firms with data on preferential trade liberalization in the European Union from Baccini, Dür, and Elsig (2018) to show that zombie firms can be killed via import liberalization.

Abstrait

Une caractéristique fondamentale de l'économie de marché est l'élimination des entreprises non compétitives. Cependant, la preuve empirique démontre qu'un nombre important de commerces qui ne sont pas productifs et qui devraient quitter le marché selon les mesures économique fondamentales, réussissent à poursuivre leurs opérations, et ceci à travers les pays développés (McGowan, Andrews, and Millot 2017a; Andrews, McGowan, and Millot 2017). La survie de ce genre de commerce, connus comme des entreprises zombies présentent un casse-tête important puisqu'elles diminuent la productivité de l'économie en général. Je prétends que la survie des entreprises zombies est animée par des acteurs politiques qui, à travers de nombreux canaux, offrent de la protection. Ceux-ci inclus des changements de politiques, la non-application des lois, l'offre de contrats gouvernementaux ou le financement à un taux moins cher que le taux du marché. Ainsi, les acteurs politiques profitent de ces mesures à cause des caractéristiques des entreprises zombies. En générale, ces entreprises ont un plus grand nombre d'employés que d'autres, alors leur survie protège contre des chocs négatifs à la croissance économique et à l'emploi, qui seraient politiquement impopulaire. Également, les acteurs politique peuvent aussi recevoir des avantages personnels comme des contributions à leur campagne politique ou un emploi post-électoral. Je joins des données au niveau de l'entreprise pour identifier les entreprises zombies avec des données sur la libéralisation commerciale préférentielle dans l'Union Européenne provenant de Baccini, Dür, and Elsig (2018) pour démontrer que les entreprises zombies peuvent être éliminées par la libéralisation des douanes.

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Contents

1 Introduction

Competition is the essential fact of a market economy. Firms grow and prosper when they invent new business practices, create innovative products and services, and identify untapped markets and consumers. Firms that consistently fail to do so will succumb to competitive economic pressures. As unproductive firms fail, new productive firms are launched in their stead. This process of creative destruction has long been recognized as the normal course of affairs in a market economy because the market mechanism "is by nature a form or method of economic change and not only never is but never can be stationary" (Schumpeter 1943, 83). Thus, economic regeneration in the form of some firms opening and of others closing should be expected in a market economy. When new firms are not being created and unproductive firms are not closing, it is indicative of a problem which can constrain the economy as a whole. Recent research from the OECD using firm-level data suggest a substantial share of firms with poor economic fundamentals that should be expected to shut down do not. This presents a puzzle: Why do firms persist when economic logic indicates that they should exit the market?

This class of firms, called *zombie firms* are damaging because they are a drag on aggregate productivity. Since zombie firms are by definition low productivity firms that should shut down, their existence lowers overall productivity averages. Additionally, zombie firms attract capital and resources that would otherwise go to more productive firms thereby clogging the economic engine further reducing productivity levels. Finally, if zombie firms were to exit, then the resources they control would be redistributed to more productive firms. Zombie firms reduce economy-wide productivity levels through these three channels. Since between country variation in income per capita is mainly driven by differences in productivity levels, zombie firms and their causes are in need of further study.

The OECD research suggests several economic reasons, including loose monetary policy that can partially explain the existence and prevalence of zombie firms. However, they fail to explicitly account for politics in their explanation. This project aims to correct that oversight by incorporating the role of political actors in explaining the phenomenon of zombie firms. I propose a theory whereby zombie firms persist because of an implicit subsidy provided by political actors. While I do not test the theory directly, I present a mechanism by which zombie firms may be forced to exit: preferential trade liberalization. Preferential liberalization of import tariffs is one cause of firms exiting the market in general. As import tariffs are lowered or eliminated, domestic firms face additional competition from foreign firms. With the reduction in trade costs, the foreign firms now find it profitable to export but as they enter the domestic market, they raise the productivity threshold required to operate. Thus, preferential trade liberalization can act as a form of external shock which forces weak firms to exit and which can overcome firm-level subsidies provided by political actors. I show that zombie firms are more likely to exit in the face of preferential trade liberalization than other firms.

In the absence of trade liberalization, political actors have access to several tools to influence firm outcomes and specifically to help zombie firms survive. Politicians can influence zombie firms' survival through the selective nonenforcement of rules and regulations, changes in public policy, or through the provision of government procurement contracts or below-market financing. The latter has recently entered the discussions at the WTO as it has important implications for industries facing overcapacity and thus consequences for many countries (WTO 2018). Below-market financing and zombie firms more generally negatively impact overall welfare by lowering productivity and constraining growth. Zombie firms also have distributional

consequences as old and entrenched firms are kept alive, while young firms face higher costs and constraints on their access to capital and labour that remains in use at zombie firms.

2 What do we know about zombie firms?

The OECD has undertaken a research project on zombie firms. Their project is made possible by the ORBIS dataset, a firm-level dataset provided by the commercial firm, Bureau van Dijk (BvD). While ORBIS is the largest cross-country firm-level database, it is not comprehensive and does not cover the entire universe of private sector firms. Thus, the sample of countries is restricted to those where ORBIS covers at least 40 per cent of aggregate national employment and where the majority of observations include data on profit, debt, and productivity. The countries covered in their analysis are Austria, Belgium, Germany, Finland, France, Italy, Korea, Luxembourg, Portugal, Slovenia, Spain, Sweden and the United Kingdom. A post-stratification procedure is also applied to align the data on underrepresented industries and small and young firms with national business registers. This is done to ensure the ORBIS data is representative of the true population of firms and that the results are not biased. The operationalization of zombie firms is discussed below in the data section. For the moment, the characteristics of zombie firms presented are based on a definition of zombie firms as a firm with an interest coverage ratio of less than one for at least three consecutive years.

Two stylized facts emerge from the OECD analysis: zombie firms tend to be larger and older than their non-zombie counterparts. The share of firms who are zombies increases with size as measured by the number of employees. Likewise, the share of zombie firms increases with age and there is a notable jump in the share of zombie firms for firms over 40 years old. Both these facts suggest politics may play a role in the survival of zombie firms. While (McGowan, Andrews,

and Millot 2017a) do not explicitly mention the role of politics, they do indicate that larger firms are more likely to receive government subsidies which may be because of "a preference to limit employment loss" on the part of politicians.

The OECD analysis also attempts to explain why zombie firms might survive in the face of economic pressure to shut down. They point to four main culprits: (1) excessive monetary stimulus, (2) bank forbearance, (3) small and medium size enterprise support policies, and (4) poorly designed insolvency regimes. The time period being studied here overlaps with the global financial crisis and great recession. Given that fact, unconventional monetary stimulus undoubtedly played a role in keeping weak firms alive (Acharya et al. 2017). Cheap and abundant credit was available throughout Europe because of the expansionary monetary policy undertaken by the European Central Bank (ECB) including quantitative easing. This gave firms access to credit at extremely low rates. At the same time, banks chose to continue rolling over loans to firms with questionable abilities to repay when provided with liquidity driven by the ECB's monetary stimulus (Andrews and Petroulakis 2017). This process of bank forbearance is not entirely surprising. Banks themselves had weak balance sheets. They faced the choice of rolling over loans to weak firms but maintaining those loans as assets on their balance sheets or refusing to roll over the loans and instead seeing those firms default. The latter option would have created losses on their balance sheets therefore banks chose to do the former. Andrews and Petroulakis (2017) show that zombie firms are more likely to be connected to weak banks and estimate that about one third of the capital misallocation caused by zombie firms can be attributed to bank health.

Beyond factors largely stemming from the macroeconomy and the financial system, zombie firm survival can also be helped along by policy choices made by political actors. When firms face persistent financial weakness, their logical decision should be to shut down unless the

costs of closure are higher than the costs of continued survival. Country-wide policies like the choice and design of the insolvency regime are often what structure the cost of exit and therefore structure this decision for firms. There are substantial differences in insolvency regimes across countries (McGowan, Andrews, and Millot 2017b) and evidence shows that well-designed insolvency regimes are associated with higher productivity growth of weak firms and more corporate restructuring (McGowan, Andrews, and Millot 2017c). While insolvency regimes are usually standard across the economy, if there are differences across industries, then there is room for political actors to alter the costs of exit in response to demands from firms and therefore alter the possibility of survival for zombie firms.

Other policy choices are firm-specific and therefore have more room for political actors to alter the costs and benefits for individual firms. Government procurement is one example where political actors do just that by using their discretion when selecting firms that will win a bid for a government contract. When political connections are present, officials can guide procurement contracts to their favoured firms (Szakonyi 2018). More generally, policies that aim to support small and medium sized enterprises (SMEs), particularly those instituted during the financial crisis are ripe for exploitation by firms and have been identified as a possible cause of their prevalence (McGowan, Andrews, and Millot 2017a). These policies, such as government guarantees, which aimed to help firms make it through the financial crisis were at times unnecessarily extended and the decision to do so and which firms to do it for could easily have been undertaken for political rather than economic reasons. Even firms that are not receiving government loans or guarantees could be receiving an implicitly reduced cost of borrowing by having a political connection. The cost of loans differs for firms with political connections relative to those without. Houston et al. (2014) show that companies that have board members with political ties pay lower rates on their

bank loans. This finding suggests that banks recognize an implicit guarantee on the firm's creditworthiness from the connection.

Another means by which political actors can help zombie firms survive is forbearance. Normally discussed in the context of the developing world, forbearance is the selective nonenforcement of rules or regulations (Holland 2016). In this case, forbearance provides an implicit subsidy to zombie firms who would likely shut down without it. Political actors can influence whether, for example, health and safety regulations are enforced or perhaps more importantly, which firms get inspected when the rules do get enforced. Overall, there are several means by which political actors can influence zombie firm survival including the provision of government contracts or loan guarantees, the altering of policies or regulations, or simply not enforcing them altogether.

3 Political actors can impact firm outcomes

Politics can impact economic outcomes. In a very direct sense, political actors determine either directly or indirectly everything from the legal environment to the corporate tax rates and influence macroeconomic stability and interest rates. All of which will impact individual firms and their returns. For example, the Tax Cuts and Jobs Act of 2017 which passed in the United States, lowered the corporate tax rate from 35 per cent to 21 per cent. This reduction in the corporate tax rate led to higher corporate returns and almost halved the tax receipts on corporate income collected by the federal government in 2018 compared with the previous year.[1] In a broad sense,

[1] U.S. Bureau of Economic Analysis, Federal government current tax receipts: Taxes on corporate income [B075RC1Q027SBEA], retrieved from FRED, Federal Reserve Bank of St. Louis; https://fred.stlouisfed.org/series/B075RC1Q027SBEA.

it is clear that political actors can impact firm results as the tax cut did. But this ability to influence firm outcomes also holds beyond the level of legislation which affects the entire economy.

Political actors can impact economic outcomes at the level of the individual firm. A substantial literature has developed studying connections between firms and politics which shows that those connections can have a significant impact on firm value under certain conditions. Often this literature looks at explicit connections such as a relationship between a corporate officer and politics where the corporate officer themselves consider running for office (Gehlbach, Sonin, and Zhuravskaya 2010). An explicit relationship could also run in the opposite direction where firms provide campaign donations to politicians. Likewise, there can be an implicit relationship between firms and politicians where politicians try to support firms located in their electoral district simply because it is in their own interest. The politician could benefit from higher electoral support if they have higher employment in their district or manage to get more public money into their district.

Political connections are more widespread in corrupt countries and among large firms (Faccio 2006). The connection only adds value to the firm when a corporate officer or large shareholder enters politics, but there is no effect when a politician is appointed to sit on a corporate board. The more important the position held by the corporate officer or shareholder after entering politics, the larger the increase in the value of the firm. For example, becoming prime minister has a larger impact on firm value than becoming a minister and becoming a minister has a larger impact than becoming a Member of Parliament/the legislature. However, other studies show that when businesspeople do get elected, they can dramatically improve firm performance in terms of revenue and profitability, even when the office they occupy is at the subnational level. Szakonyi (2018) shows that this increase in profitability comes from elected businesspeople being able to

influence how government officials do their jobs. In particular, they can increase their firm's access to public procurement contracts.

This phenomenon is not constrained to corrupt or developing countries. Even in developed countries with strong rule of law and low corruption, connections between firms and politics can have a positive effect on firm value. Amore and Bennedsen (2013) exploit an exogenous change in the electoral boundaries for local municipalities in Denmark. They show that firms with a family tie to a local politician benefit from an increase in their political power and specifically that a doubling in the size of the population under their jurisdiction doubles firm performance. In Germany, another developed country with low corruption and strong rule of law, firms with politicians as board members or advisors saw higher stock returns in 2006 (Niessen and Ruenzi 2009). However, once those connections became public in 2007, the value of the connection could be priced in to the value of the stock, and the difference in the return between the connected and the unconnected firms was much smaller.

There is also evidence that firms can see returns when their former corporate officers are appointed as high-level administration officials (Acemoglu et al. 2016). When Timothy Geithner was announced as the next nominee for Secretary of the Treasury in 2008, firms with which he had a prior connection saw dramatic abnormal returns amounting to 6 per cent after one full day of trading and 12 per cent after ten days of trading. Moreover, when news broke that tax issues might prevent his confirmation, those same firms saw abnormal negative returns. This case demonstrates that markets can view political connections as important determinants of firm value. Given that politically connected firms are more likely to receive bailouts than similar nonconnected firms (Faccio, Masulis, and McConnell 2007), financial markets have correctly priced in the value of those connections.

Financial markets also value political connections in other forms. Politicians who receive campaign contributions from certain firms are assumed to have a value enhancing relationship with that firm. Roberts (1990) showed that when Senator Henry Jackson died unexpectedly, financial markets responded by reducing the value of firms who were his campaign contributors. Likewise, firms that were located in his constituency, namely the State of Washington, also saw their value decrease at approximately the same rate. The effect was strongest for firms that were both geographically located in Washington and campaign contributors. Thus, firms can benefit from a political relationship if it is a direct relationship in the form of campaign contributions, but even if it is indirect in the form of geography. Faccio and Parsley (2009) have recently confirmed similar results at a global scale. They also examine the effect of an unexpected death of a sitting politician on firm value. Firms located in the city of birth or city of residence of a politician at the time of death suffer a decline in value of approximately 1.7 per cent, a drop in the rate of sales growth, and reduced access to credit. The decline in value is larger when the deceased politician was the minister of or sat on a committee overseeing the firm's industry. They also find that when the politician's successor is from the same hometown, the decline in value is *larger*, implying value enhancing relationships are politician-specific.

Firms benefit when they are located in a geography represented by politicians who are proximate to political power. Kim, Pantzalis, and Chul Park (2012) develop the Political Alignment Index (PAI), a state-level measure based on the degree of presidential party control including representatives, senators, governors, and state legislatures. They show that firms located in high PAI states, meaning states which more closely align with the President's party outperform firms in low PAI states by about 4.2 per cent per year. Even when there is no known explicit

connection between a firm and a politician, it should be assumed that politicians do seek to influence the performance of firms in their districts.

It should not be surprising that politicians have an incentive to influence firm value while in office. Research suggests there are private returns to public office. Using regression discontinuity and matching techniques, Eggers and Hainmueller (2009) show that serving in office almost doubled the net worth of Conservative MPs in the postwar period in Britain. Often these returns come in the form of employment or an appointment to a board of directors after a political career. Thus, politicians have an incentive to build relationships with the private sector while in office for their own gain, but also simply to get re-elected as well.

Grossman and Helpman (1994) develop a model whereby politicians maximize a polticial objective function. They take into account both the schedule of campaign contributions offered by interest groups (in this case, firms) based on the policies they could provide and citizen welfare. In this special case, there may be an alignment between contributions offered by zombie firms and short-term citizen welfare. Zombie firms may demand policies which help keep them alive and provide campaign contributions in response. Zombie firms also provide jobs so by helping alter policy to keep the firms alive, politicians are also raising citizen welfare which can help get them re-elected.

The literature reviewed above looks at the returns to firms from having connections to politicians and officials. It is clear that at minimum, markets assume that officials and politicians impact the value of firms and more likely that politicians do in fact influence firm performance. These connections between firms and politicians can be explicit, for example, in the form of corporate officers entering politics, firms making campaign contributions, or family ties between firms and politicians, but they can also be implicit connections based on geography. The same

logic that allows political connections to increase firm value can also allow zombie firms to survive when they otherwise should not.

4 Why and how do politicians help zombie firms?

Political actors may choose to help zombie firms for two basic reasons: (1) electoral concerns based on implicit connections between the firm and politician or (2) private benefits for the politician based on an explicit connection with the firm. Electorally, it is unpopular for businesses to shut down so it is no surprise politicians may want to attempt to prevent it from happening. However, politicians may also want to help a firm because of an explicit connection they have with it which provides them a benefit. For example, a politician may want to provide a subsidy to a firm if that firm provides him or her with lobbying contributions or with the promise of post-electoral employment. Political actors generally have access to three types of tools to provide support to firms: (1) forbearance, (2) policy change, and (3) traditional government support programs.

During the 2015 Canadian federal election, Justin Trudeau made "the middle class and those working hard to join it" the centrepiece of his campaign. Like many politicians before him, he argued that jobs were key. In fact, the Liberal Party platform mentioned job or jobs more than 40 times.[2] Likewise, in the 2016 American presidential election, Donald Trump argued something similar by promising to "bring back our jobs" as well as "create massive numbers of jobs.[3]" While these politicians hail from opposite ends of the political spectrum and hold diametrically opposed

[2] The Liberal Party of Canada 2015 federal election platform can be viewed here: https://www.liberal.ca/wp-content/uploads/2015/10/New-plan-for-a-strong-middle-class.pdf

[3] The speech can be viewed here: https://www.politico.com/story/2016/06/full-transcript-trump-job-plan-speech-224891

views on most issues, there is one issue that unites them: jobs. Trudeau and Trump are not outliers. Virtually all politicians want to be seen as supporting and creating jobs because they know voters will ultimately judge them in large part based on their job creation record and the state of the overall economy (Lewis-Beck and Stegmaier 2007; Duch and Stevenson 2008). While preventing the exit of zombie firms is bad for long-term economic prospects it can clearly be beneficial from the political perspective in the short-run. The exit of zombie firms means the closure of firms which tend to be larger meaning when they close more workers will face layoffs. Additionally, zombie firms tend to be older meaning they should be better known and more integrated into the community than other firms. Preventing this negative shock can help politicians electorally in the short-run but will be very damaging economically in the long-run. As the zombie firm phenomenon has shown, it is a key contributor to the productivity slowdown we have seen across advanced developed economies.

Politicians can also benefit from a connection with a firm if they receive lobbying contributions or other private benefits like employment after their political career. As described above, Grossman and Helpman (1994) develop their model of a political objective function in which politicians maximize campaign contributions and national welfare. Their model shows that politicians have a strong incentive to alter policy in response to lobbying contributions. Likewise Eggers and Hainmueller (2009) show that there are private returns to public office even in an advanced developed economy like the United Kingdom. Conservative Members of Parliament who narrowly won their first election died with a much higher net worth than candidates who narrowly lost an election. Their higher net worth came from employment in the private sector such as an appointment to a corporate board after their electoral career. This possibility of post-electoral employment is likely to change the manner in which elected officials engaged with firms, given

that they have the opportunity to receive private benefits in the future. If a firm shuts down, then the politicians no longer has the opportunity to receive the private benefits once they are out of office. While politicians have an incentive to provide subsidies to firms for political purposes they are also incentivized to do so for firms with which they have an explicit connection and may benefit personally.

When firms seek to influence public policy for their own benefit they have a number of potential means at their disposal. Some of the options include lobbying political actors or developing connections with them. In the case of zombie firms, the benefit they seek is political intervention to help them stay alive. The method the firm selects to try to alter policy will depend on its circumstances. For example, the ease with which they can develop a connection with a political actor like appointing one to their board of directors could be a prime factor. Ultimately, however, the options which the firm chooses between are just different means to achieve the same ends, namely to influence public policy. While it is likely that zombie firms do specifically lobby more intensively than non-zombie firms, data constraints prevent that question from being analyzed empirically and it has not been studied thus far. Zombie firms seeking to alter public policy may choose to use political connections if that option is available to them or they may focus their efforts on lobbying. Once a political actor is going to intervene to support a firm, they also have several options at their disposal to do so.

When politicians want to intervene to lower the cost of operation for a firm, they generally have access to three types of policy tools which include forbearance, policy change, and government support. Forbearance is the selective non-enforcement of laws and regulations (Holland 2016). It could be as simple as not enforcing the health and safety regulations which are on the books by, for example, cancelling inspections which are set to take place. It does not require

political actors to alter the underlying policy. Instead, the policy receives lax enforcement at the behest of politicians. Rules and regulations raise the productivity threshold a firm must meet in order to operate because they are costly to comply with. By selectively enforcing them, politicians can lower the productivity threshold that a firm must meet by effectively removing the costs of complying with those rules.

Politicians can also alter the policies on the books instead of just choosing not to enforce them. Certain pieces of legislation, like the US Tax Cuts and Jobs Act of 2017 described above, will alter broad policies like the overall federal tax rate, but can also create minute changes which impact just a single firm. Although the Act does make broad changes which affect all firms, it has also been reported that it included certain minute changes which help individual firms and were included at their behest (Campbell 2017). Although it is difficult to view firm-specific changes in the tax law, the outcome is differential tax rates by industry which can be seen empirically. The Penn Wharton Budget Model provides an estimate of the effective corporate tax rates by industry under the new law. It shows that while the law reduces effective tax rates on all industries it has a differential impact by industry which also changes from year to year. For example, the manufacturing sector will face a tax rate at or below 16 per cent under the new law from 2018 onwards, but the retail trade sector will face tax rates of 15 per cent in 2018 which then climb to over 20 per cent by 2022 and remain that high going forward (Penn Wharton Budget Model 2017). This demonstrates that policy changes can have differential impacts on firms and industries which allows politicians to use policy change as a tool to preferentially support certain firms.

Government support for firms is widely used. It is often done under the guise of fixing a market failure or because the support will generate positive spillovers to the broader economy (described in the following section), however, it can also be used to support weak firms which

should exit as well. Traditional government support programs come in many forms such as loans, government guarantees, grants, tax exemptions, or equity investments. There is substantial diversity in the type of support program that exists, but also in the target that the support is aimed at. While government support programs ultimately reach individual firms, they claim to have larger goals. In general, government support programs tend not to be broadly targeted at the entire economy, rather they are specific programs dedicated to small sectors or regions. For example, the European Union has a program called Creative Europe which is specifically dedicated to supporting small and medium-sized enterprises in the cultural and creative sector.[4] Likewise, the majority of State aid, namely subsidies provided by EU Member States goes to regional development. Overall in the EU, national governments collectively spent over EUR 116 billion or 0.76 per cent of GDP on State aid in 2017 (European Commission 2018). This substantial amount of spending dedicated to State aid demonstrates that politicians do employ this policy tool.

Political actors may intervene to support zombie firms to avoid politically unpopular firm closures which would result in short-term negative economic shocks like layoffs or because they receive private benefits like lobbying contributions, payoffs or post-electoral employment. This may also contribute to a climate where individuals feel that government support is key to succeeding in the private sector. According to a special Eurobarometer survey, over two thirds of people in Italy, Spain and Portugal hold the view that the only way to succeed in business is to have political connections (European Commission 2017). Political connections can help precisely because politicians have access to these policy tools discussed above which allows them to intervene in support of individual firms. The substantial support marshalled towards firms which

[4] See here for further details on the Creative Europe programme: https://ec.europa.eu/programmes/creative-europe/

is recognized as State aid shows the lengths to which elected officials go to help weak firms or regions.

5 Are zombie firms subsidized for public purposes?

Markets are not perfectly competitive. This can create a rationale for government intervention – whether to remedy a market failure or to support a positive externality. This is widely accepted and is often used to justify government intervention including at the international level. For example, the WTO Agreement on Subsidies and Countervailing Measures (SCM) does not ban subsidies outright. Instead, the SCM agreement acts as a multilateral discipline on subsidies which distort market competition. Subsidies which negatively impact the domestic industry of another member, seriously prejudice another member in a third market, or nullify or impair market access already agreed upon are actionable subsidies. The SCM agreement implicitly recognizes that not all subsidies should be subject to disciplines because government intervention can be beneficial.

Governments can intervene to remedy market failures through subsidies or other measures. A classic example of where government intervention can improve societal outcomes is that firms tend to underinvest in research and development because the gains from that research will not be entirely appropriable by the firm undertaking the research. Yet, the benefits of research can accrue to society broadly meaning the optimal level of investment for the firm is below that of society. This leads to a market failure which can be remedied by an appropriate government subsidy for research and development. The subsidy should lower the cost of research for the firm and encourages the firm to do more of it, thus benefiting society as a whole.

Infant industries are also sometimes presented as a rationale for government intervention and often for protection from foreign competition. The logic is that infant industries are industries

which have the potential to be productive but only once they reach a certain level of production. In other words, they need to reach economies of scale before they can efficiently produce the good or service. Thus, to reach that level of production they need protection in the interim because without that protection, foreign competition would prevent them from growing to an efficient scale. Government support to a specific firm can also sometimes be a justified if the firm itself is a source of positive externalities. Firms which employ or develop advanced technology can be a prime example. Their existence in the market can help raise the productivity of other firms by supporting the diffusion of that technology or of other best practices. Additionally, as lead purchasers of advanced technology, they can also spur on the development of new technology by existing as a ready customer to new developers. Likewise, they are usually key members of important value chain which purchase from numerous other firms. These facts can be used to justify the provision of government subsidies to support their growth and expansion.

It is sometimes claimed that zombie firms are an example of one or both of these phenomena. Namely, that they provide unseen positive externalities and receive government support and protection for that reason. Similarly, some claim that zombie firms are members of infant industries and thus require the support until they reach a scale which allows them to produce efficiently. However, this is not the case. Zombie firms do not provide positive externalities to the broader economy and society nor are they part of an infant industry.

Zombie firms are by definition low productivity firms implying that they are a drag on rather than supportive of the wider economy. This is show in table 1, where the multifactor productivity level of zombie firms is compared with non-zombie firms. It shows that zombie firms are indeed much less productive than their non-zombie counterparts. In fact, the recent zombie firm phenomenon was first identified as part of the explanation for the productivity slowdown

across developed countries. One of the most pernicious effects of zombie firms is their interaction with the broader economy. Their existence raises the barriers to entering the market for non-zombie firms. Since zombie firms are subsidized, they have the ability to lower prices and pay higher wages than other firms in the industry. This congests the market and limits the ability of healthy firms to expand, with a particular penalty faced by young firms looking to grow (McGowan, Andrews, and Millot 2017a).

Table 1: Firm Productivity (Zombie v. Non-Zombie)

Variable	Non-zombie firms	Zombie firms
Productivity (measured using profit)	0.471501	0.3557327
Productivity (measured using revenue)	0.0634172	-0.0000292
Number of firms	147,335	15,060

Likewise, zombie firms do not fall into the category of infant industries. Of the 15,060 zombie firms identified, only 2,968 ever 'come back from the dead.' This means that fewer than 20 per cent of firms who become zombies ever return to health. If these were firms who received government support in order to return to health, the policy should be considered a failure. In addition to being low productivity firms who are unlikely to stop being zombie firms once they begin, zombie firms also tend to be older on average than non-zombie firms. By definition infant industries must be young firms who need support to reach scale as opposed to old firms who receive subsidies. In their analysis, the OECD considers a firm a zombie firm only if it is at least 10 years old. By excluding younger firms, the OECD effectively deals with this issue. Firms can be unproductive in their early years without being zombie firms especially if they have to make investments early on or if they have high expected future profits, but nonetheless there remains a substantial share of firms who are zombies even when excluding young firms. Additionally,

zombie firms tend to be larger, but by definition, infant industries require protection because they have not yet reached their efficient scale. This reemphasizes the point that zombie firms cannot be considered to be receiving public support because they are members of an infant industry.

However, it is possible that the subsidies zombie firms receive are an example of poorly designed infant industry policies, meaning that at one time these firms were young and small and did need the support to reach scale, but as can be the case, the political actors who provided the subsidies were then captured and the subsidies were never removed. The key in designed policies which support infant industries is to make them time limited. If no time restriction is placed on the concept of an infant industry, then it loses all meaning. The purpose is to provide support to an industry in the early years so as to reach scale. Here that time restriction is defined as 10 years. If it were the case that originally the subsidies were provided with the intention of supporting a zombie firm but were then extended indefinitely or even just beyond 10 years, then the general explanation that zombie firms continue to persist because of subsidies provided by political actors would remain true. The subsidies would not have a genuine policy motivation even if they at one point did – instead they would be driven by politics.

6 How to kill a zombie firm

Zombie firms survive because although they do not meet the minimum productivity threshold normally required to operate in the market, they receive protection from domestic political actors. I do not test that connection directly. Instead, I present evidence for how zombie firms can be killed. I exploit a shock that increases the rate at which firms exit the market: trade liberalization. The goal is to demonstrate the impact trade liberalization has on both zombie and non-zombie firms. The expectation is that zombie firms exit the market at a lower rate than non-zombie firms

in general, but that trade liberalization can have the desired impact of forcing zombie firms to exit because it raises the productivity threshold required to continue operating. As such, our variables of interest are zombie firms, trade liberalization and firm-level outcomes such as firm exit. Descriptive statistics for the main variables of interest can be found in the first table in the appendix.

6.1 Data

6.1.1 Zombie Firms

Zombie firms are firms with persistent financial weakness. In a properly functioning market, we would expect these firms to shut down. Research by the OECD cites a variety of methods which scholars, authors, and research institutions have used to identify zombie firms based on their financial characteristics. The seminal approach requires information on each firm's interest payments, debt structure, and the prevailing market interest rate (Caballero, Hoshi, and Kashyap 2006). This approach was pioneered to identify zombie firms in Japan during the macroeconomic stagnation of the 1990s. It aims to identify firms potentially receiving subsidised bank credit. Unfortunately, this approach is also impossible given the dataset used. Even the OECD research programme could not use this approach because of data limitations (McGowan, Andrews, and Millot 2017a).

An alternative approach, used by the OECD, identifies firms with persistent financial weakness based on their operating characteristics. There are three ways to identify zombie firms using this approach:

(1) an interest coverage ratio less than one;

(2) negative profits;

(3) negative added value.

For the purposes of identifying firms that should shut down in the absence of government and political intervention these approaches are preferable. The approach used by Caballero, Hoshi, and Kashyap (2006) identifies firms receiving subsidized bank credit, but as mentioned above there are many other ways in which politics and policy can impact firm survival. An approach focused on financial weakness and firm survival, rather than solely subsidized credit allows us to incorporate these other channels that may be keeping zombie firms alive as well.

The interest coverage ratio is a measure of a firm's ability to finance their interest payments out of their earnings. It is calculated by dividing the firm's earnings (before interest and taxes) by the firm's interest expense. The implication being that firms which cannot (at minimum) cover their interest payments should close down. This is the approach taken by the OECD to identify zombie firms (McGowan, Andrews, and Millot 2017a). Unfortunately, data availability issues prevent me from using this approach. The alternative identification strategies, namely the one which identifies firms with negative profits or firms with negative value added have been used by central banks to show that certain firms are dragging down productivity in their respective countries (Bank of England 2013; Bank of Korea 2013). Unfortunately, again data issues prevent me from utilizing this approach. Although the data set does include measures of gross profit and added value which could be used to identify zombie firms much of it is missing. Relying on these measures would only allow me to capture far fewer zombie firms in my data than the OECD estimates exist in reality. Using them to create zombie firm variables would severely bias my results, therefore it would be incorrect to rely on the approaches used by the OECD. Instead, I construct an alternate zombie firm measure relying on the objective and definition provided by the OECD. I take the initial definition of firms with persistent financial weakness and construct a

zombie firm variable based on a firm-level financial variable I do have access to: negative working capital.

Using *working capital* to construct the zombie firm variable allows me to correctly identify firms with financial weakness. Working capital is an alternative term for net current assets. It is calculated by taking current assets and subtracting current liabilities. Thus, it appropriately captures firms with financial weakness that should likely shut down, which is the ultimate goal of the zombie firm variable. When working capital is positive, it indicates a firm can pay for all their current obligations, but when it is negative it likely indicates the firm is experiencing financial difficulties. Generally, current assets and liabilities are those which will be received or paid in the fiscal year or the normal operating cycle of the business. It being negative is thus an appropriate measure of financial weakness. In certain circumstances it is possible for firms to operate efficiently with little working capital; thus, I further limit the identification of zombie firms to firms with three consecutive years of negative working capital. I construct a binary variable equal to 1 for a firm with negative working capital in any three consecutive years. I then use this variable to identify a firm as a zombie (1) or non-zombie (0).

6.1.2 Tariff Liberalization

I rely on a dataset from Baccini, Dür, and Elsig (2018). It includes all the tariff concessions made by the European Union in all PTAs signed between 1995 and 2014. I limit my analysis to three countries: Spain, Italy and Portugal. I do so because the data coverage is substantial and because the prevalence of zombie firms is high in those countries. Although my dataset includes many countries, they are all members of the European Union or members of the EU customs union. For this reason, I include tariffs concessions made only by the European Union in my tariff cut variable. The data is drawn from tariff schedules and is highly disaggregated. The Harmonized Commodity

Description and Coding System (HS) is used to classify traded products and assigns each a code of up to 10-digits. The data from Baccini, Dür, and Elsig (2018) is taken at the 6-digit level, which means it has already been aggregated and on average, each 6-digit tariff code has data for 1.76 lower-level tariff lines. The data is then further aggregated to the 4-digit level. This allows me to merge it with the firm-level data as the latter only categorizes firms at the 4-digit level.

The dataset provides information on the amount of liberalization that occurred by industry per year. By subtracting the preferential trade agreement (PRF) rate from the Most Favoured Nation (MFN) rate per year, we obtain the tariff cut and new tariff rate that foreign exporters now face going into the European market. Importantly, in many PTAs tariffs do not go to zero immediately, this approach allows us to incorporate the phasing-out of tariffs at the product level.

6.1.3 Firm Exit

The outcome variable of interest is firm exit. This is a binary variable that equals 1 in the year a firm leaves the market. In all other years that the firm exists in the data set, the variable equals 0. In other words, it is a dummy variable that equals 1 if firm *i* leaves the market in year *t*. The challenge is the degree to which this is an accurate representation of a firm exiting the market. Since the dataset does not cover the entire universe of firms, it is possible that a firm exists the dataset without necessarily exiting the market. To mitigate this problem, I exclude firms which exit in the final year of the dataset where data availability becomes limited. I also only include firms which exist in the dataset for 10 years. This largely addresses the problem, as firms which have reported for 10 consecutive years and likely to continue reporting unless they have truly exited the market. The exit variable is created and then set equal to one when the maximum year variable is equal to the current year *t* in the dataset.

6.2 Research Design

When trade liberalization occurs, the productivity threshold to operate in the domestic market should be raised for all firms. I rely on the Melitz model of trade based on imperfectly competitive industries with heterogenous firms (based on productivity levels) selling differentiated goods to justify this assumption (Melitz 2003). As import tariffs decrease, foreign firms enter the market and bring new competition to bear on domestic firms. Even though the reduction in tariffs brought about by trade liberalization reduces the productivity threshold required for foreign firms to export, we should not assume these are low-productivity firms. Exporting firms are highly productive firms because firms self-select into exporting. By definition, it is costlier to sell into a foreign market than to produce for one's domestic market because of trade costs including the costs of learning about a foreign market and the cost of transporting goods to that market. Thus, when tariff cuts are implemented, and new competition enters we should see an increase in the rate of firm exit. As a result, industry-level productivity should rise from low-productivity firm exit and high-productivity firm entry. If, however, low-productivity firms like zombie firms do not exit, then this effect will be muted.

A key assumption of the research design is that zombie firms have access to firm-specific subsidies which are unavailable to non-zombie firms. These subsidies can come in the form of tax breaks, government procurement contracts, or access to below-market financing as well as a variety of other policies. As discussed above while reviewing the literature, there are strong reasons to suggest that political actors have the ability to influence firm-level outcomes such as firm value but also firm survival via a number of policy tools. The key component of the assumption is that the policies are provided by political actors and that they reduce the productivity threshold required to operate. With these targeted subsidies, the fixed costs of operation are lower

for zombie firms than for non-zombie firms. Given these policies, we should expect the coefficient on zombie to be negative since zombie firms exit at a lower rate than non-zombie firms. However, when faced with the shock of trade liberalization, firms face new competition, thus the coefficient on tariffs cuts is expected to be positive. Additionally, whereas zombie firms should exit the market at lower rate in general, the impact of an external shock which raises the productivity threshold a firm is required to meet to be able to continue to operate should hit zombie firms harder because they are by definition low productivity firms. The main hypothesis is therefore that the zombie firms should be more likely to exit the market because of import tariff liberalization than non-zombie firms. Formally I estimate:

$$\Pr(Exit_{ft} = 1) = B_0 + B_1 \Delta Tariffs_{it} + B_2 Zombie_f + B_3 \Delta Tariffs_{it} * Zombie_f + Controls$$

I use the data described above to test this hypothesis. I use both ordinary least squares (OLS) and logistic regression for my main model specifications because of the need to include country, year, and industry fixed effects. Firms shut down for a variety of reasons beyond increased foreign competition driven by import tariff concessions. Fixed effects help control for any time invariant omitted variables. For example, if a recession occurred that led to a large increase in firm exit in a single year, this would increase the rate of firm exit but it would not be due to trade liberalization. Thus, fixed effects help control for this type of cofounder.

6.3 Findings

Table 2 shows the main findings based on an OLS and a logit model, both of which have country, year, and industry fixed effects. Additional specifications with alternative fixed effects combinations are presented in the appendix. As expected, an import tariff cut at the 4-digit level increases the probability of firm exit, but being a zombie firm, however, reduces the probability of exit. This is in line with the main expectation. If zombie firms receive firm-level subsidies which

lower the threshold required for them to remain in the market, then the coefficient on the Zombie Firm variable should be negative as it is. Finally, the coefficient on the interaction term between Tariff Cut and Zombie Firm is positive which demonstrates that trade liberalization is one method that should be considered when attempting to kill zombie firms. This is the main coefficient of interest. Since it is positive it shows that trade liberalization triggers a stronger selection effect for zombie firms relative to non-zombie firms. Figure 1 also presents the results of the OLS model in a marginal effects plot. This plot confirms the interpretation of the coefficients.

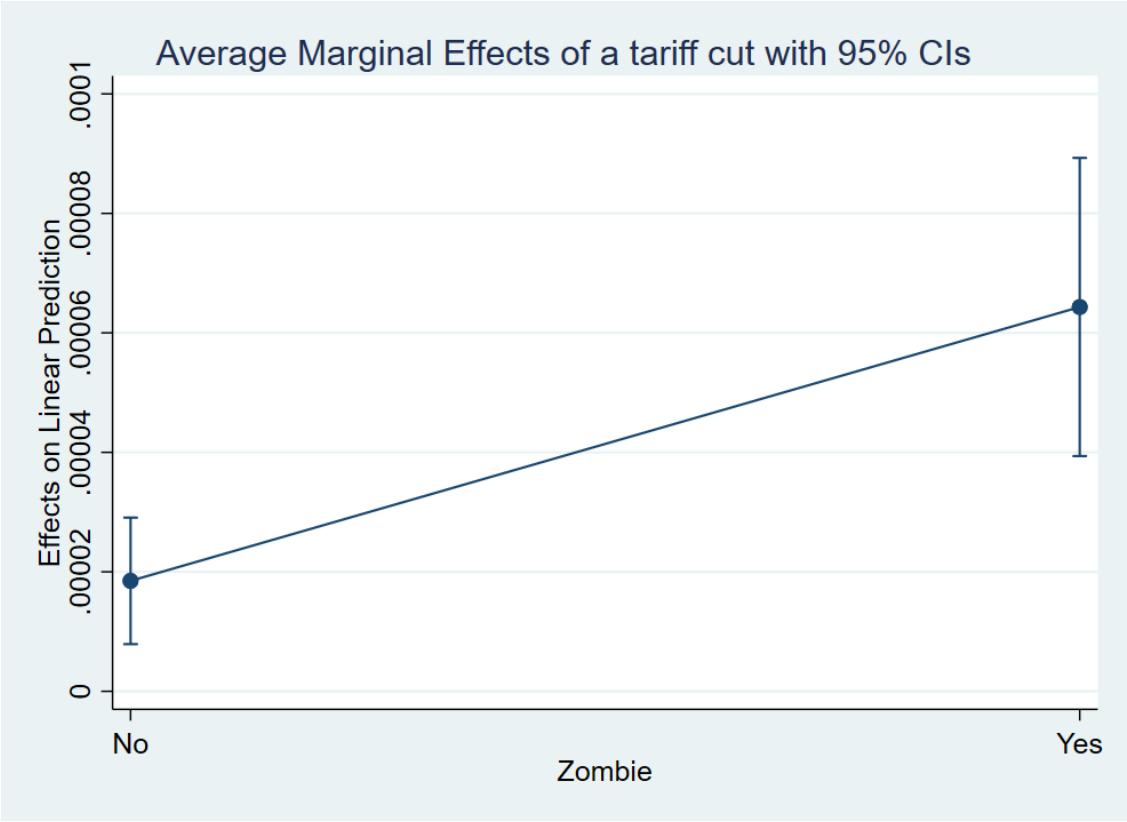
Since the dependent variable is binary (exit or no exit in the given year), the OLS model has a particular interpretation. The coefficients should be understood as the change in probability that Y=1 given a unit change in X. In general, the problem with OLS in the presence of a binary dependent variable is that the coefficients are not constrained to between 0 and 1 – implying that a unit change in X could lead to a more than 100 per cent likelihood of Y=1, but that does not occur here.

Table 2: Main Results

	Dependent variable:	
	Firm Exit	
	OLS	*logistic*
	(1)	(2)
Tariff Cut	0.0000185***	0.000450***
	(0.00000540)	(0.000123)
Zombie Firm	-0.00350***	-0.100***
	(0.000858)	(0.0209)
Tariff Cut*Zombie Firm	0.0000458***	0.00114***
	(0.0000129)	(0.000289)
Constant	0.0202***	-4.435***
	(0.00115)	(0.0529)
Country FE	Yes	Yes
Year FE	Yes	Yes

Industry FE	Yes	Yes
Observations	1,632,723	1,632,723
R^2	0. 0450	
Akaike Inf. Crit.		542898.5
Note: std. errors	*p<0.1; **p<0.05; ***p<0.01	

Figure 1 Marginal effects of tariff cuts on zombie firm exit



Column 2 of table 2 shows the results of a logistic regression using the same specification. Since logit models present results in log-odds they are not directly interpretable. However, the sign on the coefficient can be interpreted and it is signed as expected. Like the OLS model, the logit model shows that a tariff cut increases the likelihood of exit for all firms but being a zombie firm decreases the likelihood of exit. Additionally, the impact of tariffs cuts on exit is increased for

zombie firms as demonstrated by the negative coefficient on the interaction term. The coefficients are significant at the 1 per cent level in both models.

While a sector or an industry as a whole may face a changing competitive landscape from tariff cuts, it is zombie firms who face an existential threat from a reduction in import tariffs. With a rising productivity threshold following tariff cuts, some domestic firms (often zombie firms) will be forced to exit. Others, who began at the higher end of the productivity distribution may get more productive as resources once controlled by weaker firms can now be redeployed to more effective uses. It may be possible to view changes at the sector level as the average rate of productivity rises, but the exit effect which zombie firms face will be seen at the firm-level.

We should be cautious before interpreting the results as a causal relationship. Tariff cuts are themselves endogenous because firms lobby for them. Normally, the literature on the political economy of trade and tariffs views export-oriented firms lobbying for access to foreign markets. Those export-oriented firms see import tariff cuts as the cost of export access and help political actors stand-up to import-competing groups who oppose the import concessions. But that view of trade ignores the importance of global value chains and intermediate inputs in the production of goods (Baccini, Pinto, and Weymouth 2017). Exporters can mobilize to lobby for import tariffs cuts as well and should when the imports feature in their production process. Here, my variables of interest include import tariff cuts which makes this a concern. I address this by including a variety of fixed effects at the country, year, and industry level.

7 Case Study: A cautionary tale from Italy

The Italian textile and apparel industry is historic and world renown. While it continues to be an important part of the Italian economy, it has faced challenges in recent decades. Increased

competition stemming mainly from Asia and in particular from China has been the source of the challenges. What was once a key and productive sector of the Italian economy has become a sector in need of support. Many Italian firms in this sector have faced this new degree of competition and with it the challenge of restructuring to become more productive. While some firms have managed to develop new innovative production processes and products, others have merely tried to continue on as before. The latter group of firms have has sometimes required government support to do so. There are many firms which demonstrate this story and one of which is Legler SPA. The case of Legler demonstrates that while government often feel compelled to provide support to weak firms following import liberalization, it is rarely effective at helping them restructure and become more competitive.

Legler was an Italian textile manufacturing group founded in 1863.[5] They produced cotton and corduroy products, but their core business was high quality denim. In the mid 2000s, they employed over 1200 people in several production facilities across Italy and were earning well over EUR 100 million in revenue, making them both a large enterprise and an old one. The company began to experience financial difficulties in the early 2000s following increased competition from Asia. By 2005, with the termination of the Agreement on Textiles and Clothing competition was fierce and in 2006, Legler's equity fell negative for the first time dropping to EUR -8.6 million.

Negotiated as part of the Uruguay round which brought the WTO into existence, the Agreement on Textiles and Clothing (ATC) replaced the Multi-Fibre Agreement. The ATC provided for a 10-year transitional window for all quantitative trade restrictions on textiles and clothing to be eliminated. In successive phases, all products were integrated into the global trading

[5] 2012/51/EU: Commission Decision of 23 March 2011 on State aid C 39/07 implemented by Italy for Legler SpA (notified under document C(2011) 1758) Text with EEA relevance. *OJ L 27, 31.1.2012, p. 12–20*.

system and made subject to the typical disciplines. It was terminated on January 1, 2005 at which point all products were supposed to be governed by the general trade rules. Legler and the Italian textile industry in general were not the only ones to face this increased competition from China. In fact, other sectors were likely to feel the impact earlier as China joined the WTO in 2001. This phenomenon, referred to as the 'China shock' was felt across the developed world and highlighted the negative impacts trade can have in some local economic areas even when the broader impacts of trade are still positive (Autor, Dorn, and Hanson 2013, 2016). What differed for the Italian textile sector was the support provided to it by government. The case of Legler shows the dangers of government providing that type of support for the broader economy.

When Legler faced this increased competition as a result of tariff reduction on imported textile and apparel products, they did not effectively counter it by becoming more innovative and as a result they continued to see their revenue decline year after year. Between 2003 and 2007, Legler saw revenue fall sharply and losses amount to almost EUR 100 million. Instead, they asked for government support. In July 2006, they requested help from the Italian Minister of Economic Development. The Minister decided to grant the help in the form of a short-term loan guarantee meant to last 6-months to Legler for EUR 13 million. The government support was progressively enhanced and eventually totalled over EUR 40 million with the loan guarantee prolonged, a direct grant of over EUR 13 million, and a conversion of over EUR 14 million debt into equity owed to a public body. The government clearly tried to provide support to this zombie firm, but it would have been more efficient to let them exit the market. Instead, in addition to the grant and equity conversion that was already provided, the government was also forced to cover the bank loan they had guaranteed as the firm was unable to. This cost taxpayers, but it also distorted market

competition and allowed Legler to continue to control resources that could have been more effectively used by other firms.

In July 2008, the company changed its name to Texfer SPA to avoid being associated with the government support they received and to preserve its reputation (Sportswear International 2008). The newly renamed company continued to specialize in textile manufacturing and especially denim (Bloomberg n.d.). As all of Legler's production facilities were inactive between December 2007 and August 2008, some might conclude that the action taken by the government was indeed successful industrial policy given that the company began to operate once again. Yet, by October 2010 the renamed company was declared bankrupt once again. The Italian government thus only delayed the effective restructure of the company and lost valuable resources which could have been used to help redeploy capital and labour that were invested in the company (described in the following section). The European Commission also concluded that the government support provided by Italy to Legler violated State aid rules. Both the loan guarantee of EUR 13 million and the debt-to-equity swap were unlawful and breached the Treaty on the Functioning of the European Union. The ruling required Italy to recover the aid immediately.

The case of Legler illustrates why government support to weak enterprises is usually a mistake. Legler was a large firm which employed many people and an old firm which had likely built up important relationships with political actors. When the firm faced increased competition from trade liberalization and began to lose revenue, the government intervened with financial support. Yet, it was not enough, and it merely delayed the reallocation of important resources controlled by the firm. Instead, the government should have used the funds which were invested in the firm to help workers find new jobs and allow the capital to be reallocated.

8 A policy environment to support reallocation

Increasing the rate at which zombie firms exit the market is a means to an end and not an end in and of itself. The larger objective is to raise productivity across the developed world where zombie firms are often found. Across OECD countries, productivity has grown slowly especially since the financial crisis of 2008. Many have begun to speculate that this is a 'new normal' and that policy must evolve to confront the reality of slower productivity growth for the foreseeable future (Posen and Zettelmeyer 2019). In this context it is all the more important to deal with any challenges which we know are holding back productivity and can be confronted. Zombie firms are one such challenge. They drag down productivity by themselves being low productivity firms and therefore dragging down average firm productivity, by controlling resources that could otherwise be deployed to more effective uses, and finally by clogging the market and preventing other firms from growing and prospering. Given the channels through which zombie firms constrain productivity, the policy environment must support more than just the exit of zombie firms. It must also support the reallocation of resources from zombie firms who exit to other firms with the potential to grow.

Trade liberalization, as demonstrated above, can help force zombie firms to exit. That should be seen as the first step in the process of reallocating resources to more productive uses. Following the reduction in import tariffs, the increased competition coming from abroad will raise the productivity threshold required to operate in the domestic market. This will force low productivity firms, including zombie firms to exit. Once that occurs, the labour and capital once deployed by them must be reallocated and the policy environment is a key determinant of if and how that occurs. A well-designed policy environment can help the reallocation occur efficiently

whereas a poorly designed policy environment can slow the process and ultimately undermine the exit of weak firms and the reallocation of resources.

The policy environment should be conceptualized as the policies which shape the firm's decision to exit and the policies which facilitate the reallocation of resources. One key policy is the insolvency regime. It sets out the rules and regulations which apply to a firm when it is unable to pay the money owned on its debts. The regime can directly affect the decision of a firm to exit by raising or lower the costs of doing so and it can help facilitate capital reallocation by reducing the costs of restructuring. If the costs of firm exit are high, then a firm's creditors may choose not to begin bankruptcy procedures, thus attenuating the pressure on weak firms to exit. Insolvency regimes are necessary because of incomplete contracts, asymmetric information, and bargaining frictions between, for example, debtors and creditors regarding the true value of a firm in distress.[6] Overall, the insolvency regime should facilitate the exit of firms which are no longer viable while maximizing the value returned to stakeholders including shareholders in a timely manner. This will achieve the productivity enhancing goal of reducing the number of zombie firms while concurrently redeploying their viable assets such as capital, and codified knowledge like patents.

Creative destruction is the driving force behind a healthy economy. It improves the reallocation of resources, but also necessarily means certain jobs will be destroyed. The adjustment process can be difficult and potentially costly both from an economic and a social perspective, especially for individuals who lose their jobs and must find new ones (Davis and von Wachter 2011). Public policy must help facilitate the adjustment process for workers as well. However, it is often a more challenging policy problem than redeploying capital because labour markets are

[6] See McGowan and Andrews (2016) for an overview of market imperfections which can be remedied by a well-designed insolvency regime as well as best practices and procedures which should be included in an insolvency regime.

less integrated, but it is just as important. Helping reallocate individuals to more productive firms implies reallocating their tacit knowledge as well as their skills and ideas. Active labour market policies are one important approach where the goal is to help workers quickly return to employment, thus limiting any adjustment costs. Active labour market policies can include, for example, retraining and public job placement services. The latter being particularly important because it can help with job search and matching which reduces the time someone spends unemployed which is when skills atrophy. Active labour market policies are more effective at getting workers reemployed when compared with passive labour market policies like income support (Andrews and Saia 2017). The positive impact of active labour market policies is also stronger for individuals who lose their job due to firm closure. Thus, reemphasizing the importance of combining policies which facilitate firm exit along with policies which facilitate reallocation.

Finally, people who lose their jobs in layoffs are also more likely to start new companies than individuals who lose their jobs after being fired (Røed and Skogstrøm 2014). A common objective of public policy is to increase the rate of firm entry. Whereas increasing the rate of firm exit obviously implies the exit of some firms, it can also encourage the individuals who previously worked at those firms to start their own companies. Policy measures can be used to support new business formation in this context including providing access to capital and start-up resources. The importance of policy in facilitating worker transition should not be overlooked – it is both good economic policy and good social policy because resources will be redeployed, and individuals will spend less time facing the effects of unemployment.

Policy measures which encourage the exit of zombie firms must be coupled will policies which support workers if they have any hope of receiving political support. Individuals tend to view job loss from firm exit as an exogenous shock and not due to an employee's own actions

(Kletzer 1998). Therefore, building support for policies which encourage firm exit must be accompanied with policies that facilitate reallocation. Hence, why policies which encourage reallocation are just as important as the policies which encourage the exit of zombie firms. Moreover, the productivity benefits from firm exit come in large part from resource reallocation so for both political and economic purposes, the policy environment to support reallocation cannot be ignored.

9 Conclusion

Firms which operate below the required productivity threshold should exit the market. This should be the baseline expectation in an efficient and competitive market. However, empirically we see that that is not the case. Many firms continue to exist and operate even though they are low productivity firms that should exit in the face of competition. Why do zombie firms survive? The aim of this project has been to propose a political theory of zombie firm survival as well as demonstrate a mechanism by which zombie firms can be killed. While zombie firms receive firm-level subsidies that allow them to operate while meeting a much lower productivity threshold than other firms in general, trade liberalization can act as an effective external shock which forces them to exit. Both the main OLS and logit specifications confirm this finding as well as the extended specifications presented in the appendix.

This project has three main contributions. This is the first project to analyze zombie firms through a political lens and present a political theory of zombie firm survival as opposed to an economic one based on macroeconomic conditions. Second, this project suggests that tariff cuts can be an effective means to kill zombie firms. Finally, the project also suggests that while much empirical work continues to study preferential trade agreements, the focus has shifted to the study

of trade rules and the use of text analysis. While this shift is warranted to some degree, this project has demonstrated that tariffs still matter and should not be ignored when studying trade liberalization.

This project also faced some limitations that should be addressed in further work. Overall, the major limitation of this project is data availability. Both the OECD analysis and this project were limited in the countries that could analyzed because of data availability. Additionally, although the dataset is extensive, it does not cover the entire universe of firms. This is problematic because being a zombie firm and being missing from the dataset (or having absent financial variables and information) are likely to be correlated. Thus, the dataset is likely to underrepresent zombie firms. Although this is unfortunate, it is likely to bias the coefficients downwards, making the results a more conservative estimate of the true effect of trade liberalization on zombie firms. In reality, zombie firms are probably more likely to exit in the face of trade liberalization. Additionally, a robustness check on the identification strategy could be to endogenize the import tariffs cuts with the concessions made by other countries via an instrumental variables approach. Since countries attempt to match the trade policy of their competitors, this could effectively exogenize the tariff cut variable (Dür 2007). The tariff cut concessions of trade partners would not be subject to the lobbying of domestic firms and thus not endogenous.

Governments everywhere are trying to raise productivity levels as they know it is the main determinant of differences in per capita income between countries. There are many ways for policy makers to target productivity but, addressing the zombie firm problem would be one step towards this goal. Research on zombie firms to date has mainly focused on their consequences, namely that they drive down aggregate productivity, hoard resources, and prevent other firms from growing. A gap exists in the literature explaining their prevalence, survival and possible remedies to their

existence. This project is a first step in demonstrating that trade liberalization can be an effective tool in addressing the zombie firm problem.

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11 Appendix

Table 3: Descriptive statistics for main variables of interest

Variable	Observations	Mean	Std Dev	Min	Max
Zombie	1,632,723	0.105464	0.307151	0	1
Exit	1,655,411	0.050904	0.219801	0	1
Tariff Cuts	1,655,411	0.902219	2.12777	0	56.44
Year	1,655,411	2011.26	2.635375	2006	2015

Table 4: OLS models with fixed effects

	Dependent variable: Firm Exit				
	(1)	(2)	(3)	(4)	(5)
Zombie Firm	-0.00350***	-0.00791***	-0.00252**	-0.00717***	-0.00727***
	(0.000858)	(0.000857)	(0.000877)	(0.000875)	(0.000875)
Tariff Cut	0.0000185***	0.0000109**	0.0000860***	0.0000596***	0.0000564***
	(0.00000540)	(0.00000421)	(0.00000431)	(0.00000549)	(0.00000430)
Tariff Cut*Zombie Firm	0.0000458***	0.0000678***	0.0000490***	0.0000713***	0.0000713***
	(0.0000129)	(0.0000129)	(0.0000132)	(0.0000132)	(0.0000132)
Constant	0.0202***	0.00936***	0.0512***	0.0429***	0.0435***
	(0.00115)	(0.00104)	(0.000342)	(0.000607)	(0.000280)
Year FE	Yes	Yes	No	No	No
Country FE	Yes	No	Yes	No	No
Industry FE	Yes	No	No	Yes	No
Observations	1,632,723	1,632,723	1,632,723	1,632,723	1,632,723
R^2	0.0450	0.0416	0.00307	0.000205	0.000195
Note: std. errors	*p<0.1; **p<0.05; ***p<0.01				

Table 5: Logit models with fixed effects

	Dependent variable: Firm Exit				
	(1)	(2)	(3)	(4)	(5)
Zombie Firm	-0.100***	-0.194***	-0.0585**	-0.167***	-0.169***
	(0.0209)	(0.0207)	(0.0201)	(0.0201)	(0.0201)
Tariff Cut	0.000450***	0.000228*	0.00190***	0.00127***	0.00121***
	(0.000123)	(0.0000956)	(0.0000932)	(0.000120)	(0.0000928)
Tariff Cut*Zombie Firm	0.00114***	0.00159***	0.00103***	0.00154***	0.00155***
	(0.000289)	(0.000286)	(0.000276)	(0.000277)	(0.000277)
Constant	-4.435***	-4.659***	-2.930***	-3.098***	-3.087***
	(0.0529)	(0.0516)	(0.00740)	(0.0137)	(0.00630)
Year FE	Yes	Yes	No	No	No
Country FE	Yes	No	Yes	No	No
Industry FE	Yes	No	No	Yes	No
Observations	1,632,723	1,632,723	1,632,723	1,632,723	1,632,723
AIC	542898.5	549287.2	603646.7	608899.9	608912.3
BIC	543107.7	549447.2	603720.5	608973.8	608961.5
Note: std. errors	*p<0.1; **p<0.05; ***p<0.01				