

An Analysis of Factors that Determine firm Survival during Economic Crises: The Case of Zimbabwe Manufacturing Firms

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AERC Research Paper 332
African Economic Research Consortium, Nairobi
March 2017

THIS RESEARCH STUDY was supported by a grant from the African Economic Research Consortium. The findings, opinions and recommendations are those of the author, however, and do not necessarily reflect the views of the Consortium, its individual members or the AERC Secretariat.

Published by: The African Economic Research Consortium
P.O. Box 62882 - City Square
Nairobi 00200, Kenya

ISBN 978-9966-61-022-5

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List of abbreviations and acronyms

CZI	Confederation of Zimbabwean Industries
ESAP	Economic Structural Adjustment Programme
FDI	Foreign Direct Investment
MNC	Multinational Corporation
OGIL	Open General Import License
PEs	Public Enterprise
PM	Performance Management
PPP	Public-Private Partnership
RBZ	Reserve Bank of Zimbabwe
ROI	Return on Investment
RPED	Regional Programme on Enterprise Development
SMEs	Small and Medium-sized Enterprises
ZNCC	Zimbabwe National Chamber of Commerce

Abstract

The study analysed the various factors which contributed to the survival of manufacturing firms in Zimbabwe during the country's crisis of the 1990s and the one between 2000 and 2008. The study employed both descriptive statistics using firm level data from World Bank Enterprise Survey, and a logistic econometric model. The findings from descriptive analysis indicate that survival of manufacturing firms in the 1990s was, among others, determined by such factors as access to finance (whether from bank loans, informal sources, or a company's retained profits) to fund its operations including input procurement. Secondly, exportation was an important determinant which positively enhanced a given firm's survival. Third, availability of electricity power to support manufacturing activities was a positive enhancement for firm survival.

Findings from the 2011 survey shows that the problem of foreign currency shortages were so severe that some firms were forced to exit the manufacturing business as they could not be able to source some of their vital inputs from the international market. Secondly, given that by 2011 corruption was a major problem for manufacturing firms, this implies that these gifts (bribes) increased the operational costs of these firms, and as such reduced their profit margins, thus negatively affecting their manufacturing business. Third, a number of firms interviewed said that they had been incurring losses on an annual basis due to electricity outages. At national level, firms lost around 6.9% of their total annual sales due to electricity power blackouts. Lastly, access to finance, especially from formal sources like banks, was also a major challenge as most banks were not providing loans to companies due to severe liquidity constraints.

Turning to the exit (survival) logistic model which was estimated using the survey from 2011, the results showed availability of credit was an important factor affecting survival of manufacturing firms in the Zimbabwean context given that most firms' balance sheets and net profits were rendered valueless, and as such firms found themselves looking for loans to finance working capital or make new investments that would ensure continuity and growth. The study also found that competition from both formal and informal competitors increased the probability of firms exiting the manufacturing sector. With regards to foreign ownership (or the extent to which a firm is a subsidiary of a multinational corporation), results indicate that foreign firms' subsidiaries in Zimbabwe were more likely to stay in the economy comparable to domestic firms during economic crisis. The square of firm size ($size^2$) was found to be negative and significant, implying that very large firms were assumed to be more established and expected to weather the common problems that bedevil small firms, and as such, they (very large firms) are less likely to exit. The impact of older firm (age^2) on the probability of exit was negative and significant. As such, very old firms were assumed to be established and have more years of experience in conducting their line of business, thus less likely to exit from manufacturing activities.

1. Introduction

One of the most visible threats from any domestic economic crisis is the decline of manufacturing activities. Drop in firm production and lack of access to (external) finance to purchase production inputs (both locally produced and foreign purchases) may seriously impede firms, with the result that some are forced to stop exporting while others may even shut down or exit manufacturing activities. Although Zimbabwe has experienced a number of economic crises, two episodes of such crises, which this study investigates, are the one in the early to mid 1990s and the one covering the years between 2000 and 2008. The World Bank conducted a number of surveys on Zimbabwean manufacturing firms during these crises where information and factors which affected the performance of firms during the period of the surveys were collected. The surveys had research relations to the ones conducted in 1995 and 2011.

The 1995 survey shows that the country experienced a number of challenges in its economy in early to mid 1990s following the introduction of the Economic Structural Adjustment Programme (ESAP) in 1991. Whilst some of the challenges during these years were inherited from previous decade (1980 – 1990), during this period, manufacturing production was hampered due to such things as limited foreign currency, unfavourable export earnings retention regulations, and high cost of productive capital (Gunning and Oostendorp, 2002). On the other hand, the challenges which were prevalent during the country's recent economic crisis (period 2000-2008) as indicated by the 2011 survey, and which had a bearing on manufacturing (as well as services) firms' activities included severe shortage of foreign currency (with thriving black market as an alternative source), continuous electricity blackouts, and high level of corruption (bribes to get "things done"¹).

These two crises, especially the recent crisis, in the context of Zimbabwe, highlight a number of important aspects that may influence firm survival: financial health, access to electricity and the ability and/or willingness to pop up relevant (government) officials through bribes to get favours such as access to foreign currency at cheaper rates. Financial health or, on the flip side of the coin, constraints in access to finance, is important as it has implications for investment, firm growth and survival as shown in recent theoretical and empirical work (e.g., Clementi and Hopenhayn (2006) and Bond et al (2003)). Access to electricity is also important in the manufacturing activities, as most of these activities are electricity driven, to the extent that the absence of continuous power supply (or too many outages) means that firms either will not meet their production output, or will have to incur extra costs of using power from electric generators. Extreme shortages of foreign currency mean that firms will find it difficult to import their vital inputs and

hence become constrained in producing manufacturing products at optimal level. To enhance access to foreign currency, some firms have been forced to pay bribes to key and/or relevant officials to get the limited foreign currency at relatively lower rates than those prevailing at the black market.

Despite the challenges faced by firms in the two surveyed periods, analysis from the tracer survey done by this study indicates that, out of the originally 213 firms interviewed in 1993, 178 were still surviving as manufacturing firms, and were still under the same owners (shareholders) by end of 2011. Out of the 35 firms that were not considered as operating, eight were confirmed to have been bought (or had been merged) by other firms. A total of nine firms were confirmed to have exited the manufacturing business, while information on the other 18 firms could not be found, and we concluded that they were likely to have exited the manufacturing business.

This study brings the aspects of, among other things, financial health of a firm, access to electricity, political connection and corruption (paying of bribes) in determining the ability of a firm to continue its manufacturing (production) activities during economic crisis. Disentangling the effects of these aspects on the manufacturing (or production) survival of firms is not only of academic interest but also highly relevant for policy, in particular, but not only, in the current recovery economic climate for the country. For example, if access to finance is an important determinant of production activities, then government policy concerned with firm production survival needs to target financial markets and institutions. If access to reliable power/electricity supply to manufacturing firms matters, then government policy needs to think carefully about how to ensure uninterrupted power supply to economic production activities. In the case where imported inputs form a larger percentage of the production mix of Zimbabwe manufacturing firms, it follows that government policy should ensure that foreign currency is easily accessed and in a transparent manner. In summary, from an economic policy point of view, understanding firms' production survival is important, given that it is one of the aspects of industry dynamics, forming the competitive landscape in the global economy.

Study objective

Given the above introduction, the study's research questions are:

- What are the main challenges that were faced by the two groups of firms, those surveyed in 1995 versus those in the 2011 survey?
- What determined the ability of some manufacturing firms to continue manufacturing activities while others exited the same business?

The research focused on the identification of firm-level factors which helped firms to remain in manufacturing business. The following are the specific research objectives:

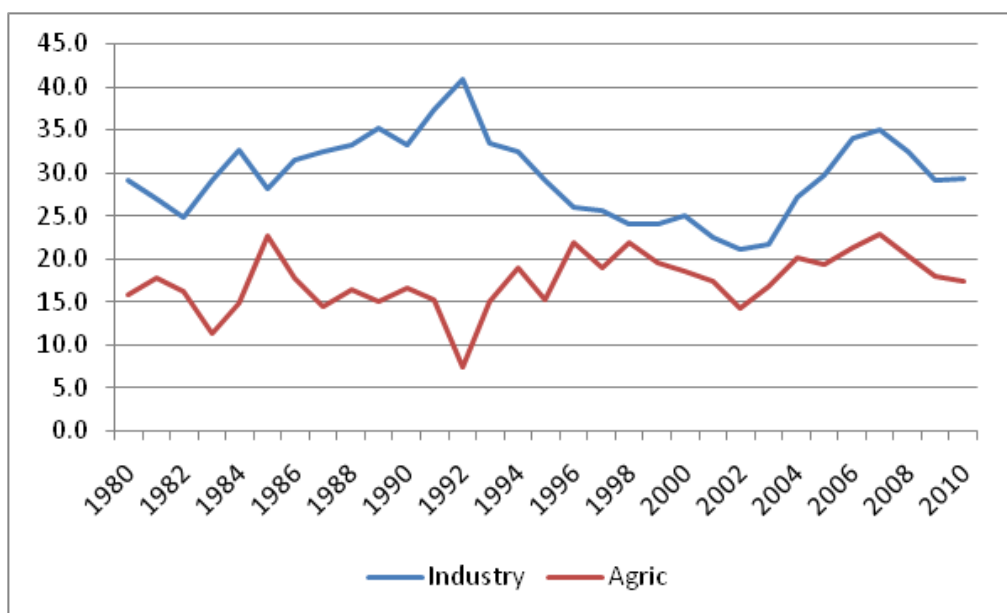
- To provide a descriptive analysis of the main challenges that were faced by the two groups of firms, those surveyed in 1995 versus those in the 2011 survey.

- To analyse the firm-level factors that determine the ability of some manufacturing firms to continue their production manufacturing activities while others exited such activities.

Zimbabwe's manufacturing sector

Although Zimbabwe's manufacturing sector contribution declined between 1993 and 2003, the sector at its peak (for example in 1992 when its contribution was 41% towards GDP) was well known for its diversity of products and as an important contributor to the country's GDP, exports and foreign exchange earnings (37%) and formal employment (15%) (Government of Zimbabwe [GoZ], 2009).² Figure 1 shows the trend contribution of industry (manufacturing) and agriculture activities to the country's GDP.

Figure 1: Industry and agriculture value added (% of GDP)



Source: World Bank Database.

The line trends indicate that the two sectoral activities were positively correlated between 1980 and 1984, and then from 1994 onwards. This is not surprising given that most of the manufacturing activities are mainly agro-based in nature, implying that the higher the output in agriculture sector, the higher will be the manufacturing activities. Nevertheless, the graph shows evidence of opposite symmetrical contributions of the two sectors in 1992, which was the year in which the country experienced severe drought. In 1992, agriculture output was less than one-quarter of the previous year (1991) and as such, agriculture contribution to GDP declined from 15% (in 1991) to around 7.4% in 1992. On the other hand, given the negative growth in the overall GDP growth, the contribution of manufacturing activities was relatively higher (40.9%) compared with most sectors (including agriculture which experienced declines). The positive spike

around 2006 in manufacturing's contribution to GDP is correlated to the growth in agriculture value addition which was witnessed in the same period. The accompanying growth in manufacturing value addition is therefore not a surprise given that a larger proportion of manufacturing activities are agriculture related.

The overall decline in the sector's contribution (especially between 1993 and 2003) to national GDP has, among others, been mirrored by the rise in contribution of sectors such as finance and insurance, whose contribution increased from a mere 6.7% in 1985 to 19.5% by 2002 before closing at around 13% by end of 2011. Thus, it can be argued that the rapid growth in sectors such as finance and insurance has overshadowed the contribution of manufacturing sector towards GDP. Furthermore, the decline, especially in last decade can also be attributed to the general economic meltdown that the country went through. Although manufacturing's contribution to GDP declined over the years, the sector continues to be an important part of the Zimbabwean economy.

The brief presentation of manufacturing firm production activities indicates that such firms encountered a number of challenges in their endeavour to continue production activities especially during periods of (domestic) economic crises. In general, the business climate in Zimbabwe during these two periods was not optimal given that most manufacturing firms struggled to survive due to a host of factors. Thus, a number of factors were at play in determining the continued production activities of the country's manufacturing firms. Although there are a multitude of possible production survival factors, little is known in terms of what determined the ability of firms to continue surviving in production activities during the economic collapse of the mid-1990s and post-2000 periods. Thus, the broad aim of this study is to investigate the factors which determined the ability of manufacturing firms to continue production activities using information and data obtained at firm-level and for the two periods as contained in World Bank Enterprise Surveys, which were conducted on Zimbabwean firms.

Overview of the crises

The crisis of the 1990s was, among other factors, triggered and exacerbated by the introduction of the Economic Structural Adjustment Programme (ESAP), which was introduced in 1991 and implemented until the end of 1995. The programme had many components which included trade liberalization, public sector reform, and financial and monetary sector reform. Implementation of these various components, in turn, impacted manufacturing firms in various ways, both positive and negative (GoZ, 1992).

On the trade front, the programme saw the current account transaction being opened up; and there was a movement from the controlled foreign exchange system to a market-based system. The programme saw a gradual move towards free market exchange rate determination. In earnest, trade liberalization began with movement of selected input items from quantitative import controls to Open General Import License (OGIL) introduced during the second half of 1990 (Tekere, 2001). In 1991, additional items were put on OGIL, which included outputs such as cement, tyres and light bulbs. These measures put significant pressures on the balance of payments resulting in government implementing import demand management measures in 1991 which included raising the minimum import tariffs to 10% on all imported goods and an additional 10% on items on OGIL.

Although there were restrictions on importation, the 1995 survey shows that, in general, the surveyed firms never had problems of accessing their imported raw materials, as only 0.6% of surveyed firms complained while just 2.9% of the surveyed firms indicated that they faced competition from imported finished products. Overall, the trade liberalization of the 1990s did not result in any significant survival challenges of the surveyed firms.

The public enterprise reform component of ESAP was aimed at eliminating the large budgetary burden of the public enterprise (PEs) sector and making the PEs more efficient; and improving the adverse policy environment within which PEs operate. Among other things, implementation of this component saw the retrenchment of around 25% of the labour force which was directly and indirectly working in the government (GoZ, 1992). This resulted in, among other things, reduced local demand for manufactured goods. This subdued demand impacted negatively on firms which were producing those products, thus threatening their profitability, and in turn increased their exit chances from the manufacturing activities. Around 23% of surveyed firms in 1995 enumerated insufficient local demand as a major challenge.

With regards to financial sector and monetary policy reform of the ESAP package, interest rates, which are a good indicator of financial reforms, remained controlled during the first period of reforms (1990-1991). This delay in decontrolling interest rates was mainly due to fears of the impact of interest rates liberalization on production and consumption. In 1992, some interest rates were decontrolled but controls were maintained in some politically sensitive areas such as mortgage rates. In addition, reversals were experienced in this area, largely driven by political considerations. In terms of the impacts, despite subdued interest rates by government controls, most interviewed firms in 1995 singled out access to credit as one major challenge to their survival. The rising inflation versus controlled lending interest rates meant lending institutions were not making profits hence reduced their lending activities. As such, some firms could not access loans from local financial institutions.

Monetary and credit policies reforms were aimed at reducing the rate of inflation to 10% by 1995 and move away from direct control of credit and money supply to indirect methods. Inflation developments show that during the first years of reform, inflation was on an upward trend, rising from 12.4% in 1990 to 23.3% in 1991, and further up to 42.1% in 1992 before coming down to 27.6% in 1993, and 22.3% in 1994. The downward trend in inflation only started towards the end of the ESAP period, in 1994. The overall rising inflation trend during this period contributed to increased cost of doing business in the country, including the cost of production. The results from the 1995 survey indicate that 5% of the surveyed firms pointed cost of production as one of their main production challenges.

Over and above the complications which were brought by ESAP, the country was also ravaged by a severe drought in 1992. The severe drought, for example, saw production of maize (the staple food crop) dwindling to around 250,000 metric tonnes as opposed to annual average of 1.5 million metric tonnes).

The 2000-2008 crisis

The severe economic and political crisis that has embroiled the country since 1997, deteriorated further in 2001 and 2002, owing to the combined effects of the increasing macroeconomic imbalances, the massive drought that hit the country during the first quarter of 2002 and the acceleration of the fast-track land reform programme, following the disputed re-election of the country's incumbent president. The question that one can ask is: How did Zimbabwe move from being a country of considerable promise to being what the development agencies euphemistically call a 'low income country under stress' popularly referred to as a failed state? (Zimbabwe Institute, 2007). The cynical land reform which was launched by the incumbent government in 2000 as a means of staying in power is certainly a major negative turning point, but the root causes of Zimbabwe's collapse go back at least to the 'Black Friday' crash on 14th November 1997. The authorities panicked and closed all foreign currency accounts, a retrogressive move at a time when the stimulation of exports was a clear necessity. On the fiscal front, the government continued to run budget deficits, largely financed by domestic borrowing (Makochekanwa, 2007). The interest burden on rapidly growing debt at the end of the 1990s had grown to a level greater than expenditure on health and education combined and threatened to swamp all other expenditure items in the budget.

To counter the budget debt trap, from the start of 2001, the government introduced a policy of suppressed interest rates, which was combined with a fixed exchange rate and a foreign currency surrender requirement on exporters. The deliberately suppressed interest rates succeeded (temporarily) in subduing interest payments on the national debt in the budget, but at huge cost to the economy as a whole. As basic economic theory would have anticipated, negative real interest rates encouraged over-consumption and speculation, particularly in the foreign exchange market. The parallel exchange rate depreciated rapidly, creating a lucrative wedge for the 'lucky few' able to access foreign currency at the official rate and trade it at its market value.

The entirely predictable result of these policies was the acceleration of inflation, from an already high level of 57% in December 1999 to just short of 600% in December 2003. Although inflation temporarily declined to a 'low' point of 124% per annum in March 2005, following the appointment of a new Reserve Bank of Zimbabwe (RBZ) governor, the rate however, started a sharp increase trajectory to annual rates of 4,530% and 7,251% in May and June 2007, respectively. The final official recorded rate was 231 million per cent in July 2008 (ZIMSTAT online database). In respect of monetary policy, frequent changes resulted in real interest rates swinging wildly between positive and (more often) negative values. One negative outcome of the higher inflation environment was the shunning away from the use of the local currency, the Zimbabwean dollar (Z\$), by economic agencies, and the corresponding surge in the demand for the use of foreign currency, mostly the US dollar. This upsurge in demand for foreign currency resulted in the scarcity of the US dollar, which in turn caused a burgeoning and thriving black market for foreign currency.

The other significant problem during this period was the banking sector crisis which saw a number of banks (more than six) either closed, or placed under curatorship or

judicial management. The central bank came up with tighter controls on bank supervision and tighter guidelines were given to banks to implement when giving out loans (Reserve Bank of Zimbabwe [RBZ], 2006). This meant that the remaining banks were now more stringent in giving out credit loans. Furthermore, there were just fewer banks than before from which potential borrowers could approach for possible bank credit. This, in turn, meant that availability of credit was made worse. The bank crisis was further compounded by shortages of both local currency and foreign currency. Despite the fact that the RBZ was good at printing the local currency notes, the hyperinflation was running at a faster pace than the machine printing and that resulted in long queues at banks becoming the norm of the day. Most of the queues were by private individuals to correct their demand deposits, which in most of cases, the banks could not sufficiently meet. These shortages of local currency also had negative bearing on the economic activities of manufacturing firms. For example, inability of private individuals to access their demand deposits meant that their purchasing ability was also reduced and that in turn meant insufficient local demand for manufactured products.

The 2011 World Bank survey (World Bank, 2011) shows that the country's crisis in the new millennium brought a number of survival challenges and opportunities for manufacturing firms. The survey indicates that the majority of interviewed firms (63.7%) identified access to finance as a major constraint to their survival. Over and above the challenges related to getting bank credit, local firms had problems in getting foreign currency to import their foreign inputs. Close to two-thirds (63.4%) of surveyed firms confirmed that they were using material inputs and/or supplies of foreign origin. Those firms which were using foreign inputs further indicated that close to a third of their inputs (32.7%) were imported.

In terms of capacity utilization or production performance, the crisis negatively affected the growth of manufacturing firms. In fact, the various components of the hardships, which included higher inflation rates, limited access to credit finance and shortages of foreign currency, among others, resulted in most manufacturing firms operating below 45% of their installed manufacturing capacities. Furthermore, real annual sales growth, and annual labour productivity growth were generally nil, with annual employment growth averaging -7.4%.

One of the factors which helped firms continue surviving the mired challenges during the crisis was the implicit benefits that were brought about by hyperinflation in terms of local overhead and direct costs. For example, given that the wage bill constituted a sizeable percentage of cost of most firms, hyperinflation meant that the cost of wage bill at each end of period was, in real terms, declining in comparison to sales. During this period, prices were moving in tandem with inflation trends (even on hourly basis at the peak of the hyperinflation period in the third quarter of 2008), while wage rates were reviewed monthly or even quarterly in some firms. The same cost advantages were also experienced by firms when it comes to payment of utilities such as water and electricity bills.

2. Literature review

The study by Mudavanhu et al (2011) analysed the major causes of small and medium-sized enterprises (SMEs) failure (and or survival) in Zimbabwe. The study employed the Tian (2005) model which argues that survival or failure of firms is overall determined by changes in return on investment (ROI). The paper found that most SMEs in Zimbabwe fail because of lack of general knowledge on how to run the business and this was indicated by a high significance level of the coefficient of education (of the proprietor) in their survival empirical model. The study also found unavailability of credit as another significant cause of SME failure. Other significant factors which also contributed to the failure of most firms in this research included competition from imports and high cost of raw materials.

Inkoun (2003) studied the survival of firms in Ghana. The research found that firm survival was closely linked to entrepreneurial skills of the proprietor. Specifically, the author found that proprietors who had business-related qualifications had 30% more chances of survival than non-qualified proprietors. In a study on the survival of firms in Peru, Ramis (2002) found out that, while management training for firm owners was important for firm survival, the factor was more important when the company had higher growth potential than in the case when the growth potential was low. The Ramis (2002) paper, however, found out that competition from both domestic and foreign firms was more predatory than entrepreneurial skills. In his study, firms faced with competition were three times more prone to collapse than those without competition.

The main objective of Peljham (2012) study was to explore how using performance management (PM) tools impact the exit hazard of firms by considering a sample of Slovenian firms during the recent economic crisis. The study employed an empirical model whose foundations are premised from studies on firm survival and industry dynamics models which emphasize the importance of firms' learning process for selection and evolution processes within the industry (Ericson and Pakes, 1995; Jovanovic, 1982). The empirical results from the logit model found that firms that used PM tools in 2007 experienced around 6% lower hazard of shutting down during the current economic crisis. Other variables which were found important and significant contributors to firm survival were firm size and age of the firm.

The factors which helped both domestic and foreign multinational (MN) firms to survive economic crisis in the case of Irish firms were analysed by Godart et al (2011). The authors were also concerned with whether survival determinants were different in case of a firm being foreign multinational or domestic. The study employed a complementary log-log model which allowed them to investigate the hazard of firm exit. The paper

found evidence that most firms were hit by the crisis, and as such, their exit probabilities also increased substantially. In fact, the study concluded that the crisis on its own led to increases in firm exit, suggesting that even firms that would not have exited under normal circumstances were forced to exit.

In a paper which analysed entry, exit, and survival of UK manufacturing establishments, Disney et al (1999) employed an augmented Cox proportional hazard to examine the survival of new plants in the UK in the 1980s. The results indicated a secular fall in cohort survival probabilities over time. Furthermore, the paper found that firm size had a negative effect, suggesting that increases in size lower the probability of exit. One of the surprising finding from the study, however, was the fact that, single (a variable which captured whether a firm had one plant or was multi-plant) had a negative coefficient, suggesting that single firms had less chance of exit. This finding, according to the authors, was counter-intuitive since multi-plant firms were expected to benefit from economies of scope and cross-subsidization, thus increasing their survival rates.

3. Methodology

To successfully answer the research questions and study objectives, the study employed two methodologies. First, the paper used descriptive approach to analyse the salient features of the firms which were surveyed in the two different periods. Second, the study employed econometric analysis with estimations of firm survival model to empirically determine the variables which were most important in the survival of manufacturing firms during economic crises.

Descriptive approach

To make the most of the World Bank manufacturing firm surveys that were done on Zimbabwean firms during the two different periods being analysed, the study conducted a detailed descriptive analysis of the various determinants which contributed to the continued survival of firms in manufacturing activities besides using econometrics. By using simple statistical analysis and sampling weights of the data from these two surveys, this approach provided a great deal of information regarding the possible factors which might have enhanced most firms to continue producing during economic collapse. This exercise was done for the two periods, 1995 versus 2011. Thus, the main features of the surveyed firms from each of the two surveys have been detailed and explained, with inference made for each variable's contribution to firms' ability to survive during hard and perilous economic times. In other words, the investigation detailed the main variables why most manufacturing firms continued conducting their manufacturing businesses and managed to weather the negative effects of economic crises.

Econometric approach

The econometric approach was also employed in the analysis. The use of this methodology is paramount, given that most studies on the subject matter use econometrics in their analysis. Furthermore, given availability of firm level data, it is pertinent to use this scientific approach in this study.

Theoretical model

The study adopted the model by Tian (2005) which has been modified from the Olley and Pakes (1996) model, and the Tian (2005) used in this paper link firm survival to

changes in return on investment (ROI). The model is underpinned on the neoclassical model which assumes that a firm enters into economic activities (i.e., manufacturing or production) solemnly for profit maximization. In this model, the change in the return on investment (ROI) is therefore used to infer viability of manufacturing firms, whereby persistent negative changes will result in eventual collapse of the entity since they will not have a solid financial base to continue shielding the losses. Thus the study adopted the change in ROI as a measure of firm survival (or failure). Following Tian (2005) the change in ROI function can be modelled as follows:

$$\Delta f \frac{N\pi}{\varphi} p = f(ED, EP, CR, SZ, AGE, C, K) \quad (1)$$

Where: Δ is change

- $N\pi$ = net profit of entity
- φ = initial capital
- $N\pi/\varphi$ = return on investment
- ED = education level of the manager
- EP = dummy taking 1 if a firm exports, and zero otherwise
- CR = dummy taking 1 if a firm get bank loan, and zero otherwise
- SZ = size of the firm
- AGE = Age of the firm
- C = dummy taking 1 if a firm faces significant competition, and zero otherwise
- K = capital stock

Thus Equation 1 can be expressed as:

$$\Delta f \frac{N\pi}{\varphi} p = \alpha_0 + \beta_1 ED + \beta_2 EP + \beta_3 CR + \beta_4 SZ + \beta_5 AGE + \beta_6 C + \beta_7 K + \varepsilon \quad (2)$$

Where, ε is the stochastic error term representing the influence of all remaining variables which are not explicitly captured in the equation. However, heterogeneous manufacturing firms in different industries have different sizes such that a firm that might qualify as a small firm in one industry might not qualify in another industry (Mudavanhu et al, 2011). Therefore, taking absolute values of some of the quantitative variables will result in high variance leading to the problem of heteroscedasticity. Thus in the study we shall standardize variables by dividing through all quantitative variables by initial capital φ . Equation 2 becomes:

$$\Delta f \frac{N\pi}{\varphi} p = \alpha_0 + \beta_1 ED + \beta_2 EP + \beta_3 CR + \beta_4 f \frac{SZ}{\varphi} p + \beta_5 AGE + \beta_6 C + \beta_7 f \frac{K}{\varphi} p + \varepsilon \quad (3)$$

For most firms, however, no major capital injections in the business are expected, especially during economic crisis, and in a short period of say two years, and hence $K \approx \varphi$. [This implies that the coefficient of β_7 in Equation 3 becomes 1, and as such the whole term disappears].

Equation 3 can be rewritten in compact form as Equation 4:

$$\Delta f \frac{N\pi}{\varphi} p = \alpha_0 + \beta_1 ED + \beta_2 EP + \beta_3 CR + \beta_4 \psi f \frac{SZ}{\varphi} p + \beta_5 AGE + \beta_6 C + \beta_7 f \frac{K}{\varphi} p + \varepsilon \quad (4)$$

$$\text{Where, } \psi = f \frac{SZ}{\varphi} p$$

EP, CR and C are qualitative variables and we will use dummy variable D_1 , D_2 , and D_3 respectively, to capture them.

$$\begin{aligned} D_1 &= 1 \text{ if a firm exports; and } D_1 = 0 \text{ otherwise} \\ D_2 &= 1 \text{ if a firm got credit loan from a bank, and } D_2 = 0 \text{ otherwise} \\ D_3 &= 1 \text{ if a firm faces significant competition; and } D_3 = 0 \text{ otherwise} \end{aligned}$$

Empirical approach

In this sub-section we model the effects of various factors on the probability of firm survival in manufacturing and/or production activities. Peljhan et al (2012) argues that empirical studies on firm survival usually rest on firm and industry dynamics models which emphasize the importance of firms' learning process for selection and evolution processes within the industry (Ericson and Pakes, 1995; Jovanovic, 1982). The firm selection process among heterogeneous firms within a particular industry operates through the entry and exit process. In our analytical framework specification, the study followed the modified model of Olley and Pakes' (1996) as presented by Tian (2005) where the mode is a version of a general dynamic model of heterogeneous firm behaviour in which the exit decision is based on comparing the ongoing value of a firm with the liquidation value the firm would receive in the case of exiting the market. According to this model, it is only if the ongoing value of the firm is greater than the liquidation value that the firm chooses a non-negative value of investment:

$$\Pr(exit = 1) = F(\beta' x) \quad (5)$$

In Equation 5, $exit_{it}$ is the dependent binomial variable, which takes the value of 1 if a firm exits the market and 0 if it continues to operate in the market. In other words, it takes a value of 0 if a firm which was interviewed in the World Bank Survey sample of 1995 was still active in 2011, and a value of 1 if a firm exited the market by end of 2010 and, as such, did not survive until 2011. Variable x_{it} is a vector of firm- and industry-level characteristics that arguably affect the chances of the firm's survival.

The study's estimation procedure will follow Peljhan et al (2012) and apply a logit model which uses a logistic distribution in specifications of the exit decision function (5) (Greene, 2003)³:

$$\Pr(\text{ext} = 1) = \frac{e^{\beta'x}}{1 + e^{\beta'x}} \Lambda(\beta'x) \quad (6)$$

Where, $\Lambda(\cdot)$ indicates a logistic cumulative distribution function.

In addition to the standard firm- and industry-level characteristics that are, according to industry dynamics models, important for the firm's performance and especially its survival, the following linear empirical model has been estimated:

$$\begin{aligned} \Pr(\text{exit}2011) = & \beta_0 + \beta_1 ED + \beta_2 SZ + \beta_3 SZ^2 + \beta_4 \text{exp} + \beta_5 AGE + \beta_6 AGE^2 + \\ & \beta_7 SUBS + \beta_8 D_1 + \beta_9 D_2 + \beta_{10} D_3 \end{aligned} \quad (7)$$

Where: ED = educational level of the manager
 SZ = firm size
 SZ² = square of firm size (to capture non-linearities)
 Exp = dummy variable taking 1 for exporting firms
 AGE = firm's years of existence
 AGE² = square of firm age (to capture non-linearities)
 SUBS = dummy taking 1 if a firm is a subsidiary of a multinational company
 D₁, D₂ and D₃ are as defined before
 v = error term.

As indicated in most studies, the study used the maximum likelihood estimation procedure since ordinary least squares (OLS) may result in probabilities which lie either below zero (0) or above one (1) if one proceeds to employ Linear Probability Model (LPM).

Data sources

The study used World Bank surveys which were done in the 1990s and the one which was done in 2011 on Zimbabwe's manufacturing firms. The 1993 to 1995 Regional

Programme on Enterprise Development (RPED) survey which was done consecutively for three years, that is Wave I (done in 1993), Wave II (conducted in 1994), and Wave III (the last one done in 1995) on the same firms, surveyed 213 manufacturing firms. The surveyed firms were further divided into seven sectors, namely food, wood, furniture, textiles, garments, metal, and leather. Each of the yearly questionnaires (1993, 1994, and 1995) had multiple questions, totalling to more than 3,000. For this study, we used the 1995 survey.

The World Bank's recent 2011 enterprise survey on Zimbabwe included 599 manufacturing firms which were geographically located in four parts of the country, namely Harare (capital city), Bulawayo (second biggest city), Midlands, and Manicaland. The surveyed firms were also grouped into four categories, namely, food, textiles and garments, retail, and other services. A descriptive analysis of the survey outcome and responses from interviewed firms shows that, unlike in the 1993 to 1995 survey, factors such as access to foreign currency, continued access to uninterrupted power/electricity (or use of electric generators) and paying of bribery were some of the factors which helped some firms to remain producing, and survive in the export business.

To further enrich the analysis, and armed with the list of the actual names of the 213 firms surveyed in the 1990s, the study managed to do a tracer survey to try and see how many of those firms were still surviving by end of 2011. This was achieved by a number of triangulation methods. First, the study used firm databank from ZIMSTAT. ZIMSTAT is the country's agent mandated to collect all economic data (among others). Second, the research also made use of firm registers from three other industry-related bodies, namely, Confederation of Zimbabwean Industries (CZI), Zimbabwe National Chamber of Commerce (ZNCC), and ZimTrade. The first two are employer organizations and most firms, including manufacturing firms, are members to at least one of them. The last (ZimTrade) is an agent which promotes exporting of Zimbabwean products, and as such contains a register of most exporting firms. Third, the paper also traced the firms in the country's Yellow Book (which contains names and contacts of most registered firms). Lastly, Internet was also used to check existence of firms, especially those which had websites. Analysis of information from the above four institutions as well as from the Yellow Book and the Internet, indicates that out of the originally 213 firms interviewed in 1993, 178⁴ were still surviving under the same owners by end of 2011. Out of the 35 firms that were not considered as operating, eight were confirmed to have been bought (or had been merged) by other firms. A total of nine firms were confirmed to have exited the manufacturing business, while information on the other 18 firms could not be found. We concluded that they were likely to have totally exited from the manufacturing business.

4. Results

This part of the study provides the major findings which came from the analysis of the surveys; and the results which came from the econometric simulations.

Descriptive analysis

Main features of 1995 and 2011 surveyed firms

This section presents analysis of various variables which are considered (as suggested in literature) to be important in determining the survival of manufacturing firms in their production activities. Given the richness of the two World Bank surveys analysed in this study, in terms of the multitude of questions contained in each of the two questionnaire (3,321 to be specific) and the number of firms interviewed, the study selected a few, but important variables as suggested by literature. Furthermore, the study decided to describe these variables for the two surveys of 1995 and 2011. Given that the variables were consistently the same across these two surveys, the analysis between these two changes mainly points the respective changes. Furthermore, survival (or exit) was interpreted to mean that a firm which was operating and interviewed in 1995, but was not conducting manufacturing activities in 2011 as indicated by the tracer survey mentioned earlier, was considered to have exited the manufacturing activities.

Sector representation

Table 1 provides the categorization of the surveyed firms in terms of the various sectors into which they belonged. In 1995, a total of 192 firms were interviewed and in 2011, a total of 456 were interviewed. Out of the seven sectoral categorization into which the 1995 surveyed firms were put, garments sector had the highest (52) firms interviewed and the sector accounted for 27% of the total investigated firms. The 2011 survey had four sectoral decomposition, other manufacturing had a majority with 163 companies, representing 35% of the total sample firms.

Table 1: Categorization of firms by sector

	Food	Wood	Furniture	Textile	Garments	Metal	Leather	Total
1995 survey								
Number	47	10	16	21	52	34	12	192
Per cent	24	5	8	11	27	18	6	100
2011 survey⁵								
	Food	Textile and garments		Other manf		Retail	Total	
Number	116	97		163		89	456	
Per cent	25	21		35		19	100	

Key: Other manf = Other manufacturing.

Analysis of survival factors

Table 2 provides the major factors which were contained in the two surveys and which have a bearing on the extent to which manufacturing firms survived or exited their activities during the two survey periods.

Table 2: Factors which impacted on firm survival

Factor	1995	2011
1 Challenges in getting bank credit (%)	19	63.7
2 Foreign ownership (%)	10	5.1
3 Percentage of firms owning or sharing a generator	2	53
4 Proportion of firms exporting (%)	48	11
5 Proportion of firms which reported significant competition	96	47
6 Corruption (% firms citing corruption as a major constraint)	3	32

Access to finance and credit challenges

Firms' ability to continue their production and manufacturing activities is, among other things, dependent on their ability to access financial resources, whether from formal banks or other informal arrangements. In a market with financial constraints, it follows that firms' investing activities may be hurt and this may imply that other firms reduce their production activities and eventually exit the production business. Table 2 shows the percentage of firms which were facing challenges of security in accessing bank credit from formal financial institutions for various reasons. During the crisis of the 1990s, while there were some mild controls on the lending rates, only 19% of firms which had applied for bank loans missed. Thus, it can be concluded that in the 1990s, firms managed to continue their manufacturing activities on the backdrop of access to bank loans.

On the other hand, results from the 2011 World Bank Enterprise Survey show that the most commonly reported obstacle to doing business in Zimbabwe was access to finance. A total of 63.7% of surveyed firms enumerated access to bank loan credit as a major challenge which inhibited their survival chances, and some firms were forced to exit the market because of this challenge. This challenge has been confirmed by

a recent manufacturing sector survey conducted by the Confederation of Zimbabwe Industries (CZI, 2012), in which the highest proportion of respondents (27%) reported cost and availability of finance as the main constraint to capacity utilization and ease of doing business in the Zimbabwean manufacturing sector. Comparative data shows that the significant gap between perceptions of access to finance in Zimbabwe versus the sub-Saharan Africa average is very high, thus highlighting the severity of the access to finance issue in the country. Zimbabwe suffers from some of the typical developing country access to finance issues such as limited liquidity, weak credit information systems (coupled with high levels of actual and perceived risk) and weak protection of creditor rights for collateralized lending.

The country also suffers from a more unique and pressing finance constraint which has developed as a result of the hyperinflationary period in the country (when inflation peaked at 231 million per cent in July 2008). During this period, financial assets at both corporate and individual level were completely wiped out (including cash in the bank, fix term investments, accounts receivable, staff loans, and individuals' pensions and provident funds). This dramatically eroded balance sheets of companies across the economy and this in turn has severely affected their ability to post security and thus borrow money. For example, prior to hyperinflation, a company that had ZWD 100 million⁶ in a three-year fixed deposit account with a bank could have used this 'asset' as collateral to borrow money from the bank. Similarly a company with a large value of invoices still to be paid by customers (again ZWD 100 million) could 'discount' this asset at a bank in exchange for a cash loan up front. The opportunity to borrow money in both of these situations was completely wiped out when these ZWD 100 million assets were re-valued at less than USD1 when the economy was dollarized in 2009 (in an effort to halt the landslide hyperinflation).

Extent to which surveyed firms were subsidiaries of MNCs

The interviewed firms were asked whether they were a subsidiary of a (foreign) multinational corporation (MNC). This ownership variable is a potential factor which helps a firm to survive in its business during economic crisis. According to Godart et al (2011), subsidiaries of MNC are "...less likely to exit because investing abroad involves substantial unrecoverable investment costs (sunk costs) which are likely to be higher than for setting up a purely domestic plant in host country, hence a foreign firm will be reluctant to leave if the shock is only temporary." Table 2 shows that only 10% of the total surveyed companies in 1995 were subsidiaries of MNCs, while the majority (162 firms, or 90%) were not subsidiaries. In the 2011 survey, the share of ownership was even more in favour of local citizens versus foreigners, as the share of ownership accounted for by MNCs was reduced to 5.1%. Thus, in summary, one can conclude that overall, the ownership structure remained largely local (as opposed to foreign) during the two surveys and did not have much influence on the survival of the majority of manufacturing firms in the country.

Exporting

The impact of a firm's export orientation on its survival chances is normally expected to be positive (Peljhan et al, 2012; Gorg and Spaliara, 2009). The rationale is that firms which export can avoid the problem of limited domestic demand, and take advantage of the economies of scale that are brought by producing in large quantities when one wants to satisfy the international market. Table 2 indicates that in 1995, 48% of the surveyed firms were exporting their products. Overall, the fact that most firms surveyed in the 1990s were exporting implies that exporting was an important determinant which positively enhanced a given firm's survival.

The picture changes when one considers the results from the 2011 survey. Only 11% of the surveyed firms in 2011 indicated that they were exporting their products. These low exporting rates can be explained by at least two factors. First, most companies had reduced their production activities, meaning that those that were producing were few, and as such there was "abundant" local market, resulting in some firms not seeing the rationale for exporting when they could sell nearly all the products on the local market. Second, given the hyperinflationary environment coupled with expensive foreign currency (from black market) to purchase foreign inputs, most locally produced goods were expensive, and thus uncompetitive on the international market.

Competition

The competition that a firm faces in its industry is one of the factors that can determine the extent to which that firm can continue to survive or whether it can be booted out of the market. Peljhan et al (2012) argues that competition is paramount in explaining the survival of firms in any market. In the surveys, firms were asked the extent to which competitors were posing serious challenges to their business. In both surveys, most firms responded that competitors were causing havoc in their operations. For example, in 1995, around 96% of firms reported that they had at least one competitor, with close to half of the firms indicating existence of more than 10 competitors.

While the 2011 survey did not have questions on competition from formal entities, the questionnaire, however, was mainly concerned with competition from informal sector. Firms were asked the extent to which practices of competitors in the informal sector were a major constraint, and to this regard, 47% of surveyed firms confirmed that competition from the informal activities was a problem. In fact, growth of informality in the economy and the associated de-industrialization has also been highlighted as a constraint to growth; vertical and horizontal linkages in supply chains and economies of scale are being lost as informality increases. This was clearly apparent in the manufacturing sector (and agribusiness sector in particular), where unreliable supply chains and domestic linkages contributed to uncertain and costly production. This, in turn, reduced the price competitiveness of locally produced goods, leading to a substitution toward imports as well as a decline in exports. A clear example of this comes from the dairy sector where large-scale commercial milk production has been disrupted by the fast-track land reform programme. Consequently Dairiboard Holdings shut down its milk processing plants

in Bulawayo and Mutare milk, citing reasons, including a limited supply of milk and increased competition from milk imports (costing around 40c/litre from South Africa versus 62c/litre for locally produced milk).⁷

Problem of electricity

Firms were asked whether they had constructed or acquired an electricity generator in the previous year. Construction or acquisition of a generator was a proxy measure of the extent to which power was a major problem. Tabulated information shows that, in 1995 only 2% of surveyed firms had constructed/acquired a generator. The fact that very few companies had generators, as indicated by these fewer percentages, implies that electricity power was not a problem in manufacturing activities during the 1990s. In other words, availability of electricity power to support manufacturing activities was a positive enhancer for firm survival in the 1990s.

The situation had changed when the survey was conducted in 2008. As shown in Table 2, 53% of firms had their own (or were sharing) generators as an alternative source of power for their manufacturing activities. The period from 2000 onwards was known for constant and continuous electricity outages. As a result, for firms to continue their economic activities they had to have guaranteed stand-by alternative electricity supply. Overall, during the crisis from 2000, the country's business environment was negatively impacted by a protracted lack of investment in infrastructure since the 1990s. The most notable example was that Zimbabwe did not have any investment to expand its power generation infrastructure since 1988 when Hwange Power Station added 440 MW. Despite recovery and improvement in some areas, unreliable and intermittent provision of power and water to firms has increased the unpredictability and cost of production which in turn has reduced profit margins and levels of competitiveness. Again, this negatively influences overall return on investment, which steers private investors away from Zimbabwe to more favourable economic environments. All these enhanced chances of a firm exit.

Corruption tendencies

Corrupt tendencies were reported in both surveys, whereby some firms participated (whether willingly or by coercion) in bribery activities in order to get favours from those in authority, especially government officials who process some of the operation papers required by the various firms. Looking at Table 2, the percentage of firms which were expected to give gifts (bribes) "to get things done" increased significantly from 3% in 1995 to 32% in 2008. The higher rate in the latter crisis is not a surprise given that the prevalence of challenges including shortages of local and foreign currency, and limited business opportunities forced some firms to pay these bribes to get things going. Some of the areas in which corruption and bribery were prevalent were related to tax compliance, government contracts, obtaining of operating licence, import licence, construction permits and electricity connection. Given that these bribes were to be factored into a firm's respective operating costs, this resulted in an upward bias on the firm's operating

costs. The overall impact was negative on the firm's survival chances.

Regression results

This part of the study presents the results from regression estimations, and they apply only to the 1995 and 2011 surveys. A firm is said to have exited if it was interviewed in 1995 but could not be traced as an existing firm when the tracer survey was conducted by the author at the end of 2011. Table 3 provides the results of the regression model. The choice of the explanatory variables is influenced by three factors; namely, previous studies on the subject area, and secondly, suitability and availability of data variables from the World Bank surveys (1995 and 2011) given that these were the main secondary data used in the estimation of the logit model. Lastly, variable selection was informed by the descriptive analysis provided in previous section.

Gorg and Spaliara (2009), and Disney et al (1999) included size (both size and size squared), and age (both age and age squared) of the firm. The size of the firm, as proxied by the total number of people employed within a given firm is used to investigate the extent to which it helps or hurts the chance of a given firm exiting the manufacturing sector. Size squared (size2) is included to allow size to have a non-linear effect on the continued existence of a firm.

Table 3: Survival regression results

Variable	Coefficient	Std. Error	z-Statistic	Prob.
ED	-0.73	0.99	-0.74	0.92
Size	0.16	0.27	0.59	0.51
Subsidiary	-1.03**	0.42	-2.45	0.03
Age	0.03	0.15	0.20	0.62
Age2	-1.1***	0.24	-4.58	0.00
Size2	-0.19**	0.07	-2.71	0.08
D1	-0.32**	0.11	-2.91	0.01
D2	-0.63**	0.25	-2.52	0.06
D3	0.69***	0.14	4.93	0.00

Source: Author simulations.

Key: [*], [**] and [***] significant at 10%, 5% and 1%, respectively.

Notes: ED = Educational level of manager; D1 = 1 if a firm exports and zero otherwise; D2 = 1 if a firm got credit loan from bank and zero otherwise; D3 = 1 if a firm faces significant completion, and zero otherwise.

The results in Table 3 show that all but two variables are statistically significant at least at 10% confidence level. It is also interesting to note that all the variables do have expected theoretical signs. The findings of the study indicate that availability of credit (D2) is an important factor affecting survival of manufacturing firms in the Zimbabwean context. During the crisis, the fact that most firms' balance sheets and net profits were rendered valueless, as such firms found themselves looking for loans to finance working capital or make new investments that would ensure continuity and growth was prevalent. Tabulated results show a negative relationship between availability of credit (D2) and firm exit, that is, when a firm gets a bank loan, its exit chances are reduced. The findings are in line with the technological capabilities theory of Lall (2001) which postulates that availability of credit ensures that firms invest in new, state of the art technology

that is efficient and cost saving which enables them to withstand competition from both domestic products and imports.

The results show that competition from both formal and informal competitors increases the probability of firms exiting the manufacturing sector. The positive coefficient on D3 indicates this positive relationship between completion and firm exit from manufacturing activities. This is conceivable given the crisis which faced the country since 2000 resulted in some firms becoming high cost producers. At the same time, some firms faced stiff competition from imported final products. The findings are incongruent with the study by Mudavanhu et al (2011) in which they found that competition from imports increased the probability of failure for SMEs which were in the manufacturing sector in Zimbabwe.

The coefficients from the estimated logit model show that the relationship (coefficient on D1) between firm survival and exporting is negative and significant. This implies that firms which are exporting have a higher chance of survival (or lower probability of exit) when compared with manufacturing firms which only sells on the local market. This finding suggests that being an exporter plays a significant role in reducing the probability of failure for Zimbabwean manufacturing firms. The findings of this study is in line with Peljahah et al (2012) who found that the exit hazard of exporters was 3.8% lower than firms oriented on the domestic market. Gorg and Marina-Eliza (2009) found that the incidence was higher in the case of UK and France exporters when compared with non-exporters.

With regards to foreign ownership (or extent to which a firm is a subsidiary of MNCs), results indicate that foreign firms' subsidiaries in Zimbabwe were more likely to stay in the economy compared with domestic firms during economic crisis. Intuitively, a foreign-owned firm (or subsidiary) has a number of operational advantages compared with domestic firms which enhances its survival even in crises periods. For example, such firms have access to cheaper or readily available credit from their parent companies, such that even with credit rationing in the host country, a foreign subsidiary will be able to continue with its manufacturing activities using foreign credit. The finding on the extent to which a firm is foreign owned are in tandem with Godart et al (2011), who did find a negative relationship between firm's likelihood of exit and its status as having more foreign ownership.

The coefficient on the square of firm size (size2) is negative and significant. This negative relationship implies that very large firms are assumed to be more established and can weather the common problems that bedevil small firms, and as such, they are less likely to exit. These findings are in line with previous findings, for example, by Gorg and Spaliara (2009), among others, who also found that very large firms were less likely to exit the industry (in their comparative study of British and French firms). On the other hand, smaller firms, measured by relatively few employees are found to be likely to exit the manufacturing sector as the coefficient is positive and significant.

The impact of older firm (age2) on the probability of exit is negative and significant. Very old firms are assumed to be established and have more years of experience in conducting their line of business. Specifically, many researchers claimed that a firm's age can improve its business performance through the enhanced ability to solve problems and exploit a plethora of business opportunities (Dominguez and Sequeira, 1993; Seringhaus, 1986; Dean et al, 2000). These experiences gained through many years of operation will enhance the firm's probability of remaining in business when compared with new entrants

or firms with few years in business. These findings are in congruent with Disney et al (1999) who found negative correlation between square of age (age²) and the extent to which British textiles firms exit the manufacturing industry.

Possible reasons for high survival rates

The outcome of the tracer survey conducted by the author indicated that from the 213 firms that were originally interviewed in 1993 and 1995, 178 were still surviving, and were still under the same owners (shareholders) by end of 2011. The survival rate in this case represents 83.5% and is considered very high. This sub-section tries to explain some of the reasons why there was this high survival rate given the economic crisis which hit the country since 2000. First, and as was already alluded to, operating costs for some firms (especially wages, water, and electricity) were lagging behind at the end of each month when compared with total sales given that in some instances product prices were increasing on daily (if not hourly) rate. As such, firms whose products' prices were escalating on daily basis could continue to make profits (surplus of total revenue minus costs), and hence motivated to continue operating. Second, some manufacturing firms were blending (supplementing) their produced products with imports from neighbouring South Africa. Some firms found this as a survival strategy which allowed them to continue serving their loyal customers. This enhanced their survival chances. Third, some firms managed to survive the turmoil riding on their ability to bribe officials to get things done. Given the hardships and acute shortages of most things, those who were able to bribe the "right" officials were able to cut their operating costs. For example, those who were in exporting (importing) business and paying bribes it meant that they could pay less duties at the borders, and they could get importing (exporting) licences easily and at lower costs. Fourth, the high survival rate may be explained by the fact that most of the firms which survived were old firms (having been established before the crisis of the 1990s), and as such might have learnt the various tricks of surviving harsh economic conditions.

Lastly, this higher survival rate might be attributed to the nature of the sources of the data. As indicated before, the author used, among other things, information from sources such as ZIMSTAT. However, given that some of the information from this institution had not been regularly updated, firms which were, for example, surviving in 1995 firm survey might have exited the market in 2008. However, due to time lag with regards to updating of such firm register, the firm might have been considered as existing and thus remain in the 2008 register when in fact it has exited.

5. Conclusion and policy recommendation

Conclusion

Some Zimbabwean manufacturing firms were unable to survive the crisis of the 1990s due to a number of reasons. The findings from descriptive analysis indicates that survival of manufacturing was determined by such factors as access to finance (whether from bank loans, informal sources or a company's retained profits) to fund its operations, including input procurement. Secondly, the fact that most firms surveyed in 1995 were exporting implies that exporting was an important determinant which positively enhanced a given firm's survival. Third, availability of electricity power to support manufacturing activities was a positive enhancement for firm survival.

Findings from the 2011 survey show some important features which had bearing on the survival of firms. First, it was found that during this period, foreign currency shortage was so severe that some firms were forced to exit the exporting business as they could not source some of their vital inputs from the international market. Most firms, which were surveyed in 2011, indicated that they imported some of the inputs, while availability of foreign currency in Zimbabwe in official sources such as banks was limited. This finding is in sharp contrast with the features of the firms in the 1995 survey, when foreign currency was not a major issue. Secondly, by 2011 corruption was a major problem for manufacturing firms. Some of the negative consequences of Zimbabwe's economic meltdown (2000 to 2008) period have been the institutionalization of corruption. This implies that these bribes increased the operational costs of these firms, as such reduced their profit margins, negatively affecting their manufacturing business. Third, the study found that a number of firms interviewed had been incurring losses on an annual basis due to electricity outages. At the national level, firms lost around 6.9% of their total annual sales due to electricity power blackouts. Most firms were forced to purchase or construct power generators. Use of power generators implies sunk costs (in terms of purchase), operating (variable) costs in the form of petrol/diesel, and maintenance costs. Generator-related costs also imply diminished profits for exporting firms. Lastly, access to finance, especially from formal sources like banks was also a major challenge as most banks were not providing loans to companies due to severe liquidity constraints. On average, 63.7% of surveyed firms in the country indicated that access to finance (local currency and foreign currency to import inputs) was yet another challenge. In the case of limited foreign currency, most firms were forced to source from the black market, with its exorbitant rates, leading to increased cost of production, which in turn reduced the competitiveness of their exports.

Turning to the exit (survival) logistic model, which was estimated using the surveys from the 2011, the results showed that a number of factors were at play in determining the survival of manufacturing firms. First, availability of credit was an important factor in the survival of manufacturing firms given that most firms' balance sheets and net profits were rendered valueless. Firms thus found themselves looking for loans to finance working capital or make new investments that would ensure continuity and growth.

Secondly, the paper found that competition from both formal and informal competitors increased the probability of firms exiting the manufacturing sector. This was conceivable given the crisis which faced the country since 2000 resulted in some firms becoming high-cost producers. The results from the econometric model also indicated that firms that were exporting had higher chances of survival (or lower probability of exit) when compared with manufacturing firms which only sell on the local market. This finding suggested that being an exporter plays a significant role in reducing the probability of failure for Zimbabwean manufacturing firms.

With regards to foreign ownership (or extent to which a firm is a subsidiary of MNCs), results indicated that foreign firms' subsidiaries in Zimbabwe were more likely to stay in the economy compared with domestic firms. Specifically, the probability of exiting for a foreign firm in the manufacturing sector was only 35% that of a wholly and locally constituted firm. In other words, the probability is 65% lower for a subsidiary firm to exit the manufacturing sector when compared with locally owned firms. The square of firm size (size2) was found to be negative and significant, implying that very large firms were assumed to be more established and expected to weather the common problems that bedevil small firms, and as such, they were less likely to exit. The impact of older firms (age2) on the probability of exit was negative and significant. As such, old firms were assumed to be established and have more years of experience in conducting their line of business, thus less likely to exit from manufacturing activities. The reported results show that old firms are less likely to exit the market (or close down) compared with younger firms. The point estimate suggests that they are 6.7% less likely to exit than their younger counterpart firms during an economic crisis.

Policy recommendations

The following are suggestions from the findings of this study:

- I. The government, working in collaboration with the private sector, needs to ensure there is a permanent solution to electricity outages. The government indicated that its electricity production capacity was not fully utilized due to shortage of working capital and equipment. It is in this vein that collaboration can be mooted through a public-private partnership (PPP), whereby the private sector can bring in capital and revamp the old equipment in some of the electricity generation plants.
- II. The problem of foreign currency in Zimbabwe remains a big challenge. With most sources of foreign currency still dry (e.g., few exports, limited foreign direct investment (FDI), few international donors (or grant providers)), it means the private sector has to source offshore credit lines. The government should also improve the

business environment for joint ventures and lure FDI as these arrangements can be potential sources of foreign currency.

- III. The private sector and government should work closely to curb corruption. While it is common knowledge that corruption and bribes are initiated by government officials, if the private sector decide to refuse to give in to such demands, while the government put relevant anti-corruption mechanisms in place, this problem may be reduced in the long run.

Notes

1. For example, due to limited foreign currency in banks, it was difficult to get foreign currency in banks. As such, some were willing to pay bribes and get foreign currency at controlled cheaper rates than to purchase the same amount of foreign currency on the black market where the exchange rate were sometimes more than ten times the official bank controlled rate.
2. Mid-Term Fiscal Statement, 17th July 2009.
3. The other route is to follow Görg and Spaliara (2009) approach. Their approach assumes the existence of an underlying response variable, y_{it}^* the probability of failure as a function of the vector of determinants of failure, X_{it} . This is defined by the regression relationship, with slope parameters given by the vector β and a normally distributed error term ε_{it} :

In practice, y_{it}^* is unobservable, and what we observe is a dummy variable y_i defined by

$$y_i = \begin{cases} 1 & \text{if firm fails (die) at any time between 1996 and 2010;} \\ 0 & \text{if the firm does not fail} \end{cases} \quad y_i = \begin{cases} 1 & (y_{it}^* > 0) \\ 0 & (y_{it}^* = 0) \end{cases}$$

4. Given the continued economic challenge facing Zimbabwe, a number of firms have been closing since 2011, and as such, this number might have declined as of April 2015.
5. For comparison purposes, information for 2011 survey omitted the ‘Other services’ sector which has 134 firms.
6. ZWD = Zimbabwean dollar.
7. <http://www.newsday.co.zw/2013/03/25/dairibord-holdings-turn-to-toll-manufacturing/>

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