Determinants of Capital Structure Choices by Listed Firms in Zimbabwe under Hyperinflation and Dollarization

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Abstract

The paper uses panel data, from 2000 to 2013, to examine the key determinants of capital structure choices for Zimbabwe listed firms under hyperinflation and dollarization by: (1) providing a reduced form model which isolates the key factors consistent with the unique situation for Zimbabwe; (2) testing the existence of a non-linear relationship between leverage and capital structure factors; (3) ascertaining the significance of marginal effects of explanatory variables due to inflation; and (4) establishing how the behaviour of firm managers influenced the choice of leverage. In an inflationary environment, the main factors explaining the choice of debt were profitability, non-debt tax shield, payout ratio, ownership structure, hyperinflation dummy variable, growth opportunities and asset structure. Under dollarization, leverage was explained by changes in revenue, firm size, short-term liquid assets, dividend payout ratio, taxation and the industry dummy variable. Information asymmetries, the use of short-term debt and the strong influence by firm managers on the choice of leverage were prevalent during the period of inflation. Firm size and liquidity explained use of long-term debt during dollarization. Debt finance had a non-linear relationship with firm size and managerial ownership. A reversed pecking order of finance is suggested by evidence in this study. The study shows that the composition and level of debt are important under the review period. The key implications for policy require the streamlining of access and use of bank finance and funds from capital markets. Access to capital and money markets by firms can be supported by improving the flow of quality information and efficient credit rationing policies.

Keywords: Pecking order hypothesis; Zimbabwe; Capital structure; Hyperinflation; Static trade-off theory; Agency theory; Panel data.

1. Introduction

Capital structure defines the decisions made by a firm to use either debt or equity to finance the business. Modigliani and Miller (1958) provided a foundation upon which the ongoing debate in corporate finance, in recent years focusing on the determinants of capital structure, has come into being. They argued that the mix between debt and equity, under perfect market conditions, is irrelevant and has no effect on a firm's market value, which is consistent with earlier work by Burr (1938). This understanding had attracted much criticism for being far from reality, due to the existence of market imperfections (agency problem, corporate tax, asymmetric information), which has led to debate in this area. Evidence suggests that the capital mix helps determine the value of the firm and it converges to long-run equilibrium with economic growth (Nwankwo, 2014). The future sustainability of a firm is dependent upon its ability to finance its operations by correctly identifying the right levels of internally generated funds, new equity and debt. The development of financial markets, regulation of institutions, economic environment, pricing systems and issues related to governance accords firms an opportunity to choose between different sources of finance. The growth in the corporate sector guarantees a flow of tax revenue to the treasury, reduction in unemployment, increased flow of income to households and subsequent reduction in poverty (Prasad et al., 2001). Poor access to finance impedes growth of small firms (Green et al., 2006).

Prasad and Murinde (2001) argue that information asymmetries and bankruptcy risk still persist in developing economies and there is a reverse pecking order of finance. Important implications exist for firms in considering their financing decisions hence there is still need to understand how firms in developing countries meet their financial requirement. Corporate finance choices are dependent on a combination of factors which are related to firm characteristics and the institutional environment. Attention on the latter has seen emphasis being put on developing countries to place little reliance on knowledge on capital structures based on developed nations due to different institutional features. Developing and developed nations have different corporate governance systems, regulatory frameworks, tax arrangements, legal systems, levels of corruption and economic climates which influence the capital mix (Booth et al., 2001; Oztekin and Flannery, 2012). However, despite the rapidly growing literature, the debate is still ongoing and far from over which supports the need to take a closer look at financing options available for developing countries.

Several studies on capital structure have focused on developed countries whose findings have become a source of policy for developing nations. There has been lack of consensus on the determinants of capital choice because research work has focused on economies operating under different conditions. Firms in emerging markets have been found to have lower levels of leverage and fixed assets while return on equity is lower than those in developed nations (Glen and Singh, 2004; Gwatidzo and Kalu, 2009; Booth and Aivazian, 2001). Evidence suggest that more short-term debt is used by firms in corrupt countries and with weaker tax laws while higher leverage is associated with explicit bankruptcy codes, deposit insurance and higher tax gains, while some studies show that debt ratios and taxes have significant relationship (Booth et al., 2001). The preference of suppliers of finance also matters, for example, a larger banking sector supports provision of shorter maturity debt (Jensen and Uhl, 2008). Longer term leverage is employed where there is creditor protection and managers can, in this case, engage in risk reducing decisions in order to keep their jobs and control of the firm but it may also increase agency costs instead. Security of property rights for foreign investors is positively related to economic development and it increases access to finance as well as accountability of politicians. Others are of the view that political risk was irrelevant in explaining capital structure of multinational firms, agency costs of debt and foreign exchange risk (Ghoul et al., 2012; Pinkowitz et al., 2003; Remer, 2012; Perotti & Volpin, 2012; Rasaei and Nguyen, 2011; Desai et al., 2007; Novaes and Werlang, 2004). Inflation was found to have a positive association with leverage (Ria, 2010). Policies like dollarization provide a hedge against political instability in the absence of proper accountability (Weymouth, 2007).

The period under review (2000-2013) in Zimbabwe was coupled with hyperinflation, political risk, uncertainty, limited choices of finance and weak governance systems. For these reasons perhaps the mixes of capital changed and that firms would desire to use more debt which became cheaper due to inflation eroded repayments. It is possible that the main theories of capital structure were no longer tenable but instead were reversed and a reduced form model was applicable. The loss of confidence by investors distorted capital structure decisions. Studies (Mutenheri, 2003; Chagonda, 2010; Ajanthan, 2013; Jambawo, 2014; Muparuri and Chikoko, 2013; Olokoyo, 2013) done thus far have failed to explain financing behaviour of firms under these unique conditions. The study therefore examines how managers chose their financing mix given hyperinflation and subsequent dollarization. Firm managers needed to make quick financing decisions while remaining within the optimal debt levels.

The study uses arguments from the pecking order, static trade-off and agency theory to answer the following questions: (1) what are the key determinants of capital structure during inflationary and dollarization period? (2) Is the capital structure choice explained by a linear or non-linear relationship considering variables like ownership and firm size? (3) Which of the three theories was useful in predicting capital structure choices? (4) Was inflation important in influencing the effects of key variables? (5) How influential were the managers in the choice of either short- or long-term debt during the period under review?

The findings are analysed using the static model, being the benchmark, with comparisons being made with the dynamic model. Explanations are given on why the static model was preferred. Most of the past studies on hyperinflation and dollarization do not focus on corporate finance. They were important in providing the basis for discussing issues affecting corporate financial decisions and also in interpreting the estimated models. In view of this, the study makes important contributions to capital structure literature: it offers a reduced form model for firms under hyperinflation and dollarization and hence isolates the main factors consistent with the Zimbabwean case; shows the existence of a reversed pecking order hypothesis under inflationary environment; argues that there was a non-linear relationship between firm size and long-term debt under dollarization period and between ownership and short-term debt under inflationary period. The study further provides evidence that there were transaction costs involved as firms adjust to optimal capital structure and that inflation helped to explain the marginal effects of growth opportunities on leverage.

The remainder of the paper is organized as follows: section 2 provides an overview of the Zimbabwe economy coupled with discussions on hyperinflation, dollarization and how firms performed; section 3 contains a review of theoretical and empirical work; section 4 explains the data, model and measurement of variables; section 5 explains the key findings; and the paper concludes and provides recommendations in section 6.

2. Overview of the Zimbabwean economy

The financial structure in Zimbabwe is more diverse being composed of a central bank, commercial banks, merchant banks, finance houses, discount houses, building societies, post office savings bank, development banks, insurance and pension funds. Firm and bank ownership are both in private and public hands, private savings are mostly directed to the public sector as short- to long-term loans by the central bank (Booth et al., 2001). The economy is unique and went through significant transformations since 1980 being summarized as follows: It was robust at independence (1980), Gross Domestic Product increased, sanctions were removed immediately after independence, and the agricultural sector expanded; economic structural adjustment programme came on board in 1991-1995 aiming to transform the economy to a market based and the financial sector was liberalized. The Zimbabwe Programme for Economic and Social Transformation was introduced in 1998-2000 to bring public sector reforms and to reduce the budget deficit, which was somehow fruitful (Makochekanwa, 2007). The country experienced macroeconomic challenges from 1997 due to the financing of the war in Democratic Republic of Congo and payment of unbudgeted gratuities to war veterans. More challenges included a fall in the local currency against major currencies and a huge budget deficit. The country also experienced disruptions in agriculture sector in 2000 because of farming invasions, the rate of inflation soared from the year 1999 (56.9%) until the end of 2008 when it reached 231 million per cent per annum.

Hyperinflation was mainly driven by an increase in money supply, black market for foreign currency and lagged values of hyperinflation were the key drivers of hyperinflation, (Makochekanwa, 2007; McIndoe, 2009; Topal, 2013). During the same period, the stock market performance was good but it was temporarily closed between November 2008 and February 2009 because traders were dealing using fraudulent cheques. In February 2009, the economy was dollarized and inflation rate fell to single digit level; in January 2010, the government published regulations governing the Indigenization Economic and Empowerment (IEE) Act 14 of 2007 making it effective requiring all foreign-owned companies to cede 51% of shares to citizens. Currently, governance indicators, effectiveness of the legal systems and protection of investor rights have deteriorated.

Empirical work has been done on Zimbabwe with mixed findings. The trading prices of shares were adversely affected by the IEE Act (Munyedza, 2011). The debt ratio increased

after the 1991 reforms, short-term external finance was the major source of finance and the pecking order hypothesis was dominant (Mutenheri, 2003). Evidence further showed that non-debt tax shields reduced the expected gains from leverage, investments were financed using liquid assets, managerial ownership helped to reduce the problem of agency, large firms supported more debt than small ones, high growth firms depended on external finance and payout ratios were low (Mutenheri, 2003). The 1991 reforms achieved partial success in opening up the capital markets and improving the transparency of firm financing (Mutenheri and Green, 2002). Firms shifted from external to internal financing sources during hyperinflationary periods (Chiwandamira, 2009). Findings showed that equity was an important source of finance than debt in the post hyperinflationary period (Jambawo, 2014). These studies did not provide a reduced form model for period under review. They failed to estimate the speed of adjustment to the desired capital structure and the possibility of non-linearities in the model.

Hyperinflation, dollarization and firm performance in Zimbabwe

Hyperinflation results in an uncontrollable and continuous rise in the general price level which destroys a currency's purchasing power like what happened in German 1920-1923, Bolivia 1985, Argentina 1989 and Peru 1987-1989. Characteristics include: excessive printing of paper money without a corresponding increase in output; increase in the use of hard money or real assets and foreign currency; the economy is destabilized; rise in the cost of doing business; the need for flexible decision and policy making; and immediate use of cash to preserve value and overinvestment in working capital. Available credit shrinks and suppliers of finance prefer short-term credit extensions to protect real money balances. The level of leverage and capital expenditure falls as firms increase funding sources and try to free up liquidity (see report by International Accounting Standard (IAS), 2009) . Firms' earnings and subsequently dividends payouts fall as firms seek to preserve cash to replace assets. Managers still have reputations to protect by sustaining high dividend payouts (Mirbagherijam, 2014). Ochieng and Kinyua (2013) argue that inflation has no impact on dividend payouts, but rather they depend on exchange rate and Treasury bill interest rates. Dividends may rise as inflation pushes upwards sellers' margins which in turn push up return on equity (Reilly, 1997; Gwin, 2000). For a high leveraged firm, the benefits from lower debt repayments are outweighed by costs of failing to borrow to finance capital expenditure. Hyperinflation discourages productivity; depresses company values; reduces the effect of non-debt tax shield and firm size as assets values falls (Pidun et al., 2010). Failure by firms to borrow reduces their asset base and performance indicators. The use of short-term debt will increase, which drives interest rates up (Mills, 1996). The pursuit of short-term windfall profits increases while long-term value creation falls. There is the possibility of reverse pecking order as firms use external (debt and equity) as opposed to internal funding, (Whittington et al.,1997).

Other important facts for Zimbabwe under hyperinflation include: the failure by the central bank to print money faster than the rate at which the currency was devaluing which defeated its intention to stimulate the economy. Alternative sources of finance were in the form of venture capital, rights issues and debt while dividend payout showed a significant decline so as to retain money for financing operations (Mhlanga and Sibanda, 2013). Shortage of foreign currency; lack of raw materials; losses increased due to prices ceilings; production costs soared, financing of operations became difficult and capacity utilization fell below 30% (Mhlanga and Sibanda, 2013). Quality of data worsened which distorted financial reports and exchange rates thus making performance indicators inaccurate (Garcia, 2007). IFRS (2010)[1] report show that firms used the consumer price index (CPI) to produce hyper inflated financial statements which was made compulsory for listed firms. This adjustment removes distortions in capital budgeting as cash flows show their real buying power (Bora, 2013). Suppliers of finance availed short-term debt falling due within a year and overdraft facilities provided money used to take advantage of arbitrage opportunities from foreign currency trading; wages rose faster than production profits signalling the need for alternative forms of finance; savings fell reducing credit available to firms and speculation provided better and immediate returns (Gumbe and Kaseke, 2012). Trading in equities was financed by newly printed money but it provided an inflation hedge as stock market returns grew three times higher than the consumer prices; for example, the industrial index grew by 12,000% in 2007 (Koning, 2007; Durden, 2008). This behaviour would, doubtless, affect performance indicators summarized in the Appendix. Cash flows were thus explained by both arbitrage rents and production income confirming the significance of short-term debt and working capital in this study.

The Zimbabwe Stock Exchange (ZSE) comprised of 66 firms[2] by end of 2013 falling under the industrial index (62 firms) and the mining (4 firms). In this study, the first group being composed of all sectors was classified into industrial holding and small capital market, in which five and 19 firms had complete data, respectively, for the period up to December 2008 (Table 1A in the Appendix). Industrial holding firms are mainly in manufacturing, retail and services industries, while small capital market is composed of other non-financial firms falling under the industrial index. Firms under small capital market category showed short-term debt and accounted for a huge proportion of leverage on average; profitability, firm size, growth opportunities increased; payout ratio and non-debt tax shield were positive and U-shaped; and ownership remained stable but with a ∩-shaped. For industrial holding firms, both short- and long-term debt fell on average; profitability, size, tangibility, non-debt tax shield and ownership increased, while payout ratio and revenue growth were erratic and negative in some years. The use of short-term and long-term debt was more pronounced for small capital market and industrial holdings firms, respectively, as the latter were considered to be stable.

Dollarization involves abandoning use of local in favour of another currency as legal tender. It is taken on board to avert the ills of hyperinflation; the country loses its ability to conduct monetary policy and firm behaviour changes when compared

to hyperinflationary phase. The Zimbabwean Government, in 2009, adopted the use of three currencies (United States dollar, South African Rand and Botswana Pula). The immediate fall of inflation to single digit levels in 2009 halted speculative activities (Chagonda, 2010); capacity utilization slightly improved; economy and prices stabilized but liquidity levels were still low (Kararach et al., 2010; Sikwila, 2013; Monyau and Bandara, 2014). Credit constraints, market confidence and uncertainty (KPMG, 2012)[3] were still prevalent. Liquidity levels in the banking sector were still low which could be improved by increasing derivatives trading (Chagwiza, 2013); provided quality of institutional factors improves (Njanike, 2010). The quality of financial reports improved and the ZSE was not efficient in the weak form (Mazviona and Nyangara, 2013; Muparuri and Chikoko, 2013). Table 1B in the Appendix shows that: the proportion of short-term debt in capital structure was still dominant, confirming the level of uncertainty and low liquidity which still exists; growth in revenue, payout ratios and firm size were lower than the 2000–2008 levels, which suggests negative relationship with debt; firms appeared to benefit more from taxation shield and liquidity levels were more pronounced in explaining to leverage. The latter suggests a positive and negative relationship with short- and long-term debt, respectively.

The analysis provides evidence that, under hyperinflation, average profitability was reportedly high but unstable, while payout ratios were equally higher suggesting the use of income from sources like foreign currency trading (Monyau and Bandara, 2014). Ownership structure varied between industrial and small capital market firms, which suggested the importance of industrial effects in choosing debt. The predictions of a negative relationship between ownership and debt using agency theory was evident as the proportion of shares under management control increased while long-term debt fell. Tangible assets were on the rise suggesting their importance in explaining the proportion of long-term debt as firms match liabilities and asset life span. Non-debt tax shield shows an inverse relationship with the level of short-term debt. Growth opportunities remained high though falling, while sales growth was evident. During the period of dollarization, the situation reversed which is evidenced by some indicators which fell while different factors were now important in explaining leverage than under inflation. Thus variables explaining both short- and long-term debt were different at any particular point in time.

3. Literature review

Theoretical framework

The theories of capital structure (pecking order hypothesis, static trade-off and agency) suggest that firms choose their capital mix after considering the costs and benefits of using more of either debt or equity. The paper discusses each of them in turn according to their contextual meaning for Zimbabwe's rare environment.

The pecking order hypothesis (POH) asserts that, with information asymmetry, a firm finances new investments by using internal resources, followed by low risk debt and then equity which is risky (Myers, 1984; Myers and Majluf, 1984). The use of reserves and debt is cheaper than equity which exhibits more issuance expenses. Profitable companies benefit from tax shield as they employ more debt, the situation which was highly unlikely for Zimbabwean firms during the review period due to losses which were faced by firms. Having both short- and long-term debt is desirable as firms make use of their financial strength to fund both current and future projects. In the case where there are arbitrage opportunities, firms use more short-term debt. Firms would portray low debt ratios in the absence of investment opportunities. Huge restrictions on internal sources result in high debt ratios for firms that are faced with more investment and growth opportunities. Asymmetric information theory shows that the capital mix adopted by managers have a signalling effect to outsiders as they associate the decisions by managers with possession of inside information. The use of more debt or equity in the capital mix signals to the market about the characteristics of the firm. A company with low levels of income issues out more equity to avoid risk of bankruptcy. The value of stocks will fall and current shareholders' investments are eroded (Myers and Majluf, 1984). The use of more debt signals to investors about the managers' confidence, that the firm is better performing and that it aims to benefit from the debt shield. The theory supports a positive relationship between the value of firm, gearing level and the probability of bankruptcy (Myers & Majluf, 1984; Chen et al., 1998; Ramjee and Gwatidzo, 2012; Mutenheri, 2003). Firms in Zimbabwe found it difficult to acquire as much debt as they would need due to the supply constraints, and the POH may have been weak in explaining the capital mix. Having more debt in the capital structure could increase the chances of bankruptcy which could in turn lead to reputational risk (Chen et al., 1998; Kasozi, 2009).

A firm has an optimal or target leverage ratio, according to Myers (1984), using the static trade-off hypothesis (STT). The capital mix for a firm changes as it aims to maximize its value using different debt equity ratios. Firm value would increase by using more debt up to the optimal mix, thus there is a positive relationship between the value of the firm and tax advantage. Tax benefits accrue in form of more after tax cash flows as the firm uses more debt in its mix. The use of more debt reduces agency costs as managers are compelled to invest in profitable projects that guarantee the ability to make repayments (committed cash flows) to debt suppliers. Managers have a task of balancing their capital mix to avoid over reliance on debt which may increase bankruptcy and reduce the potential to take on board future investment prospects (Jensen and Meckling, 1976). It is in the best interest of the manager to find an optimal capital mix at which the risk of bankruptcy and the perceived tax benefit are balanced. This was one of the challenging tasks for a manager in Zimbabwe who would want to take advantage of short-term opportunities by having short-term debt at the same time trying to avoid reaching the debt ceiling. The manager was faced with need to make quick decisions as the economy became volatile and unpredictable. All things being equal, the study argues that having short-term debt remained desirable as long as suppliers of finance were willing to make it available on demand and also considering that interest on debt is tax deductible in Zimbabwe.

The separation of ownership from control encourages managers to spend free cash flows on projects that may not be in the best interests of the owners giving rise to agency costs. As discussed above, use of more debt can address this problem (Jensen, 1986). Rajan and Zingales (1995) show a significant relationship between factors (firm size, tangibility, profitability and growth prospects) which have been found to act as proxies for agency costs. Equity holders would prefer that managers pursue riskier project (Jensen and Meckling, 1976). A high leverage ratio signals the presence of more free cash flows in the firm and debt improves the firm value as it discourages empire building by managers (Stulz, 1990). Managers can use the available cash flows to pay dividends continuously and so debt acts as a substitute for dividends. The case for Zimbabwean listed firms demanded that a manager make immediate decisions that were in the best interests of the firm. This means having decision making power was important in the event of managers having some controlling stake in the firm. The ownership of stock would on its own act as deterrent to unwarranted behaviour by the manager who had interests to protect. Thus the ownership structure and hence the agency theory were important in the determination of the choice of capital mix. Just like Chen et al. (1998), this study seeks to understand the relevance of tax considerations, agency costs and the role of corporate governance in influencing capital structure choices. These studies have influenced this current work on the use of short- and long-term debt; the testing of non-linearity in the relationships between leverage and variables like firm size and ownership structure. The argument here is that these variables, in the case of Zimbabwe, would determine managers' actions up to a certain level of leverage after which behaviour on the choice of leverage would change.

Empirical review

Capital structure and firm value

The choice between debt and equity matters among firms, though the level of importance differs. Debt financing and financial distress can be positively related (Kasozi, 2009). Firm value can be increased by lowering debt to levels near to zero in the absence of agency problem (Chowdhury and Chowdhury, 2010). Stulz (1990) argue that the effect of debt on firm value can be either positive or negative. Nguyen et al. (2014) argue that short-term financing dominates, and preference to access to finance is given to state-owned enterprises. Taxes influence the debt composition and not the total debt of a firm in the capital structure. The effect of marginal rates of tax is to make firms to move away from private to public debt. Any changes in the tax laws will have marginal effect on debt (Du et al., 2014; MacKinlay, 2013). The financial mix is dependent on suppliers of finance (commercial banks) who prefer short-term and secured debt as opposed to long-term debt. Jiang and Jiranyakul (2013) argue that the use of debt is rather dependent on strength of financial markets and that debt financing is less important for firms in developing than those in developed markets. Firms that are limited financially are expected to hold more cash, and when it comes to debt holding, investors tend to be risk averse (Caldeira and Loncan, 2013). Panda and Panigrahi (2010) supported the law of least effort that firms rely on internal sources of funding (pecking order hypothesis), and equity would be issued as a last resort. Kajanathan and Nimalthasan (2013) show that leverage had a significant impact on return on equity. Several studies have useful surveys on the relevancy of the capital structure theories and non-linearity relationships (Mojtahedzadeh and Nejati, 2011; Sovbetov, 2013; Wahab and Ramli, 2013; Ajanthan, 2013; Hernadi and Ormos, 2012; Kuhnhausen and Stieber, 2014; Mbogo, 2013; Barakat and Rao, 2012; Fattouh et al., 2001). Findings from literature show that factors that are important in explaining capital structure include profitability, taxation, firm size, firm age, asset structure, default risk, growth opportunities, inflation, ownership, industry effects, payout ratio, liquidity, growth in sales and non-debt tax shield.

These are discussed as follows:

Profitability - The POH predicts a negative relationship between profitability and leverage as firms prefer to use more internally generated resources. The risk level associated with use of external finance is high. High profits avails more funds for financing business activities and hence the less reliance on external sources like debt and equity (Ramjee and Gwatidzo, 2012; Jamal et al., 2013; Olaninka, 2011). Profits may, however, reduce the risk of bankruptcy thus a firm would take on more debt due to its ability to service it, which suggests a positive relationship (Shyan-Sunder and Myers, 1999; Abor, 2008; Chen et al., 1998; Akinyomi and Olagunju, 2013; Chechet et al., 2013). Profitability is also positively associated with equity (Myers and Majluf, 1984).

Growth opportunities – Firms, as they grow, demand more financial resources which may be met by reliance on outside sources. The Tobin's Q ratio (also known as the market to book ratio -MBR) is a measure of growth opportunities. High leverage is expected in high growth firms (Mutenheri, 2003; Ramjee and Gwatidzo, 2012; Jambawo, 2014) and in small firms as they seek to supplement internal sources to increase growth. Growth opportunities have positive effect on long-term debt for listed firms and short-term debt for small firms. Empirical evidence also suggests a negative relationship between leverage and growth opportunities (Stulz, 1990; Heshmati, 2001; Abor, 2008; Chen et al., 1998; Olokoyo, 2013; Akinyomi and Olagunju, 2013). This is so because firms with high growth opportunities can also rely more on debt (Rajan and Zingales, 1995) as revealed by the agency costs. Thus shareholders shy away from investing in highly leveraged firms because returns will accrue mostly to creditors rather than shareholders (Myers, 1984).

Firm size - Larger firms accommodate more debt in their capital structure as opposed to smaller firms. Increase in size reduces chances of default as such lenders can advance more debt and they diversify more allowing high optimal debt, this suggests a positive relationship with long-term debt (Olaninka, 2011). A positive association is present with short-term debt for small firms (Jamal et al., 2013). Financial distress is low for larger firms and informational asymmetries are lower (Abor, 2008; Chen et al., 1998; Ramjee and Gwatidzo, 2012; Akinyomi and Olagunju, 2013). Caution should be exercised by lenders as the ability to repay debt is also dependent on availability of finances which may be independent of firm size. Rajan and Zingales (1995) suggest a negative relationship due to asymmetric information within larger firms leading to less incentive to raise debt.

Asset structure – Firms with more tangible assets, which serve as collateral, have more debt in their capital structure, which suggests a positive association between asset structure and leverage. Availability of collateral reduces costs associated with moral hazard and adverse selection (Booth et al., 2001; Ramjee and Gwatidzo, 2012; Jensen and Meckling, 1976). However, a negative and positive relationship exists with short-term debt and long-term debt, respectively. The positive relationship between tangibility and leverage is a product of imperfect information (Shyan-Sunders and Myers, 1999; Abor, 2008; Chen et al., 1998; Kasozi, 2009; Jamal et al., 2013; Chechet et al., 2013).

Firm age – Firms that have managed to establish themselves over time exhibit more debt (short- and long-term) in their capital structure. The ability to attract more debt is a product of good reputation which has been built over the years. However, other findings are contrary to such claims (Abor, 2008; Esperanca et al., 2003).

Volatility - Evidence shows that, the more a firm is exposed to bankruptcy and agency costs, the greater the incentive to reduce the level of debt in their capital

structure. Firms with high level of volatility in the income streams have high chances of default; as such, they have low debt in capital structure. Studies on the agency theory suggest that short-term debt and business risk are positively related while an inverse relationship exists with long-term debt (Chen et al., 1998; Esperanca et al., 2003; Abor, 2008; Ramjee and Gwatidzo, 2012).

Taxation - Financing decisions are affected by marginal rates of tax. Firms with high tax shields use practically more of short-term debt and less of long-term debt. Tax shields are beneficial when the firm is still operational and being profitable, otherwise the benefit is lost when bankruptcy arises (Ramjee & Gwatidzo, 2012; Abor, 2008; Hemmelgarn & Teichmann, 2013; Akinyomi & Olagunju, 2013).

Inflation - The level of inflation is important in explaining the choice of debt in the case of Zimbabwean firms. During periods of high inflation, the expectation is that firms use more of short-term debt and less of long-term debt, and any deductions for tax as result of debt financing will be most important to the firm (Frank and Goyal, 2009; Koksal et al., 2013).

Non-debt tax shield - According to the trade-off hypothesis, non-debt tax shields reduce the expected gains from leverage because they reduce the income which is being protected from debt. They stand as substitutes for tax savings, which suggests a negative relationship between non-debt tax shield and debt (Mutenheri, 2003). The existence of non-debt tax shield makes debt unattractive and also depreciation and interest bearing debt are substitutable (DeAngelo and Masulis, 1980). Firms can only take advantage of interest tax shields when there is enough income to justify debt issue, otherwise optimal leverage is reduced where there are non-debt tax shields. This relationship is also important considering the economic situation for Zimbabwe which would affect the profitability of firms.

Ownership structure - Managers are insiders who are involved in the day to day running of a firm. Their wealth is connected to the firm in the form of shareholding. They are not ready to suffer as a result of the bankruptcy of the firm; as such, their interests are aligned to those of owners up to a certain level of shareholding, and this suggests a non-linear relationship (Moussa and Chichti, 2013). They become more cautious in their use of debt for fear of the risk of bankruptcy. Thus, the more they have a huge stake then the less willing they are to use more debt, suggesting a negative relationship between leverage and ownership (Noe and Rebello, 1996; Berger et al., 1997, Vo and Nguyen, 2014). Debt can only be more visible in the capital mix where power rests with shareholders otherwise managers prefer the use of equity. Mutenheri (2003) supports the agency costs hypothesis which suggests that increasing managerial ownership reduces the role of debt in solving the agency problem. The coefficient for ownership should be negative and that for ownership squared should be positive where there is non-linearity with leverage.

Other important variables in explaining capital mix include: default risk, which increases when a firm takes on more debt; dividend payout ratio; liquidity levels for firms; and the variability in earnings over a period. These factors can have a positive or negative effect on leverage (Frank and Goyal, 2003, 2007, 2009; Barakat and Rao, 2012; Nguyen et al., 2014; Kuhnhausen and Stieber, 2014; Sakatan, 2010; Mbogo, 2013).

Previous studies are limited in both scope and the context in which they were done. Empirical evidence fails to explain the behaviour of firms as well as managers in time of hyperinflation and subsequent dollarization. There is no attempt to explain the predicting power of capital structure theories during the unique period for Zimbabwe in which managers faced a difficult task to keep the debt equity ratios under constant checking while at the same time trying to keep the firm in operation. The study argues that inflation was important in determining the behaviour of firms and the type of debt preferred would be different than under normal circumstances. In this environment, choices were limited and information asymmetries existed. Industry classifications were important for Zimbabwean firms as one would expect industrial firms to have a different capital mix from those of firms classified as small capital market firms. Evidence suggests that industrial firms use less debt due to increased liquidation costs (Titman and Wessels, 1988). Contrary to these claims, Harris and Raviv (1991) argue that industrial firms use more debt than other non-industrial firms. In this current study, firms are put into two groups: industrial and non-industrial to examine its significance in choosing capital mix.

Table 2A in the Appendix provides a summary of the key variables used in this research and their perceived effect on leverage under the theories of capital structure. The aim is to clearly bring out the similarities and differences according to the main theories being tested. The agency theory is being captured by the ownership variable in the model.

4. Research methodology

Estimation and data sources

The research uses panel data analysis for conducting estimations to answer the research questions as supported by various authors (Nguyen et al., 2014; Jamal et al., 2013; Barakat and Rao, 2012; Abor, 2008; Song, 2005; Verbeek, 2004) and detailed review is in Baltagi (2008). Panel data makes it possible to analyse changes on individual level effects; it helps to model why a given unit behaves differently at different time periods; gives more accurate estimates; degrees of freedom are increased; the effects of heterogeneity are controlled and collinearity is reduced.

The analysis covers a period from January 2000 to December 2013 which was split into two periods: inflation (2000–2008) and dollarization (2009-2013). The first period combines the period of low inflation and hyperinflation which are captured by a dummy variable taking a value of one for hyperinflation (2006-2008) or zero otherwise, and a total of 24 firms had complete data. Another dummy variable was used to capture industrial effects, taking a value of one for industrial holding firms or zero otherwise. The study employs interaction terms between inflation and variables to capture the specific and marginal effects. The second period was analysed using data for 43 firms but no interaction terms were employed because inflation was single digit and had no influence on capital mix. In each sample period, the study estimates up to three models using static and dynamic models. The first model in each case captured all the variables with two dummy variables (industry effects, hyperinflation). The second model included all variables in the first model plus interaction terms. The third or final model was more specific and captured only the significant variables to come up with a reduced form model. Total leverage or debt was estimated using all variables plus interaction terms. Data came from financial statements for listed non-financial firms being inflation adjusted figures. Additional information was collected using company visits and websites for the Zimbabwe Stock Exchange and the Reserve Bank of Zimbabwe.

The static model

The study treats the individual effects as random and assumes that they are uncorrelated with other explanatory variables (Olaninka, 2011). The use of random effects model was done after conducting a Hausman test (null hypothesis that χ_{it} and μ_i

are uncorrelated). Empirical analysis was conducted using Pearson correlation analysis (explain the relationship between financial leverage and firm characteristics), non-linear multiple regression and descriptive statistics (explains the important features of the firm). The model used was adopted from previous studies with modifications to capture the unique period under review (Nguyen et al., 2014; Jamal et al., 2013; Barakat and Rao, 2012; Mojtahedzadeh and Nejati, 2011; Abor, 2008; Song, 2005). The longitudinal model takes the following general form:

$$Y_{it} = \beta_0 + \beta X_{it} + e_{it} \quad (1)$$

Where:

- i denote the firm (cross section n dimension), such that Y_{it} is a measure of financial leverage for firm i at time t.
- X_{it} - is a K-dimensional vector of explanatory variables (firm-specific characteristics).
- β_0 denotes the intercept.
- β elements are indexed as β_1 to β_n (coefficients of the explanatory variables).
- The error term (e_{it}) consists of two components: a time invariant component μ_i which captures the time dummies and a remainder component, ε_{it}, which is uncorrelated over time.
- Financial leverage is measured in total and at levels (Flev, Flev1 and Flev2).

The dynamic panel data model

The study introduces dynamics, giving a model with exogenous variables and a lagged dependent variable as follows:

$$Y_{it} = \gamma Y_{it-1} + \beta X_{it} + \mu_i + \eta_t + \varepsilon_{it} \quad (2)$$

where, Y_{it} is the leverage ratio, X_{it} is a vector of exogenous variables, $\mu_i and \eta_t$ are firm and time specific effects, respectively. The model assumes that the number of firms (N) is large and the time periods (T) is small. The firm effects are correlated with the dependent variable for the past period, and the disturbances are serially uncorrelated. The study employed the Generalized Methods of Moments Estimator by Arellano and Bond (1991). The model assumes that there are costs that are met by firms in Zimbabwe as they adjust towards the desired capital structure. The adjustment costs are captured by γ which takes the value of zero where there are no adjustment costs. The problems of misspecification were addressed by testing for the null hypothesis of no autocorrelation using z-statistics of both the first and second order.

The exact system of equations is as follows:

$$FLev_{it} = \beta_0 + \beta_1 MBR_{it} + \beta_2 AS_{it} + \beta_3 Prof_{it} + \beta_4 GR_{it} + \beta_5 Fsize_{it} + \beta_6 (Fsize_{it})^2 + \beta_7 NDTS_{it} + \beta_8 DR_{it} + \beta_9 PR_{it} + \beta_{10} L_{it} + \beta_{11} AG_{it} + \beta_{12} TX_{it} + \beta_{13} INF_t + \beta_{14} Own_{it} + \beta_{15} (Own_{it})^2 + \beta_{16} DINF_t + \beta_{17} Dind_t + e \quad (3)$$

$$FLev_{it} = \beta_0 + \beta_1 MBR_{it} + \beta_2 AS_{it} + \beta_3 Prof_{it} + \beta_4 GR_{it} + \beta_5 Fsize_{it} + \beta_6 (Fsize_{it})^2 + \beta_7 NDTS_{it} + \beta_8 DR_{it} + \beta_9 PR_{it} + \beta_{10} L_{it} + \beta_{11} AG_{it} + \beta_{12} TX_{it} + \beta_{13} INF_t + \beta_{14} Own_{it} + \beta_{15} (Own_{it})^2 + \beta_{16} DINF_t + \beta_{17} Dind_t + \beta X^{inf} + e \quad (4)$$

Where, X^{inf} (in Equation 4) is a vector of interaction terms for explanatory variables with inflation.

Equations 3 and 4 were estimated using both random effects and dynamic modelling (including a lagged dependent variable), and Equation 3 includes all explanatory variables. The dummy variables $Dind_t$ and $DINF_t$ capture, respectively, industry effects and hyperinflation as discussed previously. By including interaction terms, model (4) captures both the specific or level and marginal effects. The study further argues that the relationship between leverage with two variables (firm size, ownership structure) is non-linear, and so our models include their squared variables. The definitions of variables are presented in Table 2B in the Appendix.

5. Empirical results

Descriptive statistics

The summary of variables for the review period is presented in tables 3A and 3B in the Appendix. The results show consistency since the median values (not shown) were within the range of the minimum and maximum values. The standard deviations were relatively low, except for inflation during the period 2000-2008, showing that differences between the actual values and their means were small. All variables were more volatile during the period 2000-2008 than under dollarization, which is consistent with periods of economic instability. Our data was generally skewed to the right except for short-term leverage, profitability, default risk, inflation and taxation. Firms were more profitable during the period of inflation; ownership did not change much between the two periods with an average of 9%; more dividends were paid during the period of inflation; more fixed assets were acquired during post hyperinflation phase; firms were more liquid and experienced more growth during the hyperinflation period; on average, firm sizes and payout ratios fell during period of dollarization. More short-term debt and less long-term debt are visible during the period of dollarization than the previous. This is surprising as we expected to see more of long-term debt under dollarization. The results in tables 4A and 4B in the Appendix show that both positive and negative correlations were found among the variables.

Regression analysis: Presentation and discussion of results

The study uses the static model and the dynamic model with the former being used as a bench mark model while the latter was used for comparison, and in each case interpretations are based on the reduced form or specific model. The static model forms the basis upon which conclusions and recommendations were made. Firstly, results for the period 2000-2008 are presented (see tables 5A and 6A, model 3), followed by results for the period of dollarization (tables 5B and 6B, model 2). The values for R^2 using short- and long-term leverage were 66.47% and 65.49%, respectively, during the period up to 2008; while for the period 2009-2013, the values for R^2 were 62.15% and 69.39%, respectively, which suggests that variables outside the model were also important in

explaining the capital structure behaviour. Hausman stata was insignificant for all levels of debt in the two periods; as such, estimations were done using the random effects model. Turning to the dynamic model, the estimated coefficient for lagged dependent variable was positive and significant for long- and short-term debt, respectively, during hyperinflation and dollarization. There were transaction costs involved as firms adjusted to the optimal capital structure with the estimated speed of adjustment being higher (0.39) for short-term debt under dollarization than for long-term debt (0.32) under hyperinflation. The z-tests show evidence for negative first order autocorrelation, while no evidence is shown for second order autocorrelation. Discussions now focus on reduced form model which identifies the key variables explaining firm behaviour on the capital structure choice in Zimbabwe.

Period of inflation (2000-2008)

Findings, in Table 5A, show that firm size, default risk, inflation, industrial effects as well as marginal effects of inflation were not important in explaining choice of short-term debt. Again, firm size, non-debt tax shield, liquidity, inflation and ownership structure were not statistically significant in explaining the choice of long-term and total debt. Thus they were not used by suppliers of finance as criteria for the rationing of leverage.

The pecking order hypothesis predicts a positive relationship between market to book ratio and leverage. Findings are consistent with theory showing that high growth firms employed more long-term debt, which is agreeable with previous studies (Mutenheri, 2003; Ramjee and Gwatidzo, 2012; Kuhnhausen and Stieber, 2014, Nguyen et al., 2014). This suggests that, as a way of credit rationing, financial institutions were more concerned with the growth opportunities open to a firm before they could make a commitment to provide funding over a longer horizon considering the state of the macroeconomic environment. This result confirms the observations from Table 1A in the Appendix in which the average levels of long-term debt and growth opportunities were positively related. Unlike findings by Rajan and Zingales (1995), listed firms in Zimbabwe did not suffer from the under investment problem which would cause those with high expected future growth to rely on equity. Findings using the static model further suggested that growth opportunities have an additional partial and positive effect on long-term debt the higher the level of inflation. This is explained by the positive and significant coefficient of the interaction between inflation and growth opportunities, which is consistent with our expectations. The average inflation was 256744% during this period. At this average level of inflation, holding other factors constant, long-term debt would increase by 1.46%[4] as result of a change in growth opportunities. Thus, an additional increase of 1% in growth opportunities, for example, would increase long-term debt by 1.46%, which is significant.

Findings on tangibility, using both dynamic and static models, are consistent with the theory based on the static trade-off hypothesis which suggests a positive effect on leverage. Consistent with previous studies (Nguyen et al., 2014; Ajanthan, 2013; Hernadi and Ormos, 2012; Abor, 2008), our results shows that firms managed

to acquire more long-term debt as they showed their ability to offer collateral. The availability of collateral reduces costs that are associated with moral hazard and adverse selection (Ramjee and Gwatidzo, 2012). This result on tangibility and long-term debt suggests the presence of imperfect information in the Zimbabwean financial markets. Firm managers took advantage of this lack of adequate information on the part of financiers and applied for long-term debt to secure their positions. The other important observation is that firms tried to match the maturity of liabilities with the life span of their assets. Further to this observation is the fact that firms did not have much of short-term assets in their capital structure hence the evidence of failure to take advantage of short-term debt based on the structure of assets.

Both the static and dynamic model provided evidence that profitability had a positive effect on leverage, which is consistent with the static trade-off theory and previous studies (Chechet et al., 2013; Akinyoni and Olagunju, 2013). Highly profitable firms used more of both short- and long-term debt which is expected during inflationary periods. This is so because firm managers would want to take advantage of arbitrage opportunities by using more of short-term debt while the use of long-term debt helped them to take advantage of tax shield. This result suggested that firms were able to guarantee repayment of loans using profits which reduced the possibility of bankruptcy and in the process they earned the trust of financiers. Profitability appeared to be the most determining factor for leverage as it appeared to have been used as criteria for rationing all forms of leverage during the period of inflation. Consistent with previous studies (Alves and Ferreira, 2011; Ajanthan, 2013), profitability has a negative effect on total debt. This suggests that firms hold less of debt as they have enough cash flows in form of profit which follows the predictions of the POH. The dynamic model helped predict only the positive effect of profitability on long-term and total debt.

Consistent with other studies (Fama and French, 2002; Barakat and Rao, 2012), firms with high non-debt tax shield did not rely on debt. Using both the static and dynamic model, the coefficients for both short- and long-term debt are negative and significant, respectively. This is supported by the static trade-off hypothesis which show that non-debt tax shield reduce the gains from leverage as such firms use less debt. Listed firms in Zimbabwe did not rely much on short-term debt because the increase in allowances for depreciation reduced the income that was supposed to be shielded by debt. The more firms provide allowances for depreciation then the pointless it becomes to borrow since there will be no gains from leverage (Mutenheri, 2003). This confirms findings by DeAngelo and Masulis (1980) that showed that alternative shields like depreciation, research and development are good substitutes for shield as provided by the tax component on debt. A firm would rather borrow more where the non-debt tax shield is small or nonexistent. Literature suggests that as allowances for depreciation increase, firms would rather, given the opportunity, borrow over the long term as there was no immediate short-term benefit, which is contrary to our findings. In the long term, the allowances for depreciation would fall as assets grow older, hence debt shield would be attractive, and considering

the Zimbabwean situation of high uncertainty securing long-term debt would be preferable by the manager given the chance. However, the overall level of debt was not explained by non-debt tax shield.

Firms with high dividend payout ratio did not rely much on short-term debt as predicted by the static trade-off theory. One would wonder how this was possible considering the tough times that firms were going through during the period 2000-2008. Possible explanations for the Zimbabwean scenario are that, in order to finance operations, firms relied on other sources of income like earnings received in previous periods, income from the equities market where stocks were earning high real returns and money from arbitrage sources. The non-reluctance by suppliers of finance to issue debt, as they suspected that money would be used for non-productive purposes, caused firms not to easily access funds even though they were faced with the need to pay dividends. From the point of view of the financier, firms with low retention ratios risked being bankrupt considering the tough economic situation that the country went through between 2000 and 2008. Consistent with previous studies (Sakatan, 2010; Abor, 2008; Barakat and Rao, 2012), findings suggest that firms with more alternative liquid resources rely less on debt. The managers in Zimbabwe were still compelled to pay more dividends despite their less reliance on short-term debt. Thus high payouts suggest that firms were more liquid enough and still afford to finance growth from internal sources. The payment of dividends also acted as a way to mitigate the problem of agency, just like debt, as managers sought to maintain good reputations with investors. Dividend payout was, however, not used to determine the supply of long-term and total debt during the period.

The agency theory predicts a negative relationship between managerial ownership and debt because managers are not ready to suffer when the firm experiences bankruptcy. Considering the inflationary environment in Zimbabwe, this study suggests that managers played a key role in the determination of the capital structure as the situation required immediate solutions. Findings in this study, using both the static and dynamic model, are in support of a non-linear relationship (coefficients for both ownership and ownership squared are significant) between managerial ownership and short-term debt, which is consistent with Moussa and Chichti (2013). The static model shows that managers would use their discretion to use more of equity (less debt) up to an ownership level of 34%[5]; and beyond this level, shareholders would exercise their power seeking the introduction of more debt in the capital structure to reduce the agency problem. At ownership levels beyond 34%, the relationship between debt and ownership becomes positive. Equity holders gave managers limits in which they would exercise their choice of financing but the much needed discipline in managers would still be cultivated by the presence of debt. The dynamic model shows that long-term debt and ownership have positive linear relationship, which is consistent with our earlier suggestion on the power of equity holders demanding more debt. This shows that managers were free to use their discretion on capital mix only over short term horizons.

The study controlled for industry effects by use of a dummy that categorized firms into industrial holding and non-industrial holding. Industry heterogeneity was a key determining factor for a firm to get funding from suppliers of finance's view point.

The coefficient of this binary variable was positive and statistically significant for both debt types. This suggests that the choice of debt type was dependent on the sector in which the firm operated in. Industrial holding firms relied more on long-term debt during inflationary period, which is consistent with Harris and Raviv (1991). However, industrial classifications were not important in explaining the level of debt.

The study, in dealing with endogeneity problem, used inflation variable to capture separate effect and a binary variable capturing the importance of hyperinflation. Consistent with observations made in Table 1A in the Appendix and the expected outcomes, our findings (Table 5A) show that hyperinflation was a determining factor on the type of debt used by firms using the static model. The coefficient was positive and significant, suggesting that firms used more short-term and long-term debt during the period of hyperinflation, which is consistent with the observed arbitraging behaviour by firm managers. The coefficient of inflation was insignificant on all forms of debt using the static model. The dynamic model suggested a negative effect of inflation on short-term debt, which is different from our expectations. This may be explained by increased liquidity experienced by firms from other sources, like arbitrage, during this period. Suppliers of finance would consider the effects of inflation to avoid short-term losses from low real loan repayments.

The static model shows that marginal effects of growth opportunities as a result of inflation were significant in explaining total and long-term debt. They complemented the effect of growth opportunities on the choice of debt. Again, using short-term and total leverage, the dynamic model shows that the marginal effects of growth opportunities, asset structure, default risk and liquidity were significant. But they did not make any difference to our estimated model because the same variables had no effect on choice of debt at levels. The marginal effects of explanatory variables, due to inflation, on long-term debt were not important using the dynamic model.

Period of dollarization (2009-2013)

This period still shows high level of uncertainty, low liquidity levels and high political risk in the economy. Findings show that factors that helped explain the choice of both forms of debt during this period were different from those in the period of inflation. The dynamic model show that the coefficient for payout ratio negatively affected long-term debt, which was not the case using the static model. There is still high uncertainty, which may lead to bankruptcy in the event that long-term debt is employed. The use of less long-term debt suggests that firm managers are still using other sources of funding like equity. The dynamic model suggested that firms which have a good reputation benefited from use of long-term debt while those with more tangible assets employed more of total debt. This is because they have stood the test of time during the inflationary period having been in business for many years. Suppliers of finance were giving more long-term and total debt to firms with many years of existence as predicted by the static trade-off theory; firms with high allowances for depreciation would rather have less short-term and more of long-term debt in their capital mix

to benefit from better and alternative shields than taxation. Again, profitable and bigger firms benefited from having more of total debt. Using the static model, these allowances were not important in explaining the choice of debt. The dynamic model also suggests that there is a non-linear relationship between both forms of debt and ownership while total debt has a linear relationship with ownership. The relationship portrays an ∩-shape with short-term debt and a U-shape with long-term debt. Thus, managers would use more short-term leverage up to a controlling stake of 35.2%[6]. If ownership exceeds this level, then managers would use their discretion to reduce short-term debt. Alternatively, managers find it in their best interests to use short- term leverage considering the current economic environment. When it comes to long-term leverage, they would exercise their discretion to reduce its use due to increased chances of bankruptcy. This is possible up to an ownership level of 24.8%[7] which becomes a floor level. Beyond this point, the level of debt is expected to increase. Average managerial ownership is below 10%, which is currently lower than these threshold levels. This shows that ownership is important on the choice of debt by the firm managers.

The study now discusses the predictions given by the static model.

The static model shows that the choice of short-term debt was explained by changes in revenue, payout ratio, liquidity, taxation and industrial effects; while long-term debt was explained by changes in revenue, firm size and liquidity. Factors important in explaining total debt were growth opportunities, profitability, non-debt tax shield and default risk. The change in operating income is positively associated with short-term debt and negatively associated with long-term debt as predicted by the pecking order and static trade-off hypothesis, respectively. This suggests that firms with more changes in their revenue streams find it better to borrow over the short term as opposed to borrowing over the long term because this would help them cover their cash positions daily. This is testimony to the current cash flow problem due to the low movement of cash in the economy. The firms are reliant on consumers whose income stream is less predictable as they sometimes fail to get their salaries on time and/or in full. Firms try to hedge their positions by borrowing in the short term to sustain operations. Borrowing over the long term would leave them exposed to cash flow problems. From the suppliers of finance's view point this makes economic sense to give short-term outlays to firms with unpredictable revenue streams. Thus the stable currency regime has not managed to solve the cash flow challenges in the economy. This means as revenue become unpredictable then servicing debt would become difficult and so firms can only rely on short-term debt (Ajanthan, 2013; Alves and Ferreira, 2011; Mbogo, 2013; Kuhnhausen and Stieber, 2014). Thus, as revenue changes in the current environment, firms that prefer borrowing over the long term are left being exposed to cash flow problems. Long-term debt is therefore not preferable considering the current unpredictable and unstable environment, which is consistent with previous researches (Nguyen et al., 2014; Wahab and Ramli, 2013).

Consistent with theory our findings show that the coefficient of firm size was positive when considering long-term and total debt. Theory suggests that larger firms have easy access to capital markets, as such they tend to be highly leveraged (Fattouh et al., 2004; Ajanthan, 2013). Most importantly, results also show that a non-linear relationship existed between firm size and leverage. The level of leverage increased with firm size until it reaches an optimal level of $10^{10.24}$ or approximately US$17.5 billion[8], beyond which, long-term leverage would fall. None of the sampled firms have reached this optimal level which means this result has significant policy implications. Findings suggest that larger firms have the ability to raise long-term debt than small firms. Firms with huge asset bases find it easy to approach the financial markets for funding. Suppliers of finance are also ready to screen firms based on their asset base and small firms, by asset size, find it difficult to borrow long-term. The study gives evidence which is consistent with previous work (Nguyen et al., 2014; Hernadi and Ormos, 2012).

Liquidity is important as a rationing mechanism by suppliers of finance and a determining factor on the type of debt that firms would use. Our findings are consistent with theory showing a negative effect on choice of short-term debt and positive effect on long-term debt as predicted by the pecking order and static trade-off hypothesis, respectively. Evidence suggests that highly liquid firms are able to sustain their day to day operations without carrying short-term debt in their capital structure. In the long term, firms would prefer to restore debt in their capital structure, which is consistent with agency theory which demands the use of debt to reduce the agency problem. It is probable for firms to make their debtors to make early settlements to deal with any perceived short-term liquidity challenges. Long-term obligations are matched with long-term assets. The management of working capital is still important as an alternative source of short-term finance. Thus, firms would possibly tighten their credit policy to increase cash inflows for financing operations so as to reduce over reliance on short-term debt which may be difficult to obtain.

The association between taxation and short-term debt was consistent with theory and previous works (Abor, 2008; Barakat and Rao, 2012). Tax shield encouraged firms to rely more on short-term debt, while the influence on long-term debt was insignificant. Firms with more debt in their capital structure would benefit more from tax shield as they end up paying less tax due to the interest payments which are tax deductible. The other non-debt tax shield, like depreciation and asset structure, were not important (Pidun et al., 2010) and hence firms are still being protected by interest portion only in the short term.

Evidence shows that industry classifications were important in explaining the composition, and not the level, of debt between industrial and non-industrial holding firms. The coefficient of the industrial dummy variable was negative for all types of debt but this only turned out to be significant in explaining the usage of short-term debt. This result is consistent with Titman and Wessels (1988) who suggested that industrial firms use less debt due to increased liquidation costs. The findings on industry classifications failed to explain the choice of long-term debt but suggest that industrial holding firms rely on other forms of funding like equity and working capital as discussed earlier.

Discussion of findings

The static trade-off and agency theory were useful in understanding capital structure choices under the period of inflation, whilst the static trade-off and pecking order theories were useful in understanding capital structure choices during the period of dollarization. The factors explaining capital mix during the inflationary period were different to those that were significant during dollarization. Thus the situation was reversed during the period of dollarization and this observation was true even using the dynamic model. In an inflationary environment, the main factors explaining the choice of short-term debt were profitability, non-debt tax shield, payout ratio, ownership structure and hyperinflation dummy variable. Long-term and total debt were explained by growth opportunities, asset structure and profitability, firm size, age, and ownership. These variables have been isolated in this study to represent the reduced form model for Zimbabwe. High growth firms were able to attract more long-term debt in their financing mix and this was acceptable to financiers as assurance that firms would not default in debt repayments. In inflationary environments, growth opportunities also have significant and positive partial effect on long-term and total debt. Firms with more tangible assets in the balance sheet were able to match the life span of assets with long-term liabilities hence they attracted more long-term and total debt. Firm managers took advantage of both forms of debt even though their firms operated profitably, which is not consistent with results by Chiwandamira (2009). Firms with more allowances for depreciation did not depend on short-term debt as they did not receive much gain from leverage. The study also shows that ownership structure was important in explaining the choice of debt. Industrial holding firms relied more on long-term debt and the use of more short-term debt was influenced by hyperinflation.

The static trade-off and pecking order theory were important in generating a specific model which is consistent with the Zimbabwean case under dollarization. Long-term debt was explained by changes in revenue, firm size and short-term liquid assets. The use of short-term debt was explained by changes in revenues, dividend payout ratio, short-term liquid assets, taxation and the industry dummy variable. Total debt was explained by profitability, firm size, asset structure, age and ownership. The current market environment is illiquid, which causes firms with volatile revenues to prefer borrowing in the short term as opposed to long-term debt so as to cover daily cash flow requirements. Suppliers of finance advance more long-term debt to larger firms which can easily access the financial markets. The current situation compels firms to prefer short-term debt; but as liquidity levels improve in the market, the expectation is that firms will shift to having more long-term debt which helps to deal with the agency problem. Firms with more short-term debt in the capital mix benefited from tax shields but this would be lost in the long run. The study suggests that liquidation costs for industrial firms were perceived to be high; as such, less of short-term debt was employed.

6. Conclusions and policy implications

This paper examines the key determinants of capital structure choices for Zimbabwean listed firms under hyperinflation and dollarization. This is done by using panel data for the period 2000-2013 to: (1) generate modified versions of the existing capital structure models to capture the unique situation for Zimbabwe; (2) test the existence of a non-linear relationship between leverage and variables like firm size and managerial ownership; (3) ascertain how the marginal effects of explanatory variables were useful in explaining capital structure choices as a result of inflation; (4) determine the most important type of debt (long-term or short-term) under each period; (5) ascertain how the behaviour of firm managers influenced the choice of debt; and (6) ascertain any change in the behaviour of explanatory variables between the two periods.

The study provides some key conclusions which are the basis of recommendations.

Conclusions

During the period of inflation: the cost associated with moral hazard and adverse selection is low due to availability of collateral. This suggests the existence of imperfect information in the financial market; as such, firms make use of this lack of complete information by suppliers of finance to apply for long-term debt. Profitable firms attract both forms of debt while they fail to attract more of total debt. The composition of debt becomes an important factor for suppliers of finance in credit rationing. Findings suggest that during this period, there was a reverse pecking order of corporate capital structure choices; short-term debt is important, which allow firm managers to take advantage of arbitrage opportunities. Other sources of income (retained earnings, return from shares and arbitrage profits) are important as sources of dividends payout. Firms paying more dividends did not rely much on short-term debt, which is channelled for short-term gains. Suppliers of finance ration the availability of short-term finance to firms paying high dividends to guard against the risk of bankruptcy. The payment of dividends in stressful times is compelled by the need to maintain good reputation with investors and it also reduces the agency problem; the other important conclusion is that managers are influential in the choice of short-term debt as they need to make quick decisions while balancing the optimal leverage levels. Managerial ownership and leverage are non-linearly related. Managers rely more on equity, hence reverse pecking order, as long as their ownership stake is below 34%

after which they would be compelled to use more short-term debt. Usually, ownership structure for firms does not change quickly thus firm managers were more influential in the choice of capital mix.

During period of dollarization: the market is still characterized by low liquidity and high uncertainty, which causes suppliers of finance to avoid long-term cash outlays and prefer short-term advances to reduce the risk of bankruptcy. Firms with unstable revenue streams have problem in accessing long-term debt but they can still access short-term debt. Leverage and firm size are non-linearly related up to a certain optimal level of size. Access to long-term and total debt is easier for larger firms and those with high liquidity levels. Firms benefit from tax shields only when they are profitable, otherwise this benefit is lost where there are losses. Equity finance was important for industrial holding firms which failed to gain access to debt finance due to perceived liquidation costs. Overall, the study shows that understanding both the composition and level of debt is important during the review period.

Recommendations for policy making

The existence of information asymmetries, the importance of short-term debt and the strong influence by firm managers of choice of funding during the period of inflation suggests that: (1) suppliers of finance need more information, which points out differences between firms that are likely to default and those that are not likely to default upon receiving debt finance. This can be achieved by improving legislation that requires firms to disclose current and expected performance indicators showing the likelihood of default. The alternative is for financiers to ration the amount of credit which will help streamline accessibility to debt by firms; (2) debt covenants should outline the use of money availed to firms to avoid short-term decision making which is aimed at speculative activities, and post cash outlay audits should be intensified to improve the monitoring role of financiers; and (3) access to debt and equity finance can be improved to support its use by firm managers in the long and short term, respectively, as it would reduce the problem of agency. Lowering the costs for floating shares and costs for registering on the stock market will enhance access to capital market funding. Investors should be cautious in their choice of investments by considering the ownership structure, as managers only employ less short-term debt up to a known optimal ownership level.

During the period of dollarization, long-term debt was important, being driven by firm size and liquidity. This suggests that: (1) firms need to tighten credit policies to improve cash inflows, firms that are smaller in size can take advantage of debt finance by increasing cash inflows; and (2) availability of debt finance should be improved by financiers and this would enhance accessibility by large firms up to optimal level of firm size. Policies are required to reduce cost of debt which makes it cheaper to firms thus financial institutions can provide products on debt finance which can be easily

accessed by firms with good credit ratings. The flow of quality information will enhance access to banking finance and reduce the problem of information asymmetry and moral hazard. Creditor protection and property rights should be restored to improve availability of long-term and total debt finance.

Recommendations for future research

There are of course other important implications which were outside the scope of this study for firms in Zimbabwe. Firm managers need to understand on whether to invest or not; whether or not to pay dividends and if so in what proportions. The other important aspect is to examine the effect of firm behaviour on cash management and profitability. These are possible avenues for future research covering the two periods of hyperinflation and dollarization.

Notes

1. International Financial Reporting Standards (IFRS), Presenting IFRS financial statements after a period of severe hyperinflation, IFRS Staff Paper, September 2010.

2. Retrieved from: http://www.zimbabwe-stock-exchange.com/company-list/ November2014

3. KPMG (2012) report, Zimbabwe country profile, KPMG services proprietary limited.

4. ΔFlev2 = 0.00382 + 4.21e-08 (256744) = 0.01460 or 1.46%

5. The turnaround point is calculated as 0.4869/(2x0.71497) = 0.4869/1.42994 = 0.340503797

6. Turning point = 1.024/(2x1.4545) = 35.2%

7. Turning point = 0.6762/(2x1.3624) = 24.8%

8. Turning point = 0.1819/(2x0.008879) = 10.24

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Appendix

Table 1A: Performance indicators: 2000-2008

Small capital market

Year	Flev 1	Flev 2	Prof	Fsize	Growth	Payout ratio	NDTS	MBR	AS	Own
2000	6.18%	6.38%	134.02%	887.73%	6.81%	33.13%	284.51%	394.76%	45.51%	6.45%
2001	9.26%	4.18%	48.85%	905.86%	282.09%	48.59%	27.45%	222.38%	36.81%	7.19%
2002	8.57%	1.64%	21.41%	984.33%	489.28%	104.03%	9.84%	556.30%	37.71%	7.32%
2003	5.22%	2.63%	27.34%	999.53%	602.73%	22.50%	10.47%	558.89%	35.17%	9.23%
2004	16.37%	2.44%	145.17%	1046.91%	400.26%	11.53%	13.09%	226.78%	36.44%	10.44%
2005	13.83%	2.01%	20.22%	1067.76%	1043.21%	-228.10%	13.18%	246.95%	37.28%	10.28%
2006	12.77%	0.36%	25.09%	1076.02%	189.10%	43.59%	14.38%	175.63%	41.84%	7.20%
2007	12.45%	1.33%	64.32%	1119.26%	498.22%	18.30%	12.30%	168.84%	227.99%	9.64%
2008	18.64%	2.96%	86.69%	1323.09%	218.34%	24.63%	18.50%	126.41%	41.01%	8.50%

Industrial holdings

Year	Flev 1	Flev 2	Prof	Fsize	Growth	Payout ratio	NDTS	MBR	AS	Own
2000	8.22%	17.85%	17.94%	978.21%	-68.00%	-61.74%	4.09%	327.57%	46.34%	0.81%
2001	8.01%	27.20%	15.37%	1009.45%	137.60%	-84.67%	3.81%	101.63%	40.44%	2.38%
2002	4.73%	18.71%	16.42%	1051.25%	569.63%	-52.04%	6.41%	493.76%	43.36%	2.40%
2003	5.52%	16.23%	26.92%	1082.95%	2271.99%	68.84%	78.50%	498.67%	45.06%	1.01%
2004	5.25%	13.86%	9.67%	1178.08%	1028.97%	-1.22%	8.21%	56.66%	47.12%	1.35%
2005	2.45%	7.14%	14.69%	1178.30%	609.32%	36.47%	12.00%	49.38%	61.93%	3.73%
2006	2.19%	4.63%	-493.48%	1172.53%	618.02%	4.53%	14.12%	93.40%	63.01%	9.90%
2007	3.72%	1.48%	10.58%	1230.04%	26.15%	135.57%	13.35%	63.64%	68.77%	12.98%
2008	0.25%	1.37%	36.66%	1253.12%	385.09%	8.80%	12.83%	34.25%	87.60%	26.74%

Key performance indicators for the period 2000-2008 constructed using average values using data for 19 firms classified as small capital market and five firms classified as industrial holdings. Variables are as defined in Table 2B.

Table 1B: Performance indicators: 2009–2013

Small capital market

Year	Flev 1	Flev 2	Prof	Growth	Fsize	Payout ratio	Liquidity	Taxation
2009	9.23%	5.28%	-52.06%	-67.94%	715.90%	3.69%	134.15%	4.66%
2010	15.43%	3.73%	9.39%	117.35%	727.78%	3.48%	148.54%	23.33%
2011	21.27%	5.48%	15.27%	77.13%	725.54%	5.54%	133.44%	11.05%
2012	18.15%	9.36%	15.03%	22.77%	734.88%	10.37%	149.91%	23.20%
2013	7.03%	9.44%	12.84%	31.38%	722.33%	7.35%	156.50%	10.91%

Industrial holdings

Year	Flev 1	Flev 2	Prof	Growth	Fsize	Payout ratio	Liquidity	Taxation
2009	0.85%	1.22%	85.14%	-8.86%	905.45%	4.67%	120.80%	23.70%
2010	1.86%	1.29%	35.81%	173.88%	833.60%	36.90%	143.77%	91.40%
2011	3.02%	12.84%	166.85%	28.51%	804.93%	5.53%	98.46%	3.41%
2012	16.55%	1.97%	202.19%	-15.51%	808.09%	25.87%	100.87%	7.55%
2013	13.15%	2.68%	233.81%	325.34%	831.22%	24.01%	86.86%	7.96%

Key performance indicators for the period 2009-2013 constructed using average values using data for 34 firms classified as small capital market and nine firms classified as industrial holdings. Variables are as defined in Table 2B.

Table 2A: Selected empirical findings and effect of variables on leverage

Determinant	Effect on Leverage		Model
	Negative	Positive	(Expected Sign)
Inflation		Frank and Goyal (2009); Koksal et al. (2013)	STT (positive) POH (ambiguous)
Market to book ratio	Mojtahedzadeh and Nejati (2011)	Mojtahedzadeh and Nejati (2011); Setyawan and Frensidy (2012)	STT (negative) POH (positive)
Payout ratio	Sakatan (2010); Abor (2008); Barakat and Rao (2012)	Fama and French (2002) Frank and Goyal (2003)	STT (negative) POH (positive)
Tangibility	Sakatan (2010); Song (2005); Alves and Ferreira (2011)	Nguyen et al. (2014); Khrawish and Khraiwesh (2010); Ajanthan (2013); Hernadi and Ormos (2012); Alves and Ferreira (2011); Frank and Goyal (2009); Hovakimian and Li (2011); Wahab and Ramli (2013); Abor (2008)	STT (positive) POH (negative)
Tax		Abor (2008); Barakat and Rao (2012)	POH (ambiguous) STT (positive)
Size	Mojtahedzadeh and Nejati (2011); Ajanthan (2013)	Alves and Ferreira (2011); Hovakimian and Li (2011); Hernadi and Ormos (2012); Wahab and Ramli (2013) Khrawish and Khraiwesh (2010); Song (2005); Frank and Goyal (2009); Abor (2008); Sakatan (2010); Nguyen et al. (2014); Kuhnhausen and Stieber (2014)	STT (positive) POH (Positive)
Profitability	Nguyen et al. (2014); Mojtahedzadeh and Nejati (2011); Sovbetov (2013); Hovakimian and Li (2011); Frank and Goyal (2009); Alves and Ferreira (2011) Ajanthan (2013); Abor (2008); Sakatan (2010); Khrawish and Khraiwesh (2010); Abor (2008); Song (2005); Kuhnhausen and Stieber (2014)	Fama and French (2002); Chechet et al. (2013); Akinyoni and Olagunju (2013)	STT (positive) POH (negative)

continued next page

Table 2A Continued

Determinant	Effect on Leverage		Model
	Negative	Positive	(Expected Sign)
Growth rate	Frank and Goyal (2009); Ajanthan (2013); Alves and Ferreira (2011); Hovakimian and Li (2011)	Alves and Ferreira (2011); Song (2005); Sakatan (2010); Mbogo (2013); Nguyen et al. (2014); Kuhnhausen and Stieber (2014)	POH (positive) STT (negative)
Liquidity	Nguyen et al. (2014); Kuhnhausen and Stieber (2014); Sakatan (2010); Wahab and Ramli (2013)		POH (negative) STT (positive)
Age	Abor (2008)	Mojtahedzadeh and Nejati (2011)	STT (positive) POH (negative)
Non-debt tax-shield	Song (2005); Fama and French (2002); Titman and Wessels (1988); Mutenheri (2003)	Song (2005); Hovakimian and Li (2011); Mojtahedzadeh and Nejati (2011) Barakat and Rao (2012); Harris and Raviv (1991); Kuhnhausen and Stieber (2014)	STT (negative) POH (positive)
Default risk		Mbogo (2013); Mojtahedzadeh and Nejati (2011)	STT (positive) POH (positive)
Ownership	Noe and Rebello (1996); Berger et al. (1997); Vo and Nguyen (2014)		Agency theory (negative)
Ownership[2]		Ruan et al. (2009); Braidford et al. (2002)	Agency theory (positive)
Industrial effects	Titman and Wessels (1988)	Harris and Raviv (1991)	Ambiguous

Notes: Static Trade-off Theory (STT); Pecking Order Hypothesis (POH).

Table 2B: Definition of variables

Variable	Definition	References
Short-term debt (Flev 1) Long-term debt (Flev 2) Total Debt (Flev)	Short-term debt/(Debt + Equity) Long-term debt / (Debt + Equity) Total debt / (Debt + Equity	Setyawan and Frensidy (2012); Ajanthan (2013); Mutenheri (2003); Jamal et al. (2013); Chechet et al. (2013); Akinyoni and Olagunju (2013)
Market to book ratio (MBR)	(Market capitalization + total debt)/total assets	Setyawan and Frensidy (2012); Mojtahedzadeh and Nejati (2011); Medeiros and Daher (2004)
Tangibility (AS)	Fixed assets/total book assets	MacKinlay (2013); Ajanthan (2013); Barakat and Rao (2012); Fattouh et al (2004)
Profitability (Prof)	Earnings before interest & Tax/ total assets	MacKinlay (2013); Mojtahedzadeh and Nejati (2011); Ajanthan (2013); Barakat and Rao (2012); Medeiros and Daher (2004); Fattouh et al. (2004)
Growth (GR)	% Change in revenue	Ajanthan (2013); Mbogo (2013); Nguyen et al. (2014); Kuhnhausen and Stieber (2014); Fattouh et al. (2004)
Size (Fsize)	Log of assets	Fattouh et al. (2004); Ajanthan (2013); Barakat and Rao (2012); Mojtahedzadeh and Nejati (2011)
Non-debt tax-shield (NDTS)	Depreciation/total assets	Fattouh et al. (2004); Mbogo (2013); Barakat and Rao (2012); Mojtahedzadeh and Nejati (2011)
Default risk (DR)	EBIT/(EBIT-interest paid)	Mbogo (2013); Mojtahedzadeh and Nejati (2011)
Dividend payout ratio (PR)	Dividends/Earnings to ordinary shareholders	Barakat and Rao (2012); Sakatan (2010); Abor (2008); Mojtahedzadeh and Nejati (2011)
Liquidity (L)	Current assets/current liabilities	Nguyen et al. (2014); Kuhnhausen and Stieber (2014); Sakatan (2010); Wahab and Ramli (2013)
Age (AG)	Number of years since incorporation	Mojtahedzadeh and Nejati (2011); Abor (2008)
Tax (TX)	Tax paid/operating income	Abor (2008); Barakat and Rao (2012)
Inflation (INF)	Year-end inflation rate	Frank and Goyal (2009); Koksal et al. (2013)
Ownership (Own)	Management shareholding divided by ordinary shares in issue	Noe and Rebello (1996); Berger et al. (1997); Vo and Nguyen (2014)

Source: Author's compilation from literature review.

Table 3A: Descriptive statistics for the period of inflation (2000-2008)

Stats	Flev1	Flev 2	Flev	MBR	AS	Prof	GR	Fsize	Fsize2	NDTS2	DR	PR	L	AG	TX	INF	Own
Mean	0.094	0.073	0.401	2.754	0.168	0.429	4.70	11.079	128.608	0.396	1.022	0.1475	2,917	47.162	0.083	256744	0.091
Max	0.792	2	44	81.613	34.23	23.19	81.74	19.67	386.878	46.514	15.481	14.662	36.230	110	2.35	2310000	0.313
Min	0	0	0	0	0	-28.84	-1	1.23	1.1529	0	-37.815	-55.124	0	2	-5.871	0.5520	0
Std Dev.	0.149	0.237	3.856	8.703	2.311	3.009	10.907	2.43	55.799	3.191	3.1523	4.0815	4.587	27.334	0.804	727622	0.162
Skewness	2.368	5.915	11.251	6.472	14.334	-0.800	3.960	0.131	1.288	14.107	-7.849	-11.274	5.332	0.204	-4.540	2.4749	2.481
Kurtosis	8.503	44.175	127.724	53.015	208.963	66.334	23.187	4.86	6.429	204.032	111.653	158.104	33.973	2.414	33.574	7.1250	8.968
cv	1.589	3.263	0.012	3.160	3.743	7.019	2.321	0.22	0.434	8.053	3.084	27.668	1.573	0.580	9.732	2.8340	1.781

Notes: Variable definitions provided in Table 2B.
Source: Output from Stata 12 based on data from company financial statements.

Table 3B: Descriptive statistics for the period of dollarization (2009-2013)

Stats	Flev1	Flev 2	Flev	MBR	AS	Prof	GR	Fsize	Fsize2	NDTS2	DR	PR	L	AG	TX	INF	Own
Mean	0.1293	0.066	0.192	1.674	0.600	0.306	0.454	8.032	66.069	0.464	0.878`	0.0954	1.494	50.791	0.1789	0.0124	0.0909
Max	2.365	0.906	2.365	35.748	12.891	13.35	17.570	13.631	185.791	20.454	7.966	3.282	7.682	115	8.320	0.049	0.313
Min	-2.705	-0.098	-2.70	-3.709	0	-18.070	-1	5.67	32.149	-1.084	-14.696	-0.7584	0.0001	6	-0.626	-0.077	0
Std Dev.	0.302	0.157	0.335	4.675	0.886	2.000	2.148	1.252	23.919	2.534	1.8614	0.3563	1.3792	25.610	-0.704	0.0454	0.1340
Skewness	-1.475	3.394	-1.12	5.495	12.456	-0.754	5.207	2.327	2.902	7.132	-5.052	5.081	2.372	0.131	8.443	-1.395	2.233
Kurtosis	51.872	14.906	34.53	34.489	173.512	49.032	34.498	9.341	12.406	52.775	48.612	38.241	9.401	2.603	89.578	3.129	9.211
cv	2.336	2.374	0.119	2.792	1.478	6.532	4.727	0.156	0.363	5.459	2.118	3.732	0.923	0.504	3.937	3.662	1.475
N	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215	215

Notes: Variable definitions provided in Table 2B.
Source: Output from Stata 12 based on data from company financial statements.

Table 4A: Correlation matrix using the period of inflation (2000-2008)

	Flev1	Flev2	Flev	MBR	AS	Prof	GR	Fsize	Fsize2	NDTS	DR	PR	L	AG	TX	INF	Own
Flev1	1.00																
Flev2	0.0473	1.00															
Flev	0.44*	0.63*	1.00														
MBR	0.0133	0.1186	0.19*	1.00													
AS	-0.060	0.2654*	0.18*	-0.0395	1.00												
Prof	0.1943*	0.1736*	0.11	0.0915	0.0786	1.00											
GR	-0.0321	-0.0390	-0.081	-0.0648	-0.0355	-0.0184	1.00										
Fsize	-0.0883	-0.176*	-0.132	-0.0462	-0.284*	-0.0583	0.136	1.00									
$Fsize^2$	-0.0988	-0.146*	0.171*	-0.0505	-0.161*	-0.0472	0.1134	0.7784	1.00								
NDTS	-0.0372	-0.0264	0.081	0.0180	-0.0078	0.460*	-0.0444	-0.0466	-0.0465	1.00							
DR	0.0167	-0.0229	0.042	-0.455*	0.0203	0.0041	-0.0251	-0.0839	-0.0775	0.0023	1.00						
PR	-0.213*	-0.018	-0.16*	0.0010	0.0021	-0.0090	0.0307	-0.0336	-0.0275	0.0048	-0.016	1.00					
L	-0.0884	-0.0537	-0.22*	0.391*	-0.0380	-0.0355	-0.0582	0.0618	0.0574	-0.0462	-0.345*	-0.005	1.00				
AG	-0.0504	-0.0001	0.035	-0.2960	0.1205	-0.0467	-0.0077	0.1089	0.1248	-0.0204	0.2088*	-0.027	-0.0607	1.00			
TX	0.0509	0.0502	0.034	0.1398*	-0.0012	0.0234	-0.0654	0.0502	0.0312	0.0023	-0.0047	0.0301	0.0283	0.0171	1.00		
INF	-0.0527	0.1678*	-0.221*	-0.0679	-0.0142	0.0347	-0.0672	0.3543*	0.4243	-0.0246	0.0026	0.0268	-0.0223	0.0503	0.0082	1.00	
Own	-0.0768	-0.0217	0.213	0.384*	-0.0275	0.0612	-0.0653	0.1201	0.1220	-0.0468	-0.238*	0.0319	0.1034	-0.229*	0.0523	0.0273	1.00

*Significant at 5% confidence level.
Notes: Variable definitions provided in Table 2B.
Source: Output from Stata 12 based on data from company financial statements.

Table 4B: Correlation matrix for the period of dollarization (2009-2013)

	Flev1	Flev2	Flev	MBR	AS	Prof	GR	Fsize	Fsize2	NDTS	DR	PR	L	AG	TX	INF	Own
Flev1	1.00																
Flev2	-0.0022	1.00															
Flev	0.96*	0.07	1.00														
MBR	-0.0073	-0.044	0.30*	1.00													
AS	-0.0424	-0.0043	-0.04	0.083	1.00												
Prof	0.0435	-0.0409	-0.04	0.0607	0.0245	1.00											
GR	0.1486*	-0.0894	-0.04	0.0099	-0.042	0.168*	1.00										
Fsize	-0.0578	0.0882	-0.22*	0.0291	-0.088	0.1872*	0.026	1.00									
$Fsize^2$	-0.0534	0.0635	-0.05	0.0222	-0.094	0.1825*	0.0226	0.7337	1.00								
NDTS	-0.0946	-0.0406	-0.04	-0.0535	0.1108	0.3556*	0.1692*	0.3539*	0.3518*	1.00							
DR	0.027	0.0543	-0.04	-0.0012	0.0146	0.0174	0.0121	-0.0192	-0.0256	0.0116	1.00						
PR	-0.0606	0.1157	-0.05	-0.0176	0.0069	-0.0041	-0.0079	0.0174	0.0096	-0.0357	-0.021	1.00					
L	-0.0856	0.0267	-0.05	0.1025	-0.086	-0.1241	-0.0309	-0.178*	-0.168*	-0.151*	0.0608	-0.0465	1.00				
AG	-0.0544	-0.063	0.01	-0.231*	0.0618	-0.0719	0.025	-0.0394	-0.0329	0.0517	-0.060	-0.0177	-0.0928	1.00			
TX	0.1395*	-0.009	-0.05	-0.0236	-0.014	-0.0344	-0.0007	-0.0144	-0.022	-0.0828	-0.113	0.5885*	-0.0411	0.0127	1.00		
INF	0.097	0.0655	-0.02	-0.0065	0.0047	0.1362*	0.2529*	-0.0276	-0.0391	-0.0167	0.0837	0.0673	0.0097	0.0361	0.0534	1.00	
Own	-0.0766	-0.0375	-0.08	-0.0795	0.0513	-0.0469	-0.084	-0.0682	-0.0766	-0.0953	0.0139	0.142*	-0.0929	-0.094	0.0496	0.0933	1.00

*Significant at 5% confidence level.
Variable definitions are provided in Table 2B. Source: Output from stata 12 based on data from company financial statements.

Static Model

Table 5A: Regression results - static model for 2000-2008

Variable	Short-term debt (Flev1)			Long-term debt (Flev2)			Flev
	1	2	3	1	2	3	
MBR	0.000755 (0.51)	-	-	0.00435* (1.72)	0.00449* (1.92)	0.00382* (1.74)	0.0277 (0.96)
AS	-0.00459 (0.80)	-	-	0.01139 (1.25)	0.01562** (1.78)	0.0212** (2.52)	-0.0341 (1.18)
Prof	0.0106** (3.09)	0.01061** (3.20)	0.01121** (3.18)	0.01418** (2.40)	0.01470** (2.51)	0.0127** (2.21)	-0.0707 ** (1.73)
GR	-0.000374 (0.34)	-	-	0.000383 (0.27)	-	-	-5.33e-06 (0.08)
Fsize	0.00797 (0.27)	-0.02201 (1.15)	0.02704 (1.19)	-0.04297 (0.99)	-0.02787 (0.67)	-0.01842 (0.46)	-0.0371 (1.10)
$Fsize^2$	-0.000723 (0.52)	-0.001195 (1.42)	-0.00153 (1.38)	0.001137 (0.56)	0.00047 (0.27)	0.000428 (0.25)	0.0428 (0.37)
NDTS	-0.007168** (2.30)	-0.00621** (2.06)	-0.00669** (2.15)	-0.009147* (1.68)	-0.00912* ((1.71)	-0.00774 (1.50)	0.08352 (1.33)
DR	-0.00191 (0.29)	-0.0000942 (0.03)	-0.0002933 (0.10)	-0.000919 (0.17)	-0.000605 (0.11)	-	-0.0122 (1.79)
PR	-0.006233** (2.94)	-0.00613** (2.95)	-0.00632** (2.95)	-0.001987 (0.51)	-	-	0.0307 (0.01)
L	-0.00312 (1.28)	-	-	-0.006025 (1.50)	-0.00575 (1.49)	-0.00474 (1.31)	-0.0494 (1.49)
AG	-0.0001288 (0.18)	-	-	0.000208 (0.13)	-	-	0.0112 (0.86)
TX	-0.003844 (0.33)	-	-	0.01532 (0.78)	-	-	-0.0209 (0.50)
INF	-1.22e-06 (0.82)	-7.72e-09 (0.55)	-7.10e-08 (0.90)	8.63e-07 (1.44)	7.48e-08 (1.49)	4.19e-07 (1.02)	-0.00094 (1.58)
Own	-0.5409** (2.44)	-0.5083** (2.36)	-0.4869** (2.13)	-0.4995 (1.47)	-0.5240* (1.70)	-0.3763 (1.26)	-0.398 (1.47)
Own^2	0.7908** (2.39)	0.75745** (2.37)	0.71497** (2.13)	0.6798 (1.30)	0.7114 (1.43)	0.5384 (1.12)	0.5621 (1.30)
DINF	0.0496** (2.16)	0.04115* (1.95)	0.04497* (1.97)	0.09150** (2.45)	0.0845** (2.33)	-0.04444 (1.16)	0.0625** (2.45)
Dind	-0.0643 (1.38)	-0.0623 (1.29)	0.06380* (1.82)	0.07145 (1.33)	0.0688 (1.55)	0.07855** (2.09)	0.0224 (1.33)
MBR^{inf}	-	-	-	-	-	4.21e-08** (4.15)	1.21e-08** (3.25)
AS^{inf}	-	-	-	-	-	2.00e-10 (0.00)	3.00e-09 (0.00)
$Prof^{inf}$	-	-	-3.11e-09 (0.47)	-	-	-	-

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Table 5A Continued

Variable	Short-term debt (Flev1)			Long-term debt (Flev2)			Flev
	1	2	3	1	2	3	
$Fsize^{inf}$	-	-	-2.83e-09 (0.56)	-	-	-	-
$NDTS^{inf}$	-	-	-9.59e-08 (0.21)	-	-	5.45e-08** (1.98)	2.32e-08 (1.28)
PR^{inf}	-	-	1.27e-09 (0.13)	-	-	-	-
DR^{inf}	-	-	3.00e-08 (0.99)	-	-	-	-
Own^{Inf}	-	-	1.97e-08 (0.22)	-	-	-2.61e-07* (1.69)	-2.21e-06* (1.70)
Diagnostic tests	-	-	-	-	-	-	
Wald Chi2	39.82 [0.0022]	37.87 [0.0001]	38.80 [0.0019]	40.20 [0.0012]	42.09 [0.000]	68.07 [0.000]	54.10 [0.000]
R^2	50.31	55.69	66.47	58.18	58.18	65.49	64.21
Hausman	21.34 [0.0932]	34.06 [0.0768]	37.03 [0.0682]				

*Significant at 10% confidence level; **Significant at 5% confidence level.
( ) in parenthesis are the absolute values for the z-statistic.
[ ] inside square brackets are the probability values.
Source: Output from Stata 12.
Model (1) includes all explanatory variables with no interaction terms. Model (2) ignores most of the insignificant variables in an attempt to give a reduced form model. It includes variables that have implications for Zimbabwe and which would affect the explanatory power of the model when they are dropped. Model (3) is an extension of model (2) as it captures the marginal effects of inflation by incorporating interaction terms.

Table 5B: Regression results for 2009-2013

Variable	Short-term debt (Flev1)		Long-term debt (Flev2)		Total debt (Flev)
	1	2	1	2	
MBR	-0.001377 (0.30)	-0.0001827 (0.04)	-0.001997 (0.63)	-0.00147 (0.77)	-0.00056** (1.88)
AS	-0.00829 (0.35)	-0.01072 (0.47)	0.0708 (0.60)	0.00165 (0.53)	-0.0054 (0.50
Prof	0.01259 (1.10)	0.01395 (1.24)	-0.08995 (0.16)	-	-0.013* (1.92)
GR	0.0205** (2.02)	0.02130** (2.15)	-0.00913* (1.93)	-0.007746*(1.68)	0.0019 (0.61)
Fsize	-0.1497 (1.02)	-0.1352 (0.94)	0.1960** (2.10)	0.1819* (1.94)	0.0055 (0.24)
$Fsize^2$	0.00742 (0.97)	0.006698 (0.89)	-0.0961* (1.98)	-0.008879* (1.82)	
NDTS	-0.01258 (1.34)	-0.01271 (1.38)	-0.0474 (0.08)	0.000717 (0.13)	-0.0595* (4.34)
DR	-0.00861 (0.78)	-	-0.0279 (0.50)	0.00419 (0.76)	0.0230* (2.01)
PR	-0.1675** (2.35)	-0.1611** (2.28)	-0.0332 (0.91)	0.03658 (0.79)	-0.013 (0.20)
L	-0.0267* (1.73)	-0.02559* (1.71)	-0.01384 (1.64)	0.0145* (1.73)	0.065 (1.58)
AG	0.0008306 (0.99)	-	-0.00354 (0.56)	-	-0.0012 (1.19)
TX	-0.1136 ** (3.16)	0.1093** (3.10)	-0.0277 (1.60)	-	0.0032 (1.3)
INF	0.35813 (0.76)	0.3538 (0.76)	0.294 (1.38)	0.2893 (1.39)	0.1190 (1.33)
Own	-0.2631 (0.76)	-0.07519 (0.49)	-0.2122 (1.03)	-0.2055 (1.01)	-0.1052(1.21)
Own^2	0.3424 (0.54)	-	0.1706 (0.49)	0.2098 (0.61)	0.1091 (0.32)
Dind	-0.1002* (1.74)	-0.1042* (1.84)	-0.02075 (0.48)	-0.02285 (0.54)	-0.0429 (0.42)

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Table 5B Continued

Variable	Short-term debt (Flev1)		Long-term debt (Flev2)		Total debt (Flev)
	1	2	1	2	
Diagnostic tests					
Wald Chi2	29.55 [0.0298]	27.94 [0.0057]	38.15 [0.0000]	13.08 [0.0000]	33.21 [0.000]
R^2	53.04	62.15	59.85	69.39	61.09
Hausman	13.71 [0.5480]	17.41 [0.2950]	12.91 [0.238]		

*Significant at 10% confidence level; **Significant at 5% confidence level.
( ) in parenthesis are the absolute values for the z-statistic.
[ ] inside square brackets are the probability values.
Source: Output from Stata 12.
Model (1) contains all explanatory variables while model (2) eliminates variables that would not have an effect on the estimated model. The levels of significance and structure of the model would not be changed even after removing the variables missing in model (2). Model (2) becomes a reduced form model using the available data.

Dynamic Model

Table 6A: Regression results for 2000-2008

Variable	Short-term debt (Flev1)			Long-term debt (Flev2)			Total debt (Flev)
	1	2	3	1	2	3	
$Flev_{it-1}$	0.1044 [0.307]	0.0938 [0.404]	0.0582 [0.562]	0.87035** [0.0000]	0.6841** [0.0000]	0.6762** [0.0000]	-0.5507** [0.068]
MBR	0.00190 (1.43)	0.001967 (1.49)	0.00191 (1.48)	0.0001154 (0.06)	-	-	0.0194** (2.27)
AS	-0.009373 (1.43)	-0.01081 (1.56)	-0.00858 (1.19)	0.00342 (0.39)	0.00503* (1.69)	0.00579* (1.85)	0.0116** (2.08)
Prof	0.004522 (1.23)	0.004258 (1.23)	0.00534 (1.38)	0.00461 (1.28)	0.00560* (1.86)	0.00546* (1.91)	0.0098** (2.30)
GR	-0.000836 (1.29)	-	-	-0.000452 (0.73)	-	-	0.00131 (1.17)
Fsize	-0.04539 (1.12)	-0.05365 (1.28)	-0.03334 (0.78)	-0.0583 (1.43)	-0.01835* (1.75)	-0.0197** (2.04)	0.0121** (2.49)
$Fsize^2$	0.00138 (0.93)	0.001596 (1.10)	0.000667 (0.45)	0.00173 (1.34)	-	-	0.00154 (0.55)
NDTS	0.001423 (0.06)	-0.000639 (0.03)	0.002013 (0.07)	-0.0594** (2.49)	-0.0485** (2.93)	-0.0498** (3.01)	-0.0109 (0.64)
DR	0.000674 (0.52)	-0.000402 (0.39)	-0.000359 (0.34)	-0.00281 (1.20)	-	-	-0.0128 (1.40)
PR	-0.00337 (1.03)	-0.00234 (1.08)	-0.002286 (1.10)	-0.00054 (0.86)	-	-	-0.0429 (1.18)
L	-0.00267 (1.47))	-0.002797* (1.71)	-0.003178 (1.62)	-0.00217 (0.75)	-	-	-0.00759 (1.08)
AG	0.0135 (1.57)	0.01282 (1.53)	0.01317 (1.60)	0.0128 (0.86)	-	-	0.0511** (3.38)
TX	0.00110 (0.02)	-	-	-0.00878 (1.23)	-	-	-0.0626 (1.03)
INF	-2.22e-08 (1.49)	-2.15e-08 (1.39)	-8.76e-08* (1.76)	1.84e-08** (2.11)	3.26e-08* (1.94)	1.48e-07 (0.99)	0.0176 (1.15)
Own	-0.7946** (2.18)	-0.7861** (2.05)	-0.8875** (2.57)	-0.1048 (0.39)	0.1393* (1.68)	0.1647* (1.66)	-0.1025* (1.71)
Own^2	1.1984* (1.93)	1.1925* (1.79)	1.3598** (2.31)	0.3329 (0.87)	-	-	1.2100 (0.98)
DINF	-0.000534 (0.03)	0.004976 (0.27)	0.01273 (0.69)	0.00754 (0.22)	-0.00881 (0.54)	-0.00599 (0.33)	0.02139 (0.54)
MBR^{inf}	-	-	-1.31e-08* (1.96)	-	-	-	-1.32e-06* (1.91)
AS^{inf}	-	-	5.81e-08* (1.80)	-	-	-6.19e-08 (1.28)	4.21e-05* (1.88)
DR^{inf}	-	-	3.80e-08** (2.03)	-	-	-	
L^{inf}	-	-	1.26e-08** (2.30)	-	-	-	

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Table 6A Continued

Variable	Short-term debt (Flev1)			Long-term debt (Flev2)			Total debt (Flev)
	1	2	3	1	2	3	
$Prof^{inf}$	-	-	-	-	-	9.83e-10 (0.09)	8.32e-07 (1.23)
$NDTS^{inf}$	-	-	-	-	-	-6.12e-07 (1.57)	
$Fsize^{inf}$	-	-	-	-	-	-4.36e-09 (0.58)	-5.41e-05 (0.75)
Own^{inf}	-	-	-	-	-	-9.45e-08 (1.55)	
Autocorrelation							
z-test 1	-2.3324 [0.0197]	-2.3211 [0.0203]	-2.232 [0.0256]	-1.1714 [0.2414]	-0.0628 [0.9499]	-0.53193 [0.5948]	-2.7704 [0.0056]
z-test 2	-1.3136 [0.1890]	-1.2822 [0.1998]	-1.1815 [0.2374]	0.32208 [0.7474]	0.76311 [0.4454]	0.8695 [0.3846]	0.7078 [0.4791]
Wald Chi2 (15)	273.68 [0.0000]	104.01 [0.0000]	515.71 [0.0000]	1766.13 [0.0000]	64.79 [0.0000]	227.39 [0.0000]	210.19 [0.0000]

*Significant at 10% confidence level; **Significant at 5% confidence level.
( ) in parenthesis are the absolute values for the z-statistic.
[ ] inside square brackets are the probability values.
Source: Output from Stata 12.
Model (1) includes all explanatory variables with no interaction terms. Model (2) ignores most of the insignificant variables in an attempt to give a reduced form model. It includes variables that have implications for Zimbabwe and which would affect the explanatory power of the model when they are dropped. Model (3) is an extension of model (2) as it captures the marginal effects of inflation by incorporating interaction terms.

Table 6B: Regression results for 2009-2013

Variable	Short-term debt (Flev1)		Long-term debt (Flev2)		Flev
	1	2	1	2	
$Flev^{it-1}$	0.7907** [0.027]	0.6061** [0.009]	0.00744 [0.929]	0.00342 [0.968]	-0.625** [0.068]
MBR	-0.0103 (0.69)	-	0.0154 (1.14)	-	0.0237 (1.27)
AS	0.0104* (1.71)	-	-0.00329 (0.55)	-	0.0212** (2.15)
Prof	0.05834 (0.98)	0.0283 (1.11)	-0.0005123 (0.10)	-	0.0109** (2.41)
GR	0.0384 (1.21)	-	-0.00474* (1.83)	-	0.0231 (1.30)
Fsize	-0.3391 (1.05)	-0.0184 (0.58)	0.0436 (0.30)	-	0.0225** (2.13)
$Fsize^2$	0.01775 (0.91)	-	-0.00126 (0.16)	-	0.00243 (0.78)
NDTS	-0.0922** (3.35)	-0.0946** (5.23)	0.0195 (1.56)	0.00451** (7.31)	-0.0211 (0.98)
DR	-0.0320 (0.73)	-0.0402 (0.78)	0.00947 (1.23)	0.00991 (1.38)	-0.0425 (1.20)
PR	-0.02156 (0.22)	-	-0.0654** (2.46)	-0.0765** (2.11)	-0.0129 (1.58)
L	-0.02969 (1.30)	-0.0342 (1.44)	0.01642 (0.89)	-	-0.0863 (1.19)
AG	-0.0326 (1.25)	-	0.02191* (1.92)	0.0225** (2.00)	0.0602** (3.01)
TX	0.02885 (0.57)	-	-0.03484** (2.56)	-0.04369** (2.07)	-0.0721 (1.13)
INF	3.436 (0.71)	3.993 (0.69)	-0.1384 (0.25)	-	0.0172 (1.34)
Own	1.0614** (2.23)	1.024* (1.83)	-0.7052 (1.64)	-0.6762* (1.68)	-0.00215* (1.81)
Own^2	-1.494** (2.12)	-1.4545* (1.96)	0.7291 (1.57)	1.3624* (1.71)	1.1104 (0.88)

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Table 6B Continued					
Variable	Short-term debt (Flev1)		Long-term debt (Flev2)		Flev
	1	2	1	2	
Autocorrelation					
z-test 1	0.8095 [0.4185]	-0.05177 [0.9587]	-1.9533 [0.0508]	-1.7613 [0.0782]	-1.2593 [0.0601]
z-test 2	-1.129 [0.2589]	-1.1994 [0.2304]	-0.9104 [0.3626]	-1.1877 [0.2350]	-0.5109 [0.4616]
Wald Chi2 (15)	11106.37 [0.0000]	2243.96 [0.0000]	1167.56 [0.0000]	271.35 [0.0000]	2110.32 [0.0000]

*Significant at 10% confidence level; **Significant at 5% confidence level.
( ) in parenthesis are the absolute values for the z-statistic.
[ ] inside square brackets are the probability values.
Source: Output from Stata 12.
Model (1) contains all explanatory variables while model (2) eliminates variables that would not have an effect on the estimated model. The levels of significance and structure of the model would not be changed even after removing the variables missing in model (2). Model (2) becomes a reduced form model using the available data.

Mission

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