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RESEARCH PAPER

Firm Investment Behavior under Hyperinflation and Dollarization: A Case of Zimbabwe-Listed Firms

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Abstract
Zimbabwe's experiences with hyperinflation (2000-2008) and dollarization (2009-2019) have implications for investment decisions. The uniqueness of these periods justifies the need for critical analysis as decisions on whether to invest are sensitive to such structural changes. Because of this, the study uses the modified Tobin's Q model to examine the main determinants of investment behavior. A dynamic and non-linear model is applied using data from a panel of 30 listed and non-financial firms from 2000 to 2016. The main determinants of investment decisions are managerial discretion or power, financial constraints, uncertainty, and access to external sources of finance. Findings are sensitive to the period of analysis and consistent with the pecking order hypothesis. Interactions between investment expenditure and other corporate financial decisions are confirmed. Policymakers need to take a differentiated approach to making investment decisions. It is desirable to develop policies sensitive to prevailing market conditions, reduce financial constraints and remove informational inefficiencies to improve the uptake of debt finance and other external funding sources. Monitoring executive decision-making power will reduce entrenchment levels and hence the agency problem. Firms should improve on future financial flexibility by taking less debt, and a dynamic investment strategy sensitive to firm size is more plausible.
Keywords: Investment, Q-theory, Zimbabwe, Hyperinflation, Dollarization.
JEL Classification: G310, G320, G380.

Introduction

Studies on investment behavior (Zhao, 2015; Ferrando et al., 2017) are based on stable environments, and their findings are of limited use to a policymaker in unique markets. Zimbabwe's experience of hyperinflation and dollarization has implications for investment decisions. The uniqueness of this period demands a critical analysis as decisions on whether to invest may change in response to structural shifts. An understanding of investment models and their applicability is essential. This study offers new insights using firm-level data and a modified investment model; in this context, the country's economic crisis dates to 1997 and is primarily caused by inconsistent political and economic decisions. Firms close, leading to a fall in the country's gross domestic product (GDP) (Kararach et al., 2010). The slowdown in business activity causes firms to fail to recapitalize. All sectors suffer as revenues fall, companies close, finance suppliers lose the actual value of loans, and financing options for

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investors are limited (Dewa et al., 2013).

In addition, private capital formation is hindered by a lack of foreign currency, high political uncertainty, and government controls on labor and pricing decisions. In the long term, investment is mainly constrained by the unavailability of finance, especially retained earnings (Jenkins, 1998). Businesses lose revenue due to frequent directives by the government to slash prices. Consequently, cash flow bases dwindle, which limits the scope for investment. Firms face challenges accessing credit and foreign currency in financial institutions, poor infrastructure, and obsolete machinery. However, they survive mainly from speculative rather than production-driven profits (Siyakiya, 2014). Stock market activity is driven by inflation and share consolidations. Firms shift from external sources of finance for investment projects like debt, as interest rates sour, to cheaper internal sources, under hyperinflation.

The economy, after dollarization in 2009, stabilized and experienced a positive growth rate but still faces liquidity challenges due to the loss of the lender of the last resort function by the Reserve Bank of Zimbabwe (Kararach et al., 2010). Seigniorage is no longer possible and the sole dependency on foreign currency further imposes liquidity constraints on firms. The banking sector loses revenue from speculative activities and suffers operationally, while positive growth is witnessed in the tourism sector (Kabote et al., 2013). Market capitalization improves, real interest rates remain positive, and the money supply maintains steady growth. Firms focus entirely on earning production profits and hence the need to recapitalize (Sikwila, 2013). This recovery from hyperinflation in 2009 has implications for investment decisions.

Past studies (Hubbard, 1998; Love and Zicchino, 2006; Kusiyah and Arief, 2017) show that market conditions are imperfect and investment decisions affect firm value. Findings on investment behavior remain inconclusive as they are sensitive to the methodology employed and institutional differences, which limits their applicability in unique economies in this context. In addition, these studies (Wasiuazzaman and Arumugam, 2013; Yidan, 2014; Zhao, 2015; Ferrando et al., 2017) fail to explain how firms make current investment decisions when faced with future financial constraints. There is no explanation for how, in the absence of good cash flows, firms are willing to cut on investment expenditure and continue paying dividends. They fail to explain the applicability of the Q-theory of investment in this unique context. Given this, the following questions are important to a policymaker: Which factors are important in explaining patterns of investment decisions? How important are financing and dividend decisions in explaining investment patterns? Considering that firm managers are at the helm of making investment decisions, how important are their discretionary power and ownership stake in influencing such decisions?

This study confirms the applicability of the pecking order of finance and that the Q-theory does not explain investment behavior in our context. The main factors explaining investment behavior are managerial discretion or power, financial constraints, uncertainty, and access to external sources of finance. Interactions between investment expenditure and other corporate financial decisions are confirmed. The rest of the study is organized as follows: section 2 discusses the theoretical and empirical underpinnings of investment behavior; section 3 outlines the methodology applied; section 4 presents and discusses the main findings and section 5 concludes and draws policy implications.

Literature Review

The Q-theory of investment (Brainard and Tobin, 1968; Tobin, 1969) provides information about future market conditions affecting investment decisions. Investment expenditure is a function of Tobin's Q. Hubbard (1998) suggests that if Tobin's Q controls for firm investment opportunities, then the relationship between Tobin's Q and investment can be represented as:

$$\frac{I_{it}}{K_{i(t-1)}} = \beta_0 + \beta_1 Q_{it} + \varepsilon_{it} \quad (1)$$

Where I_{it} and $K_{i(t-1)}$ are, respectively, investment and capital stock and Q_{it} is the measure of Tobin's Q acting as a proxy for investment opportunities. Markets are imperfect as such a factor like cash flows (CF) becomes important in explaining investment behavior (Love & Zicchino, 2006) as shown in model 2.

$$\frac{I_{it}}{K_{i(t-1)}} = \beta_0 + \beta_1 Q_{it} + \beta_2 \left(\frac{CF}{K} \right)_{it} + \varepsilon_{it} \quad (2)$$

Cash flows (CF) are a proxy for financial constraints. Asante (2000) shows that investment decisions are dependent on neoclassical variables (Tobin's Q), Keynesian variables (internal funds) and uncertainty variables (inflation rate).

The analysis of investment decisions is done in both developed and developing countries. Studies done in the African context produce inconclusive results. For example, Niringiye (2014) argues that the probability of investing is reduced by the level of total leverage while factors like firm size, access to credit financing and corruption increase the propensity to invest. Adelegan (2009) notes that the level of investment is dependent on the growth rate and size of the firm. Older firms rely on internal funds for investment, while financial factors vary across firms. Surprisingly, the study shows that more investment opportunities result in lower expenditure. Again, Onwe and Olarenwaju (2014) posit that inflation and investment expenditure have a positive long-run and a negative short-run relationship. In addition, Nurudeen (2009) opines that inflation has a negative effect on investment expenditure. The level of GDP results in high investment expenditure throughout the review period. Factors like interest rates and financial development have varying effects during the long and short run.

Studies done in the Asian context give results that are inconclusive as well. For example, Hsu et al. (2009) argue that investment expenditure is negatively affected by the level of cash flows. Firms spend more where there are more investment opportunities and less where there is more board independence. Conversely, some previous studies (Ismail et al., 2010, Wasiuazzaman & Arumugam, 2013) show that investment expenditure is positively affected by the availability of cash flows and investment opportunities. Factors like leverage, market-to-book ratio, firm size, tangibility, and firm age negatively affect the level of investment. High investment is mainly driven by the market value of equity, cash flows availability and an increase in new debt and equity (Gebauer et al., 2018; Phan, 2018).

Conversely et al. (2011) argue that investment expenditure can only be increased by firm age and size while dividend payouts reduce it, which conflicts with results by Wasiuazzaman and Arumugam (2013). Yidan (2014) shows that investment expenditure is enhanced by total leverage, availability of equity financing, investment opportunities and firm size, while profitable firms reduce investment. Similarly, Zhao (2015) confirms the importance of cash flows and firm size in increasing investment. However, the same study goes further to show that investment can be increased by both domestic and foreign ownership and profitability. It suggests a non-linear relationship between firm size and investment expenditure. Dong and Gou (2010) argue that large firms invest less. However, share ownership improves investment expenditure.

More so, investment expenditure is largely driven by profitability, availability of investment opportunities, and firm size (Ding et al., 2018; Ahmadi and Kordloei, 2018). Factors like sales level, cash flows, liquidity and interest rates are important in promoting investment (Eklund, 2010; Kuantan et al., 2021). Investment falls due to firm size and age,

which contradicts results elsewhere (Hobdari et al., 2009). In addition, available investment opportunities result in more expenditure and firms face financial constraints. The level of leverage may limit investment flexibility (Degryse and de Jong, 2006). According to Ucan and Ozturk (2011), inflation has a negative effect on investment.

In addition, Marhfor (2012) suggests that firms face financial constraints depending on the country of operation. Investment opportunities have both positive and negative effects on investment. Financial flexibility enhances chances for firms to invest in the future (Ferrando et al., 2017). Investment expenditure has a positive causal effect on cash flows, while the latter has a negative effect on investment (Love and Zicchino, 2006). Firms with more vital financial positions are more cash flow sensitive than firms with weaker financial positions. Higher payout firms are more investment cash flow sensitive than lower payout firms. Firms with high cash flow volatility show lower investment cash flow sensitivities (Cleary, 2006; Bora, 2013).

Methodology and Data

This study employs an extended and modified Q-model of investment (INV). The model tests the effect of managerial discretion or power (OWN, MD), Financial constraints (PROF, CF), uncertainty (INFLN), and access to external sources of finance (FLEV, AS, SIZE) (see Table1, for definitions). If it follows that:

$$INV = F(Q, AS, FLEV, OWN, MD, INFLN, PR, PROF, CF, SIZE) \quad (3)$$

The generalized dynamic model is specified as:

$$y_{it} = \beta_0 + \beta_1 y_{i(t-1)} + \beta_2 X'_{i(t-1)} + \beta_3 X'_{it} + \varepsilon_{it} \quad (4)$$

where: y_{it} is a measure of investment behavior, X'_{it} is a vector of explanatory variables, $X'_{i(t-1)}$ is a vector of lagged selected explanatory variables (FLEV, PROF, SIZE) to help deal with problem of endogeneity (Yidan, 2014). The lagged investment variable is the best predictor of current investment and this improves the ability of the Q model to capture investment behavior (Eberly et al., 2012). The squared ownership variable is included to capture its non-linear effect on investment decisions. β_i represents parameters to be estimated and the error term (ε_{it}) captures individual specific or time-invariant components (μ_i) and a remainder component (ω_{it}).

Estimation Techniques

The analysis period contains a clear structural break in 2008/9 when hyperinflation ended and, subsequently, dollarization was introduced. Estimations are done for the period of hyperinflation (2000-2008) and the period of dollarization (2009-2016) using panel OLS and the generalized methods of moments (GMM) to check for robustness (Arellano and Bond, 1991; Ismail et al., 2010). The panel OLS model is chosen by applying tests on redundant fixed effects on the fixed effects (FE) model and Hausman's (1978) test on the random effects model. Diagnostic tests (coefficient and residual diagnostics) are applied to the best-selected model. The best model is identified by considering the extent to which results are closer to the theory, the value of $R^{2,}$ and the number of significant parameters.

Table 1. Definition of Variables

Variable	Definition	Expected signs	References
Investment decisions (INV1)	Net Fixed Assets (TFA-TL-Depn)/Total Assets	Dependent Variable	Yidan, 2014; Ismail et al., 2010; Rauh, 2006
Investment decisions (INV2)	Capex Yr1/Capex Yr0	Dependent Variable	Zhao, 2015; Marhfor et al., 2012
Investment decisions (INV3)	Capex/Non-current assets	Dependent Variable	Love and Zicchino, 2006. Almeida and Campello, 2007; Ismail et al., 2010; Rauh, 2006; Degryse and de Jong, 2006; Adelegan, 2009
Cash Flows (CF)	(Operating profit plus depreciation)/Total Assets	Positive	Yidan, 2014; Zhao, 2015; Hsu et al., 2009; Almeida and Campello, 2007; Ismail et al., 2010; Rauh, 2006; Adelegan, 2009; Marhfor et al., 2012; Cleary, 2006
Firm size (SIZE)	Log of Total Assets	Indeterminate	Yidan, 2014; Hsu et al., 2009; Wasiuzzaman and Arumugam, 2013; Marhfor et al., 2012
Investment Opportunities (Q)	Market value of equity plus total debt divided by book value of equity	Positive	Love and Zicchino, 2006; Yidan, 2014; Almeida and Campello, 2007; Rauh, 2006; Degryse and de Jong, 2006; Marhfor et al., 2012; Hsu et al., 2009
Profitability (PROF)	Operating income / Total assets	Indeterminate	Yidan, 2014; Zhao, 2015
Leverage (Flev)	Total debt / Total Assets	Negative	Niringiye, 2014; Degryse and de Jong, 2006
Tangibility (AS)	Non-Current Assets / Total Assets	Indeterminate	Almeida and Campello, 2007; Wasiuzzaman and Arumugam, 2013
Dividend Decisions (PR)	Dividend Paid / Operating earnings	Negative	Azam and Shah, 2011; Cleary, 2006
Inflation (INFLN)	Annual Inflation Rate / 100	Negative	Onwe and Olarenwaju, 2014; Gillman and Kejak, 2011; Ucan and Ozturk, 2011; Nurudeen, 2009; Lo et al., 2013; Twine et al., 2015
Insider Ownership (OWN)	Management shareholding / Total shares	Indeterminate	Degryse and de Jong, 2006; Dong and Gou, 2010
Managerial discretion (MD)	Liquid capital / operating income	Negative	Dong and Gou, 2010; Delcoure, 2007; Hoskisson et al., 2002

The study employs firm-level panel data (Verbeek, 2004; Baltagi, 2008) to analyze corporate investment behavior. Data on firm characteristics are obtained from financial statements of 30 non-financial listed firms in Zimbabwe, giving 510 firm years. Comparatively, Hoshi et al. (1991) employ a sub-sample of 24 firms for 21 years; Oliner and Rudebusch (1992) employ a subsample of 21 firms, Kaplan and Zingales (1997) employ 49 firms while Degryse and de Jong (2006) use 132 firms over six years giving 697 firm years.

Results and Discussion

The multicollinearity problem is checked using the Pearson correlation matrix and variance inflation factors. There is no severe problem of multicollinearity between variables (results withheld). Thus, all the variables could be used in the same model without giving biased results. Findings (Table 2) show that fixed effects are not redundant for the three sample periods. Random effects are correlated with explanatory variables. Thus, the FE model would provide the best results in the analysis.

Table 2. Redundant Fixed Effects and Hausman Test

Effects	**Cross Section Fixed**			**Cross Section Random**		
Period	2000-2008	2009-2016	2000-2016	2000-2008	2009-2016	2000-2016
Statistic	14.96	17.16	21.29	49.59	35.28	92.73
d.f	(29.227)	(29.197)	(29.466)	12	12	12
Prob.	0.000	0.000	0.0000	0.0000	0.0004	0.0000

Source: Research finding.

The tests for stationarity (fluctuations around the mean) are done using the methods by Levin et al. (2002) and Im et al. (2003). Panel data modeling using a nonstationary series gives rise to spurious results. Findings show that all variables are stationary at levels (See Table 3).

Table 3. Panel Unit Root Tests

	Levels		**1st difference**	
	Levin et al. (2002)	**Im et al. (2003)**	**Levin et al. (2002)**	**Im et al. (2003)**
Variable	Statistic	Statistic	Statistic	Statistic
INV1	-3.660***	-4.312***	-6.669***	-11.694***
INV2	-6.893***	-10.048***	-14.408***	-17.505***
INV3	-6.212***	-5.752***	-17.078***	-16.710***
Q	-1.418*	-1.298*	-9.510***	-11.676***
AS	-5.612***	-5.422***	-13.757***	-13.763***
FLEV	-2.896***	-3.548***	-10.540***	-13.330***
OWN	-1.566*	-1.710**	-9.305***	-10.118***
MD	-5.527***	-5.291***	-11.348***	-13.090***
INFLN	-11.597***	-6.729***	-18.594***	-13.629***
PR	-8.164***	-7.037***	-11.236***	-13.336***
PROF	-5.997***	-5.325***	-10.899***	-13.201***
CF	-7.738***	-5.825***	-12.484***	-14.290***
SIZE	-3.859***	-3.022***	-13.857***	-13.594***

Source: Research finding
Note: *** significant at 1%; ** significant at 5%; *significant at 10%

Econometric Analysis

The study estimates Tobin's Q model to test its applicability. Investment decisions are examined using both the GMM and FE models. This study replicates the Q model given as follows:

$$INV1_{it} = \beta_0 + \beta_1 Q_{it} + \beta_2 CF_{it} + \varepsilon_{it}\,, \tag{5}$$

where $\varepsilon_{it} = \mu_i + \lambda_t + \omega_{it}$.

Investment decisions (INV1) are a function of Tobin's Q or growth opportunities (Q) and financial constraints (CF). The error term $\varepsilon_{it}$is composed of firm-specific components, μ_i, time-specific component, λ_t and a component varying across firms and across time, ω_{it}. The parameters are expected to be positive, signaling the sensitivity of investment decisions to financial constraints and growth opportunities (see Table 4).

The Wald tests for the joint importance of regressors are all significant at 1%, which confirms the predictive power of the model in explaining investment decisions. The value of the objective function (J-Statistic) is used as a test of the over-identifying moment conditions. The models estimated using GMM are good since the value of the J-Statistic is closer to zero.

The Durbin-Watson (DW) statistic is employed to check for the problem of autocorrelation. The values of DW are at least 1.73 using the FE, while the GMM model has values between 0.67 and 1.80. Findings show higher values of R^2 using FE models compared to those using GMM. The heteroscedasticity problem is dealt with using robust standard errors in all estimations.

Estimations, using both GMM and FE, show that Q-theory by Brainard and Tobin (1968) and Tobin (1969) is not applicable. It is after incorporating market imperfections that internally generated sources of finance become significant in explaining investment decisions. Even after incorporating market imperfections, the measure of growth opportunities (Tobin's Q) shows no significant economic sense. The replacement investment coefficient is negative and significant, suggesting that firms underinvest. The positive coefficient of internally generated funds shows that firms are facing financial constraints, which is similar to the results of previous studies (Yidan, 2014; Zhao, 2015).

Table 4. The Tobin's Q Model

Period	**2000-2016**		**2000-2008**		**2009-2016**	
Variable	**FE**	**GMM**	**FE**	**GMM**	**FE**	**GMM**
C	-0.1633***	-0.1510***	-0.1478***	-0.1334***	-0.1568***	-0.1597***
Q	0.0008	0.0006	-0.0010	-0.0017	0.0003	0.0010
CF	0.1087**	0.2888***	0.1539***	0.3050***	0.1105*	0.2734**
R^2	0.45	0.03	0.49	0.0475	0.64	0.03
Adj R^2	0.41	0.03	0.43	0.0404	0.58	0.02
F-Test	12.37***	-	7.42***	-	11.82***	-
DW	1.73	1.00	2.05	1.28	1.80	0.67
J-Stats	-	2.03E-29	-	5.89E-30	-	1.54E-29
Observations	510	510	270	270	240	240
Wald Joint	129.80***		74.23***		110.99***	

Source: Research finding
Note: *** significant at 1%; ** significant at 5%; *significant at 10%.

The modified Q model is applied to incorporate other variables and capture the particular case of Zimbabwe. Three variables are used to capture investment decisions to identify the best measure under unique market conditions. The study estimates two models for each dependent variable using GMM and FE. However, estimations done using the GMM technique (Arellano and Bond, 1991) are selected as they produce better results when dealing with a dynamic model. Three specific models are available for consideration under each sample period (Table 5). In answering the research question, the three best models, using INV1 as a dependent variable, are identified (Table 6).

The modified Q model is given as follows:

$$INV_{it} = \beta_0 + \beta_1 INV_{i(t-1)} + \beta_2 AS_{it} + \beta_3 FLEV_{it} + \beta_4 INFLN_{it} + \beta_5 OWN_{it} + \beta_6 OWNSQD_{it} + \beta_7 Q_{it} + \beta_8 MD_{it} + \beta_9 PR_{it} + \beta_{10} PROF_{it} + \beta_{11} CF_{it} + \beta_{12} SIZE_{it} + \beta_{13} SIZE_{i(t-1)} + \varepsilon_{it} \quad (6)$$

The models, for analysis, employ INV1 as a dependent variable, and this turns out to be the best proxy for investment decisions in both periods. The main determinants of investment decisions are managerial discretion and power, financial constraints, factors explaining access to finance and debt-related costs, investment opportunities, and dividend policy. The inflation rate is not the best measure of uncertainty in the current business environment. In the case of Zimbabwe, managerial ownership does not affect investment decisions, which would mean

that managers' portfolios are not necessary for explaining investment decisions. These findings are consistent with those by Dong and Gou (2010), who find an insignificant effect.

Furthermore, the study shows that previous investment level is a good predictor of current investment under hyperinflation, which is consistent with previous studies (Fanelli et al., 2002; Asante, 2000), which show that the adjustment to the targeted investment level is not instant. The adjustment factors are 0.66 and 0.43 under hyperinflation and dollarization, respectively.

Managerial discretion (MD) or power explains investment behavior throughout the sample period. The coefficient for MD has the expected negative sign and is significant at 1%. These results are consistent with the theory (Degryse and de Jong, 2006, Beyer et al., 2012), which shows that managers underinvest due to informational problems. In the case of Zimbabwe, high uncertainty grips managers, considering the unstable working environment they are exposed to. The impact of managerial discretion is a function of the environment, firm, and individual choice. Managers are faced with the need to make quick decisions regarding excess cashflows and any upcoming opportunities. The results suggest that investment decisions are a matter of an individual's choice instead of relying on economic rationale. This effect of managerial choice may not have been consistent with the expectations of shareholders who would prefer capital accumulation. The coefficient is smaller, in absolute terms, under hyperinflation compared to dollarization, which reflects the increased uncertainty in the environment, and managers are still not making adequate capital build ups (Wang et al., 2017).

Cash flows positively affect investment decisions during the review period, while profitability is insignificant. The effect of financial constraints on investment is more severe under hyperinflation than under dollarization and using the entire sample. The high investment cash flow sensitivity may indicate that information asymmetry is high, which also increases the cost of external funding. It is possible that firm managers are not aware of the available sources of external finance, hence their decision to use internal funding. These results are consistent with views from past studies on the pecking order hypothesis that suggests that firms rely on internal sources before they can look for outside funding when faced with market imperfections (Ghosh, 2006; Cleary, 2006; Duchin et al., 2010; Marhfor et al., 2012; Ahiadorme et al., 2018).

Access to Finance and Debt Related Costs are important in this study. The coefficient of financial leverage is negative and significant at a 1% level throughout the sample period. High levels of leverage are associated with low capital accumulation. This is possible where the costs of servicing debt are high, as in the context of Zimbabwe. Interest rates increase particularly under hyperinflation as financiers seek to protect themselves. The coefficient of debt is higher during the dollarization period; in absolute terms, it means increasing the cost of debt, as debt financing increases, would make debt and investment to be substitutes, which usually happens when the share of debt in total financing falls as capital increases and vice versa. The average level of debt financing is 26.1%, meaning firms are lowly geared. Firms still have room to increase borrowing, which increases future debt repayment obligations. Increasing the level of debt financing exposes firms to future financial constraints. Consequently, firms might be reluctant to take on board more debt to reduce costs which in turn reduces the firm's value. The negative relationship between leverage and investment decisions is consistent with propositions from past studies (Bikas and Glinskytė, 2021; Myint et al., 2017; Wasiuzzaman and Arumugam, 2013).

The estimated coefficient of asset tangibility (AS) is positive and statistically significant at a 1% significance level. It shows that firms with more tangible assets can use them as security and access external funding. Theory (Ferrando et al., 2017; Almeida and Campello, 2007) shows that tangibility helps firms reduce external financial constraints by reducing borrowing

and agency costs. Our results support the theoretical propositions based on the credit multiplier, which suggests that asset tangibility only affects the investment-cashflow relationship for financially constrained firms.

The coefficient of firm size is positive, as hypothesized, and significant at a 1% level. It follows the theoretical proposition that large firms can easily access financial markets, consistent with previous studies (Azam and Shah, 2011; Yidan, 2014; Farla, 2014). Large firms are not affected by the availability of internal funding since financiers trust them. More so, these firms face less information asymmetry, improving access to alternative finance sources in the future. They are more diversified and can show their ability to pay back their future debt obligations. These results allow us to predict that large firms can mitigate against external financial constraints and the future problem with access to debt markets. However, investment behavior is worsened by the cumulative effect of the size variable. The lagged variable is negative and statistically significant. It shows that firms cannot rely on their past size to explain their current investment decisions. The overall effect is positive since the coefficient of size is higher than that for the lagged variable.

Tobin's Q is a good indicator of growth opportunities and is used as a proxy for investment opportunities. Firms with high levels of growth demand more investment spending (Tobin, 1969; Omet and Yaseen, 2015). The coefficient of investment opportunities is negative and closer to zero during the hyperinflationary period, which means firms face an underinvestment problem. They are failing to take advantage of growth opportunities and recapitalize beyond the level of depreciation and total liabilities. In other words, the net fixed assets are falling due to high investment opportunities. Theory (Hsu et al., 2009; Adelegan, 2009; Ahmadi and Kordloei, 2018) shows that a negative coefficient of investment opportunities is evident where firms are financially constrained. Under hyperinflation, firms would choose to accumulate cash flows rather than invest. Previous studies (Myers and Majluf, 1984; Greenwald et al., 1984) argue that market imperfections make outside capital more costly than internal finance. In our context, firms with growth opportunities invest less than the optimal level, which leads to low growth in the future. However, the coefficient of investment opportunities is closer to zero and makes little economic sense. Investment opportunities are not crucial under dollarization and using the entire sample, though carrying the expected sign.

The coefficient of dividend policy (PR) is positive and significant at a 1% level. This is not consistent with theoretical propositions that dividend payment reduces funds available for investment (Azam and Shah, 2011; Cleary, 2006). This finding is possible where firms rely on internal funds for investment. In the case of Zimbabwe, firms are paying dividends under the two sample periods. It is possible when firms aim to retain investors and at the same time spend a portion of funds on investment. It indicates their ability to access financing channels like equity and debt (Bond et al., 2007).

Furthermore, the non-negative coefficient of dividends is expected, where firms continue to increase payouts while financing investments partly by internally generated funds and external sources. Such actions are further reinforced by issuing equity in addition to borrowing. In Zimbabwe, the stock market provides an effective hedge against inflation, and firms can trade in equity. The stock market activity is still rising under dollarization as evidenced by the current rise in market capitalization. The impact of dividend policy on investment is higher under dollarization than under hyperinflation. It is expected since firms are currently building up their capital stock to recover from the adverse effects of inflation.

Table 5. Specific Investment Models

	2000-2008			2009-2016			2000-2016		
Dependent Var.	**INV1**	**INV2**	**INV3**	**INV1**	**INV2**	**INV3**	**INV1**	**INV2**	**INV3**
Variable	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM	GMM
C	-1.7893***	3.3188*	0.3449*	-0.4014	1.6742***	-0.4870**	-0.7758**	1.9408***	-0.0137
INV1(-1)	0.3373***	-0.2867***	0.2645***	0.5684***	-0.192	0.2378**	0.4976***	-0.2263***	0.2897***
Q	-0.0031*	-0.0038	0.0015	0.0004	7.22E-05	0.0004	0.0003	-0.0032	0.0005
FLEV	-0.1977***			-0.3287***		0.0588	-0.2242***	-0.1128	
FLEV(-1)					-1.0755				
AS	0.8238***	-0.8372*	-0.1479**	0.5006***		-0.2180***	0.6163***	-0.6691**	-0.1425***
OWN	-0.1821		0.0506		0.5578	-0.0523		0.4511	
OWNSQD									
CF	0.1751**	0.8906***	-0.1024***	0.1607**	1.1725**	-0.5754***	0.1969***	0.8511***	-0.2724***
MD	-0.0062***	0.0076		-0.0117***			-0.0070***	0.0082	
INFLN	-5.37E-09	-8.70E-08	4.36E-09		8.8197***	0.4262	-1.30E-09	-4.71E-08	2.80E-09
PR	0.1194*	0.2278	-0.0418	0.1898***			0.1312***		
PROF	0.1222				-0.7427**	0.3024***			0.1145***
PROF(-1)									
SIZE	0.3452***	-0.0662	-0.0687***	0.3639***			0.3562***		-0.0571***
SIZE(-1)	-0.2727***		0.0624***	-0.3559***		0.0357***	-0.3330***		0.0680***
R^2	0.53	0.13	0.19	0.59	0.12	0.39	0.52	0.09	0.266
Adj R^2	0.51	0.1	0.15	0.57	0.1	0.367	0.51	0.07	0.2535
Observations	240	240	240	239	239	239	479	479	479
J-stats	0.5688	6.0538	1.4183	2.5415	2.2143	0.8963	4.0578	1.1324	1.0526
p-value	[0.4507]	[0.3010]	[0.8410]	[0.6372]	[0.899]	[0.9251]	[0.2553]	[0.9512]	[0.9582]

Source: Research finding
Note: *** significant at 1%; ** significant at 5%; *significant at 10%, p-value in [.]

Table 6. Selected Investment Models

	2000-2008	**2009-2016**	**2000-2016**
Dependent Var.	**INV1**	**INV1**	**INV1**
Variable	GMM	GMM	GMM
C	-1.7893***	-0.4014	-0.7758**
INV1(-1)	0.3373***	0.5684***	0.4976***
Q	-0.0031*	0.0004	0.0003
FLEV	-0.1977***	-0.3287***	-0.2242***
AS	0.8238***	0.5006***	0.6163***
OWN	-0.1821		
CF	0.1751**	0.1607**	0.1969***
MD	-0.0062***	-0.0117***	-0.0070***
INFLN	-5.37E-09		-1.30E-09
PR	0.1194*	0.1898***	0.1312***
PROF	0.1222		
SIZE	0.3452***	0.3639***	0.3562***
SIZE(-1)	-0.2727***	-0.3559***	-0.3330***
Adj Factor($\delta = 1-\alpha$)	0.6627	0.4316	0.5024
R^2	0.53	0.59	0.52
Adj R^2	0.51	0.57	0.51
Observations	240	239	479
J-stats	0.5688	2.5415	4.0578
p-value	[0.4507]	[0.6372]	[0.2553]

Source: Research finding
Note: *** significant at 1%; ** significant at 5%; *significant at 10%, p-value in (.).

Conclusion

This study contributed to investment policy discussions within unique markets in the context of hyperinflation and dollarization. It delineated the main determinants of investment behavior. Furthermore, the interactions between investment and other corporate financial decisions (dividend and financing) under the review period were examined. It was achieved using FE and GMM models to estimate an extended version of the Q-model by Tobin. Generally, the study showed that the Q-theory was not applicable even after incorporating imperfections in the model. As a point of departure from the literature, the study employed an extended version of the Q-theory and showed that this model is non-linear and dynamic. The study's main contribution, by analyzing firm behavior, was to enhance our understanding of investment dynamics when faced with structural changes. The analysis widens the scope by showing the impact, on investment policy, of factors capturing managerial discretion or power, financial constraints, uncertainty, and access to external sources of finance. Findings are consistent with the pecking order hypothesis, which provides that firm investments are sensitive to the availability of internal funds. Interactions between investment expenditure and other corporate financial decisions were confirmed.

The study has several implications for investment policy development: Factors affecting investment decisions have differing effects depending on the prevailing market conditions. A differentiated approach is required when making investment decisions under unique market conditions. Financial constraints have implications on the development of the financial system to improve access to external funding and consequently reduce transaction costs and other market imperfections. Improving the debt market and removing informational inefficiencies will enhance access to and uptake of debt finance. Findings imply that firms with collateral can borrow more. It also follows that firms in the service sectors, for example, having fewer tangibles in their balance sheet, have less access to debt financing than those in manufacturing. This argument is consistent with the current environment in which the government targets supporting the manufacturing sector to increase economic activity.

Furthermore, findings have implications on the need for financial flexibility for firms to take up future growth opportunities. Thus, improvements in the debt market may increase the chances for firms to take up future investment opportunities. Increased monitoring and provision of information may help improve decision-making by managers and reduce uncertainty, which allows them to make decisions that are consistent with shareholders' expectations. The negative impact of past firm size suggests that a dynamic investment strategy is required each year to expand the fixed asset base.

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