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Stock market returns and hyperinflation in Zimbabwe

Abstract

The main aim of the study is to examine the long-run relationship of stock returns and its determinants in Zimbabwe during the hyperinflation period of 1998 to 2008. We used the ordinary least squares (OLS) and cointegration tests to check for existence of long run relationship for the variables of interest. The results of this research show that inflation, real income, money supply and exchange rate are the main determinants of stock market returns during the hyperinflationary period of 1998 to 2008. Both global and local economic factors were key determinants of stock market returns. We found that local factors are key drivers of industrial returns, whilst exchange rate our proxy for global factors is key in determining variation in mining returns. The short run estimates are also found to be significant. The key implication that emerges from this study is for policy makers to maintain low levels of inflation and foster high real income growth to boost returns from industrial companies. A competitive exchange rate (a strong local currency) has a positive impact on returns from mining companies listed on Zimbabwe Stock Exchange (ZSE).

Keywords: industrial and mining returns, hyperinflation, local and global factors and co integration relationship and Zimbabwe Stock Exchange (ZSE).
JEL Classification: G15, O11.

Introduction

The period of 1998 to 2008 witnessed the economy of Zimbabwe experiencing a diversity of economic problems. The country was witnessing an unprecedented economic decline[1], widening balance of payment deficit, shortage of basic commodities, high unemployment levels and the inflation surge amongst the host of economic challenges. The nature of institutional and macroeconomic environment in which the Zimbabwe Stock Exchange (ZSE) operates is of paramount importance. Thus, the poor performance of the economy and the institutions governing the fiscal and financial sector became a challenge to the operations of the ZSE.

Government in a bid to mitigate these economic challenges came up with various initiatives to try and improve the situation. However, some of the initiatives instead of becoming the panacea to the problems actually fueled them. The price controls of 2007 which the government tried to implement in a bid to reduce the price surge prompted the surfacing of the black market where basic commodities disappeared from the supermarkets only to resurface in the houses of a few who were then profiteering by selling these commodities at exorbitant prices.

During this period of economic decline, the stock market was heavily contending with economic, currency, liquidity and political risks. Economically, the depletion of the gross domestic product (GDP) as the country lost about 48% of the country's GDP between the period of 1998 through to 2008 as the country moved from a GDP of around US$9 billion in 1997 to about 4.8 billion in 2008 according to Zimbabwean Statistics Office (Zimstat).

The paper is organized into 6 main sections. The first section has provided a background and section 2 gives the rationale of the study. The third section profiles the literature in terms of empirics and theoretical postulates. The fourth section looks at the methodology and empirical results of the study. The fifth section gives data and econometric procedures. Section 6 provides empirical results analisis. The final section concludes the study with some policy implications and recommendations.

1. Background of the study

Zimbabwe was experiencing an inflation surge between the period of 1998 through to 2009 (see Table 2 in the Appendix). The impact of inflation affected the overall performance of the economy leading to the revaluation of the local currency. The Zimbabwe dollar was revalued on three occasions. The 1st revaluation took place in August 2006 where three (3) zeros were dropped. The Reserve Bank of Zimbabwe had hoped inflation would be contained by the currency revaluation of that nature. Despite this valuation, inflation continued to increase. The second revaluation was done on 31 July 2008 and ten zeros were dropped. The third revaluation was done in February 2009 where twelve zeros were dropped though this was not popularized. That puts to twenty five (25) the total number of zeros that were slashed for currency revaluation purpose as shown by the Table 1 in the Appendix.

The country resorted to the revaluation of the local currency rather than addressing the problems which were fueling the weakening of the Zimbabwe dollar. In this regard, inflation continued to skyrocket and this exacerbated the economic crisis in Zimbabwe. Table 2 (see in Appendix) shows the inflation development for the period under investigation. It is clear that Zimbabwe was trapped in a hyperinflation environment. The printing of money to meet government obligations by the Reserve Bank of

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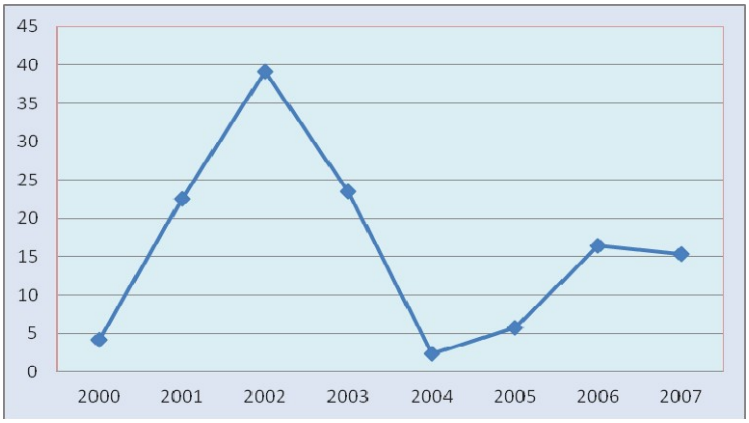
[1] Overall decline in GDP growth as shown in Figure 1a (in the Appendix) was affected by a number of issues such as inflation. The stock market also witnessed a number of delistings and number of mergers of acquisitions that could be of detrimental effect to its performance.

Zimbabwe was one of the major inflation drivers as basic economics highlight that printing of money if not used for financing developmental projects for instance infrastructure is inflationary.

In light of the challenges brought by the inflation surge many people were seeking a mode of investing the little money which they had. In this regard, activity on the stock market improved as most people were now interested in buying shares on the ZSE. Our qualitative analysis shows as inflation has been increasing through the year 2001, the value of stocks being traded on the ZSE was also increasing. This highlights the potential positive correlation between the value of stock traded and inflation during this period. However, the value of stocks traded as a percentage of GDP was witnessing a downward trend (see Figure 2) at very high levels of inflation showing that the value of stock begin to show a negative correlation.

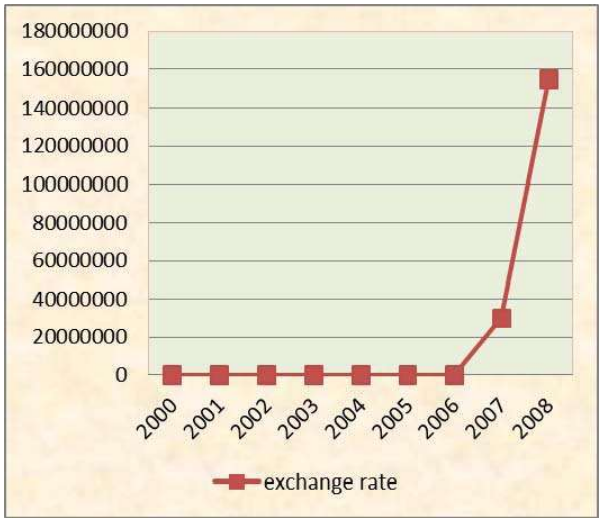
The stock market increased steadily in terms of market size and liquidity. The number of listed companies on the Zimbabwe Stock Exchange (ZSE) increased from 67 in 1998 to 76 in 2002 and further increased to 82 in 2007. Market capitalization (market size) increased from 20% of GDP in 1998 to 246% in 2002 and started to decline in 2003 to 86.9% and 41% in 2005. The market size then witnessed a rebound from year 2006 through to 2007. The level of trading activities in the ZSE also witnessed some mixed trends. The value traded increased sharply from 2.9% in 1998 to 39% in 2002 but this was followed by a decline in 2003 to 23.5% and further to 2.3% in 2004. The value traded increased in 2005 through to 2006 though it declined slightly in 2007 as shown in Figure 2.



Source: World Bank.

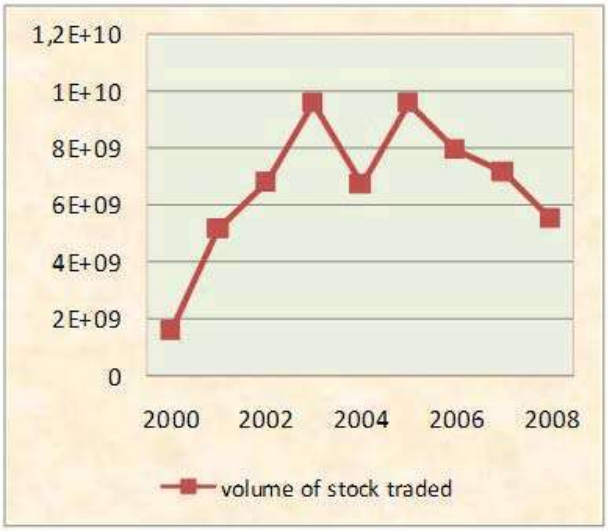
Fig. 2. Total value of stocks traded as a percentage of GDP

Figure 3 and 4 juxtaposed below show that at higher levels of exchange rate (official), the volume of stocks on the ZSE began to decline showing the impact of high exchange rate on stock market performance. Investors have preference to save in environments with predictable exchange rate movements. Figure 3 shows that there was a period of fixed exchange rate regime between years 2000 and 2005 followed by a sharp depreciation as from 2006.



Source: Zimstat.

Fig. 3. Zimbabwe exchange rate



Source: Zimbabwe stock exchange (ZSE).

Fig. 4. Volume of stock traded

2. Motivation of the research work

This paper extends the global literature by considering the relationship between stock returns and inflation in a developing/frontier capital market context, that is, Zimbabwe stock exchange (ZSE). To date, the literature on multifactor models in emerging and frontier markets has focused primarily on either microeconomic effects such as dividend yields and price-to-earnings ratios or the impact of world influences such as the world equity portfolio. Generally, the literature has not examined the potential impact that macroeconomic variables may have on frontier stock market returns.

There has been a debate by scholars[1] on the potential of hyperinflationary environments to destroy the savings and wealth for the trading public. This argument points out to the existence of a negative relationship between stock market returns and inflation. Both savers and firms usually gain from a well-functioning stock market. In times of hyperinflation, with excessive uncertainty in the economy, the savers might face difficulties in selling their shares due to inflationary risk. In that regard, the study gives more insight on how countries experiencing hyperinflation can circumvent the problem associated with trading on the stock market during those episodes, taking a leaf from the experience of Zimbabwe.

Thus countries like Zimbabwe which experienced hyperinflation, high bank failures and slow industrial growth and striving mining performance in the last decade offers a good laboratory to test whether the relationship of stock returns and inflation is an investment illusion? It is worthy investigating too, whether the relationship between inflation and stock returns is similar for industrial and the mining counters. The nominal stock returns are recorded separately in Zimbabwe for industrialist and mining listed companies which offers the opportunity to test this hypothesis. This paper makes an important attempt to understand the nature of returns and process behind their variations in a hyperinflationary country.

3. Related literature

There is a variaty of literature which deals with the relationship between the macroeconomic variables with the stock market returns. Using the vector error correction strategy, Omotor (2011) found the existence of a positive relationship between stock returns and inflation for Nigeria. The findings show that inflation and stock returns do move one to one as postulated by Fisher effect. In addition they found that money and real activities matter for the inflationary process in the country of the study.

The work of Choudhry (2001) considered the relationship between stock market returns and inflation for high inflationary economies and found a positive relationship between the two. His result also shows that past inflation do affect current stock returns. To our best knowledge, Choudhry (2001) paper is the first study to look at the inflation and stock returns nexus for high inflationary countries.

It is generally agreed there is less risk on developed stock markets as compared to emerging stock markets. The vulnerability of the developed markets to global factors tends to be higher as compared to emerging stock markets where the local factors dominate in determining the stock market returns. Bilson et al (2001) found moderate evidence for macroeconomic variables in explaining stock returns in emerging markets. Least squares and principal component analysis (PCA) were used to ascertain both

[1] John Linter (1973). Inflation and common stock prices in cyclical context.

macroeconomic and microeconomic factors that matter for explaining stock returns in emerging economies. The key drivers of stock returns were found to be goods prices (inflation), real activity, money supply, exchange rate and world return index (used to proxy global factors). In terms of microeconomic factors country risk, trade sector variables, interest rates, a regional return index, dividend yield and price-to-earnings ratio were incorporated.

The interesting aspect of this subject is an account of the perceived influence of the local and global factors on the relationship between inflation and the stock market returns. Fifield et al. (2002) used the same approach as Bilson et al. (2001) where both attempt to ascertain the relevance of local and global factors in explaining the stock returns in emerging markets. Their main findings show that though global factors such as world industrial production and world inflation do explain stock returns, local factors play a significant role in explaining stock returns.

Boudoukh et al. (1994) looked at the relationship between industrial returns and inflation in the spirit of Fisher model. They provide a cross-sectional description of the relationship between stock returns and expected inflation. They found a positive relationship between stock returns and inflation that varies in magnitude with the tobacco industrial returns. Stock returns were found to have a negative associative relationship with inflation for transportation industry in their paper. Ozturk et al. (2011) examine the relationship between stock market prices and consumer prices. They employed bounds tests approach for their analysis. The study found the existence of long-run relationship between stock market returns and inflation.

Kumar (2011) carried out a study to examine the casual relationship between stock market and macroeconomic variables for India. The study however did not give much insight on the impact of the selected macroeconomic variables on the performance of the stock market which led to the conclusion that it could be that India's stock market is still in its infant stage.

Muhammad et al. (2010) used the interest rates, exchange rate to analyze the stock market returns for Pakistan for the period of 1998 to 2009. The paper shows how the stock market can reflect the changes in the macroeconomic variables. They found a positive correlation between the exchange rate and stock market returns while on the other hand the interest rates changes exhibited a negative correlation. The focus of the paper was on interest rates and exchange rate as salient determinants of stock market returns. The primary idea of our paper is to focus on the inflationary impact of stock market returns recognizing other fundamental factors noted in literature reviewed.

3.1. Theoretical review. The Fisher hypothesis states that the expected rate of return on common stocks comprises a real return and the expected rate of inflation. The real return on common stocks is assumed to be constant over time. It is assumed the negative returns will exactly outweigh the positive real return, the rate of the common stock are therefore expected to move one-on-one with the rate of inflation. This implies the investors will be fully compensated for erosion in purchasing power caused by inflationary pressures on their investment. Our paper hypothesizes that "the return to common stock experienced a negative relationship with inflation during the period of 1998 through to 2008".

The extension of the Fisher hypothesis to the stock market has been dogged by conflicting evidence in the recent past, where various studies indicate that a negative relationship exists between stock returns and inflation rates. This is surprising because common stock represents a claim to real resources and as a result, their value is expected to increase with inflation. The proposed study aims at testing the Fisher effect in the case of the Zimbabwe stock exchange (ZSE).

At the heart of arbitrage pricing theory (APT) is the notion that a few pervasive factors are the dominant source of covariation among asset returns (Ross, 1976). While the comovements of asset prices suggest the presence of systematic influences, or state variables, theoretical asset pricing models such as the APT are silent as to the number and the identity of these factors. A number of macroeconomic factors can be a source of variations in stock market returns (see also Copeland, 1976).

Most studies have established a contemporaneous correlation between stock returns and trading volume (Karpoff, 1987; Srinivasan et al., 2010). The establishment of a causal relationship between the two variables in a hyperinflationary environment remains elusive. Karpoff (1987), using varying analytical techniques found the returns and volume had a positive correlation in both spot and future markets. He also established that the asset price-volume relationship depends on the rate of information received from the stock market. Srinivasan et al. (2010) used Granger causality test to explore whether equity returns influence volume of stocks traded or volume of stocks traded influence equity returns. The results indicate that equity returns are influenced by volume of stocks traded and volume of stocks traded is also influenced by equity returns for most stock markets. He concludes that trading volume contributes some information to the return of stocks. In general, majority of the studies conclude that stronger equity returns result in more

volume of stocks being traded than the influence of volume of stock traded has on equity returns, particularly for the developed economies.

The paper provides stylized facts on economic environment during the period of hyperinflation in Zimbabwe in the earlier sections. The background gave a qualitative analysis on the direction and extent of the causal relationship between stock market returns and inflation. The next section presents the empirical model that arises from literature and the background reviewed.

4. Methodology and empirical model

The empirical studies review used the stock market returns model with linearity assumption; this suggests an empirical model stated as follows:

$$R_t = \alpha_0 + \alpha_1 \pi_t + \alpha_2 Y_t + \alpha_3 M_t + \alpha_4 E_t + \alpha_5 i_t + \varepsilon_t,$$

where R_t is the stock market returns, that is, either mining or industrial returns, π_t is the inflation rate, Y_t is the real GDP, M_t is the money supply, E_t is the exchange of Zimbabwe dollar per USD dollar and i_t is the treasury bill rate. We expect inflation, money supply and real GDP (income) to have a positive effect on stock markets returns. Inflation will act as a hedge to investable funds, according to Fisher hypothesis. Therefore, the level of inflation and stock market returns moves are expected to move in one-to-one fashion. The stock market investments always carry some premium to compensate investors for risk undertaken and inflationary risk will have a positive premium. The availability of investable resources in the economy in real terms will provide the stock market with additional funds for participating listed counters and hence will boost their share prices and might result in increase in returns overtime (stabilize the price of shares).

The same analogy applies for money supply which might result in increase of resources investable in the stock market. Exchange rate (currency risk) in a hyperinflationary environment has a tendency to depreciate and hence will scare away foreign investors and exporting companies from actively participating in the stock market, hence we expect a negative relationship. The government bonds compete with stocks for investors and we expected the treasury bill rate to have a negative relationship with the stock market returns, they are substitute investment portfolios.

5. Data and econometric procedures

The dataset utilized in our research was obtained from Zimbabwe National Statistics Agency (Zimstat). The data is in monthly frequency. The study utilized data from 1998 to 2008, the period of hyperinflation. During the period covered the inflation figures were consistently above 50% per month with exception of year 1998. The study makes use of secondary data on monthly basis for the period of 1998 to 2008. Data on stock volumes and equity returns came from Zimbabwe stock Exchange and inflation from ZIMSTAT. The study used mining returns and industrial returns as the core variables to study the impact of inflation on the stock market returns. The results will show which counters were heavily impacted by the hyperinflation environment the country was experiencing.

This section presents the analysis of empirical results using time-series data from Zimbabwe. We start the analysis of empirical results with unit roots tests. Secondly, we provide ordinary least squares (OLS) results and compare them with the cointegration tests. The direction of relationship between variables within models is tested using cointegration test by Johansen (1988) and Johansen and Juselius (1990).

5.1. Merits of the econometric method used. To examine the possible relationship between stock returns and various economic factors, the research employs the principal components analysis (PCA) approach to identify relevant factors from the pool of macroeconomic data under consideration. Principal components analysis is a method which significantly reduces the number of variables from p to a much smaller set of k derived orthogonal variables that retain most of the information in the original p variables. The k derived variables which maximize the variance accounted for in the original variables are called principal components. After applying this analysis to the economic data series in Zimbabwe, the dominant principal components are then extracted and used as inputs into a regression analysis to explain the mining and industrial index returns of Zimbabwe Stock Exchange.

The use of principal components analysis is appealing for a number of reasons. Firstly, it allows a large number of theoretically important factors that may affect stock market returns to be considered. Secondly, it can be used effectively in conjunction with multiple regression analysis to address the problems of multicollinearity; specifically, because the k derived variables are orthogonal to each other, multicollinearity should not be present. This approach was also used by Bilson et al. (2001).

The paper proceeds to the main econometric analysis by using cointegration and error correction econometric method to examine the relationship between inflation and stock returns in the Zimbabwe Stock Exchange (ZSE). The cointegration test is advanced since it can assess both short and long run relationship between inflation and returns from the stock market.

5.2. Stationarity tests. Variables which means and variances change over time are known as non-stationary or unit root variables. Economic theory often suggests the existence of long-run equilibrium relationships among non-stationary time series variables. If variables are non-stationary, the estimation of long run relationship between those variables has been shown to be biased on the co-integration method. Hence, the pretesting for unit roots is often a first step in vector error correction modeling. We applied standard Augmented Dickey-Fuller (ADF) tests reported in Table 3. All variables are stationary in first differences; this provides suggestive evidence of presence of long-run relationship. The next statistical test we pursued was the Spearman rank correlation test that helps to ascertain the degree of association of the variables in the model.

Table 3. Results of unit root tests

Variable	ADF(Lags)	Remarks
Mining returns	-10.34	Stationary
Industrial returns	-8.87	Stationary
Real GDP	-3.38	Stationary
Money supply (M3)	-4.93	Stationary
Inflation	-3.60	Stationary
Exchange rate	-5.36	Stationary
Treasury bill rate	-9.35	Stationary
Critical values 1%	**-3.50**	**Critical values @10% = -2.58**
Critical values 5%	**-2.89**	

5.3. Correlation tests. There is high degree of association between industrial returns (manufacturing sector returns) and real GDP, money supply, inflation and exchange rate. There is low level of association between mining returns, and all domestic factors with exception of Treasury bill rate. See Table 4.

Table 4. Spearman rank correlation test

Variable	Industrial returns	Mining returns	Real GDP	Money supply	Inflation	Exchange rate	Treasury bill rate
Industrial returns	1.00						
Mining returns	0.19	1.00					
Real GDP	0.93	0.19	1.00				
Money supply	-0.93	-0.18	-0.995	1.00			
Inflation	-0.93	-0.18	-0.995	0.999	1.00		
Exchange rate	-0.93	-0.16	-0.99	0.995	0.995	1.00	
Treasury bill rate	-0.22	-0.60	-0.23	0.248	0.25	0.23	1.00

We proceed by testing the level of statistical and economic significance of the model by running an ordinary least squares (OLS) regression. The principal component analysis approach we pursued has shown that all the variables in the model are relevant for analysis.

The manufacturing sector returns are positively impacted by the level of economic activities such as real income, level of money supply and Treasury bill rate. The industrial returns are negatively influenced by exchange rate and inflation rate. The result shows that the increased income levels resulted in increased levels of manufacturing sector returns. The increased level of money supply in the economy results in increased manufacturing sector returns. The domestic factors are the ones relevant in determining variation in industrial returns.

6. Empirical results analysis

Table 5. OLS results for industrial return index

Variable	Coefficient	*t*-statistic	Remarks
Constant	-1.9	-1.73	statistically significant
Real GDP	0.41	75.01	statistically significant
Money supply	0.33	2.40	statistically significant
Inflation	-0.39	-2.85	statistically significant
Exchange rate	-0.001	-0.04	statistically insignificant
Treasury bill rate	0.04	2.48	statistically significant
Adjusted R-squared	0.99	F-test-statistic	0.0000

The mining returns index is statistically influenced by the level of money supply in the economy and exchange rate activities. All other economic variables do not significantly influence the mining

returns. The global factors seem to be significant in determining the variation in returns in mining counters than manufacturing sector returns (industrial returns). The mining companies listed at the Zimbabwe stock exchange are owned largely by multinational companies and their output is largely for exports and this explains the relationship. The industrial companies largely import their inputs and contributed insignificantly to export basket during hyperinflation, this explains the relevance of local factors to their variation during the period of analysis.

Table 6. OLS results for mining return index

Variable	Coefficient	*t*-statistic	Remarks
Constant	81.27	4.38	statistically significant
Real GDP	0.04	0.44	statistically insignificant
Money supply	-8.71	-3.85	statistically significant
Inflation	2.15	0.94	statistically insignificant
Exchange rate	4.51	8.68	statistically significant
Treasury bill rate	-0.18	-0.65	statistically insignificant
Adjusted R-squared	0.82	F-test-statistic	0.0000

6.1. Cointegration test results. The present paper utilized the Johansen test for cointegration. There are two important issues in specifying a VAR model: choice of appropriate lag length and number of variables to be included in the model. Based on statistical tests, a VAR with the lag order[1] of one is estimated. Table 7 reports the results for the co integration test under the assumption of unrestricted intercepts and restricted trend which is chosen following summary of all possible models.

Table 7. Johansen test for multiple cointegrating vectors

Test statistics: Mining return index							
Ho	Alternative	Trace	5% Critical value	Prob.**	Max. Eigen	5% Critical value	Prob.**
$r = 0^*$	$r = 1$	153.43	95.75	0.000	49.41	40.08	0.003
$r <= 1^*$	$r = 2$	79.27	69.82	0.007	30.20	33.88	0.129
Test statistics: Industrial return index							
$r = 0^*$	$r = 1$	120.09	95.75	0.0004	46.53	40.08	0.008
$r <= 1^*$	$r = 2$	73.57	69.82	0.02	28.33	33.88	0.20

Notes: * denotes rejection of the null hypothesis at the 0.05 level ** Mackinnon-Haug-Michelis (1999) *p*-values in Eviews.

The trace test indicates that there are two co-integration relations in both mining and industrial return index model at 5% level of significance. We proceed by testing the short run relationship using error correction model. The maximum Eigen test indicates that there are only one cointegration relation in our model. We used the results from the trace test based on econometric theory that suggests its superiority in providing more information about the estimated model. The results of the unidentified co integrated VAR for two cointegrated vectors are hard to interpret economically. Therefore we proceed by testing the error correction model shown in Table 8.

In order to capture the short run dynamics of the model, the error correction terms in the over-identified model are used. Existing theory implies that the error correction term must be either negative or significantly different than zero. The coefficient of the error correction term measures the speed of adjustment toward the long-run equilibrium relationship. In model 1 and 2, the vectors representing mining and industrial return index determinants the error correction term (ECM_{t-1}) carries a negative sign and is significant. This implies that there is adjustment in our stock returns in the long-run, any shock in stock returns in the short run can be corrected by adjustment in other factors.

The factors that are important for short run variation in stock returns are inflation, real income (GDP), money supply and exchange rate. In the short run real income, money supply and inflation are important determinants of mining returns as shown in Table 8. We have noticed that for industrial returns exchange rate is the only significant determinant of variation of these returns. This evidence reaffirms the previous results from OLS as it shows that local factors are important determinants of mining returns in the short run only. The global factors are therefore transmitted through movements in exchange rate matters for short run variation of industrial returns.

[1] The lag length criteria and principal component analysis results can be provided from the authors on request.

Table 8. Error correction estimates

Error correction estimates: Industrial return index						
Model 1	D(Mining return index)	D(Inflation)	D(RGDP)	D(M3)	D(Exchange rate)	D(Treasury bill rate)
$ECM1_{t-1}$	-0.16 (3.75)	0.01 (6.88)	-0.06 (-1.78)	0.01 (6.63)	-0.0006 (-0.10)	0.009 (0.93)
$ECM2_{t-1}$	-4.40 (-2.25)	-0.28 (-4.16)	2.62 (1.59)	0.136 (2.03)	-0.25 (-0.94)	-0.28 (-064)
Error correction estimates: Industrial return index						
Model 2	D(Industrial return index)	D(Inflation)	D(RGDP)	D(M3)	D(Exchange rate)	D(Treasury bill rate)
$ECM1_{t-1}$	-0.98 (-2.07)	-0.10 (-1.62)	-1.57 (-1.36)	-0.04 (-0.82)	-0.56 (-3.07)	-0.46 (-1.52)
$ECM2_{t-1}$	0.44 (0.76)	-0.10 (-1.62)	1.50 (1.08)	0.29 (4.91)	0.33 (-1.51)	-0.16 (-0.43)

Notes: figures in round brackets are *t*-statistics.

Conclusion and policy implication

The results of this paper show that inflation, real income, money supply and exchange rate are the main determinants of stock market returns in the hyperinflationary period of 1998 to 2008 in Zimbabwe. Inflation was found to be a significant determinant of industrial returns variation from OLS regressions. This shows that inflationary trends were more detrimental to trading of the companies that were in manufacturing sector and selling their products in the domestic market. We however found no relationship between inflation and mining returns by OLS estimates. This shows that since most of the mining products are exported to international markets, the prices of stocks from this industry are invariant to domestic factors like inflation. The significance of exchange rate in the OLS estimates of mining returns reaffirms this observation.

The interesting result of this study has been the rejection of Fisher hypothesis. We found a negative and significant relationship between inflation and industrial stock returns during hyperinflationary period in Zimbabwe. Real income and money supply were major factors that were driving activities at the stock market during hyperinflation in Zimbabwe since they are all significant in explaining industrial equity returns.

The main policy implication of this paper for emerging economies investors therefore is the need to participate in counter that has foreign business (tradable sector) during inflationary environments and be guided by local factors on participating in counters that are driven by domestic economic activities such as non-tradable sector.

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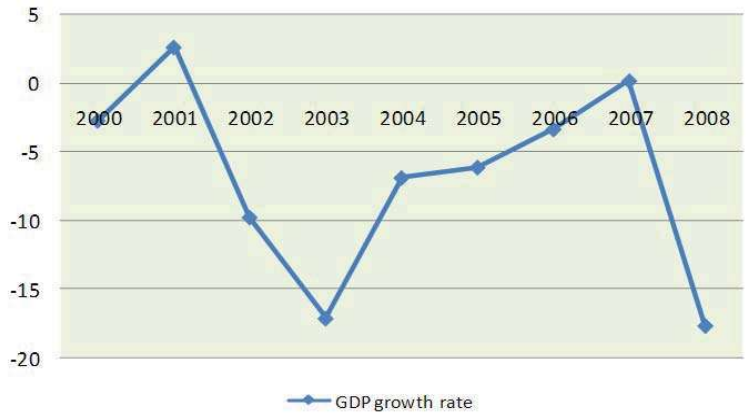
Appendix



Source: Zimstat.

Fig. 1. Economic growth rate for the period of 2000-2008

Table 1. Revaluation of Zimbabwe Dollar

Month	Year	Zeros dropped
August	2006	000
August	2008	000 000 000 0
February	2009	000 000 000 000
Total number of zeros dropped	000 000 000 000 000 000 000 000 0	

Source: Reserve Bank of Zimbabwe.

Table 2. Inflation developments in Zimbabwe

Year	1998	1999	2000	2001	2002	2003	2004	2005	2006	2007	2008
Inflation rate	31.8	55.9	55.7	75	134.5	384.7	381.5	266.8	1033.45	12562.7	231150088.9

Source: Zimbabwe National Statistics Agency (Zimstat).

Table 1a. Unit root test in levels

Variable	ADF(Lags)	Remarks
Mining returns index	1.69	non-stationary
Industrial returns index	-0.02	non-stationary
Real GDP	0.62	non-stationary
Money supply (M3)	0.20	non-stationary
Inflation	2.27	non-stationary
Exchange rate	1.96	non-stationary
Treasury bill rate	-1.16	non-stationary
Critical values 1%		Critical values @10% = -2.58
Critical values 5%		

Remarks on stationarity in levels: All variables in the model are non-stationary in levels.

Table 1b. Performance of ZSE

Year	Market capitalization (%)	Number of listed companies	Value of Shares traded (%)	Turnover ratio (%)
1998	20.5	67	2.9	11.3
1999	36.7	70	3.3	11.9

Table 1b (cont.). Performance of ZSE

Year	Market capitalization (%)	Number of listed companies	Value of Shares traded (%)	Turnover ratio (%)
2000	36.4	69	4.2	11.3
2001	117.6	72	22.6	29.4
2002	246.5	76	39.2	21.1
2003	86.9	81	23.5	13.1
2004	33.4	79	2.3	3.9
2005	41.7	79	5.8	15.3
2006	487.8	80	16.5	6.2
2007	100.8	82	15.4	5.1

Source: World Bank Development Indicators (WDI).