Financial integration and macroeconomic volatility in Zimbabwe

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Abstract

Purpose – Many developing countries are pursuing policies that foster international financial integration after decades of financial repression. Greater access to foreign financial markets may have both positive and negative impact on the performance of the economy. One of the concerns of international financial integration is macroeconomic volatility which may affect both monetary and real sectors. Zimbabwe has chosen to pursue a financial liberalization strategy in the form of imperfect financial integration following periods of excessive domestic shocks. An upsurge of capital flows since the epic of economic crisis in the 2000s has been observed with varying macroeconomic impacts. This study empirically examines the impact of partial international financial integration on the volatility of macroeconomic variables.

Design/methodology/approach – The study utilized an ARDL Model suggested by Pesaran *et al.*, (2003) which is appropriate for short time periods.

Findings – The results show that financial integration has a negative effect on output volatility while insignificant on consumption volatility.

Practical implications – The study recommends that the country should gradually liberalize the capital account and properly sequence financial development reforms in order to minimize losses from global financial integration.

Originality/value – The study used time series for Zimbabwe during a period of external imbalance, repeated economic cycles, sudden stops in capital flows and limited scope of imperfect financial integration. Findings in such an economy will be a referral for policymakers in other economies that would want to pursue international financial integration.

Keywords Financial integration, Consumption volatility, GDP volatility

Paper type Research paper

1. Introduction

Most developing countries were reluctant to liberalise capital accounts, however, in face of growing calls for financial globalisation, most changed stance in order to capitalise on excess liquidity in advanced and emerging markets. Policy redirection towards relaxing capital controls has been observed. This impetus in policy shift is motivated by the predictions of standard theoretical models of international finance which suggest that financial integration generally cause a decline in the relative volatility of consumption and other main macroeconomic variables. Most countries are concerned of macroeconomic volatility as it increases uncertainties in operating environment which distorts the efficient allocation of economic resources and renders macroeconomic policies ineffective. Increased capital mobility has helped to finance the saving-investment gap and consumption which seemed to be erratic for developing countries. As such, in contemporary times, the nexus between international financial integration and economic growth continues to be one of the most

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debated issues in global macroeconomy. Most developing countries are in need of robust evidence on whether financial integration matters for macroeconomic stability. This scarcity of evidence has forced developing countries to resist capital account liberalisation and take advantage of production holidays in safe but low return economies. The prevailing few episodes of capital account liberalisation have hampered efforts for comprehensive studies.

Understanding the macroeconomic implications of financial integration is crucial for sustaining and managing macroeconomic stability. Such evidence is important in contemporary time where the frequency of financial instability has intensified. In such instants, highly financially integrated economies will face macroeconomic instability (Friedrich *et al.*, 2010). Some countries have recorded an increase in macroeconomic instability with detrimental effects on growth while others realised economic benefits. The impact of international financial integration on macroeconomic volatility is not fully understood across countries. Developing and emerging economies are sceptical in increasing the degree of financial integration. The problem is pertinent in developing countries where markets are underdeveloped where gradual capital account liberalisation and policy reversals dominate. Developing countries have history of attracting short term and highly volatile capital inflows usually following changes in investment climate. Such capital inflows are matched by capital flight during periods of policy reversals which have wider implications on economic activities. Therefore, it is imperative to investigate the effects of financial integration on the volatility of key macroeconomic indicators. Most developing countries are susceptible to large income shocks and are incapable of insuring excessive fluctuations in domestic consumption. This study attempted to find solution to the following research question; does international financial integration reduces macroeconomic volatility?

The theoretical literature provides contrasting views on the macroeconomic impacts of financial integration. Classical open-economy macroeconomics literature predictions have often being criticised with new dimensions emerging from recent open-economy macroeconomics. The classical theorists debated on the growth implications in particular consumption and economic growth. The leading hypotheses from the classical theories, asserted that financial integration decreases consumption and output volatility through cross-border income and production risk-sharing which facilitate consumption smoothening (Obstfeld, 1994; Obstfeld and Rogoff, 1995; Baxter and Crucini, 1995). Recent theories have extended the debate to include volatility as a response to persistent capital flow. The new theories hypothesised that financial integration increases volatility under imperfect markets (Von Hagen and Zhang, 2006; Evans and Hnatkovska, 2007; Broner and Ventura, 2016). The later hypothesis seemed to be appropriate for developing countries where market frictions and policy reversals induced capital flight threatens economic stability. This becomes one of the testable hypotheses adopted for this study.

Like most developing countries, Zimbabwe chose to pursue a financial liberalization strategy in the form of imperfect financial integration following periods of domestic shocks. The removal of some restrictions on cross-border financial inflows had significantly improved capital flows. This upsurge of capital flows is believed to have contributed to consumption smoothening in an era of liquidity crisis and spurred economic activities. In some periods, the capital flows have been accompanied by episodes of macroeconomic instability. This study examines the impact of international financial integration on macroeconomic volatility of key variables such as consumption and output using the ARDL cointegration as method of econometric analysis. The approach distinguishes short-run and long-run effects of the financial integration process. Other macroeconomic variables depend on the volatility of these two variables. The country has recorded both periods of good capital inflows in the 1990s and outflows during the crisis period of 2000s. Therefore, this makes the study appropriate since such fluctuations are usually associated with macroeconomic instabilities.

Unlike other studies that investigated the effects of political risk even though it contributes to macroeconomic volatility, the study ruled out the dominance of such risk as the country was on path of political and economic transition: notably the formation of government of national unity with the opposition, a process which culminated in the new government with a second-generation leader. Macroeconomic stabilisation was the major concern over the period. The country gradually opened current account with limited progress on complementary reforms and opted for exchange rate regime switching between managed floating and fixed rates. The macroeconomic implications of such type of integration are relevant for developing countries where gradual approach is a favourable policy option. The literature tend to emphasise on deep integration (Kose *et al.*, 2003; Kalemli-Ozcan and Sorensen, 2010; Hegerty, 2014), neglecting the implications of low levels of integration. The successful promotion of full-fledged financial integration requires an understanding of the transitional effects of implementing the policy. The study therefore deviates from the literature that focused on deep integration which is more appropriate for emerging markets, and therefore contributes to the partial financial integration–macroeconomic volatility literature, especially the output and consumption risk-sharing strand of the literature for sub-Saharan Africa (SSA) (Neaime, 2005; Chen and Chien-Chiang Wang, 2009; Mougani, 2012; Ajide and Osode, 2017), and gives insights on workable integration policy options for Zimbabwe. The rest of the study is organized as follows; Section 2 presents brief discussion of literature while Section 3 explores trend of capital flows and macroeconomic volatility for Zimbabwe. Section 4 explains the methodology whilst Section 5 discusses the results and Section 6 provides the conclusion and policy recommendations.

2. Literature review

Classical theories of international macroeconomics view financial integration as a discretionary macroeconomic policy stabiliser of macroeconomic volatility; excessive output volatility is reduced through production risks insurance (Kalemli-Ozcan *et al.*, 2003; Obstfeld, 1994), others gave a contra view that financial integration increases output variability through production efficiency. Hence, the effect on output is ambiguous, although for developing countries the former is the expected outcome, given the capital deficiency and foreign capital dependence of domestic production. On the other hand, the other strand of literature emphasises on consumption smoothening effects as financial integration encourages income risk-sharing across countries. Domestic residents will have access to global financial assets which facilitate portfolio diversification (Buch *et al.*, 2005; Sutherland, 1996; Obstfeld and Rogoff, 1995; Baxter and Crucini, 1995). Recent strand of literature argued that a non-linear relationship exists, under the imperfect markets assumption (Evans and Hnatkovska, 2007). Using an analytical model, they predicted a u-shaped relationship in that greater financial integration increases consumption and output volatility, however, as integration increases the volatility declines. This shows that financial integration in the short run is susceptible to risk as investors will be highly sensitive to macroeconomic environment and uncertainties pertaining to policy reversal and political developments.

The other strand of the literature provided further extensions on initial conditions, Von Hagen and Zhang (2006) re-emphasised the need to control for developmental variables for a small open economy in a dynamic general equilibrium model. They proved that in the absence of domestic financial frictions, financial integration affects volatility monotonically; however the evidence disappears once domestic financial frictions are considered. This finding could explain the lack of strong evidence in most cross-sectional studies as pooling countries with different degree of financial openness can result in non-monotonic relationship between the variables. Recent theoretical literature seems to suggest ambiguous effects of

financial integration. Broner and Ventura (2016) presented a simple model that allows for imperfect enforcement of domestic debts and interaction of domestic and foreign debts. The analysis reveals that financial globalization has multiple outcomes on economic activity as it can undoubtedly increase domestic capital flight but has an ambiguous effect on net capital flows, investment and growth. The results show that the effects of financial globalisation depend on initial levels of development, productivity, domestic savings and quality of institutions. Therefore, theoretical evidence is pointing to a rather ambiguous or weak effect of financial integration on macroeconomic volatility if certain conditions hold. This ambiguity could explain the reluctance of most developing countries to fully liberalise their capital accounts.

The empirical literature has examined various dimensions of the causal link between financial integration and different macroeconomic variables. No general robust empirical evidence exists for developing countries, and results are mixed regardless of differences in methodological approaches. The problem is exacerbated by the existence of few episodes of financial globalisation as countries are sceptical on adopting financial openness. Some earlier studies found evidence of a non-linear relationship between consumption volatility and financial integration, (Kose *et al.*, 2003) in both developing and developed countries, which implies that the risk-sharing and consumption smoothening may be guaranteed for a specific time period. Recent literature pursuing different avenues has continued the debate. Those studies which considered different categories of capital flows found that capital inflows increases GDP growth volatility particularly in developing countries, whilst capital outflows help to reduce consumption volatility for a sample of 35 industrial and developing countries (Chen and Chien-Chiang Wang, 2009). Some studies emphasises on the catalytic effects of developmental factors on the financial integration–macroeconomic volatility nexus. Consumption growth volatility increases with the level of financial integration in countries with less developed financial markets but tend to decrease in more developed financial markets (Eozenou, 2008), whilst others found no effect on consumption except for a negative effect on output volatility in countries with high degree of financial openness, law and order and initial level of capita compared to other countries (Hegerty, 2014). Recent studies tend to give credence to previous empirical work. Mirdala and Svrcekova (2014) find a non-significant positive relationship between financial integration and macroeconomic instability which is more pronounced in developing countries where capital flows are very sensitive. Time effects of financial integration were examined, Mujahid and Alam (2014) used ARDL model to investigate the long run relationship and found that financial volatility dampens both output and consumption volatility in the short run while in the long run influences only the volatility of output.

Contrary to previous findings that controlled for level the of financial conditions, De Nicolo and Juvenal (2012) adopted a dynamic panel data model and found that international financial integration lowers output growth volatility in both advanced and emerging markets. Therefore, regardless of the level of development, integration tends to reduce output volatility in relatively developed markets. Recent studies have reversed this finding despite using the same methodology, controlling for the level of financial development and institutions, Tekin (2017) confirmed that financial integration decreases consumption volatility if the later are controlled and no impact if they are not included. This clearly shows that institutions matters for integration to be beneficial. The study also investigated the comparative effects of financial integration and domestic income volatility and the results shows that domestic consumption volatility proportionately influences consumption volatility. Therefore it is domestic income volatility that matters on consumption dynamics than foreign capital. Mimir (2016) showed that consumption smoothening is high in highly integrated countries and low in countries with high degree of financial development. In the later countries it is domestic resources that matters in explaining the

consumption smoothing hypothesis. The catalytic function of financial development was rejected.

The empirical debate in SSA has also failed to give robust results where progress on financial integration is very low, and most countries still maintain restrictions on capital inflow. Several African studies focused on the growth effects and ignored the equally important effect on macroeconomic volatility that has stalled prospects of economic growth in most developing countries. The evidence on volatility is at embryonic stage and largely depends on cross-sectional studies of which such evidence cannot be generalised in individual countries given heterogeneity of economic structures. Some studies found that, financial integration increases consumption volatility in countries with unstable economies and unsound monetary and fiscal policy in the MENA region (Neaime, 2005) whilst, Mougani (2012) show that capital flows volatility was accompanied by moderate macroeconomic volatility for a panel of African countries that either liberalized their capital account or not. Grouping countries according to macroeconomic volatility regimes (historical effect), Chinzara and Hoveni (2015) found that for countries with higher macroeconomic volatility, financial openness significantly increases macroeconomic volatility whilst reducing it in those countries with a history of low volatility. In ECOWAS region, FDI was found to dampen the output volatility in countries with a long history of low output volatility compared to those with high volatility; fiscal and monetary growth variables magnified the impacts (Ajide and Osode, 2017). Generally, the empirical evidence depends on cross-country studies, of which results cannot be generalised, given the different degree of financial openness and institutional arrangement.

3. Trends: capital flows and macroeconomic volatility

Most developing countries that embraced the concept of financial globalisation have experienced both negative and positive macroeconomic outcomes depending on the macroeconomic background and sociopolitical environments. Evidence reveal that foreign direct investment is on the recovery path after the global financial crisis of 2008–2009 reaching USD$1.76 trillion of which flows to developing countries were USD$765 billion that represent an increase of 9% as compared to 2014 (World Investment Report, 2017). Flows to Africa decreased by 7% to USD$54 billion, most of the countries are natural resource-based economies where FDI is affected by commodity prices and government policies on privatisation. In comparison to transition economies, FDI doubled to USD$68 billion in 2016 due to mineral exploration activities. Generally, Africa has the highest returns of FDI; it averaged 11.4% for the period 2006–2011 compared to a World average of 7.1% and 9.1% for Asia (Odusola, 2018). Capital must flow from low returns to high return economies and the puzzle can be explained by several factors. FDI flows to Southern Africa are driven by commodity prices and geopolitical risks; in 2016 FDI contracted by 18% to USD$21.2 billion and most countries are not frontier markets.

Highly financially integrated economies generally experience more macroeconomic volatility than less integrated economies. This observed behaviour has a bearing on the scope and strategy adopted by countries wishing to integrate to the global financial hub. Most developing countries have followed a cautious approach in liberalising the capital and trade accounts. Developing countries usually take a gradual approach in liberalising their capital account. The success of the programme depends on proper sequencing of reforms; capital account liberalisation should be complemented with reforms that target financial development, financial stability and implementation of flexible exchange rate regime.

Capital account controls are among those instruments used in exchange controls and they are complemented with exchange rate management policies. This policy pact affects and regulates the cross-border movement of capital in most developing countries which adopted

the exchange rate as a policy for macroeconomic management. Countries receive either FDI or portfolio investments, the former is usually influenced by macroeconomic and political developments, while the latter is sensitive to financial stability, industry profits and stock market performance. Moreover FDI is a long-term commitment form of investment than portfolio and debt investments. Zimbabwe has most of the factors that influence global FDI inflows; attractive extractive sector (gold, diamond and platinum), public and human capital stock; relative stock of institutional capital, tax incentives programmes. During the period, Zimbabwe experienced political, economic and financial instabilities. The 1990s economic boom and political stability was substituted with economic recession and political instability in the 2000s. Investment climate worsened in 2000s when the country enacted laws that affected foreign investments.

In the 1990s, the country was considered as one of the good economic reformers, and some of the macroeconomic frameworks adopted succeeded. Policy inconsistency is the major weakness of the Government and in most cases contributed to economic downturn and capital flight. The country also used exchange rate as a macroeconomic policy which affected internal and external balances. Stringent exchange controls were implemented as a response to severe exchange rate volatility. Shortages of foreign currency increased the risks of currency attacks. In the post-independence period (1980–1990), the country adopted strict exchange controls that included the imposition of a total embargo on dividend and income remittances. Relaxation of exchange control started in 1990s following the implementation of a market-based economic development plan. The current account was fully liberalized in 1994, while few restrictions were removed from the capital account. Eventually, the exchanged rate liberalisation was reversed following the crush of the Zimbabwean dollar in November 1997. Strict exchange controls were reintroduced where the Reserve Bank of Zimbabwe (RBZ) centrally processed all foreign exchange applications. The exchange control policy outcomes included persistent shortages and externalization of foreign currency which culminated in a vibrant parallel foreign currency market. This situation has haunted the country for decades and reached climax during the severe economic recessionary period (2005–2008). Exchange rate policies were not parallelled with capital account liberalisation. Inconsistencies in exchange rate policy affected portfolio investment, a category of capital account whilst the economic crisis reduces FDI inflows. Economic instabilities usually influence stock market volatility which in turn increases short-term risk of global finance.

Zimbabwe is not amongst the top recipient of FDI and portfolio investments. In the SADC region, Mozambique is among the leading countries with a cumulative FDI of USD513.5 million for the period 2006–2010 compared to USD55.1 million for Zimbabwe (UNCTAD, 2012). Less cross-border investments in the form of FDI and portfolio investments were recorded because of the economic crisis that rendered investments less attractive. FDI was also affected by investments laws such as the indigenisation law that compel foreign investors to recede 51% of share ownership to indigenous investors. The policy restricted FDI inflows and encouraged capital flight.

The Zimbabwe stock market is fairly liberalised and integrated with regional markets. During the economic crisis period, the ZSE outcompeted regional markets in terms of performance. However portfolio investments remained low as industries were depressed in an inflationary environment. Inflation, exchange and interest rates affect portfolio investments (Hymer, 1976). Moreover the investments laws forbid foreigners from participation in volatile sectors such as finance and banking. Such capital restrictions have affected the performance of portfolio investments.

During crisis period (2006–2008), a combination of monetary growth induced exchange rate instabilities and the wage-inflation spiral propelled the country to a record hyperinflation environment. Consequently, the domestic currency severely lost value and massive currency

substitution forced the country to dollarize in 2009. A series of landmark events between the 2008 and the 2010 transformed what had been a relatively repressed system into a liberal system though the financial sector remained tightly controlled. The current account was liberalized, and the foreign currency surrender requirements and the exports approvals through exchange control were removed but capital account remained restricted. Unlike other developing countries, Zimbabwe did not take an ambitious process toward capital account liberalization despite the surge in global financial flows. Over the last two decades, there has been an increase in the degree of international financial integration, as the country has removed restrictions on cross-border capital movements. Developments in financial infrastructure and information technology have intensified international financial integration. In post-dollarization era, the RBZ have relaxed restriction on cross-border money inflows in line with changing financial technology and meet ever-changing consumer preferences and tastes. The mobile banking platforms have opened international money transfers which have reduced transaction costs.

Recent global investment trends show a mixture of inflows and outflows. In 2012, the stock of FDI was US$3.75 billion which decreased to US$3.04 billion in 2013, and this represent an outflow of US$711 million (Zimstat, 2013). The major recipient industries in 2012 included financial and insurance activities (10%), information and communication (6%), manufacturing (19%) and mining and quarrying (59%). The sectorial distribution was almost the same for 2013; most of FDI was invested in mining and quarrying (44%), manufacturing (22%), finance and insurance activities (16%) and information and communication 10%. Therefore the flows were biased towards extractive sectors. The FDI rebounded in 2014 and 2015 with values of US$ 4.3 billion and US$4.5 billion even though a net outflow of US$200 million was experienced. Most FDI was distributed to financial and insurance activities (23.94%), and manufacturing sectors (23.88%). In 2015, the manufacturing sector remained the largest recipient sector (29.21%), followed by financial and insurance activities (23.71%) (Zimstat, 2015). The growing influence of the service sector and relative economic stability recorded during the period contributed a lot in attracting FDI.

In comparison, portfolio investment increased from US$87.4 million in 2012 to US$94.2 million for 2013. The major investor countries for 2012 were Mauritius (24%), United Kingdom (19%), USA (16%), South Africa (15%) and Malaysia (11%). Considering sectorial distribution, for 2012, half of all the portfolio investment stock was in the finance and insurance industries, manufacturing (38%) and wholesale and retail trade (6%), while in 2013 most of the portfolio investment was received in manufacturing industry (46%), finance and insurance industry (37%) and agriculture (13%) (Zimstat, 2013). The rapid recovery in these sectors, corporate profits and stock market performance could explain the upward trend. The improvement on investment climate and a prospect of good economic performance further attracted portfolio investment. In 2014, it increased to US$291 million and declined to US$271 million in 2015, resulting in an outflow to US$19 million. Information and communication was the major recipient of portfolio investment (32.80%), finance and insurance activities (25.43%), and real estate activities (20.69%). These sectors also dominated in 2015, with marginal increases in information and communication (35.02%), finance and insurance industry (30.17%) and a decrease in real estate activities (16.77%) (Zimstat, 2015). The relative stability of the financial markets complemented by regulatory and institutional frameworks and the liquidity crisis opened opportunities for financial investments.

The trends on components of global investment for Zimbabwe are presented in Figure 1.

Political and economic risks experienced during the period could provide an explanation to the trend. Notwithstanding the downsizing of political risks due to the formation of government of national unity in 2009 that brought several political reforms. From Figure 1, during the land reform period (2001–2005), the country experienced capital flight as FDI,

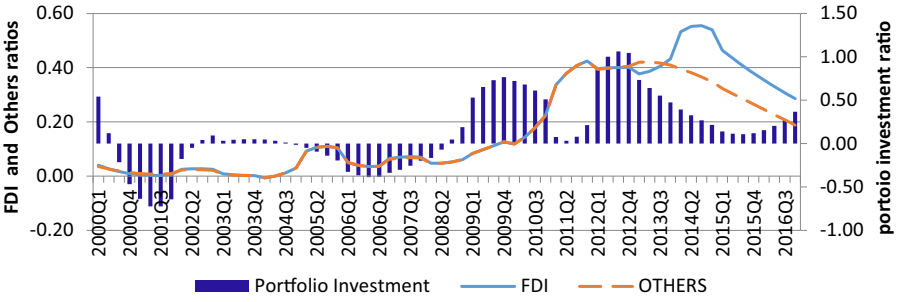


Figure 1.
Components of capital flow values in millions US dollars

Source(s): Author's compilation using data from IMF (2016)

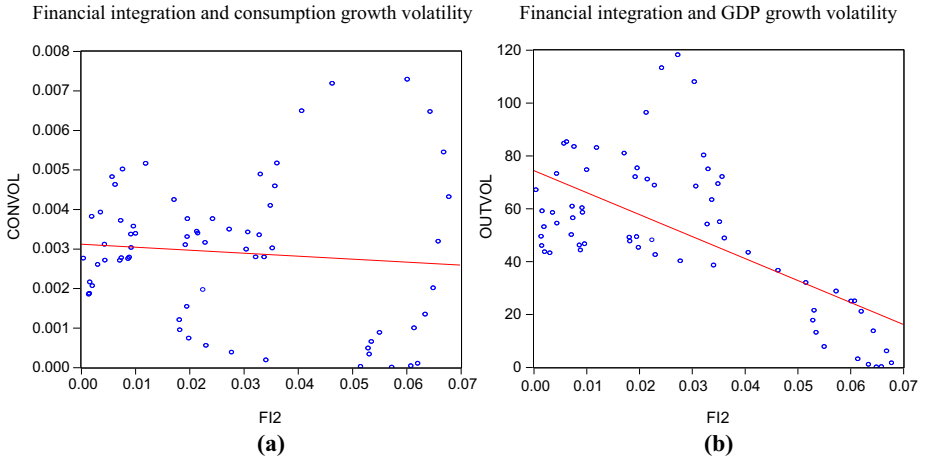
portfolio investment and others category were negative. The indigenisation law and the breakdown of property rights threatened foreign investments. Increases in investment uncertainties due to the political crisis led to closure of industries. The capital flight exacerbated economic decline which eventually affected firm profits and stock market returns. FDI remained negative as the land reform effects propagated to other industries, and the country was in recession. The economic crisis worsened between 2005Q2 and 2008Q4, inflation reached 231 million percent by June 2007 while economic growth recorded −17.7% at the end of 2008. Business confidence was at its lowest as many firms shut down and few scaled down their operations. Elections and political uncertainty, high cost operating environment and low business profitability contributed to further capital flight in all categories of foreign investments.

During the post-crisis period or the dollarization period (2009–2016), the economy was on the recovery path with firms adopting various forms of recapitalisation. News investments and firm expansions were attracted as the multi-currency arrangement stabilised the macroeconomic environment. The political and economic stability reduced investment risks associated with foreign investments. The response of portfolio investments was higher as compared to FDI which increased slowly as investors took time to evaluate the stability of the new political and monetary arrangement (Figure 1). Stable currency neutralised the negative effects of market distortions resulting in a relatively high return on asset investments compared to regional countries, and this could have attracted more short-term investments. The trend was reversed with time, portfolio investment decreased as FDI rises. As from 2014, both FDI and portfolio investments were decreasing, due to resurgence of political uncertainties.

The following Figures 2 and 3 explore the relationship between financial integration and macroeconomic volatility measures. The role of business cycle will also be explored as Zimbabwe faced both economic recession and recovery over the period of study.

The scatter plot (Figure 2) shows that there is a negative linear relationship between financial integration and macroeconomic volatility. The relationship is more pronounced on GDP growth volatility than consumption growth volatility. This reveals that the impact seems to be stronger on GDP growth volatility and weaker on consumption growth volatility.

Figure 3 reveals that financial integration increased since 2000Q1 till 2012Q1 since declined until 2016Q4. GDP growth is volatile relative to consumption growth volatility. A cyclical pattern is observed on both measures over the period and confirms the co-movement of variables. During the crisis period, a (2000–2008) increase in financial integration was accompanied by increase in macroeconomic volatility. In contrast, in the recovery period (2009–2016), an increase in financial integration was preceded with a decrease in



Source(s): Author's compilation using data from World Bank and IMF (2016)

Figure 2. Correlations of macroeconomic volatility and financial integration

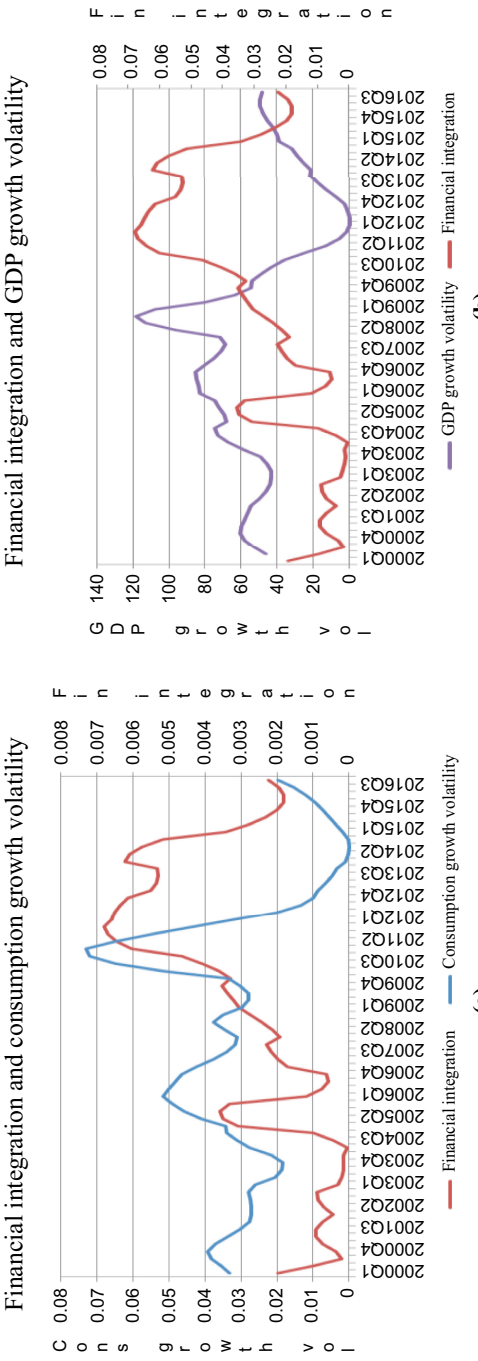
macroeconomic volatility. Macroeconomic stability tends to dampen the volatile effects of financial integration.

4. Methodology and data

The Von Hagen and Zhang (2006) theoretical arguments provided the theoretical model for the analysis. Financial integration affects volatility monotonically is small open economies in the absence of domestic financial frictions, however the effects disappears under domestic financial frictions. The framework is appropriate for the analysis since Zimbabwe has least developed domestic financial systems with financial frictions. The core framework is complemented by Broner and Ventura (2016) who concluded that under imperfect markets, financial globalization has multiple outcomes on economic activity. Financial integration can undoubtedly increase domestic capital flight but has an ambiguous effect on net capital flows, investment and growth.

The study used the ARDL cointegration approach proposed by Pesaran *et al.* (2001), unlike the Johansen and Juselius (1990) technique used in most previous studies. The approach was used in the literature (Mujahid and Alam, 2014) and has several advantages compared to other approaches. ARDL does not make unit root test a requirement unlike other approaches, however the approaches crashes in the presence of integrated stochastic trend of I(2), this is the only reason behind test for unit root. ARDL is also preferable when testing variables with different order of integration unlike conventional methods (Granger, 1981; Engle and Granger, 1987) and under such conditions ARDL gives realistic estimates. Differencing of variables lead to loss of relevant long run information, and the problem is serious if most time series are difference stationary process (Nkoro and Uko, 2016). The Johansen and Juselius (1990) does not cater for this aspect which makes the ARDL preferable. Most importantly to this study is the robustness of the approach in small and finite samples when a single long run relationship exists.

If the one cointegration vector is identified, the ARDL model is reparameterised into error correction model (ECM) which is a simple linear transformation that combine short run dynamics and long run relationship. The ECMs used in this study are presented in eqs 1 and 2.



Source(s): Author's compilation using data from World Bank and IMF (2016)

Figure 3.
Trends of macroeconomic volatility and financial integration

$$\Delta \text{Outvol}_t = a_0 + a_1 w_t + \sum_{i=1}^{m} \gamma \text{outvol}_{t-i} + \sum_{i=1}^{n} \vartheta \ln\text{inv}_{t-i} + \sum_{i=1}^{p} \theta \ln fd_{t-i} + \sum_{i=1}^{q} \tau \ln to_{t-i} + \sum_{i=1}^{m} \rho \Delta \text{outvol}_{t-i} + \sum_{i=1}^{n} \sigma \Delta \ln\text{inv}_{t-i} + \sum_{i=1}^{p} \varphi \Delta \ln fd_{t-i} + \sum_{i=1}^{q} \omega \Delta \ln to_{t-i} + \mu_t \quad (1)$$

$$\Delta \text{Cutvol}_t = a_0 + a_1 w_t + \sum_{i=1}^{m} \gamma \text{convol}_{t-i} + \sum_{i=1}^{n} \vartheta \text{incov}_{t-i} + \sum_{i=1}^{p} \theta \ln ge_{t-i} + \sum_{i=1}^{q} \theta \ln fi_{t-i} + \sum_{i=1}^{r} \tau \ln fifd_{t-i} + \sum_{i=1}^{m} \rho \Delta \text{convol}_{t-i} + \sum_{i=1}^{n} \sigma \Delta \text{incov}_{t-i} + \sum_{i=1}^{p} \varphi \Delta \ln ge_{t-i} + \sum_{i=1}^{q} \theta \Delta \ln fi_{t-i} + \sum_{i=1}^{r} \omega \Delta \ln fifd_{t-i} + \mu_t \quad (2)$$

where convol is consumption growth volatility defined as volatility of constant final consumption expenditure growth rate and outvol is GDP growth volatility as the volatility of real growth rate. The study considered two measures of volatility used in the literature; 5-quarter moving standard deviation and a measure of volatility calculated using the GARCH model (Bollerslev, 1986; Engle, 2001). The former is the common measure adopted in most studies regardless of its weaknesses which include loss of observations and overstating of variability in non-trending series (Brafu-Insaidoo and Biekpe, 2011).The GARCH measure is reliable in high frequency time series. lnge is government expenditure which captures the fiscal effects on private consumption, while lnfi is financial integration variable, and the literature proposes different approaches in measuring financial integration. This study define financial integration as the gross sum of capital flows in the form of FDI, portfolio investments and others flows as captured in the BOP. Several studies utilised this definition (Dogbey and Dogbey, 2016; Mujahid and Alam, 2014) and the *de-facto* measure captures the realised flows (Chinzara and Hoveni, 2015) and intensity rather than the *de-jure* definition which uses dichotomy variables. The variable entered the model as a ratio of GDP. lnfifd is an interactive variable between financial development and financial integration that captures the channel through which financial integration may be effective. Trade openness (lnto) is measured as the ratio of sum of exports and imports to GDP, and controls for the price effects of import penetration and trade induced exchange rate movements on consumption. Investment (lninv) is a ratio of private investment to GDP. Increase in investment affects the productive capacity of firms and investment fluctuations may impact the volatility of output. Financial depth (lnfd) is defined as M3 to GDP, which controls for the role of finance on production such as availability and accessibility of credit to private sector. Income Volatility (incov) is the volatility of income per capita, the variable captures the effects of primary income on household consumption since foreign income plays a complementary role in the consumption path. μ_t is the independent and identically distributed random error term. All data of the variables were collected from the World Bank Development Indicators data base. The data was converted to quarterly series using the HP filter for the period 2000Q1–2016Q4.

The following diagnostic tests have been considered for estimation, Augmented Dickey-Fuller test (Dickey and Fuller (1981), was used to test for unit root while the optimum lag selection is determined using the AIC. The Bounds test procedure for cointegration is performed by testing the hypothesis that all long run coefficients are equal to zero (no cointegration). The F-statistic will be computed for this restriction and if the *F*-statistic is above the upper bound, the null hypothesis of no integration is rejected, if it is below the lower bound, there is no cointegration, and the test is inconclusive if *F*-statistic lies between lower and upper bounds. The decision is considered at 5% level of significance. The model is subjected to the following diagnostic test; serial correlation, heteroscedasticity, model specification and normality using Breusch–Godfrey, Breusch–Pagan, RESET and JB tests, respectively. In the event that autocorrelation and heteroscedasticity are present, heteroscedasticity–autocorrelation consistent standard errors will be estimated. Once cointegration is confirmed, the ECM model is estimated and stability tests performed for parameter and model.

4.1 Robustness test

The results were subjected to sensitivity analysis as the literature argues that certain conditions must prevail for financial integration to be effective. Hence, no robust findings exist, and the results tend to vary according to macroeconomic and financial development factors. We controlled for business cycles (gapgdp) (proxied by output gap) as capital flows are sensitive to economic conditions; level of financial development (cregdp) (defined as credit to private sector as a ratio of GDP) and initial level of income (lnperca) (captured as logarithms of per capita income).

5. Results analysis

5.1 Descriptive statistics

Tables 1 and 2 present descriptive statistics and correlation matrix respectively.

Table 1 shows that macroeconomic volatility depends on type of variables. GDP growth rate is more volatile than consumption growth rate. The measure of financial integration is less volatile and has a mean of 0.029 which may be considered as low as compared to other developing countries. The country has not fully liberalised its capital account and it has a fair degree of financial depth given a mean of 48.3.

The correlation matrix shows that per capita income (lnperca) and government expenditure (lnge) are highly correlated which is usually considered to be undesirable. However, this may not cause a serious problem of multicollinearity as the two variables do not have a functional relation and also that several factors exist which affect standard errors (Maddala, 1992).

From Table 3, no variables are 1(2) and therefore the ARDL MODEL is appropriate to estimate the long run relationship.

5.2 Discussion of results

The regression results are presented in Tables 4 and 5. Only results of the model that measured volatility using the GARCH has been considered, whilst results of the model that used the moving standard deviation measure are reported in appendix (Tables A1 and A2). The results showed that the direction of the impact of volatility was the same with slight differences on the magnitude which does not affect the conclusion.

From Table 4, the bounds test confirmed the presence of long run relationship at 5% level of significance since the F-statistic is above the upper bound. The null hypothesis of no long

Table 1. Descriptive statistics

	OUTVOL	CREGDP	CONVOL	GAPGDP	INCOV	LNFD	LNFI	LNFIFD	LNGE	LNINV	LNPERCA	LNTO
Mean	68.49339	20.11262	0.002865	1.029723	0.083209	3.28397	−3.9675	−0.68353	9.080867	6.576678	6.439293	−2.451383
Median	32.95142	15.30798	0.002888	0.973152	0.04918	3.24626	−3.74376	−0.3696	8.867052	6.729418	6.315464	−2.145893
Maximum	422.4526	108.6551	0.007286	1.552765	0.2156	5.4826	−2.69066	0.577024	9.680631	7.706143	6.943622	−1.51546
Minimum	0.211389	−1.0375	4.39E−08	0.906948	8.34E−05	1.42449	−7.6634	−4.55531	8.478311	3.803477	5.685702	−4.259455
Std. dev.	92.94149	26.22238	0.001805	0.139709	0.078189	1.03357	1.13017	1.146326	0.448796	1.127399	0.399178	0.728398
Skewness	2.437696	2.238105	0.341791	2.425601	0.559659	0.47841	−1.10549	−1.11725	0.262836	−0.744667	0.017847	−1.098798
Kurtosis	9.005758	7.294764	2.741368	8.3433	1.709135	2.80792	3.81085	4.119689	1.318383	2.259578	1.565457	3.113046
Jarque–bera	159.5695	102.6172	1.424469	138.8934	7.784541	2.53975	14.789	16.6579	8.277778	7.376913	5.491168	12.91255
Probability	0	0	0.490547	0	0.020399	0.28087	0.00062	0.000241	0.015941	0.025011	0.064211	0.001571
Observations	64	64	64	64	64	64	64	64	64	64	64	64

Table 2.
Correlation matrix

	Infi	Inperca	gapgdp	cregdp	incov	Infifd	Inge	Ininv	Infd	Into
Infi	1									
Inperca	0.550759	1								
Gapgdp	−0.003291	−0.275166	1							
Cregdp	−0.568356	−0.435535	−0.100087	1						
Incov	0.196096	0.547589	0.102412	−0.310335	1					
Infifd	0.598688	0.726535	−0.313746	−0.000105	0.240691	1				
Inge	0.650123	0.964125	−0.131418	−0.532393	0.602	0.6545	1			
Ininv	0.083747	−0.119787	0.130511	−0.001771	−0.165283	0.041719	−0.149876	1		
Infd	−0.462819	0.184241	−0.343521	0.639507	0.045689	0.432948	−0.007303	−0.048077	1	
Into	0.139803	0.614085	−0.12992	0.028122	−0.035661	0.658026	0.484231	0.067733	0.57091	1

Series	Prob.	Lag	Max lag	Obs.
D(convol)	0.0062	1	10	65
D(cregdp)	0.0052	8	10	58
D(gapgdp)	0.0085	4	10	62
D(incov)	0.0000	0	10	66
D(lnfd)	0.0000	0	10	66
D(lnfi)	0.0000	0	10	66
D(lnfifd)	0.0000	0	10	65
D(lninv)	0.0000	0	10	66
D(outvol)	0.0000	3	10	62
D(lnge)	0.0301	4	10	62
D(lnperca)	0.0129	4	10	62
Dln(to)	0.0785	4	10	62

Table 3.
The unit root test

Variable	Model 1	Model 2	Model 3	Model 4
Short run				
Dlninv	−1.0628 (0.0018)***	−1.0998 (0.0091)**	−1.0274 (0.0398)**	−0.7569 (0.3288)
Dlnfd	0.2312 (0.2472)	0.2761 (0.3882)	0.2730 (0.2399)	0.2325 (0.2651)
Dlnto	1.0383 (0.0245)**	1.0590 (0.0291)**	0.9652 (0.1490)	0.8155 (0.2349)
Dlnfi	0.3366 (0.0567)*	0.3438 (0.0623)*	0.3476 (0.0693)*	0.3578 (0.057)*
Dcregdp		−0.0015 (0.8788)		
Dgapgdp			0.3900 (0.8129)	
Dinperca				−0.5933 (0.6616)
Ecm	−0.3603 (0.0001)***	−0.3605 (0.0002)***	−0.3537 (0.0004)***	−0.3742 (0.0002)***
Long run				
Lninv	−2.9499 (0.0032)**	−3.0506 (0.0 121)**	−2.9045 (0.0471)**	−2.0228 (0.3618)
Lnfd	0.6638 (0.2641)	0.7659 (0.3967)	0.7719 (0.2631)	0.6212 (0.2850)
Lnto	2.8819 (0.0254)**	2.9375 (0.0301)**	2.7286 (0.1496)	2.1793 (0.2655)
Lnfi	0.9343 (0.0864)*	0.9537 (0.0920)*	0.9827 (0.1064)	0.9562 (0.0732)
Cregdp		−0.0040 (0.8788)		
Gapgdp			1.1026 (0.8135)	
Lnperca				−1.5856 (0.6514)
Constant	31.2723 (0.0023)**	31.8921 (0.0044)**	29.2710 (0.1202)	33.8956 (0.0042)
R-squared	0.61	0.61	0.65	0.68
Adj *R*-squared	0.58	0.57	0.60	0.62
Breusch godfrey	0.8675	0.8658	0.4685	0.4145
Breusch pagan	0.7563	0.8415	0.6725	0.7902
Bounds test	5.7285**	3.09*	2.46*	2.23*

Note(s): *, **,**** imply significance at 1%, 5% and 10% respectively

Table 4.
Regression results with dependent variable output growth volatility

run relationship is rejected. Diagnostic test results reject the presence of autocorrelation and heteroscedasticity.

The results from the baseline model 1, reveals that investment rate has a negative and significant effect on output growth volatility in both the short run and long run. This shows that domestic investment rate reduces volatility by almost a proportionate amount. Financial integration has a positive and significant effect on output growth volatility as expected contrary to the production risks insurance hypothesis (Obstfeld, 1994; Kalemli-Ozcan *et al.*, 2003) as expected for developing countries. However the results concur with other theories which argued for an unambiguous positive effect

Variable	Model 1	Model 2	Model 3	Model 4
Short run				
D(convol (−1))	0.8442* (0.0701)	0.8442*** (0.0700)	0.8435*** (0.0710)	0.8328*** (0.0721)
D(incov)	−0.0026* (0.0015)	−0.0027* (0.0015)	−0.0026* (0.0015)	−0.0026* (0.0015)
D(incov (−1))	0.0036** (0.0014)	0.0037** (0.0014)	0.0036** (0.0014)	0.0037** (0.0014)
D(lnge)	0.0002 (0.0009)	0.0003 (0.0009)	0.0002 (0.0009)	−0.0001 (0.0009)
D(lnge (−1))	−0.0020** (0.0010)	−0.0023** (0.0010)	−0.0020** (0.0010)	−0.0021** (0.0010)
D(lnfi)	0.00004 (0.00005)	0.0001 (0.00005)	0.00004 (0.00005)	0.00007 (0.00006)
D(lnfifd)	−0.00009* (0.00005)	−0.0001** (0.00005)	−0.0001 (0.00007)	−0.0001* (0.00006)
D(gapdp)		−0.0003 (0.00028)		
D(cregdp)			0.0000 (0.000003)	
D(lnperca)				0.0004 (0.0006)
ecm(−1)	−0.1254*** (0.0273)	−0.1308*** (0.0277)	−0.1240*** (0.0294)	−0.1254*** (0.0274)
Long run				
Incov	−0.0199** (0.0062)	−0.0188** (0.0060)	−0.0201** (0.0065)	−0.0184** (0.0065)
Lnge	0.0011 (0.0015)	0.0009 (0.0014)	0.0013 (0.0019)	−0.0020 (0.0044)
Lnfi	0.0011 (0.0003)	0.0004 (0.0003)	0.0003 (0.0004)	0.00055 (0.0005)
Lnfifd	−0.0007* (0.0004)	−0.0008* (0.0004)	−0.0008 (0.0007)	−0.0010* (0.0005)
Gapgdp		−0.0023 (0.0021)		
Cregdp			0.0000003 (0.00002)	
Lnperca				0.0033 (0.0045)
Constant	−0.0048 (0.0138)	−0.00003 (0.0135)	−0.0062 (0.0178)	0.0024 (0.0165)
R-squared	0.98	0.98	0.98	0.98
Adj-*R*-squared	0.97	0.97	0.97	0.97
Breusch pagan	0.7546	0.7084	0.8127	0.7276
Breusch godfrey	0.5870	0.6870	0.3022	0.2364
Bounds test	8.206861	5.9**	5.1**	5.1**

Note(s): *, **,**** imply significance at 1%, 5% and 10% respectively

Table 5.
Regression results with dependent variable consumption growth volatility

(Evans and Hnatkovska, 2007) and recent findings in most developing countries (Mougani, 2012; Chinzara and Hoveni, 2015) due to investment uncertainties emanating from a combination of political crisis and macroeconomic instability faced in most developing countries. Zimbabwe experienced severe macroeconomic risks during the period that could have contributed to the increase in volatility. The result contradicts recent findings in other developing countries where a negative effect was confirmed (Mirdala and Svrcekova, 2014). Therefore, the result could explain the observed behaviour in most developing countries of resisting capital account liberalisation as such policy may destabilise the economy. Trade openness positively influences volatility as it increases vulnerability of the economy as the economy will be exposed to external shocks for both short and long run periods. The error correction term (ecm) is negative and significant and this reaffirms the presence of the long run equilibrium. A gradual adjustment of 36% of the disequilibria is corrected in each period. These results of the impact of financial integration are robust in the short run after controlling for financial development, business cycle and initial level of income. However in the long run, the error correction holds only when financial development is controlled.

The results of the impact on consumption growth volatility are reported in Table 5.

The results in Table 5, shows that the bounds test for cointegration rejects the null hypothesis that there is no long run relation while diagnostic test results on autocorrelation and heteroscedasticity rejects these problems as the *p*-values are greater than 5% level of significant. The results reveals persistent of volatility as the previous level of consumption volatility has a positive and significant level. Shocks related to income have a greater destabilising effect on consumption as the memory effect tends to reinvigorate and influence the consumption path. Domestic income volatility has a negative and significant effect while financial integration had a positive but not significant effect. The result confirms that domestic income volatility matters in the prediction of consumption volatility and failed to accept the consumption smoothening and risk-sharing argument (Buch *et al.*, 2005; Sutherland, 1996; Obstfeld and Rogoff, 1995). In most SSA countries, consumption largely depends on domestic income and foreign income has a complementary role. However, when we controlled for financial development, financial integration reduce consumption volatility. A negative and significant interactive term confirms this possibility of consumption smoothening and income risk-sharing. The result supported that financial development is one of the channels through which financial integration could affect macroeconomic volatility. These findings are in line with recent literature (Tekin, 2017; Mujahid and Alam, 2014). The ECM has the correct sign and significant, the disequilibrium is adjusted with a speed of almost 12.5% per each quarter. The speed is relatively lower as compared to output growth volatility. The results of the effect of financial integration are robust after controlling for financial development, business cycle and initial level of income.

6. Conclusion and policy recommendations

Financial integration in highly integrated economies tends to aggravate macroeconomic instability. Developing countries are sceptical in opening their capital account in fear of such instabilities. This study investigates the effects of partial financial integration on macroeconomic volatility in particular output and consumption growth. The results show that financial integration has a positive and significant effect on output volatility while was insignificant on consumption volatility. Therefore the finding supports the hypothesis that financial integration increases output volatility only. The finding confirms the impact under imperfect market assumption of ambiguous economic outcomes as predicted in the complementary theoretical framework (Broner and Ventura, 2016) and does not concur with the no effect under financial frictions (Von Hagen and Zhang, 2006) However, if certain conditions are controlled such as financial development, financial integration reduces the volatility of consumption. The study also found that domestic income volatility reduces consumption volatility as compared to financial integration. This is because consumption in developing countries tends to depend more on domestic income than foreign investments. Developing countries are not highly integrated and income gains from FDI took long to be realised. The finding points to the existence of a trade-off between output and consumption volatility. Zimbabwe has to make a choice whether increases in output volatility fosters economic stability or reduced consumption volatility disincentives investment. The former seems to be of concern as the country is on stabilization path. The study recommends that the country should purse gradual liberalisation of the capital account and implement complementary reforms such as financial development if deep financial integration is the main target.

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Appendix

Table A1.
Partial regression results with dependent variable output growth volatility

	Model 1	Model 2	Model 3
Long run			
Lnfi	−0.356794(0.601340)	0.173620(0.342154)	−0.585995(0.557654)
Short run			
D(lnfi)	−0.756756**(0.266270)	−0.468250*(0.265438)	–
D(cregdp)	0.022327**(0.011032)		
D(gapgdp)		−1.180799(1.079616)	
D(lnperca)			4.037020***(0.912250)

Table A2.
Partial regression results with dependent variable consumption growth volatility

Consumption volatility	Model 1	Model 2	Model 3
Long run			
Lnfi	−0.000395(0.001623)	−0.001026(0.000914)	−0.001806(0.001726)
Lnfifd	−0.004341*(0.2267)	−0.002429*(0.001302)	−0.002008(0.001931)
Short run			
D(lnfi)	−0.0022441**(0.001042)	−0.002742**(0.001027)	−0.002980** (0.001053)
D(cregdp)	0.1.90E−05 (1.75E−05)		
D(gapgdp)		0.005456*(0.003127)	
D(lnperca)			−0.391918*** (0.060320)

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