Current Research Journal of Economic Theory 9(1): 13-24, 2017
DOI:10.19026/crjet.9.5296
ISSN: 4841, e-ISSN: 2042-485X

Submitted: August 29, 2016 Accepted: February 13, 2017 Published: November 20, 2017

Research Article

Modelling the Impact of Short Term Foreign Capital on Economic Growth in the Common Market for Eastern and Southern Africa: A Dynamic Panel Data Analysis

Peter Kitonyo, Tabitha Kiriti-Ng'ang'a and Daniel Okado Abala
School of Economics, University of Nairobi, P.O. Box 30197-00100, Nairobi, Kenya

Abstract: This study uses country-level panel data to investigate the impact of short-term foreign capital flows on the Gross Domestic Product (GDP) per capita in nineteen member countries of the Common Market for Eastern and Southern Africa region (COMESA) region over the 2000-2014 period. The estimates are generated using the one-step Generalized Method of Moments (GMM)-difference estimator. The study found that short-term foreign capital flows and absorptive capacity exerted a significant positive impact on the GDP per capita in the COMESA region. Additionally, the absorptive capacity have a positive effect on the ability of the COMESA region to absorb and benefit from the spillovers of short-term foreign capital flows. The findings suggest that the countries of the COMESA region should encourage short-term foreign capital flows and improve on the absorptive capacity in order to continue realizing a positive economic growth from the said flows (143 words).

Keywords: Absorptive capacity, COMESA, economic growth, generalized method of moments, short-term foreign capital flows

INTRODUCTION

Short-term foreign capital flows comprise a broad range of financial transactions: trade credits, commercial bank loans with a maturity of less than one year and short-term private and public debt issued abroad or sold to non-residents (Rodrik and Velasco, 1999). According to the World Bank (2015), it is classified as other foreign capital flows that include short-term foreign capital flows, net errors and commissions and capital transactions excluded from either the foreign direct investment or portfolio investment in equity and bonds. This study adopts the World Bank definition of short term foreign capital flows.

The short-term foreign capital flows are believed to contribute to economic growth in recipient countries. Economic theory suggests that foreign savings add to domestic savings and stimulate capital accumulation; raise the recipient economy's efficiency via improvement of resource allocation, intensity of domestic competition, interaction with human capital, deepening of domestic financial markets or reduction of capital costs for domestic entrepreneurs; and lower consumption risks over various states of nature through enlargement of choices for portfolio diversification and appropriate sharing of risks between capital exporters and importers (Reisen, 1998). The short term foreign capital flows also provide foreign exchange that can be invested in productive activities and capital transactions boost the investment levels in host nations. Despite these advantages policy analysts and researchers have not accorded considerable attention to the relationship between short term foreign capital flows and economic growth in developing countries.

The volume of short term foreign capital inflows has been on the rise in Africa and sub-Saharan Africa in general and the COMESA region in particular. According to the World Bank (2015) data the Short Term Foreign Capital Flows (STFCF) represented by the sum of the net short-term capital and capital transactions grew since 2000. The short-term foreign capital flows rose from United States Dollar (USD) 1.94 billion in 2000 to USD 8.84 billion in 2014. A similar pattern of upward growth is shown by the net short-term foreign capital flows as a percentage of GDP that rose from the -2.53% in 2000 to positive 5.60% in 2014. However, the net short-term foreign capital flows fell to negative levels between 2004 and 2007 before rising steadily after 2007. Additionally, the growth in the first half of the period under study was slightly less than the growth in the last half of the study period.

Africa has experienced fast growth since 2000 and sub-Saharan Africa is the third fastest growing region (5.59% per annum) after emerging markets and developing economies (5.98%) and developing Asia (8.39% per annum) (International Monetary Fund, 2015). Further, although the COMESA region realized

Corresponding Author: Peter Kitonyo, School of Economics, University of Nairobi, Kenya, Tel.: +254 20 722778397

an average GDP per capita growth rate of 1.90% per annum during the same period, many member countries of the region are the fastest growing in Africa (International Monetary Fund, 2015)[1]. However, the growth impact of the increased short term foreign capital in the region is not well known. This is because, to the best of our knowledge, there are no similar studies conducted in the region in the past and previous regional empirical studies carried out omit all the COMESA countries from their analysis. They include Baharumshah and Thanoon (2006), Reisen and Soto (2001) and Rodrik and Velasco (1999), among others. Further, empirical evidence suggest that the growth impact of short-term foreign capital flows is conflicting. The results shows that the impact is either positive, negative or even indeterminate. For instance, Corbo and Herna´ndez (1996), Gruben and Mcleod (1998) and Kitonyo (2016) show that short-term foreign capital flows exert a statistically significant positive impact on the economic growth while Baharumshah and Thanoon (2006), Reisen and Soto (2001) and Rodrik and Velasco (1999) found short-term foreign capital flows to have a negative effect on growth.

The main objective of this study is to establish the growth effect of short term foreign capital flows in nineteen developing countries of the COMESA region over the time period 2000-2014. It tests the hypothesis that high volumes of short-term foreign capital flows exert a significant positive impact on the GDP per capita of the COMESA region by applying a dynamic panel data analysis and employing the one-step Generalized Method of Moments (GMM) estimation technique suggested by Arellano and Bond (1991).

RELEVANT LITERATURE

Economic theory shows that the short-term capital and capital transactions can contribute to economic growth in recipient countries. The short-term foreign capital flows that can provide foreign exchange that can be invested in productive activities and complement savings while the capital transactions can raise the investment levels in host nations. According to the neoclassical growth theory, short-term capital flows contribute to accumulation of capital by providing financial resources that bridge the gap between domestic investment and domestic savings. Consequently it contributes to economic growth. However, the neoclassical growth model suggests that the diminishing return to physical capital may limit the growth effects of short-term capital flows to the short run period. The endogenous growth theory predict that short-term capital flows support long-run economic growth through providing funds for investment and acquisition of new technological products.

Economic theory adds that foreign savings and short term flows promote economic growth. They complement to domestic savings and stimulate capital accumulation; raise the recipient economy's efficiency via improvement of resource allocation, intensifying competition in the domestic economy, interacting with human capital, deepening local financial markets and lowering costs of capital for domestic investors; reducing risks of consumption over different states of nature via enlarging choices for portfolio diversification choices and facilitating for appropriate risk sharing between capital exporters and importers (Reisen, 1998; Reisen and Soto, 2001).

Short term foreign capital and domestic savings are associated with positive long-term economic progress experienced in the East Asian countries in the 1990s. Baharumshah and Thanoon (2002) argued that short-term foreign capital flows benefitted the host East Asian countries by filling the technological and investment gaps and accelerating their economic growth. They also cautioned that such increased inflows, however, may also hinder domestic economic progress when they lead into economic instability and inflationary pressures and widen imbalances in the current account. The large deficits in the current account balance observed in the late 1980s-mid 1990 reflect this savings-investment gap (Baharumshah and Thanoon, 2002). This was demonstrated by the East Asian financial crisis of 1997/98.

Further, Baharumshah and Thanoon (2002) observed that short term foreign capital inflows increased domestic investments and increased investments contributed to the achievement of higher growth. This attested to the investment-led growth hypothesis. The hypothesis argues that higher growth invites more investment and more investments attracted further capital flows. This virtuous cycle of capital inflows and economic growth was indeed an integral part of what was called the Asian miracle. Foreign capital inflows in Asia were channeled to investment as opposed to consumption. The high levels of investment witnessed in East Asia were supported by savings drawn mainly from the rest of the world. The domestic savings rate was already high in most of the East Asian countries, especially in Malaysia and Singapore, but the rate of investment was even higher. The high investment by both the private and public sectors had contributed to the impressive growth records in the period prior to the financial crisis. These economies achieved average annual rates well above the world's average growth and also managed to sustain such rates for a long period (Baharumshah and Thanoon, 2002).

Empirical evidence has also shown that short term foreign capital have positive significant effect on the growth of recipient countries. Researchers such as Corbo and Hernandez (1996) argued that controls on short-term foreign capital flows may be counterproductive because the flows the controls discourage might contribute to growth. Using data from 18 Asian and Latin America countries, Gruben and Mcleod (1998) showed that an increase in the share of

portfolio equity capital inflows to GDP is positively and significantly related to domestic savings. Additionally, Hussein and Thirlwall (1999) and Lahiri (1989) established that foreign capital enhances economic growth.

The literature has also raised concerns about the deleterious effects of flows of capital on the recipient countries. This is especially true for the flows that create debts, including portfolio bond flows, long-term and short-term bank credit. The theory of sovereign lending by Eaton and Gersovitz (1981) and Cline (1995) focus on the benefits of consumption smoothing to countries that are prone to shocks. However, debt is serviced independent of the stream of income of the borrower, while equity finance participates in the earnings on investment of the borrower. It can thus be argued that equity finance provides the benefits of lower fluctuation in the consumption of the borrower, but that the potential incentive for borrowers to invest, as opposed to consumption, is higher under debt-than under (Corsepius *et al*., 1989).

Additionally, short-term debt, except for trade credit, is especially inspired by consumption smoothing, but can weaken the case for the higher incentive compatibility of debt finance (Reisen and Soto, 2001). The authors explored the independent growth effect of various categories of private capital flows in a sample covering 44 emerging market countries over twelve years (1986-1997). The study provided panel data analysis, corrected for standard growth determinants and measured the independent growth effect of foreign direct investment, portfolio equity investment, bond flows, as well as short-term and long-term bank lending. The findings suggested that developing countries should not solely rely on national savings, but rather should encourage foreign direct investment and portfolio equity inflows so as to stimulate long-term growth prospects.

Reisen and Soto (2001) also pointed out that the surge of foreign capital also carries an inherent risks. It exposes the recipient country to external shocks. Some authors argue that the increase in capital mobility gives mixed blessing for developing nations. They opine that short-term capital flows can increase the fragility of the financial system and destabilize the economy. A case in point are the financial crises in the 1990s-they not only pose a threat to the financial system but also undermine the economic progress of the developing nations. The financial turmoil was mainly triggered by capital reversal leading to the collapse of exchange rates and the fall of asset prices to unprecedented levels. This in turn had an adverse impact on external debt obligations and undermined the stability of the financial system of the crisis-affected countries. Perhaps, an important lesson learned from the Asian (1997-1998), Mexican (1994-1995) and Brazilian (1999) crises is that foreign capital, especially short-term capital, can exit as easily as it enters in an open economy. Additionally, it is more volatile than other categories of capital flows and its sudden reversal tends to have destabilizing effects on the host country.

The risks to short-term foreign capital flows operate through magnifying welfare losses due to distorted consumption and production patterns. This has been shown by immiserizing inflows models. For instance, Brecher and Diaz-Alejandro (1977) showed that countries will be worse off if the foreign savings are attracted into protected sectors, as long as foreign capital receives the full value of its marginal product. While trade liberalization and structuralre form in most capital-importing countries make the argument of immiserizing inflow less relevant in its original presentation, ill-regulated financial sectors or implicit credit guarantees have often created credit boom distortions that foreign flows have magnified (McKinnon and Pill, 1997). They also operate via generating bankruptcies and output losses due to abrupt reversibility. This risk is attached to foreign savings in that they can be suddenly withdrawn. Because the withdrawal causes a slump, it also acts to reduce national savings, given the fact that growth has been shown to precede and cause savings (Carroll and Weil, 1994). High pre-crisis per capita growth turned to a severe slump in 1998. Calvo (1998), analyzing the mechanics of sudden stops in international capital flows, emphasized that negative swings in foreign savings may result in widespread bankruptcies, destroy local credit channels and make human capital obsolete. Assuming that consumption is more intensive in non-tradables than investment, Calvo (1998) argued that the negative output effects of a cut in capital inflows are stronger, the higher the share of consumption in a country's aggregate demand. To the extent that cuts in domestic absorption are focused on tradables, there is less need for a lower real exchange rate to restore payments equilibrium. The larger the real devaluation, the deeper will be the ensuing financial turmoil. For the same reason, Rodrik and Velasco (1999) observe that greater short-term debt exposure is associated with more severe crises when capital flows reverse.

Rodrik and Velasco (1999) used data from the Institute of International Finance, covering 32 emerging-market economies over the period 1988-1998 to highlight the negative effects that short-term flows may have on the economy. In their theoretical model, if domestic banks excessively incur short-term debt, they become highly prone to suffering bank runs. Accordingly, this would lead to costly asset liquidations and thus a reduction in income and welfare. The authors provided a conceptual and empirical framework for evaluating the effects of short-term capital flows. Using a simple model of the joint determination of the maturity and cost of external borrowing, they also highlighted the role played by self-fulfilling financial crises. Their model also specified the conditions under which short-term debt accumulation is socially

excessive. Their results suggested that countries with short-term liabilities to foreign banks that exceed reserves are three times more likely to experience a sudden and massive reversal in capital flows. The authors also found that the short-term debt to reserves ratio is a robust predictor of financial crises and that greater short-term exposure is associated with more severe crises when capital flows reverse. They also established that higher levels of M2/GDP and per-capita income are associated with shorter-term maturities of external debt. The level of international trade does not seem to have any relationship with levels of short-term indebtedness, which suggests that trade credit plays an insignificant role in driving short-term capital flows.

In addition, Baharumshah and Thanoon (2006) provided a quantitative assessment of the effect of various types of capital flow on the growth process of the East Asian countries. Their empirical analysis was based on dynamic panel data of a sample of eight Asian countries, namely, Malaysia, the Philippines, Singapore, Thailand, South Korea, China, Myanmar and Fiji. The study covered the period 1982 to 2001. The findings by Baharumshah and Thanoon (2006) suggests that short-term capital can hinder economic growth during the surge and sudden reversals of flows in the emerging economies of Asia. The regression results showed that the short-term debt and long-term debt contribute negatively to economic growth, but long-term debt is not statistically significant even at the 10% significance level. The evidence suggests that short-term capital affect economic growth negatively in long run. The short-term capital inflows also displaces domestic savings (credit and consumption booms) in the long run and negatively affects economic progress. The short-term inflow parameter carried a negative sign, suggesting that it also displaces domestic saving in the short run, which in turn leads to adverse effect on growth. Additionally, long-term debt has positive effect on growth but its effect does somewhat disappear in the long-term.

Other harmful effects on the recipient country's economy associated with short term international capital flows have been identified by Kim (2000), who observed that a surge in capital inflow tends to cause inflationary pressure and increase current account deficits. The real exchange rate tends to appreciate in the capital-receiving country while the traded goods sector of the economy loses competitiveness in international trade. The increase in the current account deficit and the appreciation of the real exchange rate also make the economy more vulnerable to foreign shocks. When the inflow of foreign capital is interrupted, the economy has to go through reverse adjustments in the current account and real exchange rate. Kondogo (2011) observed that the process of adjustment to adverse shocks in capital movement has been highlighted by the widespread costly debt crisis of the 1980s, the Mexican crisis of 1994-95 and the Asian crisis of 1997-2000.

As such, while the theoretical literature points out that short-term foreign capital flows has positive growth impacts, the empirical evidence gives conflicting outcomes. Also, regional empirical studies that examine the impact of short term foreign capital flows on the economic growth in the COMESA region are missing in the literature.

METHODOLOGY

Data: This study utilizes annual panel data covering the period between 2000 and 2014 for nineteen countries found in the Common Market for Eastern and Southern Africa. The countries analysed in the study include Burundi, Comoros, Djibouti, Democratic Republic of Congo (or DR Congo), Egypt, Eritrea, Ethiopia, Kenya, Libya, Madagascar, Malawi, Mauritius, Rwanda, Seychelles, Sudan, Swaziland, Uganda, Zambia and Zimbabwe. The data is drawn from different sources and compiled to suit the analysis.

The data on the GDP per capita, inflation and public debt was obtained from the International Monetary Fund, World Economic Outlook reports (various years), while the data on short-term foreign capital flows (represented by the sum of short-term capital, net errors and commissions and capital transactions not included in either FDI, portfolio investment in equity and bonds), domestic investment (represented by gross capital formation), openness of the economy (measured by total trade to GDP ratio), financial sector development (measured by access to credit to private sector) was obtained from the World Bank, World Development Indicators (various years). The data on the quality of institutions of regulations, rule of law and order and control of corruption were obtained from the World Bank Institute, World Governance Indicators (various years).

Finally, the data on the human capital development was obtained from the United Nations Development Programme (UNDP), Human Development Index (HDI) report (various years); while the data on the quality of overall infrastructure was obtained from the World Economic Forum, Global Competitiveness Report (various years).

Theoretical framework: In order to examine the impact of short term foreign capital flows on economic growth of the Common Market for Eastern and Southern African countries, the theoretical growth model is constructed following Kitonyo (2016) to obtain Eq. (1):

$$Y_{i,t} = A_{i,t} L^{\alpha}{}_{i,t} K_D{}^{\beta}{}_{i,t} K_F{}^{\theta}{}_{i,t} \quad (1)$$

where,

Y = The flow of output
A = The total factor productivity (explains the contribution of factors that are not included in the model to the output growth)
K_D = The domestic capital
K_F = The short term foreign capital flows
L = The labor force
α = The output changes to labor force changes
β = The output changes to domestic capital or local investment changes
θ = The changes in output to changes in short term foreign capital flows

α, β and θ are assumed to be less than one, implying diminishing returns to each factor input. The subscripts i and t represent the cross-sectional member countries of the COMESA region and time period, respectively.

A dynamic production function, expressed as shown in Eq. (2), is produced by taking the logarithms of Eq. (1):

$$Y_{i,t} = \tau + \gamma_1 L_{i,t} + \gamma_2 K_{Di,t} + \gamma_3 K_{Fi,t} + \varepsilon_{i,t} \quad (2)$$

Equation 2 is expanded by including other factors that explain economic growth, denoted by F[2], absorptive capacity factors, denoted by Z and interaction terms between absorptive capacity factors and short term foreign capital flows, Z^*K_F. The addition of the interaction terms follows Catrinescu *et al*. (2009)[3], Choong *et al*. (2009)[4], Durham (2003)[5], Elboiashi (2011)[6] and Kitonyo (2016)[7]:

$$Y_{i,t} = \tau + \gamma_1 L_{i,t} + \gamma_2 K_{Di,t} + \gamma_3 K_{Fi,t} + \gamma_4 F_{i,t} + \gamma_5 Z_{i,t} + \gamma_6 (Z^*K_F)_{i,t} + e_t + \upsilon_i + \varepsilon_{i,t} \quad (3)$$

where,
Y = The real GDP per capita
L = The labour force
K_D = The domestic investment
K_F = Short term foreign capital flows
F = A set of other factors that explain economic growth such as openness of the economy, public debt and inflation
Z = The absorptive capacity factors
(Z^*K_F) = The interaction terms between the factors of absorptive capacity and short term foreign capital flows
τ = A constant
e_t = Time-specific effects which are also assumed to be independently and identically distributed over all time periods
υ_i = An unobserved country-specific effects which are independently and identically distributed overall the nineteen countries of the COMESA region
$\varepsilon_{i,t}$ = A normally distributed error term; and γ_1, γ_2, γ_3, γ_4, γ_5 and γ_6 are the parameters to be estimated.

The incorporation of dynamics into Eq. (3) requires that the equation be rewritten as an AR(1)[8] model by including the past values of GDP per capita as an independent variable. This operation produces Eq. (4):

$$Y_{i,t} = \tau + \gamma_0 Y_{i,t-1} + \gamma_1 L_{i,t} + \gamma_2 K_{Di,t} + \gamma_3 K_{Fi,t} + \gamma_4 F_{i,t} + \gamma_5 Z_{i,t} + \gamma_6 (Z^*K_F)_{i,t} + e_t + \upsilon_i + \varepsilon_{i,t} \quad (4)$$

where γ_0 is the parameter for the difference of lagged values of GDP per capita. The rest of the terms are as explained in Eq. (3).

Econometric model : The estimated equation used is given by Eq. (5):

$$GDPPC_{i,t} = \tau + \gamma_0 GDPPC_{i,t-1} + \gamma_1 HUMCAP_{i,t} + \gamma_2 DINV_{i,t} + \gamma_3 TRADE_{i,t} + \gamma_4 PUBDEBT_{i,t} + \gamma_5 INFLA_{i,t} + \gamma_6 STFCF_{i,t} + \gamma_7 Abscap_{i,t} + \gamma_8 (Abscap^*STFCF)_{i,t} + e_t + \upsilon_i + u_{it} \quad (5)$$

where, $GDPPC_{i,t}$ is the GDP per capita in country i during period t; $GDPPC_{i,t-1}$ is lagged GDP per capita; *HUMCAP* is the human capital stock (measured by the Human Development Index, HDI); *DINV* is the domestic investment (measured by the share of gross fixed capital formation in constant dollars to GDP ratio); *TRADE* is openness of the economy (measured by the share of total imports and exports to GDP); *PUBDEBT* is the public debt (measured by the share of the gross debt liabilities to GDP ratio); *INFLA* is the changes in annual general level of prices; *STFCF* represents the short term foreign capital flows (measured by the share of short term foreign capital flows, net errors and commissions and capital transactions excluded from either foreign direct investment or foreign portfolio investment in equity and bonds to GDP); *Abscap*[9] are the set of chosen absorptive capacity factors that influence the ability of the Common Market for Eastern and Southern Africa to absorb and benefit from spillovers of the STFCF; *Abscap*STFCF* is the interaction term between the factors of absorptive capacity and short term foreign capital flows; γ_0 is a parameter reflecting the speed of convergence of GDP per capita from one period to the next;τ is a constant; e_t time-specific effects which are also assumed to be independently and identically distributed over all time periods; υ_i is an unobserved country-specific effects which are independently and identically distributed over the countries in COMESA region; u_{it} the error term which is assumed to be independently and identically distributed over all time periods in country i; and γ_1, γ_2, γ_3, γ_4, γ_5, γ_6 and γ_7 are the estimable parameters. A positive (negative) sign of the parameters suggests that an increase in the respective variable by one percent leads to an increase (decrease) of GDP per capita by the percentage size of the parameter. In model Eq. (5), the coefficient(s) γ_8 is

interpreted as the marginal rise in the impact of STFCF on the real GDP per capita when the concerned absorptive capacity factor improves. The converse also holds true.

Variables used in the study: The growth performance of GDPPC measures the overall performance of an economy. The GDP per capita in this study is measured by the nominal real GDP per capita deflated by the GDP deflator (base 2000 = 100). The current GDPPC is expected to be affected positively by lagged GDP per capita, $GDPPC_{i,t-1,}$. In other words, high values of real GDP per capita in the past are expected to positively influence growth of the current real GDP per capita in the COMESA region. Hence, $\gamma_0 > 0$.

HUMCAP, represented by the Human Development Index (HDI) in this study, is expected to affect current GDPPC positively and enhance the ability of the COMESA region to absorb and benefit from spillovers of short term foreign capital flows. According to Jongwanich (2007) and Kitonyo (2016) high level of human development in terms of leading a long and healthy life, being knowledgeable and educated and having a decent standard of living promotes economic growth and enable the host economy to absorb and benefit from spillovers of short term foreign capital flows. It is expected that $\gamma_1 > 0$.

DINV has a positive effect on the GDPPC. Increased rate of domestic capital investment promote productivity in an economy. Domestic investment in this study is represented by the share of gross fixed capital formation in constant dollars to GDP ratio. Thus, $\gamma_2 > 0$.

Measured by the share of trade (imports and exports) to GDP, openness of the host economy is expected to enlarge markets and expand domestic investment so as to meet increased demand for goods and services (Feder, 1982). The performance of COMESA region's total imports and exports and adoption of trade liberalization by member countries could also increase the significance of the impact of short term foreign capital flows on economic growth. OPEN is therefore expected to have a positive impact on the GDPPC as well as enhance the ability of the COMESA region to absorb and benefit from the spillovers of short term foreign capital flows. Hence, it is expected that $\gamma_3 > 0$.

High level of debt liabilities in the form of Special Drawing Rights, currency and deposits, debt securities, loans, insurance, pensions and standardized guarantee schemes and other accounts payable, represents the risk for an economy to encounter difficulties in reimbursing its public debt and to face a financial crisis. The presence of a large public debt can also adversely affect investment by reducing the funds available to invest, given that the return from new investments will be overly taxed in order for the government to repay the debt. The study anticipates a negative impact of PUBDEBT, measured by the share of the gross debt liabilities to GDP ratio, on GDPPC. Therefore, $\gamma_4 < 0$

Macroeconomic instability, reflected by high, rising and unstable general levels of prices, reduces real future profits and cause uncertainties to investors. According to Larraín and Vergara (1993) and Servén and Solimano (1993), macroeconomic instability provides uncertain and unreliable economic environment, which does not allow the investors to benefit from the existing profit opportunities. The priori expectation is that INFLA, measured by the annual percentage change in the Consumer Price Index (CPI), has a negative impact on the GDPPC of the host country. Therefore, $\gamma_5 < 0$.

STFCF, measured by the share of short term foreign capital flows, net errors and commissions and capital transactions excluded from either foreign direct investment or foreign portfolio investment in equity and bonds to GDP, is expected to impact either positively or negatively to GDPPC in the COMESA region. Increased short term foreign capital flows into the COMESA region are expected to promote growth by providing additional foreign exchange capital to finance domestic business investment, improve human capital by increasing resources for health and education and reduce macroeconomic volatility. Conversely, the increased inflow of short term foreign capital flows may result into bankruptcies, output losses, currency appreciation and financial crisis and consequently poor GDP per capita growth rates. Hence, $\gamma_6 > 0$ or $\gamma_6 < 0$.

The a priori expectation is that Financial Sector Development (FSD), represented by the share of bank credit to GDP, is expected to have a positive impact on the GDPPC and also enhance the ability of the COMESA region to absorb and benefit from spillovers of short term foreign capital flows. Previous studies have established that improvement in access to bank credit promote growth (Durham, 2003; Shahbaz *et al*., 2011). Therefore, $\gamma_7 > 0$

High regulatory quality, effective and efficient rule of law and order and low prevalence of corruption encourage investment, enhance protection of property and contract rights of investors and promote economic growth (Durham, 2003). REGQUA, RULAW and COC are expected to have a positive impact on the GDPPC and also enhance the ability of the COMESA region to absorb and benefit from short term foreign capital flows. The three institutional quality variables are measured by the score on the aggregate world governance indicators. Thus, $\gamma_7 > 0$.

According to Aschauer (1989), Barro (1990) and World Economic Forum (2015), development of a high quality overall infrastructure, roads, railroads, ports, air transport and availability of airline seat kilometres, electricity supply, fixed telephone lines and mobile telephone subscriptions minimize the cost of doing business, improve private investment returns, attract

more foreign investment and promote productivity and economic growth. The priori expectation is that INFRAC impacts positively on GDPPC and enhances the ability of the COMESA region to absorb and benefit from spillovers of short term foreign capital flows. Therefore, $\gamma_7 > 0$.

Data analysis and estimation technique: The study utilizes a panel data drawn from nineteen countries in the COMESA region over 2000-2014 period. A dynamic panel data GDP per capita model, where the lagged dependent variable, the GDP per capita, is added to the explanatory variables, is estimated. It is argued that the lagged GDP per capita has a positive impact on the current GDP per capita.

However, dynamic panel data models are prone to biased coefficients if mis-specification of dynamics results into autocorrelated errors. These dynamic panel data models do not account for stationarity of variables. The main problems of dynamic panel data modelling include endogeneity, unobserved heterogeneity and short panel bias. These challenges are addressed by including appropriate and adequate explanatory variables into the growth equation, lagging the potentially endogenous variable (s) by one or more periods, using appropriate proxies for variables and estimating the growth model by using the Generalized Method of Moments (GMM) technique suggested by Arellano and Bond (1991), among others. This estimation method accounts for dynamics and resolves endogeneity, unobserved heterogeneity and short panel bias problems.

The first step of the estimation method is to eliminate the time effect, e_t by deducting from each variable its cross average in period t in Eq. (5). Next, the variables transformed into first differences do away with unobservable heterogeneity (υ_i). The endogeneity problems are handled by utilizing a second and higher order lags of these variables as instruments in the case of Arellano and Bond (1991). This approach is valid so long as there is no second order serial correlation, something which is tested in each specification. Also, to ensure validity of this approach, a Sargan test of over-identifying restrictions, which assesses the contemporaneous correlation between the set of instruments and the residual, is reported together with the results. Also reported together with the results is the m^2 test suggested by Arellano and Bond (1991). This test ensures that the residuals from the estimated regressions are first-order correlated but not second-order correlated[10].

RESULTS AND DISCUSSION

The analysis begins by providing the summary descriptive statistics in Table 1 that describe the features of the data used in the study. The panel data set is rich. Consequently, it is deemed normal and appropriate for the empirical analysis.

The results of the correlation of variables are then presented next in Table 2. An explanatory variables correlation matrix is used to test the presence of multicollinearity in the dynamic panel data GDP per capita model specified in Eq. (5).

The results in Table 2 indicates that all the zero-order correlation coefficients between any two regressors are low, ruling out the presence of perfect or near perfect linear relationship. As argued in Gujarati (2003), multicollinearity is a serious problem if the zero-order correlation coefficient between two regressors is in excess of 0.8. Thus, there is no relationship among the independent variables, implying that the regression obtains determinate coefficient and finite standard errors.

On one hand, Table 2 indicates that GDP per capita has a positive correlation with domestic investment, human capital development, openness of the economy, financial sector development, development of quality infrastructure, regulatory quality and quality of the institutions of rule of law and order and control of corruption, as theoretically predicted.

On the other hand, the Table shows that growth is negatively correlated with public debt and inflation, as theoretically predicted. Further, the Table shows that economic growth is negatively correlated to openness of the economy, contrary to economic theory. The short-term foreign capital flows are positively related to GDP per capita in line with economic theory.

Table 1: Summary statistics

Variable	Mean	Median	Min.	Max.	S.D.
GDP per capita (PPP US Dollars)	4,842.47	1,822.30	377.20	29,646.60	6,487.77
Domestic investment (%GDP)	21.035	19.922	2.000	51.788	8.736
Human capital development (HDI)	0.464	0.420	0.220	0.810	0.152
Public debt (% GDP)	66.362	53.527	1.012	202.05	46.169
Openness of the economy (% GDP)	75.944	64.000	21.000	225.000	43.254
Inflation (%)	8.716	7.445	-72.729	57.000	11.943
Short-term foreign capital flows(% GDP)	1.042	0.0975	-134.775	109.061	17.425
Financial sector development (% GDP)	22.201	16.800	0.200	108.100	18.873
Quality of infrastructure (index)	2.662	2.560	1.520	4.750	0.707
Quality of institution of regulations (index)	-0.819	-0.700	-2.260	0.980	0.684
Quality of institution of rule of law and order (index)	-0.709	-0.780	-1.950	1.060	0.640
Quality of institution of control of corruption (index)	-0.614	-0.680	-1.710	0.680	0.551

Authors' computations; S.D.: Standard deviation; Min.: Minimum; Max.: Maximum

Table 2: Correlation matrix of variables in levels

Variable	GDPPC	DINV	HUMCAP	PUBDEBT	TRADE	INFLA
GDPPC	1.000					
DINV	0.338	1.000				
HUMCAP	0.585	0.273	1.000			
PUBDEBT	-0.124	-0.220	-0.182	1.000		
TRADE	-0.570	0.119	0.590	-0.097	1.000	
INFLA	-0.166	-0.059	-0.123	0.208	-0.040	1.000
STFCF	0.154	0.077	0.196	0.182	0.039	-0.029
FSD	0.304	-0.122	0.432	0.025	0.303	-0.142
REGQUA	0.170	0.247	0.369	-0.221	0.267	0.079
RULAW	0.403	0.263	0.579	-0.008	0.423	0.072
COC	0.280	0.134	0.407	0.139	0.452	0.035
INFRAC	0.498	0.250	0.590	-0.342	0.469	-0.154
Variable	STFCF	FSD	REGQUA	RULAW	COC	INFRAC
GDPPC						
DINV						
HUMCAP						
PUBDEBT						
TRADE						
INFLA						
STFCF	1.000					
FSD	0.206	1.000				
REGQUA	0.034	0.372	1.000			
RULAW	0.194	0.498	0.0774	1.000		
COC	0.114	0.384	0.591	0.0786	1.000	
INFRAC	0.024	0.556	0.530	0.558	0.472	1.000

Author's own computations

Table 3: Arellano and Bond (1991) GMM-difference estimates of the impact of short-term foreign capital flowon economic growth in the COMESA Region, 2000-2014

Dependent variable = Growth (GDPPC)	Dynamic panel data growth model
Growth ($GDPPC_{t-1}$)	0.0261635(0.49785)
Human Capital Development (HUMCAP)	17338.70 (0.00001)***
Domestic Investment (DINV)	93.6155 (0.02638)**
Public Debt (PUBDEBT)	-38.5486(0.00001)***
Economy Openness (TRADE)	-72.8785 (0.00001)***
Inflation (INFLA)	-96.1816 (0.00004)***
Short Term Foreign Capital Inflows (STFCF)	503.57 (0.00001)***
Financial Sector Development (FSD)	87.0966 (0.00001)***
Overall Infrastructure (INFRAC)	2369.00 (0.00118)***
Regulatory Quality (REGQUA)	6496.12 (0.00001)***
Rule of Law and Order (RULAW)	11230.80 (0.00001)***
Control Of Corruption (COC)	5436.04 (0.00002)***
STFCF*HUMCAP	1149.62 (0.00002)***
STFCF*TRADE	1.33522 (0.00925)***
STFCF*FSD	0.673569 (0.07188)*
STFCF*INFRAC	6.43475 (0.14722)
STFCF*REGQUA	47.1103 (0.39602)
STFCF*RULAW	153.296 (0.02748)**
STFCF*COC	228.656 (0.00001)***
Constant	1.84904 (0.98853)
Number of observations	190
Number of instruments	104
A-B test 1st Order	-3.49958 (0.0005)***
A-B test 2nd Order	-1.97074 (0.2014)
Sargan over-identification test	138.226 (0.6966)
Wald (joint) test	1.01809e+016 (0.0000)***
Adjustment Speed, $\lambda = 1-\gamma_0$	0.9738

P-values are reported in parentheses with *, **, *** denoting significance at 10, 5 and 1 percent, respectively; The Arellano and Bond (A–B) Z-statistic tests the null hypothesis that the residuals are first-order correlated (A-B test 1st Order) and the residuals are not second-order correlated (A-B test 2nd Order); The Wald test, a test of joint significance, tests the null hypothesis that the coefficients of time dummies are zero Authors' computations

Finally, Table 3 presents estimates of the dynamic panel GDP per capita Eq. (5). The first column describes the estimated variables, number of observations, number of instruments, diagnostic tests and adjustment speed. The second column presents the estimates generated by using the one-step (Arellano and Bond, 1991) GMM difference estimator.

The regression results presented in the second column shows that the constant term for the estimated dynamic panel GDP per capita model by the one-step

difference GMM estimator is given by positive 1.849. However, it is not statistically significant at all levels of significance, implying that the estimated variables explain the models well. The one-step difference GMM estimator reports 190 useable observations, instead of the expected 285. The loss of 95 observations is due to construction of lags and taking first differences. The Arellano and Bond (1991) first-order tests of serial autocorrelation are statistically significant but the second-order tests of serial autocorrelation are not, ruling out existence of second-order serial autocorrelation in the disturbance term. According to Arellano and Bover (1995) and Blundell and Bond (1998), the finding that the residuals are free from second order serial correlation implies that the lagged levels provide sufficient information about the first-differenced variables. The GMM-difference estimator therefore obtains reliable and efficient estimates. The Sargan over-identification restrictions tests are statistically not significant, ruling out existence of correlation between the instruments and the errors. We therefore fail to reject the null hypothesis that the instruments are correlated with the errors. This result means that the instruments are valid. The regression process generated 104 instruments. Further, the Wald tests are statistically significant with very low ρ-values ($\rho = 0.00$). Thus, the independent variables are jointly significant, are not related to each other and therefore should be retained in the models specifications. The lack of second-order serial correlation, validity of instruments variables and statistically significant Wald tests shows that the models are correctly specified and GMM-difference estimator yields reliable and efficient results. The speed of adjustment, λ, is reported as 0.974. This result means that there is almost immediate adjustment of GDP per capita from one year to the next. The coefficient on the lagged dependent variable is close to zero, implying that GMM difference estimator exhibits no substantial downward bias and confirming the absence of a weak instrument problem.

The regression results shows that the impact of the short-term foreign capital flows is positive and statistically significant at 1 percent level of significance. The coefficients, given by 503.57, is robust. This means that an increase in the short-term foreign capital flows and capital transactions results into a direct increase in GDP per capita. This finding concurs with economic theory that short-term foreign capital inflows and capital transactions have a positive impact on economic growth and especially capital flows that provide foreign exchange that is invested in productive activities and complement savings while the capital transactions raise the investment levels in host nations. However, the findings contradicts Baharumshah and Thanoon (2006) who showed that short-term foreign capital inflows can hamper growth during the surge and sudden reversals of inflows in the emerging Asian economies. Further they contradict Reisen and Soto (2001) who reported that reversibility of net short-term foreign capital inflows can generate bankruptcy and output losses. The statistically significant coefficient of the short term foreign capital inflows implies that the short-term foreign capital inflows and capital transactions have a significant positive impact on the GDP per capita in the COMESA region.

The coefficients of the interaction terms between the short-term foreign capital flows and human capital development, openness of the economy, financial sector development, quality of infrastructure and quality of institutions of control of corruption and rule of law and order are positive and statistically significant at their respective levels of significance. These findings concurs with Aschauer (1989), Balasubramanyam *et al*. (1996), Borensztein *et al*. (1998) and Durham (2003). This result means that improvement in the absorptive capacity has a positive effect on the growth impact of short-term foreign capital in the COMESA region.

Additionally, the absorptive capacity has a direct positive impact on the GDP per capita in the COMESA region. This is evidenced by the parameters of human capital development, financial sector development, development of quality infrastructure and quality of institutions of regulations, control of corruption and rule of law and order that are positive and statistically significant at respective levels of significance. This result suggests that absorptive capacity is a key determinant of economic growth in the region. The finding also concurs with economic theory.

The parameter of the past values of GDP per capita growth is statistically significant at 1% level of significance. This result suggests that the past values of GDP per capita growth has a significant positive impact on the current growth rate.

Consistent to Cohen (1994) and Larraín and Vergara (1993) public debt and inflation exerts a negative and statistically significant impact on the GDP per capita in the COMESA region. However, contrary to economic theory and Makki and Somwaru (2004), openness of the economy impacts negatively on the growth.

CONCLUSION

The objective of this study is to investigate the growth impact of short term foreign capital flows in the Common Market for Eastern and Southern Africa region over the period 2000-2014. The empirical studies reviewed in this study showed conflicting outcomes, where results of some studies are positive, while others are negative and indeterminate. In order to attain the aim of the study, a dynamic panel data GDP per capita model is estimated using the one-step GMM estimators suggested by Arellano and Bond (1991).

The paper concludes that short-term foreign capital flows exerts a positive and statistically significant impact on GDP per capita in the region. The paper also concludes that growth in human capital development; improvement in access to credit to private sector; development of high quality infrastructure; and installation of high quality institutions of regulations, control of corruption and rule of law and order exert a significant positive impact on the GDP per capita. Lastly, the growth in volumes of public debt and openness of the economy through expansion of trade exhibit a negative and statistically significant impact on the GDP per capita in the COMESA region.

The COMESA region should install measures to encourage greater inflow of short-term foreign capital flows and capital transactions but ensure that the inflows are not disruptive as they may lead to appreciation of currency, make the economy uncompetitive and lead to increase in interest rates resulting in high costs of credit and effects investment. Thus, with the growing volume of short term foreign capital flows, focus should be on how well the said inflows can be harnessed to promote economic growth and simultaneously ensure macroeconomic stability in the COMESA region.

ACKNOWLEDGMENT

The author wishes to express his heart felt appreciation to Professor Tabitha Kiriti-Ng'ang'a and Dr. Daniel Okado Abala of the School of Economics, University of Nairobi, for their guidance and useful comments in writing this study.

REFERENCES

Arellano, M. and S. Bond, 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Rev. Econ. Stud., 58(2): 277-297.

Arellano, M. and O. Bover, 1995. Another look at the instrumental variable estimation of error-components models. J. Econometrics, 68(1): 29-51.

Aschauer, D.A., 1989. Is public expenditure productive? J. Monetary Econ., 23(2): 117-200.

Baharumshah, A.Z. and M.A.M. Thanoon, 2002. Foreign capitals, savings and economic growth: A dynamic panel study on the East Asian Countries. Universiti Putra Malysia, Selangor.

Baharumshah, A.Z. and M. Thanoon, 2006. Foreign capital flows and economic growth in East Asian Countries. China Econ. Rev., 17(1): 70-83.

Balasubramanyam, V.N., M. Salisu and D. Sapsford, 1996. Foreign Direct Investment and growth in EP and IS countries. Econ. J., 106(434): 92-105.

Barro, R.J., 1990. Government spending in a simple model of endogenous growth. J. Polit. Econ., 98(5): S103-S125.

Blundell, R. and S. Bond, 1998. Initial conditions and moment restrictions in dynamic panel data models. J. Econometrics, 87(1): 115-143.

Borensztein, E., J. de Gregorio and J.W. Lee, 1998. How does foreign direct investment affect economic growth? J. Int. Econ., 45(1): 115-135.

Brecher, R.A. and C.F. Diaz-Alejandro, 1977. Tariffs, foreign capital and immiserizing growth. J. Appl. Econ., 7(4): 317-322.

Calvo, G.A., 1998. Capital flows and capital-market crises: The simple economics of sudden stops. J. Appl. Econ., 1(1): 35-54.

Carroll, C.D. and D.N. Weil, 1994. Saving and growth: A reinterpretation. Carnegie-Rochester Conf. Ser. Public Policy, 40(1): 133-192.

Catrinescu, N., M. Leon-Ledesma, M. Piracha and B. Quilin, 2009. Remittances, institutions and economic growth. World Dev., 37(1): 81-92.

Choong, C.K., A.Z. Baharumshah, Z.B. Yusop and M.S. Habibullah, 2009. Private capital flows, stock market and economic growth in developed and developing countries: A comparative analysis. Jpn. World Econ., 22(2): 107-117.

Cline, W.R., 1995. International Debt Re-Examined. Peterson Institute for International Economics, Peterson Institute Press, Washington, D.C., No. 46.

Cohen, D., 1994. Low investment and large LDC debt in the 1980's. Am. Econ. Rev., 83(3): 437-449.

Corbo, V. and L. Hernandez, 1996. Macroeconomic adjustment to capital inflows: Lessons from recent latin american and East Asian experience. World Bank Res. Observ., 11(1): 61-85.

Corsepius, U., P. Nunnenkamp and R. Schweickert, 1989. Debt Versus Equity Finance in Developing Countries: An Empirical Analysis of the Agent-Principal Model of International Capital Transfers. In: Tübingen, W. (Ed.), Kieler Studien, Institut für Weltwirtschaft an der Universität Kiel, Westview Press, Boulder, No. 229. Mohr, Germany.

Durham, J.B., 2003. Foreign portfolio investment, foreign bank lending and economic growth. Board of Governors of the Federal Reserve System, International Finance Discussion Papers 757, Washington, D.C.

Eaton, J. and M. Gersovitz, 1981. Debt with potential repudiation: Theoretical and empirical analysis. Rev. Econ. Stud., 48(2): 289-309.

Elboiashi, H.A.T., 2011. The effect of FDI and other foreign capital inflows on growth and investment in developing economies. Ph.D. Thesis, University of Glasgow, Glasgow.

Feder, G., 1982. On exports and economic growth. J. Dev. Econ., 12(1-2): 59-73.

Gruben, W.C. and D. McLeod, 1998. Capital flows, savings and growth in the 1990s. Q. Rev. Econ. Financ., 38(3): 287-301.

Gujarati, D.N., 2003. Basic Econometrics. 4th Edn., McGraw-Hill Companies, New York.

Hussein, K.A. and A.P. Thirwall, 1999. Explaining differences in the domestic savings ratio across countries: A panel data study. J. Dev. Stud., 36(1): 31-52.

International Monetary Fund, 2015. World Economic Outlook. International Monetary Fund, Washington, D.C.

Jongwanich, J., 2007. Workers' remittances, economic growth and poverty in developing asia and the pacific countries. UNESCAP Working Paper WP/07/01, United Nations Economic and Social Commission for Asia and the Pacific, United Nations, New York.

Kim, Y., 2000. Causes of capital flows in developing countries. J. Int. Money Financ., 19(2): 235-253.

Kitonyo, P., 2016. The impact of foreign capital on economic growth in the common market for Eastern and Southern Africa region. Ph.D. Thesis, University of Nairobi, Nairobi.

Kondogo, C.O., 2011. Foreign exchange risk and the flow of international portfolio capital: Evidence from Africa's capital markets. Ph.D. Thesis. University of Witwatersrand, Johannesburg.

Lahiri, A.K., 1989. Dynamics of Asian savings: The role of growth and age structure. Staff Paper, 36(1): 228-261.

Larraín, F. and R. Vergara, 1993. Investment and Macroeconomic Adjustment: The Case of East Asia. In: Servén, L. and A. Solimano (Eds.), Striving for Growth after Adjustment. World Bank, Washington, D.C., pp: 229.

Makki, S. and A. Somwaru, 2004. Impact of foreign direct investment and trade on economic growth: Evidence from developing countries. Am. J. Agric. Econ., 86(3): 795-801.

McKinnon, R.I. and H. Pill, 1997. Credible economic liberalizations and overborrowing. Am. Econ. Rev., 87(2): 189-193.

Reisen, H., 1998. Sustainable and excessive current account deficits. Empirica, 25(2): 111-131.

Reisen, H. and M. Soto, 2001. Which types of capital inflows foster developing-country growth? Int. Financ., 4(1): 1-14.

Rodrik, D. and A. Velasco, 1999. Short-term capital flows. NBER Working Paper No. 7364, National Bureau of Economic Research, Cambridge, M.A.

Servén, L. and A. Solimano, 1993. Private investment and macroeconomic adjustment: A survey. In: Servén, L. and A. Solimano (Eds.), Striving for Growth after Adjustment. World Bank, Washington, D.C., pp: 11-30

Shahbaz, M., N.C. Leitão and S. Malik, 2011. Foreign direct investment-economic growth nexus: The role of domestic financial development in Portugal. Econ. Bull., 31(4): 2824-2838.

World Bank, 2015. Global Development Finance. World Bank, Washington, D.C.

World Economic Forum, 2015. The global competitiveness report. World Economic Forum, Geneva.

End note:

[1]: These countries include Djibouti (2.4% per annum), Egypt (2.4% per annum), Ethiopia (6.0% per annum), Libya (2.3%), Mauritius (3.5% per annum), Rwanda (4.7% per annum), Seychelles (2.4% per annum), Sudan (4.1% per annum), Uganda (3.1% per annum) and Zambia (3.6% per annum), among others (International Monetary Fund, 2015).

[2]: The other factors that influence economic growth include among others openness of the economy, public debt and inflation.

[3]: Catrinescu *et al*. (2009) examined the effect of remittances on growth through institutions of a country as an important channel. The authors tested the hypothesis that institutions affect the impact of remittances on economic growth by interacting remittances variable with different indices of institutional quality such as Transparency International (TI) corruption index and ICRG indicators of bureaucracy quality, corruption, ethnic tensions, law and order, democratic stability, government stability, socio-economic conditions, investment profile and political risk. The study tested the significance of the interacted coefficient.

[4]: Choong *et al.* (2009) investigated how FDI, portfolio investment (PI) and foreign debt (DEBT) impacted on the growth in host 19 developed and 32 developing countries through the stock markets channel through which foreign capital flows could promote growth. The authors tested the hypothesis that measures of stock market affect the impact of private capital flows on growth by interacting different components of private capital flows with two types of stock market measures. The study tested the significance of the interacted coefficient.

[5]: Durham (2003) interacted stock-market capitalization to GDP, bank credit to GDP, business regulation, property rights index, corruption index, country credit risk with the foreign portfolio investment, bond foreign portfolio investment and other foreign investment in examining their effects on growth on 88 countries from 1977 through 2000.

[6]: Elboiashi (2011) interacted the human capital, technology gap, infrastructure development, institution quality, financial market development and trade openness with FDI so as to investigate the effect of the host country conditions on the impact of FDI in 76 developing countries between 1980 and 2005.

[7]: Kitonyo (2016) investigated the growth impact of short term foreign capital flows in the Common Market for Eastern and Southern Africa (COMESA). The author tested the hypothesis that

absorptive capacity affect the impact of short term foreign capital flows on economic growth by interacting short term foreign capital flows variable with different factors of absorptive capacity. The study tested the significance of the interacted coefficient.

[8]: AR(1) stands for autoregressive dynamic panel data model of order one.

[9]: The absorptive capacity factors analyzed in this study as important in influencing the ability of the Common Market for Eastern and Southern Africa to absorb and benefit from spillovers of the short term foreign capital flows are human capital development (measured by the Human Development Index, HDI), openness of the economy (measured by the total imports and exports to GDP), infrastructure development (represented by the indicator of quality of overall infrastructure, roads, railroads, ports, air transport and availability of airline seat kilometres, electricity supply, fixed telephone lines and mobile telephone subscriptions), financial sector development (measured by the share of bank credit to GDP) and quality of institutions measured by the the score on the aggregate world governance indicators of regulation, rule of law and order and control of corruption.

[10]: Arellano and Bond (1991) argued that, if the residuals u_{it} were first-order correlated, then $y_{i,t-2}$ would be correlated with Δu_{it} and therefore it could not be used as an instrument. The same is true of any independent variable which is correlated with u_{it}.