Determinants of Short-Term Foreign Debt in Ghana

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Abstract

This study tests the validity of the hypothesis that the regulatory and macroeconomic environments and the disparity between domestic and international interest rates are important determinants of short-term foreign debt stock in Ghana. This involves a time series econometric analysis of annual secondary data covering the period 1970 to 2012. More specifically, the bounds testing approach is used to estimate the impact of potential determinants – identified in the theory and empirical literature – on the real stock of short-term foreign debt in Ghana. The study finds that a reduction in regulatory restrictions on external borrowing, a widening of the disparity between domestic and international interest rates, economic growth performance and domestic financial deepening lead to increases in the short-term foreign debt stock in both the long and short run, respectively. The short-term foreign debt stock reduces in response to an increase in trade openness in the short run, and to international debt relief initiatives by multilateral development institutions in the long run.

Key words: *Capital accounts liberalization, short-term foreign debt, foreign borrowing*

Acknowledgements

1. Introduction

One of the main emphases of the ongoing discussions about international financial integration is measures to extend the maturity of foreign debt, as short-term debt is considered unstable. High shares of short-term debt may expose countries to risks of sudden capital flow reversals, to speculative currency attacks and to banking crises, which eventually leaves the domestic economy with high costs of recessionary readjustments (Buch and Lusinyan, 2000). A number of studies such as Furman and Stiglitz (1998) provide empirical support linking high short-term external debt ratios (and excessive build-up of short-term debt) to crises in a number of emerging markets. As a result, a number of countries in sub-Saharan Africa are making efforts to encourage long-term investments. Ghana is one of the exemplary cases of countries in sub-Saharan Africa that have been making efforts to lengthen the maturity of foreign capital through limited and selective capital accounts liberalization (Ishii and Habermeier, 2002). However, according to the World Bank's World Development Indicators 2012, the country's share of short-term debt in total foreign debt, and its share of short-term debt in total international reserves, has increased but also fluctuated over time (see Table 1 and Figure 1). This development has the tendency to increase the country's susceptibility to sudden reversals in capital flows and exposure to external financial shocks. In addition, it offers evidence that gives credence to the assertion that maintaining limited and selective external capital controls may not adequately cause a reduction in the more volatile short-term foreign debt. This raises an important policy challenge for the country. The challenge is how to put in place measures that can reduce short-term debt and lengthen the maturity of foreign debt. Another challenge is the extent to which the external capital accounts should be liberalized.

Very little work has been identified on the basic causes of rising share of short-term external debt. The theoretical works include those by Broner et al (2013), Balta et al (2013), Kose and Prasad (2010), Makin (2004), Schmukler and Vesperoni (2006), Broner et al (2004) and Mama (2007). Different authors mention different factors as key potential determinants of short-term foreign debt, and there is generally no consensus regarding the most important factors influencing short-term foreign debt or the maturity of foreign debt. Also, there are differences in the arguments on how each of the mentioned factors affects short-term foreign debt stock. Factors mentioned in the literature as key potential determinants include information asymmetry, risks and uncertainties, term premium, economic growth, domestic financial development, trade, interest rate differentials and foreign borrowing regulations.

Schmukler and Vesperoni (2006) contend that the relationship between capital account liberalization and the maturity of foreign debt is ambiguous and depends on a

number of conditions. These conditions include the adequacy of information available to creditors and borrowers, the attitude of lenders towards risk, the adequacy of prudential regulations, the liquidity and quality of investments, growth opportunities, and the degree of development of domestic financial systems relative to international financial markets. Buch and Lusinyan (2003) and Schmukler and Vesperoni (2006) also argue that although advanced financial markets are characterized by a high degree of sophistication that creates incentives for short-term lending due to reduced costs in rolling over short-term debt, they may also create an opportunity for long-term lending as a result of better institutions. Zafar and Butt (2008), Tambunan and Indonesia (2006) and Buch and Lusinyan (2000 and 2003) discuss the relationship between international trade and short-term foreign debt. They argue that although increased trade activities are normally associated with increased short-term foreign debt due to the fact that trade finance usually entails projects of a shorter duration, increased trade earnings could reduce the short-term debt stock of the exporting country due to the country's improved capacity to service its external debt. Hence the relationship between trade openness and the short-term debt stock of a country is ambiguous. The disparity between the domestic interest rate and the international rate is also mentioned in the literature as one of the causes of changes in a country's short-term foreign debt stock. For instance, Makin (2004) explains that domestic interest rates in small open economies are usually higher than international rates due to uncertainties and country risk factors in the domestic economy. Broner et al (2013 and 2004) similarly maintain that emerging and developing economies borrow short term due to the higher risk premium charged by international capital markets on long-term debt, changes in the bondholder's risk aversion and in the country's expected repayment capacity. Mama (2007) likewise suggests that a small open economy borrower that has lower growth prospects is more willing to choose a short-term debt contract, which gives rise to an increase in its short-term indebtedness. In addition, a collection of studies by the International Monetary Fund in 2008 contend that the immediate impact of international debt relief initiatives is to reduce the level of debt stocks of beneficiary countries, especially the long-term debt stock. However, foreign lenders are willing to provide more long-term funds than short-term loans to the borrowing country because the reduced debt stock arising from the debt relief reduces the borrowing country's risk of debt distress and creates additional room for fiscal spending and borrowing (refer to IMF, 2008a & b).

Empirical studies identified in support of existing theory are also very few. These include Broner et al (2013), Schmukler and Vesperoni (2006), Dasgupta and Ratha (2000) and Mama (2007). The identified studies confirm the importance of the previously mentioned host of factors in the surveyed theoretical works. The identified studies similarly do not provide any conclusive evidence on the issue. The lack of consensus points to the obvious differentials in terms of the number of countries covered and the analytical approaches adopted in the studies. In addition, most of these studies are panel and cross-country studies.

The lack of a consensus in both theory and empirical literature concerning the key determinants of short-term debt in emerging and developing economies necessitates case-by-case (country-specific) studies to unravel the actual determinants of short-term foreign debt. One of the few identified country-specific studies is Rana (1998), which

identified a liberal capital accounts regime coupled with a vast magnitude of sterilization measures as the primary cause of an upsurge in short-term debt in Chile and Colombia in the early 1990s. In addition, while related studies abound for Latin America, Asia and Europe (for example see Dasgupta and Ratha, 2000; Rana, 1998; Cardenas and Barreras, 1997; and Mama, 2007) this is not necessarily the case for countries in sub-Saharan Africa. Moreover, country-specific studies in sub-Saharan Africa, such as an empirical investigation into the determinants of short-term foreign debt in Ghana, are yet to be identified.

This study fills the research gap by investigating the long- and short-run determinants of short-term foreign debt in Ghana. It focuses on examining the effect of changes in the regulatory environment, interest rate disparity, and the domestic macroeconomic and financial environments on short-term foreign debt in Ghana. To achieve this objective, this study uses a time series econometric analysis technique. The intention is to provide evidence that can inform public policy on foreign debt in the country. The focus of the study is justified on the grounds that the foreign debt stock has contributed an average of 66.2% of total external financial liabilities of Ghana, and has constituted about 63.1% of overall GDP in the country during the period 2000 to 2011. In addition, the share of short-term debt in total foreign debt has risen sharply from 8.4% in 2001 to 36% in 2006, and declined only marginally to 24.7% in 2011. The contribution of this study to research is that the selective or discriminatory liberalization of direct regulations on foreign borrowing, a widening of the disparity in interest rates, financial deepening and higher growth prospects increase the short-term foreign debt stock, whilst the international debt relief initiatives and increased trade openness reduce that stock in Ghana.

Objectives

The main objective of the study is to investigate the long- and short-run determinants of short-term foreign debt in Ghana. The specific objectives are to determine the quantitative effect of:

• changes in the regulatory environment on short-term foreign debt in Ghana; interest rate differential on short-term foreign debt in Ghana;

• the macroeconomic environment on short-term foreign debt in Ghana; and increased trade openness on short-term foreign debt in Ghana.

Hypothesis

The main hypothesis tested in this study is that selective reductions in regulatory restrictions on external borrowing lead to a reduction in short-term foreign debt. Detailed discussions on how changes in the regulatory restrictions affect the length of maturity of external debt are presented in the "Theoretical Framework" section of this paper.

2. Stylized facts about the Ghanaian economy

This section takes a cursory look at the regulatory environment for foreign borrowing by residents (the official sector and the private sector) in Ghana. It includes a review of the capital account regulation, international debt relief initiatives and non-concessional borrowing policy of the multilateral institutions and outcomes in terms of observed trends and patterns in the dynamics of foreign debt and its components over time.

The regulatory environment

Ghana is one of the exemplary cases in sub-Saharan Africa in that it has cautiously and partially liberalized its external capital accounts transaction in a bid to attract and direct foreign capital flows. The process of liberalization has been gradual and well-sequenced, and has involved a partial liberalization of foreign direct investment and portfolio flows in the 1990s, a partial opening of the government securities market to foreigners, and the complete liberalization of foreign purchase of equities in 2006. One of the reasons for the partial liberalization of the capital accounts transaction has been to influence both the volume and composition of foreign capital flows to the country (Ishii and Habermeier, 2002).

The liberalization process can be categorized into two phases. The first phase entailed the partial removal of restrictions on foreign direct and portfolio investments in the mid-1990s. For portfolio investments, non-residents had the option to purchase corporate shares and bonds in the Ghana Stock Exchange, but only up to a maximum of 10% of any one share. The aggregate of non-resident total holding in any one company was not to exceed 74%. They were, however, prohibited from purchasing government securities. Also, foreign residents holding domestic currencies had the freedom to invest in the local money market instruments with a maturity of not less than three years. The second phase of liberalization included the passing of the new Foreign Exchange Act of 2006 in December of that year. Under this act, non-residents are now permitted to buy government securities for the first time. Restrictions on the issuance and transfer of securities as well as loans contracted between residents and non-residents have been relaxed. Foreign Direct Investment (FDI) inflows have also been liberalized and loans contracted by residents no longer require Bank of Ghana approval.

Foreign residents are also now allowed to invest in money market instruments. However, due to concerns about vulnerability to shocks, foreign residents' purchases are

limited to securities with a minimum maturity of three years and a minimum holding period of year. Another important feature of the liberalization is the complete removal of restrictions on foreign holdings of equities listed on the Ghana Stock Exchange. Residents are also now permitted to invest in direct production abroad without restrictions. However, some other restrictions on non-residents have remained in place, particularly the prohibition on investment in short-term money market instruments with a maturity of less than three years (see Appendix, Table A2). Maintaining some capital controls such as keeping the restrictions on maturities and the resale of government bond securities and money market instruments to non-residents are meant to reduce short-term capital inflows and mitigate the country's vulnerability to any sudden reversal of the flows.

The capital account liberalization has been implemented alongside wide-ranging institutional reform measures. Institutional reforms have included efforts to strengthen the capacity and authority of the Bank of Ghana, which started with the Bank of Ghana Act of 2002; reforms in the primary government debt and stock markets to increase their depth and liquidity; and the reinforcement of financial sector supervision and soundness. In spite of the easing of regulatory restrictions on the country's capital accounts transactions, including regulations on external borrowing, the government has maintained guidelines and procedures for public borrowing (Ministry of Finance and Economic Planning, 2010).

Another aspect of the regulatory environment that had a direct influence on the country's external debt stock was the debt relief and forgiveness granted under international debt relief initiatives by the World Bank's International Development Agency (IDA), the International Monetary Fund (IMF), and the African Development Bank. The first was the Enhanced Highly-Indebted Poor Countries (HIPC) initiative in 2002 and the Multilateral Debt Relief Initiative (MDRI) in 2006. Ghana became eligible for additional debt relief under the Multilateral Debt Relief Initiative (MDRI) after successfully reaching the completion point under the Enhanced HIPC Initiative. The MDRI proposes full debt cancellation by the IDA, the IMF and the African Development Fund to countries that have completed the HIPC initiative and offers 100 per cent relief on eligible debt to those countries (International Monetary Fund, 2013).

However, following the attainment of lower middle-income status in 2010 after the rebasing of the economy, Ghana may no longer access any form of debt relief under the HIPC initiative or MDRI. In addition, Ghana will have little access to external borrowing on a concessional basis with extended grace periods on principal payments.

Since 2006, multilateral institutions, namely the IMF, the World Bank's IDA and the African Development Fund, have imposed restrictions on new non-concessional foreign borrowing by grant recipient, and post-HIPC and MDRI beneficiary countries. The decision is premised on the concerns of multilateral institutions that HIPC/MDRI debt relief could possibly cross-subsidize non-concessional borrowing (NCB) from other lenders who offer loans on rigid terms. The non-concessional borrowing policy of the multilateral institutions is meant to discourage non-concessional borrowing through disincentives directed at the borrowing countries (African Development Bank Group, 2008 and 2011; World Bank, 2010).

Foreign debt in Ghana: Trends, composition and potential determinants

Table 1 shows trends in the stock of short-term foreign debt, calculated as annual averages for every 10 years. The observed data indicate that the total stock of short-term foreign debt has increased from an annual average of US$86.4 million between 1970 and 1979, to US$1164.7 million between 2000 and 2011. Akin to the nominal values, the real stock of short-term foreign debt has also risen from annual average values of US$0.7 million and US$5.9 million, respectively, between 1970 and 1979 to US$4.9 million and US$30.8 million, respectively, between 2000 and 2011. Similarly, the shares of short-term foreign debt stock in total foreign debt and international reserves have also increased over the same period. The observed trend makes the country more vulnerable to external financial shocks. It also deters investors and may alter the composition of investments towards short-term projects with high immediate returns.

Table 1: Trends in short-term foreign debt stock

|	Short-term foreign debt stock (US$ million)		Short-term debt (% of total external debt)	Short-term debt (% of external reserves)
	Nominal values	**Real values***		
1970–1979	86.4	0.7	8.1	34.7
1980–1989	174.3	1.0	8.8	47.3
1990–1999	551.9	3.4	10.6	98.1
2000–2011	1164.7	4.9	17.7	71.0

Source: Computed by author using data from External Resource Mobilization Division of the Ministry of Finance and Economic Planning and the World Development Indicators.
*Note: The real stock of foreign debt is calculated by deflating nominal values with GDP deflator index (2000=100; US$ series)

In addition to the rising trend, the real stock of short- and long-term foreign debt has also fluctuated over time (see Figure 1). The abrupt decline in the real stock of long-term foreign debt from 2001 to 2006 reflects HIPC/MDRI-related cancellation of long-term debts to official creditors. The rise in real stock of both short and long-term debt after 2006 could be attributed to the creation of new borrowing space and a reduction in the country's risk of financial distress following debt relief, which made investments in the domestic economy attractive.

The steady growth in the real stock of short-term foreign debt since 1988 and its sharp increase from US$3.7 million in 2008 to US$7.1 million in 2011, the highest in the real stock value of short-term foreign debt for the period of analysis, raises concerns about the country's external vulnerability and calls for the need to investigate the basic causes of the dynamics of short-term foreign debt in Ghana.

Alongside the maintenance of limited external capital controls, other macroeconomic policy measures are necessary for an effective reduction and maintenance of low levels of short-term debt. The identification of effective macroeconomic policy instruments in itself requires an identification of the basic key determinants of short-term foreign debt.

Figure 1: Real stock of foreign debt
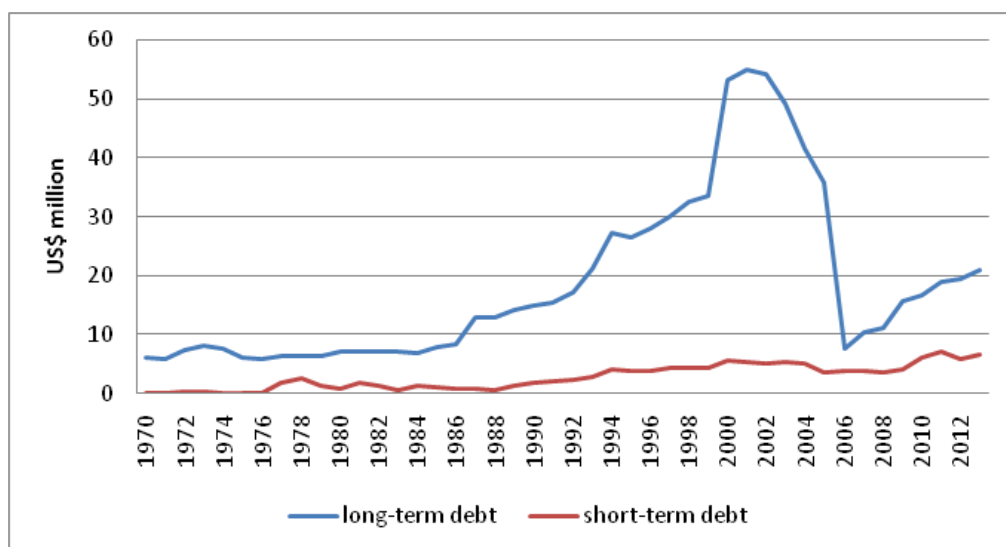
Source: Computed by author using data from the World Development Indicators database

Table 2: Potential determinants

	Index for liberalization of direct regulations on foreign borrowing	Interest rate differential	Broad money supply M2+ (% of GDP)	External trade (% of GDP)	Growth in GDP per capita (%)	Index for international debt relief initiatives
1970–1979	1.0	3.4	23.4	32.6	-0.8	0.0
1980–1989	1.0	6.9	14.8	25.5	-1.0	0.0
1990–1999	1.2	26.7	20.6	62.7	1.6	0.0
2000–2012	2.5	18.4	29.6	89.4	4.0	1.1

Source: Computed by author using data from the World Bank's World Development Indicators database.

Table 2 shows that the rise in the country's short-term foreign debt stock has been in tandem with the liberalization of foreign borrowing, an increase in the interest rate differential (domestic interest rate relative to international rate), increased domestic financial depth (represented by growth in broad money supply), increased external trade openness (normally reflecting a rise in trade credit), increased output growth and debt relief granted by the international donor community under the Enhanced Highly-indebted Poor Countries (HIPC) initiative and Multilateral Debt Relief Initiative (MDRI).

The liberalization of foreign borrowing covered the sale or issue of bonds and other debt securities and money market instruments, commercial and financial credits, and overseas borrowing by commercial banks and other institutions. Direct restrictions on the length of maturity of foreign borrowing applied only to the purchase of money market instruments, where foreign residents were permitted to buy money market instruments with a minimum maturity of three years. Increased domestic financial depth

may simply be a reflection of an increase in the volume of trade (in financial assets) and financial institutions that deal mainly with short-term assets in the domestic financial market, thereby leading to more short-term borrowing from overseas. Increased output growth rates may provide a signal to resident institutions about possible future growth opportunities and may result in them deciding to take advantage of such opportunities by embarking on short-term borrowing to steer clear of passing the proceeds of future projects to bondholders.

Figure 2: Trends in time series indicators
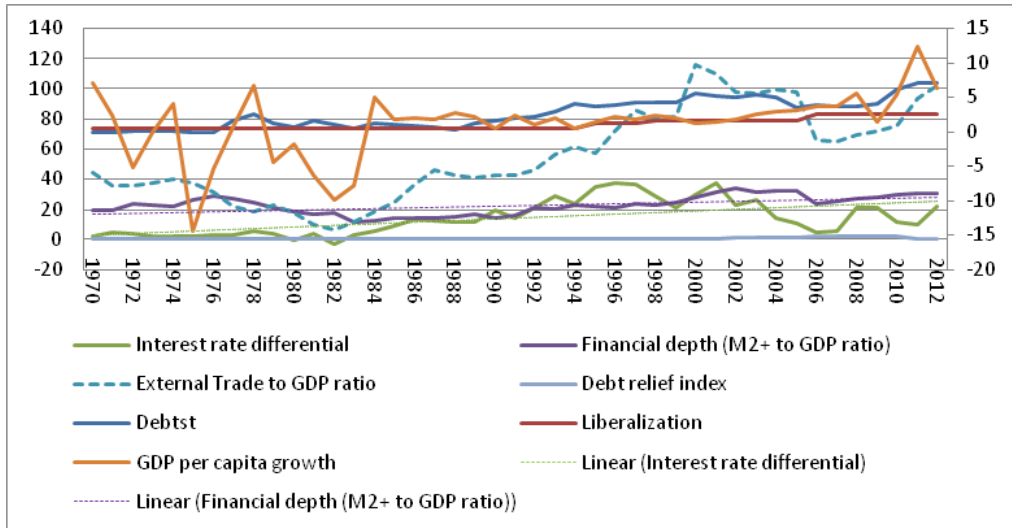
Source: Based on data from the World Bank's World Development Indicators database

Figure 2 shows a generally rising trend in the real stock of short-term foreign debt and all the potential determinants from 1970 to 2012, more especially in the 1990s and in the 2000s. This suggests the possible existence of a long-run relationship between real stock of short-term foreign debt and its potential determinants, namely, liberalization of regulations on foreign borrowing, international trade openness, domestic financial depth, domestic output growth, and international debt relief initiatives.

Foreign debt by type of creditor and borrower

Table 3 shows trends in the average total stock of foreign debt to official and private creditors, and by type of borrower. The data indicate a rise in annual average values of Ghana's foreign debt stock to official and private creditors from US$29.1 million and US$8.9 million, respectively, between 1970 and 1979 to US$135.5 million and US$130.9 million, respectively, between 2000 and 2012. Similarly, long-term debt by public sector borrowing and short-term debt by private sector borrowing rose substantially over the same period.

Table 3: Foreign debt by lender and borrower type (US$ million)

Year	Foreign debt by lender type			Foreign debt by type of borrower		
	Foreign debt to official creditors	Foreign debt to private creditors	Long-term debt, public sector	Long-term debt, private sector	Short-term debt, public sector	Short-term debt, private sector
1970–1979	29.1	8.9	602.8	53.9		
1980–1989	81.7	44.7	1561.3	35.6		
1990–1999	145.4	96.2	3881.4	125.9	107.2	470.5
2000–2012	135.5	130.9	5305.0	63.8	65.8	1098.9

Source: Computed by author using data from the External Resource Mobilization Division of the Ministry of Finance and Economic Planning, the World Bank's International Debt Statistics database, IMF Staff Country Reports (various issues), and West African Institute of Finance and Economic Management database.

The steady rise in foreign debt to official and private creditors could be attributed to the increasing need to finance economic growth and the country's inability to generate sufficient income domestically and from trading with the rest of the world (ROW) to finance its development needs. The rise in foreign debt to private creditors from between 1990 and 1999 to the period between 2000 and 2011 could also be attributed to Ghana's borrowing from the international capital market in 2007 by issuing its first US$750 billion Eurobond, which was oversubscribed. The observed trend also reflects the positive response of foreign borrowing by the private sector to the liberalization of the country's capital account transactions that was initiated in the mid-1990s. The public sector borrowing component of total foreign debt stock remains significantly high.

3. Theoretical framework

The basic underlying assumption for the framework of this study is that international capital mobility is imperfect and that it creates a wedge between domestic interest rates and international or global interest rates. In addition, the information available to both lenders and borrowers is imperfect. Consequently, agents incorporate risk and uncertainty factors into their determination of interest rates and their choice of debt maturity. Based on the survey of identified literature and the stated objectives, this study analyses the impact of easing capital account restrictions and interest rate differentials on short-term foreign debt in Ghana. The analysis controls for the impact of domestic financial depth, external trade openness, economic growth prospects and international debt relief initiatives on short-term foreign debt in Ghana.

The main working hypotheses tested in this study are as follows: (a) A selective liberalization of restrictions on the capital account transactions that entail easing restrictions on long-term capital while maintaining some restrictions on short-term capital leads to a reduction in short-term foreign debt; and (b) an increase in the short-term interest rate differential (disparity between the domestic interest rate and global interest rate on domestic debt instruments with a short-term maturity) leads to an increase in short-term foreign debt.

This section makes a brief presentation of the theoretical framework and is followed in the subsequent sub-section with a presentation of the estimating equation.

Theoretical underpinning

Capital account regulation

There are basically two types of capital account regulations (or restrictions). These are: direct "administrative" controls and indirect "market-based" restrictions. Direct restrictions usually entail either outright prohibitions and explicit quantitative limits on or an approval procedure for international capital transactions. Direct restrictions normally seek to directly influence the volume of the appropriate cross-border financial transactions. One of the notable features of direct regulations is the imposition of administrative responsibilities on the banking system to regulate capital flows.

Indirect measures, on the other hand, seek to discourage specific capital flows by raising their transaction costs and may assume different forms, that is either explicit or implicit taxation of cross-border capital account transactions and multiple exchange rate

systems. Indirect "market-based" measures tend to influence the price or both the price and the volume of a given capital transaction, depending on the specific type of market-based regulations in force. In dual or multiple exchange rate systems, different exchange rates apply to different types of transactions. The two-tier market attempts to raise the cost to speculators of the domestic credit needed to establish a net short domestic currency position, while allowing non-speculative domestic credit demand to be satisfied at normal rates. Explicit taxation of cross-border flows involves the imposition of taxes or levies on external financial transactions, thus limiting their attractiveness, or income resulting from the holding by residents of foreign financial assets, or the holding by non-residents of domestic financial assets thereby discouraging such investments by reducing their rate of return or raising their cost. Tax rates can be differentiated to discourage certain transaction types or maturities (Akita et al, 2000).

Indirect taxation of cross-border flows, in the form of non-interest bearing compulsory reserves, is one of the most frequently used market-based controls. Under this scheme, a proportion of the inflows or net positions in foreign currency held by banks and non-banks are to be deposited with the central bank at zero interest. The amount to be deposited with the central bank could be in the form of domestic or foreign currency equivalent to the proportion of the inflows required to be deposited. Such a scheme limits capital inflows by reducing their effective return, and they may be differentiated to discourage particular types of transactions. Other indirect regulatory controls bear the features of both price- and quantity-based measures and involve discrimination between different types of transactions or investors. Such controls include certain rating requirements to borrow abroad and reporting requirements for specific transactions (Akita et al, 2000; Kose and Prasad, 2010).

However, the effectiveness of capital account regulations depends on the incentives for circumvention relative to the costs of the evasion. If the regulatory restrictions on cross-border financial transactions create a significant wedge between interest rates in the domestic market and interest rates in the international market, the incentive for circumvention will increase and may reduce the effectiveness of the regulations.

The impact of the liberalization of capital controls on the volume and maturity mix of foreign capital depends on the pace of liberalization and the presence of relevant supporting policies. A gradual easing of restrictions on capital account transactions, supported by appropriate policies such as a more flexible exchange rate regime and adequate prudent financial regulation and supervision, tends to reduce short-term external borrowing and increase long-term external borrowing. Also, capital account liberalization that is not accompanied by a more flexible exchange rate regime and prudent fiscal policies can lead to excessive external borrowing, particularly short-term borrowing (Kose and Prasad, 2010).

In Ghana, the liberalization of direct restrictions on foreign borrowing by residents' and non-residents' purchase and holdings of government securities and money market instruments has been selective or discriminatory in nature. Regulatory restrictions on long-term foreign debt inflows have been liberalized, whilst some form of direct quantitative restriction on short-term foreign debt inflows has been maintained. Consequently, selective liberalization of cross-border financial transactions, of the type implemented in Ghana, is expected to reduce short-term foreign debt stock or to significantly influence the maturity-mix or composition of external debt towards long-term maturity.

Interest rate differential

A theoretical explanation of the relationship between the interest rate differential (the difference between domestic and foreign interest rate) and foreign debt is achieved by bringing together the international flow of funds and the standard parity relationships. This analysis adopts the work of Makin (2004).

The nominal interest rate of a small open economy can be linked to the global interest rate by means of international financial flows, the inflation rate and exchange rate expectations. An expression of the relationships is presented in the form of an economy-wide accounting and behavioural linkages as follows.

$$R_r = R_r^* \tag{1}$$

$$R^* = R_r^* + P^* \tag{2}$$

$$R = R_r + P \tag{3}$$

$$-C(R) = S(R) = L(R); \, S_R > 0, \, L_R > 0 \tag{4}$$

$$I = I(R, Op) = D(R, Op); \, D_R < 0 I_R < 0, \, I_{Op} > 0 \tag{5}$$

$$D(R) - L(R) = CAB = D^*(R, R^*); \, D_R^* < 0, \, D_{R^*}^* < 0 \tag{6}$$

$$\hat{H} = \frac{(h_{t+1} - h_t)}{h_t} \tag{7}$$

$$P - P^* = \Delta P = \hat{H} \tag{8}$$

$$D^*(R, R^*, Op, P, \Delta P) = L^*(R, R^*, P^*, \hat{H}) \tag{9}$$

where:

R_r = real domestic interest rate; R_r^* = exogenous real world interest rate; R^* = nominal world interest rate; R = nominal domestic interest rate; P = expected domestic inflation; P^* = expected world inflation; = the small open economy's given national income; C = domestic consumption expenditure; S = domestic savings; L = domestic lending; I = real domestic investment; Op = real domestic investment opportunities; CAB = current account balance; D = domestic demand for funds; D^* = external borrowing requirement; $\hat{H}$ = expected currency depreciation; $h_{(t+1)}$ and h_t = spot exchange rates at times t+1 and t; ΔP = domestic inflation in excess of world inflation; and L^* = foreign lending.

Equation 1 indicates that, at the initial equilibrium position, domestic borrowers are faced with a domestic real interest rate R_r set equal to the exogenous world interest rate, R_r^*. Equations 2 and 3 (the Fisher interest equations), respectively, represent the nominal world and domestic interest rates that provide a picture of expectations of respective world and domestic inflation rates.

The framework indicates that in a small, open economy faced with a given world interest rate, an excess demand for funds by domestic residents leads to a current account imbalance and an external borrowing requirement, taking into account that foreign lenders or investors are risk-neutral.

In the domestic financial market (or domestic market for loanable funds), an increase in the domestic interest rate causes an increase in domestic lending, but leads to a decrease in domestic borrowing. Lending and borrowing may occur, respectively, through the purchase or issuance of interest bearing instruments or assets. At the given world interest rate, an increase in real investment opportunities in the domestic economy leads to an increase in total borrowing in excess of domestic lending, which in turn results in an increase in the external borrowing requirement and hence a rise in actual borrowing from foreign sources, which could increase further with a fall in the world interest rate. Resident borrowers may then issue additional debt instruments denominated in domestic currency in order to obtain foreign funds at the given world interest rate. The amount of the external borrowing requirement is either fully met by foreign lenders at the given world interest rate if there is perfect capital mobility (and foreign lenders or investors are risk-neutral), or partly met if there is imperfect capital mobility (and foreign lenders or investors are risk-averse).

An increase in domestic inflation (in the small borrowing economy) in excess of the world inflation rate by the amount ΔP, causes an increase in the domestic interest rate relative to the world interest rate, and a subsequent increase in external borrowing. Equation 10 shows that the domestic nominal interest rate is in excess of the world interest rate during an inflationary period.

According to the relative purchasing power parity relation expressed in Equation 8, foreign lenders should expect the exchange rate of the borrowing economy to depreciate if the domestic inflation is in excess of world inflation. As such, foreign lenders may demand a higher rate of return as compensation for capital losses incurred upon maturity of the debt instrument.

Consequently, even if restrictions on cross-border financial transactions are completely removed, risk-averse domestic and foreign lenders incorporate a risk premium in the

determination of their interest rates. In that case, a risk premium is incorporated into the analysis and can be represented as follows.

$$S_t = \int_0^t D^*(t) . \, dt \tag{11}$$

$$\varphi = \varphi(S_t, u); \; \varphi S_t > 0, \; \varphi_u > 0 \tag{12}$$

Equation 11 shows the stock-flow link between foreign borrowing and levels of external debt. The notation S_t denotes foreign debt stock at a given time, t. Equation 12, on the other hand, indicates that foreign investors require a premium, φ, as compensation for risks associated with rising levels of foreign debt stock and other possible risk factors such as political and country risk, represented as u. Country risk factors include uncertainty about the currency of the borrowing country. Foreign lenders are willing to increase lending to the borrowing country or domestic residents of the small open economy only if the international interest rate incorporates the risk premium. The presence of risk-averse foreign investors indicates that international capital is imperfectly mobile.

The implication of this theoretical framework is that an increase in the domestic interest rate relative to the world rate will lead to an increase in external borrowing and hence an increase in the foreign debt stock of the borrowing small open economy. However, the extent of increase in the debt stock caused by changes in the interest rate differential depends on the expected domestic currency depreciation and the attitude of foreign lenders towards the borrowing country's risk factors (such as debt-related risks and political instability).

In another theoretical framework developed by Broner et al (2013), risk-averse foreign investors place a higher risk premium on long-term debt instruments than on short-term debt instruments due to the possibility of the borrowing economy defaulting in repayments over longer periods. Hence, the cost of borrowing using long-term debt instruments will be generally higher than that for borrowing using short-term debt instruments. Even though the government of the borrowing small open economy prefers issuing long-term bonds because it is safer and reduces the probability of a rollover crisis, the higher costs of long-term borrowing make the government of the borrowing economy shift the issuance of debt instruments towards shorter maturities.

In summary, in a small open economy, an increase in the disparity between the short-term domestic interest rate and the short-term foreign interest rate leads to an increase in foreign borrowing due to a corresponding increase in the cost of domestic borrowing relative to foreign borrowing. This, in turn, could lead to a rise in the short-term foreign debt stock of the small open economy. However, the extent of increase in the short-term foreign debt stock may be less if foreign investors are more risk-averse (Makin, 2004).

Other potential determinants

A survey of the literature indicates that aside from changes to direct and indirect regulations on capital account transactions, and the disparity between domestic interest rates and global rates, there are a host of other key potential factors that tend to influence a country's short-term foreign debt stock. These factors include external trade openness, domestic financial depth, economic growth and, in recent times, granting debt relief under the international debt relief initiatives (see the Introduction).

4. Empirical model

This section presents the empirical model to be estimated. From early discussions on the potential determinants of the real stock of short-term foreign debt derived from existing literature, the equation to be estimated is presented as follows:

$$Debt_0^{st} = \beta_0 + \beta_1\, lib_t + \beta_2\, IRD_t + \beta_3\, M2Q_t + \beta_4\, TQ_t + \beta_5\, Qpcg_t + \beta_6\, drel_t + u_t \quad (13)$$

where:

$Debt_0^{st}$ = logarithm of the real stock of short-term foreign debt (in US$ million). Real stock of short-term foreign debt is calculated by deflating the nominal values with GDP deflator index (2000=100; US$ series).

lib_t = an index for intensity of restrictions on overseas borrowing is used as a proxy measure of external financial liberalization. The value ranges from '0' to '4'; with '0' denoting outright prohibition, '1' representing existence of quantitative restrictions and requiring official approval from relevant authority, '2' signifying the elimination of some quantitative restrictions, but the requirement for official approval is maintained, '3' indicating no requirement of official approval, but authorities must be notified and some quantitative restrictions are maintained, and '4' representing no requirement for official approval and no quantitative restrictions apply (see Appendix, Table A2 for information on chronology). The expected sign of its estimated coefficient is negative.

IRD_t = interest rate differential, measured by computing the disparity between the average 6-12-month domestic Treasury bill rates and the average 6-12-month Treasury securities rates of the Group of 7 countries (the United States of America, Canada, the United Kingdom, France, Germany, Italy and Japan).

$M2Q_t$ = domestic financial sector development/depth measured as broad money supply expressed as a share of GDP.

TQ_t = international trade openness, measured as the sum of imports and exports expressed as a share of GDP.

$Qpcg_t$ = GDP per capita growth (%).

$drel_t$ = an index for international debt relief initiatives. The value reflects the number of debt relief initiatives the country has benefitted from. The value '0' indicates that the country has not benefitted from any debt relief initiative, '1' shows that the country has benefitted from one debt relief initiative, and the value '2' means that the country has benefitted from two such initiatives. Ghana benefitted from the HIPC initiative between 2002 and 2005, and also from an additional debt relief, the MDRI, between 2006 and 2010.

The subscript 't' = 1,2, .T, where T = 43 years, spanning the sample period 1970 to 2012. The intercept β_0 is the intercept and u_t denotes the error term, indicating the unexplained component of the regression with respect to the real stock of short-term foreign debt.

In view of the fact that inflation constitutes one of the reasons for the increase in the nominal values of external debt, the GDP deflator index (2000=100; US$ series) was used to deflate the nominal values of short-term external debt to obtain an indicator for short-term external debt expressed in real terms (refer to Long, 1981, for justification). The objective of this empirical investigation is to provide estimates of the long-run relationships and short-run dynamics of Equation 13. To do this, we use the autoregressive distributed lag (ARDL) model approach.

ARDL model specification

The use of the autoregressive distributed lag model has several small sample econometric advantages over other techniques. One of the key advantages is that the bounds testing procedure does not require the pre-testing of the variables to establish their order of integration, in contrast with other techniques such as the Johansen and Juselius (1990) approach. It is applicable and relevant irrespective of whether the series are integrated of order one (that is I(1)), of order zero (that is I(1)) or mutually cointegrated. A second advantage is that it produces more efficient and robust estimation results for small or finite sample data sizes. Another advantage of the ARDL approach is that the long-run coefficients is very consistent. The ARDL approach facilitates simultaneous testing for both short- and long-run relationships.

Following Pesaran et al (2001), the bounds testing procedure was conducted by re-specifying Equation 13 as follows:

$$Debt_t^{st} = \alpha_0 + c_1 Debt_{t-1}^{st} + c_2 lib_{t-1} + c_3 IRD_{t-1} + c_4 M2Q_{t-1} + c_5 TQ_{t-1} + c_6 Qpcg_{t-1} +$$

$$c_7 drel_{t-1} + \sum_{i=1}^{q} \delta_i \Delta Debt_{t-i}^{st} + \sum_{i=1}^{q} \theta_i \Delta lib_{t-i} + \sum_{i=1}^{q} \varnothing_i \Delta IRD_{t-i} + \qquad (14)$$

$$\sum_{i=1}^{q} \Psi_i \Delta M2Q_{t-i} + \sum_{i=1}^{q} \eta_i \Delta TQ_{t-i} + \sum_{i=1}^{q} {}_i \Delta Qpcg_{t-i} + \sum_{i=1}^{q} Z_i \Delta drel_{t-i} + u_t$$

The notation Δ denotes the first difference of the variable. Prior to testing for the existence of a long-run relationship, a unit root test of the series was conducted to

determine if they are integrated of order zero or one. The unit root test results indicated that some of the series are I(0) (that is integrated of order zero) whilst other series are I(1) (that is integrated of order one). Detailed results of the unit root tests are presented in Table 7. Consequently, we proceeded to conduct ARDL bounds testing for the existence of a long-run relationship among the series. The first stage of the bounds testing procedure involved testing for the existence of a long-run relationship in Equation 14 using the ordinary least squares (OLS) method, taking into consideration the optimum-lag-length order of each short-run variable. Given the existence of a long-run relationship, the following conditional ARDL long-run model is estimated using OLS.

$$Debt_t^{st} = \alpha_0 + \sum_{i=1}^{p} c_1 Debt_{t-i}^{st} + \sum_{i=0}^{q1} c_2 lib_{t-1} + \sum_{i=0}^{q2} c_3 IRD_{t-1} + \sum_{i=0}^{q3} c_4 M2Q_{t-1} +$$

$$\sum_{i=0}^{q4} c_5 TQ_{t-1} + \sum_{i=0}^{q5} c_6 Qpcg_{t-1} + \sum_{i=0}^{q6} c_7 drel_{t-1} + u_t \qquad (15)$$

All variables are as previously defined. This involved selecting the orders of the ARDL (p, $q1$, $q2$, $q3$, $q4$, $q5$, $q6$) model in the seven variables using the Akaike information criteria (AIC) and Schwartz-Bayesian criterion.

The third stage involved estimating an error-correction model associated with the long-run estimates, and based on identifying the optimum lag length of each variable. The estimated error correction model (ECM) is as follows:

$$\Delta Debt_t^{st} = \upsilon + \sum_{i=1}^{q} \delta_i \Delta Debt_{t-i}^{st} + \sum_{i=1}^{q} \theta_2 \Delta lib_{t-i} + \sum_{i=1}^{q} \emptyset_i \Delta IRD_{t-1} + \sum_{i=1}^{q} \psi_i \Delta M2Q_{t-1} +$$

$$\sum_{i=1}^{q} \eta_i \Delta TQ_{t-i} + \sum_{i=1}^{q} {}_i \Delta Qpcg_{t-i} + \sum_{i=1}^{q} Z_i \Delta drel_{t-i} + \lambda ecm_{t-1} + u_t \qquad (16)$$

Here v is the unrestricted intercept; δ, θ, $\emptyset$, Ψ, η, and Z are the short-run dynamic coefficients, and λ is the speed of adjustment towards the equilibrium.

Data sources

Annual time series (secondary) data collected from various sources were used for the study. These include the External Resource Mobilization Division of the Ministry of Finance and Economic Planning, Bank of Ghana's *Quarterly Bulletin* (various issues), the World Bank's World Development Indicators, and International Debt Statistics database. Qualitative information on direct domestic regulations on foreign borrowing was sourced from various IMF publications including the *Annual Reports on Exchange Arrangements and Exchange Restrictions* (various issues). The study period is from 1970 to 2012.

5. Results and interpretation

This section presents and discusses the estimation results. The analysis tests the validity of the hypothesis that risk and uncertainty factors and the regulatory environment are important determinants of short-term foreign debt.

Pre-estimation test results

This study reports research findings based on the estimation of the short-term foreign debt equation. The analysis begins with an investigation of the time series properties of the data used in the estimation exercise. This is followed by a test for (weak) exogeneity to enable us to draw an inference about causality.

Time series properties of data

Table 4 reports the results of the test for a unit root (non-stationary) null hypothesis (H0) against a stationary alternative (H1). All the variables are either I(0) or I(1). The series for domestic output growth is I(0) whilst the series for short-term foreign debt, liberalization, interest rate differential, domestic financial depth, external trade openness and debt relief are I(1). Consequently, the pretest results support the choice of the ARDL bounds test approach.

Table 4: Unit root test results

Variable	Augmented Dickey-Fuller (ADF)		Phillip-Perron (PP)		Order of integration I(d)
	Level form	First difference	Level form	First difference	
$Debt_t^{st}$	-0.6200	-2.1723**	-0.6355	-6.8310**	I(1)
lib_t	-0.1232	-6.4979***	-0.4181	-6.5163***	I(1)
IRD_t	-1.7222	-6.3158***	-1.7829	-6.3153***	I(1)
$M2Q_t$	-1.9997	-6.0701***	-1.8184	-6.0722***	I(1)
TQ_t	-3.5157*	-5.3981***	-2.2481	-5.3981***	I(1)
$Qpcg_t$	-5.6726***		-6.3157***		I(0)
$drel_t$	-0.1012	-6.4251***	-0.0870	-6.5892***	I(1)

Note: ***, ** and * represent significance at the 1%, 5% and 10% level of significance, respectively. The computed test statistics were compared to the respective Mackinnon (1996) one-sided critical values for 1%, 5% and 10%. The existence of trend and intercept was assumed

Weak exogeneity test

The model specification of the estimation equation suggests that, with the exception of the domestic credit to the private sector ratio, all the independent variables are at least weakly exogenous. To test the validity of this assumption, this study used EViews econometric software to conduct the pairwise Granger causality test on the individual independent variables of the estimation equation at a 5% significance level (Granger and Hyung, 2004). This is used in testing for strong exogeneity. We tested for strong exogeneity because the presence of strong exogeneity necessarily implies that weak exogeneity also exists (Johnston and DiNardo, 1997). The F-statistics and their corresponding probability values shown in Table A1 indicate that the dependent variable does not Granger-cause any of the independent variables. This reveals that Ghana has not experienced strong feedback effects from: short-term foreign debt to liberalization of direct regulations on foreign borrowing, the interest rate differential, domestic financial deepening trade openness, domestic output growth and an international debt relief initiative. Thus, the assumption of strong exogeneity is validated.

The next stage involved the times series analysis, comprising the bounds testing for the existence of a long-run relationship between the dependent variable, short-term foreign debt and the independent variables, namely the liberalization index for direct regulations on foreign borrowing, the interest rate differential, domestic financial depth indicator, trade openness indicator, domestic output growth rates and an indicator for an international debt relief initiative.

ARDL bounds testing

We estimated the error-correction form of the ARDL model for the relevant equation in two stages. First, using the unrestricted Vector Auto-Regression (VAR) approach and the minimum lag order criteria, the Schwarz Bayesian Criteria (SBC) lag order selection process identified the one-period lag as appropriate for variables for the short-term foreign debt equation. Results of the computed Wald's F-test statistics on the null hypothesis of no-cointegration between the lagged level variables ($H_o : c_1 = c_2 = c_3 = c_4 = c_5 = c_6 = c_7 = 0$) were compared with specific asymptotic critical values bounds as in Table C1(iii) of Pesaran et al (2001, pp. 303) to determine one of three possible outcomes.

The computed F-statistic was found to be above the upper-bound critical values at a 10% level of significance. The computed F-tests for the joint significance of lagged levels of variables in Equation 14 are recorded in Table 5. There is strong evidence of co-integration because the computed F-statistic is 3.0325, which is greater than the critical value of the upper limit of the bound at the 10% level of significance for the short-term foreign debt function. Thus, there is a long-run relationship between $Debt_t^{st}$, lib_t, IRD_t, $Qpcg_t$, TQ_t, $M2Q_t$ and $drel_t$.

Table 5: Results of bound test

Dependent variable	Independent variables	F-Statistic	Probability
$Debt_t^{st}$	$M2Q_t$, TQ_t, lib_t, $Qpcg_t$, IRD_t, $drel_t$	3.0325	0.017
TQ_t,	$Debt_t^{st}$, $M2Q_t$, lib_t, $Qpcg_t$, IRD_t, $drel_t$	2.0043	0.092
$M2Q_t$	$Debt_t^{st}$, TQ_t, lib_t, $Qpcg_t$, IRD_t, $drel_t$	1.9903	0.094
lib_t	$Debt_t^{st}$, $M2Q_t$, TQ_t, $Qpcg_t$, IRD_t, $drel_t$	1.2402	0.316
$Qpcg_t$	$Debt_t^{st}$, $M2Q_t$, TQ_t, lib_t, IRD_t, $drel_t$	4.3656	0.002
IRD_t,	$Debt_t^{st}$, $M2Q_t$, TQ_t, lib_t, $Qpcg_t$, $drel_t$	0.8775	0.537
$drel_t$	$Debt_t^{st}$, $M2Q_t$, TQ_t, lib_t, $Qpcg_t$, IRD_t	3.0603	0.017

	Bounds critical value	
Critical value	Lower bound	Upper bound
1%	2.595	3.909
5%	2.003	3.199
10%	1.718	2.837

Notes: Asymptotic critical values are obtained from Pesaran and Pesaran (2009: 564); Table B1 of case II: No trend and no intercept for K= 7.

Long-run estimates

Given the existence of a long-run relationship, the ARDL approach was used to compute the long-run estimates. The SBC determined a maximum-order lag length of one for the level variables to minimize the loss in the degree of freedom. Results of the estimated long-run elasticities for Equation 15 are reported in Table 6. With the exception of the trade openness indicator, all independent variables have statistically significant coefficients in the long-run model. The estimated coefficients for the liberalization index, interest rate differential, domestic financial depth and domestic output growth are statistically significant at the 10% level and have a positive sign, whilst the estimated coefficient for the international debt relief initiative indicator is also statistically significant at the 10% level, but has a negative sign.

Table 6: Estimated long-run coefficients using the ARDL approach

Equation 3: ARDL (1, 0, 0, 0, 0, 0, 0) selected based on Schwarz Bayesian Criterion. Dependent variable is $Debt_t^{st}$

Regressor	Coefficient	Standard error	T-ratio	T-probability
α	-2.477	1.268	-1.954	0.059
lib	1.975	0.825	2.395	0.022
IRD	0.166	0.070	2.375	0.023
TQ	-0.061	0.038	-1.585	0.122
M2Q	0.182	0.091	1.999	0.054
Qpcg	0.146	0.085	1.716	0.095
drel	-1.129	0.647	-1.744	0.090

A 1% increase in the liberalization index leads to an approximate 1.98% increase in short-term foreign debt. The estimated results suggest that the liberalization of direct restrictions on foreign borrowing increases the short-term debt stock. The results are

consistent with the findings of Schmukler and Vesperoni (2006) for seven Latin American and South East Asian countries, that liberalization leads to more short-term debt. A possible explanation for the finding could be the absence of adequate macroeconomic and financial policies, such as prudent fiscal policies, to support the liberalization effort.

A 1% increase in the interest rate differential causes an increase in short-term foreign debt by approximately 0.17%. This suggests that an increase in the domestic interest rate relative to the global interest rate causes an increase in the short-term debt stock. A plausible explanation for this is that the increase in the domestic interest rate relative to the international rate makes the cost of borrowing from domestic sources more costly than from foreign sources, hence creating an incentive for the borrowing country to borrow from foreign sources. The estimation result is consistent with the findings by Verma and Prakash (2011) for India that an increase in the interest rate differential induced a rise in external commercial borrowing.

Contrary to expectation, the estimated coefficient for financial deepening is also statistically significant and has a positive sign. A 1% increase in the financial deepening indicator leads to an approximate 0.15% rise in the stock of short-term foreign debt. This means that as domestic financial markets become deeper the stock of short-term external debt increases. The result is similar to the findings by Mama (2008) and Rodrik and Velasco (1999) for 33 emerging economies and 32 emerging-market economies, respectively, that financial deepening increases short-term debt stock due to increased financial sophistication which increases the demand and supply for maturity-transformation services.

The estimated coefficient for domestic output growth is also statistically significant at 10% and has a positive sign. A 1% increase in the rate of output growth causes a rise in the stock of short-term foreign debt by approximately 0.15%. The result contradicts the finding by Mama (2008) for 33 emerging economies that a country with a lower growth rate faces comparatively greater certainty and hence greater certainty over future resources and, therefore, is less willing to opt for short-term debt. A plausible explanation could be that, in the case of Ghana, higher growth rates are associated with greater certainty in the price of financial instruments and, consequently, more certainty in future resources. A persistently higher output growth rate is therefore perceived to mean higher future growth prospects and returns.

The estimated coefficient for the international debt relief initiative indicator is also statistically significant at 10%, but has a negative sign. A 1% increase in debt relief causes a reduction in the short-term debt stock by 1.13%. The result confirms the expectation that the immediate impact of debt relief is to reduce the level of debt stock of the beneficiary country.

Most surprisingly, this study does not find any significant relationship between trade openness and short-term debt. The estimated coefficient has a negative sign, suggesting that more open economies tend to borrow less in the short term. This contradicts the idea that short-term borrowing is driven in part by trade credits. A possible explanation is that increased openness to international trade tends to make the borrowing country more creditworthy based on the fact that they have more to lose from defaulting on their debt, can readily provide collateral to their creditors and, consequently, tend to be less credit-rationed in the market for long-term finance. As such, the borrowing

small open economy tends to have lower levels of short-term debt and higher levels of long-term debt. The obvious conclusion is that the levels of short-term debt that we observe in the country are only weakly, if at all, related to international trade in the long run. The estimated result for trade openness is similar to the findings by Rodrik and Velasco (1999).

Analysis of short-run dynamic model

The estimation results for the error correction representation for the selected ARDL model specified in Equation 16 are presented in Table 7. The signs of the short-run dynamic impacts of the independent variables are maintained in the long run. The liberalization and interest rate differential variables are significant at the 10% and 1% levels, respectively, supporting the findings that the easing of regulatory restrictions on overseas borrowing and the widening of the disparity between domestic and international interest rates increase the accumulation of short-term foreign debt. The results are consistent with the findings of Schmukler and Vesperoni (2006) for seven Latin American and South East Asian countries, and Verma and Prakash (2011) for India.

Trade openness has a significant short run effect on short-term foreign debt stock, but contradicts the assertion that short-term borrowing is in part driven by trade credit and is not consistent with the finding by Buch and Lusinyan (2000) that international trade drives up short-term foreign debt through increased trade credit. A possible explanation is that increased trade openness improves the capacity of the country to service its external debt obligations and, consequently, reduces the country's short-term external indebtedness in the short run. The coefficient for domestic financial depth is statistically significant at the 5% level and has a positive sign, suggesting that an increase in domestic financial deepening also leads to the accumulation of short-term foreign debt in the short run. The result is similar to the findings by Mama (2008) and Rodrik and Velasco (1999) for 33 emerging economies and 32 emerging-market economies, respectively.

The estimated coefficient for change in domestic output growth is statistically significant at the 5% level and has a positive sign. Despite the statistical significance, the economic significance is small. The result suggests that an increase in domestic output growth contributes significantly to the accumulation of short-term foreign debt in Ghana and contradicts the finding by Mama (2008), which suggests that short-term foreign debt is negatively correlated with economic growth for 33 emerging economies. The indicator for international debt relief is not statistically significant in the short-run model, but maintains the sign of impact in the long run. A possible reason could be the fact that the immediate expected impact of international debt relief is to reduce the long-term debt stock of beneficiary countries and hence may not impact on the short-term debt of the beneficiary country's foreign debt stock. The respective coefficient of the error correction term is negative and significant at the 1% level of significance, implying a fairly high speed of adjustment to equilibrium after a shock. About 41% of the deviations or disequilibria from the previous year's shock (that is, whenever short-term foreign debt overshot its long-run equilibrium values) were corrected in the current year or converge with the long-run equilibrium in the current year.

Table 7: Error correction representation for selected ARDL model

ARDL (1, 0, 0, 0, 0, 0, 0) selected based on SBC. Dependent variable is $\Delta Debt_t^{st}$

Regressor	Coefficient	Standard error	T-ratio	T-probability
v	-0.893	0.448	-1.991	0.055
Δlib	0.712	0.368	1.932	0.062
ΔIRD	0.060	0.021	2.885	0.007
ΔTQ	-0.022	0.011	-2.026	0.051
$\Delta M2Q$	0.066	0.027	2.932	0.022
$\Delta Qpcg$	0.053	0.025	2.140	0.040
$\Delta drel$	-0.407	0.251	-1.620	0.114
ecm_{t-1}	-0.361	0.120	-3.000	0.005

$ecm = Debt^{st} + 0.060526*TQ - 0.18201*M2Q - 1.9751*lib - 0.1463*Qpcg - 0.1663*IRD + 1.1287*drel + 2.4771*\alpha$

R-squared = 0.373	Adj. R-squared = 0.244	F-stat. (7, 34) = 2.894[0.017]
SER = 0.604	RSS = 12.397	DW-statistic = 2.062
Akaike Info. Criterion = -41.970		Schwarz Bayesian Criterion = -48.921

The regression for the underlying ARDL Equation 2 passes the diagnostics tests against serial correlation, functional form misspecification, non-normal errors and heteroscedasticity. This suggests that the underlying ARDL equation is a good fit. The results of the diagnostic tests for the underlying ARDL equation are presented in Table 8. The cumulative sum (CUSUM) and cumulative sum of squares (CUSUMQ) plots from a recursive estimation of the model, shown as Figures A1 and A2, and also indicate stability in the coefficients over the sample period.

Table 8: ARDL-ECM model diagnostic tests

Test statistics	LM version	F version
Serial correlation	$\chi^2 (1) = 0.104[0.747]$	F(1, 33) = 0.08191[0.777]
Functional form	$\chi^2 (1) = 0.1726[0.678]$	F(1, 33) = 0.13613[0.715]
Normality	$\chi^2 (2) = 3.6544[0.161]$	
Heteroscedasticity	$\chi^2 (1) = 0.0589[0.808]$	F(1, 40) = 0.056[0.814]

6. Conclusion and policy recommendations

As part of a broad macroeconomic and financial sector reform strategy, Ghana has liberalized its external capital account transactions since the mid-1990s. The process of liberalization has been gradual and well-sequenced, and has included the reduction in regulatory restrictions on overseas borrowing. However, due to concerns for vulnerability to shocks, some restrictions have been kept, suggesting that the liberalization of the capital account transactions has been partial with some selective controls remaining, which include direct restrictions on the minimum length of maturity of government debt securities and money market instruments purchased and held by foreign residents. In addition, the liberalization of the capital account transactions has been carried out alongside a successful completion of a macroeconomic stabilization programme, an improvement in the country's creditworthiness through debt relief and debt reduction, and wide-ranging institutional reform measures. Although one of the aims for these measures is to reduce the short-term end of foreign capital, the past two decades havewitnessed a rise in the contribution of short-term debt to the total foreign debt stock in Ghana and are at levels higher than those of the 1970s and 1980s. This raises the question of whether reducing regulatory restrictions on foreign borrowing and pursuing complementing reform measures to improve the macroeconomic environment are prudent measures for managing and influencing the length of maturity of foreign capital in the country.

Conclusions and implications

In this study, an effort has been made to analyse the nature of the impact of liberalization of overseas borrowing and interest rates on short-term foreign debt in Ghana. An effort has also been made to examine the contributions of domestic financial depth, external trade openness and economic performance to the levels and accumulation of short-term external debt in Ghana. To do this, we adopted a robust time series approach to quantitatively determine the nature of impact of reductions in overseas borrowing regulations on short-term foreign debt in Ghana.

Overall, the findings of the study fail to confirm the hypothesis that a selective liberalization of restrictions on the capital account transactions that entail easing restrictions on long-term capital but maintaining some restrictions on short-term capital leads to a reduction in short-term foreign debt. In both the short- and long-run scenarios, liberalization leads to an increase in the stock of short-term foreign debt in Ghana. The findings of the study point to the difficulties with disaggregating short-term foreign debt.

Even though the maintenance of some restrictions on short-term borrowing is targeted at the minimum maturity of central government debt, the difficulty with determining the exact composition of short-term debt distorts the possibility of knowing the specific impact of the selective restrictions on specific aspects of short-term foreign debt. This is especially so when central government short-term debt may just be a fraction of the total public sector short-term foreign debt. The maintenance of some restrictions on short-term foreign debt, namely that foreign residents are not allowed to purchase money market instruments and government securities with a maturity of less than three years, applies to and may directly reduce short-term foreign borrowing of central government. However, its impact on other public sector short-term borrowing and private sector short-term borrowing is not clear. For instance, commercial banks and other credit institutions, importers and exporters, among other resident organizations, also borrow from overseas. It is not clear how much of their foreign borrowing activities form part of the total short-term foreign debt profile of the country. The implication of this is that easing restrictions on long-term capital and maintaining some restrictions on short-term borrowing (which apply to central government borrowing via the minimum maturities of Treasury bills and government securities) may be effective in reducing short-term government foreign debt but may not be effective in reducing other short-term public sector foreign debt and short-term private sector foreign debt.

The finding of the study confirms the hypothesis that a widening of the interest rate differential increases the short-term foreign debt stock. In the short- and long-run, an increase in the domestic interest rate relative to international rates leads to an increase in short-term foreign debt in Ghana. An increase in the domestic interest rate relative to international rates leads to lower costs of borrowing from overseas. Domestic borrowers find it cheaper to borrow from overseas and hence substitute foreign borrowing for domestic loans, whilst foreign lenders demand higher interest rates on domestic currency-denominated debt instruments from the borrowing economy as a condition for meeting the foreign borrowing requirements of domestic borrowers. Consequently, the actual amount of foreign borrowing increases when the domestic interest rate is in excess of the international interest rate.

The study also finds that increased trade openness leads to a reduction in the short-term foreign debt stock in the short run. A possible explanation is that increased trade openness improves the country's capacity to service its short-term external debt obligations. Furthermore, the analysis suggests that increased domestic financial deepening causes an increase in the short-term foreign debt stock of the country. The increase in domestic financial depth could just be a reflection of increased trade volumes in the domestic financial market and an expansion of the domestic financial market dominated by financial institutions that deal more in short-term assets and liabilities, and consequently engage in short-term external borrowing. In addition, an increase in domestic output growth causes a rise in the level and accumulation of short-term foreign debt stock in Ghana. An increase in domestic output growth causes growth in the short-term foreign debt stock possibly by increasing aggregate expenditure with high import content, leading to an increase in demand for foreign exchange which in part may lead to an increase in short-term foreign borrowing to finance the rising imports. This could be a reason why increased trade openness leads to a reduction in short-term foreign debt in the short run

but does not have any significant impact in the long run. Lastly, the debt relief initiative reduces the country's short-term external debt in the long run, probably due to the overall reduction in the country's external debt stock and subsequent reduction in debt-related risks, which in turn attracts longer term investments.

Policy recommendations

From the results, a policy suggestion for the management of short-term foreign debt in Ghana will be to impose indirect "market-based" regulations, such as introducing unremunerated reserve requirements or some form of levy, on other public sector and private sector short-term foreign borrowing. This will raise the transaction costs of short-term foreign borrowing, limit their attractiveness and thereby discourage and reduce the volume of such transactions. The imposition of direct restrictions on the minimum maturity of money market instruments and government bonds purchased and held by non-residents is not an adequate measure to effectively reduce the short-term foreign debt stock of the country.

In the case of the interest rate differential, government or the relevant authorities must pursue measures that help to improve the domestic investment environment to the extent that they reduce country risk factors such as high rates of inflation and the rapid accumulation of government domestic debt. Regarding the impact of increased trade openness, measures to promote greater international trade could help to improve the country's capacity to reduce its short-term external indebtedness through increased exports. On the subject of the impact of domestic financial deepening, policy measures must be directed at developing and strengthening the bonds and equities markets to encourage financial institutions to increase their dealings in longer term assets and make the holding of shorter term assets more costly. Measures that also help to further improve the liquidity and efficiency of the markets and enhance the quality of the institutional and regulatory framework are also recommended. This recommendation is premised on the finding that short-term foreign debt increases with domestic financial deepening in the short- and long-run when we consider an indicator for financial deepening as the only variable for financial development in the model. An increase in domestic output growth can lead to reduction in short-term foreign debt if measures can be taken to reduce the high import content of rising aggregate expenditures, for instance by making competitive consumer imports more costly and encouraging local substitutes.

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Appendix

Table A1: Pairwise Granger causality test

	Null Hypothesis	Obs	Chi-squared	Probability
1.	lib_t does not granger cause $Debt_t^{st}$	42	5.5677	0.0589
	$Debt_t^{st}$ does not granger cause lib_t		2.0521	0.1520
2.	IRD_t does not granger cause $Debt_t^{st}$	42	10.7393	0.0010
	$Debt_t^{st}$ does not granger cause IRD_t		0.1703	0.6799
3.	TQ_t does not granger cause $Debt_t^{st}$	42	5.9011	0.0151
	$Debt_t^{st}$ does not granger cause TQ_t		0.5052	0.4772
4.	$M2Q_t$ does not granger cause $Debt_t^{st}$	42	3.5621	0.0591
	$Debt_t^{st}$ does not granger cause $M2Q_t$		1.7919	0.1807
5.	$Qpcg_t$ does not granger cause $Debt_t^{st}$	42	0.0155	0.9011
	$Debt_t^{st}$ does not granger cause $Qpcg_t$		0.0030	0.9561
6.	$drel_t$ does not granger cause $Debt_t^{st}$	42	0.3595	0.5488
	$Debt_t^{st}$ does not granger cause $drel_t$		2.5076	0.1133

Source: Computed by author using EViews 5.0 econometric software

Table A2: Chronology of regulatory restrictions on foreign borrowing

	Before 1994	**1994 to 2005**	**Since 2006**
Non-residents' purchase of domestic bonds or other debt securities domestically	There is prohibition on sale or issue of securities in Ghana or abroad by Ghana residents to non-residents (**Dec. 197**0 **through Dec. 1994**)	a. Non-residents have the option to purchase corporate bonds but within confined limits. Nonetheless, existing regulations prohibit them from purchasing government securities (**Dec. 1995**)	Non-residents are allowed to purchase bonds or other debt securities domestically or invest in debt securities with maturities of three years or more (**since Dec. 2006**)
		b. Purchase of bonds or other debt securities domestically by non-residents require prior approval by the BOG (**Dec. 1998 to Dec. 2005**)	
Residents' sale or issue of domestic bonds or other debt securities abroad	There is prohibition on sale or issue of securities in Ghana or abroad by Ghana residents to non-residents (**Dec. 1970 to Dec. 1994**)	Sale or issue of bonds or other debt securities abroad by residents require the prior approval of the Bank of Ghana (**Dec. 1995 through Dec. 2005**)	Residents are allowed to sell or issue bonds or other debt securities abroad. However, banks are obliged to report these transactions to the BOG (**since Dec. 2006**)
Non-residents' investment in or purchase of domestic money market instruments (BOG and government securities)	There is prohibition on sale or issue of securities in Ghana or abroad by Ghana residents to non-residents (**Dec. 1970 to Dec. 1994**)	Existing regulations forbid non-residents from bringing in foreign exchange for investing in money market instruments (BOG and government securities). Nonetheless, non-residents having local currencies can invest in the instruments with maturity of three years or more (**Dec. 1995 to Dec. 2005**)	Existing regulations allow non-residents to bring in foreign exchange for investing only in debt instruments with maturity of three years or more. However, non-residents having local currencies can invest in any money market instrument (**since Dec. 2006**)

Table A2 Continued

	Before 1994	1994 to 2005	Since 2006
Residents' sale or issue of domestic money market instruments	Existing regulations do not allow residents to sell or issue money market instruments abroad (**Dec. 1970 to Dec. 2005**)		No restrictions apply to the sale or issue of domestic money market instruments by residents. Previously, existing regulations did not allow residents to sell or issue money market instruments abroad (**since Dec. 2006**)
Overseas borrowing by commercial banks and other credit institutions	Overseas borrowing by the private sector and commercial banks require the approval of the Bank of Ghana. Foreign borrowing by Ghanaian nationals is conditional on meeting certain government guidelines (**Dec. 1970 to Dec. 199**5)	Purchase of bonds or other debt securities domestically by non-residents require the prior approval of the BOG (**Dec. 1998 to Dec. 2005**)	Requires Bank of Ghana notification
Commercial and financial credits from non-residents to residents	Private import credits for machinery and equipment valued at US$100,000 and above require the approval of the Bank of Ghana (**Dec. 1970 to Dec. 1994**)	Commercial credits from non-residents to residents require the approval of BOG, must be channelled through the banking system and must be supported by appropriate documents. Also, financial credits from non-residents to residents also require the approval of BOG (**Dec. 1995 to Dec. 2006**)	

Source: International Monetary Fund's Annual Reports on Exchange Arrangements and Exchange Restrictions, various issues 1988-2011 and other IMF databases

Indicators
- Non-residents' purchase of domestic bonds or other debt securities domestically
- Residents' sale or issue of domestic bonds or other debt securities abroad
- Non-residents' investment in domestic money market instruments
- Residents' sale or issue of domestic money market instruments
- Overseas borrowing by commercial banks and other institutions
- Commercial and financial credits from non-residents to residents

Measures

Scores range from 0 to 4.

- 0 - if outright prohibition
- 1 - if quantitative limits are set and requires official approval from relevant authority
- 2 – if some quantitative limits are eliminated but official approval is required
- 3 - if no official approval is required but authorities must be notified and some quantitative limits are maintained
- 4 – if no official approval is required and no quantitative limits apply

The average score represents the value for the liberalization index.

Figure A1: Plot of cumulative sum of recursive residuals
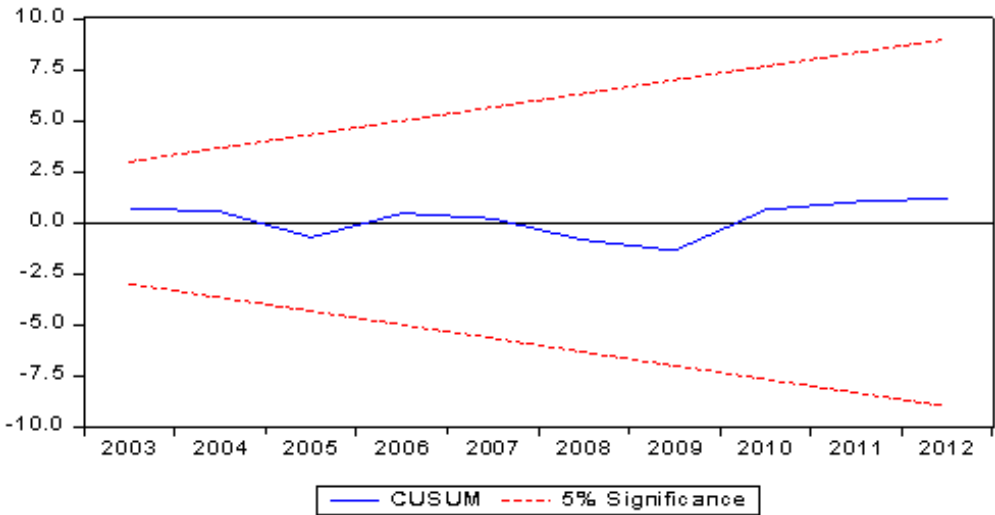
Figure A2: Plot of cumulative sum of squares of recursive residuals
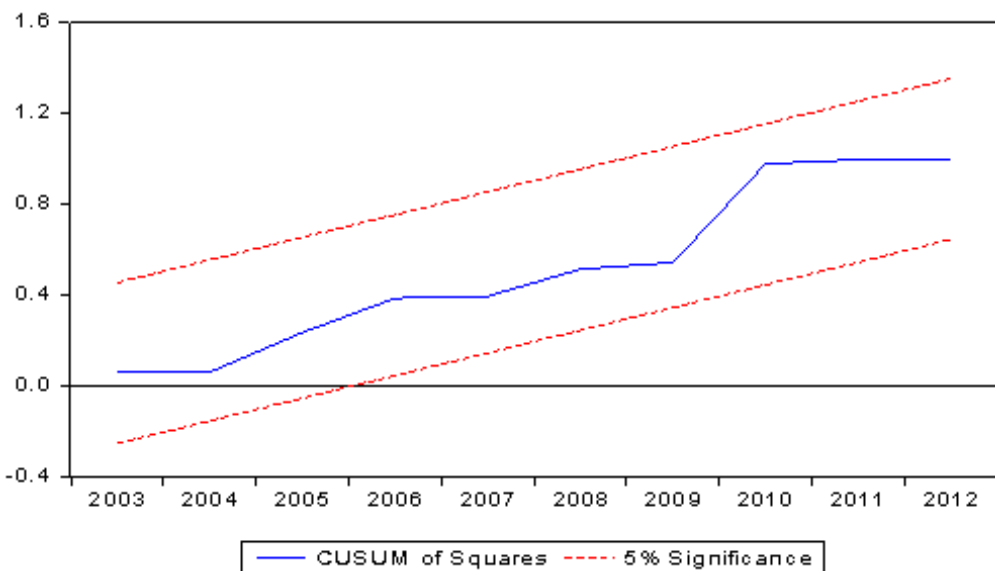
Note: The straight lines represent critical bounds at the 5% significance level.