Does Civil War Violence Contribute to Exchange Rate Fluctuations? Evidence from Uganda*

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Abstract

While most countries adopted floating exchange rates in the 1970s, the literature has consistently failed to demonstrate that current or future rates can be explained entirely by conventional macroeconomic fundamentals. But there is evidence to suggest that exchange rates movements can be better understood if socio-political variables are explicitly incorporated in the empirical models. Apparently, in some countries where socio-political problems are most prevalent, and bullets rather than ballots dominate contests for political power, the subject remains largely unexplored. This paper uses data on the actions of rebel and government armies to see if civil war violence is a determinant of exchange rate fluctuations in Uganda. Evidence from general-to-specific modelling shows that simultaneous protagonists' attacks have opposite effects. Rebel offensives cause the Uganda shilling to depreciate against the US Dollar, but the government army's 'peace-keeping' operations causes it to appreciate. This reinforces the government's credibility regarding the use of force; it safeguards the gains from the recent macroeconomic reform targets – the stability of Uganda's currency.

April 2009

JEL Classification: E44, E47, F31, G11, P16
Keywords: Exchange rate, civil war, violence, Uganda, Autometrics, model reduction.

* Preliminary version prepared for presentation at the 50th New Zealand Association of Economists Conference, 1 – 3 July 2009, Wellington, New Zealand. It is part of my PhD research in progress supported by a Department of Economics Scholarship at the University of Otago, Dunedin, New Zealand. I thank Professors David Fielding and Dorian Owen for their guidance and assistance but take blame for errors and imperfections that remain.

Does Civil War Violence Contribute to Exchange Rate Fluctuations?

1. Introduction

The hypothesis that apart from economic variables, fluctuations in exchange rates are also more likely to be brought about by civil war violence is the subject of investigation in this paper. This task is undertaken for three main reasons. First, ever since Meese and Rogoff (1983), testing the forecasting power of exchange rate models has been a popular pastime. Despite the large volume of empirical findings, the literature has consistently failed to demonstrate that current or future exchange rate changes can be explained by observable macroeconomic fundamentals only (Taylor, 1995; Engel & West, 2005). Even alternative approaches that use residuals from reduced-form structural equations as proxies for news, surprises, risks and uncertainties about the economic fundamentals thought to affect exchange rates (e.g. Frenkel, 1981; Edwards, 1982 and Hoffman & Schlagenhauf, 1985) have showed less impressive results. Nonetheless, Blomberg & Hess (1997) and Lobo & Tufte (1998) provide evidence that exchange rate movements can be better understood if non-economic factors such as politics are incorporated in simple time series specifications; these seem to work better than conventional models backed by economic theory.

Second, most of the studies referred to above have investigated the influence of news and political variables on bilateral currency exchanges between developed countries with well-functioning capital and money market systems, with a more refined focus on investors' international asset (portfolio) decisions where stocks, bonds and mutual funds are more popular, although futures, options and money are also well known financial assets. In developing countries where capital and money markets are primitive but political violence problems are most prevalent, the subject remains largely unexplored. (A notable exception is Fielding & Shortland (2005) who relegate their brief discussion of the subject to the appendix.) Yet entrepreneurs in those countries also build up large holdings of financial assets in the form of dollars (Collier & Pradhan, 1994; Collier & Gunning, 1995). Because uncertainties and risks of expropriation of investments are high, traders in these countries are more likely to prefer financial assets. For the governments, the turbulence of foreign exchange rates and the risk of capital flight become serious policy concerns.

Lastly, although the focus has shifted to investigating the role of unconventional variables in exchange rates determination, none of those studies, with the exception of Kauffman & Weerapana (2006), have focussed on the analysis of 'news' in exchange rate models of Sub-Saharan Africa countries. Kauffman & Weerapana dealt with AIDS-related news in South Africa, explicitly incorporating it a time-series model of the Rand-Dollar exchange rate behaviour. On the basis that detailed medical information about AIDS incidence may not be readily available, Kauffman & Weerapana's results implied that newspaper reports about AIDS may be equally important for financial asset market decisions in Sub-Saharan Africa economies. The purpose of this Chapter is not to re-estimate or replicate Kauffman & Weerapana's study, but to use their general approach with a view to clarifying the implications of past studies. Specifically, it largely relies on their analytical framework in an attempt to answer the question of whether civil war violence can be blamed for the depreciation of the Uganda Shilling against the United States Dollar.

As discussed in Collier & Gunning (1994, 1995) and Collier & Pradhan (1994), the case for Uganda is particularly interesting not only because, unlike the developed countries, the country's capital market is primitive or that its currency is not traded in international financial markets. In addition, there are reasons that arouse interest in the fluctuation of exchange rates and its interaction with the civil war violence. First, apart from evaluating the risk of not being able to exchange their financial resources or earnings from source to destination country currencies or vice versa, businessmen in Uganda also need to understand the inter-linkage because large proportions of their investments are financed by offshore private cash borrowing, principal crop stabilization funds and bilateral or multilateral aid inflows to public sector as complementary capital. All these forms of borrowings are, in most instances, repayable in foreign currencies at foreign-determined interest rates. Therefore, if investors expect to sell in the domestic market, they should be able to assess the dangers of financial losses as a result of political chaos if the low intensity violence were to continue and degenerate into a more intensive civil war.

Second, the fact that there was a marked increase in foreign portfolio holdings in Uganda (since the 1990s), at the time when media reports about rebel insurgency and government counterinsurgency continued to paint a bleak future for the country, appears to contradict the view that violent political conflicts is harmful to investments (see Alesina & Perotti, 1996; Fedderke & Liu, 2002; Fielding, 2004 for empirical evidence). Moreover, most quantitative studies of civil war do not account for low level violence known to encourage capital flight (Sambanis, 2004). Since those contributing resources for rejuvenating Uganda's economy may be particularly worried that a defeat of the NRM government would return the country to its brutal past, expulsion of foreign businessmen and nationalization of their assets, this Chapter attempts to disentangle this confusion by regarding violence in the civil war as a multifaceted one rather than as a single political instability index as used in previous analyses (e.g. Fielding & Shortland, 2005). It is expected that civil war violence disturbs the exchange rate and, as will be shown, the aggregate and disaggregated civil war violence relate to exchange rate fluctuations in very different ways and the size of the effects differ both between levels of aggregation and between the actions of government forces and rebel armies.

The rest of this paper consists of three Sections and a conclusion. The second Section will discuss the quantification of the variables to be used in the analysis and expand Kauffman & Weerapana's (2006) model by including civil war violence and lags to facilitate dynamic analysis of variable relationships. Since Kauffman & Weerapana did not subject their model to rigorous specification tests, it is difficult to decide, based upon a priori and previous empirical work, which of the variables is most closely associated with the dependent variable or which model best explains exchange rate movements in countries where violent political conflicts is most prevalent. So the third Section contains the regression results testing the explanatory variables for statistical significance from the general cases where the influences of all the potential explanatory variables are controlled for first, and then from models simplified using Autometrics, a computer-based general-to-specific model reduction algorithm. Following most of the literature, out-of-sample forecasts of the simplified models are evaluated in the fourth Section to see if civil war violence can help predict future exchange rate fluctuations. The last Section concludes.

2. Data and Model Specification

Kauffman & Weerapana (2006) estimated six specifications in an effort to test the macroeconomic impacts of AIDS-related news in South Africa. Their first specification is a baseline model that includes only a constant and the counts of the number of good, bad and neutral news stories that explain the daily depreciation of the South African rand. Kauffman & Weerapana then add one or more variables to the specifications, expanding to the sixth model (Tables 3 and 4), which is more or less Harvey's (1990) structural time-series specification with seven intervening explanatory variables. Based upon the discussion in Odhuno (2008a), these variables seem to be the most important for short-term macroeconomic fluctuations in Uganda.

Since there is no firm theory indicating which variables should appear in exchange rate models, the same set of variables suggested by Kauffman & Weerapana are used to control for the potential influence on the exchange rate which might obscure the role of civil war violence.

Quantification of the Variables

The determinants of exchange rates have been traditionally classified into two broad categories: the conventional macroeconomic fundamentals and unconventional socio-political correlates. The empirical work will add structural time series components: trading day and holiday effects, seasonal dummies and trend. Before discussing the quantification of these variables, some clarification is in order. A data set which corresponds to Kauffman & Weerapana (2006) could not be constructed because it was difficult to obtain daily and/or weekly data tailored for Uganda for all of the suggested variables. But a data set of monthly time-series (obtained from sources different from those cited in their study) has been constructed instead. Some variables have also been conceptualized differently so an exact replication of their study is not possible. Nonetheless, the fact that snap-shot economic time series are subject to revisions while daily newspaper reports about the socio-political concerns linger in the society for long suggest some advantage in using monthly data over daily or weekly data; monthly data averages out the irregularities of daily or weekly observations.

Percentage exchange rate fluctuation (x). As in Kauffman & Weerapan, this is the dependent variable, measured as percent depreciation/appreciation of the Uganda shilling against the United States dollar, $(lnX_t - lnX_{t-1}) \times 100$. The variable has been constructed using the bureau or market-determined exchange rate (X) data taken from the IMF’s International Financial Statistics (IFS) online databank. Using the market-determined rather than official exchange rate is appropriate because, although Uganda maintained a dual exchange rate system during the initial periods, the market-determined exchange rate is the actual exchange rate used by businessmen. Moreover, the legalization of a parallel market for the currency was the foundation of economic reforms, macroeconomic stability and resurgence of growth in Uganda (Henstridge & Kasekende, 2001), so Uganda’s foreign exchange markets had been liberalized by the late 1990s. Since this time, the marketing of principal trade commodities was no longer controlled by government agencies, the official and parallel exchange rates had been unified while the difference between the official and market-determined exchanges rate (had also virtually) disappeared (see Figure 1).

– Figure 1 about here –

Figure 1 is of interest as it shows the dramatic change in both series after 1993, marking the change over from managed to floating exchange and transition from dual exchange rate system to a unified market-determined rate. More on exchange rates unification episodes can be found in Kasekende & Ssemogerere (1994). This Chapter however focuses on Figure 2, showing the monthly percent depreciation/appreciation of exchange rate during the sub-sample period (1997:7 – 2006:6) because it corresponds to the actual time frame and actual data that is used in empirical analyses. It is clear from Figure 2 that exchange rate has been less volatile during 2001 – 2004 than other periods.

– Figure 2 about here –

AIDS-related news ($ARN = \{G, B, N\}$). Based on the methodology first used in Jo & Willet (2000) and perfected by Fornari, Monticelli, Pericoli & Tivegna (2002), these variables have been constructed using Kauffman & Weerapana's (2006) definitions to categorise the news stories about the HIV/AIDS epidemic reported in The New Vision newspaper as good (G), bad (B) or neutral (N), respectively. As in civil war violence, the news about HIV/AIDS has been retrieved from the Factiva® online database. Using news data is justified because, medical statistics quoted in the press may show that efforts to combat the HIV/AIDS epidemic worked more effectively in Uganda than elsewhere (Allen & Heald, 2004), i.e. good news, suggesting that the prevalence of the HIV/AIDS epidemic may have been under control. But the flurry of media reports about the peoples' miserable social welfare, government's and enterprises' vigorous campaigns and increasing social responsibility for sick workers and their relatives indicated that the epidemic was indeed threatening or causing set-backs to the country's exemplary economic recovery trajectory – bad news. Neutral stories are those that cannot obviously be categorised as good or bad for Uganda – like those referring to the epidemics in other countries.

Trade-weighted exchange rates fluctuations (m). In their regressions, Kauffman & Weerapana (2006) used the appreciation of the US dollar against a broad basket of currencies to account for the fact that the rand/dollar exchange rate might be influenced by events in the US rather than in South Africa. Although international transactions are billed or invoiced in US dollars, the USA is not the most predominant trading partner of many countries in Africa, so controlling for the bilateral exchange rate of the US dollar against other countries' currencies might be of little significance. Since the civil war violence in Uganda has been regarded as one of the world's most neglected humanitarian situations, it seems reasonable to control for exchange rates of the country's currency against the currencies of its major trading partners for which it can be assumed that the civil war violence shocks might have an immediate impact. For the current regressions therefore, the percent depreciation/appreciation of the trade-weighted exchange rates is calculated as $(lnMTP_t - lnMTP_{t-1}) \times 100$, with weights based on the total bilateral trade volumes between Uganda and each of the country's **M**ajor **T**rading **P**artners. The list of countries and trade shares used to prepare the trade-weighted exchange rates fluctuations are given in Appendix 5.6.1.

Percent changes in world market price for coffee (f). Traditionally, coffee has been Uganda's principal foreign exchange earner although its volume is relatively a minor share of the commodity's world market. Since Uganda's coffee supply cannot influence international market prices, the value of export earnings is more important than the volume. So, whenever the country's foreign exchange earnings shrank, it was not because of fluctuations in coffee harvests, but because of the collapse in the commodity's international market price. Gubert (2001) emphasises this because the value of primary commodity-dependent countries' currencies are prone to shocks resulting from fluctuations in the respective commodity world market prices. In the present case for Uganda, the monthly percent changes in the world market price for coffee has been calculated as $(lnCOF_t - lnCOF_{t-1}) \times 100$ using the composite indicator price (COF) compiled (based on the market share of exports of each group of coffee) by the International Coffee Organization (ICO). The data used have been obtained from ICO's online database.

Percent changes in world price for oil (q). Like fluctuations in the world market price for coffee, Kauffman & Weerapana (2006) used oil prices to represent exogenous terms of trade shocks, believing that such shocks could be one of the factors driving persistent exchange rate movements. For an underdeveloped landlocked oil-importing country like Uganda, the potential contribution of the movements in the oil price is non-ignorable. The percent change in world oil price has been calculated as $q_t = (lnOIL_t - lnOIL_{t-1}) \times 100$, where OIL is the international spot price index obtained from the IMF's IFS online databank.

Interest rate differential (I). It is the usual practice in the literature to assume that interest rates in the advanced countries are essentially different from those in the developing countries. So, when floating exchange rates were adopted in the 1970s it was argued that developing countries would have access to international financial markets, so investment capital is supposed to flow from the more advanced to the developing countries. Therefore the difference between interest rates in the developed and developing countries should respectively represent the cost of funds for the less developed and rate of return on investment for the more advanced countries. Although Kauffman & Weerapana (2006) used the interest rate differential between the United States and South Africa, it can be argued in the case of Uganda that, like trade, USA is not the principal source of the country's investment capital. Since loans and investments are usually closely related to trade flows, the weighted average world interest rate is more appropriate. So, the difference between Uganda's 91-Day Treasury Bill Rate and a trade-weighted world interest rate is used in the regressions. The 91-Day Treasury Bill rate is obtained from UBOS Quarterly Key Economic Indicators. The list of countries and trade shares used to prepare world interest rate is given column 4 Table 7 in Appendix 5.6.1.

Change in the number of working days (D). Kauffman & Weerapana (2006) used dummy variables to indicate the day of the week included in their regressions, suggesting that the regular exchange rate fluctuations observed are, to some extent, due to actual trading the days of the week, and not merely seasons. By extension, the activities of a month depend on which days of the week occur five times. So, ignoring trading day effects or a combination of trading day and holiday effects which are due to changes in the composition of the calendar might be inappropriate (Bell & Hillmer, 1983). Therefore, the approach taken by Moriguchi (1967) has been used to calculate the actual number of working days (WKD) by subtracting Saturdays, Sundays, and national/public holidays (including bank holidays) from the number of calendar month days. The change in working days each calendar month is then calculated as $D_t = WKD_t - WKD_{t-1}$. Since trading and holiday effects must be distinguished from seasonal effects, the conventional seasonal dummies (0, 1) (S_t) which assume that regular seasonal change reflects the fixed effects due to the specific time of the year, and the conventional time trend ($Trend$) are also included in the regressions.

Civil war violence ($CWV = \{A, R, T\}$). As discussed in Odhuno (2008b), this variable comprises the event data reported in the *New Vision* newspaper and retrieved from the Factiva® online database. As is common in recent literature, and as intimated in Odhuno (2008b), the data have been compiled in a way that allows the current analysis to examine the violent behaviours of the two protagonist actors in the Ugandan civil war – government armies (A) and rebel forces (R), and measure the impact of their force, counterforce and joint force. A and R are, respectively, the violent incidents or attacks perpetrated by government forces, rebel armies and by both of them (T). As explained in Odhuno (2008b), a significant problem with these variables is that for some months during the 1997:7 – 2006:6 samples, electronic copies of the *New Vision* could not be retrieved from the Factiva® online database; hence the data are not quite complete (see Figures 3 – 5). Since these data are missing at random, 22 observations with missing values have been listwise-deleted.

– Figures 3 – 5 about here –

In summary, four groups of variables are used in the regressions. The variables are either pure numbers (or frequencies of events), absolute differences, changes (or first differences) or rates of change (% first difference of natural logs) and deterministic components (dummy variables). The first group comprises the disaggregated HIV/AIDS-related news and the aggregate and disaggregated news about civil war violence. The interest rate differential and the change in the number of working days make up the second category while the monthly percent changes in the nominal effective bureau exchange rate of the Uganda Shilling against the US dollar, the official trade-weighted exchange rate of Uganda Shilling against currencies of the country's major trading partners, and the international market prices for coffee and oil constitute the third. These four rates of change variables are expressed as index numbers (July 1997 = 1). The last group of variables are the monthly seasonal dummies and trend. In order to see the degree of linear association between these variables, their correlation matrix is shown in Table 1 and a summary of their descriptive statistics is presented in Appendix 2.

– Table 1 about here –

The Estimated Model

Using Kauffman & Weerapana's framework, the dynamic interaction between civil war violence and exchange rates, controlling for the variables used in their model, can be expressed as a p^{th}-order autoregressive distributed lag (ADL) model, in which the dependent variable is expressed as a function of its own lagged values, and the current and lagged values of each of the potential explanatory variables as:

$$x_t = \alpha_0 + \sum_{1}^{p} \beta_j x_{t-j} + \sum_{0}^{p} \delta_j CWV_{t-j} + \sum_{0}^{p} \phi_j KWP_{t-j} + \varphi\Gamma + \varepsilon_t \qquad (1)$$

where x is the percent monthly depreciation/appreciation of the Uganda Shilling against the US dollar, CWV is a vector of variables depicting the number of news items about the civil war violence, KWP is the vector of explanatory variables used in Kauffman & Weerapana (2006), Γ is a vector of deterministic components (here, the time trend and 11 monthly seasonal dummies). α_0 is an intercept term, β_j, δ_j, ϕ_j and φ are autoregressive coefficients ($j = 0,1,2,..., p$), t is time period and ε is a white noise error term.

The above specification is equivalent to ignoring the lagged levels and dummy variables in Fielding & Shortland's (2005) model in appendix 3 but expanding it with Kauffman & Weerapana's explanatory variables, with lags. The lagged levels of the variables are not considered because the evolution of the level of parallel/market exchange rate depicted in Figure 2.1 show no obvious trend during the sample period considered (1997:7 – 2006:6) but its up- and downturns are visible. (Indeed, tests of the order of integration in earlier drafts of this Chapter showed that the exchange rate is stationary in levels.) Moreover, the dependent variable and most of the explanatory variables included in (5.1) are expressed either as first differences or rates of change, so lagged levels usually designed to capture long run effect are not appropriate when the focus is on short-run parameters only. The dummy variables are ignored because the periods of major macroeconomic policy changes intended to eliminate black market exchange rate premium were implemented outside the sample period (1992 – 1994) considered.

Some Basic Assumptions and Clarifications

Before estimating equation (1) some qualifications are in order. First, in the empirical models, the focus is on the aggregate and disaggregated frequencies of news stories about civil war violence, the new explanatory variable(s) added to the Kauffman & Weerapana (2006) framework, rather than Aids-related news. Extending Kauffman & Weerapana's work this way has been motivated by the fact that the debate about the co-existence of civil war violence and the HIV/AIDS epidemic at the same time has been a matter of controversy in Uganda. Contrary to the impressions created by most contributors to Reinikka & Collier (2001), the alternative view believes that Uganda since 1986 is being mistakenly referred to as a 'post-conflict' society because, in reality, there has been widespread violence and both the civil war and the HIV/AIDS epidemic were equally claiming thousands of lives.

Moreover, the fact that peace was not forthcoming in Uganda (at the time when a 'slim disease' was confirmed as the HIV/AIDS epidemic), was becoming a strain in the political administration and beginning to damage the country's image as an emerging economy (Tumushabe, 2006). So, when, as a result, Museveni's rating as one of a new breed in Africa's political and economic leadership began to measure-up poorly in governance, the government began to focus on the fight against the HIV/AIDS epidemic as the major problem facing Uganda in order to divert attention from the pressure for democratic reforms and avert the risk of international donor alienation. But those who cast doubt on the government's political will to combat the HIV/AIDS epidemic (Putzel, 2004; American Jewish World Service (AJWS), 2005) believe that, even though Uganda has been cited as an exemplar in the global fight against the epidemic, the use of gender-based violence as a weapon in the conflict meant that its prevalence in the areas affected by the war remains far higher than the national average.

These arguments suggests, as discussed in Odhuno (2008a), that even if the civil war and rampant coups may have militated against economic performance in Uganda, they were not the country's only problem at the time. No one disputes the fact that the HIV/AIDS epidemic also continues to pose difficult long term challenges for the country (Mackinnon & Reinikka, 2002). It seems therefore that in Uganda, both the civil war violence and HIV/AIDS epidemic are two major sources of economic disturbances that can hardly be separated from economic spheres. So there might be good reasons to include both of these catastrophes in the analysis; both catastrophes may have had complementary contributions to the flurry of media reports about the people's miserable social welfare and ignoring AIDS-related news from the analysis might not be appropriate.

Secondly, Kauffman & Weerapana (2006) used the depreciation of the US dollar against a basket of major currencies as a control variable. However it is not clear from their study which major currencies are included in this basket. Nonetheless, it can also be argued that exchange rate in a small open economy like Uganda might depend on events happening in the major industrial nations and those catching up with them, like India, China, Brazil and South Africa. In earlier drafts of this Chapter, a weighted average exchange rate of the US dollar against the currencies of the ‘world engines of growth’ countries, with weights based on the total bilateral trade volume between these countries and the USA (Appendix 5.1 Table 7 column 2) was used as a control variable. The results were similar to those reported in Tables 5.2 and 5.3. As explained earlier, some of the world engines of growth countries have therefore been used to construct a world interest rate to explain the bilateral exchange rate of the Uganda shilling against the dollar.

Thirdly, the list in Table 5.7 indicates that 11 of the 16 ‘global engines of growth’ countries (including the USA) are also Uganda’s major trading partners (column 3), so using either group of countries to summarize international liquidity conditions from which Uganda is not excluded makes disentangling the bilateral exchange rate of a country’s currency against the US dollar much more difficult. Therefore, imposing restrictions on the contemporaneous parameters of the exchange rate variables – m and x – is in order because current m is likely to be influenced by current x. A simultaneity bias would be created if contemporaneous m is included in the equation for x. As is the usual practice in the literature, the ADL equation (6.1), which is from a system of equations, will be estimated with these variables influencing each other only with lags.

3. Regression Results I: Explaining Exchange Rates Fluctuations

In the general ADL model, the exchange rate fluctuation is expressed as a function of its own lagged values, and the current and lagged values of all the potential explanatory variables discussed above. Estimating more than ten variables with trend and monthly seasonal dummies after dropping observations with missing values from the sample takes large a number of degrees of freedom, but estimation with a maximum of 3 lags is feasible. Given that the current phase of the civil war in Uganda has been considered a low intensity conflict, the a priori notion that 3 months was sufficiently long to capture the ‘medium-term’ dynamics of rebel insurgency and government counter-insurgency, coincides with the maximum lag length dictated by the availability of data. The appropriate lag length for each regression is then determined by the testing-down procedure, ensuring that the lag selected is consistent with the underlying data generating process. For all the models, the reductions are valid only up to two periods, which is the optimal lag length used in the regressions.

General Unrestricted Models

Table 2 reports the results for the civil war violence variables. (For completeness, the rest of the coefficient estimates of the General Unrestricted Models (GUMs) are reported in Appendix 5.6.3 Table 9.) Model 1 contains the relationship between the fluctuations in the exchange rate of the Uganda shilling for United States dollar (x) and the total reported incidents of civil war violence (T). Controlling for all other potential correlates of exchange rates suggested in Kauffman & Weerapana (2006), the results in column 2 shows that the aggregate frequency of civil war violence incidents is a poor explanatory variable. Regardless of the perpetrator, additional report about an incident of civil war violence has no statistically significant influence upon the value of the Uganda shilling. This suggests, perhaps, that Uganda's money market perceives the civil war as a slow intensity non-regime threatening conflict with no economic consequences. Since using aggregate reported incidents of civil war violence might camouflage market reaction to the force and counterforce exerted by the government armies and rebel forces, Models 2, 3 and 4 explore whether the above results are sensitive to the disaggregation of news stories about the civil war violence.

Model 2 and Model 3 are specifications that allow exchange rates to respond separately to incidents of civil war violence perpetrated by government army (A) and rebel forces (R) respectively. The Model 2 results show an additional report that the government army has attacked the rebel's bases, whether or not casualties ensue, causes the Uganda shilling to appreciate immediately (i.e. within the month) by 0.15 percentage points. Such immediate foreign exchange reaction to an additional report about an attack by government without rebel counter-insurgency (coefficient restricted to zero) suggests that businessmen are pessimistic that the government's army is winning the civil war and that the economy is no longer gloomy. The picture is confirmed by Model 3 results in column 4: even if the rebels continue their onslaught without government counter-insurgency (coefficient restricted to zero), the exchange rate market is not affected. So an additional report about rebel attack has no statistically significant impact on Uganda's foreign exchange market. Generally, the incidents of violence perpetrated by either the government army (column 3) or rebel forces (column 4) are also poor explanatory variables.

– Table 2 about here –

The independent interpretations of Models 2 and 3 results suggest that attacks by government's army might be good for Uganda's economy while the attacks by rebel forces is inconsequential. However, in a civil war, both rebel insurgency and government counter-insurgency are non-excludable and imposing zero restrictions on reported attacks by government army and rebel forces is not appropriate. Therefore, Model 4 allows the exchange rate movements to respond to the simultaneously actions of both protagonists in the civil war. The results in columns 5 (A) and 6 (R) shows significant contemporaneous influences (no lags are significant) of the actions of both protagonists in the civil war upon exchange rate fluctuations. While the Uganda shilling loses value (i.e. depreciates) by 0.18 percentage points within the same month that a rebel insurgency is reported in the newspapers, an additional report about government counter-insurgency simultaneously causes the shilling to gain value (i.e. appreciate) by 0.23 percentage points. With or without rebel actions, government attacks influences exchange rate movements in the same direction, but the rebel's action is only significant in the presence of government counterinsurgency.

Disaggregating the newspaper reports show that the two actors are, indeed, protagonists – both their actions significantly impact on the exchange rate but in opposite directions. In addition, the sizes of the impacts are not equal: evidence of homogeneity (i.e. that the sum of the two coefficients is equal to unity) or that the two coefficients are similar is strongly rejected ($\chi^2 = 445.87^{**}$) at the 5% critical value. Moreover, the coefficient estimate for government counterinsurgency is larger (in absolute terms) than the coefficient estimate for rebel insurgency indicate that the gains in the value of the Uganda shilling when the government army steps up efforts to end the civil war outweigh the loss in the value caused by rebels offensive aimed at capturing the seat of power. The fact that Uganda's exchange rate market becomes optimistic about rebel insurgency as opposed to the pessimism about government counter-insurgency suggest that the rebel's army might be seen as the weaker side not only in the contest for political power but its macroeconomic influence in Uganda. So during the period of transition to peace cannot be ignored.

The validity of the above results depends on whether the respective models are not misspecified. Table 5.3 reports the diagnostic test statistics for the General Unrestricted ADL (2) models. Note that there were not enough observations so Autometrics algorithm automatically excluded the tests for heteroskedasticity, with or without cross products, from the battery of tests. Nonetheless, the models pass all the remaining misspecification tests, so their validity cannot be doubted. However, the models are only satisfactory when large outlier dummies (L) are included in each case, indicating the sensitivity of OLS estimation technique to the departure from normality. So the results for coefficient statistics are still valid because OLS has good properties of linear unbiased estimators even if errors are not normal.

Although their explanatory powers are high (R^2 in Table 2) and satisfactory, there are many explanatory variables with lags in the complete regression results presented in Appendix 5.3 which are not significant. Some of these insignificant variables might be irrelevant variables or obscuring the role of variables omitted from the current analysis. The intention in the next Section is to employ the general-to-specific modelling procedure to eliminate these seemingly irrelevant or insignificant variables to arrive at parsimonious specifications.

– Table 3 about here –

'Computer' Selected Parsimonious Models

Kauffman & Weerapana (2006) employed the simple-to-general modelling technique to show that the impact of bad news about AIDS is not affected by the inclusion of other potential macroeconomic correlates of the rand/dollar exchange rate. However, altering a simple model by successively adding one or more variables does not constitute a rigorous specification testing. Instead, it is an ad hoc method for robustness check for the sensitivity of variable relationships and not the validity models which often incorporate irrelevant correlate(s) of the dependent variable. To disentangle the potential influences of the web of relationships with irrelevant variables, the Autometrics model reduction algorithm implemented in PcGive 12 (Doornik & Hendry, 2007) uses multiple search paths to simultaneously try different combinations of variables in alternative models and sequentially removes variables that are irrelevant. Thus, the general-to-specific 'testing-down' procedure reduces the large sized GUMS obtained using fixed lag lengths, checking at each stage, that the model obtained after each elimination is congruent with the data generating process, that is that the model is not miss-specified.

Table 5.4 reports the diagnostic checks used to ensure model and data congruency. Although the Autometrics algorithm is designed to ensure that the data and quantitative analysis rather than theory serve the purpose of finding models that are statistically well-behaved, there appears to be only problem with the variance matrices of Model 1's, 2's and 3's disturbances. There is no heteroscedasticity problem in the simplified Model 4 so correcting for White's (1980) heteroscedasticity consistency is not necessary. Therefore, the diagnostic check statistics that are valid in the presence of heteroscedasticity (HCDS) are also reported for Models 1, 2 and 3 for comparison with the standard (Std) test results. For some reason, the problem with the variance matrix of Model 2's disturbances cannot be corrected. Consequently, in Table 5, only the coefficients and t-statistics that are consistent in the presence of heteroscedasticity are reported for Models 1, 2 and 3. As evident in this table, the retained variables are statistically significant with reasonable parameter magnitudes.

– Table 4 about here –

Comparing these results and those obtained from General Unrestricted Models in Table 5.2, the findings in section 5.3.1 still holds. The only exception is in Model 2: the civil war violence perpetrated by government forces is no longer significant and has been omitted from the parsimonious model. The results for Model 4 are similar to the general unrestricted model. Both actors are antagonistic, i.e. have opposite effects on exchange rates. Rebel insurgency causes depreciation government counter-insurgency causes appreciation in the value of the shilling. However, the magnitudes of the simultaneous impacts of rebel's and government's actions might be difficult to disentangle if the action-reaction occurs at around the same time because the evidence of homogeneity (i.e. the sum of two coefficients equal unity) or that the two coefficients are equal but opposite signed is strongly rejected ($\chi^2 = 445.87^{**}$) at the 5% critical value, so the impacts are not equal.

Notable features of these results are that, first, the coefficients of two-period lagged good news about the HIV/AIDS epidemic appear highly significant and have been retained in all final models. This suggests that unlike in South Africa, it is good news and not bad news that is robustly associated with exchange rates fluctuations. Secondly, the summary statistics in Table 5.5 shows that the explanatory powers (R^2) of the specific models are relatively high, considering that a large number of variables with lags introduced to increase the search space have been dropped. Moreover, restricting the coefficients of the parsimonious models to zero is rejected (see F-statistics), suggesting that none of the retained contemporaneous or lagged values of the variables can be deleted without affecting their explanatory powers.

Sensitivity Analysis

In the above paragraphs, the robustness of the results with respect to the levels of aggregation and particular actor in the civil war has been tested, with a large number of insignificant or irrelevant variables removed from the general unrestricted models to arrive at the final models. The objective in this Section is to see if any of the deleted variables would be significant in conjunction with either the civil war violence or Aids-related news variables. Since it is not known which variables to add back to arrive at parsimonious models, the estimation process is the same as in Section 3.1 but without alternately allowing the 'computer' to delete any of the civil war violence or Aids-related indicators. The aim is to constrain the models to minimize the probability of non-selection of relevant or significant variable if the potential influence of violence or the epidemic is controlled for. The results are presented in Tables 6 and 7. The Table shows the sensitivity of the specific models and indicates how the rest of the coefficients of the other variables adjust given their interrelationships with civil war violence variables.

– Table 5 about here –

Comparing Model 1 results in Tables 5.5 and 5.6, although the interest rate differential is no longer significant, good news about AIDS and the exchange rate of the Uganda shilling against the currencies of the country's major trading partners, both lagged twice are significantly related to exchange rate fluctuation. More importantly, total civil war violence exerts mixed significant influences upon the exchange rate when lagged once and three times. The results for the constrained Model 2 suggest that both government army's 'peace keeping' operations, the change in the number of working days and most of the fixed seasonal effects are poor explanatory variables, so fewer variables are selected when insignificant civil war violence variables are not deleted. In contrast, Model 3 results indicate that more variables are selected if the civil war violence perpetrated by rebel armies is not deleted. Although there is an unexpected result in Model 3 that the news about rebel offensives causes the exchange rate to appreciate after one period lag, the results in constrained Model 4 remain largely unchanged, except that the exchange rate reacts to an additional report about rebel offensives significantly after two-period lags.

4. Regression Results II: Forecasting Exchange Rate Fluctuations

The results presented above suggest that disaggregated civil war violence do explain the exchange rate fluctuation. The results do not however answer the question of whether civil war violence can help forecast future exchange rate fluctuations. As a further robustness check, the present section looks at out-of-sample forecasting ability of the newspaper reports about civil war violence. Following most of the literature, the forecasting performance of models that incorporate civil war violence variables is compared with random walk models and a model that exclude the civil war violence variables. Procedurally, these models are first estimated using shortened sample up to 2005:6 in the subsection immediately below. Based on the parameters from the simplified models estimated for the shortened sample, the rolling regression technique is used to construct $h - step(s)$ ahead forecasts to period $T + h$ $(h = 1, 2, \dots, 12)$ in the next subsection. The last subsection compares the out-of-sample forecast accuracy of the Autometrics' simplified models.

– Table 6 about here –

Sub-Sample Estimation and Prediction

This Section presents the empirical models used to evaluate the forecasting ability of civil war violence. Since these models are typically based on shortened sample periods, the Autometrics algorithm might have to select models that are different from those based on full sample used in Section 3 above. Therefore, new GUMS (results not reported) for equation (1) are formulated and simplified using general-to-specific model reduction algorithm implemented in PcGive 12 (Doornik & Hendry, 2007). The aim is to test the ability of civil war violence to influence exchange rate fluctuations and provide the parameter estimates to be used in successive re-estimation of forecasts based on the shortened sample. The parameter estimates of the computer selected sub-sample models are reported in Table 8. Compared to the simplified full sample results in Table 5, the major improvement in this Table is that Autometrics has retained more civil war violence variables in all the sub-sample shortened models than in full sample models. It can also be seen that only the results for simultaneous attacks by both governments' and rebels' armies (Model 4) still hold except that the protagonists' actions now influence exchange rate fluctuations with lags only.

Looking at Models 2 and 4 results for the shortened sample, it emerges that the newspaper reports about government's army's counterinsurgency consistently play a very significant role in explaining short-term fluctuations in the exchange of the Uganda shilling against the US dollar. This variable is robust to all specifications; the exchange rate appreciates (as shown by the significant positive signs of three months lags) for every additional newspaper report about the government's army's actions although the magnitude of the influence is slightly reduced. Models 1 and 3 show mixed results for the shortened sample. Model 1 results suggest that the exchange rate appreciates or depreciates when one more joint rebel's and government's armies' action is reported in newspapers. This pattern is similar to the case when the rebels' force only is considered (Model 3). The exception is that it takes one month for a reported incident of violence perpetrated by rebels to cause the Uganda shilling to depreciate by 0.14 percentage points. Both the three-month lags of rebels' and joint protagonists' actions however cause the Uganda currency to appreciate by 0.11 and 0.17 percentage points respectively.

– Table 7 about here –

The results of Models 1 – 4 based on shortened sample show that civil war violence can in part explain (in-sample) exchange rate fluctuations. However, it has been found, starting with Meese & Roggoff (1983) that variables that significantly explain exchange rate movements are not necessarily the ones that help predict or improve forecast its future values over those obtained from benchmark models. In exchange rates forecasting studies, the random walk model ($x_t = \delta_0 x_{t-1} + \varepsilon_t$) and random walk with a drift ($x_t = \propto_0 + \delta_0 x_{t-1} + \varepsilon_t$), where $\propto_0$ is the drift (intercept) term, δ_0 are coefficients, t is time period and ε is a white noise error term, are often used as a benchmark for comparing the out-of-sample predictive ability of specifications that also incorporate unconventional variables (e.g. Blomberg & Hess, 1997). Following this tradition, the parameter estimates of the random walk equations used in the current analysis are given in the Appendix 5.6.3. To evaluate whether civil war violence can help improve forecasts over those obtained from simple specifications that do not incorporate civil war violence, Model 5 in Table 7 shows the parameters of the computer selected variables from equation (1) estimated for the shortened sample but without incorporating civil war violence in the initial GUM.

Out-of-Sample Forecast Comparison

This subsection presents the comparative results of the one-month ahead forecasts of exchange rate fluctuations generated recursively starting from the sub-sample model parameters estimated in the above subsection. Figures 5.6 – 5.9 shows the plots of the series of forecast values are obtained using rolling regression technique, starting from July 2005 to end of sample. The figures show clearly that the driftless random walk forecasts seem to strictly fit the actual values of exchange fluctuations during 2006:1 – 2006:4 period quite well. The models incorporating civil war violence variables do not track the actual exchange rate fluctuations any better although they exactly match the actual realizations on a few instances. For example Models 1 and 3 exactly predict the value of exchange rate fluctuation for February 2006; Models 2 and 3 predict the value for April 2006; while Models 3 and 4 predict the value for December 2005 quite well. Moreover, the models incorporate civil war violence do not seem to improve the forecasts over those obtained from the without civil war violence; their forecasts are not any closer to the actual exchange fluctuations than the alternative benchmark models. This poor forecast performance is also apparent when the out-of-sample accuracy of the above models is measured using Root Mean Square Error (RMSE): in the next subsection.

– Figures 6 – 9 about here –

Evaluating Out-of-Sample Forecast Results

To assess whether models incorporating civil war violence can accurately forecast exchange rate fluctuations, the Root Mean Square Error (RMSE):

$$RMSE = \left[\frac{1}{h}\sum_{t=1}^{h}\left(x_t - z_t\right)^2\right]^{\frac{1}{2}} \qquad (2)$$

(where h is the forecast horizon, x is the sequence of actual exchange rate fluctuations while z is the sequence of the forecast exchange rate fluctuation) are computed for each model and compared to the RMSE for the benchmark model. The RMSE values for each of the above models are presented in Table 8.

– Table 8 about here –

The RMSE results in Table 5.8 provide the evidence that forecasts from the model without civil war violence outperforms all the models only on the short 3 months horizon. Perhaps the striking result is that, the random walk with a drift outperforms all other models on the 6^{th}, 9^{th} and 12^{th} horizon forecasts. The models incorporating civil war violence produces the worst forecast performance. Indeed, the in-sample predictive ability of these models does not translate into out-of-sample forecasting ability. Nonetheless, models that fail badly in forecasting may still suggest useful policy implications (Clements & Hendry, 2005). …details to appear…

5. Conclusion

Ever since a majority of countries adopted the floating exchange rate system in the 1970s, the literature has consistently failed to demonstrate that current or future exchange rate changes can be explained by conventional macroeconomic fundamentals only. Instead, it has come to believe that exchange rate movements can be better understood when the dynamics of unconventional socio-political variables are also explicitly incorporated in simple time series model. However, a large number of empirical results are not robust so it is difficult to decide based on a priori and previous empirical work, which of the variables is most closely associated with exchange rates. To see if civil war violence is a robust determinant of exchange rate fluctuations, this paper has considered jointly, separately and simultaneously, the frequency of actions of the protagonists in the civil war in Uganda to provide answers using Autometrics a general-to-specific model reduction and selection algorithm.

The joint and separate actions of the protagonists cause the exchange rate to appreciate but when considered together, the evidence shows that both government and rebel attacks have opposite effects on exchange rates. The Uganda shilling appreciates against the United States dollar when newspapers report about government army attacks but an additional report about rebel offensive causes the exchange rate to depreciate. These results are robust to the deletion of the insignificant, irrelevant or nuisance variables from the general models except for the cases when the antagonists' combined force or rebel insurgency only is considered. When constrained to minimise non-deletion of potentially significant variables in conjunction with civil war violence, only the model with the civil war violence perpetrated by both government soldiers and rebel armies entered interactively remains largely unaltered. A rise in rebel insurgency is associated with currency depreciation while the counterinsurgency mounted by government soldiers is associated with increases in the value of the Uganda shilling.

These results lead to the following conclusions. First, military operations aimed at ending the long-running civil war violence in Uganda have implications for the country's foreign exchange rate market. Attempts to militarily stamp out rebel activities are instrumental in stabilizing the Uganda shilling, so the government's credibility regarding the use of force is important as it appears to safeguard the gains from recent macroeconomic reform programmes. Second, Gubert (2001) and Elkins (2000) might be right: the fact that Autometrics consistently retained the disaggregated civil war violence by actors and their significant impact upon exchange rate fluctuations suggests that the civil war is an important factor in Uganda's political economy. Third, the significance of civil war violence in conjunction with the AIDS-related news refutes the claim that Museveni's government shifted the focus to fighting the epidemic at the expense of attempting to resolve the long-running conflict.

6. Appendix

Appendix 1: Tables and Figures

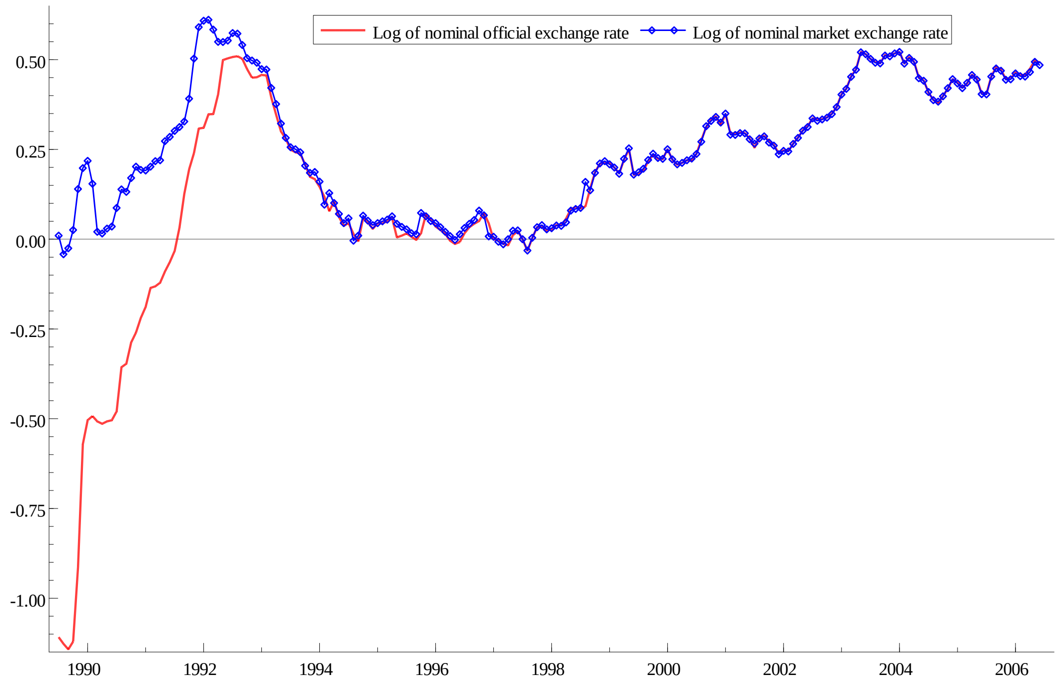

Figure 1 Evolution of Nominal Official and Parallel/Market Exchange Rates

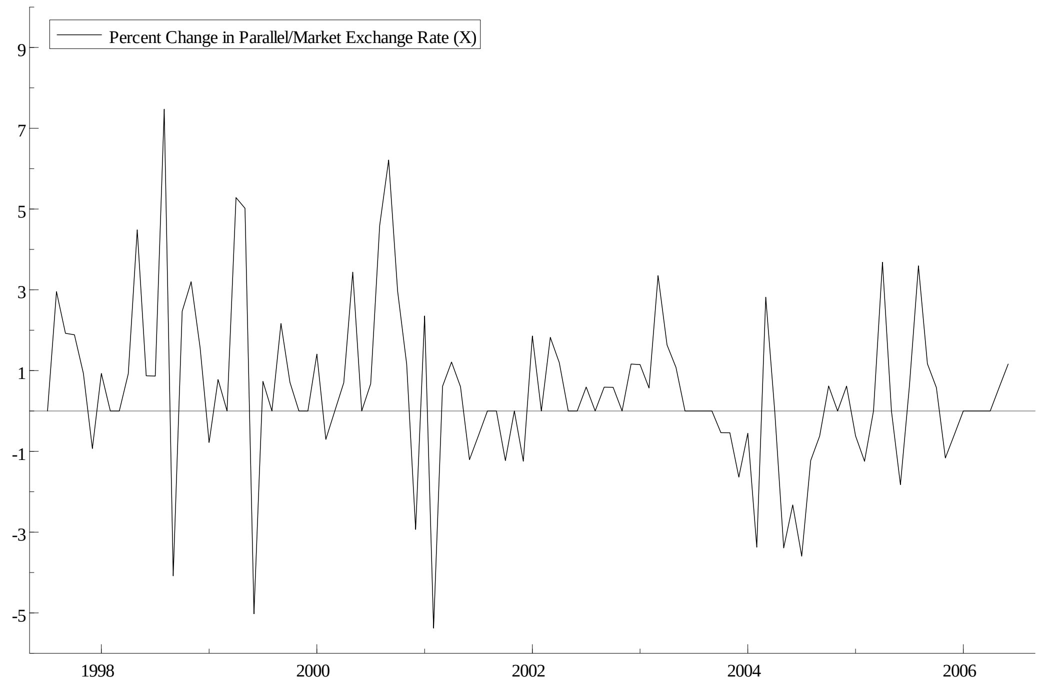

Figure 2 Parallel/Market Exchange Rate Fluctuations

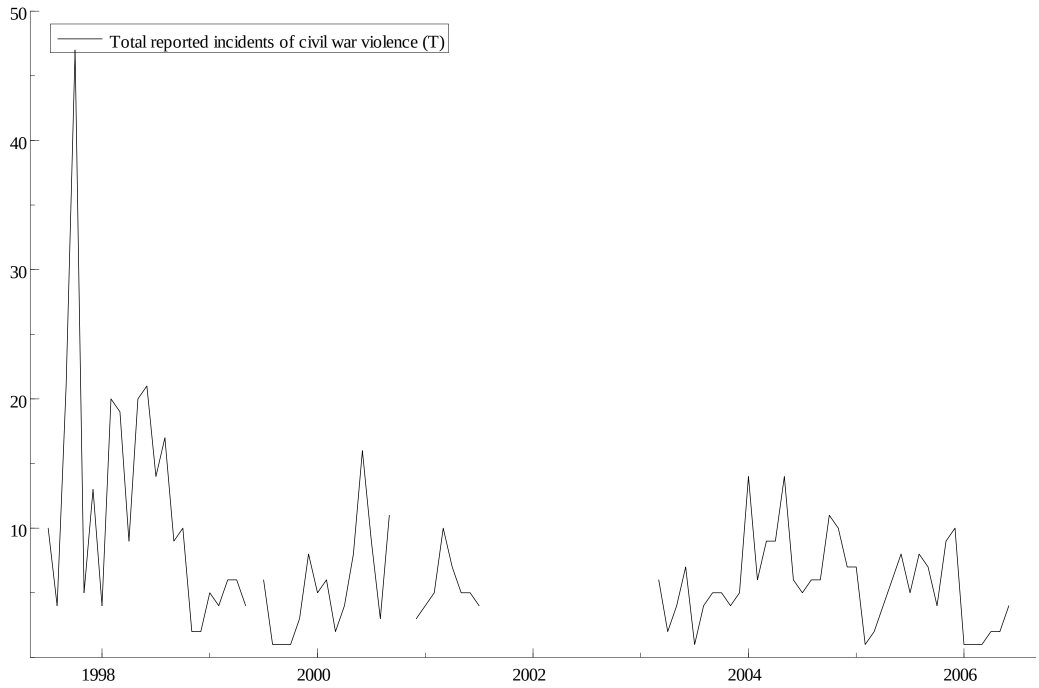

Figure 3 Total (Joint) Civil War Violence by Rebel and Government Armies

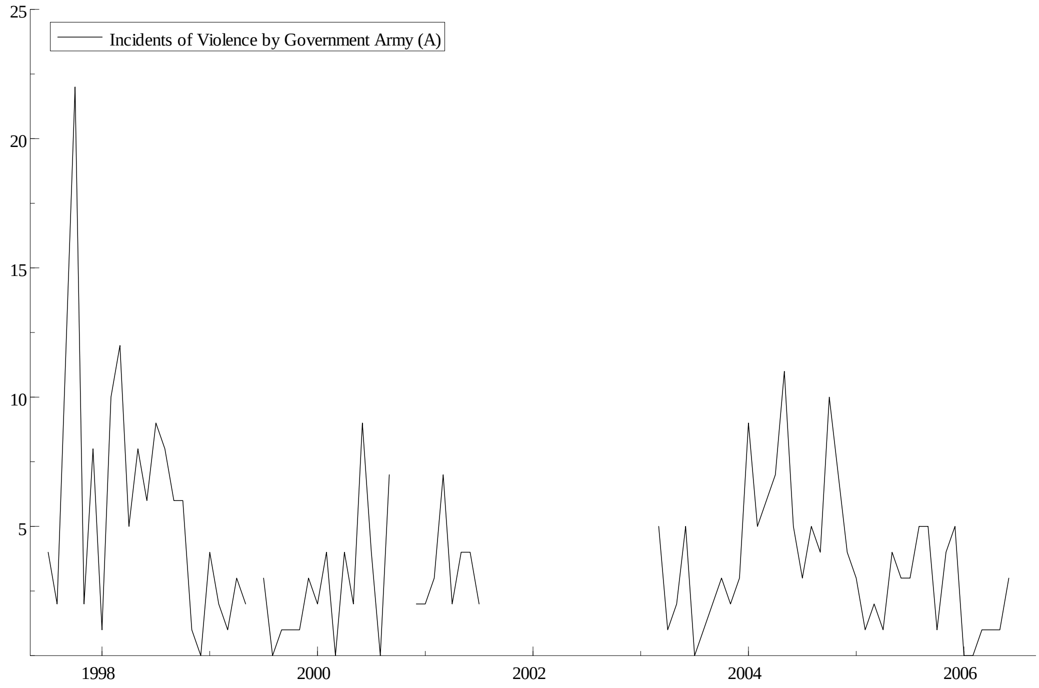

Figure 4 Incidents of Civil War Violence by Government's Army

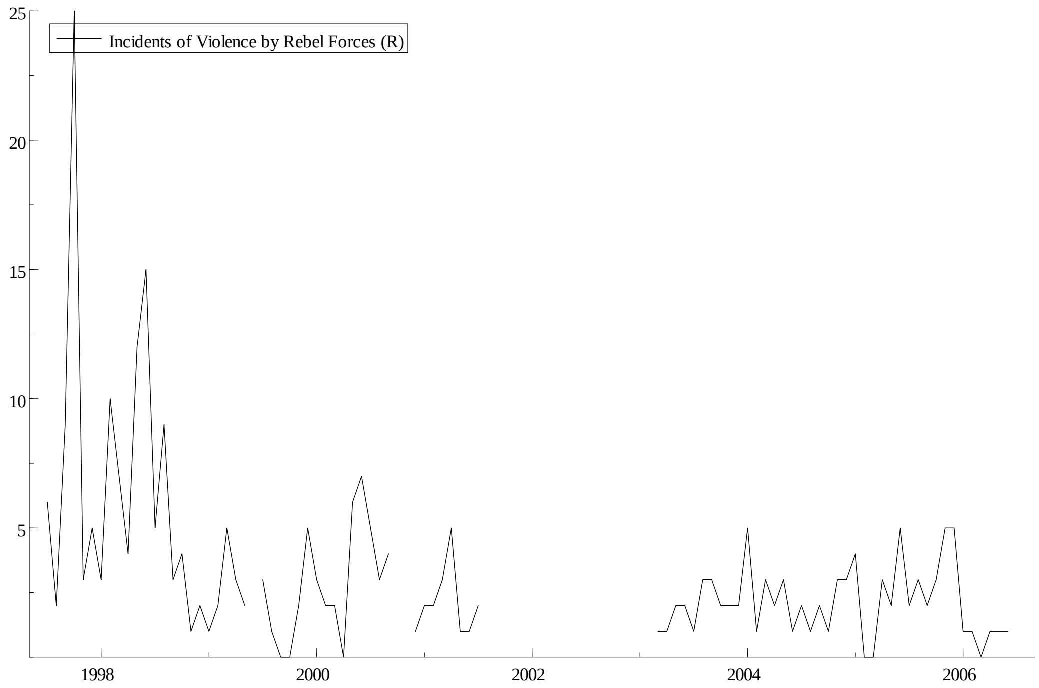

Figure 5 Incidents of Civil War Violence by Rebel Forces Armies

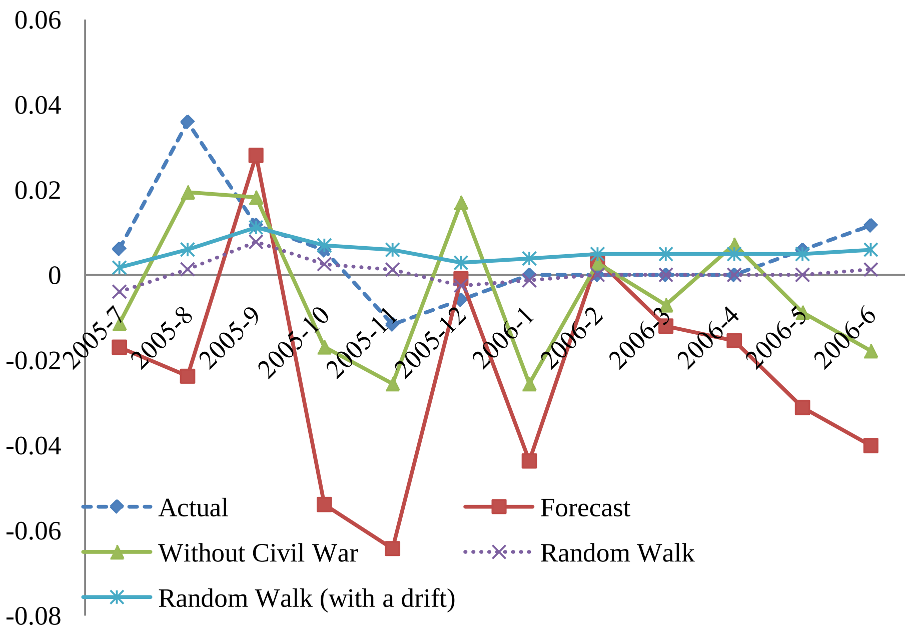

Figure 6 Plots of Model 1's Forecasts (labelled 'Forecast'), Actual Fluctuations ('labelled Actual') and Forecasts based on Benchmark Models

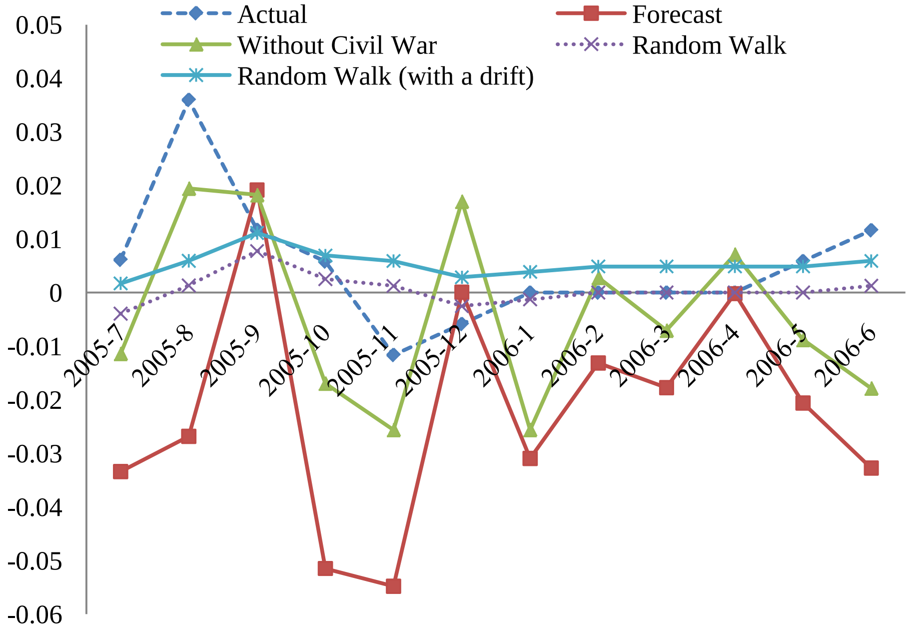

Figure 7 Plots of Model 2's Forecasts (labelled 'Forecast'), Actual Fluctuations ('labelled Actual') and Forecasts based on Benchmark Models

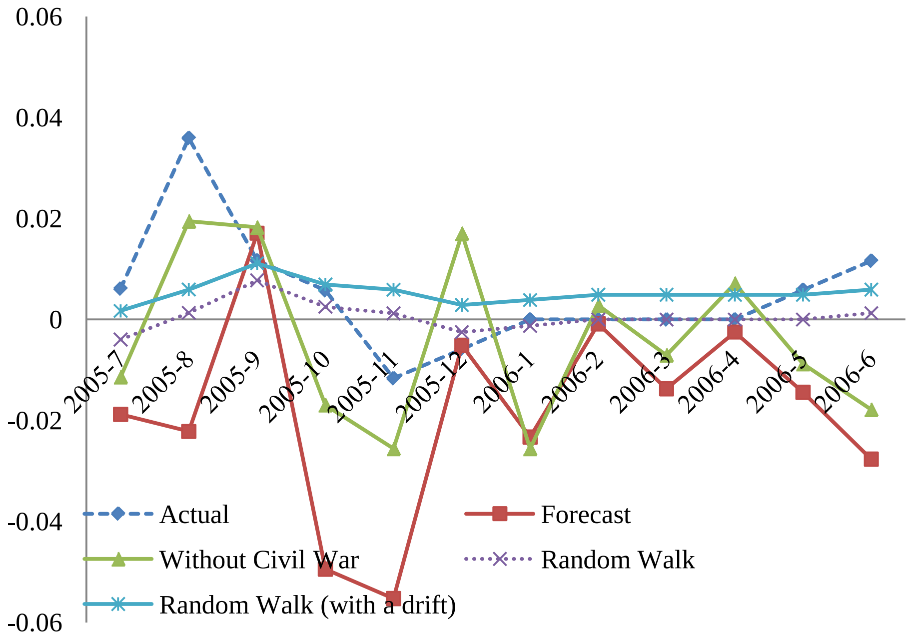

Figure 8 Plots of Model 3's Forecasts (labelled 'Forecast'), Actual Fluctuations ('labelled Actual') and Forecasts based on Benchmark Models

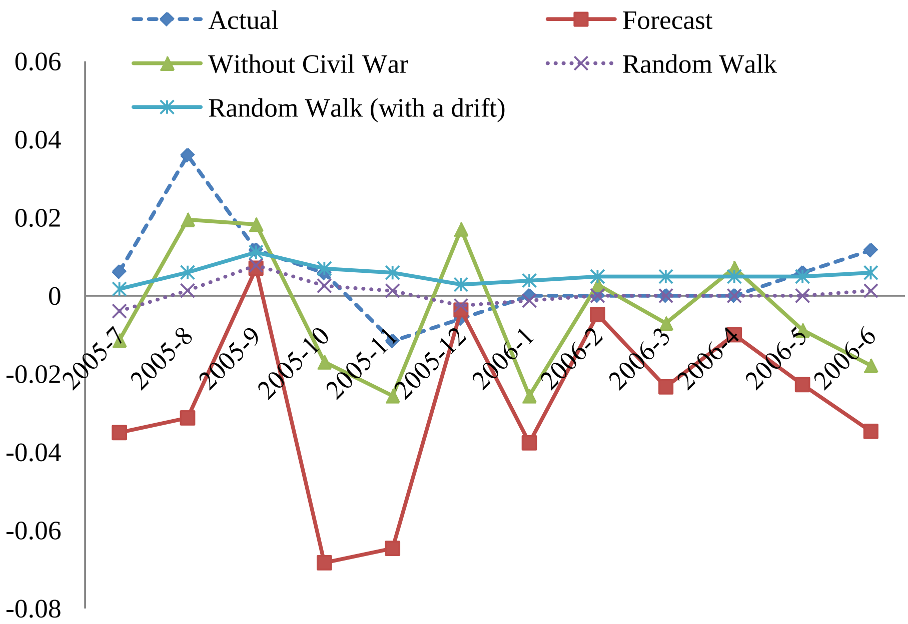

Figure 9 Plots of Model 4's Forecasts (labelled 'Forecast'), Actual Fluctuations ('labelled Actual') and Forecasts based on Benchmark Models

Table 1 Correlation Matrix of Variables Used in the Model

	x	m	f	q	i	G	B	N	D
A: Correlation between the Variables Suggested by Kauffman & Weerapana									
x	1								
m	0.23**	1							
f	-0.08	-0.18**	1						
q	0.03	0.08	-0.05	1					
i	-0.13	-0.08	0.13	-0.02	1				
G	-0.15	-0.13	0.21**	0.04	-0.02	1			
B	-0.09	-0.09	-0.13	0.04	0.03	0.30*	1		
N	-0.18**	-0.09	0.15	-0.02	-0.01	0.45*	0.48*	1	
D	0.00	0.03	0.02	0.15	-0.03	0.04	-0.02	0.06	1
B: Correlation between Civil War Violence and Other Variables in the Models									
T	0.13	-0.03	-0.19**	0.03	-0.09	-0.09	-0.10	-0.08	-0.01
A	0.02	-0.08	-0.15	0.03	-0.07	0.05	-0.06	0.00	-0.05
R	0.22**	0.03	-0.20**	0.01	-0.10	-0.21**	-0.13	-0.14	0.03

Note: * and ** indicate significance at 1% and 5% respectively; Correlation between A and R is 0.70.

Table 2 Coefficient Estimates for Civil War Violence in GUMS

Lag	Model 1	Model 2	Model 3	Model 4	
	(T)	**(A)**	**(R)**	**(A)**	**(R)**
Coefficient Estimates					
0	-0.02 (-0.47)	-0.15* (-1.90)	0.08 (0.96)	-0.23** (-2.81)	0.18** (2.15)
1	-0.03 (-0.92)	-0.03 (-0.44)	-0.09 (-1.30)	0.00 (-0.04)	-0.08 (-0.88)
2	0.00 (-0.03)	0.01 (0.18)	-0.01 (-0.10)	-0.01 (-0.08)	0.05 (0.53)
Summary Statistics					
R^2	0.78	0.79	0.78	0.83	
F	2.69** [0.00]	3.02** [0.00]	2.78** [0.00]	3.19** [0.00]	
σ	1.51	1.44	1.49	1.38	
RSS	72.78	66.46	71.08	55.38	
Log-like	-104.38	-101.02	-103.51	-94.28	

Notes: * and ** indicate significance at 5% and 1% levels respectively; t-ratios are in ( ); p-values are in [ ] ; Log-like = Log Likelihood; RSS = Residual Sum of Squaress; σ = Standard deviation of regression; Number of observations = 74; Maximum number of lags used = 2.

Table 3 Diagnostic Checks for GUM Validity

Statistic	Model 1	Model 2	Model 3	Model 4
AR 1-5	0.74 [0.60]	1.24 [0.32]	0.32 [0.99]	1.34 [0.28]
ARCH 1-5	0.17 [0.97]	0.10 [0.99]	0.23 [0.94]	0.08 [0.99]
Normality	3.59 [0.17]	5.65 [0.06]	2.24 [0.32]	3.87 [0.14]
Chow	1.34 [0.31]	1.13 [0.43]	1.42 [0.28]	0.92 [0.59]

Notes: * and ** indicate significance at 5% and 1% levels respectively; p-values are in [ ]; AR(1-5) = Lagrange Multiplier (F) test for autocorrelation of residuals up to order 5; ARCH (1-5) = Autocorrelated Conditional Heterscedasticity of lag order 5; Normality = Doornik & Hansen's (1994) χ^2 test for normality of residuals; Chow = Chow (F) test for parameter constancy, sample split 70:30.

Table 4 Diagnostic Checks for the Validity of Specific Models

Statistic	Model 1		Model 2		Model 3		Model 4
	Std	HCDS	Std	HCDS	Std	HCDS	Std
AR 1-5	0.11	0.61	0.10	0.55	0.10	0.85	1.83
	[0.99]	[0.64]	[0.99]	[0.74]	[0.99]	[0.52]	[0.12]
ARCH 1-5	1.58	1.59	1.14	1.94	1.14	1.47	0.30
	[0.18]	[0.18]	[0.35]	[0.10]	[0.35]	[0.21]	[0.91]
Normality	1.01	5.97	1.47	2.83	1.47	5.71	0.99
	[0.60]	[0.05]	[0.48]	[0.24]	[0.48]	[0.06]	[0.61]
Hetero	2.42*	1.47	1.76	1.87	1.76	1.68	0.47
	[0.04]	[0.19]	[0.10]	[0.07]	[0.10]	[0.12]	[0.97]
Hetero-X	1.75	1.08	2.03*	2.25*	2.03*	1.34	N/A
	[0.10]	[0.40]	[0.03]	[0.01]	[0.03]	[0.23]	

Notes: * and ** indicate significance at 5% and 1% levels respectively; *p*-values are in [ ]; AR(1-5) = Lagrange Multiplier test for autocorrelation of residuals up to order 5; ARCH (1-2) = Autocorrelated Conditional Heterscedasticity of lag order 5; Normality = Doornik & Hansen (1994) test for normality of residuals; Hetero and Hetero-X are White's (1980) heteroscedasticity tests with and without cross products, respectively; HCDS = heteroscedasticity consistent diagnostic statistics.

Table 5 Coefficient Estimates for the Explanatory Variables Retained in the Persimonious Models (Sample 1997:7 – 2006:6)

Var.	Model 1$	Model 2$	Model 3$	Model 4
C	2.26^{**}(4.87)	1.99^{**}(4.99)	2.25^{**}(4.86)	2.83^{**}(6.88)
A				-0.22^{**}(-3.67)
R				0.19^{**}(3.00)
m_{-1}	-0.45^{**}(-2.68)	-0.37^{*}(-2.34)	-0.45^{**}(-2.61)	-0.60^{**}(-4.29)
q_{-1}				0.06^{**}(2.82)
q_{-2}		0.04(1.53)		
I	-0.11^{**}(-2.46)			-0.11^{**}(-3.03)
I_{-1}		-0.12^{**}(-2.88)	-0.10^{**}(-2.35)	
G_{-2}	-0.54^{**}(-5.45)	-0.54^{**}(-5.89)	-0.54^{**}(-5.46)	-0.49^{**}(-5.95)
D				0.60^{**}(4.10)
D_{-1}				0.84^{**}(4.51)
D_{-2}				0.60^{**}(4.02)
S_2	-1.78^{**}(-4.15)		-1.64^{**}(-4.20)	-1.59^{**}(-2.59)
S_3				-1.81^{**}(-2.86)
S_7				-1.58^{**}(-2.57)
S_8		1.77^{**}(1.69)		
S_9				-2.90^{**}(-3.76)
L	6.62^{**}(22.17)	6.86^{**}(23.2)	6.32^{**}(26.90)	8.44^{**}(5.67)
R^2	0.45	0.47	0.44	0.69
F	10.97^{**}[0.00]	10.10^{**}[0.00]	10.88^{**}[0.00]	9.60^{**}[0.00]

Note:
$ t-statistics of coefficients which are consistent in the presence of heteroscedasticity; C = constant; L = Large outlier dummy; * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ); p-values in [ ].

Table 6 Coefficients Estimates of 'Fixed' Focus Variables

	Model 1[$]	Model 2	Model 3	Model 4
Coefficient Estimates When Civil War Violence Variables are 'Fixed'				
T	-0.01(-0.57)			
T_{-1}	-0.02(-0.72)			
T_{-2}	0.02(0.42)			
A		-0.09^{*}(-1.86)		-0.22^{**}(-3.61)
A_{-1}		-0.01(-0.13)		0.02(0.28)
A_{-2}		0.00(-0.04)		-0.06(-1.02)
R			0.06(0.97)	0.20^{**}(3.22)
R_{-1}			-0.03(-0.57)	-0.08(-1.38)
R_{-2}			0.07(1.38)	0.12^{*}(1.98)
G_{-2}	-0.56^{**}(-5.26)	-0.57^{**}(-6.73)	-0.42^{**}(-4.15)	-0.46^{**}(-5.29)
Coefficient Estimates When AIDS-Related News Variables are 'Fixed'				
A		-0.11^{*}(-2.31)		-0.23^{**}(-3.65)
R				0.18^{**}(2.71)
G	-0.11(-1.09)	-0.08(-0.83)	-0.11(-1.09)	-0.02(-0.24)
G_{-1}	-0.11(-1.10)	-0.07(-0.72)	-0.11(-1.10)	-0.03(-0.28)
G_{-2}	-0.48^{**}(-4.72)	-0.53^{**}(-5.24)	-0.48(-4.72)	-0.49(-5.00)
B	-0.22(-1.52)	-0.31^{*}(-2.26)	-0.22(-1.52)	-0.31^{**}(-2.35)
B_{-1}	0.17(1.24)	0.11(0.79)	0.17(1.24)	0.07(0.53)
B_{-2}	0.25(1.60)	0.29^{*}(1.84)	0.25(1.60)	0.29^{*}(1.99)
N	0.18^{*}(1.96)	0.18^{*}(1.94)	0.18^{*}(1.96)	0.16^{*}(1.80)
N_{-1}	-0.31^{**}(-2.71)	-0.20^{*}(-1.90)	-0.31^{**}(-2.71)	-0.17^{**}(-1.66)
N_{-2}	0.06(0.62)	0.01(0.06)	0.06(0.62)	-0.02(-0.23)

Notes: [$] t-statistics of coefficients which are consistent in the presence of heteroscedasticity; * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ); The rest of coefficient estimates are relegated to Appendix 5.6.3.

Table 7 Estimates of Computer Selected Models (Sample is 1997:7 – 2005:6)

	Model 1	**Model 2**	**Model 3**	**Model 4**	**Model 5**
C	1.60**(3.60)	1.42**(3.85)	1.62**(3.71)	1.75**(4.22)	1.51**(4.57)
T	-0.11**(-2.87)				
T_{-3}	0.11**(3.57)				
A_{-3}		0.12*(2.20)		0.18**(3.32)	
R_{-1}			-0.14*(-2.18)	-0.18**(-2.93)	
R_{-3}			0.17**(3.27)		
m_{-1}		-0.36*(-2.16)			
m_{-3}	0.53**(3.53)		0.40**(2.83)	0.44**(3.13)	
q_{-3}		0.06*(2.27)			
G_{-2}	-0.75**(-5.89)	-0.64**(-5.75)	-0.51**(-4.75)	-0.60**(-5.68)	
B_{-1}	-0.69**(-3.40)	-0.61**(-2.93)	-0.57**(-2.89)	-0.76**(-3.85)	-0.55**(-4.65)
N	0.30**(2.67)				
D_{-1}	0.59**(3.79)	0.58**(3.48)	0.57**(3.71)	0.58**(3.86)	
D_2	0.42**(2.74)	0.48**(2.95)	0.46**(3.01)	0.43**(2.85)	0.43**(2.82)
S_5	1.94**(2.57)	2.28**(2.86)	1.86**(2.48)	2.11**(2.86)	
S_6					2.11**(2.43)
L_{98}^{6}			-5.33**(-2.99)		-1.70**(-2.20)
L_{01}^{1}				4.19**(2.63)	
R^2	0.60	0.56	0.61	0.62	0.39
F	8.69**[0.00]	8.27**[0.00]	8.87**[0.00]	9.34**[0.00]	8.92**[0.00]

Note: * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ); p-values are in [ ]; L_k^t are large outlier dummies detected by Autometrics in month t in year k.

Table 8 Root Mean Square Error Forecast Statistics

	Forecast Horizon (Months)			
	12	9	6	3
Model 1 with *T*	3.772	3.770	4.229	3.816
Model 2 with *A*	3.518	3.678	4.229	4.301
Model 3 with *R*	3.119	3.285	3.869	3.663
Model 4 with *A* & *R*	4.041	4.286	4.924	4.558
Model Without Civil War Violence	1.757	1.690	1.759	**1.438**
Random Walk with a Drift	**1.136**	**1.282**	**1.520**	1.786
Drift less Random Walk	1.171	1.293	1.582	2.093

Note: Numbers in bold the minimum RMSE value in each column.

Appendix 2: Notes on Preparation of Weighted Exchange and Interest Rates

A: Trade-weighted exchange Rates:- In order to account for the contribution of each of Uganda’s trading partners in the value of the country’s currency against other countries currencies, it is necessary to construct an index of exchange rate based on the relative significance of the bilateral trade with each of the partners. To do this, the value of each country’s currency when converted to Uganda Shilling has been weighted using the value of average bilateral trade (import and export) flows data over the period 1998 – 2005. The choice of the trading partners was based on whether a country could be identified as both export destinations and sources of Uganda’s merchandize imports. The trade figures that could not be identified with any country in the Statistical Abstracts are not included in the weights. Based on these criteria, twenty out of twenty-four export destination and forty-one import source countries are included in the calculation of the weighted average exchange rate. The list of countries (column 1) and the corresponding trade shares (%) (column 3) used to prepare the weighted official exchange is given in Table 6.5.

Since existing datasets do not contain exchange rates against the Uganda Shilling for the majority of countries that Uganda trades with, these exchange rates have been indirectly generated from their exchange rates against the US Dollar as the common base, which is available in the IMF's online IFS database. The nominal effective exchange rate of the Uganda Shilling with the basket of trading partners' currencies in month j of year t ($MTP_{t,j}$), was then calculated as the average of nominal exchange rates weighted by the share of each country's bilateral US Dollar trade values as: $MTP_{t,j} = \sum \left(\frac{U^{\$}_{t,m}}{F^{\$}_{j,t,m}} \times W_j \right)$, where $U^{\$}_{t,m}$ is the rebased (July 1997 = 100) nominal exchange rate index of the US Dollar in terms of Uganda Shillings in month m of year t, $F^{\$}_{j,t,m}$ is the nominal exchange rate of the US Dollar in terms of foreign country $j's$ currency at month m of year t, and W_j is the average weight of total trade value with country j during the years 1998 – 2005.

Before constructing the trade-weighted exchange rate index, some adjustments were necessary because some member countries of the European Union – Belgium, France, the Netherlands, Germany and Spain adopted the Euro as a common currency in January 1999. Therefore, these countries' currency exchange rates with the US Dollar for the periods prior to adoption of common currency or devaluations had to be appropriately adjusted with the rates used to convert or devalue the respective currencies to avoid sudden jumps usually occasioned by the devaluations or abandonment of currencies. Although Uganda maintained a dual exchange rate system during the initial periods, only the official exchange rate has been weighted by the trade shares because although the market-determined exchange rate is the actual exchange rate used by businessmen, the official exchange rate is used by the Uganda Revenue Authority in determining the value of goods entering and leaving the country.

Table 9 List of Countries and Trade Shares (%) used to Prepare the Weighted Exchange and Interest Rates

	Exchange Rates		World Interest Rates[§]
	World Engines of Growth[#]	Major Trading Partners[§]	
Australia	1.81	-	-
Belgium	2.00	3.20	5.85
Brazil	2.55	-	-
Canada	31.64	1.03	1.88
China	11.21	-	-
Egypt	-	0.65	-
France	4.61	2.59	4.74
Germany	8.67	3.88	7.10
Hong Kong	-	2.31	-
India	1.33	-	-
Israel	-	0.56	-
Italy	3.17	-	-
Japan	18.78	7.60	13.89
Kenya	-	30.41	-
Netherlands	2.40	5.55	10.15
Rwanda	-	1.41	-
Saudi Arabia	-	0.96	-
Singapore	-	01.99	-
South Africa	0.64	8.42	15.40
Spain	1.29	1.61	2.95
Sweden	1.22	-	1.77
Sudan	-	1.25	-
Switzerland	1.45	5.85	10.70
United Arab Emirates	-	6.73	-
United Kingdom	7.25	9.16	16.74
United States	-	4.83	8.83
Total	100.00	100.00	100.00

Source: [§] and [#] indicates trade shares compiled from Statistical Abstracts published by UBOS (based 1998 – 2005 average on trade with Uganda) and from OECD.Stat online database (based on 1990 – 2005 average trade with the US).

B: Weighted World Interest Rate: - To measure the nominal world interest rate, the various lending rates of 12 industrial countries (11 members of the OECD and South Africa) were taken from the IMF's IFS online databank. The industrial countries were selected on the basis of their potential source of foreign direct investment (FDI) inflows to Uganda's manufacturing sector. Since loans and investments are usually closely related to trade flows, the weighted average world interest rate is constructed using weights based on trade shares (column 4 Table 9) of each country with Uganda.

Appendix 3: Descriptive Statistics

Table 10 presents the means, standard deviations, minimum and maximum values for the time series data used in the empirical work.

Table 10 Descriptive Statistics, Sample is 1997(7)-2006(6)

	Obs	Means	StDev.	Minimum	Maximum
T	86^{+}	7.291	6.524	1	47
A	86^{+}	4.000	3.535	0	22
R	86^{+}	3.291	3.538	0	25
x	108	0.566	2.154	-5.4	7.5
m	108	0.265	1.587	-3.2	9.3
f	108	-0.819	6.580	-15.2	15.9
q	108	1.195	8.330	-24.5	19.4
i	108	5.173	4.465	-1.9	17.5
G	86^{+}	1.965	1.979	0	8
B	86^{+}	1.140	1.520	0	8
N	86^{+}	1.733	2.318	0	10
D	108	0.047	2.000	-4	5

$^{+}$22 observations (Obs) with missing values dropped from the sample.

Appendix 4: Additional Regression Results

Table 11 Complete Regression Results for the General Unrestriced Models

Var.	Model 1	Model 2	Model 3	Model 4
C	3.53**(2.48)	3.84**(2.89)	2.88*(2.09)	3.34**(2.54)
x_{-1}	0.23*(1.70)	0.22*(1.71)	0.21(1.52)	0.18(1.24)
x_{-2}	0.05(0.42)	0.02(0.15)	0.10(0.79)	0.02(0.19)
m_{-1}	-0.69*(-3.31)	-0.72**(-3.63)	-0.68*(-3.30)	-0.73**(-3.75)
m_{-2}	-0.06(-0.33)	0.06(0.36)	-0.22(-1.25)	-0.06(-0.35)
f	0.06(1.56)	0.06(1.60)	0.06(1.35)	0.04(1.05)
f_{-1}	-0.04(-0.87)	-0.02(-0.61)	-0.05(-1.18)	-0.03(-0.67)
f_{-2}	-0.01(-0.13)	0.00(0.10)	-0.02(-0.42)	0.00(-0.01)
q	-0.03(-0.97)	-0.03(-0.97)	-0.03(-0.93)	-0.02(-0.91)
q_{-1}	0.07*(2.24)	0.07**(2.38)	0.07*(2.33)	0.08**(2.77)
q_{-2}	-0.01(-0.28)	-0.02(-0.71)	0.01(0.22)	-0.02(-0.52)
I	-0.21(-1.51)	-0.20(-1.50)	-0.21(-1.52)	-0.21(-1.61)
I_{-1}	0.15(0.69)	0.17(0.83)	0.10 (0.47)	0.16(0.81)
I_{-2}	-0.02(-0.15)	-0.05(-0.40)	0.02(0.13)	-0.04(-0.32)
G	-0.05(-0.32)	-0.02(-0.17)	-0.06(-0.43)	0.02(0.16)
G_{-1}	-0.12(-0.84)	-0.08(-0.60)	-0.14(-1.01)	-0.08(-0.63)
G_{-2}	-0.44**(-3.00)	-0.46*(-3.18)	-0.44*(-3.04)	-0.43*(-3.07)
B	-0.29(-1.48)	-0.33*(-1.75)	-0.27(-1.45)	-0.33*(-1.73)
B_{-1}	0.16(0.72)	0.19(0.93)	0.07(0.32)	0.08(0.42)
B_{-2}	0.21(0.95)	0.28(1.30)	0.17(0.77)	0.26(1.21)

Note: C = constant; * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ).

Table 5.11 Cont…

Var.	Model 1	Model 2	Model 3	Model 4
N	0.19(1.55)	0.20(1.64)	0.16(1.28)	0.16(1.26)
N_{-1}	-0.38**(-2.49)	-0.34*(-2.29)	-0.37**(-2.41)	-0.26(-1.62)
N_{-2}	0.26(1.69)	0.20(1.32)	0.25*(1.70)	0.15(1.00)
D	1.07**(3.51)	1.05**(3.62)	1.04**(3.46)	1.03**(3.67)
D_{-1}	1.42**(3.87)	1.43**(4.13)	1.43**(3.90)	1.48**(4.31)
D_{-2}	0.87*(3.29)	0.86**(3.44)	0.91**(3.41)	0.89**(3.56)
TR	-0.01(-0.28)	-0.01(-0.43)	0.00(0.17)	0.00(-0.19)
S_1	0.27(0.21)	-0.09(-0.07)	0.69(0.55)	0.19(0.16)
S_2	-2.56*(-2.08)	-2.60*(-2.23)	-2.25*(-1.85)	-2.35*(-2.05)
S_3	-2.54*(-1.81)	-2.30*(-1.71)	-2.70*(-1.98)	-2.41*(-1.85)
S_4	-0.21(-0.17)	-0.34(-0.30)	-0.11(-0.09)	-0.36(-0.32)
S_5	0.24(0.18)	0.47(0.37)	0.16(0.12)	0.55(0.45)
S_6	-0.74(-0.74)	-0.81(-0.85)	-0.74(-0.75)	-0.86(-0.91)
S_7	-2.19*(-1.79)	-2.11*(-1.81)	-2.07*(-1.72)	-1.88*(-1.66)
S_8	-0.25(-0.20)	-0.49(-0.40)	-0.13(-0.10)	-0.77(-0.64)
S_9	-5.52**(-3.54)	-5.31**(-3.66)	-5.36**(-3.40)	-4.78*(-3.23)
S_{10}	1.58(1.34)	1.59(1.42)	1.47(1.26)	1.62(1.48)
S_{11}	-0.84(-0.77)	-1.12(-1.08)	-0.54(-0.50)	-0.71(-0.70)
L	8.45**(4.11)	8.77**(4.48)	8.15**(4.04)	8.30**(4.40)

Note: * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ); L = Large outlier dummy.

Table 12 Complete Regression Results for the Sensitivity Analysis

	Civil War Violence (T, A & R) 'fixed'				AIDS-related News (G, B & D) 'fixed'			
	$Model\ 1$	$Model\ 2$	$Model\ 3$	$Model\ 4$	$Model\ 1$	$Model\ 2$	$Model\ 3$	$Model\ 4$
C	2.28**(3.67)	3.25** (6.72)	0.54(1.19)	2.77**(5.95)	3.24**(8.24)	3.63**(7.99)	3.24**8.24)	3.16**(6.84)
m_{-1}	-0.36*(-2.20)	-0.59**(-3.89)	-0.36*(-2.28)	-0.58**(-4.19)	-0.60**(-3.81)	-0.67**(-4.24)	-0.60**(-3.81)	-0.68**(-4.56)
I		-0.12**(-2.96)		-0.11**(-2.99)	-0.12**(-3.23)	-0.12**(-3.24)	-0.12**(-3.23)	-0.11*(-3.23)
I_{-1}	-0.11*(-2.22)							
f					0.06*(2.02)		0.06*(2.02)	
q_{-1}		0.05*(2.19)		0.06**(2.88)	0.05*(2.25)	0.05**(2.45)	0.05*(2.25)	0.06**(2.90)
D		0.62**(3.88)		0.60**(4.12)	0.87**(4.93)	0.78**(4.81)	0.82**(4.93)	0.74**(4.81)
D_{-1}		0.81**(4.03)		0.82**(4.45)	1.13**(5.10)	1.05**(4.97)	1.13**(5.10)	1.06**(5.34)
D_{-2}		0.56**(3.46)		0.58**(3.94)	0.82**(4.59)	0.75**(4.38)	0.82**(4.59)	0.79**(4.87)
S_2		-1.74*(-2.62)		-1.67** (-2.75)	-1.963**(-2.90)	-2.09**(-3.10)	-1.96**(-2.88)	-1.81**(-2.82)
S_3		-2.09**(-3.05)		-1.82**(-2.88)	-2.33**(-3.50)	-2.33**(-3.52)	-2.33**(-3.49)	-2.02**(-3.19)
S_4			1.62**(2.48)					

Note: $^{\$}$ indicate t-statistics of coefficients which are consistent in the presence of heteroscedasticity, otherwise standard t −ratios apply; * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ); C = Constant; $T, \{G, B, N\}, A, R, \{A, R\}$ with lags are fixed or forced to be included in the final models.

Table 5.12: Cont…

	Civil War Violence (T, A & R) 'fixed'				AIDS-related News (G, B & D) 'fixed'			
	$Model$ 1	$Model$ 2	$Model$ 3	$Model$ 4	$Model$ 1	$Model$ 2	$Model$ 3	$Model$ 4
S_5			1.69^{**}(2.62)					
S_7		-1.59^{**}(-2.38)		-1.53^{**}(-2.51)	-2.11^{**}(-3.00)	-1.99^{**}(-2.83)	-2.11^{**}(-2.96)	-1.84^{**}(-2.77)
S_8			1.85^{**}(2.66)					
S_9		-3.00^{**}(-3.59)		-2.75^{**}(-3.61)	-4.44^{**}(-4.81)	-3.94^{**}(-4.44)	-4.44^{**}(-4.83)	-3.72^{**}(-4.42)
L	6.33^{**}(18.40)	8.42^{**}(5.15)	6.27^{**}(3.91)	8.14^{**}(5.44)	8.73^{**}(5.39)	8.62^{**}(5.40)	8.72^{**}(5.39)	8.57^{**}(5.68)
R^2	0.41	0.65	0.51	0.72	0.71	0.71	0.71	0.75
F	6.54^{**}[0.00]	7.14^{**} [0.00]	7.26^{**} [0.00]	8.05^{**}[0.00]	6.02**[0.00]	6.21^{**}[0.00]	6.02^{**} 0.00]	6.98^{**}[0.00]
AR	0.81[0.55]	1.10[0.37]	0.13[0.99]	2.58^{*}[0.04]	0.21[0.95]	1.11[0.37]	0.21[0.95]	1.44[0.23]
$ARCH$	1.81[0.13]	0.41[0.84]	1.07[0.38]	0.91[0.48]	0.60[0.70]	0.45[0.81]	0.60[0.70]	0.31[0.91]
$Norm.$	5.36[0.07]	1.06[0.59]	0.76[0.68]	0.58[0.75]	1.70[0.43]	5.34[0.07]	1.70[0.43]	2.66[0.26]
$Hetero$	1.67[0.13]	0.74[0.75]	1.30[0.26]	0.29[0.99]	0.50[0.94]	0.42[0.97]	0.50[0.94]	0.47[0.96]
$HeteX$	1.47[0.18]	N/a	1.72[0.08]	N/a	N/a	N/a	N/a	N/a

Note: $^{\$}$ indicate t-statistics of coefficients which are consistent in the presence of heteroscedasticity, otherwise standard t −ratios apply;: * and ** indicate significance at 5% and 1% levels respectively; t-values are in ( ); L = Large outlier dummy; $T, \{G, B, N\}, A, R, \{A, R\}$ with lags are fixed or forced to be included in the final models.

7. References

Alesina A. and R. Perotti, 1996, 'Income Distribution, Political Instability and Investment', *European Economic Review*, 40(6), 1203 – 1228.

Allen, T. and S. Heald, 2004, 'HIV/AIDS Policy in Africa: What Has Worked in Uganda and What Has Failed in Botswana?', *Journal of International Development*, 16, 1141 – 1154.

American Jewish World Service, 2005, 'Northern Uganda's Forgotten Conflict', in *Pursuing Global Justice through Grassroots Change*, AJWS Reports, Summer, pp.3 – 5.

Bell, W. R. and S. C. Hillmer, 1983, 'Modeling Time Series with Calendar Variation' *Journal of the American Statistical Association*, 78(383), 526 – 534.

Blomberg, S. B. and G. D. Hess, 1997, 'Politics and Exchange Rate Forecasts', *Journal of International Economics*, 43(1 & 2), 189 – 205.

Clements, M. P. and D. H. Hendry, 2005, 'Evaluating a Model by Forecast Performance', *Oxford Bulletin of Economics and Statistics*, 67(1), 931 – 936.

Collier, P. and J. W. Gunning, 1994, 'Policy Uncertainty, Repatriation and Investment', in *Some Economic Consequences of Transition from Civil War to Peace* by J-P. Azam, D. Bevan, P. Collier, S. Dercon, J. W. Gunning and S. Pradhan. Policy Research Working Paper 1392, Ch. 3, The World Bank: Washington D.C.

Collier, P. and J. W. Gunning, 1995, 'War, Peace and Private Portfolios,' *World Development,* 23(2), 233 – 241.

Collier, P. and S. Pradhan, 1994, 'Economic Aspects of Ugandan Transition to Peace' in *Some Economic Consequences of Transition from Civil War to Peace* by J-P. Azam, D. Bevan, P. Collier, S. Dercon, J. W. Gunning and S. Pradhan. Policy Research Working Paper 1392, Ch. 9, The World Bank: Washington D.C.

Doornik, J. A., 2008, 'Autometrics', in J. L. Castle and N. Shephard (eds.), *The Methodology and Practice of Econometrics: A Festschrift in Honour of David F. Hendry*, Oxford University Press, Oxford, forthcoming.

Doornik, J. A. and D. F. Hendry, 2007, *Modelling Dynamic Systems – PcGive™ 12*, Timberlake Consultants Press, London.

Edwards, S., 1982, 'Exchange Rates and 'News': A Multi-Currency Approach', *Journal of International Money and Finance*, 1, 211 – 224.

Engel, C. and K. D. West, 2005, 'Exchange Rates and Fundamentals', *Journal of Political Economy*, 113(3), 487 – 517.

Fornari, F., C. Monticelli, M. Pericoli and M. Tivegna, 2002, 'The Impact of News on the Exchange Rate of the Lira and Long-term Interest Rates', *Economic Modelling*, 19(4), 611 – 639.

Fedderke, J. and W. Liu, 2002, 'Modelling the Determinants of Capital Flows and Capital Flight: with an Application to South African Data from 1960 to 1995', *Economic Modelling*, 19(3), 419 – 444.

Fielding, D. and A. Shortland, 2005, 'How Does Political Violence Affect Confidence in a Local Currency? Evidence from Egypt, *Journal of International Development*, 17(7), 841 – 866.

Frenkel, J. A., 1981, 'Flexible Exchange Rates, Prices, and the Role of "News": Lessons from the 1970s', *Journal of Political Economy,* 89 (4), 665 – 705.

Gubert , F., 2001, Review of: 'Uganda's Recovery. The Role of Farms, Firms and Government' by R. Reinikka and P. Collier (eds.), *Journal of African Economies*, 10(4), 498 – 500.

Harvey, A. C., 1990, *Forecasting Structural Time Series Models and Kalman Filter,* Cambridge: Cambridge University Press.

Henstridge, M. and L. Kasekende, 2001, 'Exchange Rate Reforms, Stabilization and Fiscal Management', in R. Reinikka and P. Collier (eds.), *Uganda's Recovery: The Role of Farms, Firms and Government*, Ch. 3, Washington, D. C.: The World Bank.

Hoffman, D. L. and D. E. Schlagenhauf, 1985, 'The Impact of News and Alternative Theories of Exchange Rate Determination', *Journal of Money, Credit and Banking,* 17(3), 328 – 346.

Jo, G-J, and T. D. Willet, 2000, 'Currency Market Reactions to Good and Bad News During the Asian Crisis', *Seoul Journal of Economics,* 13(4), 407 – 419.

Kauffman, K. and A. Weerapana, 2006, 'The Impact of AIDS-Related News on Exchange Rates in South Africa', *Economic Development and Cultural Change*, 54(2), 349 – 368.

Kasekende, L. A. and G. Ssemogerere, 1994, 'Exchange Rate Unification and Economic Development: The Case of Uganda, 1987 – 92', *World Development,* 22(8), 1183 – 1198.

Kasekende, L. A. and M. Atingi-Ego, 1999, 'Impact of Liberalization on Key Markets in Sub-Saharan Africa: The Case of Uganda', *Journal of International Development,* 11(???), 411 – 436.

Lobo, B. J. and D. Tufte, 1998, 'Exchange Rate Volatility: Does Politics Matter?', *Journal of Macroeconomics*, 20(2), 351 – 365.

Mackinnon, J. and R. Reinikka, 2002, 'How Research Can Assist Policy: The Case of Economic Reforms in Uganda', *The World Bank Research Observer*, 17(2), 267 – 292.

Meese, R. A. and K. Rogoff, 1983, 'Empirical Exchange Rate Models of the Seventies: Do They Fit Out of Sample?', *Journal of International Economics*, 14, 3 – 24.

Moriguchi, C., 1967, *Business Cycles and Manufacturers' Short-Term Production Decisions,* Amsterdam: North-Holland Publishing Company.

Putzel, J., 2004, 'The Politics of Action on AIDS: A Case Study of Uganda', *Public Administration and Development,* 24, 19 – 30.

Odhuno, F. O., 2008a, *How Civil War Violence is Reflected in Uganda's Economy*, Draft Chapter 2 of Doctoral Thesis Research in Progress, University of Otago

Odhuno, F. O., 2008b, *Time Series Measurement of Civil War Violence in Uganda,* Paper presented at the 2008 Australasian Political Studies Association Conference

Reinikka, R. and P. Collier, (eds.), 2001, *Uganda's Recovery: The Role of Farms, Firms and Government*, Washington, D. C.: The World Bank.

Sambanis, N., 2004, 'Using Case Studies to Expand Economic Models of Civil War', *Perspectives on Politics*, 2(2), 259 – 279.

Taylor, M. P., 1995, 'The Economics of Exchange Rates', *Journal of Economic Literature,* XXXIII, 13 – 47.

Tumushabe, J., 2006, '*The Politics of HIV/AIDS in Uganda'*, SPDP Paper No. 28, Geneva: United Nations Research Institute for Social Development.

White, H., 1980, 'A Heteroscedastic Consistent Matrix Estimator and a Direct Test for Heteroscedasticity', *Econometrica*, 48(4), 817 – 838.