The Impact of Sovereign Credit Rating Changes on the GHS/USD Exchange Rate

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This paper examines the short-term impact of sovereign credit rating changes on the Ghanaian cedi to US dollar (GHS/USD) exchange rate. Using both quarterly OLS and ARCH regressions, as well as daily event study analysis, the study tests whether announcements by Fitch, Moody's, and S&P lead to immediate currency movements. Results show that credit downgrades—particularly from Fitch and S&P—consistently trigger significant depreciations of the cedi. Upgrades, in contrast, yield weaker and more inconsistent effects. These asymmetric reactions suggest markets respond more strongly to negative credit signals. Event study findings reinforce this pattern, showing stronger market reactions during periods of fiscal stress. Control variables, including inflation and monetary policy rate of the US, help isolate the specific effect of rating changes. Overall, the study concludes that sovereign downgrades matter for exchange rate volatility, with implications for debt sustainability and investor confidence in emerging markets like Ghana.

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INTRODUCTION

This study asks how the announcement of changes in the sovereign credit rating of Ghanaian government debt feeds through into the Ghanaian cedi to US dollar exchange rate. Credit rating agencies (CRAs) such as Fitch, Moody's, and S&P Global play a crucial role in financial markets. Among their many activities, the CRAs form and report assessments of the creditworthiness of different countries. The sovereign credit ratings that emerge from the CRAs are generally taken as indicators of the riskiness of government debt – and sometimes of private debt – originating in these countries. Consequently, the announcements of changes in the sovereign credit ratings affect the movements of financial capital into these countries. A country that experiences a downgrade of its credit rating will typically find it more difficult to attract inflows of hard currency, which in turn might be expected to put downward pressure on exchange rates. But the question – both in theory and as an empirical matter – is whether credit rating downgrades are causally related to exchange rate movements. This depends on whether the CRAs are providing new information to the market, or whether they are simply reflecting data about economic fundamentals that is already known and widely understood. If these agencies provide new information to the market, we should observe significant exchange rate movements following rating announcements. Conversely, if their ratings merely reflect information already priced in by investors, exchange rate fluctuations should be minimal.

The relationship between sovereign credit ratings and exchange rates is particularly relevant for emerging economies like Ghana, where external borrowing and investor confidence heavily influence currency stability. Prior research suggests that rating downgrades can trigger capital outflows and exchange rate depreciation, while upgrades may attract investment and strengthen

the currency. However, the extent and consistency of these effects remain an open question. To address this, we analyze both upgrade and downgrade events and account for potential asymmetries in market reactions.

Our analysis leverages a combination of quarterly exchange rate data and daily event study techniques to capture both broad trends and immediate market responses. The study also considers control variables such as inflation, monetary policy rates, and exchange rate volatility to isolate the impact of rating changes. Additionally, we assess whether market reactions differ based on the issuing agency and the severity of the rating revision.

The background section provides an overview of Ghana's credit rating history, highlighting key economic events that shaped rating changes. The literature review in Section 2 discusses existing research on sovereign credit ratings and exchange rate dynamics. Section 3 outlines the data and descriptive statistics, followed by Section 4, which details the empirical strategy. Section 5 presents the results, and Section 6 concludes with policy implications and recommendations for future research.

BACKGROUND INFORMATION

Ghana began obtaining sovereign credit ratings in the early 2000s as it sought to establish a presence in the international capital markets. This decision was part of a broader economic reform strategy to improve transparency, credibility, and investor confidence. By the time of Ghana's first rating, the economy had made great strides. A key example was Ghana benefiting from debt relief initiatives particularly the Highly Indebted Poor Countries (HIPC) initiative in 2002, which helped

reduce external debt and free up resources for developmental spending. Ghana's successful management of external debt and significant reduction in debt ratios brought the country credibility in international capital markets. Foreign observers viewed Ghana's macroeconomic management as effective and responsible, despite the challenges that the country continued to face in the domestic economy, such as persistent energy shortages. Beyond these economic reforms, Ghana built a reputation as one of the continent's most politically stable economies, holding fair and competitive elections at regular intervals since 1992.

In 2003, Ghana received its first ever credit rating from S&P Global and Fitch Ratings. Both agencies rated the country's debt at a B+ with an opinion of a positive outlook.[1] The ratings agencies revealed that future rating actions will largely hinge on Ghana's ability to effectively manage its public finances. Within West Africa, Ghana's B+ rating in 2003 was considered strong. It compared favorably to many of its neighbors, such as Burkina Faso and Mali, which often had lower speculative-grade ratings or were unrated during that time. The inception of sovereign credit ratings as part of a United Nations Development Program(UNDP) initiative was a strategic move to signal economic stability and attract foreign investment. The economy responded by showing strong growth, with over 6% GDP growth in 2006, driven by structural reforms and moderate inflation. By the end of 2007, major economic indicators had been positive and indicative of the direction the economy was moving in. Building on that economic success, Ghana issued its first ten-year note Eurobond of $750M at 8.5% in 2007 to offset its budget deficit. This issuance was aimed at financing infrastructure projects and served as a major step by the government in diversifying funding beyond traditional bilateral and multilateral loans. The Eurobond also boosted

[1] This rating falls in the highly speculative category and indicates that while the sovereign faces significant risks, there are signs of improvement that could lead to a better credit rating in the future.

Ghana's foreign exchange reserves and temporarily strengthened the cedi. Ghana was able to borrow from international investors through Eurobonds starting in 2013 and kept doing so regularly until 2022, when it became too expensive for the country to borrow due to worsening investor confidence or credit risk. Over time, debt servicing, fiscal imbalances, and external vulnerabilities from the Eurobond contributed to the cedi's depreciation.

In the years following 2007, the cedi-dollar exchange rate for the most part was fairly stable, with the cedi depreciating modestly by 3% annually. The economy was performing well due to the reforms, increased foreign aid, and manageable debt levels. The discovery of oil in 2007 also temporarily boosted the Ghana cedi. Aryeetey and Ackah (2018) found that this newfound resource positioned Ghana as a potential middle-income country by attracting foreign direct investments and increasing fiscal revenues. Initial macroeconomic projections were positive, with the expectation that oil exports would improve the country's current account balance and foreign exchange reserves. However, this positive outlook was badly interrupted by events beyond Ghana's borders. In 2008, the global financial crisis led to liquidity shortages and impacted external inflows. The cedi underwent a 22.17% depreciation against the US-dollar between January and December in 2008. It did not help that the economy also faced negative impacts from the oil discovery. Bawumia and Halland (2017) emphasize that increased oil revenues lead to an appreciation of the real-exchange rate, harming the competitiveness of non-oil exports such as cocoa and gold. This situation further deepened Ghana's reliance on oil revenues and created a vulnerability to global oil price shocks. Bawumia and Halland (2017) note that the Bank of Ghana struggled to maintain exchange rate stability as foreign reserves dwindled, resulting in further depreciation.

The deteriorating financial situation of the country led Fitch to downgrade Ghana's rating from B+ to B in 2013, citing deteriorating fiscal and external balances, exacerbated by loose fiscal policy and lower-than-expected oil revenues. Further economic challenges in 2014 led to another downgrade. The economic conditions at the time reflected a struggling economy with limited fiscal space to maneuver through financial difficulties. In 2020 also, the global impact of the COVID-19 pandemic severely affected Ghana's economy, leading to another downgrade by the rating agencies. Overall outlooks by the agencies had been changed to negative with the agencies remarking that the economic shock caused by the pandemic resulted in a sharp increase in the government's debt burdens resulting in major downside risks to Ghana's fiscal and external metrics. Despite these downgrades, there was not much panic from local and foreign investors alike. The general sentiment was that, like any economy, there are bound to be periods of bust and booms, and that most economic indicators were fairly stable.

That all changed in 2022 when Ghana experienced multiple downgrades by all the rating agencies. All the rating agencies further revised their ratings from the B range, where Ghana had been situated for fifteen years, to the C-range, which is a category termed as high-yield junk. By the end of the year, Moodys issued a rating of Ca, Fitch had Ghana at CC and S&P global at CCC+.[2] During this period, the Ghanaian cedi lost over 50% of its value, inflation soared to 54.1%, and the debt levels exceeded 80% of GDP. The worsening financial situation was driven by a combination of global monetary tightening, supply chain disruptions, rising fuel prices, and pandemic induced borrowing pressures (Akolgo, 2023; Atuahene et al., 2024). The rating agencies

[2] By the end of the year, all three major credit rating agencies had significantly downgraded Ghana's credit rating, placing it deep into "junk'' or speculative grade territory, indicating a high risk of default.

felt justified in their revision, especially since Ghana was experiencing high inflation, a weakening currency, and significant debt distress, leading to the government's decision to restructure its debt.

As expected, these multiple downgrades were not well received by the investor community or by the government of Ghana. For instance, in response to Moody's downgrade, the Ministry of Finance in Ghana, issued a statement where they complained that institutional bias against African economies had influenced the rating decision.[3] The African Peer Review Mechanism also criticized the downgrade, highlighting "technical inaccuracies in Moody's assessment" and emphasizing the need for "seriousness" in rating decisions in major African economies.[4][5] Internationally, the downgrades raised concerns about Ghana's economic stability. The United Nations Office of the Special Advisor on Africa opined that the downgrades "reignite the debate about the credibility of credit rating agencies'' and questioned their methodology, especially in relation to African countries.[6] The reactions from the decisions in 2022 prompted this analysis. Since 2022, Ghana's ratings have improved to some degree, due to the completion of a debt restructuring program by the government; nevertheless, the country is still exposed to the impacts of prior revisions.

[3] Ministry of Finance, Ghana. "Moody's Downgrades Ghana Rating to Caa1 and Stabilizes the Outlook." *Ministry of Finance Ghana*, February 7, 2022. Accessed [15/03/2025]. https://mofep.gov.gh/press-release/2022-02-07/moodys-downgrades-ghana-rating-to-caa1-and-stabilizes-the-outlook.

[4] The African Peer Review Mechanism (APRM) is a Specialized Agency of the African Union (AU) initiated in 2002 and established in 2003 to improve governance across African nations through peer-led assessments and reforms.

[5] APRM Denounces Moody's Inaccuracies in Ghana's Rating Downgrade," *African Union*, accessed [15/03/2025], https://au.int/en/pressreleases/20220208/aprm-denounces-moodys-inaccuracies-ghanas-rating-downgrade.

[6] United Nations Office of the Special Adviser on Africa. *Factsheet: Ghana and the Credit Rating Agencies.* United Nations, n.d. Accessed [15/03/2025]. https://www.un.org/osaa/reports-and-publications/factsheet-ghana-and-credit-rating-agencies.

Ghana's sovereign credit ratings have been pivotal in shaping its economic path, influencing everything from foreign investment to exchange rate stability. Between 2003 and 2022, the Ghanaian cedi experienced significant depreciation against the US dollar, influenced by various macroeconomic factors. In the early 2000s, the cedi maintained relative stability, supported by economic growth and sound government policies. For instance, in July 2007, Ghana redenominated its currency, converting 10,000 cedis to 1 new Ghana cedi, however, as the decade progressed, economic challenges began to exert downward pressures on the currency. Notably in 2024, the cedi faced a sharp decline, prompting the Bank of Ghana to implement measures like increased interest rates and foreign exchange controls to curb the depreciation. While periods of economic growth, fiscal reforms, and external support have reinforced Ghana's creditworthiness, persistent challenges - such as fiscal imbalances, oil dependency, and oil shocks - have led to significant downgrades. These ratings might have had some consequences on the Ghanaian cedi, underscoring the interconnectedness of credit ratings and currency performance.

With the country now recovering from the severe downgrades of 2022, understanding how changes in its credit rating affect the exchange rate is crucial to forecasting Ghana's economic future and its ability to regain financial stability. Chen et al. (2016) noted that "credit ratings affect a country's economic growth…", hence it would be interesting to investigate how Ghana has been affected particularly with regards to their foreign exchange rates.

This paper investigates the impact of sovereign credit rating changes on the cedi-dollar exchange rate. The upcoming sections delve further into our analysis.

2. LITERATURE REVIEW

Understanding the impact of sovereign credit ratings on foreign exchange rate requires examining how rating methodologies influence investor sentiment and other macroeconomic conditions. This section reviews key studies on rating agencies methodologies, exchange rate dynamics and their relevance to Ghana. In developing countries like Ghana, sovereign credit ratings play a role in signaling both institutional and private investors about the economic health of the country. Sovereign credit ratings, according to Cantor and Parker (1996) are "assessments of the likelihood that a borrower will default on its obligations.''[7] Thus, in the context of exchange rates, a depreciation of the local currency would increase the cost of borrowing and hence, there would be a high probability of default. Sovereign credit ratings shape investment decisions through assessments of economic, political, and other institutional factors. Furthermore, the rating agencies' methodologies mix both quantitative and qualitative analyses.

Building on this understanding of sovereign credit ratings, it is essential to explore the specific methodologies used by the major rating agencies in assessing economic health and their implications on foreign exchange rates. According to Fitch Ratings (2021), the process starts by analyzing "economic fundamentals, including GDP growth, inflation rates, fiscal deficits, and external balances.'' [8] Moody's also highlights the importance of governance and institutional strength, stating that "a sovereign's ability to implement sound policies is a critical determinant of

[7] Cantor, Richard, and Frank Packer. "Determinants and impact of sovereign credit ratings." *Economic policy review* 2, no. 2 (1996).
[8] Fitch Ratings, *Sovereign Rating Criteria* (2021), accessed [15/03/2025], https://www.fitchratings.com.

its resilience to economic and financial shocks" (Moody's Investor Service, 2020).[9] These agencies consider external factors like foreign exchange reserves and external debt structure. S&P Ratings emphasize that "the composition of external liabilities- whether foreign-currency denominated or local-currency dominated- affects a country's vulnerability to currency volatility" (Standard & Poor's Global Ratings, 2019)[10]. In Ghana's case, high levels of foreign-denominated debt amplify the impact of sovereign credit ratings on exchange rate stability.

In addition to economic fundamentals and external factors, these agencies integrate econometric models and qualitative assessments, which provide further insights into their credit rating process. As noted by Mellios and Paget-Blanc (2016), "rating agencies rely on historical data, expert judgement, and forward-looking indicators to construct a balanced risk portfolio." When finalized, ratings are expressed on a standardized scale, from AAA (highest) to C/D (default). The rating agencies also provide outlooks to indicate potential changes in future ratings. Bhatia (2002) notes that this approach ensures that ratings are dynamic and reflect evolving domestic and global conditions. Despite their rigor, these methodologies face criticisms; Bhatia (2002) argues that "the subjective nature of qualitative inputs introduces potential biases, particularly against emerging markets.'' Nonetheless, the information provided by rating agencies is still highly regarded by foreign and domestic investors.

While rating agencies assess sovereign risk based on economic and political factors, their decisions directly influence macroeconomic variables such as exchange rates. Theoretical frameworks such

[9] Moody's Investors Service, *Sovereign Bond Methodology* (2020), accessed [15/02/2025], https://www.moodys.com.
[10] Standard & Poor's Global Ratings, *Sovereign Ratings Criteria* (2019), accessed [15/02/2025], https://www.spglobal.com.

as interest rate parity and portfolio balance theory help explain these dynamics. The interest rate parity theory establishes a direct link between interest rate differentials and exchange rate expectations. When the ratings agencies issue a rating downgrade, it signals investors higher risks and reduces investor confidence in the economy. To offset the resulting outflow of capital, central banks will often respond by increasing interest rates in order to retain or attract foreign investments by compensating for the perceived risks. This dynamic is affirmed by Cantor and Packer (1996) and similarly by Afonso et al. (2012). This mechanism is particularly relevant to Ghana given its reliance on foreign-denominated debt and international capital markets. The other theory is the Portfolio balance theory which complements the interest rate parity theory. This theory explains that investors often divest from a country's financial assets when a rating downgrade is issued leading to a depreciation of the domestic currency. On the other hand, a rating upgrade has the opposite effect; it boosts investor confidence and leads to an increasing demand for a country's financial assets and consequently, its currency. The theoretical foundations of these dynamics have been empirically tested by several authors, who find a relationship between sovereign credit ratings and exchange rates. We categorize these studies into three sections, studies that focus on the impact of sovereign risk on exchange rate volatility, the role of sovereign debt and fiscal policies in currency stability, and evidence from emerging and African economies.

Della Corte et al. (2022) investigate this relationship using sovereign credit default swap (CDS) spreads as a measure of sovereign risk. Their analysis spans developed and emerging markets, finding that increased sovereign risk leads to exchange rate depreciation and greater volatility. The authors argue that "increases in sovereign risk are accompanied by significant depreciations as investors demand higher risk premia for holding riskier currencies." Similarly, Bhatia and Tuteja

(2024) examine exchange rate volatility in both developed and emerging markets, demonstrating that periods of heightened sovereign risk coincide with increased currency fluctuations. Moreover, Su et al. (2024) explores the dynamic feedback loop between credit default swaps and exchange rates, showing how changes in sovereign risk affect foreign exchange markets and vice versa.

Additionally, Kumar and Singh (2025) employ a Bayesian approach to examine the spillover effects of sovereign risk among BRICIT (Brazil, Russia, India, China, Indonesia, and Turkey) economies, finding that exchange rate fluctuations play a critical role in determining sovereign credit spreads. Alsakka and ap Gwilym (2012) employ an event study approach to analyze short-term exchange rate movements following sovereign rating announcements, finding that negative rating events trigger immediate currency depreciations, whereas positive events have weaker and less consistent effects. Eraslan (2017) extends this analysis using a corrected Dynamic Conditional Correlation GARCH model to assess time-varying exchange rate correlations among emerging markets. His findings highlight the asymmetric effects of rating changes, showing that Fitch downgrades lead to stronger exchange rate spillovers than similar actions by Moody's or S&P. Their findings suggest that sovereign risk plays a crucial role in shaping investor sentiment and exchange rate stability. These studies collectively establish that sovereign credit risk has a significant impact on exchange rate movements, primarily through investor expectations and capital flows.

A separate strand of the literature focuses on how government debt levels and fiscal policies shape exchange rate behavior. Fisera et al. (2021) emphasize this point in the context of emerging economies, demonstrating that currency depreciation increases the local currency value of foreign-denominated debt, raising debt-to-GDP ratios and exacerbating sovereign risk. Meanwhile, Ojeda-Joyo and Sarmiento (2018) find a significant positive correlation between sovereign risk and

exchange rate movements, noting that macroeconomic instability amplifies exchange rate fluctuations and, in turn, affects sovereign credit ratings.

Despite the available research on sovereign credit ratings and exchange rates, relatively few studies focus specifically on African economies. Rusike (2020) addresses this gap by testing the relationship between sovereign credit risk and exchange rate dynamics in selected African countries. Using a vector autoregression (VAR) model, the study finds that sovereign downgrades induce currency depreciation through capital outflows, particularly in economies reliant on foreign-denominated debt. The author concludes that "African economies face disproportionate effects of sovereign credit rating downgrades due to weaker fiscal buffers and external vulnerabilities." Savadye (2020) complements these findings by highlighting the volatility-inducing effects of rating downgrades in African markets. The study also underscores the asymmetric nature of market reactions, showing that downgrades trigger sharper exchange rate depreciations than the appreciation effects observed after upgrades. Together, these papers provide empirical support for the theoretical link between sovereign credit ratings and exchange rate fluctuations, particularly in economies with high external debt exposure.

As financial globalization has intensified the spillover effects between currency markets and sovereign debts, the intersection between exchange rate dynamics and sovereign credit risks has gained attention in recent years. Although these studies provide valuable insights, their focus on aggregated data across multiple countries limits their applicability to country-specific contexts, which merits further exploration. This paper focuses on Ghana to isolate the effects of rating changes on foreign exchange rate volatility. Moreover, previous research has primarily focused on long-term implications of rating changes and this paper would leverage quarterly data to analyze short-to-medium term impacts. Given that Ghana's economy is heavily dependent on foreign

denominated debt and thus vulnerable to external shocks, it offers a perfect case for country-specific analysis which we would dive deep into in the next sections.

3. DATA AND DESCRIPTIVE STATISTICS

In order to conduct this analysis, this paper utilizes data from multiple sources. Our first dataset contains the domestic currency (Ghana Cedi) per US dollar which we refer to as the exchange rate. This dataset is obtained from International Financial Statistics. This dataset contains the quarterly exchange rate for Ghana from 2003Q1 to 2022Q4 (80 observations total). The exchange rate starts at 0.86 in 2003Q1, peaks at 9.60, and ends near 8.58 in 2022Q4, with gradual increases and periods of stability. Our period of study ends at 2022 due to Ghana's loss of creditworthiness in the aftermath of its sovereign defaults and the commencement of an IMF program beginning in 2023.[11] We believe that including data beyond 2022 will shift the focus away from how markets react to changes in credit rating towards how they react to a country in or near default.

A second dataset we include in this study is all sovereign ratings issued by the three main sovereign rating agencies[12]. These ratings are assigned as letter grades and include rating announcements over the study period, capturing both upgrades and downgrades. While credit ratings are discrete events rather than continuous variables, we transform these letter grades using a numerical scale of which we detail under the rating event subsection. The ratings stay constant between revisions.

[11] International Monetary Fund. "IMF Executive Board Approves US$3 Billion Extended Credit Facility Arrangement for Ghana." *IMF Press Release No. 23/151*, May 17, 2023. accessed [12/04/2025], https://www.imf.org/en/News/Articles/2023/05/17/pr23151-ghana-imf-executive-board-approves-extended-credit-facility-arrangement-for-ghana.

[12] The three rating agencies here are Fitch Ratings, S&P Global Ratings and Moody's Investor Service.

Revisions do not come on a fixed schedule; they come at moments when the CRAs feel that conditions have changed sufficiently to warrant a revision. The ratings of the three CRAs do not move in perfect lockstep, but they tend to track closely with one another. Summarized in Table 5 under the Appendix is a comprehensive breakdown of the long-term credit ratings used by the three main agencies. Fitch Ratings serves as our focus later in the paper given that they relatively frequently revise their ratings. Again, it is widely agreed that these three rating agencies are highly correlated.

Additionally, the analysis in this paper includes control variables that help to isolate the impact of sovereign credit rating changes on exchange rates. These control variables include the U.S. monetary policy rate, inflation rate, and exchange rate volatility to account for other macroeconomic and global factors that simultaneously influence currency movements. Our choice of control variables is backed by existing literature. For instance, Afonso et al. (2012) demonstrate that global interest rate benchmarks directly impact sovereign risk perceptions, thus our inclusion of monetary policy rate in the US. Furthermore, Bleaney and Fielding (2002) emphasize that inflation, particularly in developing economies, plays a critical role in determining currency stability. Finally, the inclusion of exchange rate market volatility is consistent with the approach taken by Della Corte et al. (2016).

Monetary Policy rate data is accessed from the Board of Governors of the Federal Reserve System (US). Inflation Rate data is accessed from the Bank of Ghana database while the data on exchange rate volatility is sourced from Baker et al (2019). Both datasets have been transformed from their

original monthly frequency to quarterly to fit into our analysis. Specifically, we computed the quarterly values as the average of the three-monthly observations within each quarter.

4. EMPIRICAL SPECIFICATIONS AND RESULTS

Sovereign credit ratings and exchange rate movements are influenced by the same macroeconomic fundamentals, such as inflation, economic growth, and fiscal stability. As a result, their fluctuations may reflect a common response to underlying economic conditions rather than a direct causal link. Thus, understanding how exchange rates react to changes in sovereign credit ratings is an open question. A correlation between the two variables may not be causal. Moreover, it is extremely challenging to construct a persuasive causal analysis.

To explore this relationship, we first perform a basic OLS regression model to identify broad correlations between rating changes and exchange rate movements. We then conduct an event study analysis to examine short-term exchange rate dynamics surrounding rating announcements. While we do not aim to establish causality, our analysis sheds light on how exchange rates respond to sovereign credit rating changes in the short run, capturing potential market reactions to such announcements.

This section is divided into five parts. First, we clearly state and explain what we term as a rating event. Next, we provide a graphical representation of exchange rate movements alongside credit rating changes to illustrate the relationship between our two variables of interest. Additionally, we create dummy variables representing the changes in the ratings and run a basic regression with

exchange to establish a relationship between these two variables. The fourth section details our econometric method employed and our main results.

4.1. Rating Event

We follow the method used by Gande and Parsley (2005) and define a rating event as any change in the assigned letter rating for a country (ranging from SD/D to AAA) or updates in secondary announcements that provide context or qualification to the country's stated rating. Adapting the approach outlined by Gande and Parsley (2005), we transform the letter ratings on a scale of 0 (lowest) - 21 (highest) to obtain our explicit credit rating. Similarly, we code the credit outlook on a scale between -1 to 1, in five increments based on the five distinct credit outlook categories used over the years by the rating agencies. We sum these two up to produce what we call the comprehensive credit rating (CCR).

Table 1 presents a summary of all the rating changes that occurred for Ghana between 2003 and 2022. Overall, there are 74 rating events across the three agencies. Of these, 4 represent credit rating upgrades (a positive change in CCR from the previous quarter) and 12 represent credit rating downgrades (a negative change in CCR from the previous quarter). The remaining 58 events correspond to periods where the rating agencies made no changes to Ghana's sovereign credit rating.

4.2. Visual Representation of The Relationship of Exchange Rate and Sovereign Credit Ratings.

Figure 1 shows the exchange rate trend during our period of study. It reveals a consistent depreciation of the cedi over time. The graph shows a steady depreciation of the Ghana Cedi over the period, with an accelerated decline post 2013 and a sharp spike by the end of the period.

In the early 2000s, the exchange rate was relatively stable, hovering around 0.87 to 0.93 GHS/USD. However, from 2007 onward, the depreciation became more pronounced, with the cedi surpassing 1.00 GHS/USD and reaching 1.98 by 2011. The trend accelerated significantly after 2012, with the exchange rate nearly doubling by 2014 (2.90 GHS/USD) and continuing its decline to 3.91 in 2016. The depreciation persisted over the following years, surpassing 5.00 in 2019 and reaching 8.27 by 2022. This pattern suggests sustained currency weakness, likely driven by macroeconomic challenges such as inflation, fiscal deficits, external debt pressures, and structural trade imbalances.

Figure 2 represents the graph of credit rating events by the three main rating agencies and exchange rate movements occurring over our period of study. From the graph we see that all three agencies exhibit periods of relatively stable ratings followed by sharp changes at different times. Ratings issued by Fitch remain relatively stable between 2003Q1 to 2013Q1 but exhibit volatility post 2013q1 and a sharp decline by the end of 2022Q4. S&P ratings also follow a similar pattern by having stability in earlier periods, followed by a sharp decline starting in the mid-2010s. Moody's rating changes, on the other hand, tend to mirror the patterns of Fitch ratings and S&P ratings but experience slightly less dramatic fluctuations. However, by the end of the period, Moody's ratings also declined sharply, converging with the other two agencies. This downward trend from all the agencies post-2013 suggests increasing concerns by Ghana's fiscal and economic stability and thus reflected in the ratings.

Additionally, there is a negative correlation between exchange rate depreciation and sovereign credit ratings. Hence, as the sovereign credit rating consistently decreases, particularly after 2013, the cedi also loses value. Given that a depreciating cedi increases external debt servicing costs, erodes investor confidence, and negatively impacts Ghana's creditworthiness, it's no surprise that there is a negative correlation between these two variables. This observed relationship between exchange rate depreciation and sovereign credit ratings prompts a deeper empirical analysis into their dynamics of which we cover next.

4.3. Testing Sovereign Ratings-Exchange Rate Relationship Using Dummy Variables

To get an idea of how sovereign credit rating announcements impact exchange rates, we run regression models with exchange rate transformations as dependent variables. The different variations of the exchange variable we use include the rate of change in the log of exchange rate and the filtered version of the exchange rate. This regression involves the use of dummy variables representing upgrades and downgrades from the three main rating agencies. Given that we believe it is possible for rating changes to have delayed effects, we include lagged dummy variables to capture any lagged effects. Additionally, we evaluate scenarios where there could be cumulative changes or no change at all in credit ratings for our analysis. In effect, we create two models with these dummy variables with the exchange rate transformations and separately run an OLS and ARCH regression. The first model in each regression includes dummy variables for rating upgrades, downgrades, and stable ratings to capture the immediate effect of each type of announcement. The second model extends this by incorporating lags and additional cumulative change variables to account for potential delayed or persistent effects. We replicate these two

models for each transformation of the exchange rate and extend them by including relevant control variables. While all models are presented in full in the appendix, the main text of the paper highlights only on the OLS regression models with statistically significant results and without control variables. Our analysis reveals compelling evidence of asymmetric effects across different rating agencies and between upgrades and downgrades.

Table: Fitch change dummies on exchange rate differences and transformations.

	(1)	(2)	(3)	(4)
	d_exch	d_exch	Filtered_exch	Filtered_exch
upgrade_dummy	0.00192	-0.00502	-0.0232	0.0277
	(0.21)	(0.00988)	(0.0329)	(0.0658)
downgrade_dummy	0.0943***	0.0784**	0.101	0.149
	(0.0338)	(0.034)	(0.253)	(0.255)
stable_ratings_dummy	0.0110*	-	-0.0465	-
	(0.0063)		(0.0372)	

***, **, * indicate significance of 1%, 5%, and 10% level, two-tailed test

In Model One, quarters in which Fitch Ratings announce an upgrade are associated with a 0.192 percentage increase in the exchange rate, holding all other factors constant. This would mean that the exchange rate depreciates slightly, but the results are not statistically significant at the 5% level (0.793 > 0.05). Likewise, a Fitch Ratings downgrade from the previous quarter leads to a 9.89 percentage increase in the exchange rate, holding all else constant. This would mean that the exchange rate is depreciated, and this effect is in line with our expectations, especially given the statistical significance at the 5% level (0.007 < 0.05). In model 3, a Fitch Ratings upgrade is not statistically significant at the 5% level (0.482 > 0.05). Similarly, downgrades are not statistically significant at the 5% level (0.691 > 0.05). This result follows our initial thoughts of how exchange rate depreciation could potentially result from a downgrade announcement. We can conclude that Fitch rating downgrades tend to be associated with statistically significant increases in exchange

rates, particularly in the specifications presented in model (1) and (2). There is no strong statistical evidence that upgrades by Fitch significantly affect exchange rate movements based on these results.

Table: S&P change dummies on exchange rate differences and transformations.

	(1) d_exch	(2) d_exch	(3) Filtered_exch	(4) Filtered_exch
upgrade_dummy	0.0258**	0.0146	-0.0863***	0.102
	(0.55)	(-0.23)	(2.97)	(-1.10)
downgrade_dummy	0.0999**	0.0916*	0.371	0.546
	(0.0444)	(0.0477)	(0.400)	(0.444)
stable_ratings_dummy	0.0163**	-	-0.0511	-
	(0.00702)		(0.0349)	
downgrade_dummy(t-1)	-	-	-	0.442**
				(0.170)
downgrade_dummy(t-2)	-	-	-	0.435**
				(0.202)

***, **, * indicate significance of 1%, 5%, and 10% level, two-tailed test

In Model One, quarters in which S&P announces an upgrade are associated with a 2.61 percentage increase in the exchange rate, holding all other factors constant. This indicates that the cedi depreciates (since a higher GHS/USD exchange rate means it takes more cedis to buy one U.S. dollar). These results are statistically significant at the 5% level (0.047 < 0.05). In quarters where S&P Global announces a downgrade, it leads to a 10.51 percentage increase in the exchange rate movement across quarters, holding all else constant. This would mean that the exchange rate depreciates and is in line with our expectations, especially given the statistical significance at the 5% level (0.027 < 0.05). However, after more variables are included in Model (2), the downgrade effect remains significant, while the upgrade effect loses significance, suggesting the market is more sensitive to negative news. In model 3, S&P Ratings upgrades are also statistically significant at the 5% level (0.000 < 0.05). A downgrade announcement on the other hand is not statistically

significant at the 5% level (0.357 > 0.05). This counterintuitive response may reflect investor skepticism about the credibility or sustainability of improved ratings, or potential overreactions in the exchange rate market. Overall, the findings suggest that downgrades trigger sustained exchange rate depreciation, with effects that persist over subsequent periods. Upgrades, in contrast, exhibit less consistent and potentially adverse effects once broader market dynamics are accounted for.

Table: Moody's change dummies on exchange rate differences and transformations.

	(1) d_exch	(2) d_exch	(3) Filtered_exch	(4) Filtered_exch
upgrade_dummy	-0.00798	-0.0157	0.0608***	0.115
	(0.00538)	(0.0165)	(0.0156)	(0.133)
downgrade_dummy	0.0352	0.0230	0.210	0.150
	(0.0429)	(0.0511)	(0.207)	(0.255)
stable_ratings_dummy	0.0160	-	-0.00818	-
	(0.0137)		(0.0897)	
upgrade_dummy(t-1)	-	0.0283*	-	0.235*
		(0.0165)		(0.133)
upgrade_dummy(t-2)	-	-	-	0.244*
				(0.133)

***, **, * indicate significance of 1%, 5%, and 10% level, two-tailed test

In Model One, quarters in which Moody's announce an upgrade are associated with a 0.79 percentage decrease in the exchange rate across quarters, holding all other factors constant. This would mean that the exchange rate appreciates slightly, but this result is not statistically significant at the 5% level (0.142 > 0.05). In quarters where Moody's announces a downgrade leads to a 3.58 percentage increase in the exchange rate across quarters, holding all else constant. This would mean that the exchange rate is depreciated but this result is not statistical significance at the 5% level (0.415 > 0.05). In model 3, Moody's upgrades unlike in model one is statistically significant at the 5% level (0.000 < 0.05). A downgrade announcement by Moody is not statistically

significant at the 5% level (0.314 > 0.05). Overall, the results highlight an asymmetric market response to rating actions. Upgrades lead to a delayed and persistent appreciation of the Ghanaian cedi, especially when macroeconomic noise is filtered out. In contrast, downgrades do not produce statistically significant effects, suggesting that these may already be priced in or offset by other market forces.

Downgrade Events

Across all three sets of regression results, sovereign credit rating downgrades are consistently associated with a depreciation of the Ghanaian cedi. In the rate of change models, the downgrade dummy is positive and statistically significant at conventional levels, suggesting that the cedi tends to lose value immediately following a downgrade announcement. This effect remains significant even when additional controls are added, such as lagged downgrade indicators. In particular, lagged downgrade dummies in later models also show significant coefficients, indicating that the impact of downgrades may persist for up to two periods following the announcement. However, once the exchange rate returns are filtered to account for broader market or macroeconomic influences, the statistical significance of the downgrade effect weakens, though the direction remains positive. This implies that part of the observed depreciation may reflect coinciding macroeconomic shocks or market risk factors. Nonetheless, the consistent direction of the effect across models supports the conclusion that downgrades have a depreciative and potentially persistent effect on the exchange rate, even if their statistical strength diminishes under stricter filtering. The magnitude of these effects remains robust even after the inclusion of control variables in tables 10 to 12.

Upgrade Events

In contrast, credit rating upgrades show no consistent or significant effect on the exchange rate across the tables. The coefficients on the upgrade dummy variable are generally small and statistically insignificant in both raw and filtered models. Interestingly, when examining lagged effects, the upgrade dummy becomes marginally significant in some filtered specifications, suggesting a possible delayed appreciation effect. However, these effects are relatively weak and less robust than those observed for downgrades. Overall, the evidence suggests that upgrades do not generate a strong or immediate reaction in the exchange rate, and any delayed effects appear to be minor. This asymmetry is consistent with the idea that markets react more sharply to negative news (downgrades) than to positive news (upgrades), especially in emerging markets where deteriorations in creditworthiness may raise concerns about capital flight or heightened risk premiums.

Combined Effects and Robustness

To assess the robustness of the baseline OLS regression findings, two sets of additional analyses were conducted. First, ARCH models were estimated to account for volatility clustering in exchange rate movements surrounding rating announcements. Second, pooled OLS regressions were run using combined rating change dummies from Fitch, Moody's, and S&P, both with and without macroeconomic control variables. The ARCH regressions offer strong confirmation of these patterns. Across the agency-specific models, downgrades consistently lead to statistically significant increases in the exchange rate, particularly in the filtered specifications. In contrast, upgrades remain mostly insignificant, aligning with the asymmetric response documented in the OLS results. Moreover, the significance of ARCH terms in many of the models highlights the presence of volatility clustering around rating events, especially those from Fitch and S&P. Importantly, these findings persist even after introducing macroeconomic control variables;

monetary policy rate (mpr), inflation (infl), and economic policy uncertainty (emv). In sum, these robustness checks; across ARCH models, pooled regressions, and models with controls consistently confirm the central finding: sovereign credit rating downgrades, particularly from Fitch and S&P, lead to significant and immediate depreciation of the Ghanaian cedi. Upgrades, in contrast, continue to yield inconsistent and generally insignificant responses. The persistence of these patterns across different model structures enhances confidence in the reliability and validity of the study's empirical results.

Table 6 through 13 provides detailed OLS regression tables supporting these findings.

Table 14 through 21 provides detailed ARCH regression tables supporting these findings.

4.4. Event Study Analysis.

Our earlier regression focused on a quarterly dataset which provided a broad overview of the relationship between sovereign credit ratings and the GHS/USD exchange rate. However, we decided to zoom in on one rating agency [Fitch Ratings] and focus on the reactions of exchange rate movements around credit rating announcements. We picked a seven-day pre and post announcement window to understand the immediate reaction and see whether the conclusion from our linear regression model held true even at daily frequency. Our sourced daily exchange rate data is recorded just when the markets are open, and we allow for a three-day gap post rating announcement to count for our post announcement window. As always, we first visualized this relationship and found an interesting dynamic. Fitch ratings issued a total of 11 rating events during our period of study. Out of these events, 4 represent rating upgrades and 7 represent rating downgrades. Preliminary visual inspections reveal a very complex and intriguing dynamic. While standard theoretical frameworks suggest that credit rating upgrades should lead to an exchange rate appreciation (a decrease in the GHS/USD rate) and downgrades to a depreciation (an increase

in the GHS/USD rate), a quick glance at the figures reveal instances that deviate from this expectation. For example, on rating upgrade events that happen on 29/11/2004 and 24/09/2013, we see a drastic change in the movement of exchange rates post rating announcement but for the other two events on 01/02/2006 and 12/05/2017, the changes are not quite aligned with our theory. Additionally, on downgrade events that happen on 03/03/2009, 22/06/2021 and 14/01/2022, we see another drastic movement in exchange rates but for the remaining events, the movements are not evidently aligned with our theory post rating announcements. Figures 3-4 capture the visual representation of these movements.

Event studies are designed to capture short-term impacts, which is particularly relevant in the context of the rapidly adjusting foreign exchange market. The events of interest are sovereign credit rating upgrades or downgrades announced by Fitch Ratings. These events are identified based on the date of an official announcement from the rating agency. The exchange rate data consists of daily nominal exchange rate values (GHS/USD), spanning a 7-day window before and after each rating announcement. This yields a 14-day event window centered around the announcement date (t=0). To capture the reaction of the USD/GHS exchange rate to the announcement of the ratings, the study applied construct abnormal returns in the form of exchange rate movements around announcements using the constant mean adjusted return model. The constant mean adjusted model assumes that the expected return of the exchange rate is constant over time and equal to the average return during a specified estimation window (7-days) prior to the event. This model has been shown to perform comparably to more sophisticated models in detecting abnormal returns in short-term event studies.[13]

[13] Brown, S. J., & Warner, J. B. (1985). Using daily stock returns: The case of event studies. *Journal of Financial Economics*, 14(1), 3–31. https://doi.org/10.1016/0304-405X(85)90042-X

The expected return ($E[R_t]$) is calculated as the average return over the estimation window:

$$E[R_t] = \frac{1}{N} \sum_{t=-N}^{-1} R_t$$

Where N is the number of days in the estimation window preceding the event window.

The abnormal return (AR) for each day in the event window is defined as the difference between the actual return and the expected return:

$$AR_t = R_t - E[R_t]$$

The cumulative abnormal return (CAR) over the event window is then computed as:

$$CAR(t_1, t_2) = \sum_{t=t_1}^{t_2} AR_t$$

Where CAR (t_1, t_2) represents the sum of the abnormal returns from day t_1 to day t_2. This allows for capturing the aggregate market reaction to the rating change over time.

Following the foundation laid by (Mackinlay, 1997), we use a t-test to test whether the mean cumulative abnormal return differs from zero. The test statistic is given by:

$$t = \frac{CAR(t_1, t_2)}{\sigma(CAR(t_1, t_2))}$$

Where σ(CAR) is the standard deviation of cumulative abnormal returns.

The subsequent table will present a summary of our event study results.

Table: Summary of Event Study Results

Event	Date	Rating Action	Event Window	AR on Day 0	CAR on Day 0	5% level Significance
1	29/11/2004	Upgrade	[-7,+7]	-0.0001571	-0.0001570	Yes (p-value = 0.0001)
2	01/02/2006	Upgrade	[-7,+7]	0.0001	0.0000998	No (p-value = 0.7464)
3	07/02/2008	Downgrade	[-7,+7]	0.0030428	0.0030428	No (p-value = 0.1076)
4	03/03/2009	Downgrade	[-7,+7]	0.0030143	0.0030142	Yes (p-value = 0.0215)
5	24/09/2010	Upgrade	[-7,+7]	-0.0001	-0.0001001	Yes (p-value = 0.0217)
6	15/02/2013	Downgrade	[-7,+7]	-0.0016857	-0.0016855	No (p-value = 0.0547)
7	28/03/2014	Downgrade	[-7,+7]	0.052757	0.0527565	Yes (p-value = 0.0330)
8	12/05/2017	Upgrade	[-7,+7]	0.0146999	0.0147004	Yes (p-value = 0.0217)
9	22/06/2021	Downgrade	[-7,+7]	0.0018287	0.0018296	Yes (p-value = 0.0130)
10	14/01/2022	Downgrade	[-7,+7]	0.0000715	0.0000725	Yes (p-value = 0.0306)
11	10/08/2022	Downgrade	[-7,+7]	0.2383428	0.2383428	Yes (p-value = 0.0572)

Downgrade Events

The event study analysis of Fitch Ratings' downgrade announcements for Ghana reveals varied impacts on the exchange rate, reflecting both the evolving macroeconomic context and market expectations. Early downgrades, such as in July 2008, occurred amid strong GDP growth and the discovery of oil, but rising inflation and debt. The market response was a slight, statistically insignificant depreciation of the cedi, suggesting that positive economic prospects may have offset concerns, or that the downgrade was anticipated. In contrast, the March 2009 downgrade during the global financial crisis led to a statistically significant depreciation, as heightened economic vulnerabilities and global uncertainty amplified investor risk aversion.

Subsequent downgrades in 2013 and 2014 produced mixed results. The 2013 event showed a marginally significant appreciation, possibly due to market anticipation or policy interventions, while the 2014 downgrade resulted in a significant appreciation, which may reflect a relief rally after the downgrade was priced in. More recent downgrades in 2021 and 2022, amid escalating debt and fiscal pressures, triggered pronounced and statistically significant depreciations of the cedi. The sharp market reactions, especially in 2022, underscore heightened investor concerns over

debt sustainability and the risk of default, with abnormal returns indicating both immediate and sustained impacts on market confidence.

Overall, the results suggest that sovereign credit rating downgrades are generally associated with significant movements in the Ghanaian cedi–US dollar exchange rate, particularly in periods of heightened economic stress or fiscal vulnerability. However, the magnitude and direction of the exchange rate response vary across events, indicating that market expectations and macroeconomic context play an important mediating role. While not all downgrades produced statistically significant reactions, the consistent pattern of cedi depreciation during major downgrades supports the conclusion that rating actions can materially influence investor sentiment and currency markets.

Upgrade Events

The analysis of Ghana's credit rating upgrades reveals mixed effects on the exchange rate, contingent on economic conditions and market expectations. The 2004 upgrade during a period of fiscal consolidation and declining debt triggered a statistically significant appreciation of the cedi, reflecting improved investor confidence. However, the 2006 upgrade, despite strong GDP growth and reduced debt, had no measurable exchange rate impact, likely due to market anticipation or overshadowing macroeconomic factors. The 2010 upgrade, coinciding with oil-driven growth, paradoxically led to a slight but significant depreciation, possibly because fiscal and inflationary risks offset the positive rating signal. In contrast, the 2017 upgrade amid economic recovery prompted a sharp appreciation, aligning with reduced risk perceptions. Together, these results suggest that upgrades influence exchange rates when they convey new information or reinforce

improving fundamentals, but their effects can be muted or even reversed if markets preempt the change or prioritize other risks.

Overall, the evidence indicates that sovereign credit rating upgrades can influence the exchange rate, but their impact is not uniform. While some upgrades were associated with significant appreciations of the Ghanaian cedi, others had no effect or even led to depreciation. This suggests that market reactions depend not only on the rating change itself, but also on the surrounding macroeconomic environment and investor expectations at the time of the announcement.

In summary, the results indicate that credit rating downgrades generally lead to a significant depreciation of the cedi, while upgrades show mixed effects. Some upgrades align with theoretical expectations, strengthening the cedi, whereas others appear to have no impact or even lead to unexpected depreciation. This asymmetry suggests that markets react more strongly to negative credit signals than positive ones. Additionally, the analysis finds that some rating changes exhibit delayed effects, with depreciation trends continuing beyond the immediate announcement period. These findings reinforce the notion that investor sentiment and external vulnerabilities play a crucial role in exchange rate fluctuations following sovereign rating adjustments.

CONCLUSION

This paper examines the impact of sovereign credit rating announcements on the Ghanaian cedi to US dollar exchange rate. Our findings reveal that downgrades lead to a statistically significant depreciation of the cedi, while upgrades produce weaker and less consistent effects. This asymmetric response suggests that negative credit signals carry more weight in the foreign

exchange market, likely due to concerns over Ghana's fiscal stability, debt sustainability, and investor confidence. The results of our event study analysis indicate that market participants may anticipate rating downgrades, as depreciation trends often begin before the official announcement. However, there is still a noticeable reaction on and immediately after the event day, confirming that rating agencies influence market behavior. In contrast, credit rating upgrades show mixed effects, with some instances of appreciation but no strong statistical significance across the board. This suggests that while negative rating actions are perceived as critical risk signals, positive announcements may not introduce substantial new information to investors.

Negative Events

Our analysis finds some evidence that sovereign credit downgrades lead to significant exchange rate depreciation. When examining different rating agencies, downgrades from Fitch and S&P have the most pronounced effects, while those from Moody's show less immediate impact. Additionally, the cumulative effect of successive downgrades places sustained pressure on the exchange rate, suggesting that repeated credit deteriorations reinforce negative investor sentiment. Interestingly, lagged downgrade effects are not significant, implying that market reactions to rating cuts are largely immediate rather than prolonged.

Positive Events

Unlike previous studies that suggest rating upgrades boost investor confidence and currency value; our findings show no strong evidence that upgrades influence the Ghanaian cedi. While some upgrade events correspond to slight appreciation, the overall results are statistically insignificant. This could indicate that positive rating actions are either expected by the market or considered less informative compared to other macroeconomic factors affecting exchange rates. The limited

reaction to upgrades supports the notion that foreign exchange markets react more strongly to bad news than good news, in line with behavioral finance theories on loss aversion.

Despite these compelling findings, it is important to acknowledge some limitations of this study. Nelson and Kim (1993) identified critical small-sample biases in predictive regression models used to analyze stock return predictability, which are particularly relevant to short-horizon event studies. Their work demonstrated that conventional statistical tests in such studies can overstate the precision of abnormal return estimates due to methodological limitations. Second, the limited number of rating events, particularly upgrades, constrains the statistical power of our tests and may explain the weak or inconsistent responses to positive announcements. Additionally, although control variables are included in the regression models, omitted variable bias cannot be entirely ruled out, particularly in capturing investor sentiment and global risk conditions.

Overall, this study underscores the significant role of sovereign credit rating downgrades in influencing exchange rate fluctuations. The results suggest that policymakers should prioritize macroeconomic stability and proactive investor engagement to mitigate adverse currency movements following negative rating actions. Future research could explore whether similar effects hold across other emerging markets or examine the interaction between sovereign ratings and broader financial market conditions.

APPENDIX

TABLES

Table 1: Description of Variables

Variable	Definition
exch	Nominal exchange rate, measured as the Ghanaian cedi (GHS) per US dollar (USD), quarterly averages
fitch	Quarterly credit ratings from Fitch, transformed into numerical scores
sp	Quarterly credit ratings from S&P Global Ratings, converted into numerical scores
moodys	Quarterly credit ratings from Moody's expressed numerically.
mpr	Monetary Policy Rate (US), measured as an annual percentage
infl	Inflation rate, calculated as the annual percentage change in the consumer price index (CPI)
emv	Equity Market Volatility Index for exchange rates, measured as the standard deviation of quarterly equity market returns

Table 2: Summary Statistics of Variables

Variable	Mean	p50	SD	Min	Max	Number of Observations
exch	2.94	1.92	2.12	0.86	9.60	80
fitch	7.51	7.50	1.27	2.00	9.00	77
sp	7.12	7.50	1.15	4.50	8.50	78
moodys	6.27	6.50	1.05	3.00	8.50	41
mpr	17.65	16.42	4.13	12.50	27.50	80
infl	14.71	12.48	6.97	7.80	48.27	80
emv	0.22	0.19	0.23	0.00	1.92	80

Table 3: Long-Term Sovereign Credit Ratings used by S&P, Moody's and Fitch

Fitch	S&P	Moody's	Interpretation	
AAA+	AAA+	Aaa	Highest Quality	Investment
AA+	AA+	Aa1		
AA	AA	Aa2	High Quality	
AA-	AA-	Aa3		
A+	A+	A1		
A	A	A2	Strong payment capacity	
A-	A-	A3		
BBB+	BBB+	Baa1		
BBB	BBB	Baa2	Adequate payment capacity	
BBB-	BBB-	Baa3		
BB+	BB+	Ba1	Likely to fulfill obligations, ongoing uncertainty	Speculative
BB	BB	Ba2		
BB-	BB-	Ba3		
B+	B+	B1		
B	B	B2	High-risk obligation	
B-	B-	B3		
CCC+	CCC+	Caa1		
CCC	CCC	Caa2	Vulnerable to default	
CCC-	CCC-	Caa3		
CC	CC	Ca		
C	C	C	Near or in bankruptcy or default	
RD/D	SD/D			

Table 4: Changes in the Long-Term Sovereign Credit Ratings of Ghana by Rating Agencies

Credit Rating Agency	Total Changes	Rating Upgrade	Rating Downgrade	Outlook Upgrade	Outlook Downgrade
S&P Rating	18	3	4	4	5
Moody's Rating	13	0	5	2	2
Fitch Rating	43	1	3	5	7
Total	74	4	12	11	14

Table 5: Explicit Credit Ratings

Sovereign Rating	ECR
AAA+	21
AA+	20
AA	19
AA-	18
A+	17
A	16
A-	15
BBB+	14
BBB	13
BBB-	12
BB+	11
BB	10
BB-	9
B+	8
B	7
B-	6
CCC+	5
CCC	4
CCC-	3
CC	2
C	1
SD/D	0

Credit Outlook

	Add to ECR
Positive	1
Credit Watch-Developing	0.5
Stable	0
Credit Watch-Negative	-0.5
Negative	-1

Table 6: Effect of Fitch Global Ratings Change Dummies on Exchange Rate Differences and Transformations (OLS Results)

VARIABLES	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
upgrade_dummy	0.00192	-0.00502	-0.0232	0.0277
	(0.00731)	(0.00988)	(0.0329)	(0.0658)
downgrade_dummy	0.0943***	0.0784**	0.101	0.149
	(0.0338)	(0.0340)	(0.253)	(0.255)
upgrade_dummy(t-1)		-0.0163		-0.0521
		(0.00996)		(0.0935)
downgrade_dummy(t-1)		-0.00369		0.0108
		(0.0191)		(0.156)
upgrade_dummy(t-2)		-0.00456		-0.0635
		(0.00993)		(0.0745)
downgrade_dummy(t-2)		0.0289		0.157
		(0.0268)		(0.302)
cumulative_upgrade		0.00183		-0.0387
		(0.00530)		(0.0318)
cumulative_downgrade		0.0136*		-0.0339
		(0.00759)		(0.0510)
stable_ratings_dummy	0.0110*		-0.0465	
	(0.00630)		(0.0372)	
Constant	0.00963***	0.00735***	0.0261***	0.0322***
	(0.00255)	(0.00268)	(0.00200)	(0.00280)
Observations	79	79	80	80
R-squared	0.216	0.257	0.017	0.038

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 7: Effect of S&P Global Ratings Change Dummies on Exchange Rate Differences and Transformations (OLS Results)

VARIABLES	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
upgrade_dummy	0.0258**	0.0146	-0.0863***	0.102
	(0.0128)	(0.0276)	(0.0189)	(0.183)
downgrade_dummy	0.0999**	0.0916*	0.371	0.546
	(0.0444)	(0.0477)	(0.400)	(0.444)
upgrade_dummy(t-1)		-0.0147		-0.00858
		(0.0246)		(0.184)
downgrade_dummy(t-1)		0.0509		0.442**
		(0.0535)		(0.170)
upgrade_dummy(t-2)		-0.0194		-0.182
		(0.0366)		(0.297)
downgrade_dummy(t-2)		0.0470		0.435**
		(0.0341)		(0.202)
cumulative_upgrade		-0.00171		-0.0814
		(0.0281)		(0.203)
cumulative_downgrade		0.00557		-0.0789
		(0.0110)		(0.0531)
stable_ratings_dummy	0.0163**		-0.0511	
	(0.00702)		(0.0349)	
Constant	0.00762***	0.0150***	0.0242***	-0.00360
	(0.00287)	(0.00540)	(0.00130)	(0.00914)
Observations	79	79	80	80
R-squared	0.126	0.212	0.083	0.251

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 8: Effect of Moody's Rating Change Dummies on Exchange Rate Differences and Transformations (OLS Results)

VARIABLES	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
upgrade_dummy	-0.00798	-0.0157	0.0608***	0.115
	(0.00538)	(0.0165)	(0.0156)	(0.133)
downgrade_dummy	0.0352	0.0230	0.210	0.150
	(0.0429)	(0.0511)	(0.207)	(0.255)
upgrade_dummy(t-1)		0.0283*		0.235*
		(0.0165)		(0.133)
downgrade_dummy(t-1)		0.0590		0.138
		(0.0448)		(0.236)
upgrade_dummy(t-2)		-0.000315		0.244*
		(0.0165)		(0.133)
downgrade_dummy(t-2)		-0.0583		-0.0839
		(0.0455)		(0.142)
cumulative_upgrade		-0.0270		-0.218
		(0.0309)		(0.156)
cumulative_downgrade		0.0348		0.190
		(0.0285)		(0.133)
stable_ratings_dummy	0.0160		-0.00818	
	(0.0137)		(0.0897)	
Constant	0.0201***	0.0201***	-0.0104	-0.0362*
	(0.00538)	(0.00519)	(0.0156)	(0.0216)
Observations	79	79	80	80
R-squared	0.032	0.160	0.021	0.080

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 9: Combined Effects of Rating Change Dummies by the three main agencies on Exchange Rate Differences and Transformations (OLS Results)

VARIABLES	(1) d_exch	(2) filtered_exch
fitch_upgrade_dummy	-0.0104	0.0282
	(0.00981)	(0.0690)
fitch_downgrade_dummy	0.0730**	0.0660
	(0.0316)	(0.196)
moodys_upgrade_dummy	-0.00425	0.0912**
	(0.00543)	(0.0368)
moodys_downgrade_dummy	0.0111	0.163
	(0.0468)	(0.289)
sp_upgrade_dummy	0.0167	-0.0850
	(0.0205)	(0.113)
sp_downgrade_dummy	0.0597*	0.377
	(0.0355)	(0.390)
Constant	0.0164***	-0.0409
	(0.00543)	(0.0368)
Observations	79	80
R-squared	0.282	0.099

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 10: Effect of Fitch Global Ratings Change Dummies on Exchange Rate Differences and Transformations with Control Variables (OLS Results)

VARIABLES	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
mpr	-0.00587**	-0.00867	0.0257*	0.0775*
	(0.00276)	(0.00884)	(0.0150)	(0.0429)
infl	0.000769	0.000936	0.0366***	0.0362***
	(0.00242)	(0.00204)	(0.0107)	(0.00952)
emv	-0.0553	-0.0582	0.209**	0.193*
	(0.0369)	(0.0396)	(0.0950)	(0.106)
upgrade_dummy	0.0143	-0.0136	0.617***	0.152*
	(0.0464)	(0.0125)	(0.207)	(0.0765)
downgrade_dummy	0.0963*	0.0694*	0.665**	0.0965
	(0.0570)	(0.0349)	(0.295)	(0.165)
upgrade_dummy(t-1)		-0.0210*		0.0557
		(0.0121)		(0.0619)
downgrade_dummy(t-1)		-0.0151		-0.221*
		(0.0162)		(0.132)
upgrade_dummy(t-2)		-0.0113		0.0125
		(0.0115)		(0.0730)
downgrade_dummy(t-2)		0.0171		0.0330
		(0.0287)		(0.206)
cumulative_upgrade		0.0412		0.0817
		(0.0277)		(0.164)
cumulative_downgrade		-0.0180		0.305*
		(0.0340)		(0.156)
stable_ratings_dummy	0.0238		0.540***	
	(0.0463)		(0.196)	
Constant	0.00697	0.0104	-1.149***	-0.980***
	(0.0779)	(0.0556)	(0.335)	(0.269)
Observations	79	79	80	80
R-squared	0.285	0.312	0.449	0.472

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 11: Effect of S&P Global Ratings Change Dummies on Exchange Rate Differences and Transformations with Control Variables (OLS Results)

VARIABLES	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
mpr	-0.00697**	-0.0124	0.0281*	0.104***
	(0.00299)	(0.00789)	(0.0142)	(0.0339)
infl	0.000417	-0.00115	0.0315***	0.0306***
	(0.00199)	(0.00206)	(0.00819)	(0.00893)
emv	-0.0646*	-0.0655**	0.226**	0.203**
	(0.0324)	(0.0269)	(0.0912)	(0.0880)
upgrade_dummy	0.0163	0.00558	0.540***	0.221*
	(0.0434)	(0.0260)	(0.170)	(0.123)
downgrade_dummy	0.0949	0.101*	0.719**	0.290
	(0.0606)	(0.0530)	(0.348)	(0.290)
upgrade_dummy(t-1)		-0.0179		0.0967
		(0.0241)		(0.124)
downgrade_dummy(t-1)		0.0773*		0.0684
		(0.0449)		(0.154)
upgrade_dummy(t-2)		-0.0157		-0.0178
		(0.0375)		(0.184)
downgrade_dummy(t-2)		0.0458		0.356*
		(0.0337)		(0.190)
cumulative_upgrade		0.00176		-0.214
		(0.0235)		(0.132)
cumulative_downgrade		-0.0331		0.361***
		(0.0301)		(0.128)
stable_ratings_dummy	0.0201		0.424***	
	(0.0380)		(0.154)	
Constant	0.0219	0.0868	-0.979***	-0.879***
	(0.0639)	(0.0575)	(0.255)	(0.246)
Observations	79	79	80	80
R-squared	0.221	0.329	0.440	0.554

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: Effect of Moody's Rating Change Dummies on Exchange Rate Differences and Transformations with Control Variables (OLS Results)

VARIABLES	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
mpr	-0.00668*	-0.00455	0.0346**	0.0455***
	(0.00395)	(0.00301)	(0.0159)	(0.0142)
infl	0.000620	0.000419	0.0283***	0.0276**
	(0.00213)	(0.00214)	(0.0104)	(0.0108)
emv	-0.0697**	-0.0759**	0.194**	0.163*
	(0.0324)	(0.0311)	(0.0919)	(0.0872)
upgrade_dummy	-0.0253***	-0.0208	0.0742*	0.0503
	(0.00893)	(0.0224)	(0.0442)	(0.130)
downgrade_dummy	0.0205	0.00432	0.0938	-0.00844
	(0.0433)	(0.0468)	(0.150)	(0.181)
upgrade_dummy(t-1)		0.0263		0.200*
		(0.0199)		(0.118)
downgrade_dummy(t-1)		0.0372		0.208
		(0.0474)		(0.209)
upgrade_dummy(t-2)		0.00142		0.262**
		(0.0159)		(0.0995)
downgrade_dummy(t-2)		-0.0389		-0.0653
		(0.0313)		(0.108)
cumulative_upgrade		-0.0477		-0.151
		(0.0333)		(0.117)
cumulative_downgrade		0.0470		0.200*
		(0.0301)		(0.110)
stable_ratings_dummy	0.00857		0.0776	
	(0.0164)		(0.0902)	
Constant	0.0392	0.0388	-0.543***	-0.558***
	(0.0365)	(0.0356)	(0.165)	(0.167)
Observations	79	79	80	80
R-squared	0.132	0.239	0.357	0.415

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 13: Combined Effects of Rating Change Dummies by the three main agencies on Exchange Rate Differences and Transformations with Control Variables (OLS Results)

VARIABLES	(1) d_exch	(2) filtered_exch
mpr	-0.00536*	0.0320**
	(0.00287)	(0.0156)
infl	7.50e-05	0.0268***
	(0.00145)	(0.00785)
emv	-0.0507	0.256**
	(0.0388)	(0.0987)
fitch_upgrade_dummy	-0.00951	0.0864
	(0.00961)	(0.0764)
fitch_downgrade_dummy	0.0644*	0.125
	(0.0332)	(0.149)
moodys_upgrade_dummy	-0.0151**	0.0831
	(0.00755)	(0.0554)
moodys_downgrade_dummy	0.00822	-0.0199
	(0.0459)	(0.222)
sp_upgrade_dummy	0.00509	0.118
	(0.0217)	(0.101)
sp_downgrade_dummy	0.0569	0.308
	(0.0376)	(0.258)
Constant	0.0351	-0.534***
	(0.0240)	(0.139)
Observations	79	80
R-squared	0.337	0.412

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 14: Effect of Fitch Global Ratings Change Dummies on Exchange Rate Differences and Transformations (ARCH Results)

	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
upgrade_dummy	0.00181 (0.30)	0.000918 (0.12)	-0.00474 (-1.14)	-0.0138 (-1.39)
downgrade_dummy	0.0642* (2.10)	0.0180 (1.45)	0.188*** (14.96)	0.174** (2.98)
stable_ratings_dummy	0.0115 (1.81)		-0.00963* (-2.18)	
upgrade_dummy(t-1)		-0.00257 (-0.52)		0.00361 (0.54)
downgrade_dummy(t-1)		-0.0419*** (-3.50)		0.00942 (0.18)
upgrade_dummy(t-2)		0.000353 (0.07)		-0.0122 (-1.08)
downgrade_dummy(t-2)		0.0254* (2.18)		0.252*** (4.37)
cumulative_upgrade		-0.00483 (-1.21)		-0.0120 (-1.12)
cumulative_downgrade		0.0238 (1.69)		0.0797*** (8.28)
_cons	0.00998*** (5.09)	0.00724*** (3.40)	0.0273*** (10.57)	0.0303*** (8.63)
ARCH				
L2.arch	0.403 (1.24)	1.844* (2.24)	11.64** (2.69)	4.751*** (4.53)
_cons	0.00190*** (3.40)	0.000421 (1.57)	0.000190 (0.70)	0.0000480 (0.70)
N	79	79	80	80

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 15: Effect of S&P Global Ratings Change Dummies on Exchange Rate Differences and Transformations (ARCH Results)

	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
upgrade_dummy	0.0238*	0.0714***	-0.101*	0.409***
	(2.22)	(31.00)	(-2.03)	(3.94)
downgrade_dummy	0.0863***	0.0249***	0.512	0.320***
	(3.58)	(9.82)	(1.82)	(8.19)
stable_ratings_dummy	0.0150*		-0.0267	
	(2.06)		(-0.67)	
upgrade_dummy(t-1)		0.0201***		0.249**
		(10.53)		(2.77)
downgrade_dummy(t-1)		0.0373***		0.706***
		(11.65)		(19.99)
upgrade_dummy(t-2)		0.0451***		0.175
		(10.68)		(1.86)
downgrade_dummy(t-2)		0.0286***		0.491***
		(7.61)		(3.59)
cumulative_upgrade		-0.0573***		-0.340***
		(-15.70)		(-3.65)
cumulative_downgrade		0.0361***		-0.0749***
		(5.43)		(-3.35)
_cons	0.00759***	0.00394	0.0242***	-0.0100
	(3.71)	(0.66)	(34.12)	(-0.47)
ARCH				
L2.arch	0.384*	4.740**	0.562	3.631***
	(2.12)	(2.62)	(1.12)	(3.30)
_cons	0.00199**	0.0000384	0.0840	0.000513
	(2.84)	(0.61)	(1.83)	(1.15)
N	79	79	80	80

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 16: Effect of Moody's Rating Change Dummies on Exchange Rate Differences and Transformations (ARCH Results)

	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
upgrade_dummy	0.00886**	-0.00579	-0.0597**	0.0698
	(2.84)	(-0.18)	(-2.97)	(0.21)
downgrade_dummy	0.0492***	-0.0112	0.481***	0.149
	(13.87)	(-0.23)	(15.12)	(0.50)
stable_ratings_dummy	0.0390***		0.311***	
	(12.36)		(12.33)	
upgrade_dummy(t-1)		0.0382		0.190
		(1.17)		(0.57)
downgrade_dummy(t-1)		0.0872		0.189
		(1.82)		(0.66)
upgrade_dummy(t-2)		0.00957		0.198
		(0.29)		(0.60)
downgrade_dummy(t-2)		-0.00841		-0.0230
		(-0.30)		(-0.08)
cumulative_upgrade		-0.0333		-0.170
		(-0.65)		(-0.52)
cumulative_downgrade		0.0356		0.177
		(1.17)		(1.32)
_cons	0.000498	0.0156**	0.0247**	-0.0259
	(0.19)	(2.95)	(3.03)	(-0.90)
ARCH				
L2.arch	5.508**	0.586*	2.993***	0.247
	(2.69)	(2.31)	(3.29)	(0.42)
_cons	0.000100	0.00141**	0.00132	0.105
	(0.97)	(3.01)	(0.84)	(1.42)
N	79	79	80	80

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 17: Combined Effects of Rating Change Dummies by the three main agencies on Exchange Rate Differences and Transformations (ARCH Results)

	(1) d_exch	(2) filtered_exch
fitch_upgrade_dummy	-0.00723 (-0.81)	-0.0622*** (-3.81)
fitch_downgrade_dummy	0.0563* (2.01)	0.196** (2.64)
moodys_upgrade_dummy	-0.00251 (-0.44)	-0.0281 (-0.12)
moodys_downgrade_dummy	-0.00168 (-0.04)	0.301*** (4.21)
sp_upgrade_dummy	0.0210 (1.19)	-0.283*** (-4.82)
sp_downgrade_dummy	0.0611** (2.61)	0.255** (2.93)
_cons	0.0146** (2.59)	0.0827 (1.75)
ARCH		
L2.arch	0.441 (1.51)	2.683*** (3.77)
_cons	0.00163** (3.11)	0.00766 (1.28)
N	79	80

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 18: Effect of Fitch Global Ratings Change Dummies on Exchange Rate Differences and Transformations with Control Variables (ARCH Results)

	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
mpr	-0.00816***	-0.00581***	-0.0138	0.0256**
	(-6.20)	(-21.24)	(-1.67)	(2.69)
infl	-0.00266***	-0.00199***	0.0372***	0.0316***
	(-7.19)	(-16.36)	(3.84)	(14.08)
emv	0.000996	0.00246*	-0.0223	-0.0210
	(0.05)	(2.44)	(-0.47)	(-0.17)
upgrade_dummy	-0.0411***	-0.00986***	0.652***	0.0522***
	(-3.98)	(-9.82)	(4.24)	(4.33)
downgrade_dummy	0.000626	0.00942	0.691***	0.0628
	(0.04)	(1.62)	(4.72)	(1.05)
stable_ratings_dummy	-0.0283*		0.611***	
	(-2.20)		(3.90)	
upgrade_dummy(t-1)		-0.0101***		0.0522**
		(-14.35)		(3.08)
downgrade_dummy(t-1)		-0.00371		-0.219***
		(-1.20)		(-8.92)
upgrade_dummy(t-2)		-0.00987***		0.0111
		(-9.10)		(0.57)
downgrade_dummy(t-2)		0.00146		0.156**
		(0.24)		(3.02)
cumulative_upgrade		0.0143***		0.258***
		(13.38)		(4.88)
cumulative_downgrade		0.00921***		0.186***
		(5.95)		(4.22)
_cons	0.103***	0.0436***	-1.023***	-0.825***
	(6.50)	(18.97)	(-4.11)	(-14.43)
ARCH				
L2.arch	2.552***	5.012***	1.762**	3.587
	(3.43)	(4.48)	(2.70)	(1.78)
_cons	0.000184	5.24e-08	0.0155*	0.00151
	(1.37)	(0.65)	(2.13)	(0.47)
N	79	79	80	80

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 19: Effect of S&P Global Ratings Change Dummies on Exchange Rate Differences and Transformations with Control Variables (ARCH Results)

	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
mpr	-0.00862***	-0.00710*	0.000958	0.0271**
	(-7.91)	(-2.52)	(0.21)	(2.64)
infl	-0.00230***	-0.00148	0.0280***	0.0240***
	(-4.18)	(-1.73)	(12.58)	(25.27)
emv	-0.00507	-0.0819***	-0.173	0.00395
	(-0.19)	(-9.78)	(-1.56)	(0.19)
upgrade_dummy	-0.0342*	0.0732***	0.334***	0.408***
	(-2.18)	(4.48)	(6.84)	(12.01)
downgrade_dummy	0.0532***	0.0331***	0.479***	0.189***
	(3.55)	(3.48)	(6.18)	(4.83)
stable_ratings_dummy	-0.0161**		0.340***	
	(-3.26)		(9.86)	
upgrade_dummy(t-1)		0.0328**		0.274***
		(3.08)		(12.93)
downgrade_dummy(t-1)		0.151***		0.317***
		(8.54)		(8.57)
upgrade_dummy(t-2)		0.0621***		0.255***
		(4.80)		(10.64)
downgrade_dummy(t-2)		0.0568***		0.368***
		(6.30)		(5.07)
cumulative_upgrade		-0.0685***		-0.427***
		(-6.86)		(-28.08)
cumulative_downgrade		-0.0131		0.131**
		(-0.79)		(2.84)
_cons	0.0878***	0.0765**	-0.650***	-0.440***
	(5.10)	(3.05)	(-12.07)	(-10.62)
ARCH				
L2.arch	1.725*	1.524*	5.047	3.911***
	(2.13)	(2.37)	(1.71)	(3.38)
_cons	0.000575	0.000394*	0.00175	0.000214
	(1.42)	(2.02)	(0.43)	(0.42)
N	79	79	80	80

t statistics in parentheses

* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 20: Effect of Moody's Rating Change Dummies on Exchange Rate Differences and Transformations with Control Variables (ARCH Results)

	(1) d_exch	(2) d_exch	(3) filtered_exch	(4) filtered_exch
mpr	-0.00859***	0.000138*	-0.00400	0.00575**
	(-4.76)	(2.11)	(-0.78)	(3.15)
infl	-0.00233**	0.000713***	0.0289***	0.0165***
	(-3.24)	(162.77)	(7.33)	(10.68)
emv	-0.00484	-0.00785***	-0.0176	-0.123***
	(-0.15)	(-10.93)	(-0.69)	(-4.88)
upgrade_dummy	-0.0160	-0.0285***	-0.0816**	-0.195***
	(-1.10)	(-11.84)	(-3.21)	(-7.76)
downgrade_dummy	0.0145	0.00346	0.328	-0.306***
	(0.70)	(1.23)	(1.69)	(-6.06)
stable_ratings_dummy	0.00271		0.101**	
	(0.21)		(3.29)	
upgrade_dummy(t-1)		0.00329		-0.0620*
		(0.85)		(-2.13)
downgrade_dummy(t-1)		0.0989***		0.375
		(9.83)		(1.34)
upgrade_dummy(t-2)		-0.00478		0.0489**
		(-1.38)		(2.63)
downgrade_dummy(t-2)		-0.0196***		-0.248**
		(-5.10)		(-2.80)
cumulative_upgrade		-0.0464***		0.0502*
		(-16.71)		(2.02)
cumulative_downgrade		0.0868***		0.146***
		(20.97)		(12.93)
_cons	0.0717***	-0.00787***	-0.354***	-0.227***
	(3.98)	(-31.32)	(-7.01)	(-11.04)
ARCH				
L2.arch	1.773*	8.191***	3.210*	3.957**
	(2.07)	(4.25)	(2.21)	(3.08)
_cons	0.000601	4.86e-10	0.00531	0.000271
	(1.25)	(0.04)	(1.37)	(1.22)
N	79	79	80	80

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 21: Combined Effects of Rating Change Dummies by the three main agencies on Exchange Rate Differences and Transformations (ARCH Results)

	(1) d_exch	(2) filtered_exch
mpr	-0.00778*	-0.00754
	(-2.40)	(-0.56)
infl	-0.00276**	0.0256***
	(-2.63)	(9.52)
emv	-0.00962	-0.0247
	(-0.56)	(-0.14)
fitch_upgrade_dummy	-0.00953	0.0510
	(-1.54)	(1.81)
fitch_downgrade_dummy	0.0300	0.0927
	(1.81)	(1.19)
moodys_upgrade_dummy	-0.0125	-0.126***
	(-1.15)	(-3.72)
moodys_downgrade_dummy	0.0211*	-0.0594
	(2.13)	(-0.87)
sp_upgrade_dummy	-0.0273	0.0342
	(-1.62)	(0.51)
sp_downgrade_dummy	0.0353***	0.179**
	(5.34)	(3.11)
_cons	0.0759*	-0.306***
	(2.52)	(-6.43)
ARCH		
L2.arch	2.400***	2.953**
	(3.68)	(2.89)
_cons	0.000168	0.00568
	(0.97)	(1.71)
N	79	80

t statistics in parentheses
* $p < 0.05$, ** $p < 0.01$, *** $p < 0.001$

Table 22: Event Study Results of Upgrade Rating Events by Fitch Rating

Upgrade on 29/11/2004 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	18/11/2004	0.9025	0.9029	-0.0003572	-0.0003572
	19/11/2004	0.9028	0.9029	-0.0000571	-0.0004143
	22/11/2004	0.9029	0.9029	0.0000429	-0.0003714
	23/11/2004	0.903	0.9029	0.0001429	-0.0002285
	24/11/2004	0.903	0.9029	0.0001429	-0.0000857
	25/11/2004	0.903	0.9029	0.0001429	0.0000572
	26/11/2004	0.9028	0.9029	-0.0000571	0.0000001
B+ (Positive)	29/11/2004	0.9027	0.9029	-0.0001571	-0.0001570
	06/12/2004	0.9028	0.9029	-0.0000571	-0.0002141
	07/12/2004	0.9028	0.9029	-0.0000571	-0.0002712
	08/12/2004	0.9028	0.9029	-0.0000571	-0.0003283
	09/12/2004	0.9028	0.9029	-0.0000571	-0.0003854
	10/12/2004	0.9027	0.9029	-0.0001571	-0.0005425
	13/12/2004	0.9027	0.9029	-0.0001571	-0.0006996
	14/12/2004	0.9029	0.9029	0.0000429	-0.0006568

Upgrade on 01/02/2006 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	23/01/2006	0.908	0.9082	-0.0002	-0.0002
	24/01/2006	0.9082	0.9082	0	-0.0002
	25/01/2006	0.9082	0.9082	0	-0.0002
	26/01/2006	0.9082	0.9082	0	-0.0002
	27/01/2006	0.9082	0.9082	0	-0.0002
	30/01/2006	0.9083	0.9082	0.0001	-0.0001001
	31/01/2006	0.9083	0.9082	0.0001	-0.000000119
B+ (Positive)	01/02/2006	0.9083	0.9082	0.0001	0.0000998
	07/02/2006	0.9082	0.9082	0	0.0000998
	08/02/2006	0.9082	0.9082	0	0.0000998
	09/02/2006	0.9082	0.9082	0	0.0000998
	10/02/2006	0.9082	0.9082	0	0.0000998
	13/02/2006	0.9082	0.9082	0	0.0000998
	14/02/2006	0.9082	0.9082	0	0.0000998
	15/02/2006	0.9088	0.9082	0.0006	0.0006998

Table 22: Event Study Results of Upgrade Rating Events by Fitch Rating

Upgrade on 24/09/2010 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	14/09/2010	1.4334	1.4333	0.0001	0.0001
	15/09/2010	1.4337	1.4333	0.0003999	0.0005
	16/09/2010	1.4331	1.4333	-0.0002	0.0002999
	17/09/2010	1.4333	1.4333	0	0.0002999
	20/09/2010	1.4332	1.4333	-0.0001	0.0001999
	22/09/2010	1.4332	1.4333	-0.0001	0.0000999
	23/09/2010	1.4332	1.4333	-0.0001	-0.000000119
B+ (Stable)	24/09/2010	1.4332	1.4333	-0.0001	-0.0001001
	30/09/2010	1.4326	1.4333	-0.0007	-0.0008001
	01/10/2010	1.4305	1.4333	-0.0028	-0.0036001
	04/10/2010	1.4308	1.4333	-0.0025001	-0.0061002
	05/10/2010	1.4318	1.4333	-0.0015	-0.0076002
	06/10/2010	1.4306	1.4333	-0.0027	-0.0103002
	07/10/2010	1.43	1.4333	-0.0033001	-0.0136002
	08/10/2010	1.4303	1.4333	-0.003	-0.0166003

Upgrade on 12/05/2017 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	03/05/2017	4.1835	4.1944	-0.0109	-0.0109
	04/05/2017	4.1925	4.1944	-0.0018997	-0.0127997
	05/05/2017	4.1934	4.1944	-0.0009999	-0.0137997
	08/05/2017	4.1955	4.1944	0.0011001	-0.0126996
	09/05/2017	4.1979	4.1944	0.0035	-0.0091996
	10/05/2017	4.1983	4.1944	0.0039001	-0.0052996
	11/05/2017	4.1997	4.1944	0.0053	0.000000477
B (Stable)	12/05/2017	4.2091	4.1944	0.0146999	0.0147004
	18/05/2017	4.2413	4.1944	0.0469003	0.0616007
	19/05/2017	4.2484	4.1944	0.0540004	0.1156011
	22/05/2017	4.2629	4.1944	0.0685	0.1841011
	23/05/2017	4.3025	4.1944	0.1080999	0.292201
	24/05/2017	4.3032	4.1944	0.1087999	0.401001
	26/05/2017	4.3046	4.1944	0.1101999	0.5112009
	29/05/2017	4.2989	4.1944	0.1045003	0.6157012

Table 23: Event Study Results of Downgrade Rating Events by Fitch Rating

Downgrade on 07/02/2008 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	29/01/2008	0.9543	0.9674	-0.0130572	-0.0130572
	30/01/2008	0.9692	0.9674	0.0018429	-0.0112143
	31/01/2008	0.9692	0.9674	0.0018429	-0.0093715
	01/02/2008	0.9692	0.9674	0.0018429	-0.0075286
	04/02/2008	0.9692	0.9674	0.0018429	-0.0056857
	05/02/2008	0.9702	0.9674	0.0028428	-0.0028429
	06/02/2008	0.9702	0.9674	0.0028428	-0.0000000596
B+ (Stable)	07/02/2008	0.9704	0.9674	0.0030428	0.0030428
	13/02/2008	0.9722	0.9674	0.0048428	0.0078856
	14/02/2008	0.9722	0.9674	0.0048428	0.0127284
	15/02/2008	0.9722	0.9674	0.0048428	0.0175712
	18/02/2008	0.9722	0.9674	0.0048428	0.022414
	19/02/2008	0.9723	0.9674	0.0049428	0.0273569
	20/02/2008	0.9723	0.9674	0.0049428	0.0322997
	21/02/2008	0.9728	0.9674	0.0054429	0.0377426

Downgrade on 03/03/2009 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	20/02/2009	1.326	1.3285	-0.0024858	-0.0024858
	23/02/2009	1.3262	1.3285	-0.0022857	-0.0047715
	24/02/2009	1.3276	1.3285	-0.0008857	-0.0056572
	25/02/2009	1.3276	1.3285	-0.0008857	-0.0065429
	26/02/2009	1.3303	1.3285	0.0018142	-0.0047287
	27/02/2009	1.3305	1.3285	0.0020143	-0.0027144
	02/03/2009	1.3312	1.3285	0.0027143	-0.000000119
B+ (Negative)	03/03/2009	1.3315	1.3285	0.0030143	0.0030142
	10/03/2009	1.3438	1.3285	0.0153142	0.0183284
	11/03/2009	1.3442	1.3285	0.0157143	0.0340427
	12/03/2009	1.3464	1.3285	0.0179143	0.051957
	13/03/2009	1.347	1.3285	0.0185143	0.0704713
	16/03/2009	1.3522	1.3285	0.0237143	0.0941856
	17/03/2009	1.353	1.3285	0.0245143	0.1186999
	18/03/2009	1.3558	1.3285	0.0273143	0.1460142

Table 15: Event Study Results of Downgrade Rating Events by Fitch Rating

Downgrade on 15/02/2013 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	06/02/2013	1.906	1.9045	0.0015143	0.0015143
	07/02/2013	1.905	1.9045	0.0005143	0.0020286
	08/02/2013	1.9062	1.9045	0.0017143	0.0037429
	11/02/2013	1.908	1.9045	0.0035143	0.0072572
	12/02/2013	1.9039	1.9045	-0.0005857	0.0066715
	13/02/2013	1.9005	1.9045	-0.0039856	0.0026859
	14/02/2013	1.9018	1.9045	-0.0026857	0.000000238
B+ (Negative)	15/02/2013	1.9028	1.9045	-0.0016857	-0.0016855
	21/02/2013	1.9036	1.9045	-0.0008857	-0.0025712
	22/02/2013	1.9019	1.9045	-0.0025856	-0.0051569
	25/02/2013	1.9064	1.9045	0.0019143	-0.0032426
	26/02/2013	1.911	1.9045	0.0065143	0.0032717
	27/02/2013	1.9091	1.9045	0.0046144	0.0078861
	28/02/2013	1.9111	1.9045	0.0066143	0.0145004
	01/03/2013	1.9143	1.9045	0.0098143	0.0243146

Downgrade on 28/03/2014 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	19/03/2014	2.5709	2.6197	-0.0488429	-0.0488429
	20/03/2014	2.5832	2.6197	-0.0365429	-0.0853858
	21/03/2014	2.6193	2.6197	-0.000443	-0.0858288
	24/03/2014	2.6251	2.6197	0.005357	-0.0804718
	25/03/2014	2.6425	2.6197	0.0227571	-0.0577147
	26/03/2014	2.6459	2.6197	0.0261571	-0.0315576
	27/03/2014	2.6513	2.6197	0.0315571	-0.000000477
B (Negative)	28/03/2014	2.6725	2.6197	0.052757	0.0527565
	03/04/2014	2.6996	2.6197	0.0798571	0.1326137
	04/04/2014	2.6968	2.6197	0.0770571	0.2096708
	07/04/2014	2.6942	2.6197	0.0744572	0.284128
	08/04/2014	2.6977	2.6197	0.0779572	0.3620851
	09/04/2014	2.71	2.6197	0.0902572	0.4523423
	10/04/2014	2.713	2.6197	0.0932572	0.5455995
	11/04/2014	2.7482	2.6197	0.1284571	0.6740565

Table 15: Event Study Results of Downgrade Rating Events by Fitch Rating

Downgrade on 22/06/2021 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	11/06/2021	5.7515	5.7514	0.0001287	0.0001287
	14/06/2021	5.7514	5.7514	0.0000286	0.0001574
	15/06/2021	5.7514	5.7514	0.0000286	0.000186
	16/06/2021	5.7512	5.7514	-0.0001712	0.0000148
	17/06/2021	5.7512	5.7514	-0.0001712	-0.0001564
	18/06/2021	5.7512	5.7514	-0.0001712	-0.0003276
	21/06/2021	5.7517	5.7514	0.0003285	0.000000954
B (Negative)	22/06/2021	5.7532	5.7514	0.0018287	0.0018296
	28/06/2021	5.7598	5.7514	0.0084286	0.0102582
	29/06/2021	5.7613	5.7514	0.0099287	0.0201869
	30/06/2021	5.7626	5.7514	0.0112286	0.0314155
	01/07/2021	5.7631	5.7514	0.0117288	0.0431442
	02/07/2021	5.7641	5.7514	0.0127287	0.0558729
	05/07/2021	5.7641	5.7514	0.0127287	0.0686016
	06/07/2021	5.764	5.7514	0.0126286	0.0812302

Downgrade on 14/01/2022 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	04/01/2022	6.0061	6.0062	-0.0001283	-0.0001283
	05/01/2022	6.0059	6.0062	-0.0003285	-0.0004568
	06/01/2022	6.0064	6.0062	0.0001717	-0.0002851
	10/01/2022	6.0064	6.0062	0.0001717	-0.0001135
	11/01/2022	6.0064	6.0062	0.0001717	0.0000582
	12/01/2022	6.0062	6.0062	-0.0000286	0.0000296
	13/01/2022	6.0062	6.0062	-0.0000286	0.000000954
B- (Negative)	14/01/2022	6.0063	6.0062	0.0000715	0.0000725
	20/01/2022	6.0101	6.0062	0.0038714	0.0039439
	21/01/2022	6.0099	6.0062	0.0036716	0.0076156
	24/01/2022	6.0109	6.0062	0.0046716	0.0122871
	25/01/2022	6.0109	6.0062	0.0046716	0.0169587
	26/01/2022	6.0124	6.0062	0.0061717	0.0231304
	27/01/2022	6.0226	6.0062	0.0163717	0.0395021
	28/01/2022	6.0226	6.0062	0.0163717	0.0558739

Table 15: Event Study Results of Downgrade Rating Events by Fitch Rating

Downgrade on 10/08/22 by Fitch Ratings

Rating	Date	exch	ER	AR	CAR
	29/07/2022	7.612	7.7918	-0.1797571	-0.1797571
	01/08/2022	7.614	7.7918	-0.1777573	-0.3575144
	02/08/2022	7.644	7.7918	-0.1477571	-0.5052714
	03/08/2022	7.647	7.7918	-0.1447573	-0.6500287
	05/08/2022	8.0001	7.7918	0.208343	-0.4416857
	08/08/2022	8.0051	7.7918	0.2133431	-0.2283425
	09/08/2022	8.0201	7.7918	0.2283425	0
10/08/2022	10/08/2022	8.0301	7.7918	0.2383428	0.2383428
	16/08/2022	8.0791	7.7918	0.2873425	0.5256853
	17/08/2022	8.0991	7.7918	0.307343	0.8330283
	18/08/2022	8.0991	7.7918	0.307343	1.140371
	19/08/2022	8.1491	7.7918	0.3573432	1.497715
	22/08/2022	8.1941	7.7918	0.4023433	1.900058
	23/08/2022	8.1951	7.7918	0.4033427	2.303401
	24/08/2022	8.2251	7.7918	0.4333425	2.736743

FIGURES

Figure 1: GHS/USD Exchange Rate Trend

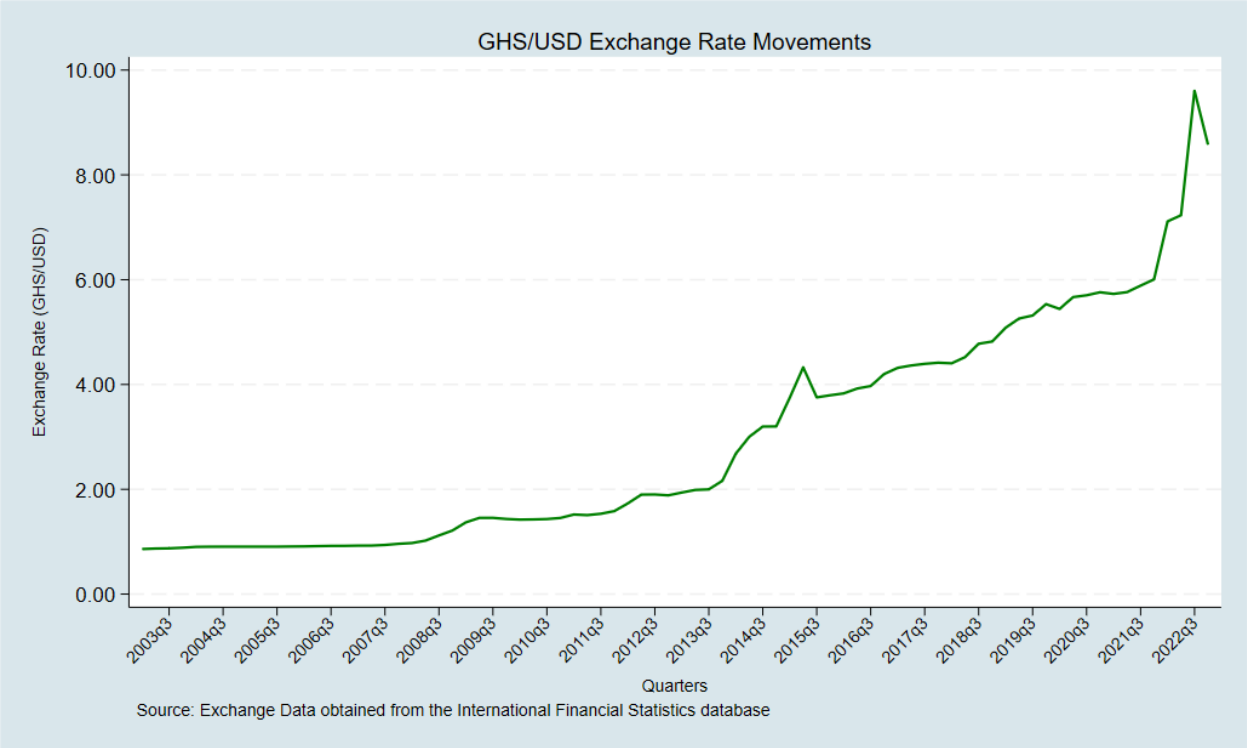


Figure 2: GHS/USD Exchange Rate and Credit Ratings Trend

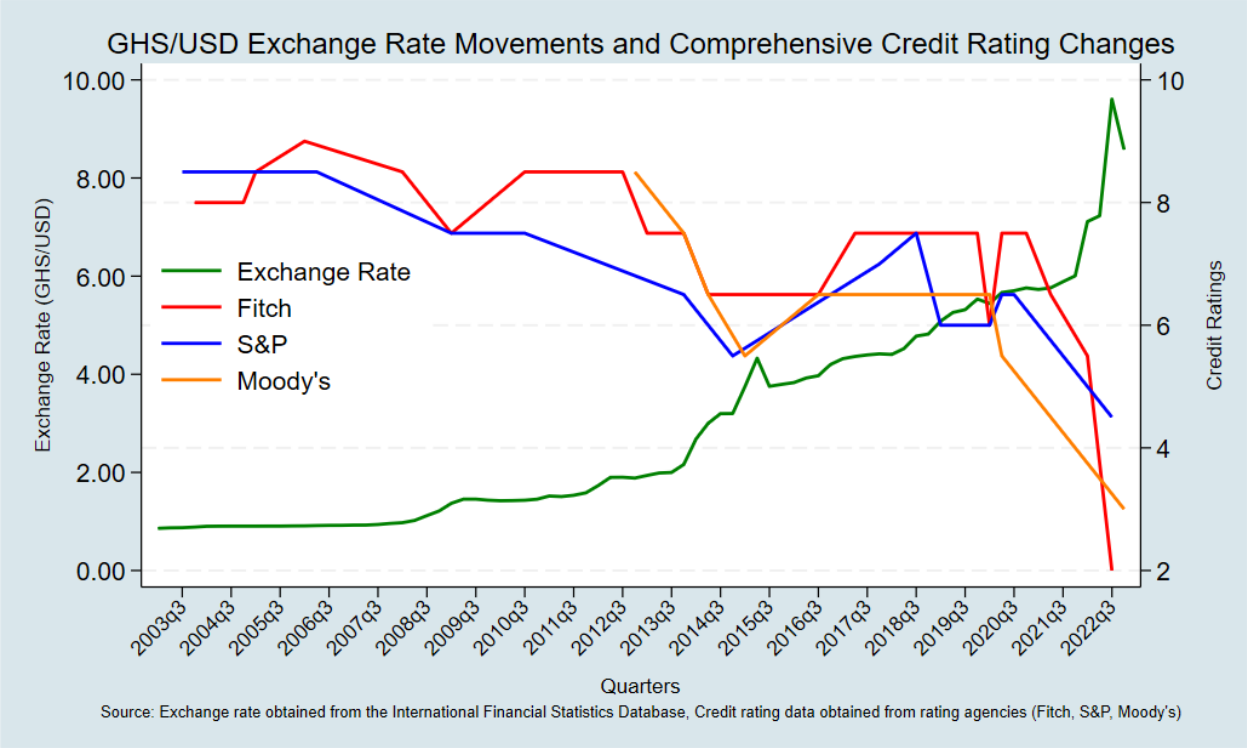
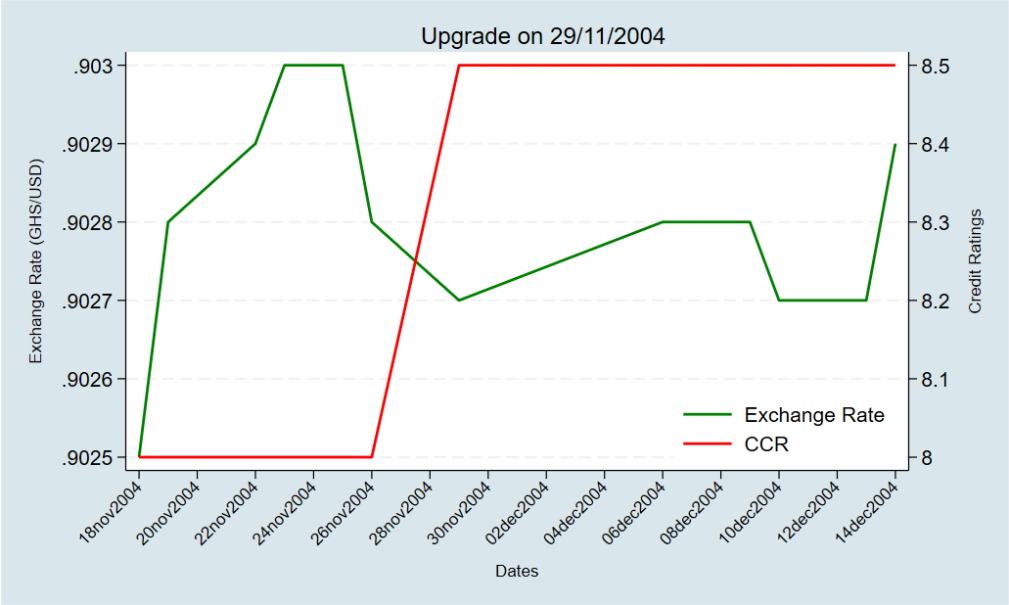
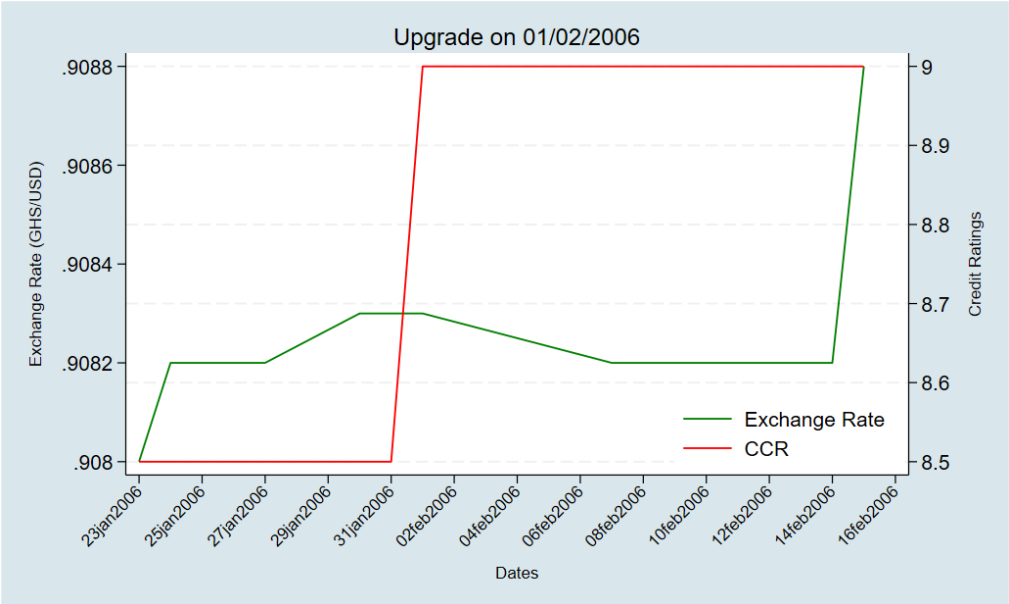
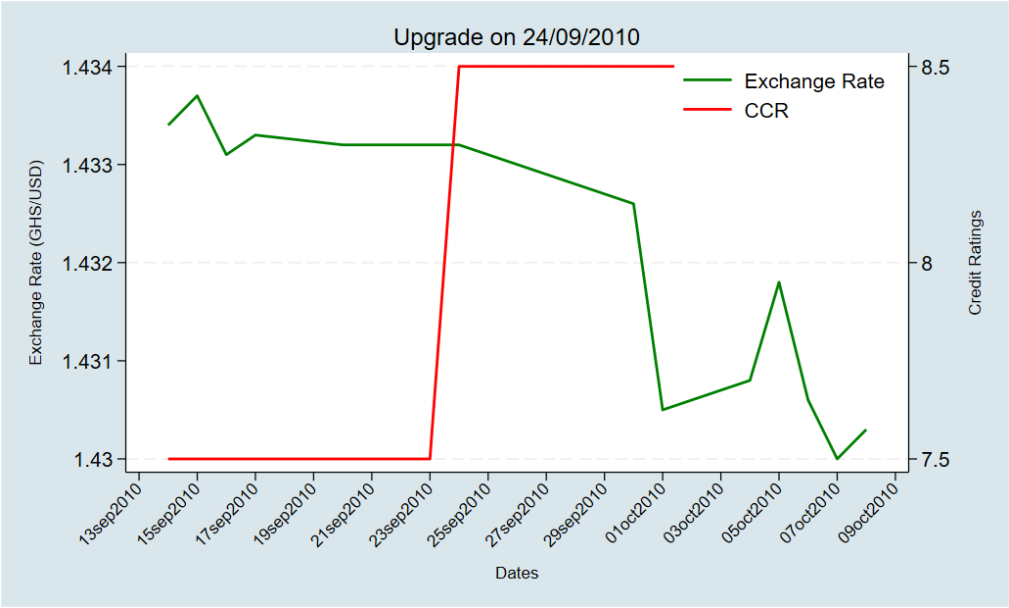


Figure 3: Upgrade Events by Fitch Ratings





Upgrade Events by Fitch Ratings



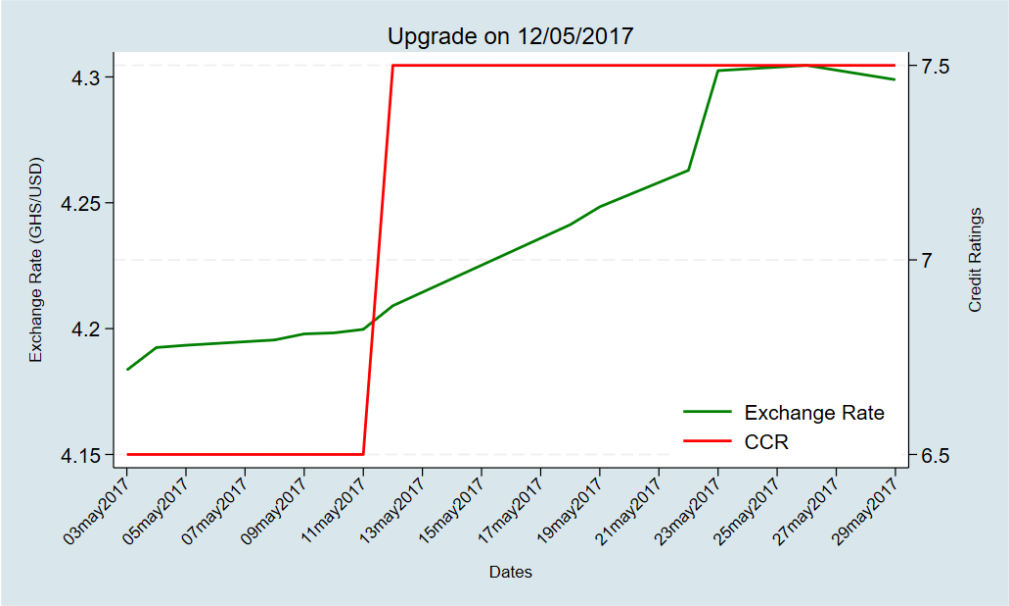
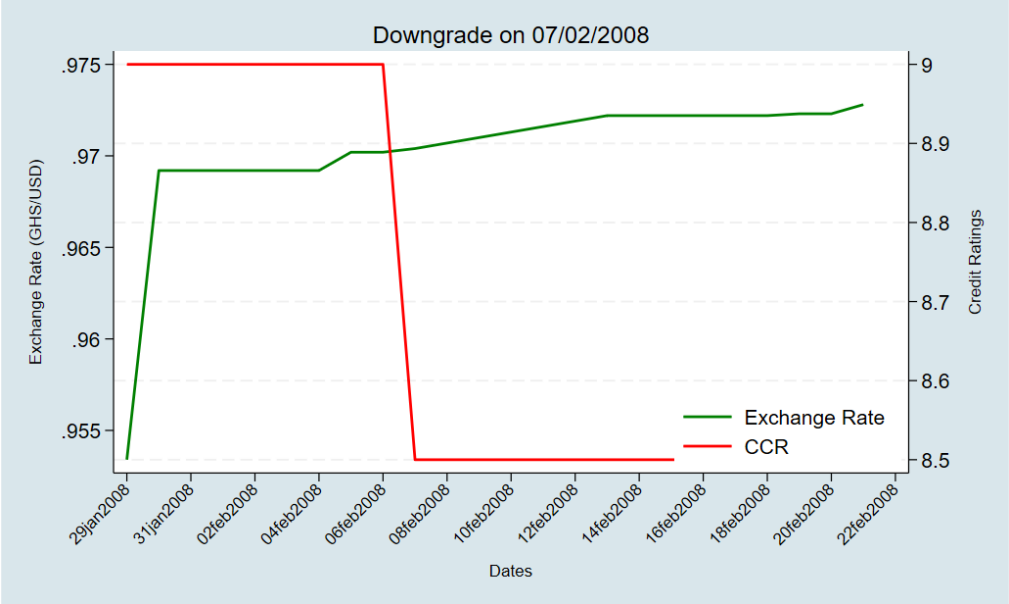
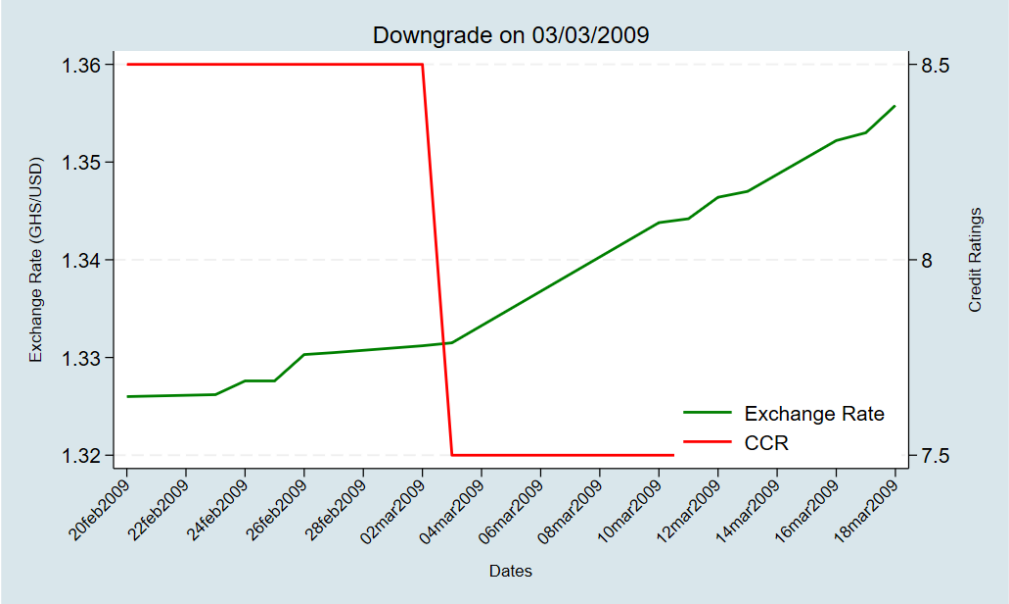
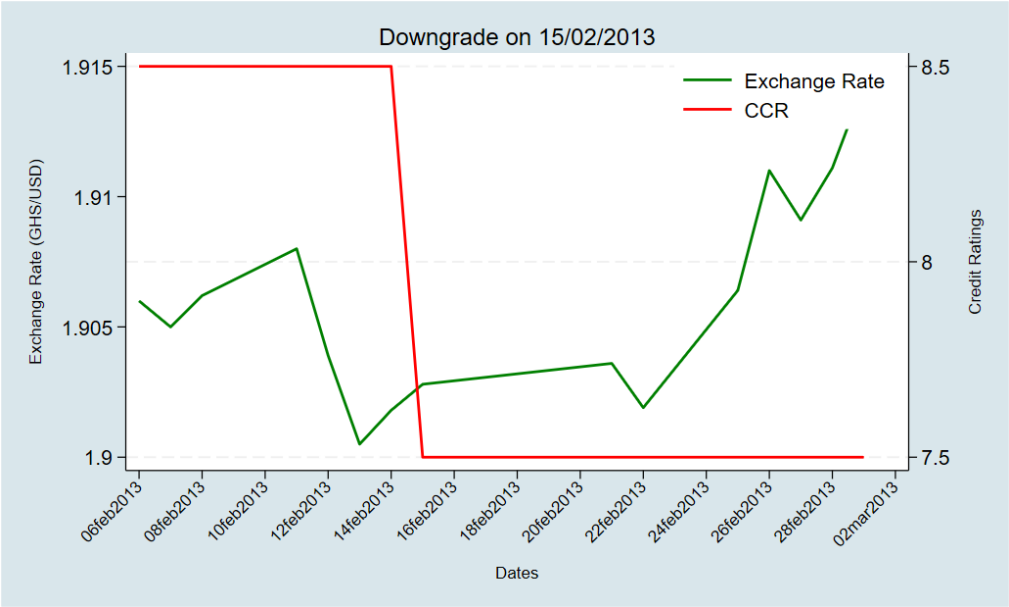


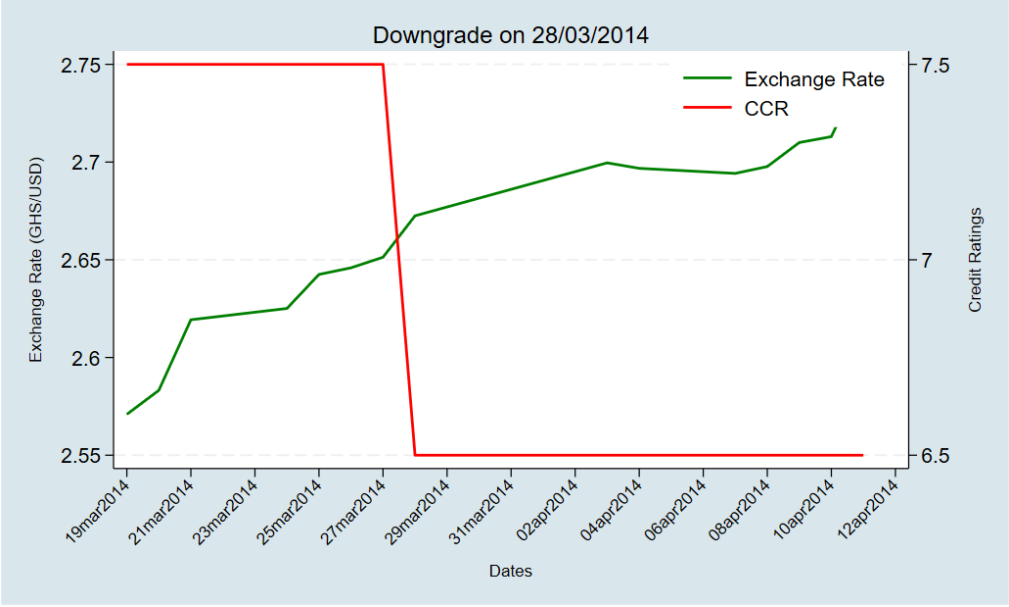
Figure 4: Downgrade Events by Fitch Ratings



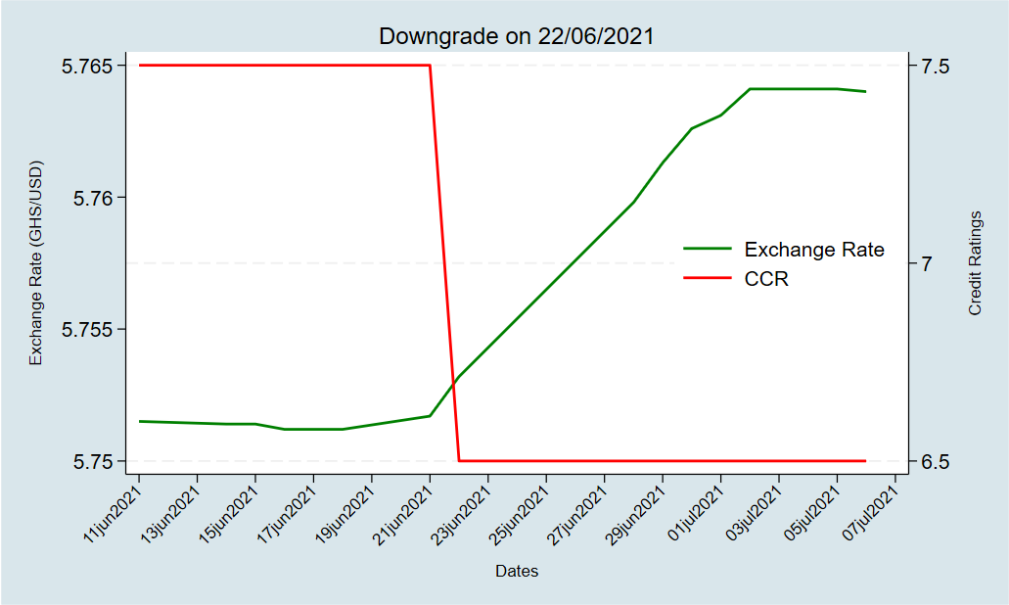


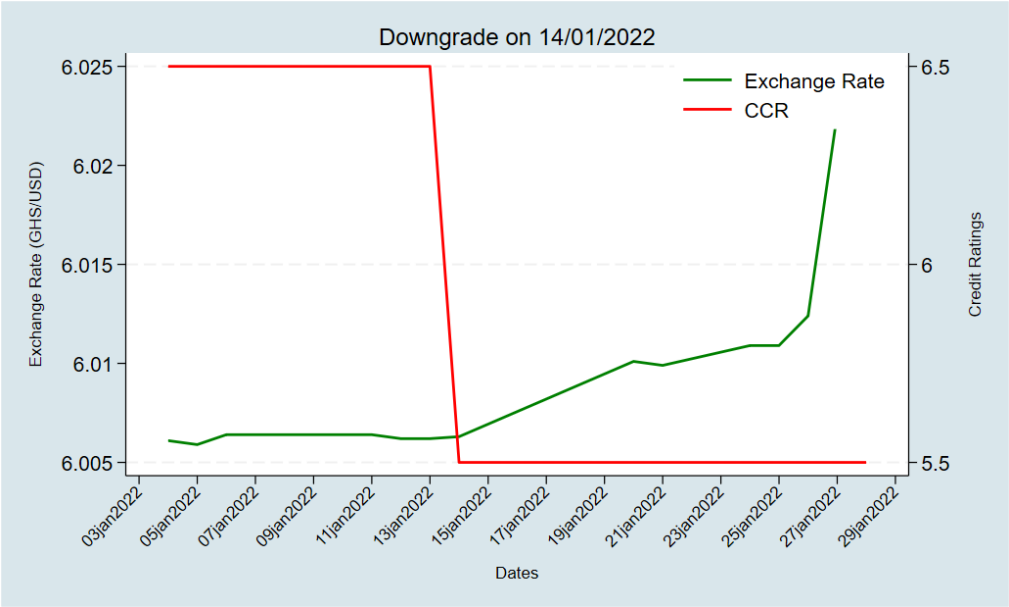
Downgrade Events by Fitch Ratings



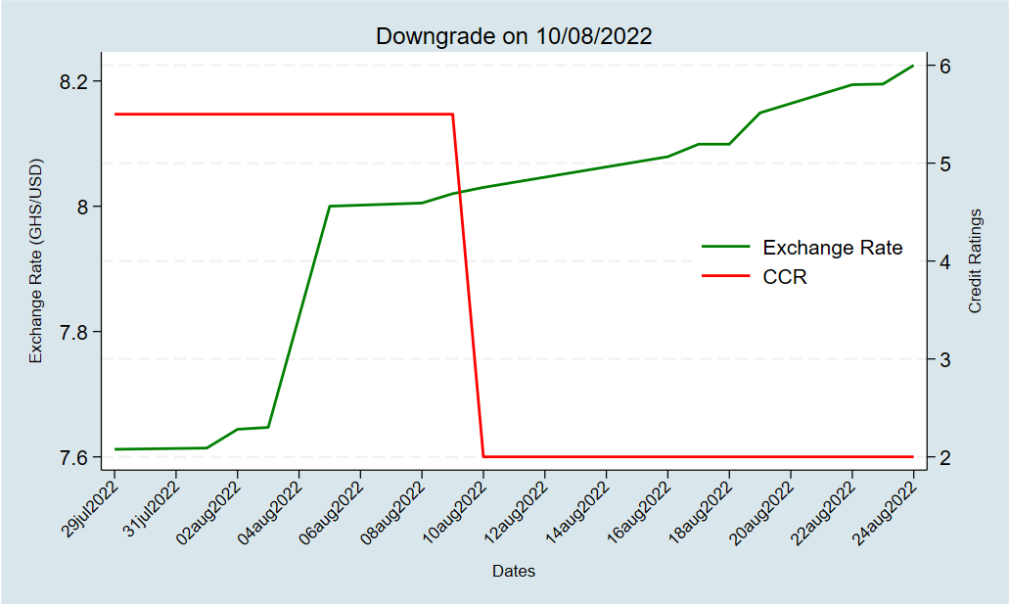


Downgrade Events by Fitch Ratings





Downgrade Events by Fitch Ratings



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