WORKING PAPER

EVOLUTION OF FOREX AUCTIONS IN GHANA

Prepared by **Gershon K. Agbledzorwu**

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ABSTRACT

This study examined the objectives, governance, performance, and challenges of each forex auction implemented by the Bank of Ghana since independence. The analysis shows that the first forex auction in Ghana began in September 1986 and was designed to address the widespread gap between the parallel and the official exchange rates. It began on a retail basis and was later modified into a wholesale auction in March 1990. The second auction episode commenced in November 2016. It was intended to support market development, price formation, and also to provide a transparent mechanism to intermediate FX proceeds from Cocoa Syndicated Loans to the market. A key feature of all seven auctions under this episode was a sharp depreciation of the exchange rate on the day of the auction due to high unmet demand. The third auction episode, which started in October 2019, was a retail forward auction, settled on a spot basis but forex delivered on the maturity day. It was intended to improve price discovery, deepen the FX market, and reduce uncertainty about the future availability of FX to meet the needs of banks' clients. It was suspended in October 2022 in favour of the Bulk Oil Distributors (BDC) auction to prioritise critical imports such as oil to keep the economy on a sound footing. The study recommends that future attempts at these auctions should consider setting auction targets to appropriately reflect market demand conditions. Also, the guidelines that govern the auctions should not impose price limits to help achieve proper price discovery.

JEL Classification: *G1, N2, F31, G14*

Keywords: *Spot Auction, Forward Auction, Retail Auction, Wholesale Auction, Dutch Auction, Marginal Pricing Auction.*

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1.0 Introduction

Ghana has become increasingly integrated into the global economy through trade and financial channels. Consequently, global shocks are often transmitted rapidly to the domestic economy mainly through disorderly exchange rate movements. Against this backdrop, the Bank of Ghana (BoG) occasionally intervenes in the market to smooth extreme volatility using the auction as one of its tools.

Auction systems are critical elements within the central bank's policy toolbox. Their performance is therefore of interest not just to central banks, but also to the business community, investors, government agencies, and the general public. According to the IMF's 2016 Annual Report on Exchange Arrangements and Exchange Rate Restrictions (AREAER), there were 38 countries practising forex auctions out of its 189 member countries. Out of the 38 countries, 30 central banks used forex auctions as the only means of intervening in the forex market.

Countries such as Mexico, Turkey, Colombia, Russia, Nigeria, and Sierra Leone used forex auctions to minimise exchange rate volatility, enhance price discovery, and help preserve liquidity in the forex market. Forward auctions were also common, with countries such as Brazil, Mexico, Turkey, and Indonesia implementing the Non-Deliverable Forward (NDF), often referred to as Forward Foreign Exchange Auctions in Domestic Currency.

In Ghana, the auction system was first introduced in 1986 and has since evolved to serve different objectives. However, aside from the works of Quirk et al. (1987), Dordunoo (1994), Kapur et al. (1991), and Younger (1993), which focused mainly on the first auction experience in Ghana, very little is known about the effectiveness of the second and third forex auctions implemented in Ghana.

Specifically, there is no formal analysis of the second and third auction systems in terms of their conditions precedent, objectives, governance, performance, and challenges. This study, therefore, seeks to fill that gap in the literature. The paper provides a detailed account of the three FX auction episodes since independence to the year 2022, when the Bulk Oil Distributors (BDC) auction was introduced. Well-implemented auctions can reduce exchange rate volatility, aid in price discovery, and improve liquidity in the forex market.

The remainder of the paper is structured as follows: Section 2 reviews the relevant literature. Section 3 examines the first episode, highlighting its structure, objectives, and performance. Sections 4 and 5 cover the second and third episodes, respectively, while Section 6 concludes the paper.

2.0 Related Literature Review

There are different methods of FX market intervention available to central banks: these include transacting directly using the telephone, forex brokers, electronic trading platforms, and conducting auctions (Archer, 2005). These interventions vary across several dimensions and can either be rule-based or discretionary (Krugman, 1991).

Transacting directly using the telephone involves calling a counterparty to request a bid and offer price, following which the transaction is carried out at the quoted price. Some central banks intervene covertly using brokers, a third party. This type of intervention differs from transacting directly with a market-maker because a deal is made before the market-maker knows that the other party is the central bank.

Interventions using an electronic trading platform usually involve a combination of telephone price-making and trading systems or applications by market-makers (e.g., Refinitiv/Reuters and Bloomberg platforms). The market-makers quote two-way prices to the system without knowing the identity of the potential counterparty that might hit the price. The trading platform is configured to provide information to the central bank on the current flow of outstanding orders, also known as the Order Book (Disyatat & Galati, 2005).

Forex auctions are another key method of intervention by central banks. Conducting such an auction involves accepting bids from multiple counterparties, usually for a predetermined target amount and allowing the price to be market-determined. The prices or the exchange rates are normally determined using two main methodologies: the Dutch Auction System (DAS) and the Marginal Price Auction System (MPAS). The DAS allocates foreign exchange to bidders at each bidder's own bid rate, starting from the highest bid rate. This continues until all the foreign exchange supplied is exhausted and the market clears. Thus, under DAS, successful bidders pay their own bid prices (Dordunoo, 1994).

In the MPAS, successful bidders pay a single exchange rate called the marginal price. This is usually the lowest bid price at which the available foreign exchange is exhausted. Bidders who have offered rates higher than this rate receive all the foreign exchange they bid for at this marginal price. This is sometimes referred to as the uniform allotment rate. Those whose bid prices are equal to the marginal price receive only part of what they bid for based on a sharing formula and, in some cases, on a pro rata basis (Quirk et al., 1987).

The auction approach perfectly suits a strategy in which the central bank wants to maintain transparency, promote price discovery, and assure neutrality among counterparties. Since independence, Ghana has implemented many episodes of forex auctions with different experiences. However, only the first auction has received some appreciable interest in the literature. For instance, Younger (1993) touched on the history of exchange rate management in Ghana, highlighting the balance-of-payments challenges stemming from trade shocks and expansionary aggregate-demand policies. Quirk et al. (1987) catalogued the auction and interbank market experiences of developing countries in their quest to achieve exchange rate flexibility. The authors showed that export proceeds from specified goods and services were surrendered to central banks in Ghana, Bolivia, Guinea, Jamaica, Uganda, and Zambia at the prevailing exchange rate, which were then auctioned at a weekly auction. The central banks decide the total amount to auction (auction target) and the cut-off price at the auction.

Dordunoo (1994) discussed foreign exchange policies in Ghana before the adoption of the Economic Recovery Program (ERP) in 1983, multiple exchange rate regimes practised between 1983 and 1986, a dual exchange rate system in a retail auction market using the Dutch Auction System (DAS), the merger of the auction and the bureau markets, as well as how the wholesale and the interbank system began in Ghana. The paper concluded that foreign exchange reforms in Ghana require strong institutional support, sound monetary and fiscal policies, as well as trade regimes.

Kapur et al. (1991) touched on various phases of exchange rate policies practised between 1983 and 1991, the outcomes of those reforms, and the lessons from their implementation. The reforms included a series of devaluations and revaluations of the Ghana Cedi, the introduction of the forex auction system in September 1986, the legalisation of the parallel market in April 1988, and the unification of the forex exchange markets in April 1990.

The review so far shows that the first episode has received some appreciable interest in the literature. However, little is known about the wholesale spot auction implemented in 2016 and the retail forward auction implemented in October 2019. This study, therefore, seeks to discuss each of the three episodes of the FX auction in Ghana, highlighting their objectives, governance, performance, and challenges.

2.1 Exchange Rate Policies Before the First Forex Auction

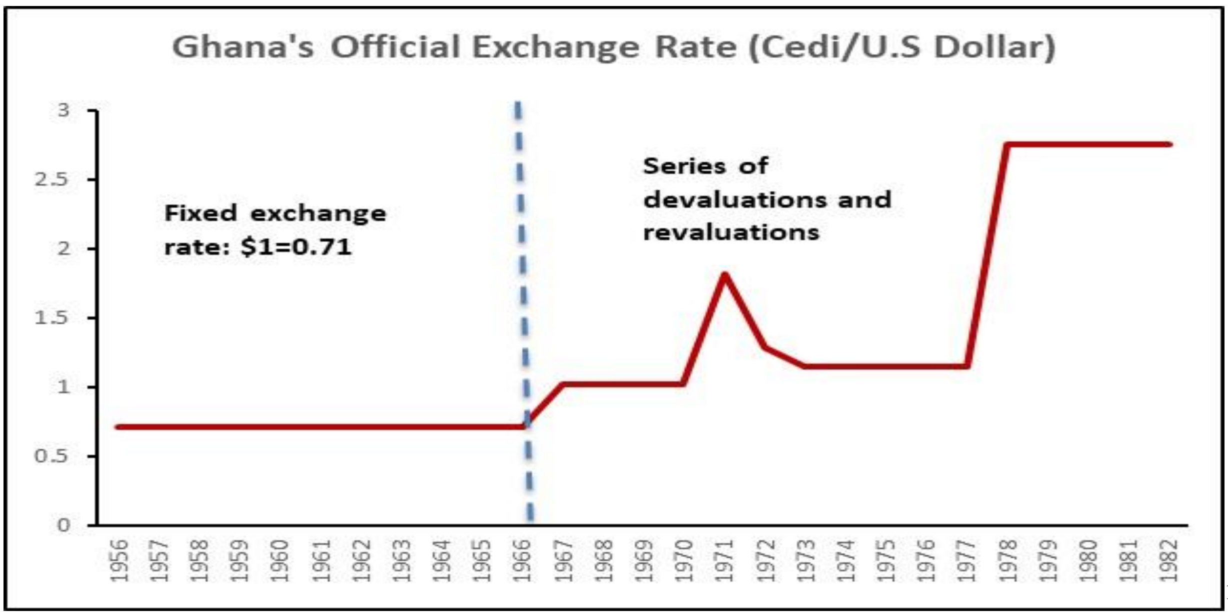
Before independence, there was no separate or unique exchange rate policy or regime for the Gold Coast, now Ghana. The exchange rate policy was formulated by the Colonial Office and implemented throughout British West Africa. In this arrangement, the West African Currency Board (WACB) was responsible for the issuance of currency, and the British West African Pound, Shilling, and Pence constituted the currencies issued. These currencies were in circulation in Ghana until July 1958 (BoG, 2022).

After Independence, the BoG issued its own first currency comprising the Ghana Pound, Shilling, and Pence on July 14, 1958. The Bank of Ghana, therefore, formally took over from the WACB as the official issuer of its own currency. On July 19, 1965, Ghana decided to leave the British

Colonial monetary system and adopt the widely accepted decimal system. Cedi and pesewa coins were introduced to replace the Ghana Pound, Shilling, and Pence. This was the second issue by the Bank of Ghana and marked the birth of the Cedi, which was pegged at ₵2.4 per British Pound or ₵0.71 per dollar.

The overthrow of the first president of Ghana in 1966 led to the devaluation of the exchange rate from ₵0.71 per dollar to ₵1.02 per dollar. It was again devalued in 1971 to ₵ 1.82 per dollar. This partly led to the overthrow of the government of the Second Republic in 1972. Thereafter, the exchange rate was revalued and pegged at ₵1.15 per dollar for six years until another devaluation to ₵2.75 per dollar in 1978, which lasted until 1982 (Dordunoo, 1994). Figure 1 captures these developments.

Figure 1. Exchange Rates from 1956-1982: Predominantly Fixed.



[1]

Source: Author's compilation.

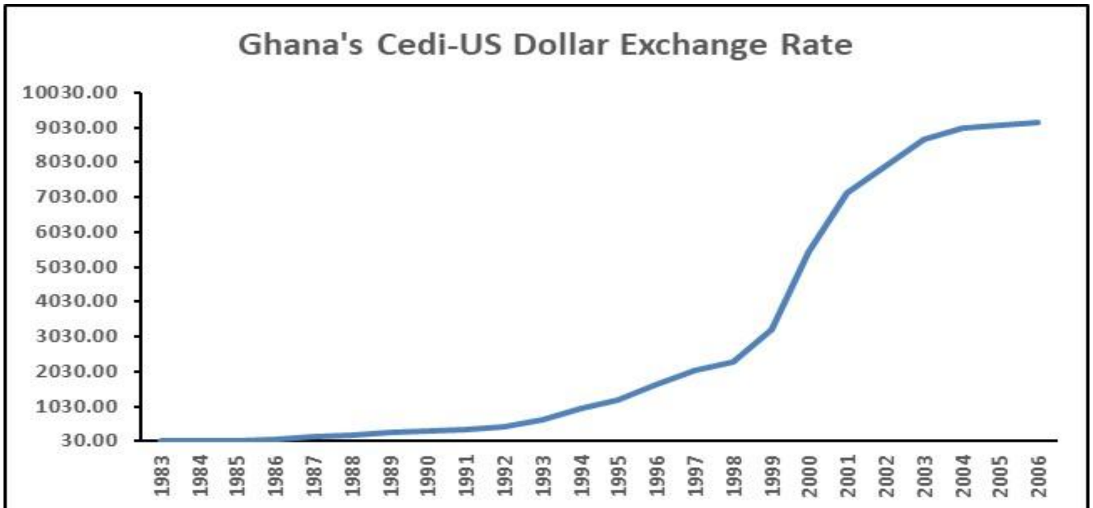
The period April 1983 to January 1986 marked the inception of a multiple-exchange regime (i.e. ₵23.38/$ 1.00 and ₵30.00/$ 1.00) that was applied to specified receipts and payments. For the period 1983-84, a real exchange rate rule, within the framework of purchasing power parity, was adopted. This rule required a quarterly adjustment of the exchange rates based on inflation differentials between Ghana and its major trading partners. The quarterly adjustment mechanism

[1] For a full appreciation of the chronology of the exchange rate regimes by Ghana since 1956 to the period of adoption of a floating exchange rate regime in 1991, see Appendix 1.

was replaced in December 1984 by exchange rate devaluations because the real exchange rate was still considered overvalued.

The last discrete exchange rate adjustment, before the establishment of an auction system, brought the exchange rate to ₵90.00/$ 1.00 at the end of September 1986. These developments are captured in Figure 2. In what follows, we discuss the evolution of the Forex auctions in Ghana with particular focus on their objectives, governance, performance, and challenges.

Figure 2. Exchange Rates from 1983-2006:



Source: Author's compilation, 2024. The exchange rates are not re-denominated.

3.0 The First Forex Auction Episode: Retail Auction

3.1 Rationale for the First Auction

The Ghanaian forex market before the first auction was characterised by a high, overvalued official exchange rate, a booming parallel foreign exchange market, and an allocation of forex based on import licensing arrangements by an Import Programming and Monitoring Committee (IPMC) (Younger, 1993). The IPMC created a significant divergence between the official and the parallel market exchange rates. For example, the rate of divergence, which was about 8% in 1967, increased sharply to 4,264% by the end of 1982 (Dordunoo, 1994).

The authorities at the time were cautious in addressing this wide gap through rapid exchange rate adjustments due to political instability associated with such moves. However, in April 1983, a staggered devaluation of the Cedi from ₵2.75/$1.00 to ₵90.00/$1.00 was implemented by the third quarter of 1986. In addition, import control measures were introduced involving two different import licenses: The Specific Import License (SPIL) and the Special Import License (SIL). SPIL allowed the use of foreign exchange from the banking system, while the SIL required importers to use their own foreign exchange resources (IMF, 1990).

Despite the above policy measures, overvaluation of the Cedi, a high divergence between the parallel and official exchange rates, and a deteriorating balance of payments position remained. To address the above challenges, the auction market was introduced in September 1986 with the primary objective of narrowing the spread between the parallel and official exchange rates.

3.2 First Auction Overview

The first forex auction took place under a dual exchange rate system in September 1986. There were two exchange rate windows. The Window 1 exchange rate was fixed at ₵90.00 per dollar, while the Window 2 exchange rate was determined by demand and supply in a weekly auction conducted by BoG. Window 1 was used for transactions such as debt service payments on official debt, imports of crude oil, processed petroleum products, essential drugs, and inputs for Ghana Italian Petroleum (GHAIP). Consequently, the surrender of exchange earnings to BoG was implemented at two different rates; earnings from exports of cocoa and residual oil products were surrendered at the Window 1 exchange rate, whilst all other transactions were conducted through Window 2, using the marginal rate determined at the latest forex auction.

It was a retail auction in that the auctioned forex was targeted only to final users every week. The commercial banks only aggregated the bids from their clients and submitted them to the BoG. Also, the banks authorised the BoG to debit their current accounts. Eligibility for the auction was restricted to holders of a valid import license and persons or institutions who received the approval of the exchange control authorities to undertake service payments or make an outward transfer. However, other traders could import goods using their own foreign exchange if such imports were allowed under the existing specific import license regulations. The target amount to be auctioned was decided by the BoG after foreign exchange allocation to the government and certain other public institutions.

The first weekly auction happened on September 10, 1986, and was based on a marginal pricing auction system (MPAS) where all the successful bidders paid the marginal price. However, the Dutch auction system (DAS) was adopted for the subsequent auctions, where successful bidders paid their bid or quoted prices, and those whose bid prices were equal to the market-clearing (marginal) rate received a pro-rated amount of the remaining foreign exchange.

3.3 First Auction Process and Governance

The first auction process began with the submission of bids to BoG in sealed envelopes on Thursday every week. A standard bid form is completed by the bidders, accompanied by appropriate supporting documents, such as an import license, letters of credit, pro forma invoice, etc. Bidders were required to state the currency, the amount, a minimum of $500.00, and the bid price. The bids could be in any currency of choice. Auctions were conducted every Friday and in US dollars. If a bidder's currency is different from the US dollar, the amount is determined using the most recent cross rates between the US dollar and the other currencies in the international currency markets. It was compulsory to submit an authorisation from a client's commercial bank that allowed BoG to debit the bank's account with the corresponding cedi equivalent of a successful bid.

The auction was supervised by a foreign exchange auction committee comprising representatives from BoG and several Ministries. The main tasks of the committee included verification of bids against the eligibility criteria and the determination of the marginal exchange rate. The allocation begins with the demand or the bids with the highest price until the marginal price is reached. There were cases where the total demand at the marginal rate exceeded the residual supply of the target amount. In such instances, the bidders whose bid prices were equal to the marginal rate received a pro-rated amount of the remaining supply of the foreign exchange. The marginal exchange rate declared at a week's auction served as the benchmark, the transaction rate, or the reference rate for all other transactions undertaken outside the auction window, such as all foreign exchange bought by BoG and foreign exchange support to the commercial banks until a new marginal rate is announced the following week.

3.4 Assessment and Modifications to the First Auction

The implementation of the first auction led to several challenges, including forex supply shortfalls relative to the demand, high exchange rate volatility, wide disparity between the highest and the lowest bid prices, and the divergence between the auction and the parallel market exchange rates. Against this backdrop, several modifications were proposed and implemented as follows:

- The unification of the two windows that co-existed within a dual exchange rate system from September 1986 to February 1987. This resulted in the use of the marginal rate determined in the weekly retail auction to settle all transactions through the banking system.
- The expansion of the auction coverage by the BoG. This was done by widening access to include restricted categories of imports subject to the SIL scheme.
- Abolishing the import licensing system along with the IPMC in January 1989. All importers could import the goods of their choice and were only expected to file an import declaration form at their commercial banks.
- The acceptance of invisible payments in the form of services and transfer payments approved by the exchange control authorities became eligible for funding at the auction from March 1987. In addition, requests for business travel up to a maximum of $3,000 per trip were allowed, as well as transfers of profits and dividends from February 1989. However, repatriation of profits by companies financed with locally raised capital was not permitted.

- The foreign exchange retention threshold of the Ghana Cocoa Board was reduced from 5 percent to 2 percent in March 1987. Within sixty (60) days of shipment, all foreign exchange retention entitlements were to be credited to the exporters' foreign exchange accounts with domestic banks from April 1989. Also, all cocoa exports under bilateral payment agreements to regions outside convertible foreign exchange receipts were reduced to less than 5 percent of Ghana's total cocoa exports (about 10,000 tons).
- Establishment of Forex Bureaux in April 1988 enabled the authorities to capture foreign exchange market dynamics.
- Introduction of Wholesale Auction as a Replacement to the Retail Auction: After operating the modified retail auction alongside the bureau system for some time, the auction system was still not effective in capturing the forces of demand and supply of foreign exchange. The continued existence of the divergence between the marginal rate and the bureau rates led to the introduction of the wholesale auction system in March 1990. Thus, the authorised dealer banks and the eligible foreign exchange bureaus were allowed to purchase foreign exchange from BoG for sale to their end-user customers (at a margin determined by each authorised dealer) and to meet their own foreign exchange needs.
  The wholesale auction begins with the submission of bids by customers to authorised dealer banks and an eligible bureau. The customers state the bid rate, the amount to purchase, and the required currency. Each bureau aggregates the submitted bids by its customers, and the consolidated bid position is submitted to the auction through authorised dealer banks. The DAS was applied, where the successful bidders pay for their forex allocation at their respective bid rates.

- The Bank of Ghana reduced its dominance in the FX market by ceding export proceeds (except those from COCOBOD and the gold mining firms) to the authorised dealer banks in June 1991. These surrendered flows were purchased at the marginal auction rate (official exchange rate). In March 1992, the BoG terminated the auction system entirely, leaving the allocation of foreign exchange to the interbank market (Younger, 1993). This provided the opportunity for exporters and other foreign exchange holders to negotiate the exchange rate with the commercial banks in the absence of the marginal auction rate. The BoG also participated in the interbank market to purchase forex from surplus units as well as provide balance of payments support to banks with unmet demand.

4.0 The Second Forex Auction Episode

The Bank of Ghana discontinued the first auction system entirely in March 1992, allowing the allocation of foreign exchange through the interbank market. However, the BoG continued to provide balance of payments support on a bilateral basis to various sectors of the economy, including the government’s external obligations.

4.1 Rationale for the Second Forex Auction

The second forex auction was borne out of a recommendation from the IMF Technical Assistance Mission in 2015. The mission highlighted concerns about BoG's foreign exchange intervention strategy, direction of policy, and the depth of market liquidity. Several reforms were to be undertaken by the BoG in the area of monetary and foreign exchange operations. For example, the BoG was to eliminate compulsory surrender requirements of foreign exchange by key sectors of the economy by mid-2016 (IMF, 2015). The main argument for this reform was that the requirement to surrender cocoa and gold proceeds to the BoG results in liquidity constraints or tightness in the interbank segment of the FX market, leading to reduced intermediation.

A team from the Fund recommended that the BoG should cede the mandatory surrender requirements of key export proceeds to the commercial banks and communicate the rationale of the measure to the market. Gold and residual cocoa proceeds were to be moved by December 2015, and lump-sum cocoa export proceeds were to be intermediated through FX Auctions by September 2016. In terms of strengthening the BoG FX operational framework, BoG was expected to implement a rule-based competitive FX auction for intermediating flows to the market from January 2016 and use discretionary interventions only for extreme market conditions from October 31, 2015. BoG moved the gold proceeds to the commercial banks by notice number BG/GOV/SEC/2016/02: With effect from July 1, 2016, the portion of foreign exchange receipts from the export of minerals and cocoa (other than the proceeds of the cocoa syndicated loan) that was subject to surrender would no longer have to be surrendered to the Bank of Ghana. Exporters would be required from the above-mentioned date to sell the surrender portion of their export receipts directly to the (commercial) banks.

4.2 The Second Forex Auction Process and Governance

Preparations for the maiden auction began with the formation of a technical committee to design the governance structure for managing the auction process. The committee first developed auction market conventions and documentation to manage the process. The guidelines and regulations (i.e., "Bank of Ghana regulation for allocation of foreign exchange through competitive multiple price FX auctions" (BG/RG/FXAUC/2016/11/01)) were produced to govern the FX auction process and published two weeks before the auction was conducted on the 14th of November 2016. The auction was to be conducted on a spot basis. Participation was open to all authorised FX dealer banks. The guideline focused on key areas such as publication of foreign exchange auction calendar; eligibility; eligible currency and quotation convention; auction schedule and frequency; bidding

process; allocation methodology; auction committee; communication of auction results to the market; confirmation and settlement of trade, and other provisions[2].
The process begins when authorised dealer banks submit their bids via a secure BoG page on the Reuters Terminal or through a designated email address in the approved format provided by the BoG. Each bank was permitted to submit a maximum of three (3) bids in the auction, quoting their desired amount and a freely determined exchange rate, as per the quotation convention. The minimum bid size was $500,000 and in multiples of $250,000. The maximum bid size of a single bid cannot exceed ten per cent of the announced auction target. The cumulative volume of all bids from any single bank was also expected not to exceed twenty per cent of the announced target for the auction. Bids with incomplete or missing information or submitted after the deadline were not accepted. In terms of allocative methodology, the auction cut-off rate cleared the target volume offered in an auction, and bids were accepted on a best-price principle.

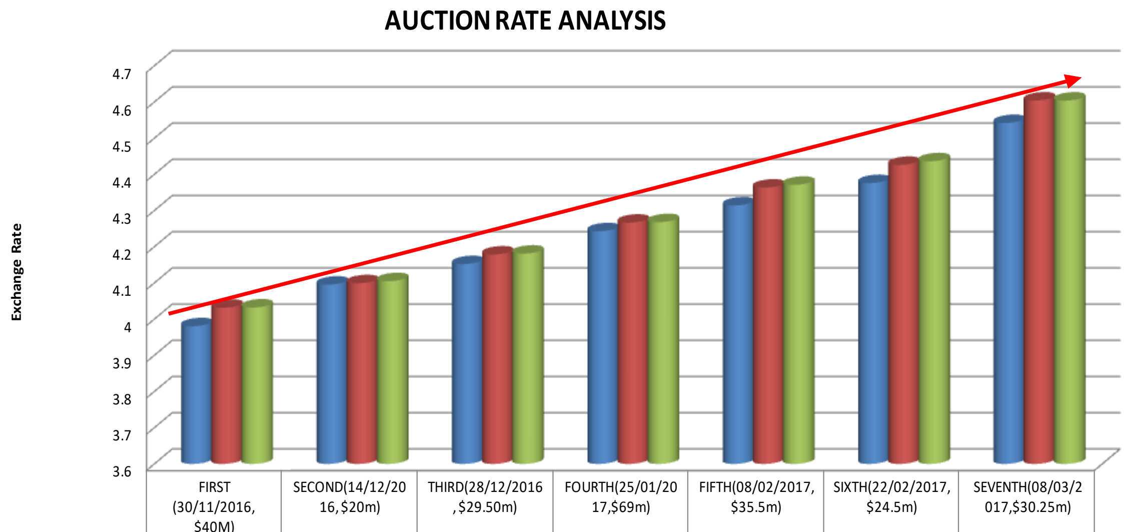
The maiden auction under the second episode was conducted on November 30, 2016, with an announced target of $40 million. It was a wholesale auction in that the banks were permitted to sell FX purchased from clients and to cover net open positions that were created from sales to clients and interbank. It was expected to be rule-based and market-neutral.

4.3 Second Auction Performance and Assessment

- In all, seven (7) FX auctions were conducted between November 14, 2016, and March 2017.
- A total amount of $248.75 million was sold to the participating banks against a total auction target of $180.50 million; an excess of $68.75 million over the announced target.
- Total FX demand, indicated by the number of bids submitted by participating banks, amounted to $694.50 million, representing an unmet demand of $445.75 million. (See Figures 3 and 4 for details).

[2] Refer to (BG/RG/FXAUC/2016/11/01) for details.

Figure 3. Exchange rate Movements as well as Auction Details.



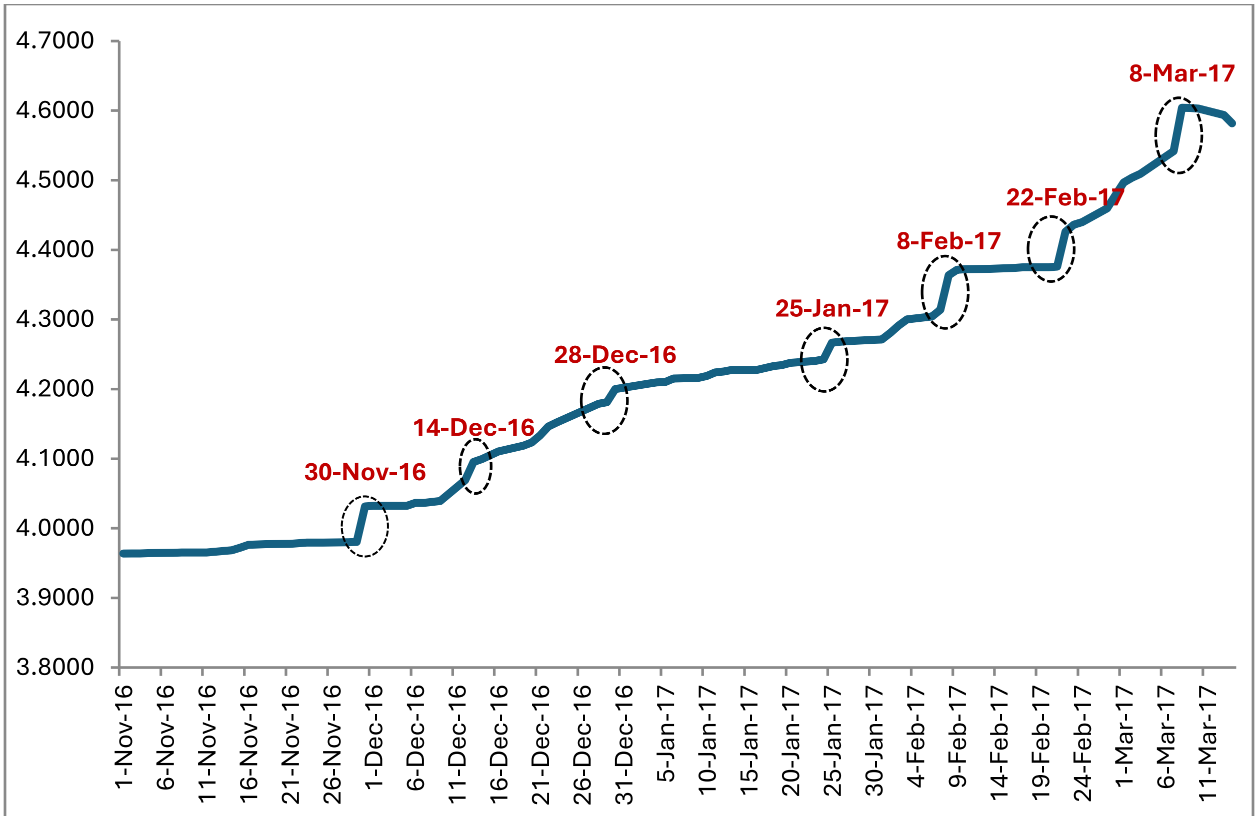
	FIRST (30/11/2016, $40M)	SECOND(14/12/2016,$20m)	THIRD(28/12/2016,$29.50m)	FOURTH(25/01/2017,$69m)	FIFTH(08/02/2017, $35.5m)	SIXTH(22/02/2017, $24.5m)	SEVENTH(08/03/2017,$30.25m)
DAY BEFORE	3.9805	4.0954	4.1521	4.2430	4.3142	4.3760	4.5420
DAY OF	4.0316	4.0994	4.1787	4.2667	4.3635	4.4263	4.6042
DAY AFTER	4.0322	4.1049	4.1811	4.2681	4.3712	4.4363	4.6039

Source: Author's compilation, 2024

The auctions were conducted in a consistent, rule-based manner. Allocation was done according to the best price approach (starting from the highest bidder) as recommended by the auction guideline. There were, however, two occasions where the committee applied the cut-off rule due to outlier rates quoted.

Each of the seven auctions was accompanied by sharp exchange rate depreciations, contrary to expectations (see Figures 3 and 4). This was due to tight forex liquidity conditions in the market, evidenced by the high unmet demand on auction days. Submitted bids exceeded the announced auction targets, resulting in very high bid-cover ratios. Due to the high unmet demand, a greater part of the demand for forex by both the banks and enterprises was satisfied outside the auction window, resulting in higher exchange rates on the days of the auction.

Figure 4: Exchange Rate Movement During Auctions



Source: Author's compilation, 2024

The tight forex liquidity conditions are also reflected in the pricing behaviour of participants in the auction itself. There were "price wars" among competing banks. It was observed that "desperate" banks, mindful of the best price allocation methodology, simply priced using the previous auction's weighted average price plus a margin of up to 2%. Some of these desperate banks adopted this pricing behaviour by taking advantage of section 6d of the auction guideline, under allocation methodology, which permitted current pricing not to exceed 2% of the previous auction's weighted average price. "*The under-fulfilment of the auction is only if the bids are clearly out of the market or outside the ±2 per cent price range of the previous trading session or in case of weak demand; however, rule 6 (b) would still be adhered to.*" (see section 6d of auction guidelines).

The auction was deemed successful in terms of mechanics and processes. However, it led to a gradual depletion of foreign exchange reserves, accompanied by sharp depreciations, especially on auction days. In summary, high unmet demand, tight forex liquidity conditions, and the pricing behaviour of participating banks pointed to an exchange rate that was clearly overvalued and required further depreciation.

From the stated objectives, this auction was particularly targeted at gradually moving lumpy cocoa flows into the market. The syndicated cocoa loan is only available once a year and is received in tranches. Therefore, once the cocoa funds were exhausted, the continuation of the auction became challenging. Note that the residual cocoa and gold proceeds were already going directly to the market. There were no spot auctions beyond the 7th auction conducted on March 8, 2017. The Bank of Ghana continued to use the bilateral approach for balance of payments (BOP) support and other interventions.

5.0 The Third Forex Auction Episode

5.1 Rationale for the Third Forex Auction

Before the introduction of the third forex auction in 2019, the BoG intervened in the forex market through bilateral support. The interventions were conducted based on market intelligence, analysis of daily FX returns by banks, and the pipeline (unmet) demand from the banks. The BoG also intervened by paying the government's external obligations, such as debt servicing and amortisation. This is sometimes called internal account conversion because the government is the main customer of the Bank of Ghana. Literally, a conversion of the government's cedi balance at the central bank into forex for external payments.

Using the bilateral approach, interventions are done mainly through spot transactions at the current market rate. The Bank of Ghana's capacity to intervene is dependent on its official reserve positions as well as its cash flow projections. The overall intervention budget is determined annually in line with its binding reserve targets and cash flows. It also considers seasonality and macroeconomic fundamentals. This annual budget is then broken down into a quarterly budget based on recent developments in the FX markets.

Despite these bilateral market supports, the exchange rate still faced persistent depreciation and volatility. Rising external obligations, rollover risks, especially from external portfolio investors, and continuous demand pressures for forex to support trade, coupled with other unfavourable external developments, continued to exert great pressure on the exchange rate. These pressures led to frontloading of FX demand due to uncertainty about the future availability of FX. It also resulted in multiple demand placements by forex seekers. Many corporations, especially energy-related ones, undertake continuous forex transactions by opening margin accounts at various banks, into which they regularly buy and stock forex to meet current and future payments. The above features of the FX market at the time perfectly fit a currency that was overvalued.

For multiple demand situations, it was observed that as soon as a demand is fully met at one bank, the rest of the demand in other banks vanishes. This is because the forex seekers don't have enough cedi cover for all the multiple demands placed. This condition is resolved by increasing the supply of forex at the short end of the market.

To help resolve the front-loading market behaviours, two questions became relevant: "What is the nature of the future demand that is being front-loaded?" and "What type of forward was suitable for the Ghanaian forex market?" These clients have payment obligations due on 7-day, 15-day, 30-day, 45-day, 60-day, and 75-day, etc., depending on their established letters of credit and other negotiated payment maturity arrangements.

The idea of guaranteeing certainty and shaping expectations about the availability of forex to meet obligations in the future gave birth to the forward forex auction strategy.

With regard to the appropriate type of forward to adopt, both the deliverable forward (DF) and the non-deliverable forward (NDF) were considered. They are both agreements and contracts that allow hedging against exchange rate risk, but they differ fundamentally in the way the contract is settled on maturity. Whilst in a DF, the underlying currencies are physically exchanged on maturity, an NDF does not involve the exchange of currencies. Rather, it involves local cash settlement based on rate differences. Thus, the difference between the agreed NDF rate and the prevailing spot rate at maturity will be settled in cash, in Ghana Cedis.

To curb front-loading of demand and ease pressure in the short end of the market, BoG opted for the DF due to the nature of our forex market and the potential impact of the domestic cash settlement on the reserve money of the central bank, which could be inflationary if not promptly sterilised.

This intervention strategy was a novelty and completely departed from the two previous auction attempts in Ghana, which were on a spot basis. It also makes the Bank of Ghana one of the few, if not the only, central banks intervening using a deliverable forward. According to Patel & Cavallino (2019), the few central banks that use forwards for attaining the objective of limiting exchange rate volatility used the NDF (see Table 1).

The DF strategy came with some immediate benefits, such as deferred cash flow impact. For example, a forward contract does not require immediate funding. It therefore defers the cash flow impact of the intervention relative to the cash flow that would be associated with a spot transaction. It also complements the Bank of Ghana's liquidity management efforts by mopping up the cedi upfront.

Table 1. Instruments and Objectives of Central Bank Interventions

Cross-product between instruments and objectives[1]

The number of central banks which follow a certain objective are indicated in brackets[2] Table 2

	Influence level of exchange rate **(3)**	Smooth trend path of exchange rate **(4)**	Limit exchange rate volatility **(10)**	Limit pressure caused by internationa l investors **(5)**	Provide liquidity to thin market **(12)**	Achieve reserve target **(2)**
Intervention in spot market	3	3	8	3	8	2
Derivatives[3]	1	3	5	2	8	1
Futures	0	1	2	0	2	0
Forwards	1	1	2	0	0	0
Swaps	0	1	2	2	4	0
Options	0	0	0	0	0	1
Other	0	0	2	0	4	0
Off-shore intervention (national currency/USD)	0	0	2	2	0	0

[1] Based on the responses of 16 central banks. [2] As most central banks indicated they have more than one instrument per objective, the sum of each column always exceeds the number of central banks that pursue the objective. [3] Central banks are considered to use derivatives if they use at least one derivative for the objective. The sum of derivative sub-categories can exceed the number of central banks which use derivatives, as central banks sometimes use multiple derivatives per objective

Source: Patel & Cavallino (2019)

5.2 Overview of the Third Forex Auction

The maiden auction conducted under this episode began on October 1, 2019, with an announced target of $25 million. These multiple-price forward FX auctions are aimed at improving price discovery, deepening the FX market, and reducing uncertainty about the future availability of FX to meet the needs of banks' clients. Consequently, it was expected to minimise front-loading of FX purchases by economic agents and ease pressure on the spot market.

It was a retail auction in that the foreign exchange from the auction is targeted at final users only. The commercial banks aggregated the bids for auction funds from their clients and then channelled these bids together with their supporting documents to the BoG. They also distribute or credit the forex obtained from the successful bids to their clients.

The Forward FX auction is limited to the purchase or sale of the United States Dollar (USD) against equivalent value in the local currency, Ghana Cedi, on a forward basis at various tenors, including but not limited to 7-day, 15-day, 30-day, 45-day, 60-day, and 75-day tenors. At the operational level, bids are received from the corporates/users through their respective banks in accordance with the forward forex auction guidelines. Cedi equivalents of successful bids are debited to the banks' operational accounts on the deal or trade date, while the dollar leg is settled at the agreed date (maturity date) in line with standard settlement rules. Effectively, the forward forex auction is uniquely implemented by taking the cash (cedi) upfront and giving the forex on maturity (a deliverable forward). The forward forex auction's implementation was also guided by an auction calendar, which is a form of forward guidance (an announcement of a future policy action).

5.2.1 The Third Forex Auction Process and Governance

On auction days, authorised dealers submit their bids in the requested format through a dedicated email, between 10:30 am and 11:30 am, to the Bank of Ghana. These are bids of their clients that are aggregated for the auctions. The bids are submitted for each of the six tenors and are accompanied by supporting documents such as customs documents, invoices, letters of credit, etc. Each bank is permitted to submit a maximum of three (3) bids per tenor in the auction, quoting their desired amount and at their freely determined exchange rate as per the quotation convention. The minimum bid size is $500,000.00 and in multiples of $250,000.00.

To ensure equity in the distribution of the auction funds, the maximum bid size of a single bid does not exceed ten per cent of the announced auction target, and the cumulative volume of all bids from any single bank does not exceed twenty per cent of the announced target for the auction. Bids with incomplete or missing information or submitted after the deadline are rejected. The bids are collated or aggregated at the close of the auction by the relevant staff who generate scenario reports using different market spot rates to determine successful bids for the consideration of the Auction Committee. The generated scenarios cover the use of different spot rates such as the Bloomberg BGN, Bloomberg REGN, BoG Reference rate, Interbank weighted average rate, and the average of all the above-mentioned rates. The rationale for this is that the forward rates in the submitted bids reflect a certain spot rate used by the banks in the forward calculator[3].

In terms of allocative methodology, the auction cut-off rate clears the target volume offered in an auction. However, successful bids are allocated from those selected based on a constructed decision corridor within each of the generated spot rate scenarios. This approach is a modified internal DAS. The decision corridor is a strategy of cutting off outlier bids submitted to the auction. The decision corridor consists of an upper bound of the calculated Bespoke[4] Forward rates for all tenors and a lower bound of the Effective Market Forward rates[5]. ***Therefore, the spot rate scenario that selects or picks a volume of bids equal to or close to the target amount is adopted for the allocation of the successful bids.*** Allocation is then done on a best price basis on the bids captured

3 Forward calculator is based on the concept of Covered Interest Parity (CIRP) which shows the relationship between interest rate, the spot and the forward currency rates of two countries. CIRP holds that the difference in interest rate should equal the forward and the spot exchange rates.

4 Bespoke forward rate is the forward with a discounted domestic interest rate. This is done as a compensation for the cedi amounts taken upfront because the forex is actually received on maturity.

5 Effective Market forward rate is the resultant forward rate when parties to the contract exchange currency at contract maturity after the cedi interest forgone (interest earned on the cedi amount if invested up to contract maturity) is deducted from the cedi amount to be taken upfront. Thus, Cedi notional principal at contract initiation divided by the dollar notional principal.

in the decision corridor. In addition, all those whose bid prices were equal to the marginal rate received a pro-rated amount of the remaining foreign exchange.

The Auction Committee meets between 11 am and 12 pm to consider and adopt the most suitable scenario and then seeks Management's approval. The Bank of Ghana publishes the auction results on its website, in print media, and the Reuters platform. The publication highlights the following: Ranges of bids tendered according to tenor, amount tendered per tenor, total amount of invalid bids, successful bid rates, total amount accepted, auction target amount, and the bid-cover ratio.

The FX dealers then prepare a report (blotter) indicating the names of successful banks, rates accepted per tenor, and amounts accepted per tenor. The successful banks are contacted using the Reuters/Refinitiv dealing system. Deal tickets are generated in duplicate and captured into the main banking application, T24, debiting the respective successful banks with the cedi equivalents of the forex amounts won.

5.3 Forward Auction Performance

- In all, about eighty (80) FX forward auctions were conducted between October 1, 2019, and October 18, 2022.

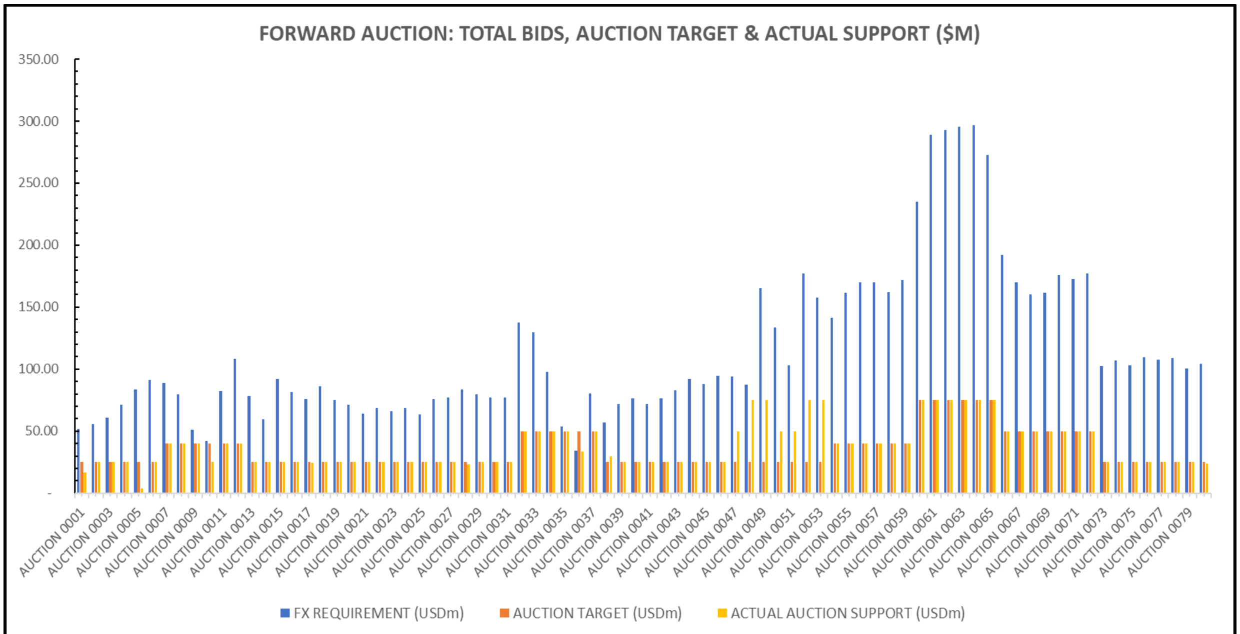
Table 2: Summary of Forward Auction Results, 2019-22

YEAR	7-day Tenor	14-day Tenor	30-day Tenor	45-day Tenor	60-day Tenor	75-day Tenor	Grand Total
2019	59.25	38.00	20.00	2.00	0.75	0.50	**120.50**
2020	316.50	235.25	101.25	31.00	11.00	3.00	**698.00**
2021	600.75	378.50	164.75	47.75	9.50	2.50	**1,203.75**
2022	409.00	307.50	181.00	56.00	34.75	10.50	**998.75**
Total (US$M)	**1,385.50**	**959.25**	**467.00**	**136.75**	**56.00**	**16.50**	**3,021.00**

Source: Author's compilation, 2024

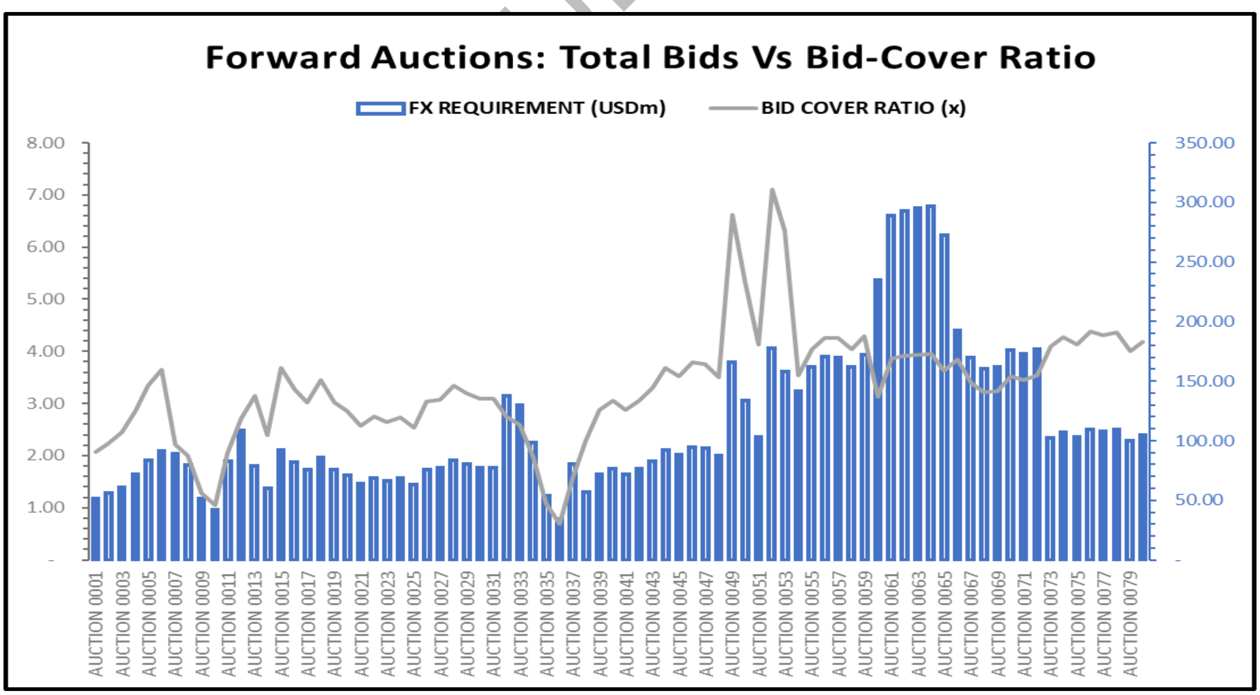
- From Table 2, the total amount of $3,021.00 million was sold to the participating banks over the entire auction period.
- Most bids concentrated in the shorter tenors, 7-30 days. Total auction target for the entire period was $2,805.00 million. This represented an excess of $216.00 million over the announced targets (Figures 5 and 6).
- Total FX demand, indicated by the number of bids submitted by participating banks, amounted to $9,168.88 million. This represented an unmet demand of $6,147.88 million over the entire period. The auctions, therefore, experienced a very high unmet demand.
- On average, the required FX needed by banks is three times more than the available FX support. The bid-cover ratio is on average 3.27 (See Figures 5 and 6). This bid-cover ratio was too high, given that each bank is already restricted to submitting total bids not exceeding 20 per cent of the announced target per auction.

Figure 5: Total Bids Submitted, Auction Target, and Amounts Sold at Auction



Source: Author's compilation, 2024

Figure 6: Total Demand at Auction & the Bid-Cover Ratio



Source: Author's compilation, 2024

5.4 Assessment of the Third Forward Auction

In general, market feedback about the forward auction was positive. It provided the market with additional liquidity support and therefore helped in easing pressures in the FX market. However, there appeared to be a lack of interest in the longer-dated tenors. Most of the bids concentrated around the 7-day tenor, followed by the 15-day and the 30-day tenors. The 45-day, 60-day, and 75-day tenors received fewer bids in that order.

This development requires a study to explain and understand the rationale for these preferences revealed by forex seekers. In addition, questions have been asked concerning the allocation methodology. For example, why doesn't the auction committee simply take each tenor and its share of the target amount and proceed straight to apply the best price technique in allocating funds to the successful bids? Others think that the use of the BoG reference rate as a spot rate in the scenario analysis amounts to subsidising the forex. This is because a lower spot rate compared with a truly market-reflective rate translates into a lower forward rate, holding all the other variables constant in the forward calculator.

5.5 Modification to the Forward Auction: BDC Auction

During the year 2022, forex reserves to support the forward auctions strategy became challenged when Ghana lost access to the international capital market (ICM). Fast-rising external obligations, rollover risks, especially from external portfolio investors, and continued demand pressures for forex to support trade depleted the reserves of the BoG. These, coupled with other unfavourable external developments, exerted pressure on the exchange rate. In addition, the petroleum ex-pump prices reflected "out-of-market" forward rates generated by the National Petroleum Authority (NPA) and the Bulk Oil Distributors (BDC), causing fuel prices to escalate rapidly, with its accompanying second-round effect on transport fares.

As a consequence, the regular forward auctions were suspended to prioritise critical imports such as oil to keep the economy running. This gave birth to the BDC auction. Participation in this auction was restricted to the Bulk Oil Distributors (BDC) licensed by the National Petroleum Authority (NPA). It was limited to the purchase of USD against the equivalent value of the Ghana Cedi on a forward basis at 30-day tenor only. The auction was held biweekly and conducted no later than three working days before the 1st and 16th of each month. Detailed information on the regulations governing the BDC auction processes can be obtained from the publication issued by the Financial Markets Department, Bank of Ghana, dated March 29, 2022.[6] The maiden BDC auction happened on March 30, 2022, with an announced target of $100 million. The targets varied along the line based on the reserve buffers of the central bank.

[6] "Bank of Ghana Guidelines for Allocation of Foreign Exchange Through Forward Auctions to Bulk Distribution Companies" dated March 29, 2022.

6.0 Conclusion and Recommendation

The exchange rate management in Ghana has evolved since Independence. This paper discussed the evolution of forex auctions in Ghana, highlighting their objectives, governance, performance, and challenges. The first auction addressed the spread between the parallel and the official rates. It began on a retail basis and was later modified into a wholesale auction in March 1990. During this period, several other changes occurred until the Bank of Ghana entirely discontinued it in March 1992, allowing the allocation of foreign exchange through the interbank market.

The second auction episode was intended to support market development, price formation, and also to provide a transparent mechanism to intermediate FX proceeds from Cocoa Syndicated Loans to the market. However, all seven (7) FX auctions led to a sharp depreciation of the exchange rate due to unmet demand. Overall, auctions under the second episode were deemed successful in terms of mechanics and processes. They, however, led to a net effect of gradual depletion of foreign exchange reserves with no significant impact on the exchange rate.

The third auction episode was a retail forward auction, settled on a spot basis but forex delivered on the maturity day. It was intended to improve price discovery, deepen the FX market, and reduce uncertainty about the future availability of FX to meet banks' clients' needs. Consequently, it was expected to minimise front-loading of FX purchases by economic agents and ease pressure on the spot market. Its implementation was guided by an auction calendar, which is a form of forward guidance (an announcement of a future policy action). The maiden auction under this episode occurred on October 1, 2019. In all, about eighty (80) FX forward auctions were conducted between October 1, 2019, and October 18, 2022. The auctions were suspended in October 2022 in favour of the Bulk Oil Distributors (BDC) auction to prioritise critical imports such as oil and keep the economy on a sound footing.

The study recommends that future auctions should set targets to appropriately reflect market demand conditions. Also, the guidelines governing the auctions should not impose price limits to help achieve proper price discovery. For example, the 2 per cent cutoff margin in section 6d of the guideline implemented during the second episode implicitly served as a price guidance and contributed to slowing down the price adjustment process.

Finally, given the observed auction experiences and developments, it would be interesting to evaluate the overall effectiveness of these auctions empirically, especially the forward one, given its novelty as a strategy in addressing the exchange rate challenges during the period it was implemented.

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Appendix:

CHRONOLOGY OF GHANA'S FOREX MARKET SINCE 1956

Year	Official Exchange Rate(USDGHS)	Exchange rate Regime at the time
1956	0.71	Fixed exchange rate
1957	0.71	
1958	0.71	
1959	0.71	
1960	0.71	
1961	0.71	
1962	0.71	
1963	0.71	
1964	0.71	
1965	0.71	
1966	0.71	
1967	1.02	**Cedi devaluation from ¢0.71 : US$1 to 1.02: US$1.00**
1968	1.02	Fixed exchang e rate
1969	1.02	
1970	1.02	
1971	1.82	**Cedi devaluation from ¢1.02 : US$1 to 1.82: US$1.00**
1972	1.28	**Cedi revaluation from ¢1.82 : US$1 to 1.28: US$1.00**
1973	1.15	**Cedi revaluation from ¢1.28 : US$1 to 1.15: US$1.00**
1974	1.15	Fixed exchange rate
1975	1.15	
1976	1.15	
1977	1.15	
1978	2.75	**Cedi devaluation from ¢1.28 : US$1 to ¢2.75: US$1.00**
1979	2.75	Fixed exchange rate
1980	2.75	
1981	2.75	
1982	2.75	
1983	30.00	**Cedi devaluation from ¢2.75 : US$1 to ¢30.00 : US$1.00**
1984	50.00	**ERP launched and exchange rate determined based on PPP**
1985	59.99	Rate determined on PPP framework
1986	90.01	Dual retail auction based on Dutch auction system introduced. W1 and W2 operated side by side with W1 at ¢90.00 : US$1.00
1987	166.50	Windows 1 and 2 unified at ¢156.00 : US$1.00
1988	212.10	Multiple exchange rate regime
1989	277.34	Multiple exchange rate regime
1990	331.15	Wholesale and interbank auction operational from 23rd March 1990
1991	367.73	Ghana adopted a floating exchange rate regime
1992	437.09	
1993	648.98	
1994	956.73	
1995	1200.40	
1996	1637.24	
1997	2050.28	
1998	2314.15	
1999	3252.94	
2000	5455.51	
2001	7170.58	
2002	7932.31	
2003	8697.49	
2004	9004.68	
2005	9074.06	
2006	9175.50	
2007*	3rd July 2007 to date Cedi redenomination	