Arbitrage Opportunities on the Forex Bureau Market in Ghana

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ABSTRACT

The liberalization of currency sales in February 1988 has brought into being many "Bureau of Change" (popularly known as "Forex Bureau") onto the foreign exchange market of Ghana. Do these bureaus set the same prices? If they do, there is no possibility of arbitrage. If they do not, then there could be the possibility of arbitrage which market participants can take advantage of. This paper looks at the extent of arbitrage going on in the Forex bureau market of Ghana in the three cities of Accra, Kumasi, and Takoradi. The currencies of interest are the United States dollar, the British pound, and the CFA franc which together form slightly more than ninety percent of the Forex bureau market of Ghana.

Keywords:- arbitrage, equilibrium, Forex bureau, market, quotation, transaction.

INTRODUCTION

Arbitrage is the process of taking advantage of the existence of price differentials on the international foreign exchange market for financial assets traded in different markets or the process of taking advantage of the existence of different prices among different dealers in the same market. In effect, arbitrage transactions are made to take advantage of temporary imperfections in the international financial markets.

For example, the pound sterling may be selling in London for £.5800/$. In New York it maybe selling for $1.7241/£. These two prices are the same, so there is no incentive for buying one currency in London and selling it in New York and vice versa. At certain times however, it happens that whilst the London quotation is £.5800/$ the New York quotation may be $1.7500/£. These prices are not the same and such a situation presents an opportunity for buying in one market and selling in the other to make profit amounting to $.0259/£ or £.0086/$.

In the above situation, if one had £10,000 in New York, one could purchase US$17,500. Selling the US$17,500 which was purchased in New York on the London financial market fetches

$$\frac{\text{US\$17,500}}{\text{US\$1.7241/£}} = \text{£10,150}$$

Thus, there is a profit of £150 for every £10,000 used in purchasing dollars in New York (Transaction cost is not considered).

Alternatively, one could sell dollars for pound sterling in London and use the pound sterling to purchase dollars in New York to arrive at the same results. It must be noted that such arbitrage opportunities, if they exist, are very short lived since other market participants, realizing the existence of such an opportunity rush in to share in the profit. Equilibrium is therefore soon established and prices in the different markets equalize. Perhaps the greatest incentive in arbitrating is that it does not involve any risk since the prices or returns are known from the beginning.

In Ghana with the licensing of foreign exchange dealings, Forex bureaus have opened in almost all the major commercial centres in the country. Since these major centres are located quite a distance apart from one another, there may be price differentials as often occur on the international foreign exchange markets. If such a situation exists, people could take advantage of this differential pricing to reap some profits without any risk.

The purpose of this paper therefore is to establish whether pricing by the Forex bureaus in Ghana presents profitable arbitrage opportunities for participants in the Forex bureau market. The three currencies of interest are the dollar, the pound sterling and the CFA franc. The three major cities used in the research are Accra, Kumasi and Takoradi. Data are for the period between March 1988 and December 1989.

The International Foreign Exchange Market vs The Local Market

The international foreign exchange market is a highly developed financial market. Buying and selling is done by the use of telephone, telex, fax etc., without any physical money actually changing hands. All transactions are mere paper work. It is therefore easy for a dealer in New York to make a transaction in London or Frankfurt or any part of the world at the same time.

Transactions on the local forex bureaus market are quite different from those of the international foreign exchange markets. All transactions are strictly on cash basis. This means that even if arbitrage opportunities do exist, taking advantage of such opportunities must involve physical movement of currency from one market (dealer) where the purchase of currency is to be done, to the other where the sale is to be made. Due to the shortcomings of the local market, only intracity market opportunities for arbitrage are considered in this paper.

The Accra Market

Accra is the biggest Forex bureau market in Ghana. As at the end of December 1989, there were 137 licensed Forex bureaus in the country. Out of these, 79 (about 60%) were located in Accra.

Tables 1, 3 and 5 show the currency quotations of seven randomly selected bureaus in Accra for the dollar, the pound sterling and the CFA. The rates for these bureaus were taken for 24 different days at intervals of about two weeks.

In tables 1, 3 and 5, the figures in brackets present opportunities for profit making arbitrage. For each bureau the buying and selling rates are quoted. The buying rate is the rate at which the bureaus buy currency from the public whilst the selling rate is the rate at which they sell to the public. To profit from arbitrage therefore, the selling rate of one bureau must be such that it is lower than the buying rate of another bureau so that currency purchased at one bureau on one day can be sold at profit at another bureau on the same day.

For instance, from table 1, on 18th January 1989, dollars may be purchased from bureau 1 at C340 per dollar. On the same day, bureau 5 purchased dollars at C350 per dollar. This means that dollars could be purchased from bureau 1 at C340/US$1 and sold at C350/US$1 to bureau 5, yielding C10 for every dollar bought and sold. Again on the same date, bureaus 2 and 3 sold dollars at C345, per dollar. Since bureau 5 bought dollars at C350 per dollar, dollars could be bought at C345/US$ at bureaus 2 and 3 and sold at C350 per dollar at bureau 5 thereby making a margin of C5 on each dollar bought and sold.

TABLE 2 : Summary of Profitable Arbitrage Opportunities on the Dollar Market.

Arbitrage Opportunity	Date	* Bureaus among which arbitrage is possible
1	3/10/88	5, 6, 7
2	15/10/88	5, 7
3	1/11/88	1, 2, 4, 5, 6, 7
4	1/12/88	1, 2, 4, 5, 6
5	4/1/89	2, 3, 4, 6, 7
6	18/1/89	1, 2, 3, 5
7	3/2/89	3, 4, 6
8	17/2/89	4, 6

Source: Table 1

TABLE 1 : DOLLAR QUOTATIONS FOR SEVEN BUREAUS IN ACCRA

DATES	BUREAU 1		BUREAU 2		BUREAU 3		BUREAU 4		BUREAU 5		BUREAU 6		BUREAU 7	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
1st Sep 1988	280	290	-	-	-	-	-	-	270	300	280	290	276	290
16th Sep 1988	285	295	287	297	-	-	-	-	290	310	285	300	283	295
3rd Oct 1988	295	305	295	305	-	-	-	-	(305)	310	290	(300)	287	(295)
15th Oct 1988	290	305	295	305	-	-	295	305	(305)	320	295	310	285	(295)
1st Nov 1988	306	(315)	305	(315)	-	-	300	(310)	(328)	330	305	(320)	298	(315)
15th Nov 1988	315	325	315	325	-	-	310	320	320	345	320	340	315	330
1st Dec 1988	(350)	360	(345)	360	-	-	325	(340)	(350)	360	(345)	360	340	365
15th Dec 1988	320	340	315	345	-	-	320	360	310	350	310	340	300	340
4th Jan 1989	310	330	(315)	(325)	(320)	340	(328)	350	300	340	305	(310)	(320)	350
18th Jan 1989	335	(340)	335	(345)	340	(345)	330	350	(350)	360	336	350	335	350
3rd Feb 1989	360	365	355	365	355	(360)	350	(360)	345	370	(363)	370	352	365
17th Feb 1989	370	375	370	375	370	375	360	(370)	360	385	(371)	380	365	380
1st Mar 1989	375	385	375	380	370	385	377	385	360	390	376	385	370	385
15th Mar 1989	370	385	375	380	390	385	377	385	370	385	370	385	370	385
3rd Apr 1989	355	380	360	375	360	380	330	385	355	380	350	375	370	383
17th Apr 1989	345	370	355	370	365	370	330	385	350	375	352	370	370	383
2nd May 1989	350	365	350	365	350	365	340	380	350	370	345	370	360	370
16th May 1989	345	365	340	365	330	365	340	380	350	370	350	370	340	360
6th Jun 1989	355	370	355	370	350	370	340	370	350	370	360	370	358	370
20th Jun 1989	370	380	365	375	355	375	340	370	360	380	367	380	355	375
4th Jul 1989	370	380	365	380	360	380	340	375	360	380	-	-	360	375
18th Jul 1989	360	375	360	375	360	380	340	375	355	380	-	-	360	375
1st Aug 1989	355	375	360	370	350	370	360	370	360	380	-	-	355	370
15th Aug 1989	-	-	355	365	350	370	-	-	350	370	-	-	350	370

Source: Survey 1989.

TABLE 3: POUND STERLING QUOTATIONS FOR SEVEN FOREX BUREAUS IN ACCRA

DATES	BUREAU 1		BUREAU 2		BUREAU 3		BUREAU 4		BUREAU 5		BUREAU 6		BUREAU 7	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
1st Sep 1988	470	490	-	-	-	-	-	-	480	500	470	490	475	485
16th Sep 1988	480	490	480	490	-	-	-	-	485	500	480	490	476	485
3rd Oct 1988	485	(495)	490	498	-	-	-	-	(497)	500	480	500	485	495
15th Oct 1988	490	495	490	498	-	-	485	495	490	500	480	500	490	500
1st Nov 1988	500	510	500	510	-	-	490	500	500	520	500	520	500	510
15th Nov 1988	510	520	(520)	525	-	-	500	(510)	510	550	(520)	530	509	520
1st Dec 1988	(550)	560	(560)	570	-	-	530	(540)	(550)	580	(545)	570	(550)	570
15th Dec 1988	560	580	565	580	-	-	560	570	550	595	545	580	550	570
4th Jan 1989	565	580	560	570	570	585	560	580	550	590	570	580	560	570
18th Jan 1989	580	590	(590)	610	(590)	600	580	595	580	600	(586)	590	575	(580)
3rd Feb 1989	605	(615)	(620)	625	610	(620)	605	(615)	590	630	(623)	630	610	(615)
17th Feb 1989	620	(630)	(635)	640	625	645	630	640	590	640	(639)	650	630	640
1st Mar 1989	640	(645)	645	650	635	650	645	650	620	650	(646)	660	640	650
15th Mar 1989	645	655	645	650	635	655	645	650	635	650	640	656	640	650
3rd Apr 1989	635	650	625	645	600	650	620	650	620	650	620	650	640	650
17th Apr 1989	600	(630)	600	640	610	(630)	600	650	600	640	610	(630)	(640)	650
2nd May 1989	605	625	580	635	580	630	600	650	600	625	590	620	600	630
16th May 1989	580	625	580	635	590	615	600	650	580	625	580	620	610	640
6th Jun 1989	580	610	600	625	590	605	570	635	580	620	580	620	580	630
20th Jun 1989	585	605	580	625	570	610	570	635	580	615	580	620	580	630
4th Jul 1989	565	600	570	625	570	610	570	620	570	605	-	-	530	570
18th Jul 1989	560	590	555	605	570	590	570	600	550	595	-	-	565	575
1st Aug 1989	570	590	555	590	550	580	565	588	550	590	-	-	570	580
15th Aug 1989	-	-	550	590	550	580	-	-	560	590	-	-	570	580

Source: Survey (1989).

TABLE 4: Summary of Arbitrage Opportunities on the Sterling Market.

Arbitrage Opportunity	Date	Bureaus among which arbitraging is possible
1	3/10/88	1, 5, 7
2	15/11/88	2, 4, 6
3	1/12/88	1, 2, 4, 5, 6, 7
4	18/1/89	2, 3, 6, 7
5	3/2/89	1, 2, 3, 4, 6, 7
6	17/2/89	1, 2, 6
7	1/3/89	1, 6
8	17/4/89	1, 3, 6, 7

Source: Table 3

TABLE 6: Summary of Profitable Arbitrage Opportunities on the CFA Market.

Arbitrage Opportunity	Date	Bureaus among which arbitraging is possible
1	15/10/88	2, 4, 5, 6, 7
2	1/11/88	1, 2, 4, 5, 6, 7
3	15/11/88	1, 2, 4, 5, 6, 7
4	1/12/88	1, 2, 4, 5, 6, 7
5	15/12/88	1, 2, 4, 5, 6
6	4/1/89	1, 2, 3, 4, 5, 6, 7
7	18/1/89	1, 2, 4, 5, 6

Source: Table 5

TABLE 5: CFA QUTATION FOR SEVEN FOREX BUREAUS IN ACCRA

DATES	BUREAU 1		BUREAU 2		BUREAU 3		BUREAU 4		BUREAU 5		BUREAU 6		BUREAU 7	
	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell	Buy	Sell
1stSep1988	870	890	-	-	-	-	-	-	880	910	870	900	850	900
16thSep1988	880	900	880	900	-	-	-	-	890	915	880	900	870	900
3rdOct1988	890	920	895	920	-	-	-	-	900	930	900	920	880	920
15thOct1988	910	940	920	(930)	-	-	900	(930)	(990)	1020	910	(930)	900	(930)
1stNov1988	(980)	(1000)	(980)	1100	-	-	950	(1000)	(1005)	1015	940	(950)	(960)	(995)
15thNov1988	1000	(1030)	990	(1010)	-	-	1000	(1020)	(1020)	1070	(1050)	1070	950	(1000)
1stDec1988	(1100)	1120	(1090)	(1110)	-	-	1010	(1040)	(1120)	1140	(1070)	(1080)	(1050)	(1100)
15thDec1988	(1050)	1120	(1050)	1100	-	-	1010	(1040)	(1070)	1110	(1050)	(1060)	1000	1100
4thJan 1989	1000	(1050)	1000	(1050)	1050	(1100)	950	(1100)	(1120)	1130	(1060)	(1070)	1000	(1100)
18thJan1989	(1080)	1100	1050	(1070)	1050	1120	(1080)	1100	(1080)	1120	(1080)	1090	1050	1120
3rdFeb1989	1090	1120	1060	1110	1020	1110	1080	1150	1070	1120	1083	1120	1050	1120
17thFeb1989	1050	1120	1080	1110	1050	1150	1080	1150	1070	1120	1080	1120	1080	1120
1stMar1989	1080	1120	1100	1115	1050	1150	1090	1170	1090	1130	1091	1120	1060	1120
15thMar1989	1090	1130	1100	1115	1050	1150	1080	1150	1100	1140	1110	1130	1060	1120
3rdApr1989	1090	1125	1090	1120	1050	1150	1080	1150	1080	1130	1080	1120	1120	1130
17thApr1989	1080	1125	1100	1120	1050	1150	1050	1130	1100	1130	1080	1130	1060	1130
2ndMay1989	1090	1125	1100	1120	1050	1150	1000	1130	1100	1130	1080	1120	1080	1120
16thMay1989	1090	1125	1100	1125	1050	1150	1000	1130	1100	1140	1110	1140	1060	1120
6thJun 1989	1100	1130	1110	1135	1050	1150	1000	1140	1100	1140	1090	1140	1080	1130
20thJun1989	1100	1130	1110	1135	1050	1150	1000	1140	1100	1130	1090	1140	1080	1130
4thJul 1989	1080	1130	1100	1135	1050	1120	1000	1140	1080	1130	-	-	1080	1130
18thJul1989	1080	1130	1090	1130	1070	1120	1000	1140	1100	1130	-	-	1080	1130
1stAug1989	1100	1130	1090	1130	1070	1130	1080	1140	1100	1130	-	-	1080	1130
15thAug1989	-	-	1090	1135	1070	1130	-	-	1100	1150	-	-	1080	1130

Source: Survey(1989)

Similarly, table 1 shows that such arbitrage opportunities existed on 3rd October, 1988 among bureaus 5, 6 and 7. Arbitrage opportunities in Accra for the sale of dollars as shown in table 1 is summarised in table 2.

The Forex Bureau Market for Pound Sterling in Accra

The Forex bureau market for pound sterling in Accra, like the dollar market, also presents opportunities for profitable arbitrating. A study of the rates for the 7 bureaus is shown in table 3 and the arbitrage opportunities are summarised in table 4.

The Forex Bureau Market for CFA in Accra

In the CFA sales by the Forex bureaus shown in table 5 there are opportunities for profitable arbitrage, just as for the market for dollars and pound sterling as summarised in table 6.

The analysis above indicates that there are opportunities for profitable arbitrage on the forex bureau market in Accra. For the one year period of September 1988 to August 1989 selected for the study, profitable arbitrage opportunities occurred in about a third of those 24 days on which prices were observed for all the three currencies used in the study.

The Kumasi Market

Kumasi is the second biggest Forex bureau market. As at the end of December 1989, there were 28 licensed forex bureaus representing about 20 percent of the number of bureaus in the country. Tables 7, 8 and 9 show the rates quoted by three bureaus in Kumasi on the dates shown. Again, these

TABLE 7: DOLLAR QUOTATION FOR THREE FOREX BUREAUS IN KUMASI

DATES	BUREAU 1		BUREAU 2		BUREAU 3	
	Buy	Sell	Buy	Sell	Buy	Sell
1st Sept 1988	270	290	-	-	270	288
16th Sept 1988	275	305	-	-	270	295
3rd Oct 1988	290	305	275	303	290	310
15th Oct 1988	315	325	290	330	280	325
1st Nov 1988	305	310	305	325	-	-
15th Nov 1988	305	330	315	335	300	350
1st Dec 1988	320	360	-	-	-	-
15th Dec 1988	300	330	-	-	-	-
4th Jan 1989	300	340	-	-	-	-
18th Jan 1989	330	355	332	345	-	-
3rd Feb 1989	340	375	355	365	-	-
17th Feb 1989	350	375	360	380	340	380
1st Mar 1989	365	385	370	385	340	380
15th Mar 1989	360	385	370	385	340	370
3rd Apr 1889	350	375	360	375	-	-
17th Apr 1989	350	375	340	365	-	-
2nd May 1989	350	375	350	365	330	360
16th May 1989	345	375	350	352	350	370
6th June 1989	360	370	363	365	360	365
20th June 1989	365	370	365	378	-	-
4th July 1989	375	380	365	380	360	380
18th July 1989	(375)	380	360	378	350	(360)
1st Aug 1989	350	375	360	375	340	365
15th Aug 1989	350	370	-	-	-	-

Source:Survey(1989).

TABLE 8: POUND STERLING QUOTATION FOR 3 BUREAUS IN KUMASI

	BUREAU 1		BUREAU 2		BUREAU 3	
	Buy	Sell	Buy	Sell	Buy	Sell
1st Sept 1988	460	490	-	-	470	490
16th Sept 1988	480	490	-	-	470	500
3rd Oct 1988	490	500	480	498	470	500
15th Oct 1988	490	510	485	505	470	490
1st Nov 1988	490	510	500	510	490	510
15 Nov 1988	500	550	510	535	500	520
1st Dec 1988	540	600	-		-	-
15th Dec 1988						
4th Jan 1989	540	590	-	-	-	-
18th Jan 1989	570	590	580	600	-	-
3rd Feb 1989	590	650	600	620	-	-
17th Feb 1989	615	630	610	620	-	-
1st Mar 1989	630	660	630	645	-	-
15th Mar 1989	640	660	630	655	-	-
3rd Apr 1989	630	650	630	655	-	-
17th Apr 1989	610	645	615	640	-	-
2nd May 1989	600	635	605	625	-	-
16th May 1989	600	635	600	620	-	-
6th June 1989	(600)	635	585	(590)	-	-
20 June 1989	570	610	590	615	-	-
4th July 1989	595	600	580	605	-	-
18th July 1989	560	595	570	595	-	-
1st Aug 1989	570	600	570	595	550	570
15th Aug 1989	570	600	-	-	-	-

Source:Survey(1989).

TABLE 9: CFA QUOTATION FOR 3 BUREAUS IN KUMASI

DATES	BUREAU 1		BUREAU 2		BUREAU 3	
	Buy	Sell	Buy	Sell	Buy	Sell
1st Sep 1988	880	890	-	-	870	900
16th Sep 1988	885	900	-	-	880	900
3rd Oct 1988	900	920	900	915	900	915
15th Oct 1988	970	990	950	990	900	980
1st Nov 1988	980	1010	970	1010	990	1000
15th Nov 1988	1040	1055	1010	1030	1020	1060
1st Dec 1988	1050	1120	-	-	1060	1100
15th Dec 1988	1020	1060	-	-	1000	1080
4th Jan 1989	1050	1090	-	-	1050	1100
18th Jan 1989	1050	1120	1070	1110	1090	1120
3rd Feb 1989	1070	1110	1080	1110	1060	1110
17th Feb 1989	1100	1110	1080	1110	1050	1110
1st Mar 1989	1100	1120	1080	1120	1060	1104
15th Mar 1989	1100	1130	1080	1120	1100	1130
3rd Apr 1989	1070	1120	1090	1130	-	-
17th Apr 1989	1080	1125	1080	1120	1080	1120
2nd May 1989	1080	1115	1090	1120	1080	1120
16th May 1989	1100	1130	1100	1130	-	-
6th Jun 1989	1115	1135	1100	1130	1080	1140
20th Jun 1989	1100	1125	1100	1130	1100	1130
4th Jul 1989	1080	1115	1080	1110	1060	1110
18th Jul 1989	1115	1130	1100	1120	1080	1120
1st Aug 1989	1100	1135	1100	1130	1100	1130
15th Aug 1989	1110	1135	-	-	-	-

Source:Survey(1989)

bureaus were randomly selected. The currencies involved once again are the dollar, the pound sterling and the CFA franc.

The Kumasi market showed an entirely different picture. With respect to the dollar market, there was only one situation for profitable arbitrage; on the 18th of July 1989, between bureaus one and three.

The market for the pound sterling also indicated only one day for an opportunity for profitable arbitrage; on 6th June 1989. The remaining 23 days showed a market equilibrium.

In the CFA market, there was no opportunity for arbitrage at all. In trying to explain why there were not many cases of opportunities for arbitrage, one can easily say that a greater number of these bureaus are located in the same area i.e Adum. Almost each one is within sight of the other. Again the bureaus are not many, thus dealers can easily check rates quoted by others without much difficulty.

The Takoradi Market

As at September 1989, there were three bureaus in Takoradi. All the 3 bureaus were used in this study. in this case, not a single arbitrage opportunity was found for any of the three currencies i.e. the dollar, the pound sterling, and the CFA. (Rates omitted since no cases of arbitrage were found) The case of Takoradi is not surprising since Takoradi is a much smaller place and, with only three Forex bureaus, there is perfect information on prices. Each bureau is therefore aware of the prices at other Forex bureaus.

CONCLUSION

The results above indicate that profitable arbitrage opportunities on the Forex bureau markets exist only in the Accra market. It is the only market which is big enough to make arbitrage possible. In the other cities, the number of bureaus is relatively small and so close together that pricing is easily monitored among the bureaus.

Although the Accra market provided opportunities for arbitrage, the volume of money changing hands is still not big enough to allow large volume transactions which are necessary before large profits can be made in arbitrage transactions. This is because on many occasions, bureaus cannot supply the needed currency. Arbitrage opportunities therefore exist on the Forex bureau market of Ghana, especially on the Accra market, although its profit possibilities are limited.

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