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Thesis Topic:

STRATEGIES FOR MANAGING THE CURRENCY RISK ASSOCIATED WITH HOME FINANCE COMPANY's FOREIGN DENOMINATED HOUSBONDS

Submitted and Defended By:

Wilfried Salustiano TAMEGNON

Under The Supervision Of:

John B. K. AHETO, Professor of Finance, C.A
DMD - Ghana Institute of Management and Public Administration (GIMPA)
University of Ghana, Legon

Philip Amoyaw, M.A Economics
Financial Analyst,
HFC Investments Services Ltd
Accra, Ghana

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To my parents, for a lifetime of love, support and encouragement

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Note

The views expressed in this thesis are the student's and do not necessarily reflect Cesag's views on the subject matters discussed therein. The designations employed and the presentation of the material do not imply the expression of any opinion whatsoever on the part of the MBA in Banking and Finance Project, concerning the study's validity.

Material in this thesis may be freely quoted; acknowledgement however, is requested including reference to the thesis.

Preface

"Governmental institutions, central banks and leading institutions have long called for the establishment of high-level training in banking and finance throughout the continent.

CESAG, in response, has developed a post-graduate bilingual programme in banking and finance. This programme, established in collaboration with the BCEAO, the BEAC, the Bank of France, the French Development Agency, the European Union, the World Bank, the French Ministry of Foreign Affairs and the African Capacity Building Foundation, provides advanced training to candidates from financial institutions as well as from private and public structures"[1].

At the end of this 12-month course, trainees are requested the submission and defence of a research thesis or a professional report. To comply with this requirement, I had a 3-month internship in Home Finance Company (HFC), a Ghanaian company operating in Accra (Ghana).

Familiarity with the company's business enabled me to discover that currency risk was being harmful to HFC. My desire to help face this practical issue by using my theoretical knowledge of *"Forex mechanisms"* and *"Hedging Strategies"*, led to the choice of the topic: *Strategies For Managing The Currency Risk Associated With HFC's Foreign Denominated Housbonds*, which is discussed in this document.

To understand this study, it should be borne in mind that Home Finance Company (HFC) is a private limited liability company founded on 7th May 1990 which was turned into a public company on 5th October 1994. The following year, on 17th March 1995, HFC became a listed company on the Ghana Stock Exchange with a stated capital of ¢ 8,094,001,000 split into a billion shares. The floating capital is made up of 57,152,556 shares. Now, the company finance its activities by raising private bonds on the Ghanaian financial market. These bonds - the so-called *housbonds* - are foreign currency denominated. Our study is designed to help enhance the management of the currency exposure associated with these mortgage backed securities.

The research carried out here has been supervised by Professor John B.K. Aheto, (Chartered Accountant and Deputy Managing Director of Ghana Institute of Management and Public Administration, University of Ghana, Legon). The in-company Supervisor was Mr Philip Oduro Amoyaw (M.Sc.), Financial Analyst.

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[1] MBA in Banking and Finance Prospectus, 2003

Executive Summary

This thesis describes the Ghanaian cedi volatility and evaluates its implications in the management of the currency risk associated with Home Finance Company[2]'s foreign denominated bonds of which 87% are in US dollars and 13% in UK Pound Sterlings.

The study shows that over the last five years, 1-year volatility rates have ranged from 15.54% to 344.65 % for cedi-US dollar, and from 4.30 % to 371.96% for cedi-UK Pound Sterling. However, these volatility rates have behaved somehow cyclically : a year of high-volatility for cedi to US dollar exchange rates seems to correspond to a year of low-volatility for cedi to UK Pound Sterling.. On that basis, carry trade behaviours have been suspected on the part of investors in Ghana.

We also discovered that owing to abgood currency match, Home Finance Company (HFC) in 1998, 1999 and 2000, has successfully managed the currency exposure associated with its foreign denominated housbonds, despite high volatility. For 2001 and 2002 however, HFC experienced huge exchange losses as a result of the new issue of UK Pound Sterling denominated bonds, on July 13, 2001.
Could these results imply that the number of currencies is a crucial determinant of currency risk management strategies? The question is worth looking at. It seems that unlike single currency, multiple currency exposures require more sophisticated hedge tools.
Were HFC aware of that rule?

Significant correlation between HFC Mortgage Portfolio and Bonds outstanding has shown that HFC is aware of her exposure to currency risk. But management is actually shifting to a " do nothing" strategy. Exchange losses (profits) for Year 2003 could be crucial for proper hedging decisions in the company.

Meanwhile, our proposal of simpler techniques might be helpful.

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[2] *Home Finance Company is Ghana sole mortgage financing company. HFC is listed on the Ghana Stock Exchange*

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GENERAL INTRODUCTION

- *The Current international financial environment*

Over the last three decades, we have witnessed dramatic changes in the international business environment. From the classical Gold Standard of the 19th Century, to the pegged exchange rate system known as Bretton Woods system adopted in 1944, through the Floating Exchange Rate System that began in the early 1970s, many international monetary arrangements have been made to adapt to the new era. The most recent is the introduction of the Euro, a currency commonly used by the European Union member countries, since January 1999.

In the capital markets industry, the list of financial instruments has lengthened. New products are developed along with new trading, pricing, and hedging techniques. All over the world, many sophisticated innovations have been made. However, in both mature and emerging economies, this trend toward complexity has been increasingly challenging the national monetary authorities.

In addition to creating host of opportunities worldwide, those changes in the international financial arena have also raised new issues. More than ever, volatility has characterized the financial market setting, whilst financial instability has become a major concern to most policymakers. As a result, some international institutions, such as the Bank for International Settlements (BIS) and the International Monetary Fund (IMF), have been working on various international agreements to harmonize capital requirements for banks, to establish securities trading and underwriting standards and to remove barriers to capital flows. The ultimate purpose of all these arrangements is to prevent financial distresses and bubbles.

By and large, these unified efforts would have strengthened the international financial environment, had Enron and subsequent corporate scandals not eroded public confidence in the business world and in capital markets[3]. As a consequence, the review and the harmonization of international accounting principles and disclosure requirements have become a priority. This is indeed, as stressed by Klaus Schwab, President of the World Economic Forum (2003), the only one way to rebuild investor's trust in corporate governance.

Curiously, at the same time as the international community was struggling to establish a viable set of platform for world-wide business, many developing countries pursued their own efforts to implement financial reforms suggested by the IMF and the World Bank. On the list are many West African countries including Senegal and Ghana, whose Sovereign Credit Rating has recently been set at **B+** by Standard and Poor's. This makes Ghana's country-risk more acceptable to international investors[4]. The truth is that the continued pursuit of strict fiscal discipline and prudence enabled those governments to maintain a relatively stable macroeconomic environment, despite many external threats.

We can not say that African countries prospered whilst mature economies were suffering. They did not! For example, albeit to a lesser extent, Ghana's economy which we are going to focus on here, was stricken by consecutive international economic turmoils. Having gone through the contagion effect of the South East Asia crisis of 1998, the country experienced another external shock in 1999 when its major export commodities (gold and cocoa) plummeted to their lowest historic prices while crude oil import prices skyrocketed. This

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[3] See President Klaus Schwab's foreword to World Economic Forum, 2003
[4] Daily Graphic of September 2nd, 2003

resulted in an important deterioration in the country's terms of trade. The year 2000 brought no better news: Ghana had to face a 50% depreciation of its local currency, a situation which the September 11th events had but worsened. Since then, the continuously decreasing cedi-dollar (and cedi-sterling) exchange rates have undoubtedly become the first and foremost weakness of Ghanaian economy. Therefore, no one can now deny the fact that globalisation has made our world a global village where a crisis can affect the remotest economies.

Worst of all is the crushing and spiralling (though moderate in recent months) inflation rate prevailing in the country since the beginning of the year 2003. This brings us to the heart of the question of the currency risk facing any Ghanaian company involved in international business, whether its assets and liabilities are or not denominated in the local currency.
In Ghana, a tangible example of such companies is the Home Finance Company (HFC), the only mortgage finance company in the country.

- ***Problem Statement : The Currency Risk Management in HFC***

To perform a useful study of currency risk management in HFC, it would be helpful that we pause to emphasize and understand the company's business features.

To sump up, HFC activities consist of:

- "Managing a fund for the provision of long term resources for home mortgage financing,
- Issuing and dealing in bonds and other financial instruments,
- Undertaking the business of housing finance,
- Undertaking the management of investments including real estate and arrangement of capitalization /financing packages for its clientele"[5].

To run such a business, long term resources are absolutely needed. The lack of long-term financing in Ghana has necessitated the shift by HFC to financing its activities by issuing private bonds. Some of those bonds are denominated in dollars and sterlings. To offset the resulting currency exposure, HFC invoices part of her financial products in dollars. Despite this, currency risk is still of concern to the company. As a result, many millions of cedis have been recorded over the last five years in the "Profit and Loss Account" as exchange losses, and dealt with as such. Hence, the question:

What has HFC management done about this exposure?

Or, are they adopting the "do nothing approach" so common to most domestic companies operating in West Africa? Then, the problem needs to be properly addressed, using appropriate hedging strategies. That's what this project is all about.

- ***Expected Results from the Study***

In undertaking this study on the HFC Group, our aim is twofold:

- Firstly, to perform a careful examination of the company's housbonds currency exposure over the past five years and to analyze how this risk has been managed. This is partly to help us identify where the HFC currency exposure stems from and to measure the impact of the cedis (¢) volatility on HFC's performance during the stated period.

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[5] HFC's Annual Report – 2002, pp.3-4

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- Secondly, to formulate and suggest a set of realistic and simple techniques to provide a successful hedge to the foreign exchange risk that faces the HFC group, given its foreign currency denominated housbonds.

These objectives, if reached, would not only contribute to the improvement of the overall risk management process at HFC, but also provide cause for reflection, should other companies operating in Ghana or in any other developing country, get into a similar dilemma.

- ***Structure Of The Study***

To complete the task, we have stretched the study over five chapters.

- Chapter One provides a broader restatement of the study objectives, the hypotheses and the research methodology.

- Chapter Two reviews existing literature about exchange rates mechanism and currency exposure issues.

- Chapter Three focuses on the currency risk empirical evidence in Ghana. As a starting point, Section One of the chapter examines the currency volatility concept and its experience in Ghana. Section Two is the practical side of the volatility study: for illustrative purposes, an analysis of the local currency historic volatility between 1998 and 2002 would be made. The data used are the inter-bank average exchange rates, gathered on a daily basis, as calculated by the Central Bank of Ghana and published by the Ghana Association of Bankers. Comments of the resulting charts will help us draw conclusions as to possible relationships between macroeconomic stability and currency volatility in Ghana.

The rest of the study highlights the currency risk management in HFC:

- Chapter Four carefully describes the company's business, with emphasis on the activities more likely to expose the company to currency risk, especially the non-cedis-denominated housbonds.

  This description is followed by the assessment of HFC's foreign currency exposure and by a critical analysis of the strategies adopted by the company in managing it, particularly in the case of the dollar and sterling denominated securities.

- We shall further explore some of the various techniques that can be used to eliminate or, at least, mitigate the currency exposure at HFC. Given the fact that not many of the hedging techniques available in mature economies are applicable to corporate bodies operating in the developing countries, Chapter Five seeks to identify the appropriate hedging strategies for managing this form of risk in HFC.

CHAPTER ONE: THEORITICAL FRAMEWORK

This chapter provides an overview of the theoretical framework of our study. Following the review of the study's objectives and hypotheses, the research methodology is displayed.

1.1 OBJECTIVES, HYPOTHESES, AND METHODOLOGY

In this first section, we will lay the study's foundations. The focus shifts from a restatement of the objectives as well as the associated hypotheses, to the presentation of our methodology.

1.1.1 WHY LOOK AT THE CURRENCY RISK MANAGEMENT IN HFC?

A familiar quotation from Albert Einstein, no less apt today than when it was written, states that: " *The formulation of a problem is far more often essential than its solution, which may be merely a matter of mathematics or experimental skill. To raise new questions, new possibilities, to regard old problems from a new angle requires creative imagination and marks real advance in science.*"[6] Of course, the currency-risk management is no peculiar problem. To medium and small sized companies, the issue has simply been for a long time, a non answered question, at least in developing countries. One justification for that lies in the fact that most available hedging techniques are designed for creditworthy institutions in developed countries. Aware of the lack, the World Bank has tried over the years to address it through the International Finance Corporation. The latter offers a wide variety of risk management products to private sector projects in developing countries, but conditionalities are serious barriers. Many companies even don't know the existence of such facilities; and those who know are oftentimes, not eligible.

Through this study, our general purpose is to draw attention to this topic of currency risk management in developing countries where local currencies are often volatile. To a more specific extent, the emphasis is on Home Finance Company (HFC), a Private Limited Company operating in Ghana.

1.1.2 THE STUDY'S SPECIFIC OBJECTIVES

The end of this study should have answered three major questions, at least partially:

- Question 0: Is Home Finance Company exposed to currency risk or not ?

- Question 1: What did Home Finance Company do about its currency exposure between 1998 to 2002?

- Question 2 : How can this currency risk management be improved?

In other words, this study seeks:

- To assess (in a critical perspective), the HFC's awareness about currency risk, and
- To help sharpen this awareness by making recommendations for hedging strategies.

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[6] Donald R. Cooper and Pamela S. Schindler, *in Business Research Methods,* page 60 (The Research process)

The associated hypotheses are given below.

1.1.3   HYPOTHESES

Hypotheses are expected to guide any study and to provide a framework for organising the resulting conclusions. It is a way of predicting the possible outcomes of an investigation. Two aspects are worthy of our interest:

1.1.3.1 Hypotheses Statement

In this case study, they derive from the above-formulated questions.

Hypothesis Associated with Question 1

Trying to work out what attitude HFC has hitherto adopted toward its currency exposure can lead to two sets of conclusions. As a consequence, the hypothesis associated with this objective is as follows:

$H_{1,0}$ *(Null hypothesis)* :   "HFC is aware of its currency exposure and has found a strategy to hedge it."

Or,

$H_{1,A}$ *(alternative hypothesis)*   "HFC is not aware of its currency-risk. In which case the company could be adopting the 'do nothing' approach to its currency-risk".

Hypothesis Associated with Question 2

No matter how Question 1 is answered, question 2 has many answers. For a simplicity purpose, the associated hypothesis is the following:

H_2 To come out with a successful currency risk management, HFC should avoid currency mismatches, and use hedging techniques.

1.1.3.2 Hypotheses Testing

A closer look at our hypotheses shows that they are related. For instance, to assess HFC awareness about currency exposure, we need to examine the nature of relationships between HFC currency exposure and the company's foreign denominated mortgages over the period from 1998 through 2002. To say it another way: Is HFC's foreign mortgage portfolio size modified in response to changes in the company's currency exposure?

A simple correlation test would be appropriate to answer this question. The resulting Pearson "r" would be subject to a test of significance (a t-test). This is to discover whether the "coefficient of correlation" is strong enough to lead to the conclusion that HFC is aware of the currency exposure or not. Depending on the results from the test of significance, the null hypothesis could be "rejected" or "not rejected".

1.2 RESEARCH METHODOLOGY (DESIGN)

Being a case study, this work intends to provide an in-depth analysis of the currency risk management in HFC, followed by a set of practical recommendations to help the company minimise its currency-exposure. To reach these goals, our methodology is the following:

1.2.1 Time Dimension

The study is ex post facto and covers a period of five (5) years (1998 through 2002). This longitudinal choice is made to track accurate data and to take into account most changes in the company's exposition to currency risk.

1.2.2 Exploratory Study

First step of our methodology, the exploratory study focuses on the literature review. Studies made by others on the topic are examined to identify what has been done and what needs to be done. Our reflections are shaped accordingly.

1.2.3 Descriptive Study

Having explored the available literature on the currency-risk concept, it seems important to present its empirical evidence in Ghana. For this purpose, we will assess the local currency volatility by using some simple statistical calculations: mean, variance, standard deviation, skewness, and so forth. .

1.2.4 Method of Data Collection

Our data collection method involves two components:

- Firstly, the *monitoring process*, which consists of a careful inspection of the company's various activities to gain an in-depth familiarity with them. At this stage, we will note and record the information available from observation.

- Secondly comes the *interrogation study*, where relevant information are searched and gathered to address the different issues raised by the former step. As far as our case study is concerned, many channels will be explored, including:

  - Conversational interviewing of well-informed people in the organisation: financial analysts, research and development department, CFO and accountants, …)

  - Document analysis (annual reports, bonds issue prospectuses, Ghana Stock Exchange Fact Books, etc.)

1.2.5 Data Analysis, Interpretation and Reporting

Throughout the study, we intend to perform many analyses to elicit the different findings. Although qualitative analyses are more needed, we shall try, where possible, to reach the ideal of the quantitative analysis in substantiating our arguments and views.

The collected data are both secondary and primary.

CHAPTER TWO: LITERATURE REVIEW

After President Nixon announced in 1971 the suspension of the gold convertibility of the dollar, significant fluctuation margins developed among major currencies. Very soon, the fixed parity rule was abandoned and in 1973, the dollar started to "float" depending on market quotations. The 1976 Jamaica Conference officially confirmed those changes by setting a floating exchange rate rule, with the dollar as landmark currency.

As a major turning point for the international monetary system, this shift to a floating rate-system was not the free choice of policymakers, per se. Rather, events have compelled them to admit that floating was the only system compatible with the separate macro-economic choices of nations and the intense scrutiny of financial markets. Moreover, it transpired - as pointed out by Richard Levich (1998) - that "the tendency for countries to place domestic economic priorities ahead of external economic commitments and the increase in international capital movements meant that exchange rates needed to become more flexible to equilibrate international movements."

No sooner had that floating rate system started than increased exchange rate volatility became a great concern, calling for new reflections and solutions. Economists responded with enthusiasm, providing an abundant literature. Hosts of books, articles and journals have studied the question intensely for the last 25 years.

In this chapter, our purpose is to summarize some of their findings. The first section will provide a general literature review. The second section seeks to examine the topic more specifically, by focusing on writings (if any) related to the professional angle of currency-risk.

2.1 GENERAL LITERATURE REVIEW

A review of both theoretical and empirical propositions on the subject matter of our study is the main focus of this section. Throughout its development, we intend to touch many topics.
The Purchasing Power Parity Theory will be our starting point. Later, Fisher parities will be examined before we could shift to the more specific concept of currency risk as presented by Richard Levich (1998), E. Clark & B. Marois (1996), Meir Kohn (1994), Stewart C Myers, Alfred Kenyon (1981), from a purely practical point of view.

2.1.1 The Purchasing Power Parity (PPP)Theory

The PPP theory is associated with Gustav Cassel (1922) who advanced it as a technique for setting rates after the disruptions of financial markets during World War I. It should however be recalled that the essential elements of PPP have been traced back to David Hume and David Ricardo. What is the theory about?

Behind the Purchasing Power Parity (PPP) lies the idea that exchange rates adjust to keep purchasing power constant among currencies. The early work on this topic was built on the notion of arbitrage across goods markets and the "Law of One Price". In fact, assuming a Perfect Capital Market (PCM[7]) setting, Gustav Cassel (1922) showed that homogenous goods would sell for the same price in two markets, taking into account the exchange rate.

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[7] The standard PCM assumptions are (1) no transactions costs; (2) no taxes; and (3) complete certainty.

Actually, there are two forms of PPP: absolute PPP and relative PPP.

2.1.1.1 Absolute PPP

In <u>Fundamental of Corporate Finance</u>, Ross *et al* (1998*)* stress that the basic idea behind "Absolute Purchasing Power Parity (PPP)" is that a commodity costs the same, regardless **what currency** is used to purchase it or **where** it is selling. In other words, absolute PPP says that $1 will buy you the same number of, say, hamburgers, anywhere in the world. "This is a very straightforward concept", concluded the authors.

Developing the same absolute version of the PPP, R. Levich (1998) went farther in his illustrations by using a basket of goods. He then concluded that, according to absolute PPP, "the price of a market basket of US goods equals the price of a basket of foreign goods when multiplied by the exchange rate".

As a consequence, what is true about one good (according to Ross et al) is also true for a basket of goods. However, the latter raises an important issue: given a set of price indexes, absolute PPP will require that the consumption basket (and the weights of individual goods within the basket) are identical across the countries. When this assumption fails, absolute PPP will fail. As we shall soon see, relative PPP offers a way of dealing with the shortcomings that plague absolute PPP.

2.1.1.2 Relative PPP

Instead of telling us what determines the absolute level of the exchange rate, relative PPP tells us what determines the change in the exchange rate.

More specifically, relative PPP says that given two countries, the change in the exchange rate is determined by the difference in the inflation rate of these two countries.

Such conclusions make sense. The Relative PPP provides that PPP is not thought of as a causal relationship. Despite its relevancy, relative PPP lies on assumptions - (1) no transactions costs; (2) no taxes; and (3) complete certainty - that are not realistic. Hence, the doubt about how PPP might survive in the real world of transaction costs, taxes, and uncertainty.

Conducting an interesting analysis (he called it "Relaxing the perfect Capital Market Assumptions"[8]), Richard Levich (1998) reached the conclusion that "the relaxation of each assumption - transaction costs, taxes, and uncertainty- results in a wider band around the PPP line before arbitrage becomes possible. To put this another way, PPP which relies widely on commodity arbitrage assumptions, seems not to hold in the real world. We

Empirical Evidence of PPP on Exchange Rates

To check out whether the Purchasing Power Parity holds in the real world or not, economists have over the last three decades, performed a host of empirical tests. Findings from these investigations (see below) have shown that the theory's validity widely depends on both *time length* and on *the rate of inflation* prevailing in the sample countries.

1- Based on a set of quarterly data for the $/DM exchange rate and the US and German consumer prices over the 1973-1993 period, R. Levich (1998) came out with the

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[8] Richard Levich, in International Financial Markets: *Prices and Policies*, p.107

conclusion that in the short run "PPP is a poor explanation of exchange-rate changes[9]".
Contrariwise, he suspected the possibility that quarterly exchange rates might be driven
by factors other than the contemporaneous inflation differential.

2- Most recently however, longer time series of exchange rates have been used to reach
more definitive conclusions regarding PPP. The main findings showed the tendency for
the real exchange rate to return to its initial value. This conclusion has later been
confirmed by Niso Abuaf and Philippe Jorion (1990)[*] whose investigation of an 80-year
series of $/£ and $/Fr exchange rates demonstrated a clear tendency of the real exchange
rate to revert back to its central value. Seemingly, it can be argued that PPP holds in the
long run.

Another researcher, Maurice Obsfeld (1995)*, having looked at exchange rate changes
and inflation over a 20-year period (1973-1993), reached a similar conclusion.
These results show convincingly that over the modern period, the long run variation in
exchange rates changes across countries is largely dependent on differences in rates of
inflation.

Jacob Frenkel's (1980)* work on the topic is also worth highlighting since it
demonstrated that in hyperinflationary economies, evidence is more favourable to the PPP
theory.
These findings are very important for management decisions, especially in the formation
of strategies toward international business. In fact, as stressed by Richard Levich (1998),
" when parities hold, a source of risk and a source of opportunity disappear; therefore, a
decision point is removed." But as shown by the empirical evidence, while on average,
parity conditions may hold, at many times, they are violated. As a result, Richard Levich
(1998) concluded that " managers are not relieved from having to make critical financial
decisions". These decisions are of two categories: profit maximizing decisions and risk
managing decisions. The latter is the quintessence of this study, to which we will come
back later. Before that, we need to look at the Interest Rate Parity theory and at Fisher
Parities.

2.1.2   The Interest Rate Parity

2.1.2.1 The Theory statement:

- *Relationship between interest rates, spot and forward exchange rate*

The Interest Rate Parity (IRP) is the cornerstone to most, if not all, of today's international
financial transactions. As a theory, it was first developed by J.M. Keynes, in 1930[10].

IRP theory states that on perfect money markets, the forward discount or premium on the
foreign exchange market is equal to the relative difference between the two nominal interest
rates. We can see that here, the focus shifts to parity conditions that link spot and forward
exchange markets.
To say this another way, "IRP draws on the principle that, in equilibrium, two investments
exposed to the same risks must have the same returns" Richard Levich (1998).

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[9] Ibid, p.113
[*] Quoted by Richard Levich (1998), in International Financial Markets: *Prices and Policies,* pp 114-115
[10] J.M. Keynes (1930), in *A Treatise on Money*, quoted by E. Clark (1996) in *Managing Risk in International Business*

- *Relationship Between Forward Exchange Rate and Expected Spot Exchange Rate: the Unbiased Forward Rates (UFR)*

Loosely, the UFR condition says that, on average, the forward exchange rate is equal to the future spot exchange rate.

2.1.2.2 Empirical evidence of IRP

Early studies found substantial deviations from IRP which were attributed to transaction costs, differential market liquidity, differential investment risk, and a failure of the supply of arbitrage funds to respond with perfect elasticity in response to an arbitrage incentive (Frenkel and Levich, 1975)
.
Later, with the introduction of the Eurocurrency markets in the 1960s, evidence for the validity of IRP was once again tested. Three studies, one by R. Aliber (1973), one by R. Marston (1976) and another by R. Roll and B. Solink (1977), found that IRP holds almost perfectly in the Eurocurrency markets. These results simply show that the "IRP condition is extremely robust in the Eurocurrency market." Richard Levich (1998).

Up to this point, we have developed three relationships: PPP, IRP and UFR. They respectively describe the relationship between exchange rates and inflation (PPP), between interest rates and spot and forward exchange rates (IRP) and finally, the relationship between spot and forward exchange rates (UFR). Still, many questions, critical to the understanding of our study, are left unanswered, i.e.:

- Is there any relationship between nominal and real interest rate?
- Is it possible that the interest rate differential across pairs of currencies embodies information about the likely exchange rate between these units of account?

Irving Fisher (1867-1947) who developed what is nowadays known as "Fisher Parities", which we are yet to examine, has provided interesting responses to these interrogations.

2.1.3   The Fisher Parities

" In a financial market, prices tend to reflect information. The Fisher Parities describe how information regarding expected inflation and expected exchange rates are captured in current interest rates" (Richard Levich, 1998). We distinguish the Fisher Effect and the International Fisher Effect.

2.1.3.1 The Fisher Effect

Basically, the Fisher Effect represents another example of arbitrage, this time between real assets and nominal (or financial assets) within a single economy. In fact, Irving Fisher suggested that the nominal interest rate(r) be split into two components: the real interest rate (ρ) and the expected rate of inflation (i^*). Stated formally, this relation can be written:

$$1+r = (1+ \rho)[1+ i^*]$$
$$\text{Or} \quad 1+r = 1+ i^* + \rho + \rho.i^*$$
$$r = i^* + \rho + \rho.i^*$$

In countries where the expected rate of inflation is high (like in Ghana), the final cross-product term can be important. But in most developed countries where inflation and the real

interest rate are low (which is especially true for the five last years), the Fisher Effect is usually approximated as:

$$r = i^* + \rho$$

Wordily translated, the Fisher Effect is as follows:

% Nominal interest rate = % real interest rate + %expected inflation rate

2.1.3.2 The International Fisher Effect (IFE)

In addition to this important relationship (Fisher Effect), Fisher also realized that interest rates across countries must be set with an eye toward expected exchange rate changes. Finally, he came out with an interesting equation stating that, under Perfect Capital Markets assumptions:

% expected exchange rate change = % expected interest rate differential

This relation and the IRP are alike, except the fact that the International Fisher Effect (IFE) contains an exchange risk. This is because only three variables out of the four used can be observed at the time when the transaction is pictured. The fourth (forward rate, or expected future spot rate) is unknown, conditional on today's spot rate and the pair of interest rates.
Further derivations of the IFE have led to surprising conclusions. An example is the one revealing that IFE implicitly assumes that *real interest rates are equal across countries*.
Although from the same author, the Fisher Parities have nourished passionate debates among economists as to the empirical validity of the above relationships. Findings on the matter are thrilling.

Empirical Evidence of the Fisher Parities

- The historical evidence is consistent with the Fisher Effect. Many researchers came to realize that most, if not all, of variations in nominal interest rates could be attributed to changing inflationary expectations. That is, most countries show a strong correlation between inflation and nominal interest rates.

- Contrariwise, "whether or not real interest rates are stable and equal across countries is a more difficult proposition" E. Clark and Bernard Marois (1996).

- E. Kane and L. Rosenthal (1982) studied the subject in the Eurocurrency market over 1974-1979 and found support for the IFE. F. Mishkin (1984) on the other hand came out with the conclusion that real interest rates are somewhat variable over time and differ across countries. Perhaps the most difficult problem in testing the validity of the IFE is that the expected inflation itself cannot be observed directly. There lies the most convincing reason underlying the contradictions in the findings from various empirical tests on the International Fisher Effect.

Seemingly theoretical and highly stylized on the basis of some unrealistic assumptions, the above developments constitute the anchoring point for understanding and explaining the international financial environment, source of the currency risk which our study is mainly about. But, what is currency risk? How can it be explained? How can managers involved in international business cope with it?

Albeit more practical in their form, these questions have long been dealt with. Moving along lines similar to those in the foregoing paragraphs, our next point will review the associated literature.

2.2   What Professionals Have Written About Currency Risk.

Here in this section, we intend to examine the literature on currency risk in the professional world. Specifically, we will review the works focusing on:

- the nature, the assessment and the management of currency exposure in general;
- the nature, the assessment and the management of currency exposure in Ghana;
- currency risk management in HFC.

2.2.1   The Currency Risk Concept

The current system of floating exchange rates that replaced the Brettons Woods fixed rate system has made currency risk an important component of international business risk. No wonder the business world has little doubt about the existence of it. Alfred Kenyon (1981) has given an illustration of this common awareness about currency risks in international business, as follows:

> "It is widely known that J. Lyons of teashop fame had to sell their teashops and lost their independence because they borrowed non-sterling currencies to finance assets in the United Kingdom, and that Royce recorded a very large loss in 1979 because they had taken major contracts in US dollars"

Yet, to the question "What is currency risk?" there is no template-like answer! There seems to be rather less agreement on just what is a currency risk. Books on the topic use a number of expressions like economic, transaction, accounting, translation, and balance sheet exposures, but they do not all define them in the same way. Very few authors have tried to set out rigorous or formal definitions.

One author who does define exposures formally is David P. Walker (1978)[11]. According to him, " an asset, liability or income-stream is exposed to exchange rate risk when a currency movement will change, for better or worse, its parent currency value".

E. Clark and B.Marois (1996), defined currency risk as "volatility of the exchange rate", whereas Professor S. Ross (1998) of Yale University found in this kind of risk, "the natural consequence of international operations in a world where relative currency values move up and down".

According to these authors, currency exposure is intimately linked with the fluctuating nature of exchange rates in international financial markets. Despite their relevancy, some caution is in order using them, because they don't wholly capture the issue of currency exposure. They are likely to limit currency exposure to international firms with sales and production operations in foreign currencies.

To provide a more accurate definition, Richard Levich (1998) laid on the concept of currency risk (exposure) a purely mathematical sight. Currency exposure, he explained, is

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[11] See Alfred Kenyon, Currency Risk Management (1981)

"the sensitivity of the market value of the firm to a change in the (local to foreign currency) exchange rate". This definition has the advantage of extending exchange rate exposure to a wide range of firms, including those with domestic operations and with assets and liabilities denominated in domestic currency only.

Throughout our study, currency exposure will be used in either of the previous meanings, depending on the focus.
As a final word, it is important to recall that in finance, we can distinguish many types of currency exposure: accounting currency exposure, economic exposure, balance sheet or translation exposure, transaction exposures, etc. Let's have a look at their individual meanings.

Accounting Versus Economic Currency Exposures

David P. Walker defines an accounting exposure as the " possibility that those foreign denominated items which are consolidated into a company's published financial statements will show a translation loss (or gain) as a result of currency movements since the previous balance sheet date." In economic exposure, he sees "the possibility that the parent currency-denominated net present value of the foreign subsidiary's cash-flows will be aversely affected by exchange rate movements".

On the same wavelength with Walker is Andreas Prindl (1976) who sees in accounting risk, the possibility " that the publicly stated value of the company's assets, equity and income may be aversely affected by the movement of currencies in which it has dealings".

Unlikely, his view of economic exposure takes in " the whole range of the future effects of parity changes which have occurred or may possibly occur in the future". It includes the case "where an actual conversion may be made or where the cash-flow effect of an exchange loss is an impediment to the operations of one subsidiary, but also " the impact on future sales of a company situated in a country whose currency has appreciated, or future profits where the local currency has depreciated".

Translation Versus Transaction Currency Exposure

After defining accounting and economic exposures, Andreas Prindl goes on to say that " the impact of actual conversions is called ' transaction exposure', adding that, this is not all-encompassing as the term 'economic exposure'." This point makes translation and transaction exposures worth looking at.

John Heywood[12] (1978) defines translation or balance sheet exposure much as David Walker defines accounting exposure. But to explain economic or transaction exposures, he quotes the simplest case where a company has " one export order to sell goods in a currency. If the currency in which the goods are invoiced appreciates, the company will make a gain; if it depreciates, the company will suffer a loss. He adds that " the exposure arises as soon as the order is taken, but it will not show in the financial accounts... until it becomes a 'receivable'."

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[12] Quoted by Alfred Kenyon, *Currency Risk Management*, 1981

J.A. Donaldson (1980) distinguishes between transaction and translation exposures. Transaction exposures "are revenue in nature and exist for relatively short periods". He says that a sale from seller to buyer in another country must be in the currency of, at best, one of them, and the other one has an exposure, but only " when there is a period of delay in payment for the goods" and " most transaction exposures arise from the granting of credit". Translation exposures, on the other hand "relate to the balance sheet and are in existence for periods in excess of a year."

These examples show "that the terminology is not yet agreed. There is some similarity of views about balance sheet, translation and accounting risk, which most authors treat as almost interchangeable terms." For the economic exposure, things are still foggy. For example, what Donaldson calls transaction currency risk, Prindl considers it an economic exposure.

To gain a clearer understanding of the above classifications, a look at the different currency risk measures may be worthwhile.

2.2.2 How can currency exposure be assessed?

A company with an open foreign exchange position (short or long) incurs a currency risk, i.e. a potential gain or loss depending on the currency's future rate. This exposure can be measured in several ways.

- E. Clark and B. Marois (1996) distinguish two methods: the first method limits the analysis to commercial transactions and financial flows whereas the second looks at the overall balance sheet, including foreign investments and liabilities.

- Using another approach, Richard Levich (1998), distinguishes what he calls "accounting measures of foreign exchange exposure" and "economic measures of foreign exchange exposure", the former being split into translation exposure and transaction exposure.

The Accounting Measure Method

Basically, the departure point for the accounting method is the information in the company's accounts. Accounts receivable and short-term financial claims grouped by currency indicate the firm's long position whereas accounts payables and short-term financial liabilities grouped by currency indicate the firm's short position. For accounting purposes, the definition of net exposure is *exposed assets minus exposed liabilities*, provided that the accounting information is complemented by the expected cash flows resulting from decisions that have been made or are likely to be made. But, as stressed by E. Clark and B. Marois (1996) cash flows from non-commercial transactions (dividend payments and debt amortization) must also be considered. The assessment of the company's currency exposure requires mastery of all the firm's decision-making circuits. In fact, more than a mere accounting issue, currency exposure reflects the company's economic position in foreign exchange. Hence, the necessity of economic measures.

The Economic Measure Approach

As underlined by Richard Levich (1998), an economic measure of foreign exchange exposure captures more than the combination of effects on balance sheets items (translation exposure) and on planned transactions (transaction exposure)". It captures the

entire range of effects on the future cash flows of the firm, including the effects of exchange rate changes on customers, suppliers, and competitors.

At the present point, it might be helpful to stress that economic measures can be designed in two ways: the *regression approach* which Richard Levich qualified as " the most appealing method of measuring economic exposure" and *the scenario approach.*

- The regression approach is a model that directly measures the exposure of a firm to exchange rate changes, by estimating the relationship between the firm's market value at time *t* (MV$_t$) and the spot rate (S$_t$) using the equation:

  MV$_t$ = a + bS$_t$ +e$_t$, where

    - The coefficient **b** measures the sensitivity of the market value to the local to foreign currency exchange rate. Dimensions of b should be in foreign currency, which coincides with the definition in Michael Adler and Bernard Dumas (1984) that exposure is an amount of foreign currency that represents the sensitivity of the real value of the firm to random variations in the exchange rate.

    - "**a**" is a constant variable, a provision for the part of the market value variation, the explanation of which lies in other factors.

    - "**e$_t$**" is the standard error

- The scenario approach on the other hand, is built on a series of assumptions where one is encouraged to ask a variety of " what if" questions to estimate the firm's cash flows conditional on an exchange rate. The scenario approach is well suited to a spreadsheet analysis.

Further in the study, we will only use accounting approach to evaluate the Home Finance Company currency exposure, in the case of her foreign denominated housbonds.

2.2.3   Currency Risk Management

As previously discussed throughout the literature review of the currency risk definition and assessment, exchange rates changes may have complex and subtle effects on the company's performance. Hence, the necessity of hedging. Along with the financial markets development, many tools, techniques and strategies have been developed to cover currency risks.

In developed countries, hedging strategies are many. They help firms of any size to mitigate currency risks. Richard Levich (1998), examined some of those techniques such as currency forward contracts, currency futures, currency options, currency swaps, etc. According to him, "an important step in the process of determining financial hedging instruments for a firm is to firstly analyze its currency cash flows. Three aspects of the cash flows are critical: the frequency of foreign exchange currency cash flows, the number of currencies, and the degree of certainty about the cash flows." Moreover, not all these techniques can be used in all cases.

Generally, the success of hedging with derivatives widely depends on both the hedger's mastery of the techniques used and the suitability of these techniques. Whenever this side of the coin was ignored, the results have been disappointing.

"Using a 350-firm sample to examine whether firms that use derivative exhibit more or less foreign exchange exposure to foreign risk, George Allayanis and Eli Ofek (1996) found that the use of currency derivatives significantly reduces the firm's exposure to exchange rate risk" Richard Levich (1998).

E. Clark and B. Marois explored other simpler hedging strategies available in developed countries. Designed to help companies avoid currency mismatches, these techniques include the choice of invoicing currency, the payment terms in international trade, etc.

Globally, we can see that in industrialised countries, as far as currency risk is concerned, " the bull has long been taken by the horns".
In contrast, studies of the currency risk management in developing countries are scarce. The few studies that have tried to examine the question have largely focused on Latin America whose impressive experience could not but attract researchers' curiosity.

Our conviction is that the time has come for such studies to touch the other countries of the Third World. That is why we undertook this work on a company operating in Ghana where not much of research of this type has been performed. As a matter of fact, most recent studies published by the Central Bank of Ghana on exchange rates have only emphasized the macro-economic side of the topic leaving its micro aspect to the responsibility of private companies. Most of the latter, having no appropriate tools to face their exposure, adopt a "do nothing approach".

Further in this study, we will figure out how currency risk has been dealt with at Home Finance Company, a housing firm with foreign denominated debts. In the meantime, let us look at currency volatility in Ghana from 1998 to 2002.

CHAPTER THREE: EXCHANGE RATE VARIABILITY IN GHANA: A STUDY OF THE CEDI VOLATILITY (1998-2002)

This chapter considers the question of volatility. In section One, we firstly lay a theoretical view on the concept before examining the Ghanaian historical experience of currency volatility. Section Two provides a study of the cedi volatility against US dollar and UK Pound Sterling, from 1998 through 2002.

3.1 THE CONCEPT OF CURRENCY VOLATILITY AND ITS EXPERIENCE IN GHANA

In the first part of this section, we will concentrate on the controversial concept of volatility. We later focus on the historical experience of instability in setting up appropriate exchange rate policies for Ghana.

3.1.1 VOLATILITY, KEY FEATURE OF TODAY'S FINANCIAL MARKETS

Over the past ten years, we have witnessed a remarkable turnaround in the Third-World economy. Many developing countries that were being financially integrated with the world have experienced sudden gyrations in capital flows and commodity prices, moving from surges in financing to sharp cuts. This has made the struggle to understand developments in the economy and financial markets particularly challenging for monetary policymakers, including the Federal Reserve, where scholars were puzzled by a number of issues related to assets bubbles - i.e. "surges in prices of assets to unsustainable levels" (Alan Greenspan, August 2002). As a consequence, there is renewed interest on the debate about whether more stable relationships among G-3 currencies can bring about greater stability to the world economy in general, and to the developing countries in particular (Williamson, (1986) and Currie and Wren-Lewis, (1990))[13].

Following the same path, influential people like Paul Volcker and George Soros have recently stated that "...the impact of the global economy on emerging countries is driven significantly by swings among the currencies of the three major economic powers. In recent years these swings have been enormous, volatile and frequently unrelated to underlying economic fundamentals ... The current G-3 authorities intervene on a totally ad hoc and episodic basis, without any clear sense of a sustainable equilibrium. Such intervention typically comes too late to prevent severe currency misalignments. These imbalances in turn, trigger major economic distortions, protectionist trade pressures, and inevitably sharp currency reversals that generate a second round large costs." (Allaire et al, 1999)

More recently, it has also been argued that G-3 instability may have been at the root of some of the currency and financial crises that have affected several developing countries. Whatever the source, the truth is that currency volatility has become a major concern to both mature and emerging or developing economies.

In this section, the emphasis is on currency volatility. We start by defining the concept of volatility, its typology and assessment. The remainder of the section is devoted to Exchange Rates Policies in Ghana.

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[13] Quoted by Gerardo Esquivel and Felipe Larraín B. (2002)

3.1.1.1 Defining Volatility

Though well known to the majority of investors in the financial markets, volatility is not in theory, so easy to apprehend. There are numerous definitions to the concept. Having been found relevant, some are worth mentioning here. Before giving our own comprehension of the matter, we need to have a look at it.

In what was probably the first attempt ever made to define volatility, Louis Bachelier[14], a century ago, coined the term " coefficient of nervousness" or "instability" of the price, a way of picturing the importance of changes in the magnitude of prices on volatile markets.

The same phenomena has been rendered by Tumpell-Gugerell in a speech to the Third International Meeting in Madrid (2002) in a short definition stating that:" [A price] volatility refers to the intensity of the fluctuations affecting this price".

With no reference to time, these two definitions might seem incomplete. But they have the merit of emphasizing the erratic meaning of volatility.

Departing from the views expressed above, Dr Sam Vaknin in a recent article, clearly stressed that " Volatility is a form of market inefficiency, a reaction to incomplete information".

No less surprising is Robert Shiller's (1990)[15] work on the topic, since his investigations led to the conclusion that volatility is the manifestation of investors' psychological behaviour. He continued, claiming that "substantial price changes (i.e. volatility), can simply be explained as a collective change of mind by the investing public..." (David Sophister, 2003), a position hotly disputed.

No matter how the issue is explored, volatility, in our opinion, embodies a notion of *intense changes in price over a short time-period*. It is the tendency of an asset's price to rise and fall frequently within a short period. To say it another way, volatility is the rate at which an asset moves up and down over the time. As such, volatility can either be backward looking (historical volatility) or forward-looking (implied volatility).

Historical Volatility (HV) or Implied Volatility (IV)?

- *Historical or realized volatility* is captured from historical prices often gathered on a daily basis. It has been argued that "the further back one looks in time...the less one has to worry about uncertainty in the estimate of volatility due to small sample size" (Gregory, 2003). However, depending on specific purposes or investor's expectations, it might be relevant to distinguish between *near past* and more *distant past*. Such distinctions become pertinent particularly when market expectations show that a past period of high variability is not representative. What we are going to analyse in the second section is the cedi historical volatility.

  Although historical data should not be ignored, investors and central bankers are more interested in forward-looking information. Hence, the vital role of implied volatility for investment decisions.

- *Implied volatility* is used to derive or deduce a financial asset's volatility from its option's price. According to Richard Levich (1998), implied volatility is "the volatility figure that

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[14] In *Théorie financière*, p.53
[15] In *Market Volatility*, pp 1-4

equates the 'model price' from a particular option pricing equation with the market price as observed in the option market". In light of this definition, implied volatility appears to be the figure that should denote the extent to which the return of the underlying asset of an option would fluctuate until the expiration date of the option.

In short, implied volatility in an efficient market is expected to provide an unbiased prediction of future (realized) volatility. But the evidence on foreign exchange markets seems not to support such assertion. For instance, the evidence in Philippe Jorion (1990)[16] suggests that implied volatility is a "fairly poor predictor of future volatility"

In conclusion, both historical and implied volatility are of critical importance for traders: relying on implied volatility alone is as risky as sticking to a backward looking volatility. Whilst the former may thoroughly reveal the underlying assets' current volatility, only the historical volatility can help us understand whether or not option are realistically priced.

As the only not directly observable variable, volatility has been said to be a major shortcoming in The Black and Scholes Option Pricing Model. This debate has somehow made the quantification of volatility a Nobel Prizes Topic. (Dr Sam Vaknin, 2003)

3.1.1.2 Measure of Volatility

"Volatility is considered the most accurate measure of risk" (Sam Vaknin, 2003). It is calculated by using the variance or annualized standard deviation of the return, i.e. the daily change in price. Measuring the cedi volatility can then be thought of as determining how far away from the average, changes in this currency's exchange rate return are likely to be.

Though generally accepted by practitioners, these statistical definitions of volatility are somewhat confusing. There is a disagreement among scholars and traders whether one should better use historical data or current market prices- which include expectations - to estimate volatility (Sam Vaknin, 2003). This excerpt from Richard Levich (1998) may provide us with a better understanding of the controversies:

> "A related issue is how to estimate σ, [i.e. volatility]. Volatility can be estimated from historical data, but option-pricing theory provides no guidance about how the estimate should be constructed. Should we use the last 20 trading days, the last 260, or more? Should we weight observations equally or weight more recent observations more heavily?
> If we use daily data, should we construct an annualized volatility measure by multiplying by $\sqrt{260}$ (the number of trading days in the year) or by $\sqrt{365}$ (the number of the calendar days in the year)? Should we use the classical statistical estimator of volatility, $\sigma^2 = \sum(x_i - x^*)^2 / (n-1)$, or an alternative estimator based on the daily range of prices?" Richard Levich (1998), p.432.

Mike Mulholland (2003) expressed the same concern. He underlined that one problem in using historical data is what time interval to use. In his opinion, although we ultimately want the standard deviation of year-to-year changes, it is not advisable that we use annual prices as inputs. Otherwise, we would be using a very small number of observed prices. Instead, he suggested the use of daily prices, collected at a consistent time of the day, generally at closing.

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[16] Quoted by Richard Levich (1998)

As far as currency volatility is concerned, Gerardo Esquivel and Felipe Larraín B (2002), in a study on the Impact of G-3 Exchange Rate Volatility on Developing Countries also mentioned that " one of the most common measures of exchange rate volatility is the standard deviation of the growth rates of real exchange rates".

An alternative measure of exchange rate volatility is defined as the time varying twelve-month coefficient of variation of the real exchange rate. The methodology used in our study is detailed in Section two.

"Is Volatility Constant or Does volatility Vary": A Currently Debated Question

Whether volatility is constant (as assumed by the Black and Scholes Option Pricing Model) or not, has recently become a seriously controversial topic.
Whilst arguments in favour of a changing volatility are widespread, Richard Levich's opinion is fairly equilibrate since he warns that "it should be clear that volatility is the result of macroeconomic fundamentals. There is no reason that σ **(volatility)** should be constant although it may be convenient and not inappropriate to model it as constant over certain periods".

Our opinion is that volatility is variable. Empirical evidence supports that volatility in markets can rise or fall depending on macroeconomic fundamentals fluctuations. A good illustration, as we shall soon discover, is the Ghanaian experience.

3.1.2   EXCHANGE RATE POLICIES IN GHANA: THE BACKGROUND

From 1960 to date, Ghana has seesawed between fixed and floating systems. The associated exchange rate regimes are twofold: the one from 1972-1983 and the current one, which started in 1983 onwards.

3.1.2.1   Exchange Rate Policy in Ghana: 1972-1983

Conformably to the thinking of Bretton Woods Accords, Ghana adopted during the 1960s, the policy of fixed exchange rates. Owing to an extensive support from multilateral partners, this regime supposed no adjustment of the parities, except when there was a fundamental balance of payments disequilibrium. No significant disturbance occurred. The policy was then successful, consistent and made good sense, being by all means, the one adopted by most countries in the world. The paradox was however that Ghana maintained her fixed rate policy until the second half of 1980s, despite the breakdown of the Bretton Woods system and the shift to the floating system by most industrialized countries since 1976. Not so much that the fixed exchange rate regime was a panacea for Ghana. Rather, the highly overvalued official exchange rate, the active parallel market in foreign exchange and capital controls that characterized the regime might reasonably have been expected to produce the local currency's devaluation. But this did not occur. According to Aryeetey et al (2000), the reason for such reluctance on the part of the policymakers to alter the exchange rate was a concern about "adverse political repercussions".

For instance, a prior devaluation (1971) ended up with a military coup: "the government was [then] outset and the currency revalued by 29%", the new leaders arguing that the conditions of a successful devaluation did not exist. Looking back on those years, it appears that by revaluing the currency, the new government rejected the use of exchange rate as a monetary policy instrument. Policymakers at that time seem to have ignored that fixed exchange rates

systems need to be supported by sound monetary and fiscal policies. If fiscal and monetary policies are not consistent with the currency's parity, it is necessary that the parity be adjusted. To the new leaders, this truth was worthless. As a result, it wasn't until 1978 that the unsustainable overvaluation of the local currency led to another devaluation. Political concerns delayed the associated nominal exchange rate adjustment for five years, until 1983 which marks the shift to the second exchange rate policy.

3.1.2.2   Exchange Rate Policy : 1983-1993

By 1983, it has become clear to policymakers that the solution to avoid deflation of the economy was the exchange rate adjustment. In fact, support of the fixed exchange rate of the 1970s has long been withdrawn and the economy was dramatically suffering a short of foreign exchange inflows. Reforming the foreign exchange regime was unavoidable, the objectives being to realign the exchange rate, to achieve a convergence of official and parallel markets rates, to absorb the parallel market into the legal market and to allow free determination of the exchange rate by the market forces. Still, as in earlier years, the political implications of devaluation were a major consideration. (Aryeetey et al, 2000).
Gradually, the transition to a liberalized exchange rate system was begun in 1983 with a system of bonuses and surcharges that led to multiple exchange rate system. "Traditional exports and imports of crude oil, essential raw materials, basic foodstuffs and capital goods were subject to a rate of ¢ 23.3985=US$1.00. The rate for non-traditional exports and other imports was ¢ 29.985=US$1.00. The exchange rate was unified six months later at a rate of ¢30=US$1.00" (Table 3.1). (Aryeetey et al, 2000). Once the initial large exchange rate adjustment had been introduced, it was followed by more frequent adjustments based on a quarterly purchasing power parity principle of exchange rate determination. In this course of adjustments, "the cedi stood at ¢ 90=US$1.00 by January 1986" (Ibid).

Transition by the foreign exchange auction started in September 1986 with an official two-tier exchange rate system which was unified in February 1988 at ¢ 150 per US$. The auction system behaved erratically[17] and took over 210 auctions and four years to achieve its objectives[18]. Later began the third phase of the exchange rate reform with the legalisation of the parallel market through the establishment from February 1988, of foreign exchange bureaux. These bureaux were authorized to trade in foreign currencies without having to verify the source of the foreign exchange or the purpose for which it was demanded. (Ibid.)
Thus, slowly but surely, Ghana moved to a market-determined exchange rate. By early 1990s, a degree of de-politicization of nominal exchange rate changes had occurred via gradual shift to a floating exchange rate mechanism. Direct fixing of nominal exchange rates was definitively forfeited and replaced by indirect tools: fiscal and monetary policies.

From the foregoing analysis of exchange rates policies in Ghana since the 1980s, it can be understood that the currency has erratically shifted from periods of under-valuation to periods of overvaluation. Many studies have debated the causes of the matter and attributed the exchange rate appreciation that occurred between 1982 and 1993 to rising public sector expenditures (Islam and Wetzel, 1994)[19]. On the other hand, Younger (1992), argued that nominal devaluations in Ghana have been excessive. This view has been contested by Bank

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[17] As predicted by Grilli and Kaminsky, (1991) quoted by Aryeetey (2000), the auction was initially characterized by increased instability, depreciating from ¢1.00 to US$128 to ¢145 to US$ 1.00. Thereafter the movements became smoother
[18] The auction's objective was primary to narrow the spread between the official and the parallel market.
[19] Quoted by Aryeetey, 2000

of Ghana staff who stressed that the cedi's value should be allowed to reflect underlying domestic economy and that the root causes of inflation (such as government deficits) should be tackled instead.

Years	Nominal Exchange Rates (¢ per US$)	Nominal Exchange Rates (US$ per GBP)	Nominal Exchange Rates (¢ per GBP)	Appreciation (Depreciation) Rate			Inflation Rate %
				USD/GBP	¢/USD	¢/£	
1971	1.82	N/A	N/A	N/A	N/A	N/A	9.28
1972	1.28	2.35	3.01	-	-42%	-	10.04
1973	1.15	2.32	2.67	-1%	-11%	-12%	17.51
1974	1.15	2.35	2.70	1%	0%	1%	18.35
1975	1.15	2.02	2.33	-16%	0%	-16%	29.68
1976	1.15	1.70	1.96	-19%	0%	-19%	56.34
1977	1.15	1.91	2.19	11%	0%	11%	116.25
1978	2.75	2.03	5.59	6%	58%	61%	73.16
1979	2.75	2.22	6.12	9%	0%	9%	54.49
1980	2.75	2.39	6.56	7%	0%	7%	50.09
1981	2.75	1.98	5.45	-20%	0%	-20%	116.45
1982	2.75	1.61	4.44	-23%	0%	-23%	22.31
1983	30.00	1.45	43.52	-11%	91%	90%	128.71
1984	50.00	1.16	57.83	-25%	40%	25%	10.31
1985	59.99	1.44	86.66	20%	17%	33%	24.6
1986	90.01	1.47	132.72	2%	33%	35%	39.81
1987	176.06	1.87	329.50	21%	49%	60%	31.34
1988	229.89	1.81	415.99	-3%	23%	21%	25.22
1989	303.03	1.61	486.51	-13%	24%	14%	37.24
1990	344.83	1.93	664.83	17%	12%	27%	18.03
1991	390.63	1.87	730.75	-3%	12%	9%	10.06
1992	520.83	1.51	787.49	-24%	25%	7%	24.96
1993	819.67	1.48	1,214.10	-2%	36%	35%	24.8
1994	1,052.63	1.56	1,644.73	5%	22%	26%	74.34
1995	1,449.28	1.55	2,246.38	-1%	27%	27%	70.8
1996	1,754.39	1.70	2,978.95	9%	17%	25%	32.6
1997	2,272.73	1.65	3,758.64	-3%	23%	21%	20.8
1998	2,325.58	1.66	3,868.60	1%	2%	3%	14.6
1999	3,535.14	1.62	5,714.20	-3%	34%	32%	12.4
2000	7,047.65	1.49	10,516.50	-8%	50%	46%	25.2
2001	7,321.94	1.45	10,619.74	-3%	4%	1%	32.9
2002	9,438.82	-	-	-	22%	-	16.4

Sources:
World Bank: World Economy Outlook 2002(Appendixes)
IMF, International Financial Statistics
Aryeetey, 2000 (Economic Reforms in Ghana

Table 3.1: Exchange Rates Trend from 1971 to 2002

Several other investigations identified the parallel foreign exchange market as the first and foremost cause of the local currency's historical instability. According to them, the emergence of the parallel market's premium due to the gap between the black market's rate and the official exchange rate was source of important distortions. Rather, many researchers [Chhibber and Shafik (1991), Gymah-Brempong (1992)][20], underlined the findings that the official exchange rate policy affected the parallel market rate both directly (through official devaluation and exchange laws) and indirectly (through import and export which affect supply and demand of foreign exchange on the parallel market).

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[20] Quoted by Aryeetey, 2000

No less interesting is the other conclusion reached by Gymah-Brempong, (like Chhibber and Shafik) that devaluations of the official exchange rate have led to an appreciation of the domestic currency in the black market. The justification of such a paradox lies according to Aryeetey (2000), in the fact that, *creteris paribus*, "devaluation increases exports and hence capacity to import which reduces pressure on the domestic currency in the black market."

To check whether cedi exchange rates have remained erratic until now, the second section of the chapter will study this currency's volatility by applying the concept to the cedi, using the Ghanaian banking system's daily average exchange rates for UK£ and the US$.

It is worth noting that the choice of the bilateral countries (UK and USA) has been guided by the necessity to use HFC's housbonds currency denominations: UK Pound (UK£) and US dollar (US$)

3.2   CEDI-US DOLLAR AND CEDI-POUND VOLATILITY (1998-2002)

Having gained familiarity with the concept of volatility and its experience in Ghana through exchange rates policies instability, we now shift to a more practical task: the study of the cedi volatility over the five last years (1998-2002). It may be useful to stress that the choice of the period covered by our study refers to the most recent date of Rights offer of HFC's ordinary shares on the Ghana Stock Exchange. This is a provision to track accurate data for analyses to be performed, further in the study, on the currency risk management in HFC.

3.2.1   Preliminaries

- *The data*

As mentioned above, what we shall be looking at in this section is the bilateral historic volatility between the Ghanaian local currency (cedi) and currencies in which Home Finance Company's housbonds are denominated, i.e. the United States dollar (USD) and the UK Pound Sterling (UK£). To make our analysis as clear as possible, a detailed analysis of the macroeconomic environment is provided. Nominal exchange rates trend and volatility analysis come later.

The data used are the daily exchange rates as calculated by the Central Bank of Ghana for the commercial and investment banks operating in the country.

- *Volatility Calculation Methodology*

In our study of the cedi historical volatility, we shall use historical data. But as the aim is to interpret the results in terms of high versus low volatility, the obvious approach is to use data at the highest frequency available, i.e. daily average exchange rates generated by the Central Bank of Ghana for the whole banking system. It is an approach based on the standard deviation of log changes in exchange rates.

Our methodology consists of calculating:

- First order approximation of logarithmic prices changes: $LN(E_{i,t}/E_{i,t-1})$, $E_{i,t}$ being the cedi average bilateral exchange rate for the day t.

- the standard deviation of these prices changes (returns)
- Annualization of the standard deviation, by making use of the fact that the standard deviation is proportional to the square root of the time interval. Here, as we are dealing with the foreign exchange market with weekdays' data, we need to multiply the daily basis standard deviation by $\sqrt{252}$.

3.2.2 The Graphs: Charts displaying

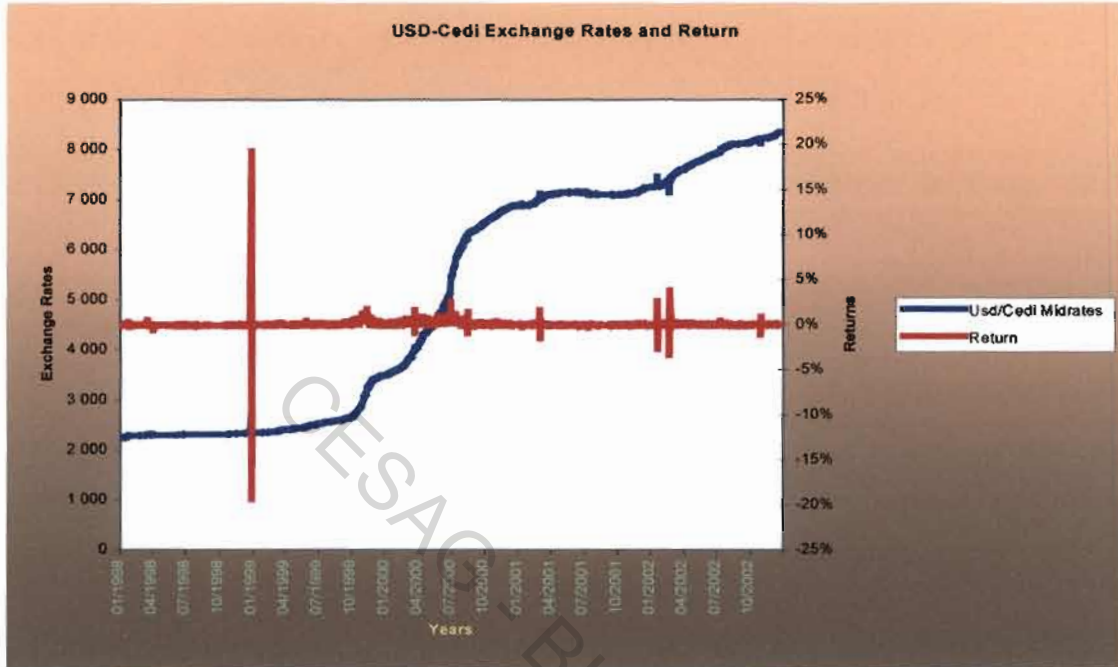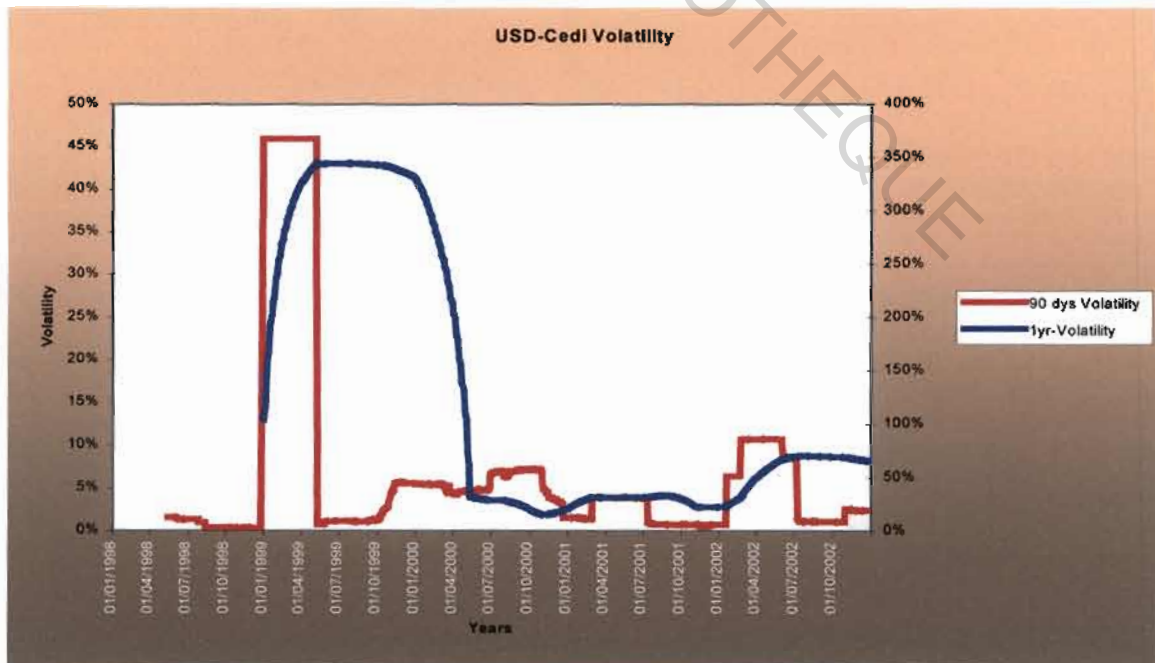**Chart 3.1: USD-Cedi Exchange Rate Trend from 1998 to 2002**

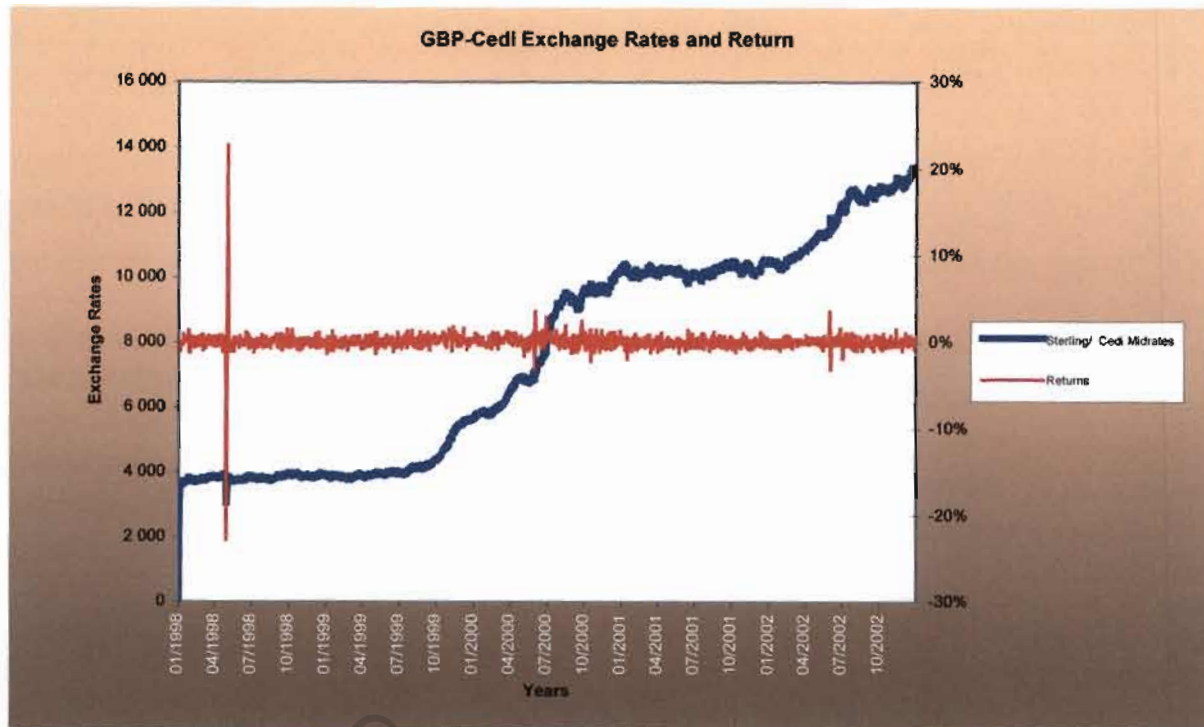**Chart 3.2: USD-Cedi Exchange Rate Volatility from 1998 to 2002**

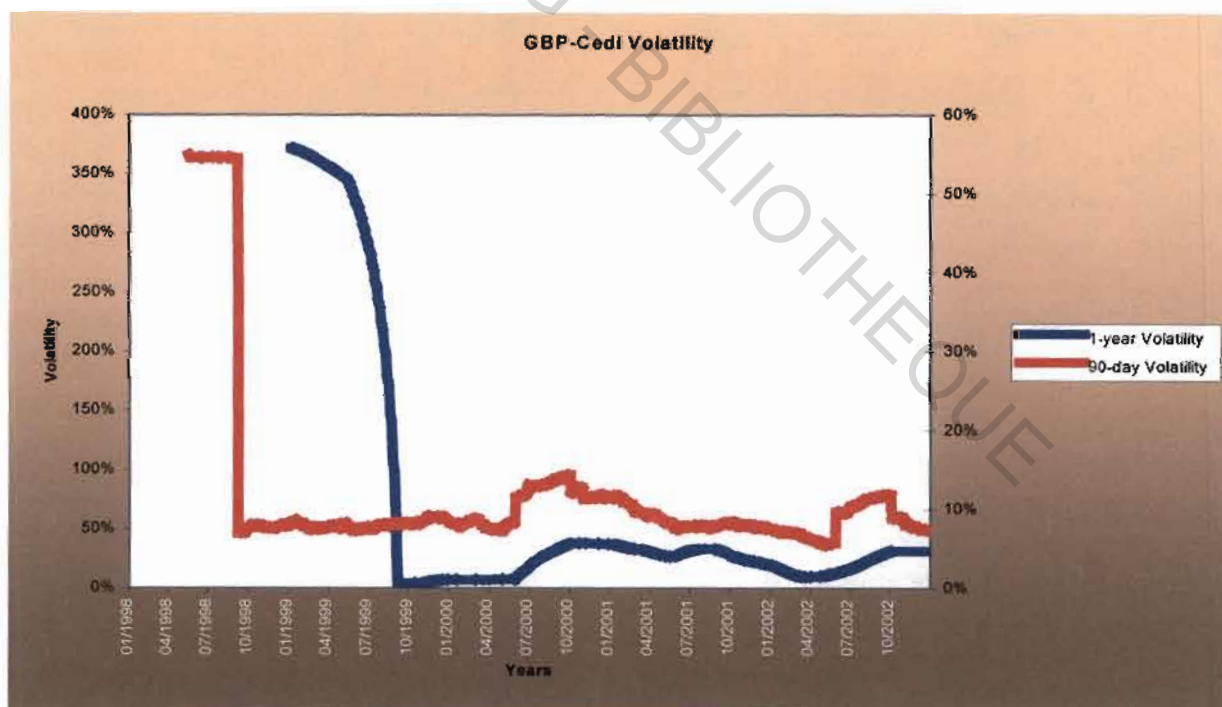**Chart 3.3: GBP-Cedi Exchange Rate Trend from 1998 to 2002**

Chart 3.4: GBP-Cedi Volatility from 1998 to 2002

Ghana Key Macroeconomics Indicators, 1998-2002					
Items	1998	1999	2000	2001	2002
GDP (Current cedis millions)	17.296	20.579	27.153	38.014	46.875
Real GDP growth %	4.70%	4.40%	3.70%	4.20%	4.50%
Balance of Payments (US$ m.)					
Trade Balance	-805.7	-1222.6	-842.9	N/A	N/A
Current Account	-443.1	-932.5	-412.6	N/A	N/A
Overall Balance(Change in international reserves)	172.1	250.8	-20.4	N/A	N/A
Government Fiscal Balance as % of GDP	-3.7	-4.9	-4	-3	-3.3
Money Supply growth rate (broad money)	16.20%	19.60%	22.40%	23.20%	16.40%
Inflation CPI	14.60%	12.40%	25.20%	32.90%	14.60%
Exchange Rate, annual average Cedi					
US$	2,325.58	3,535.14	7,047.65	7,321.94	9,438.82
GBP	3,868.60	5,714.20	10,516.50	10,619.74	0.00

Table 3.2 : Ghana Key Macro Economic Indicators, 1998-2002
Source: IMF, International Financial Statistics, World Bank- World Economy Outlook 2002 (Appendixes) and Ghana Economic forecasts and Analysis, October 2002

3.2.3   The Graphs: Comments and Interpretation

Chart 3.1 displays the historical nominal cedi/USD exchange rates trend from 1998 to 2002, and the associated changes in the returns. The graph, in the form of a cross, illustrates the most important swings that have occurred in the past five years amongst the Ghanaian currency and the United States dollar. It makes clear that over the stated period, the bilateral exchange rate between the two currencies has shown a moderate upward-sloping trend whilst returns have somewhat remained constant. The reason is that in recent years, Ghana has chalked a marked success in respect of the macro-economic stability.

The Year 1998

▪ *The Macroeconomic Environment in 1998*

Macro-economic policies pursued by the Government in 1998 were bulwarks against the effects of the Asian financial crisis and the drought-related energy problem that engulfed the country in mid 1998 *(GCB-Quarterly Economic Review Bulletin, June 1999)*.
Owing to tight monetary policy and reduced government deficit financing, year-on-year inflation rate declined by 5.1% from 20.8% in 1998 to 15.8% in 1998. As a consequence, local investors shifted from foreign currencies to cedi-denominated assets. Strengthened by this shift, the cedi gained a relative stability. Its rate of depreciation slowed down considerably, from 22.8% in 1998 (¢1.638 in 1996 to ¢2.050 per US$ in 1998) to 4.1% in 1998 (from ¢2.250 to ¢ 2.346 per US$).

On the balance of payments side, the relative stability of the Ghanaian currency as regards US$ in 1998 might find additional explanation in the countries' comfortable external reserves. Export receipts (FOB) stood at $1,830.4 million, an increase of 22.8% over the 1998 outturn of $1,489.9. Cocoa receipts experienced a modest leap in response to a price of $1,633.0 per metric tonne, higher than expected. Earnings from gold exports increased by 18.8% at $688.8 millions on account of higher export volume. Sole timber exports recorded a slight decrease of 1% compared to 1998 receipts.

The combined effect of these achievements reduced the country's trade balance deficit from -9.3% to -5.2% of GDP. Official transfers excluded, the current account deficit represented 3.8% of GDP against 8.6% the previous year whilst the Capital Account showed a positive net inflow of $ 3.81.5 million. The resulting overall balance of payments surplus was $ 99 millions.

- *Cedi to US Dollar and UK Pound Exchange Rates Trend in 1998 (Chart 3.1 & Chart 3.3)*

In light of the above analysis, one cannot help but admit that 1998 was by all means a "spectacular year" in the Ghanaian economic experience. No wonder the local currency (the cedi) remained strong and relatively stable against both US$ and UK£. This fact confirms the Fisher International Effect Theory. With a rate of inflation as low as that of 1998 (compared to those of the years before), an improvement in the exchange rate could have been reasonably expected. And that has been the case. From 2,250.41 and 3,731.75 in 1997 (per USD and GBP respectively), the rates stood at 2,361.45 and 3,891.86 as of December 31st, 1998: a very moderate depreciation.

- *Cedi to US Dollar and UK Pound Exchange Rates Volatility in 1998 (Chart 3.2 & Chart 3.4)*

Charts 3.2 and 3.4 show that cedi to US$ and UK£ volatility during 1998 behaved differently.

- *Cedi to US$ Volatility in 1998 (Chart 3.2)*

For cedi to US dollar exchange rate, both 90 day-volatility and 1-year volatility were quite low. Is it that no risk was embodied in transactions initiated between these two currencies during 1998? No. Low-volatility simply means that over the period, the bilateral exchange rate deviations in either direction (up or down) were very narrow.

As volatility is an important consideration in the evaluation of alternative investing and borrowing strategies, one can justify the choice by HFC to have its housbonds denominated in US$ at that period. That's why, prior to any investment or borrowing decisions, volatility should be examined, a view shared by Richard Levich: "greater volatility implies greater exposure, or value-at-risk (VAR)…Thus, accurate and timely estimates of volatility now play a key role in the risk management…" (Richard Levich, 1998)

- *Cedi to UK Pound Volatility in 1998 (Chart 3.4)*

Coming to cedi to GBP, it appears that annualized measures of both 90-day volatility and 1-year volatility were greater (though acceptable), ranging from 6.94% to 54.95%. Holding assets or being indebted in UK£ when running a cedi based business in year 1998, was thus a bit riskier. It is good that HFC did not issue Sterling housbonds during 1998

Year 1998 was not bad for Ghana. Had things moved on following the same trend, the country might have reached a sustainable level of development now. Charts 3.1 and 3.3 clearly reveal that this has not been the case.

The Year 1999

- *Macroeconomic Environment in 1999*

Early in 1999, sharp rise in oil prices and historically lowest prices for cocoa and gold dramatically eroded Ghana terms of trade. Automatically transmitted to the bilateral exchange rate, this shock has resulted in a "huge devaluation of the cedi of 33%" *(GCB-Quarterly Economic Review Bulletin, June 2000 and March 2002).*

The situation was later worsened by revenue shortfalls stemming from delays in external aid disbursement. By the end of 1999, Ghanaian economy has been described as" sluggish and inflationary" *(GCB-Quarterly Economic Review Bulletin, March 2002).*

- ### *Cedi to US Dollar and UK Pound Exchange Rates Trend in 1999 (Chart 3.1 & Chart 3.3)*

Going back to Chart 3.1, we can see that in 1999, cedi exchange rates as regards US$ experienced an up-ward trend. Ghanaian economy was stricken by external shocks. As a result, the cedi depreciated by 33% against US$ whilst year-end inflation was 13.8% compared with a target of 9.5% *(HFC, Annual Report 1999).*

On the other hand, cedi- Pound Sterling exchange rate shifted from ¢3,891.86 per UK£ as of December 31st, 1998 to ¢5,667.99 per GBP as of December 31st 1999, a depreciation of 31.33%. The reason is that during 1999, imports from UK decreased by 23.17% whilst imports from US increased by more than 6%.

In conclusion, we can understand that being subject to many external and internal pressures, the cedi did not perform well in 1999. The currency deteriorated against most major currencies.

- ### *Cedi to US Dollar and UK Pound Exchange Rates Volatility in 1999 (Chart 3.2 & Chart 3.4)*

- #### *Cedi to USD volatility in 1999 (Chart 3.2)*

Like depreciation rate, cedi volatility in first semester of 1999 was important as regard the US$. Could it be that volatility increases with currency depreciation? It seems reasonable not to draw such a hasty conclusion until proper research is performed on the topic. However it is a fact that in the case of the cedi to US$ bilateral exchange rate, volatility seems to have increased in 1999, a year of a two-digit depreciation rate.

In fact, unlikely to 1998, Chart 3.2 shows a peak in the cedi to US$ volatility curve for 1999. Both 90-day volatility and 1-year volatility are displayed in the form of a hard shoulder. Annualized 1-year volatility figures for the stated year ranged from 104.31% to 344.65%.

- #### *Cedi to UK£ volatility in 1999 (Chart 3.4)*

What we saw for chart 3.2 does not apply to chart 3.4 where volatility moved in the opposite direction. A simple inspection of the charts suggests that standard measure of volatility has behaved adversely in response to the important depreciation of the year 1999.

Compared with state of things in 1998, it is as if cedi volatility against US$ and UK£ are subject to a trade-off: whilst cedi to US$ volatility is high, cedi to UK£ volatility is low and vice-versa. Is it a rule or a random finding? Can we suspect carry-trade behaviours in Ghana from 1998 to 1999?

Though beyond the coverage of our study, these are interesting questions. To answer them, further researches are called for. All we can say here is that for the period, annualized 90-day volatility averaged 8.24%, a volatility level far lower than cedi to US$ volatility figures.

The Year 2000

- ### *Macroeconomic Environment in 2000*

In 2000, " the less than expected receipts from exports due to poor prices for cocoa and gold and the limited inflows of grants affected the foreign exchange market." *(ISSER, 2000)*.
Cocoa receipts were subject to a dramatic decrease of 21.9% as a consequence of a 24% decline in the world market price, from US$1,434 to 1,092 US$ per metric tonne.
Similar, was the trend of timber prices whilst the slight rise recorded by gold was not significant (0.6%, from US$288.8 in 1999 to US$280.4 per Fine oz in 2000). No wonder the overall balance of payments deteriorated to a deficit of US$ 194.8 millions. Stock of foreign currency shrunk in both inter-bank market and foreign exchange bureaux. Unable to meet donor conditionalities, Government on her part, recorded limited grant inflows.

- ### *Cedi to US Dollar and UK£ Pound Exchange Rates Trend in 2000 (Chart 3.1 & Chart 3.3)*

The difficult economic environment that prevailed in Ghana in 2000 led to a weak cedi as regards the major currencies. Nominal exchange rates averaged ¢ 5,321.68 per 1US$ (from ¢2,684 end of 1999) and ¢10,277.79 (from ¢5,667.99) per 1UK£. All in all, cumulative depreciation of the local currency was approximately of 49% against the US$, and 45% against the UK£.
Once again, charts 3.1 & 3.3 show that worse than in 1999, the Ghanaian currency under-performed in 2000. A situation that might have not been favourable to companies indebted in US$ or UK£, unless appropriate hedge had been provided.

- ### *Cedi to US Dollar and UK Pound Exchange Rates Volatility in 2000(Chart 3.2 & Chart 3.4)*

Albeit to a lesser extent, what we earlier suspected about volatility trade-off is likely to be confirmed by 2000 volatility figures. In fact, with the rise of depreciation rates recorded by the local currency, volatility arguably could have behaved exactly as in 1999. That clearly did not happen, indicating the possible existence of a cyclical trade-off between cedi to US$ and cedi to UK£ volatility figures.

This is a partial proof that investors in Ghana are risk averse. With limited investment alternatives for their capitals, they are likely to seek respite in the currency of lower volatility, compared to what they have experienced the year before. These are factors HFC should consider when denominating her foreign bonds, to be able to attract capitals.
This behaviour of investors also suggests that in Ghana, issuing foreign denominated bonds in the same currency may not be successful for two consecutive years.

If that were the case, wouldn't it be wiser to issue bonds in both currencies as did H.F.C?
This is a question to which appropriate answer will be given at the end of our study.
Meanwhile, a closer look at charts 3.2 & 3.4 may be useful.

- *Cedi to US$ Volatility in 2000 (Chart 3.2)*

In 2000, cedi to US$ 90 day-volatility was quite low. After a first period of high value,
1-year volatility remarkably decreased in second semester 2000. The chart suggests that in
2000, the standard measure of volatility seesawed between period of high and period of low
volatility. The overall outcome was an important instability of the local currency, with a
deterioration rate of 49%

- *Cedi to UK£ Volatility in 2000 (Chart 3.4)*

The steep rise of cedi-US$ volatility during first semester 2000 corresponded to a plateau in
cedi to UK£ volatility chart. Though wide, changes in bilateral cedi-UK£ exchange rates
were stretched over a long period, leading to smaller deviations from the mean.
For the second semester, cedi-UK£ volatility behaved slightly the same way as cedi to US$,
prior to the trend reversal that occurred in 2001.

The year 2001

▪ *Macroeconomic Environment in 2001*

Despite the continuously declining prices in international commodities markets, the year
2001[21] unlike 2000, brought signs of recovery to the country's economic environment.
"After taking up office in January 2001, the new Government of Ghana set off to pursue
policies intended to redress the slippages and to restore macroeconomic stability..." *(Ghana
Stock Exchange Facts Book 2001).* Notable improvements were experienced in many parts of the
national business setting. As a consequence, GDP went up from 3.7% in 2000 to 4.2% in
2001, i.e. 0.2% above the target of 4%. Broad budget deficit declined from 8.5% of GDP in
2000 to 4.4% in 2001.
The country's Balance of Payments was positively impacted by the fall in crude oil prices
that followed the September 11 attacks in the US. As a result, the usual deficit on the current
account was reduced by about 58% and the overall balance of payments turned surplus of
$144.1 million. *(GCB Quarterly Economic Review Bulletin, March 2002)*

▪ *Cedi to US$ and GB Pound Exchange Rates Trend in 2001*

From the above, we can conclude that sound fiscal and monetary policies as well as political
boldness led to marked improvements in economic aggregates in 2001.
"Year-on-year inflation which was 40.5% as of December 2000 and rose to 41.9% in March
2001, dropped steadily to 21.3% by end December 2001. Foreign exchange volatility
diminished, and the cedi held reasonably firm against the major currencies" *(GSE Facts Book
2001).*

The cedi depreciation rate stood at 3.8% for 2001 in contrast with year 2000's 49.5%
depreciation. Reasons advanced for the exchange rate stability in 2001 include the reduced

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[21] 2001 was the actual government first year.

demand for foreign currency to service debts as a result of Ghana's HIPC[22] Declaration, as well as lower government spending and money supply growth.

> ▪ *Cedi to US Dollar and UK£ Exchange Rates Volatility in 2001 (Chart 3.2 & Chart 3.4)*

- *Cedi to US$ volatility in 2001 (Chart 3.2)*

A look at chart 3.2 confirms that 2001 was special. The Ghanaian local currency's volatility dropped to 2.29% against US$. The whole year 2001 is represented by a constantly downward curve. This is a proof that macroeconomic stability often leads to reduced volatility of local currencies. Conclusions of this type raise other interesting questions such as "who is responsible of monitoring local currencies stability in developing countries"?

- *Cedi to UK£ volatility in 2001(Chart 3.4)*

In 2001, the cedi recorded higher volatility figures against the UK£. But we can also see that the trend is a decreasing one, showing good impact of the satisfactory underlying macroeconomic fundamentals. However, why should volatility be high when macro setting is so sound?

In a study of the Impact of G-3 Exchange Rate Volatility on Developing Countries, Gerardo Esquivel and Felipe Larraín (2002) faced a similar dilemma. Their conclusion was that: "…the standard measure of volatility misrepresents what is taking place on the bilateral… exchange rates. It fails to identify periods of rapid but sustained change in the real exchange rate…The coefficient of variation measure is successful in capturing these events…"

Whether Gerardo and Esquivel are right or not, the topic deserves further investigations.

The year 2002

> ▪ ***Macroeconomic Environment in 2002***

The year 2002 started with an extension of the positive developments in macroeconomic indicators recorded in 2001. Owing to strict control on government finances and tight monetary policies, Ghanaian economy achieved a modest level of stability. Key indicators during the year stood as follows:
- GDP growth of 4.5%, higher than that of 2001 (4.2%)
- Inflation rate of 15.2% compared to 21.3% in 2001
- Decrease in the annual yield on the benchmark 91-day Treasury Bill, from 40.8 to 25.1%.[23]

All in all, the continued pursuit of fiscal discipline enabled policymakers to maintain a relatively stable macro economic environment, despite potential threats from the domestic and external factors. These potentially destabilising factors on the external front mainly stemmed from the crisis in neighbouring Ivory Coast and higher crude oil prices.

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[22] HIPC= Heavily Indebted Poor Countries
[23] HFC, Annual Report 2002

- **_Cedi to US Dollar and UK£ Pound Exchange Rates Trend in 2002 (Chart 3.1 & Chart 3.3)_**

During this period, the local currency (cedi) only depreciated by 4.6% against the US dollar. The exchange rate stood at ¢8.606 per USD during the first quarter. Against UK£, the depreciation rate was 21%.

Later in the year however, the decline in the return of government Treasury Bills from over 40% in 2001 to an average of 25% has been cause for an attraction towards currency substitution. On the other hand, the reduction in government borrowing from the domestic financial market created excess pools of funds within financial institutions. With limited alternatives for holding these short-term funds, traders found respite in the US dollar, especially after the supply of Euro (a declining currency at that time) by the European Union as a budgetary support to Ghana. The phenomenon put a downward pressure on the local currency. The resulting nominal depreciation was about 15.1%, a lower rate, compared with 15.2% against US dollar in 2001.

- **_Cedi to US $ and UK£ Exchange Rates Volatility in 2002 (Chart 3.2 & Chart 3.4)_**

  - **_Cedi to US Dollar Exchange Rates Volatility in 2002(Chart 3.2)_**

Chart 3.2 is the graphical representation of the volatility associated with the different changes in exchange rates and returns as observed on chart 3.1. Despite the difference between the 90-day volatility and the 1-year volatility due to the time extension of the underlying data, the resulting curves had an up-ward trend ranging from 22.61% to 70.50%.

Although macroeconomic figures indicate acceptable stability, exchange rates behaved a bit erratically. This is not to contradict our previous statement about the impact of macroeconomic stability on volatility. But, we do not reject the possibility that volatility might be determined by many other factors than macroeconomic fundamentals.

  - **_Cedi to UK£ Exchange Rates Volatility in 2002(Chart 3.4)_**

Faithful to the trade-off rule suspected in earlier stages of our analysis, cedi to UK£ volatility moved to the opposite direction to cedi-US$ figures, that is, following a downward trend. Unlikely 2001, cedi-UK£ exchange rates in 2002 reflect underlying macroeconomic realities. No disconnection is recorded, since for a stable environment, investors experienced a relatively low volatility on the cedi-UK£ currency market.

A final point is noteworthy: although both 90-day volatility and 1-year volatility curve are globally downward sloping, we can see that a reversal movement has started in late 2002.
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In conclusion, the study of the cedi to USD and UK£ volatility over the five past years showed that the floating exchange rate system adopted by Ghana since the 90s has led the local currency to frequent periods of instability characterized by important rates of deprecations.

When efforts are made on the macroeconomic front, the impact on the currency's volatility is far from obvious. In years like 1998, the results of macroeconomic endeavours were quite encouraging. But for 2001 sound macroeconomic had less influence on volatility figures. It is not impossible that in a globalized world, the complex concept of volatility stems from other sources.
For instance, a study by the United Nations Conference on Trade and Development revealed that   " G-3 exchange rate volatility increases the probability of occurrence of an exchange rate crisis in developing countries…" (Gerardo Esquivel and Felipe Larraín, 2002)

The study also showed a possible trade-off between cedi to US$ volatility and cedi to UK£ volatility. In the same macroeconomic environment and during the same year, we sometimes came out with opposite trends in volatility figures for several years, especially 2000, 2001 and 2002. The brief look provided by this study would not be sufficient by itself to draw general conclusions about our findings. Nor was that our purpose. In-depth studies may reveal more relevant conclusions.

Anyway, the study has given us clues to the appropriate stance for the necessity of currency risk management in any company indebted in either US$ or UK£ in Ghana. HFC being a tangible case, the rest of our study is devoted to examine currency risk management in that company. The study covers the period from 1998 to 2002.

CHAPTER FOUR: CURRENCY RISK MANAGEMENT IN HOME FINANCE COMPANY (HFC)

Our study of the cedi volatility has led to the conclusion that over the last five years, the Ghanaian local currency has been volatile against the US dollar and the British Pound. The direct implication is that during the stated period, Home Finance Company (HFC), a Ghanaian Company indebted in USD and GBP had to deal with currency exposure.

In this chapter, our aim is to scan the company's business and thereby, to understand what strategies the company adopted to hedge her currency risk.

Before examining the HFC's foreign-denominated bonds, Section One describes the company's activities and performance from 1998 to 2002. Section Two on the other hand examines the evidence and impact of increased volatility on both HFC's performance.

4.1   HOME FINANCE COMPANY (HFC) AT A GLANCE

This section seeks to provide insightful understanding of the Home Finance Company's business. We examine various activities undertaken by the company's components as well as their performance over the period covered by our study, i.e. from 1998 through 2002.

4.1.1   OVERVIEW OF HFC's BUSINESS FROM 1998 TO 2002

Before going through the company's financial performance, let us gain familiarity with the company and its subsidiary's activities.

4.1.1.1 History, Ownership, and Activities Description

History and Ownership

Home Finance Company (HFC) is a private limited liability company created on 7th May 1990. Less than five (5) years later, on 5th October 1994, HFC was converted into a public company. The following year, on 17th March 1995, HFC became a listed company on the Ghana Stock Exchange with a stated capital of ¢ 8,094,001,000 split into 1 billion shares. The floating capital is made up of 57,152,556 shares. Home Finance Company's three largest shareholders[24] are:

1. Social Security and National Insurance Trust 26.60%
2. Ghana Union Assurance Company Ltd...............15.55%
3. State Insurance Company of Ghana...................11.32%

With 53.47% of the capital, these "Big Three" have absolute control over the company.

Activities overview

The principal activities of Home Finance Company and its subsidiary (H.F.C. Investment Services Limited) consist of:

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[24] From exhaustive list of HFC's shareholders as of 31st 2002 provided in HFC's 2002 annual report

- Operating and managing a fund for the provision of long-term resources for home mortgage financing;
- Issuing and dealing in bonds and other financial instruments;
- Undertaking the business of housing financing;
- Undertaking the management of investments including real estate and arrangement of capitalisation/financing packages for its clients.

To her object clauses, HFC has associated the following mission statement:

" *As Ghana's apex mortgage financing institution, HFC is committed to the establishment of a sustainable mortgage finance system in Ghana, intervening with new products and services at the primary and secondary levels.*
The development of the primary mortgage market is a crucial part of the company's development. HFC will continue to promote home ownership in the country by providing financial products that make mortgage and other loans more accessible in Ghana for all income levels especially the middle and the lower income groups" (HFC, Employee Handbook)

To fulfill this mission, HFC decided to set up two investment funds: the Real Estate Investment Trust (REIT) and the Unit Trust both of which are managed by HCF Investment Services Limited. To cover the company's business, we need to pause and understand these units' activities.

HFC's Investment Funds Activities

HFC's funds are managed by HFC Investment Service Limited (HFC-ISL), a wholly owned subsidiary of Home Finance Company Limited. Formerly, HFC Investment Fund, HFC-ISL is licensed to operate as an investment advisor under the Securities Industry Law (PNDCL 333). The funds' activities are briefly presented as follows

- *The HFC Unit Trust (HFC UT)*

The HFC UT was established in May 1991 in the form of a collective investment unit. Operating as a savings mobilization vehicle, the fund was designed to enable prospective purchasers to save towards a down payment of a mortgage. With the recent broadening of this purpose, HFC UT can now be used to save for other purposes: the fund has really become an investment avenue for both individuals and institutions in general.

As far as the fund's characteristics are concerned, it should be borne in mind that HFC UT is open-ended investment scheme. This means that there is no restriction on the amount and timing of investments. Once the minimum requirement is met, the investor can buy as many units as he affords to. Besides, he can increase his investment as often and take out part or all of his investment whenever he chooses to divest.

As final word about HFC UT features, we need to note that the fund's portfolio is mainly made up of money market instruments.

Table 4.1 and chart 4.1 below provide a summary of the HFC UT performance from 1998 to 2002

- *The HFC Real Estate Investment Trust (HFC REIT)*

Like the Unit Trust, HFC-REIT is a collective investment fund. The difference lies in the fact that the HFC REIT is dedicated to investments in the real estate sector. Set up and managed by HFC-ISL since July 1995, it serves as an investment vehicle in real estate for both residential and commercial. In short, the REIT's purpose is to mobilize funds for investment in real estate.

As characteristics, HFC-REIT is also built on the open-ended scheme. There is no restriction as to the amount and the timing of investments. Thus, once minimum requirement is met, one can buy as many units as afforded or divest whenever desired.
Most HFC-REIT investments are made in housing developments. But sometimes, equities of corporate real estate institutions are purchased.

Table 4.1 and chart 4.1 provide a summary of the HFC-REIT performance as follows

HFC Performance Highlights (¢ "000")	1998	1999	2000	2001	2002
Investments HFC-UT					
Short-term Securities	6,913,065	10,822,485	8,126,854	14,116,902	21,523,554
Fixed Deposits	3,138,177	3,498,461	3,456,809	2,040,210	8,228,624
Equities	2,378,795	3,458,062	3,457,269	4,598,346	7,785,339
Others	951,487	1,803,806	1,831,257	1,831,257	2,804,921
Total Investments	13,381,524	19,582,814	16,872,189	22,586,715	40,342,438
Value of the Trust	12,948,518	18,551,989	17,543,875	21,646,340	42,743,750
Net Income	2,201,368	2,388,561	2,951,807	4,406,007	3,997,551
UT-Yield	N/A	22%	30%	36%	25%
Properties HFC-REIT					
ACP Estates or others	250,367	250,367	250,367	3,724,794	4,970,058
Land	648,016	363,301	165,133	107,031	42,812
Property for resale	2,087,813	4,197,277	3,864,810	0	0
Total Properties	2,986,196	4,810,945	4,280,310	3,831,825	5,012,870
Value of REIT	8,524,831	5,230,107	5,460,014	5,769,939	9,012,922
REIT-Yield	N/A	18%	32%	38%	20%
HFC Group					
Debt/Equity Ratio	5.09	5.48	4.94	5.66	N/A
Earning per Share(cedis)	62.39	83.38	109.21	133.05	140.00
Dividend per Share(cedis)	24.00	29.00	37.00	44.35	48.00
Net Assets per Share	234.30	288.70	579.30	652.40	N/A
Return on Equity	26.60	28.90	18.90	20.40	N/A
Market Price(31 Dec)	750.00	750.00	952.00	952.00	N/A
Dividend Yield%	3.20%	3.87%	3.89%	4.66%	N/A
Price Earning Ratio (Time)	12.02	9.00	8.72	7.16	N/A

Source: Unit Trust, REIT, HFC Annual Reports and Ghana Stock Exchange Facts Books 2001
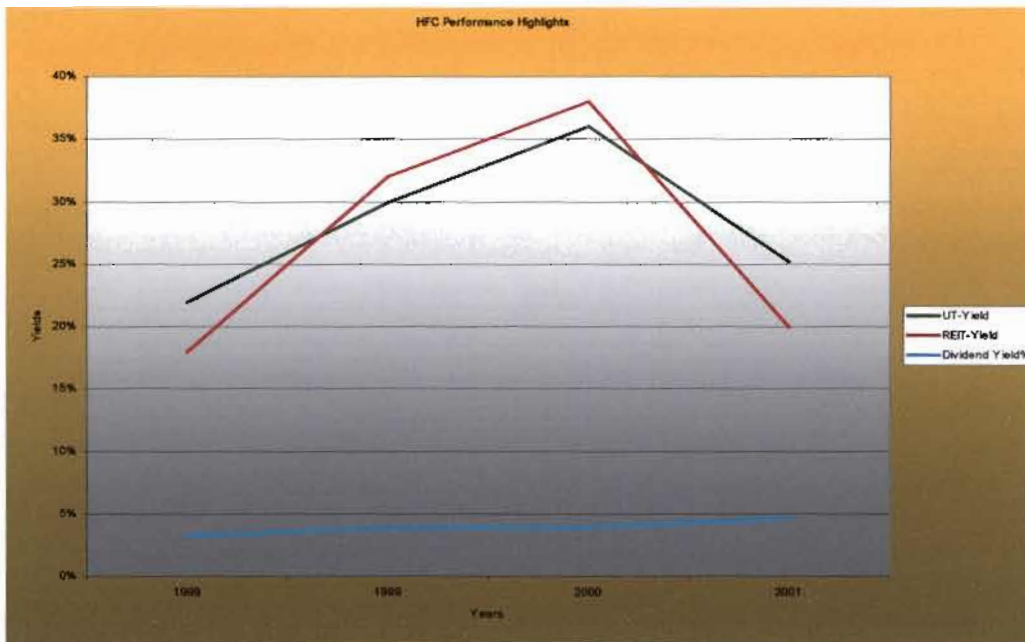
Table 4.1: HFC Performance Highlights from 1998 to 2002

Chart 4.1: HFC Performance charts

- ***Comments***

Table 4.1and Chart 4.1 show that over the past five years, HFC has done quite well. Albeit slowly, dividend yields have increased. On the other hand, the funds have always come out with yields higher than those of the benchmark (T-Bills). For instance, during the stated period, the UT returns have ranged from 22% to 36% and the REIT returns, from 18% to 38%. At the same time, T-Bills returns declined markedly to an average of 26%.

In a similar way, the Group has recorded satisfactory results. With a continuously growing mortgage portfolio, pre-tax results have regularly increased at sustainable rates.

As of 31st December 2002, the company's profit before tax amounted ¢ 10 billion, an increase of 25.7% over that of 2001. Total assets stood at ¢349.8 billion. These are proofs that HFC has a steady growth capacity.

4.1.1.2 HFC's CORE BUSINESS: THE HOME MORTGAGE FINANCING ACTIVITY

We earlier mentioned the housing finance as an important component of HFC's business. In this second part of section one, our aim is to present this side of HFC's activity.

We shall start by explaining the mortgage financing in general. The following step will provide understanding of HFC's home mortgage financing packages and explain the company's financial means sources.

4.1.1.2.1   The Mortgage Financing Concept

"Securing a loan with collateral reduces the risk to the lender. The reduction in risk reduces the cost to the borrower and makes loans more readily. The most common form of secured loan is the mortgage- a loan secured by real property such as a building or a land"

This statement from Meir Kohn (1994) shows that the mortgage-financing concept is a risk reducing one. In addition, it has been used by many institutions all over the world for a wide variety of purposes. To understand the nature of this financial instrument, we begin by reviewing its historical background and typicality.

- *Historical Background*

Historically, mortgage borrowing has played a variety of roles. It has been the predominant form of borrowing in rural economies, because land was the most important asset.

"Landowners borrowed against future rents to finance current consumption or development of their estate. Likewise, urban developers - with urbanization and industrialization - used mortgage borrowing to finance construction. Industrial firms used it to finance new plant. Households used it to finance the purchase of a home" (Meir Kohn, 1994).

The traditional form of form of mortgage lending was a direct loan from one individual to another (both of them usually wealthy). The mortgage contract was written by a lawyer who also acted as a broker, matching borrowers with lenders. Later, this traditional arrangement was transformed and supplemented by others.

In the United States, the growing need for mortgage credit led to the specialization of intermediaries acting as mortgage brokers. Some of the latter even shared management with national banks. Under pressure of competition, mortgage brokers began to guarantee mortgages they sold, and in the 1880s[25], some of them became intermediaries. These mortgage banks as they were called, issued bonds and used the proceeds to fund portfolios of mortgages, exactly what HFC has been doing in Ghana for more than a decade now.

Owing to the tremendous real estate boom in the US in the 1920s (after World War I), mortgage lending expanded rapidly. Unfortunately, the Great Depression led to a collapse of the land and housing values. Lending institutions and particularly savings and loans, were hit hard. This welcomed deep changes that have now made mortgage market an important one in many countries.

- *Forms of mortgage loans*

Mortgage loans have existed in many forms. The three more popular schemes are worth mentioning:

The balloon loan

Typically, this is structured like a three to five-year bond. Up to maturity, only interest is due, with no repayment of principal. At maturity, the principal comes due. This form of mortgage scheme was said to have worsened the real estate crisis in the US during the Great Depression (Meir Kohn, 1994)

The long-term, fixed rate, amortized mortgage

This type of mortgage contract allowed borrowers to pay off the loan over time, rather than a single large payment. In the US, this instrument proved to be extremely popular and successful.

The adjustable-rate mortgage (ARM)

The most recent type of mortgage is the adjustable-rate mortgage, a mortgage with a variable interest rate, pegged to some short-term market rates. Repayments are on a monthly basis.

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[25] Meir Kohn, 1994

Having examined the mortgage concept, our focus will now shift to HFC's practice of mortgage financing.

4.1.1.2.2   The Home Finance Company Mortgage Instruments

General Mechanism

- From a general view, when a mortgage is taken to buy a house, the house becomes collateral for the loan. In case of default, the mortgager can foreclose and sell the house to recover what is still owed; anything left over is the mortgagor's. In fact, there is a **lien** on the property, i.e. a clause in the title document that prevents the property's sale unless the mortgage loan is fully repaid.
- For protection purpose in case of default, a mortgage is usually over-collateralized: the borrower must finance a part of the purchase with down payment. A second security is often provided by an additional mortgage insurance aiming at covering the mortgage lender against any shortfall in the value of collateral.

The Home Finance Company's Mortgage Packages[26]

HFC offers her clients four types or mortgage products. Our purpose here is not to make extended presentation of these packages. We merely provide a quick exploration of their main features.

- **Home Improvement Mortgage (HIM)**

The HFC Home Improvement Mortgage (HIM) is designed to assist applicants with financing to undertake renovation and extension works on their existing houses. The maximum limit shall not exceed 80% of the forced sale value of the property, or US$ 80,000 equivalent in cedis (whichever is lesser). Any additional amount required in excess of the approved loan may be contributed by the borrower, or obtained through a joint financing arrangement.

- **Home Purchase Mortgage (HPM)**

The HFC Home Purchase Mortgage (HPM) is a mortgage financing facility designed to assist interested individuals and companies in purchasing residential properties. It is flexible and can be tailored to the applicants' needs. Applicants under the HPM may be resident, non resident Ghanaians or corporate customers with verifiable and sustainable monthly incomes sufficient to repay the loan within a specified term. The maximum term for this facility is 20 years for resident Ghanaians and 10 years for non-resident Ghanaians or the equivalent of the applicant residual working life, whichever is lesser. Corporate loans are usually for periods of 5 to 10 years.

In the HPM scheme, loans shall not exceed 70% of the value of the property or, amount of US$ 80,000 or the equivalent in cedis for individuals. The maximum loan amount for corporate requests is 15% of the net worth of Home Finance Company Ltd. as determined from time to time.

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[26] From HFC Web Site www.homefinance-gh.com

- **Home Equity Mortgage (HEM)**

The Home Equity loan Program is specially conceived to help homeowners release the equity built up in their homes for other meaningful purposes.

In fact, most homeowners are house rich but cash poor. Hence, they often experience cash flow problems. With Home Equity Mortgage loan, HFC intends to lend to qualified homeowners up to 80% of forced value or US$ 80,000 (whichever is less than the equity vested in their properties. HFC would seek to consolidate them with the expected loan advance where possible, to become the first lien holder.

- **Home Completion Mortgage (HCM)**

The HFC Home Completion Mortgage (HCM) is set up to assist applicants with financing to complete the construction of their uncompleted houses. The facility is available for applicants with verifiable and sustainable incomes and the ability to repay the loan within a specified term. Like HPM, HCM loans are limited to 70% of the total cost of the construction of the property or a maximum amount of US$ 80,000 or the equivalent in cedis whichever is lesser.

The continuously increasing trend in HFC's mortgage portfolio size (See Table 2.1.2) shows that the products offered to the public are satisfactory. Further, we shall come back to mortgages as crucial component of any currency risk management strategy to implement in HFC.

Table 4.2: HFC Mortgages Portfolio Size(1998-2002)

	1998	1999	2000	2001	2002
Mortgage Portfolio					
Number (estimate)*	258	343	428	513	598
Value (¢"000")**	62,101,607	89,738,781	155,869,261	186,513,841	197,954,246

Sources:

* HFC Annual Reports

** HFC Housing Bonds Prospectus
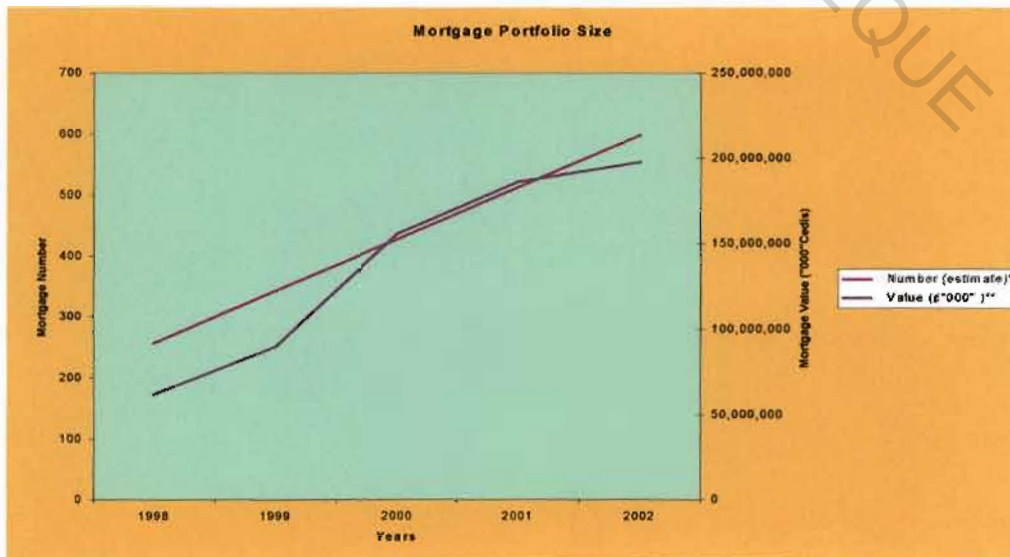
Chart 4.2: HFC Mortgage Portfolio's trend from 1998 to 2002

From the foregoing description, no sign of currency exposure has been suspected in Home Finance Company's business. Nevertheless, this issue does exist and appears when one is willing to understand how the company arranges to fund its mortgage portfolio.

To date, HFC has financed its mortgage portfolio in three ways:

- by using resources mobilized by the her investment funds,
- by raising cedis denominated housbonds,
- by raising foreign denominated housbonds.

Currency exposure stems from the third strategy. We need to have a closer look at it.

4.1.2   DOES CURRENCY RISK MATTER IN HFC?

Here in this section of chapter one, our objective is twofold:

1- to perform a diagnosis of currency risk in HFC by highlighting the company's financing sources;
2- to study currency risk evidence in HFC. For this purpose, we will assess the company's exposure from 1998 to 2002, in terms of foreign denominated bonds as well as the currency risk management results (different exchange gain or loss recorded by the company).

4.1.2.1 CURRENCY RISK IN HFC: THE DIAGNOSIS

The Collins Concise Dictionary defines diagnosis as "the identification of diseases from the examination of symptoms… a thorough analysis of facts or problems to gain understanding". Indeed in this first part of section two we are going to examine possible sources of currency risk in HFC. The process is made up of two main components:

1- an analytical examination of HFC's mortgage portfolio financing strategy;

2- a critical analysis of the company's foreign denominated housbonds features.

4.1.2.1.1   HFC's mortgage-portfolio financing strategy

Prior to proper analysis of HFC's mortgage-portfolio financing, let us picture the strategy.

4.1.2.1.1.1 The picture

BONDS REDEMPTION ($, £) (INTEREST DUE SEMI-ANNUALLY)

MORTGAGE LOANS (¢, $)

SERIES OF FOREIGN DENOMINATED BONDS ($, £)

INVESTMENTS FUNDS (REIT & UNIT TRUST) (¢)

HFC

HOME BUYERS (MONTHLY REPAYMENTS) ($, £, €, ¢)
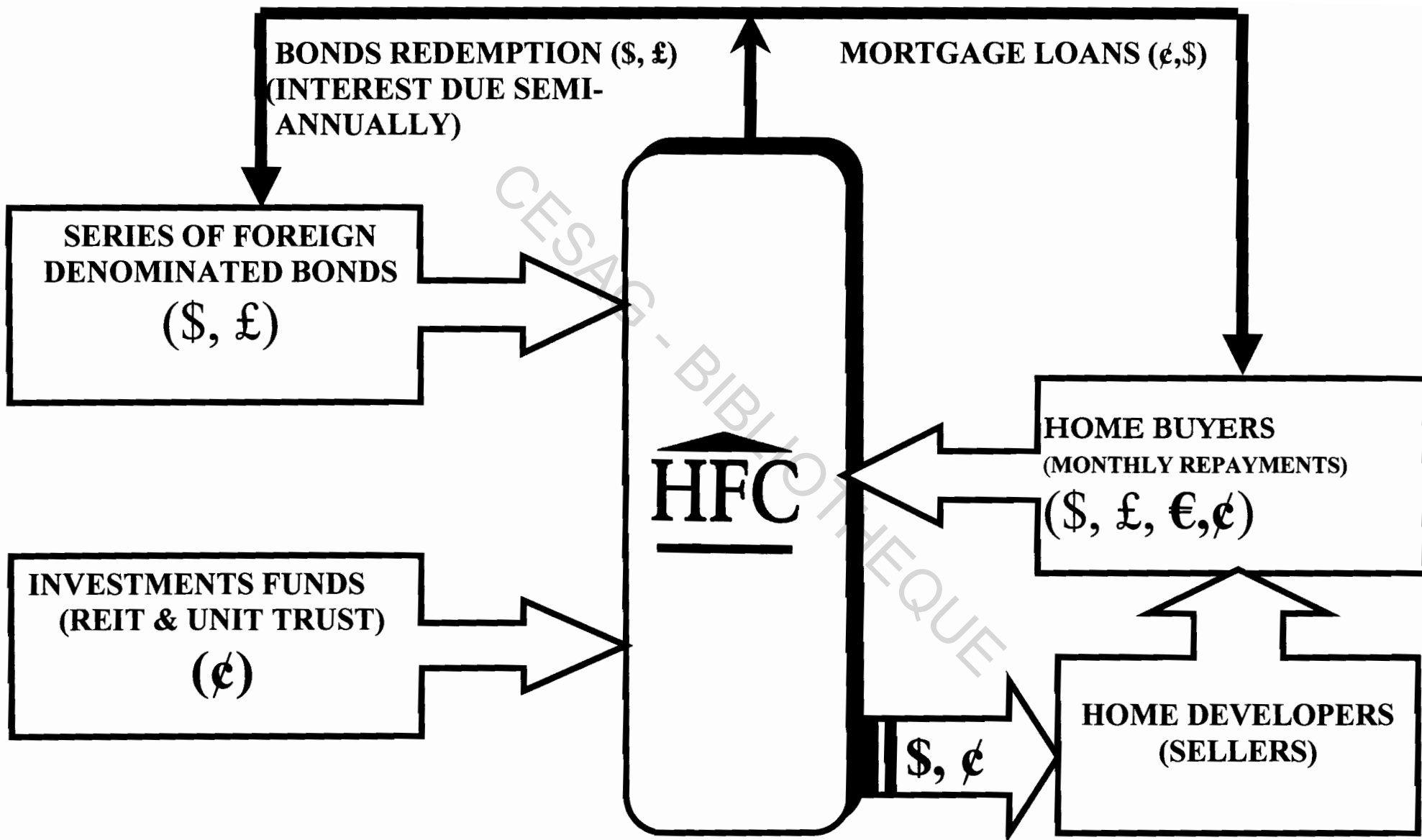
$, ¢

HOME DEVELOPERS (SELLERS)

Figure 4.1: HFC's Mortgage Portfolio Financing Strategy (Cash Flow Structure)

4.1.2.1.1.2 Comments

From the above picture of HFC's cash flows, we can draw the following conclusions:

1- HFC's mortgage portfolio is financed by both local (¢) and foreign denominated resources (UK£, US$, €). On the other hand, loans are granted to customers to buy houses invoiced in US$ alone. Hence, a currency mismatch, source of currency exposure. No wonder the company has sometimes recorded an important exchange loss (¢ 2.9 billion). In fact, despite the fact that foreign denominated mortgages are excellent match hedge channels to HFC's housing bonds, they fail to mitigate the exposure stemming from the interrelationship between the currencies, i.e. movement between USD and UK£, UK£ and €, € and US$, etc. That's the reason why matching to hedge is just the first step in hedging strategies, especially in the case of more than one foreign currency. Further, hedging strategies are examined in-depth.

2- The second interesting notice is about cash-flows frequency. Interest on most foreign denominated bonds issued by HFC are due semi-annually whilst mortgage repayments are on a monthly basis. Unless the company reaches a point that allows semi-annual interest payments to be done monthly (i.e. when having at least 6 series of outstanding bonds) there would be a lag, leading either to exchange gain of loss. We need to draw closer attention to all of these issues to see whether currency risk is a real concern in HFC or not. As a starting point, let's look at the foreign denominated bonds' features.

4.1.2.2 HFC's Foreign Denominated Mortgage Backed-Housbonds

The focus shifts from the concept to the very issue of the bonds' features analysis

4.1.2.2.1 The Concept

The concept of packaging mortgages into tranches for use as collateral for mortgage-backed bonds or mortgage-backed securities is an innovation designed to unlock fresh capital to finance new housing stock. Traditionally in Ghana, capital funding for housing and mortgages has been generated directly from investor and depositor cash resources as well as from the repayment of loans and the interest charged thereon. The proportion of commercial bank funds channelled to the sector has been limited firstly by the legal prudential requirements of the Bank of Ghana. This establishes capital adequacy ratios, and secondly, by the returns from the mortgage funds which have not kept up with inflation, thereby eroding the real value of loans to the housing sector.

This situation has therefore created the need for capital market instruments such as the housbonds backed by pools of mortgages. For about seven years now, HFC has successfully been using the mortgage-backed housbonds to finance the housing sector in Ghana. For instance, as major player on the Ghanaian Bonds Market, Home Finance Company, on 17 September 1996 made a shelf registration of US$ 35 million bonds on the Ghana Stock Exchange (GSE). With a maturity of five years, these bonds give investors the option to redeem their holding at the end of the second year of issue, and this at a discount value of US$ 98.25 for every US$100.

Recently however, on 13 August 2001, HFC, on the basis of a shelf registration, has added a UK£ denominated bonds. These bonds have a maturity of five years and also give investors the

option to redeem their holding at a discount value of £ 98.80 for every £100, at the end of the second year of issue (i.e. 2003). In addition to that, the Sterling denominated bonds are callable: from the end of the second year of issue, HFC can buy and repay investors at a premium of £ 101.2.

It should be reminded that from 1996 to date, HFC has issued 7 series of foreign denominated bonds (A to G) of which A has already been entirely redeemed and has gone off the GSE.

Being the main source of currency risk in HFC, these foreign denominated mortgage-backed housbonds deserve a closer analysis.

4.1.2.2.2 Summary and Analysis Of HFC's Foreign Denominated Mortgage Backed-Housbonds Features

- *Summary of the bonds' features (See Page 51 Table 4.3)*

- *Comments on HFC's foreign denominated mortgage-backed bonds features*

As shown in the above summary table, HFC has issued in 7 years periods time, seven series of foreign denominated bonds (Series A to G) of which:
- 6 series in US$: Total Amount as of 31 December 2002 is US$ 9.3 million
- 1 series in UK£ : Total Amount as of 31 December 2002 is UK£ 1.2 million
Laying a critical sight on the bonds' characteristics, we can see both strengths and weaknesses in their ability to allow effective currency risk management.

Strengths

These liabilities being in foreign currencies we can see that HFC has made valuable provision as to counter currency risk:

1- Interest payment dates have been chosen in a way to cover most months in the year. This is a very interesting strategy allowing HFC to make interest payments using mortgage repayments inflows. As of 31st December 2002, only three months in the year are still free (i.e. no interest is paid whilst mortgage repayment are made). These months are January, June, and December.

2- The foreign denominated housbonds are backed by a pool of conventional monthly payments first lien mortgage loans. Most of these mortgages are denominated in the same currency as the bonds. This currency match is a good way of mitigating the currency risk associated with the bonds. We will come back to those issues in the second chapter.

Weaknesses

1- Despite an effort to eschew currency mismatch, there is still a lag between monthly mortgage loans repayments and interest payments, a gap that is source of currency risk.

Summary of HFC Foreign Denominated Bonds as of 31 December 2002

Features/Series	A	B	C	D	E	F	G
Title	HFC Dollar Housing Bonds Series A (1996-2001)	HFC Dollar Housing Bonds Series B (1997-2002)	HFC Dollar Housing Bonds Series C (1998-2003)	HFC Dollar Housing Bonds Series D (1999-2004)	HFC Dollar Housing Bonds Series E (2000-2005)	HFC Pound Sterling Housing Bonds Series F (2001-2006)	HFC Dollar Housing Bonds Series G (2002-2007)
Total Amount	US$ 2,000,000	US$ 2,000,000	US$ 2,000,000	US$ 2,000,000	US$ 1,500,000	UK£1,200,000	US$ 1,800,000
Type	Fixed Rate US$ Bonds	Fixed Rate US$ Bonds	Fixed Rate US$ Bonds	Fixed Rate US$ Bonds	Fixed Rate US$ Bonds (Callable at US$101.75)	Fixed Rate UK£ Bonds (Callable at UK£101.2)	Fixed Rate US$ Bonds
Interest Rate	7% per annum on the US$ Amounts	7% per annum on the US$ Amounts	8.25% per annum on the US$ Amounts	8.25% per annum on the US$ Amounts	8% per annum on the US$ Amounts	6% per annum on the UK£ Amounts	7% per annum on the US$ Amounts
Interest Rate Payment dates	Semi-Annual (1st Nov and 1st May)	Semi-Annual (1st Oct and 1st April)	Semi-Annual (1st Oct and 1st April)	Semi-Annual (1st Sept and 1st March)	Semi-Annual (1st Nov and 1st May)	Semi-Annual (13 August and 13 February)	Semi-Annual (1st Oct and 1st April)
Maturity	5 Years (1st Nov , 2001)	5 Years (1st Oct , 2002)	5 Years (20 Nov, 2003)	5 Years (1st Sept, 2004)	5 Years (1st Nov, 2005)	5 Years (1st August , 2006)	5 Years (1st Oct , 2007)
Redemption	Optional from 1st Nov, 1998 at US$ 98.25 per HB	Optional from 1st Oct, 1999 at US$ 98.25 per HB	Optional from 20th Nov, 2000 at US$ 98.25 per HB	Optional from 1st Sept, 2001 at US$ 98.25 per HB	Optional from 1st Nov, 2002 at US$ 98.25 per HB	Optional from 1st August 2003 at UK£ 98.80 per HB	Optional from 1st Oct, 2004 at US$ 98.25 per HB
Principal Outstanding	Redeemed	Redeemed	In progress	in Progress	in Progress	in Progress	in Progress
Mortgage Pool	See Comments	See Comments	See Comments	See Comments	See Comments	See Comments	See Comments
Listing Market	GSE	GSE	GSE	GSE	GSE	GSE	GSE

Table 4.3 Summary of HFC Foreign Denominated Bonds as of 31 December 2002

Source: HFC's Foreign Housing Bonds (HB) - Series A to G -Prospectuses

2- HFC has been so careful about exchange rates movement between the cedi and the foreign currencies that they have failed to consider exposure from movements between US$ and UK£, a source of risk as well.

3- In each bond issue prospectus, assumptions have been made to demonstrate HFC's ability to originate from the company's business cash flows steady enough to repay or redeem issued bonds. For example in the Series C Prospectus (See appendix 2 for a copy), Table 2.02 (Cash-flows Projections on Forex Bonds and Mortgages) lies on assumptions that would have led to successful currency risk management, had realities not departed from projections. The truth is, unfortunately that HFC did not follow these projections. For instance in 1999 and 2001, the company issued a US$ 2,000,000 and a UK£ 1,200,000 bonds against US$ 1,500,000 and US$ 3,500,000 projected respectively, in 1998. These departures from projections have also played their role in widening the company exposure.

In conclusion we can already say that in HFC, currency risk matters. The substantiating figures are displayed in the second point of this chapter.

4.2   CURRENCY RISK IN HFC: THE EVIDENCE

To suspect currency risk concern in HFC is not sufficient. It is now time to establish facts and figures that prove how the company's business has been shaken by this type of risk over the last five years. That is what this part of our study aims at. Subsequently, we shall cover the following points:

1- HFC's housbonds currency exposure assessment.

2- Currency risk management in HFC: tools and outcomes

4.2.1   HFC's Currency Exposure Assessment

4.2.1.1 Preliminaries

By nature, business is exposed to many kinds of uncertainties. Some are imponderable whilst the others can be thoroughly weighted. Currency risk is just one of the latter. Here, the objective is to measure HFC's currency exposure for each year of the last quinquennium. Lacking accurate an in-depth information on the company whose very young Research Department has few data to provide, we shall limit our assessment to accounting measures. Specifically, what we are going to measure is HFC's translation exposure[27].

Actually, accounting measures of foreign exchange exposures, though very controversial, provide a fairly unambiguous technique for measuring exposure (Richard Levich, 1998).
Under this method, accounting items are classified either as "exposed" or " not exposed".
Then came the question: what is an exposed item?

Prior to 1976 for example in the US, "firms could elect their exposure by using current/non current approach or monetary/non-monetary approach." (Richard Levich, 1998). Under the current/ non-current approach current classified balance sheet items (cash, short-term receivables, and short-term

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[27] Translation exposure focuses on the book value of assets and liabilities as measured in the company's balance sheet.

payables) **as exposed.** And non-current items (long-term receivables, fixed assets and long-term payables) **as not exposed.**

The monetary/non-monetary approach classified all "monetary" balance sheet items   (such as cash, accounts receivables, and short and long-term debt) as exposed, and non-monetary items (such as inventories and fixed assets) as not exposed.

After 1976, the US Financial Accounting Standards Board (FABS) adopted Statement No.8 (FASB-8) which eliminated choice and required firms to employ **the temporal method** for measuring balance sheet exposure. (Richard Levich, 1998). The temporal method emphasized what was then called "time consistency": the valuation date of a balance sheet item determined the valuation date for an exchange rate. For example, on a December 31 balance sheet, inventories valued at their historical cost (as of June 30) would use the June 30 exchange rate. On the other hand inventories valued at a lower cost (as of December 31) would use the December 31 exchange rate. With the temporal method, firms that had been using the current/non current approach prior to 1976 saw a dramatic swing in the accounting measure of their foreign exchange exposure. Eventually, dissatisfaction with FASB-8 led to another revision in 1981, the FASB-52, that is the adoption of the all-current approach. With this last approach, which remains the current standard in Ghana, all foreign currency denominated balance sheet items are classified as **exposed.**

Using this approach has often proved relevant. One reason is that it provides us with an exact numerical answer for the studied firm's exposure.

As a final word, let's bear in mind that we will distinguish **gross** and **net** exposure. Gross exposure is the book value of the exposed item (either an asset or a liability), taken individually. On the other hand and for accounting purposes, net exposure is exposed assets minus exposed liabilities. A positive net exposure could be described as a **net asset exposure**. A negative net exposure could be noted as a **net liability exposure.**

To measure HFC's net exposure to currency risk in UK£ for example, one would calculate:

HFC (Net UK£ Exposure) = HFC (Exposed UK£ Assets) – HFC (Exposed UK£ Liabilities)

In our case, exposed assets would be restricted to **Foreign Denominated Mortgages (FDM)**. Exposed liabilities are restricted to the **Foreign Denominated Bonds (FDB)**. In fact, the balance sheets show no other significant items labelled in foreign currencies.

4.2.1.2 HFC's Currency translation exposure from 1998 to 2002

We shall perform the assessment for both US$ and UK£

- ### *Assessing HFC's US$ Currency Exposure from 1998 to 2002*

Introductory Calculations

Mortgages	62,101,607	89,738,781	155,869,756	186,513,841	197,954,246
Percentage of Foreign Denominated Bonds	51%	51%	51%	43%	59%
US$	74%	82%	74%	87%	79%
UK£	26%	18%	26%	13%	21%
Coefficients (weights)					
US$	37.74%	41.82%	37.74%	37.41%	46.76%
UK£	13.26%	9.18%	13.26%	5.59%	12.24%
Reconciliation Calculations	51.00%	51.00%	51.00%	43.00%	59.00%

Table 4.4: Mortgage Portfolio Structure

Assessing HFC US$ Exposure from 1998 to 2002 (US$"000")

	1998	*1999*	*2000*	*2001*	*2002*
Exposed US$ Assets					
US$ Denominated Mortgages	9,991	10,720	8,539	9,617	11,082
Exposed US$ Liabilities					
Due on US$ Denominated Housing Bonds	572	675	543	3,388	2,281
Bonds Redemption (¢"000")	0	0		17,627,643	14,012,215
Interest charged (¢"000")	1,341,128	2,362,302	3,743,225	6,953,939	5,042,064
Translation Exchange rates (31ˢᵗ Dec mid-rates)	*2,346*	*3,501*	*6,889*	*7,255*	*8,352*
Net US$ Exposure	9,419	10,046	7,995	6,229	8,801
Currency Position	**Long**	**Long**	**Long**	**Long**	**Long**

Table 4.5: HFC US$ Exposure from 1998 to 2002

Assessing HFC UK£ Exposure from 1998 to 2002

	1998	*1999*	*2000*	*2001*	*2002*
Exposed UK£ Assets					
UK£ Denominated Mortgages	2,116	1,453	2,011	992	1,811
Others					
Exposed UK£ Liabilities					
Due on UK£ Denominated Housing Bonds	0	0	0	100	77
Bonds Redemption	0	0	0	0	0
Interest charged	0	0	0	1,054,471	1,029,479
Translation Exchange rates (31ˢᵗ Dec mid-rates)	3,892	5,668	10,278	10,512	13,383
Net UK£ Exposure	**2,116**	**1,453**	**2,011**	**892**	**1,734**
Currency Position	**Long**	**Long**	**Long**	**Long**	**Long**

Table 4.6: HFC US$ Exposure from 1998 to 2002

Tables 4.4, 4.5, and 4.6 clearly show that because of periodicity mismatch, HFC has been long in both US$ and UK£ over the last five years as of 31ˢᵗ December. However, lacking data, we can say nothing about what the situation was mid-year.

4.2.2 HFC's Foreign Housbonds Currency Risk Management: Tools and Outcomes

Volatility study in Chapter Three has led to the remark that Ghanaian companies operating in foreign currencies should think of managing the associated risk.

In addition, we have just established that HFC is exposed to currency risk. For instance, from Table 4.4, 5 and 6 it can be concluded that over the past five years, the company has constantly been long in foreign currencies. Here comes an important question: " What has HFC been doing hitherto, about her currency exposure?

4.2.2.1 HFC's Tools for the Housbonds Currency Risk Management

When analysing HFC's Foreign Denominated Housbonds at the beginning of this section, we have already shown that HFC's strategy towards currency is what Richard Levich (1998) called " Naïve Hedge Match".

In fact, HFC's housbonds are backed by a pool of foreign denominated mortgage loans. By using this strategy, HFC's intention was to balance and offset losses incurred on the bonds as a consequence of strengthened US$ (or UK£) vis-à-vis the cedi, by exchange gains recorded on mortgage loans.

The " Naïve Hedge Match" also includes a tenor match side. HFC is still trying to establish an exact match between interest payments on her Foreign Denominated Bonds and the Repayments received from customers. For instance, as of 31 December 2002, only three months (January, June, and December) are free from interest payment commitment.

Though well thought, is that "Naïve Hedge Match" strategy an appropriate risk management tool in HFC's case?
To answer, let us look at the Hedge outcomes.

4.2.2.2 HFC's Foreign Housbonds Currency Risk Management : The Outcomes

- *Figures*

HFC Hedge Outcomes (¢"000")

	1998	1999	2000	2001	2002
Assets (Total Forex Gain)	1,170,000	9,488,787	33,633,008	2,650,000	14,801,314
Exchange Gains on Mortgage Portfolio	1,170,000	9,488,787	33,633,008	2,650,000	14,801,314
Others	0	0	0	0	0
Liabilities (Total Forex Loss)	560,652	8,377,592	31,312,671	4,606,827	17,706,200
Exchange Losses on Foreign HB	560,652	8,377,592	31,312,671	4,606,827	17,706,200
Exchange Losses on US$ HB	560,652	8,377,592	31,312,671	3,577,910	13,669,448
Exchange Losses on UK£ Foreign HB	0	0	0	1,028,917	4,036,752
Others	0	0	0	0	0
Net Exchange Gain/(Loss)	609,348	1,111,195	2,320,337	-1,956,827	-2,904,886

NB: For 1998 and 1999 HFC published in the Series F Pound Sterling Housing Bonds,
Exchange losses of ¢ 47,180 and ¢ 1,736,375

Currency risk impact on Shareholders' Wealth

Surplus Account (Net Income)	3,555,969	4,752,613	6,224,869	7,584,410	8,806,066
Exchange G/L As a Percentage of Surplus Account	**17%**	**23%**	**37%**	**-26%**	**-33%**
Total Shares	57,000	57,000	57,000	57,000	57,000
Exchange Gain / Loss per Share	11	19	41	-34	-51
Dividend per Share	24	29	37	45	48
As a percentage of Dividend	45%	67%	110%	-76%	-106%

Table 4.7 (Source: Calculations are made by student using HFC Annual Reports for 1999, 2001, and 2002).

- **Comments**

1- For 1998, 1999, and 2000, HFC's hedging strategy has proved very successful. Why?

The first and foremost reason is that during the stated period, HFC has raised bonds in US$ only, a currency in which the company was long (See tables 4.4, 5 and 6). In fact, Naïve Hedge Matches is the appropriate hedging tool for single foreign currency exposure. In addition to that, we should recall that HFC was also long in UK£, a currency that has strengthened over these three years. The combined effect of these factors provided the company with important exchange gains from 1998 to 2000.

On the macroeconomic side, justification to these substantial exchange gains (45%, 67% and 110% of dividend per share), can be found in some of our earlier analyses:

a) In 1998, one of the main factors that has worked favourably to the positive hedge outcome for HFC was low volatility, as we earlier showed.

b) In 1999, HFC's Forex profit can be attributed to cedi's 31.33% depreciation against US$. In fact at the same time that interest burden has increased as a consequence of this depreciation, US$ denominated mortgages have also increased, more significantly (HFC was long in US$). This is partly because the mortgage pool's size is greater than the bonds' amount. We can also evoke the lag between monthly repayments of foreign denominated mortgages received by HFC and the semi-annual payment of interest due on the bonds.

c) In 2000, HFC was long in US$ when the local currency experienced a huge depreciation of about 50%. The logic effect was the important exchange gain obtained in HFC: 110% of dividend amount! In other words, the exchange gain recorded could have helped HFC pay more than distributed dividends.

Unfortunately, this has been the end of the positive part of the story. Since 2001, as we shall see, the company has been going experiencing her strategy's side effects.

2- Table 4.7 shows red figures for 2001 and 2002 for HFC's hedging strategy's outcomes. Plausible interpretations are as follows:

a) On July 13, 2001 HFC issued the Series F Pound Sterling Housbonds UK£ 1,200,000. From then, HFC has added a new currency to her foreign currency denominated liabilities. "Match strategies" are no longer effective to manage the resulting currency exposure.

In fact, the financial risk has increased. More than the mere cedi-US$ and cedi-UK£ exchange rate movements, US$-UK£ exchange rates movements had to be carefully followed up. HFC seems to have failed to adjust her currency risk management tools

accordingly. The result has been a sudden shift from exchange gains to increasing exchange losses, for 2001 and 2002. As a consequence, shareholders in 2001, lost 76% of Account Surplus. In 2002, exchange losses swallowed more than distributed dividends. It is high time to do something about it.

b) Another possible interpretation of the 2001 and 2002 exchange losses recorded by HFC is rather, macroeconomic: cedi volatility against US$ and UK£ was globally high.

All in all, currency risk is disturbing HFC's business. Even in 1998 and 1999, calculations performed by **Data Bank Brokerage Limited**, Lead Manager of the Pound Sterling Housbonds issue have shown exchange losses of ¢1,736 million (for1998) and ¢47.18 million (for 1999). Had we considered these figures, we could have reached more dramatic conclusions.

Whatever the scenario, it is clear that since 2001 HFC's results are being stricken by currency volatility. Then the traditional questions:

- Is HFC aware of that?
- Do HFC's employees know that exchange losses is eroding their efforts for good performance?
- Do shareholders understand that exchange losses can take all their dividends if nothing is done to hedge currency risk?
- If HFC were to hedge the currency exposure associated with her Foreign Denominated Bonds, how could she make it? What are the appropriate strategies for a successful currency risk mitigation in HFC?

CHAPTER FIVE: BEYOND "NAÏVE HEDGE MATCH": FINANCIAL STRATEGIES TOWARDS CURRENCY RISK MANAGEMENT FOR HFC

What HFC is now going through as regards currency risk has been, during the last two decades, common experience to many companies involved in international business. However, whether the company itself is or not aware of it is another problem. Though up to this point of our study, it has been implicitly assumed that HFC is aware of her currency exposure and has found strategies (Naïve Hedge Match) to mitigate it, no proof has been shown to convince us of such awareness.

In this chapter, our first objective is to perform an assessment of HFC's awareness about currency risk, using a correlation test. Further and considering conclusions from the correlation test, we shall plead for hedging currency risk in HFC before displaying the wide variety of tools from which HFC can chose the most appropriate to manage her exposure.

5.1   IS HFC AWARE OR NOT OF HER CURRENCY EXPOSURE?

First part of this section is designed to assess HFC's awareness about currency risk. The second part discusses the controversial question of the opportunity of hedging at the corporate level. We apply the 'pros' arguments to HFC, pleading for a hedging decision before it is too late.

5.1.1   The Correlation Test

How can a qualitative notion " awareness" be quantitatively captured is arguable. This is not our objective. In our opinion, HFC's awareness can be determined through the company's behaviour as regards both mortgage portfolio size and the amount of bonds raised.

In other words, if HFC is aware of her currency risk, the company will increase mortgage portfolio in response to foreign denominated bonds outstanding increases, *and vice versa*. Through correlation study between these two variables, i.e. Mortgage portfolio (MP) and Bonds Outstanding (BO), we can at least, approximate a conclusion about HFC's awareness towards currency exposure.

5.1.1.1 Variables

(To reach more acceptable conclusions, data used to perform the study are quarterly)

- **Variables for Test 1**

- *Mortgage Portfolio (MP)*: As HFC's mortgages are denominated in three different currencies (¢, US$, and UK£), we have decided for simplicity sake, to use their equivalent value in the parent currency (¢). The amounts are picked from 1998 through 2002 Annual Reports. Annual data have been transformed to obtain their quarterly equivalence. To do this, we calculated the quarterly increase rate equivalent to the annual portfolio growth rate of 20%[28]. From the calculations, quarterly mortgage portfolio's growth rate has been set at 4.66351%.

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[28] Assumption picked in the Series E US$ Housbonds prospectus

- *Bonds Outstanding (BO)*: the data are picked from HFC's Annual Reports. As available data are annual, quarterly equivalents have been computed using annual growth rates. Detailed calculations are provided in appendix 4

    ▪ *Variables for Test 2*

Data computed in this test are the same as those of test 1, but variables are on a flows basis. Instead of MP and BO, we use here, DMP=MP-MP(-1) and DBO=BO-BO(-1). This second test aims at offsetting the trend effect that could have led test 1 to a strong correlation.

5.1.1.2 Correlation Test Results

- *Scatterplots*
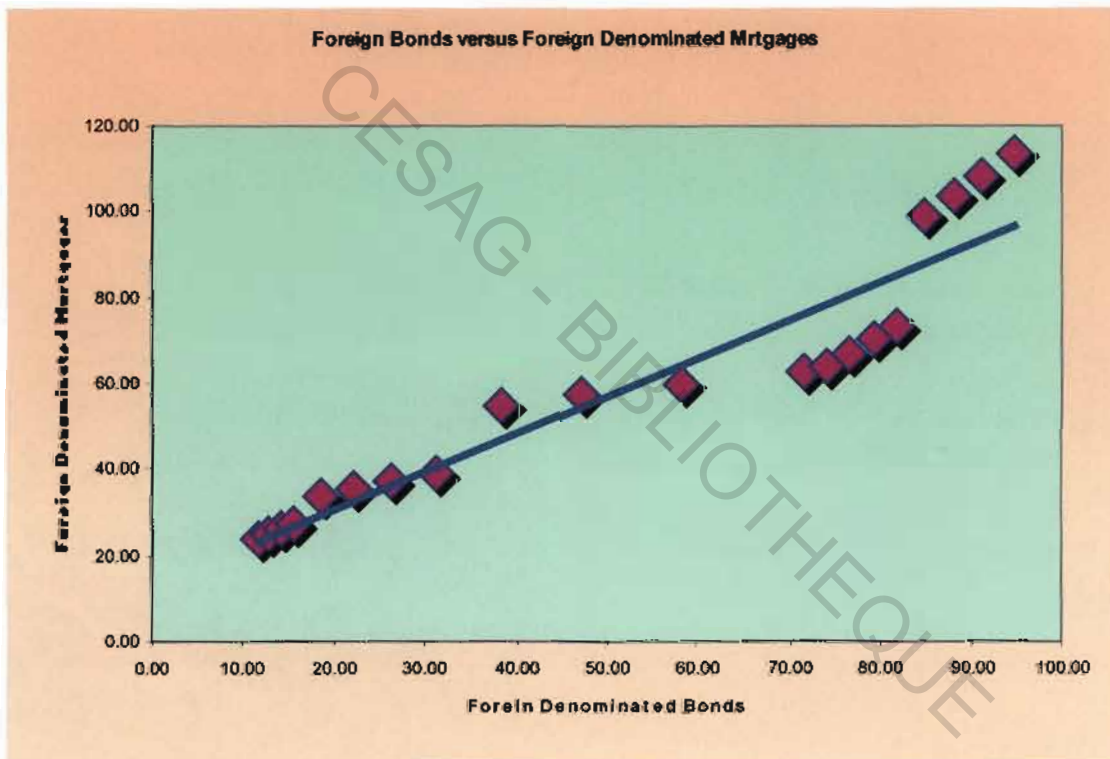
Chart 5.1: Bonds and Mortgage correlation Scatter plots

From chart 5.1, we can suspect the existence of a relationship between the two variables: Mortgage Portfolio and Bonds Outstanding. To reach more relevant conclusions, the following tests have been performed using the statistical software "Eviews". The detailed results are displayed in Appendix 5. Partial results are below.

- *Test 1 : Results from Eviews Software*

Dependent Variable: MP
Method: Least Squares

Sample: 1998:1 2002:4
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BO	0.818796	0.011854	69.07598	0.0000

- *Test 2 : Results from Eviews Software*

Dependent Variable: DMP
Method: Least Squares

Sample(adjusted): 1998:2 2002:4
Included observations: 19 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DBO	0.689818	0.169317	4.074131	0.0007

- *Comments*

- Calculations of Pearson r [(r = + 0.82, for Test 1) and (r = + 0.69, for Test 2) suggest in terms of magnitude, a strong relationship between foreign denominated bonds outstanding and foreign denominated mortgage portfolio in HFC, and this, whatever the approach (Stock, i.e. Test 1, or flows, i.e., Test 2). The coefficients' sign (+) signifies that as HFC foreign denominated bonds increase, provision is made to increase the pool of mortgage backing the transaction.

Chart 5.1 displays the corresponding Scatter plot, showing that the points cluster close to an imaginary straight line passing through the data: correlation between the two series is high! However, it appears that for 2001 and 2002's data the points spread farther from the line. Another proof that the association has become less strong.

Of course, this high correlation does not give us the kind of evidence that can allow us to make cause-and-effect statements. But this sizeable coefficient may be the result of a cause-and-effect between the two variables. HFC is likely to adjust foreign denominated mortgage portfolio in response to bonds' outstanding increases. This relationship suggests HFC awareness for the sample years.

- Though correlation coefficient between series of bonds and mortgage is high, nothing tells us whether the relationship is real or occur by chance. Hence, the necessity of testing the significance of the coefficient of correlation against a zero correlation hypothesis.

The Significance of the coefficient of correlation (t-statistic)

Let us assume that the Pearson product-moment correlation coefficient of a population is ρ (rho). Our null hypothesis is: H_0: $\rho=0$ (We are testing the Significance of the coefficient of correlation against an hypothesis of zero correlation). The results displayed by the software (Eviews) show that the probability for H_0: $\rho=0$ to occur is close to zero. We can then reject the null hypothesis, i.e. the hypothesis that there is no linear relationship between foreign denominated bonds outstanding and foreign denominated mortgage portfolio.

In conclusion, the correlation coefficient is significant and we can say that HFC is aware of the currency risk associated with her foreign denominated housbonds. In addition to being aware of he exposure, HFC has been using a "match" strategy to manage the currency risk. But since the issue of the Pound Sterling Housbonds in 2001, HFC's strategy to cover currency risk has become ineffective. For 2 years now, exchange losses have widened, shifting from 1.96 billion in 2001 to 2.90 billion in 2002. As a consequence, we think that a decision to set up proper hedging strategies is urgently called for. A decision, which after all, is not easy to make, unless shareholders through senior management are convinced.

5.1.2   Arguments for hedging in HFC

5.1.2.1 The theoretical side of the question

Classical theory of finance taught us that managers run a company as agents on behalf of shareholders who are assumed to be risk averse. The paradox is that these shareholders instruct managers to manage their firm in a risk-neutral manner, seeking profit maximization without regard to risk. According to Richard Levich (1998), "shareholders prefer this system because they are assumed to operate in a Perfect Capital Market without transaction costs or taxes. Shareholders in this view, should not favour hedging because they can select well-diversified portfolios to rid themselves of firm-specific risks, and reach their desired level of exposure to corporate and currency risks."

Unlike shareholders, risk-averse managers may prefer to hedge risks to maximize their utility.
This is particularly true of debt holders like HFC. The logic behind this is that for companies with foreign denominated debts, their value depends on exchange rates. The stronger the currency in which they are indebted, the lower the company's net worth. In this regard, hedging becomes more secure, providing to the risk-averse borrower a higher utility[29].

But the problem is that in a Perfect Capital Market, Modigliani and Miller showed that the financial policies of a firm are irrelevant because the shareholder can recreate or undo whatever financial decisions the firm has made. Logically however, corporate financial policy choices become important when transaction costs and taxes enter the analysis. (Richard Levich, 1998) . In fact, from this more realistic view, there should be a cost of entering into bankruptcy as well as a cost of starting a new business, hence the necessity of hedging.
High volatility of exchange rates leads to high volatility in exposed company's cash flows. With high volatility, companies' cash flows can shift from a consistent value to naught. Moreover, as stressed by Levich, " the costs of financial distress represent the impact that volatile cash flows may have on the firm's relationship with its customers, employees, suppliers, bankers, bondholders, and

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[29] See Richard Levich (1998), for concrete case

other constituencies". All of these costs may be reduced if the firm can reduce its cash flows volatility by hedging her risk.

It is a fact that customers in many cases prefer to buy from companies that they expect will remain in business for a long time. This is especially so the product require after sale service and follow-up. Employees also express the same preferences for long-term stability in cash flows. During a period of weak or negative cash flows for example, a company may consider laying off employees, cutting back on amenities, an so forth. The most qualified of a firm in this situation may have an incentive to "jump ship", therefore jeopardizing the firm's future cash flows. This problem is when future cash flows depend on accumulated know-how embodied in key employees.

Along the same lines, suppliers may also be reluctant to deal with an unhedged exposed firm.

And if a supplier cuts back on shipments, cuts back on trade credits, and reduces its service commitment to the account, unhedged exposed firm will clearly be at disadvantage in generating future cash flows..

What the classical theory suggests is that a firm can borrow (based on its future cash flows) from a perfect capital market in times of weak cash flows to eschew these adverse effects and pull it through into the recovery. But since future cash flows are uncertain in the real world, customers, employees, and suppliers may show a clear preference for dealing with less volatile firms.[30]

In the same way, banks and bondholders are more attracted by companies with stable and less volatile cash flows.

5.1.2.2 Hedging Currency Risk in HFC: A must?

These arguments in favour of hedging are consistent in HFC's case, as the company is at the cutting edge of an industry of growing interest. HFC should hedge her exposure as nothing is certain in the present-day fast-paced business setting. Foreign exchange market can bring very bad news at any time.

Richard Levich (1998) reported that as the US$ depreciated against most currencies in 1976, 1977, and 1978, US firms with debt denominated in foreign currencies incurred substantial foreign exchange translation losses, all of which were carried to the bottom line and reported in current income. For some companies, the impact was especially dramatic. Exxon Corporation reported US$258 million for 1976 and more than US$500 million in 1977. As many other US companies in this period, Exxon declined to hedge her currency exposure and endured the resulting drawbacks.

When we consider how exchange losses have dramatically increased in HFC since 2001, we can not help but wonder what forthcoming years are likely to bring to the company's performance. For an exposed company, hedging is a crucial decision to make. Otherwise, any long run vision is at stake. We can hardly consider such firms in a going concern view.

Let us now assume that HFC management is convinced of hedging necessity. The resulting question would logically be: "What are the most appropriate techniques for an effective currency risk hedging in HFC?"

5.2   HEDGING RECOMMENDATIONS FOR CURRENCY EXPOSURE IN HFC

As we have discussed and seen in HFC's case, exchange rate changes may have complex and subtle effects on the firm's market value. Many financial instruments may be used to adjust the firm's exposure to exchange rate risk. This section seeks to examine how HFC can build a strategy that matches an appropriate hedging technique to its currency exposure.

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[30] Froot, Scharfstein, and Stein (1993), quoted by Richard Levich

We firstly look at some preliminaries before shifting to the hedging tools.

5.2.1 CURRENCY RISK MANAGEMENT IN HFC: THE PRELIMINARIES

Here, we will consider the Currency Profile and Scenario approach as prior choice devices in the currency risk management process

5.2.1.1 Currency Profile: An Indicator of Suitable Financial Hedging Instruments

An important step of determining the appropriate financial hedging instruments for a firm is to firstly analyze the nature of the firm's currency cash flows. Three aspects of the cash flows are critical: the frequency of foreign currency cash flows, the number of currencies, and the degree of certainty about the cash flows.

5.2.1.1.1 Frequency of Cash flows

For some firms, foreign currency cash flows are a rare or infrequent event. If a currency cash flow is expected in a single period, clearly a naïve match will effectively offset the currency risk. But in HFC's case, we are on a field of long-term contracts. Mortgage financing obligates HFC to pay and receive a set amount of foreign currency over many periods, about 60 months. Interest payments on foreign denominated bonds are semi-annual whereas foreign denominated mortgage repayments are monthly. In mature economies with deep and active financial markets, HFC could have hedged with a strip of 10 forward contracts with maturities of 6, 12, 18, …54, 60 months call options placing cap on the US$ and UK£ repayment amounts. All this shows that frequency of cash determines in a large extent what hedging techniques are the most suitable.

5.2.1.1.2 Number of Currencies

As experienced by HFC, the more the currencies dealt with in a business, the more subtle the currency exposure. Such cases require an careful exposure measure, consisting of Net exposure calculation, currency by currency. When firms fail to follow-up their exposure in a rigorous way, the outcomes can be an apparent hedging ending up with huge exchange losses.
It should be borne in mind that HFC mainly deals in two foreign currencies: US$ and UK£.

5.2.1.1.3 Degree of Certainty

A final issue to address when selecting hedging techniques is the confidence in the firm's cash flow positions. Cash flows that are contractual in nature such as dividend, interest, lease and mortgage payments, royalty and licensing receipts, are usually considered certain. So, HFC's foreign currency cash flows are certain.

5.2.1.2 Scenario Calculations: The Starting Point To Effective Currency Risk Hedging

A scenario is a helpful tool in currency risk management decisions. It is a detailed set of assumptions concerning how the firm will respond conditional on a change in the path of an exchange rate.
In HFC's case, ISL could take this task in charge, so that given a scenario, they will be able to estimate HFC's cash flows (and its market value) conditional on US$/¢ or UK£/¢. The scenario approach, we must remember, is well suited to a spreadsheet analysis where one is encouraged to

ask a variety of "what-if" questions. Exchange gains and losses can thus be estimated and hedging decisions taken accordingly.

Scenario calculations are by all means the starting point to effective hedging decisions. And we urge HFC to set up such tools to gain a clear view of her cash-flows behaviour given specific indicators such as growth and inflation rates, exchange rates appreciation or depreciation, etc. As most cash flows (interest payments and mortgage repayments) are made on a monthly basis, it is advisable for HFC to use monthly scenarios.

Had they started scenario analysis, they would have used 31st December data as a base case scenario to estimate what would happen if the cedi appreciated (or suffered a depreciation) in 2003. Anyway, it is not too late to perform such analyses before choosing between the hedging techniques suggested below.

5.2.2 CURRENCY RISK MANAGEMENT IN HFC: SOME HEDGING STRATEGIES

In this part of our study, some proposals are made to help HFC cope with her currency exposure. Not being template-like solutions to the problem, these techniques can be subject to improvement depending on the firm's means and strategic business orientations.
Hedging strategies requiring a bit of expertise, we distinguish techniques that HFC can set up and the techniques the company can use through intermediaries such as the International Finance Corporation (IFC)

5.2.2.1 Hedging Techniques by HFC itself

To succeed in managing HFC's currency exposure stemming from foreign denominated bonds, the Treasurer or Finance Officer should set up computerized system fulfilling, at least two requirements:

1- A currency by currency forecast of inflows and outflows for each month, using the company's budget, bonds and mortgage outstandings.

2- Once the month-by-month forecast of in and out flows for each currency (US$, UK£, and ¢) has been established, the second step is to measure the exchange exposure generated by foreign currencies, using scenario analyses.

Having set up the currency risk management frame, the following strategies can be helpful:

5.2.2.1.1 Currency choice in invoicing

We earlier pictured HFC's mortgage financing strategy which consisted of receiving mortgage repayments in two main currencies (US$ and UK£) and buying for the customers houses invoiced in US$ only. In other words, HFC invoices her mortgage loans in US$ while resources used are in US$, UK£ and ¢. No currency exposure is associated with cedi resources because they are automatically adjusted to exchange rates to meet the houses' value in US$. For the UK£ however, caution is in order. As long as US$ weakens against UK£, the result will be positive until reversal when US$ will strengthen against UK£.
To avoid bad surprise, HFC may negotiate with house developers to invoice houses in the same currency as her foreign denominated resources, that is in US$, UK£.

5.2.2.1.2   Central Accounts

This technique is appropriate for a company like HFC with small amounts of foreign currency inflows on a frequent and regular basis. As it would be administratively costly to attempt to hedge each transaction, we suggest that HFC sets up a central or global account through which all tr transactions associated with foreign currencies bonds and mortgages can be handled. Every month, HFC will convert the balance. If it is negative, that is, HFC is short in foreign currency, the company will have to purchase the foreign currency in a bank or in a Forex Bureau (arbitraging on spreads) to make up the difference. If the balance is positive, HFC can invest it to earn interest. Over the course of each month, HFC will monitor the account according to previous month position.

5.2.2.1.3   Reducing Number of Currencies

Evidence found in HFC's Accounts has shown that once HFC has issued Sterling Pound Denominated Bonds, exchange loss skyrocketed. Increasing the number of currencies in HFC's business has then proved harmful to the company's performance, perhaps because of the local currency high volatility against the two currencies. To come out with an effective hedge, sophisticated and costly techniques may be required. But as these tools are not available in Ghana, HFC can merely get rid of Sterling Pound Denominated Bonds.

In fact, HFC Sterling housbonds are callable at a premium of £101.20 and this from July 2003. If 2003 accounts record exchange loss of the same amounts as in 2002, we will advise HFC to issue an equivalent amount of US$ housbonds and use the proceeds to call the Sterling bonds. As the company is about to start banking operations, Treasurers can properly place the Sterling mortgage repayments to make them profitable for the company.

From then, HFC can continue dealing in US$ alone as for 1998, 1999 and 2000. Refined match hedge combined with effective use of scenario tools based on realistic assumptions may provide successful results.

5.2.2.2 Hedging Through Specialized Institutions: IFC's Local Currency Swaps

As hedging channel, HFC can refer to the International Finance Corporation (IFC). IFC has recently designed risk management tools and hedging strategies for developing countries. If HFC intends to continue funding her activities using both US$ and UK£, the company can use IFC to have access to Currency Swap.
In fact, to avoid removing UK£ mortgage portfolio, HFC can convert both UK£ resources and debts in US$ resources and debts by entering the swap. By so doing, HFC would reduce the number of currencies and fix exchange rates for both foreign denominated loans and debts at a low cost.

In this chapter, we have studied HFC awareness about currency risk and found that the company is really concerned by currency risk issues. To hedge that exposure, HFC has tried to use as stressed in chapter I a simple match hedge. The results for the first three years were encouraging whereas 2001 and 2002 closed with substantial exchange losses beforehand. Hence the necessity of refining hedging strategies in HFC. Having defended the opportunity of these hedging decisions at the corporate level in general and in HFC in particular, we have come out with some specific suggestions. With computerizing tools (scenario analysis spreadsheets) as prerequisite, the following techniques can be used by HFC:

1- A review of invoicing currency, source of currency mismatch in the company's business
2- A Central Account may also be helpful
3- Reduction of the number of major foreign currencies dealt in, from two (US$, UK£) to one (US$) by getting rid of Sterling Pounds housbonds. To do this, the company can issue another series of US$ bonds and use the resulting proceeds to call the former UK£ bonds.
4- Finally, HFC may call on IFC for a local currency swap.

These are very simple strategies for a Small and Medium Sized Company like HFC. No reference has been made to derivatives and more complex hedging strategies. This is to consider the financial environment in which HFC is operating: Ghana is an HIPC. Sophisticated hedging techniques are not available. Required skills to use them are dramatically scarce.
Nonetheless, the above suggestions if implemented and thoroughly followed, may be very helpful and at least, reduce exchange losses incurred by HFC.

GENERAL CONCLUSION

Having analyzed a range of issues that relate to management of the currency risk associated with HFC's foreign denominated bonds, it is now time to pause and sum up the study's key findings.

Findings Summary, Conclusions And Recommendations

As stated in the introductory part of the study, let us remember that, our objectives are twofold:

1- Firstly, to measure HFC's currency risk exposure stemming from her foreign denominated bonds and analyze how the company has hitherto dealt with this kind of risk,

And

2- Secondly, to perform a test of the company's awareness about currency risks before suggesting simple strategies for managing currency exposure in HFC.

As a starting point to our attempt to reach these two set of goals, we have performed a analysis of the local currency's volatility against the US$ and UK£. The findings can be summarized as follows:
- Over the period from 1998 to 2002, the Ghanaian local currency has globally behaved erratically against US$ and UK£, these currencies in which HFC has been indebted.

- Volatility study also showed that over the stated period, most years were characterised by a cyclical trade-off movements between Cedi to US$ and Cedi to UK£ volatility figures. To say it another way, we have noted that given a year, Cedi to US$ volatility moves adversely to Cedi to UK£. For that reason, we have suspected carry trade behaviour from Ghanaian investors, a conclusion we cannot qualify definitive until researches covering longer times are performed.

- Last but not the least is the conclusion that satisfactory macroeconomic environment in Ghana has oftentimes (but not always) led to low volatility rates. This is an interesting finding since it sheds clear light on policymakers' responsibility in local currencies' volatility monitoring.

The following step has been the analysis of currency risk management in HFC. In fact, having understood that HFC's parent currency (cedi) has shown intense volatility as regards foreign bonds currencies, the logical question was to see how HFC has coped with currency exposure during these years. The findings are not so dramatic:

- From 1998 to 2002, HFC used the match strategy to hedge the currency risk associated with the company's foreign denominated bonds.

- The results were quite encouraging for the three first years, i.e. 1998, 1999 and 2000 since HFC closed these years with substantial exchange gains. Unfortunately, 2001 and 2002 brought huge and increasing exchange losses. We suspected that the widening exchange losses might be the result of the additional Pound Sterling Denominated Bonds issued by HFC in July 2001. This is especially true when we consider the fact that following this bond issue, no change has been brought to currency risk management strategy in HFC.

Taking heed of HFC's silence despite increasing exchange losses, we decided to test the company's awareness about currency exposure to check whether the successful hedge recorded during the first

years were just by chance or the result of conscious currency risk management. This has been done through a correlation analysis. Two test has been performed with Eviews Software. The results have demonstrated that HFC is more than not, aware of her currency exposure. The successful hedging outcomes for 1998, 1999 and 2000 were not random facts but the results of good currency and periodicity match. If 2001 and 2002 moved adversely, it seems to be because with the additional foreign denominated liabilities, a refining of the currency risk management was needed. That's why we have suggested some simple tools to improve HFC's hedging strategy:

- A review of invoicing currency, source of currency mismatch in the company's business.

- A Central Account

- Reduction of the number of major foreign currencies dealt in, from two (US$, UK£) to one (US$) by getting rid of Sterling Pounds housbonds. To do this, the company can issue another series of UUS$ bonds and use the resulting proceeds to call the former.

- Finally, HFC may call on IFC for a local currency swap

Whatever the strategy, the starting point is the scenario analysis. Computerizing macroeconomic indicators and possible exchange rates paths, HFC will be able to estimate the impact of exchange rates volatility on its Profit and Loss Account.

The Study's Limitations

All in all, most questions have somehow been answered and the initial goals reached. However, we must acknowledge that this study has suffered several limitations, mainly:

- Lack of accurate database for most analyses. We sometimes had to use estimates calculated based on specified assumptions from the company's projections.

- Our desire to perform PPP calculations to depict periods of over or under valuations of the local currency against US$ and UK£ could not come through. Statistical Service Head failed to help gather the required information.

- About hedging strategies, our wish to use financial information to perform simulations hit the secrecy wall. And time was not enough to negotiate.

A look into the future

In *"Analysis and forecasts for 2002-2006"*, a Publication by Ghana Chartered Institute of Bankers and Claydord Enterprises Limited has demonstrated that a more (but managed) flexible exchange rate policy (which will prevent the over-valuation of the cedi) should be pursued while private sector is enabled to be the engine of growth and be supported by interest rate and credit policy.
If this be the case, the resulting macroeconomic environment could be helpful to foreign denominated bonds currency risk management in HFC, provided that "do nothing" approach is turned down.
Our wish is that using our recommendations, HFC could come out with steady cash flow and high dividend growth rate for coming years.

APPENDIXES

Appendix 1 : Ghana Monthly Interbank Average Exchange Rates from 1998 to 2002

A- *Monthly Interbank Cedi-USD Mid-Rates, 1998-2002*

	1998	1999	2000	2001	2002
January	2,271.70	2, 352.02	3, 547.94	7, 005.03	7, 268.92
February	2, 291.79	2, 363.68	3, 666.73	7, 059.49	7, 379.04
March	2, 303.79	2, 394.34	3, 934.72	7, 075.26	7, 559.40
April	2, 307.58	2,428.35	4, 278.26	7, 121.75	7, 667.05
May	2, 322.30	2, 453.01	4, 560.84	7, 147.87	7, 786.64
June	2, 315.01	2, 506.67	5, 001.94	7, 154.13	7, 885.24
July	2, 324.76	2, 554.06	5, 842.02	7, 121.98	8, 009.81
August	2, 325.41	2, 598.87	6, 290.03	7, 106.56	8, 104.60
September	2, 324.70	2, 662.46	6, 460.53	7, 102.84	8, 127.83
October	2, 324.58	2, 790.11	6, 622.51	7, 109.72	8, 182.56
November	2, 332.97	3, 238.34	6, 771.94	7, 145.63	8, 235.03
December	2, 366.37	3, 466.60	6, 869.72	7, 227.57	8, 315.35

Source: Ghana Association of Bankers, data received from Bank of Ghana

B- *Monthly Interbank Cedi-UK£ Mid-Rates, 1998-2002*

	1998	1999	2000	2001	2002
January	3,716.39	3,883.03	5,821.24	10,202.17	10,424.53
February	3,758.08	3,850.12	5,874.32	10,108.59	10,648.82
March	3,828.47	3,879.95	6,217.44	10,214.43	10,752.3
April	3,819.98	3,814.04	6,780.19	10,213.7	11,075.41
May	3,778.52	3,959.65	6,879.81	10,193.91	11,368.75
June	3,817.47	4,001.42	7,546.71	10,033.33	11,368.75
July	3,808.25	4,019.71	8,811.01	10,061.12	11,694.49
August	3,792.79	4,154.4	9,368.29	10,196.66	12,457.96
September	3,903.38	4,382.68	9,267.5	10,384.73	12,453.47
October	3,935.04	4,624.7	9,616.75	10,322.5	12,644.91
November	3,875.89	5,257.21	9,663.05	10,270.67	12,742.27
December	3,914.79	5,596.41	10,043.39	10,409.67	12,942.55

Source: Ghana Association of Bankers, data received from Bank of Ghana

Appendix 2 : Ghana Month-By-Month Average Volatility Rates

A- Cedi-USD Month-by-Month 1-year Volatility, 1999-2002

	1999	2000	2001	2002
January	237%	304%	27%	27%
February	293%	264%	31%	36%
March	326%	204%	32%	49%
April	342%	112%	32%	60%
May	344%	30%	32%	67%
June	344%	29%	32%	70%
July	344%	29%	33%	70%
August	344%	26%	33%	70%
September	343%	21%	30%	70%
October	341%	16%	24%	69%
November	337%	21%	22%	67%
December	330%	27%	23%	66%

Source: Primary data are collected from Ghana Association of Bankers
Volatility figures are student's calculations

B- Cedi-UK£ Month-by-Month 1-year Volatility, 1999-2002

	1999	2000	2001	2002
January	369%	7%	35%	15%
February	363%	7%	33%	11%
March	356%	7%	31%	10%
April	349%	8%	28%	11%
May	329%	8%	27%	13%
June	288%	18%	32%	16%
July	224%	26%	33%	21%
August	86%	32%	33%	27%
September	4%	37%	29%	31%
October	5%	38%	25%	32%
November	6%	38%	23%	32%
December	7%	38%	20%	32%

Source : Primary data are collected from Ghana Association of Bankers
Volatility figures are student's calculations

Appendix 3 : HFC Series F Pound Sterling Housbonds Prospectus Title Page

HFC

HOME FINANCE COMPANY LIMITED

Prospectus
Supplement

£1,200,000
6% per annum
HFC HOUSING BONDS
(SERIES F POUND STERLING HOUSBONDS)

LEAD MANAGER
DATABANK BROKERAGE LIMITED

SPONSORING BROKER
DATABANK BROKERAGE LIMITED

TRUSTEE
MERCHANT BANK (GHANA) LIMITED

This prospectus is Dated
July 13, 2001
PROSPECTUS SUPPLEMENT

- Appendix 4 : Primary data for Correlation Tests

- *Quarterly amounts of Bonds Outstanding Estimation*

	1-Jan-98	31-Dec-98
F.D.B. Outstanding	10,741,128	15,760,691

Growth rate for 1998	46.73[31]%
Quarterly Equivalent	10.060%

Computing the same data for the other years has led to the rates in the table below:

Years	1998	1999	2000	2001	2002
Growth Rates	10.06046%	18.65976%	23.13884%	3.35641%	3.66115%

- *Bonds Outstanding (BO) and Mortgage Portfolio (MP) series:*

Years	Quarters	BO(X) (¢ million)	MP(Y) (¢ million)	(X - X*) x	(Y - Y*) y	xy	x^2	y^2
1998	1	11.82	23.93	-40.22	-35.23	1,416.72	1,617	1,241
	2	13.01	25.04	-39.03	-34.11	1,331.28	1,523	1,164
	3	14.32	26.21	-37.72	-32.94	1,242.58	1,423	1,085
	4	15.76	27.43	-36.28	-31.72	1,150.78	1,316	1,006
1999	5	18.70	33.92	-33.34	-25.23	841.19	1,111	637
	6	22.19	35.50	-29.85	-23.65	705.92	891	559
	7	26.33	37.16	-25.71	-22.00	565.43	661	484
	8	31.25	38.89	-20.79	-20.26	421.32	432	411
2000	9	38.48	54.89	-13.56	-4.27	57.87	184	18
	10	47.38	57.45	-4.66	-1.71	7.96	22	3
	11	58.34	60.12	6.30	0.97	6.13	40	1
	12	71.84	62.93	19.80	3.78	74.77	392	14
2001	13	74.25	64.20	22.21	5.05	112.21	493	26
	14	76.74	67.20	24.70	8.05	198.77	610	65
	15	79.32	70.33	27.28	11.18	304.99	744	125
	16	81.98	73.61	29.94	14.46	432.97	897	209
2002	17	84.98	98.92	32.94	39.77	1,310.21	1,085	1,582
	18	88.09	103.54	36.06	44.38	1,600.29	1,300	1,970
	19	91.32	108.36	39.28	49.21	1,933.10	1,543	2,422
	20	94.66	113.42	42.62	54.27	2,313.04	1,817	2,945

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[31] Formula used: growth rate for the year = [(Outstanding as of 31st Dec / Outstanding as of 1st Jan)-1] x 100

Appendix 5 : Correlation Tests Results

- *Correlation Test 1 : Stock Data Approach*

Dependent Variable: MP
Method: Least Squares
Date: 02/10/04   Time: 14:28
Sample: 1998:1 2002:4
Included observations: 20

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BO	0.818796	0.011854	69.07598	0.0000

R-squared	0.974962	Mean dependent var	115.3683
Adjusted R-squared	0.974962	S.D. dependent var	51.35295
S.E. of regression	8.125709	Akaike info criterion	7.076650
Sum squared resid	1254.516	Schwarz criterion	7.126436
Log likelihood	-69.76650	Durbin-Watson stat	0.993875

- *Correlation Test 2 : Flows Data Approach*

Dependent Variable: DMP
Method: Least Squares
Date: 02/10/04   Time: 14:32
Sample(adjusted): 1998:2 2002:4
Included observations: 19 after adjusting endpoints

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DBO	0.689818	0.169317	4.074131	0.0007

R-squared	0.001961	Mean dependent var	7.648438
Adjusted R-squared	0.001961	S.D. dependent var	8.199818
S.E. of regression	8.191773	Akaike info criterion	7.095334
Sum squared resid	1207.893	Schwarz criterion	7.145041
Log likelihood	-66.40567	Durbin-Watson stat	2.373701

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