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AN EVALUATION OF THE FINANCIAL SYSTEM IN GHANA

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ABSTRACT

This thesis reports the findings of a study investigating whether some aims of financial sector reform (FSR) in Ghana had bean achieved. Proponents of FSR had argued that, among others, it would improve competition, efficiency and ensure that only efficient firms are profitable using the –Herfindahl index (HH) to measure the competition he study found that whereas competition increased in the deposit market, the picture in the loan was somewhat mixed. Efficiency was measured using data envelopment analysis (DEA). The study found that efficiency increased in the early years and stabilized thereafter. The source of bank ownership (e.g. foreign, domestic, and state-owned) did not appear to be a significant driver of efficiency. Rather size seems to be the main driving force. In addition the link between efficiency and competition was found to be very weak. Finally neither efficiency nor competition influenced profitability very much over the period of the study. The key determinant of profitability was market share in the main markets (i.e. deposit and loan markets.) overall then, the study concluded that the anticipated benefits of FSR that its proponents claimed had not been achieved. This calls for a rethink of financial sector reform policy in Ghana.

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MY DEDICATION

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CHAPTER ONE

ABREVIATIONS AND ACRONYMS

ADB	Agricultural Development Bank
AFRC	Armed Forces Revolutionary council
ATM	Automatic Teller Machine
BBG	Barclays bank of Ghana
BOG	Bank of Ghana
BSD	Bank supervision department
EBG	Ecobank Ghana limited
FINSAC	financial sector adjustment program
CAL	CAL merchant Bank
CEPA	Center for policy analysis
COT	commission on turnover
CUR	currency outside the banking sector
DD	demand deposit

EBG-IML	ecobank investment managers limited
ECO	equal credit opportunity
ERP	economic recovery program
ESL	ecobank stockbroker's ltd
GCB	Ghana commercial bank
GDP	gross domestic product
GSE	Ghana stock exchange
IA	international approach
ICB	international commercial bank
M3	merchant bank (Ghana) ltd
Merchant	merchant bank
NBFI	non-bank financial institutions
NIB	national investment bank
NPART	Non-bank (Ghana) ltd
PA	production approach
PNDCL	provisional national defence council law
QM	quasi money
ROA	Return on equity
ROE	return on equity
SME	small and medium scale enterprise
SSA	sub-saharan Africa
SCB	standard chartered bank
SSB	SSB Bank
TTD	Total deposit

FSR	financial services reform
SOE	State owned enterprise

INTRODUCTION & BACKGROUND

The economy of Ghana suffered seriously in the 1970's this was evidenced in high unemployment, high unemployment, high inflation, decline in investment, lack of foreign capital, low per capita income and high food prices.

In 1980's Ghana was classified among the poorest countries. Government deficits were unacceptable and gross domestic product (GDP) was declining at a rate of 0.5% per annum.

It became clear mismanagement of the economy, coupled with its substances of corruption, brain drain, embezzlement and low growth rate of about 3.1% were responsible for the deplorable state of the economy. Other factors were excessive government involvement in the business, unregulated and undeveloped financial system

in the (banks, insurance firms, etc), low foreign exchange earnings and weak infrastructure for growth and development. The entire economy was characterized by negative practices such a 'KALABULE'. To arrest this situation, the government launched the economic recovery program (ERPO) (I) in April 1983. it was envisaged that the ERP would put the country back on its track to prepare the ground for a continuous and sustainable economic growth and development.

The ERP(1983-1986) Has its aims

i. To stabilize the economy
ii. Rehabilitation of key economic and social infrastructure
iii. Attaining real growth of about 5% per annum
iv. Enhance productivity in all sectors including exports

It was to consolidate the effort of ERP II was launched in 1987. ERP II 1987 aimed at improving the standard of national economic management. It was to ensure economic recovery in addition to the continuation of the policies of ERP I. after a period, it quickly became clear during the stabilization phase that the financial sector required urgent specific attention, hence the financial sector adjustment program (FINSAP).

FINSAP was initiated in 1988 by the government of the Ghana and the international development agency (IDA). It is an ongoing program, which sought to provide adequate support to the productive sectors of the economy and to rectify the deficiencies in the financial sector.

The objectives of FINSAP are:

a. Financial and management re-structuring of state owned banks
b. Reform of the legal and regulatory framework
c. Developing the capital market and making the banks more market oriented.

SSB Limited

Having carefully looked at the banking industry, it would be proper if we into the background of SSB ltd since our research will be narrowed down to the bank. The social security and national insurance trust SSNIT) established SSB in response to several request directed to it for funding of investment in the productive sectors of the economy. On 7th February 1975, SSNIT incorporated a wholly owned private limited company under the name 'Social Guarantee Trust ltd'. By a special resolutions, the bank changed its name to the present SSB ltd. On the 23rd February 1976.

On the 17th September 1976, the bank was issued a license to operate as a bank by BOG in accordance to the companies code(1963 Act 179). The bank commenced commercial business on 17th January 1977.

From its very inception, the bank sought to offer efficient and competitive commercial banking services to the general public skillful and prudent banking practices. In so doing, it played an increasingly important role in the economic development of the country. The bank's mission statement is captured as:

i. "Dedicated to building a strong, liable and profitable banking institution" which will

ii. Pursue prudent innovative policies and strategies and also offer quality service' aimed at

iii. Guaranteeing market tender-ship in Ghana's financial service industry"

The bank's objectives in the fulfillment of its mission statement are to provide;

i. Short term financing aid to business enterprise.

ii. Financing for investment in project of national importance in agriculture industry and other sectors of the economy

iii. A consumer credit scheme largely to the benefit of workers

SSB at its beginning has a simple strategy of making a mass appeal to customers through innovative consumer durable loan with a popular slogan' "SSB is your bank"

STATEMENT OF THE PROBLEM

It has been recognized that the private sector is the engine of growth, however, the sector needs a more innovative and vibrant banking sector to give the needed financial support. The banking sector is noted for inefficiency, insolvency and mismanagement. In certain instances, it survived only through government bail out plans and protection. In 1995 for example, the state owned enterprises (SOEs) in the banking sector account for 50% of non-performance assets. This trend must be reversed through restructuring and elimination of bottlenecks in the banking business. The ERP was to reform the banking industry and remove some of these bottlenecks.

SSB, a commercial bank and now a partly state owned company, was among seven (7) banks classified as distressed. It thus benefited form restructuring plans under FINSAP. Currently SSB is a limited liability company following the passing of ACT 461 statutory corporations (conversion to companies)by parliament in December 1993. It went into merger with national savings and credit bank (NSCB) in 1994, got privatized and listed to the stock exchange in October 1995 to complete the full reform program.

Given the above, the following issues need to be considered and critically analyzed.

a. Specifically to what extent was SSB non-performing and distressed before FINSAP?
b. Has there been a turn around in the operation and performance of SSB making it sound to survive in the competitive banking industry following liberalization?

c. What were the bottlenecks in the industry that necessitated FINSAP and have they been addressed?

The important role of this research hypothesis is to suggest the statements that are to be tested to draw a relationship between the research variables.

For the purpose of this study, the following hypotheses will be tested both quantitatively and quantitatively.

- H1: Has FINSAP made a possible impact on the Banking industry in general and SSB Bank in particular?

Deleted: has

- H2 FINSAP had no impact on the Ghanaian Banking industry in general and SSB Bank in particular?

- H3: FINSAP had a negative impact on the Ghanaian Banking sector in general and SSB Bank in particular:

The hypotheses are subject to the response to the questionnaire. If it is favorable or positive then it will suggest that FINSAP has had impact on SSB. If it is negative then FINSAP has no impact on SSB.

The practice of evaluating the impact of public policy has a long and cherished pedigree. Thus enables discussions about implementation and result of extant policy and informs the formation of future policies. Such assessments are, however, seldom neutral. The protagonist seeks to prove their point of view with the results of the impact assessment. For instance, opponents of the policies look at the negative issues raised whilst supporters of the policies point the positive aspects of impact assessments. In addition there is often disagreement as to how the assessment should be conducted. On one hand, are those who would restrict the assessment to the stated objectives of the policy. The rationale for this view is that one should access the policy for only what is sought to achieve. Those objectives formed, as it were, the terms of the "social contract" between its formulators and the affected population. Such a view can however be seen as unusually narrow. Those who put across this perspective believe that the desirability and adequacy of the

objectives themselves should be assessed. Thus despite its usefulness, impact assessments could lead to entrenched position by protagonists which hinder dialogue and weaken its potential use in policy review and (future) formulation (Clegg, forthcoming).

In spite of the potential controversies inherent in the designing and use of impact assessment in formation, the plurality of "protagonists" view can still be helpful. It allows multiple voices and views to be factored into the policy review and assessment of objectives and achievement as mutually exclusive. By this is meant that the adequacy and usefulness of the original objectives can be evaluated whilst at the same time assessing the impact of the policies based on those same objectives one potential benefit would be encourage diverse parties to "see" the other's point of view and to engender conversation between them. Consequently, this thesis takes the view that such an approach is the way forward.

In recent times in Ghana, a west African country with a population of 21 million in 2004 (world bank data), the economic reform programme (ERP) and the structural adjustment programme (sap) constitute one set of policy whose impact assessment has been dogged by the issues raised above. In brief, the antecedents to the formulation and implementation of these policies were: (i) persistent economic decline; (ii) the inability to raise funds from sources other than the international monetary fund (IMF) and the World Bank; and (iii) the insistence of the IMF/World Bank of Ghana to pursue those policies as pre-conditions for providing financial assistance. The financial sector reform which is the main theme of this thesis is a component of these policies and was introduced in the second phase of the ERP.

The financial sector reform programme was based on the McKinnon – Shaw hypothesis which distinguishes between liberalized and repressed financial sectors. Repression in the financial sector is defined in terms of government control of foreign exchange rates interest rates and credit allocation. Financial sector reform (FSR) would liberalize the sector removing these governments' interventions. Among others, this should lead to more competitive and efficient financial sectors where profitability is closely linked with the efficiency of the banking organizations.

Not everyone sees FSR as beneficial. Its opponents can be classified into two groups. Te first group opposes FSR on grounds of principle (e.g. based on personal philosophy and / or ideology). For this group, FSR is incapable of achieving any good anywhere. The opposition of the other group is based on pragmatic grounds (Stigiz, 2002). They admit that FSR might have some merit but question whether the time is right for countries such as Ghana with weak markets and informational. Failures associated with these markets. Their mantra is that FSR could work if the conditions are right.

Ghana was one of the first African countries to implement FSR under the financial sector adjustment programme (FINSAP). This policy has been flagged as a success by its formulators and implementers and after nearly two decades of implementation the time might be right to conduct a rigorous assessment of its impact. Among other benefits, such an assessments would test the success claims of its supporters. The test would be based primarily on the intended objectives of the policy. As noted above, this might be viewed as very restricted. Nevertheless it can be vital because:

- Should they present evidence of failure, proponents are more likely to be listed
- Others can use the findings to provide a wider critique
- Could also call into question the accountability of policy makers for policy failures as opposed to implementation failure.

This study assesses the impact of FINSAP in Ghana using its intended objectives as the basis of assessment. The rest of the thesis is divided as follows:

- Chapter Two looks at the macro economy of Ghana. It provides an overview of the immediate antecedents of FSR.
- Chapter Three surveys the implementation of FSR in Ghana under the rubric of the financial sector adjustment programme (FINSAP).
- Chapter Four reviews the literature on the theoretical foundations of FSR (including the views of proponents). It also examines the empirical evaluation of FSR in the countries implemented so far. The chapter ends with a look at the literature on competition and efficiency including the measures used for them in this study.
- Chapter Five focuses on the methodology of the study. It details the main research objective, related research questions and their derivative hypothesis. It also discusses data sources, data collection methods and analytical methods.
- Chapter Six presents the findings of the study. These are reported on a hypothesis by hypothesis basis using graphs and statistical tables.
- Chapter Seven discusses the findings in relation to the hypothesis and the literature. In particular the location of each hypothesis within the research question that it is mean to answer form a composite picture of how the research

questions have been answered and to link them to the overall picture created with respect to the overall research objective. The final section indicates how this work is situated extant literature – in particular it would indicate where it agrees with the literature and where it disagrees and why.

- Chapter Eight summarizes the study and presents some concluding thoughts.

INTRODUCTION TO MONETARY POLICY

1 Introduction

The key aim of monetary policy for most central banks is to keep inflation low and steady. Central banks are not, of course, indifferent to economic growth and unemployment but believe that the best contribution they can make to long-term economic growth is to aim for price stability, or something close to it. In the short run, say over the period of a year, a reduction of interest rates and an increase in the money supply can increase demand and output in the economy but, unless output is below its potential, only at the cost of an increase in inflation. Higher inflation, in turn, reduces output again. In fact, the long - run effects of high inflation on the economy are probably adverse. Recent comprehensive studies, covering a large number of countries, suggest that, over ten-year periods, higher inflation - particularly of more than 10-20% a year - is associated with *lower not higher* economic growth.1 In nearly all former centrally-planned countries too, positive economic growth has resumed recently only *after* inflation stabilised at relatively low rates.

In a market-oriented economy, central banks cannot control inflation directly. They have to use instruments such as interest rates, the effects of which are uncertain. And they have to rely on incomplete information about the economy and its prospects. Decisions on monetary policy are based on a variety of indicators. Some central banks use money

growth or the exchange rate as the sole guide to decisions. Others take a more eclectic approach and consider a range of factors in assessing inflation conditions.

2 The costs of inflation

There are a number of costs of inflation.

Costs of unanticipated inflation

Empirical evidence shows that higher rates of inflation are associated with more variable, and therefore less predictable, inflation.2 Although difficult to measure precisely, among the most significant costs of unanticipated inflation are the following:

* Microeconomic costs. These affect the heart of the market economy. An efficient allocation of goods and services depends on producers and consumers having accurate information about the relative prices of goods and services. Inflation in the economy makes it difficult for producers and consumers to know whether an increase in the price of a good or service actually represents a *relative* price increase or a general increase in the price of *all* goods and services. A producer may temporarily supply more and make unwarranted investments in extra capacity because he mistakes a general price increase for a relative price increase. Moreover, borrowers and savers may not know the real rate of interest. This uncertainty may result in less efficient and/or lower investment, reducing, in turn, the rate of economic growth and increasing its variability.

* Distributional costs. High inflation is unfair. Borrowers tend to benefit at the expense of savers, who are seldom fully protected. The less financially sophisticated, in particular, may suffer (eg, the elderly may find that their lifetime savings become worthless).

* Resource costs. Some individuals and companies will expend considerable effort to protect themselves against the effects of high and variable inflation. Such initiative and ability could be put to uses more beneficial to society.

Costs when inflation is anticipated

There are costs of inflation even if it can be perfectly anticipated:

* 'Shoe leather' costs. Because it loses value, people hold less domestic currency when there is inflation. More visits are needed to the bank to obtain currency to purchase goods and services.

* 'Menu' costs. The costs to manufacturers and retailers of continually revising upwards their selling prices.

* Distortions caused by the tax system, associated with operating a less than perfectly indexed system which taxes nominal rather than real quantities. For example, unless tax bands are fully indexed against inflation, an increase in price and wage inflation will, in a progressive income tax system, push people into higher tax brackets. This increases people's real tax burden.

3 Transmission mechanism of monetary policy

Low and non-volatile inflation is the main goal of central banks. However, central banks cannot control inflation directly with the instruments at their disposal, such as interest rates and reserve requirements.3 Instead they need to assess the various channels by which monetary policy affects prices and output in the economy - the transmission

mechanism. Inflation in an economy can only be sustained through increases in the quantity of money. Therefore a natural starting point in assessing the transmission mechanism is

the role of the money supply

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Quantity theory of money

The quantity theory of money provides a transparent framework in which to analyse the relationship between the growth in the money supply and inflation. By identity, the theory shows that the stock of the money supply (M), multiplied by the speed it moves around the economy (velocity, V), equals output measured in current prices (PY).

$MV \equiv PY$

However, the following assumptions need to be made if one is to conclude that there is a direct systematic relationship between changes in the money supply (money supply growth) and prices (price inflation):

* Velocity (V) of circulation - output in current prices divided by money - is stable (velocity growth is zero), or at least, predictable. Whether this is true is an empirical question.

* In the long run, real output (Y) is independent of the money supply but is, rather, determined by the supply side of the economy - the amount and productivity of the labour force, capital equipment, land and technology. During a cyclical downturn, when actual output is below its full potential, monetary (and fiscal) policy can be used to restore demand and output without resulting in higher inflation. However, increases in demand

which attempt to raise output above its supply potential manage to increase output only for a short period (see Table 1). In such cases, inflation increases which, in turn, reduces output back to its initial level, and money supply is seen to have a neutral impact on output - column (2). In fact, empirical evidence suggests that if anything, in the long run, higher inflation results in lower output growth than otherwise - column (3). 11

Table 1

Impact of a reduction in interest rates (increase in the money supply) on inflation and real output

(1) (2) (3)

Short Run Short/Medium Run Long Run

(If actual output (If actual output (If actual output

is below potential) is above potential) is above potential)

inflation unchanged inflation increases inflation increases

actual output increases actual output returns actual and potential

to initial level output growth are

lower than would

have occurred

otherwise

Adverse *supply* shocks, such as an increase in oil prices, can affect relative prices in the economy. But they only result in permanently higher general inflation if the money supply is increased (interest rates are reduced) to prevent output from falling. Such accommodatory monetary policies in the face of adverse supply side shocks can put off

the adjustment in output, but only temporarily - the ensuing inflation eventually results in a decline in output. Worse still, expectations of higher inflation may damage the long-run growth potential of the economy.

More generally, irrespective of whether an initial increase in prices is caused by an increase in demand or a reduction in supply, an increase in price inflation can only be sustained by an increase in monetary growth. In this sense "inflation is always and everywhere a monetary phenomenon"4.

However, since lower interest rates (higher money supply) can *temporarily* increase output, there is an incentive for myopic policy-makers to inflate, especially, for example, in advance of parliamentary elections. This creates an inflationary bias in the economy. It also makes

it more costly for policy-makers to reduce inflation should they so wish. A tighter monetary policy reduces inflation, *without first reducing output*, only if wage and price inflation expectations are immediately and fully lowered. This requires policy-makers to be fully credible, which is rarely the case in practice. A number of institutional arrangements have been suggested to enhance the credibility of long-run policy intentions so as to minimise the short-run loss in output from a tightening in monetary policy. These include *transparent* and simple intermediate or final monetary policy targets, and also central bank independence.

The quantity theory framework is sometimes criticised for being a "black box". Money goes into the box and prices come out of the other side. But no explanation is given of *how* changes in money affect prices. Also, in practice, most central banks implement monetary policy through changing the short-term interest rate at which they lend to

and/or borrow from the banking system rather than through changing directly the quantity of the money supply.

Changes in central bank interest rates affect the whole spectrum of interest rates in the economy, particularly at the short end but also at longer maturities. The lending and deposit rates of banks play an important role. In less-developed financial markets, the banks are often the only source of credit or haven for savings (other than hoarding bank notes or precious metal), implying that movements in the banks' lending and deposit interest rates and the quantity of lending and deposits will play an important role in the transmission mechanism. Even in developed financial markets, the banks remain special since they are the main source of credit for households and small companies.

Overall transmission mechanism

Thus, the transmission mechanism is the term used to describe the various routes through which changes in central bank monetary policy, *including* the quantity of money, affect output and prices. As illustrated diagrammatically in Figure 1 below, the quantity of money is only one, albeit an important channel through which monetary policy may affect prices and output. There are a number of other routes through which interest rates may have an effect (the signs in the diamond figure show the expected direction of the relationship). For instance:-

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through domestic demand and output

Changes in central bank interest rates affect real demand and output because in the short run, with inflation expectations unchanged, movements in nominal interest rates are

reflected in changes in real rates. In what follows the impact of higher interest rates is described. Lower interest rates have the opposite effect.

* Substitution effect. An increase in interest rates reduces the attractiveness for individuals and companies of spending now rather than later. Domestic credit, the quantity of money and real demand all decrease (lines 1 and 2 in Figure 1).

* Income effect. Higher interest rates re-distribute income from borrowers, such as the young and the government, to savers, such as the middle-aged. This increases the spending power of savers but reduces that of borrowers. Since savers have a lower propensity to spend than borrowers, total expenditures decline. In addition, if lending rates increase more than rates of return on assets, total incomes, and therefore, spending decrease (line 3).

* Wealth effect. Higher interest rates usually reduce the price of assets such as houses and shares. This decline in wealth discourages individuals from spending their current income (line 3).

* Unless the economy is operating above capacity, lower demand will put downward pressure on prices and costs in the economy. Companies will reduce their profit margins, while workers will accept lower wages (line 4).

* If workers and companies fully revise downwards their inflation expectations when interest rates are increased, prices will decrease but real demand and output will be unaffected, even in the short run (lines 5 and 6).

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Through the exchange rate

This channel has two parts:

* For countries with capital account convertibility, *unexpected* increases in domestic interest rates (with interest rates in other countries unchanged) will encourage a net capital inflow. If the exchange rate is not fixed, the domestic currency appreciates to bring the balance of payments back into balance.5 The more liberalised are the capital markets, and the closer that domestic financial assets are substitutes for foreign assets, the larger the exchange rate appreciation (line 7).

Figure 1

Transmission mechanism

Instrument Intermediate Targets Final Target

Credit/

Money supply

(-) (+)

1 (+) 2 (+)9 5 Domestic

channels

(-) 3 4 (+)

Nominal interest rates Real demand/output 6 (-) Prices

7 (-)(-) 8 (+) (-) External

channel

Exchange

rate[1]

(foreign currency

per domestic currency)

+/- shows the direction of effect;

* Exchange rate appreciation results in lower import prices, measured in domestic currency terms. A reduction in the price of imports of finished goods directly reduces consumer prices. Lower prices of imported inputs and intermediate goods indirectly reduce consumer prices through first lowering the costs of domestically produced goods and services (line 8).

A given increase in central bank interest rates is likely to prove more powerful in reducing inflation where:

* Changes in official interest rates are more fully reflected in changes in other interest rates in the economy and in the exchange rate. This is more likely the more open and competitive the financial system and the more that financial contracts are set on a floating basis, where interest rates vary along with changes in central bank rates, rather than on a fixed interest rate basis.

* Residents' demand for domestic *net* liabilities (line 1), and foreign demand for domestic assets (line 7), are sensitive to changes in interest rates.

* Financial liabilities are large relative to GDP. This ratio should increase with financial liberalisation.6

* For countries or sectors where financial liabilities exceed assets (implying negative rather than positive income effects). For example, a tightening in monetary policy should have a bigger (smaller) effect in reducing the price of retail goods than investment goods if households' net floating-rate debts are bigger (smaller) than those of enterprises. 16

A given increase in central bank interest rates is likely to have a *faster* effect in reducing inflation and lead to smaller *short-term* losses of output7 where:

* Wage and price expectations are more sensitive to changes in official interest rates and the money supply (lines 5 and 6). This sensitivity increases with policy credibility - so that there is less expectation of changes in interest rates being quickly reversed.

* Wages are sensitive to reductions in output and employment (line 4); this sensitivity increases with, *inter alia*, the flexibility of the labour market.

* Exchange rates are flexible (line 7).

* Domestic prices are sensitive to changes in the exchange rate (line 8). This depends on import prices changing with the exchange rate (and therefore on foreign exporters not varying their profit margins) and on the impact of changes in import prices on domestic prices. This is larger where imports are a large share of GDP, such as in small open economies, than in large closed ones.

4 Intermediate and final monetary targets

The foregoing suggests that the transmission mechanism of monetary policy is quite complex. Therefore, central banks use targets to guide their policy decisions. There are two broad strategies which central banks adopt when using their policy instruments to control inflation:

1 Base policy indirectly on an *intermediate target* such as the growth in a particular monetary aggregate or the exchange rate. Here the central bank changes its policy instrument to steer money/credit growth or the exchange rate towards its targeted level (lines 1 and 2 respectively in Figure 2). It is *implicitly* assumed that there is a predictable relationship between the

intermediate target and future inflation along the lines suggested by the quantity theory of money. The final target for inflation is usually stated in general terms, such as "low inflation".

Figure 2

Monetary policy reaction under different target regimes

Instrument Intermediate Targets Final Target

Credit/

Money supply

1 (+)

Nominal Prices

interest 3(+)

rates

(-) 2

Exchange

rate

(foreign currency

per domestic currency)

+/- denotes the direction of policy reaction;

1 - policy reaction with an intermediate money/credit growth target; interest rates are increased if monetary growth is above target and lowered if it is below target;

2 - policy reaction with an intermediate exchange rate target; interest rates are increased if the exchange rate is weaker than target and lowered if it is stronger than target;

3 - policy reaction with a final inflation target; interest rates are increased if the forecast of inflation is above target and lowered if it is below target.

2 Base policy *directly* on an explicit *final target* for inflation. A target is usually set for *future* inflation, in order to allow for the time lag between changes in monetary policy and its impact on inflation. Here policy is changed on the basis of *multiple* intermediate variables on both the demand and supply side of the economy rather than a single one. For example, asset prices, inflation expectations, real output, credit growth, fiscal policy and wage costs may all be monitored *as well as* money growth and the exchange rate. Sometimes this information is summarised in a forecast for inflation which then serves a similar role to a conventional intermediate target. Interest rates are increased when future inflation is forecast to be above target, and reduced when inflation is forecast to be below target (line 3 in Figure 2).

Intermediate money targets

For money growth (or the exchange rate) to serve as a useful *indicator* of price inflation it is necessary that:

* there is a predictable relationship between money growth (or the exchange rate) and future price inflation. This means that the intermediate target serves as a useful guidepost for future inflation.

In addition, to serve as a useful intermediate target in operational terms:

* the central bank must have predictable control over money growth or the exchange rate when operating its monetary instruments. In other words monetary policy must be capable of guiding the intermediate variable towards its target.

The quantity theory equation *(M ≡ PY/V)* discussed above is usually adopted as the framework for such monetary targeting. The intermediate monetary target can be made operational using the quantity theory framework by the following steps: (i) set a desired final target for future inflation, (ii) estimate the underlying potential growth of real output, and (iii) predict the future trend in velocity growth. This yields an intermediate target for money supply growth consistent with the final target for inflation. In Germany - where the velocity growth of broad money has been quite stable for the past twenty years - the Bundesbank uses this approach when setting its intermediate target for broad money growth each year. A typical example used in Germany is shown in Table 2 below. In the example, inflation is targeted at 2% per annum, trend real output is assumed to grow at 2¼% per annum and velocity of broad money (M3) is estimated to fall by 1% per annum. This yields a target (mid-point) growth of broad money of just under 5½%8. 19

Table 2

Setting a monetary target using the quantity theory equation: example Germany

.

Final inflation target *(P)* 2%

.

Assumed trend in economic growth *(Y)* 2¼%

.

Estimate of velocity growth *(V)* -1%

.

Target of monetary growth *(M)* 5½%

However, there are a number of practical difficulties with the quantity theory framework:

* There are various possible measures of output, *Y*, and money, *M*. Each pair of measures for *Y* and *M* produces a different measure of velocity, *V*. For the theory to be useful in practice, measures of *Y* and *M* have to be found which produce a predictable measure of velocity.

* Potential output depends on the amount and productivity of the factors of production. These are very difficult to measure and forecast, particularly if an economy is undergoing large structural changes to production such as in former centrally-planned countries. In addition, for economies in transition, *actual* output - and therefore the gap between potential output and actual - is difficult to measure because of the usually sizeable unrecorded informal (or "grey") economy.

* Which definition of money? Theory suggests it should be a measure which can either be directly used as a means of payment or easily and costlessly changed into one. But should this include time deposits and foreign currency deposits? Even if they can be easily and costlessly changed into a means of payment, it is unclear whether they are being held primarily for this purpose - implying that they may be inflationary - or as

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Table 3: Measures of the money supply

Measure	Definition	Advantages	Disadvantages

Monetary base (M0) - also referred to as base money and reserve money	domestic currency + banks' deposits at the central bank	direct means of payment; consists only of central bank liabilities, which must be within the control of the central bank data available frequently and without delay	excludes other means of payment (demand deposits and possibly foreign currency cash) and other balances which can be easily and cheaply transformed into a means of payment
M1	domestic currency in circulation + demand deposits held at banks	includes most means of payment	less controllable than M0 excludes time deposits which may be transferred cheaply and quickly into money

Broad money (M2)	M1 + time deposits and possibly foreign currency deposits held by residents at banks	includes a broader spectrum of close substitutes for money	includes time deposits and (sometimes) foreign currency deposits which may be held for the purpose of saving rather than spending velocity is affected by financial liberalisation since it consists mainly of liabilities of commercial banks rather than the central bank, it is less controllable in a deregulated system where commercial banks have freedom to set their own lending and deposit rates and the

			associated money and credit quantities
Divisia	weighted measure of money based on the ease of using different components as a means of payment ("transactions services")	attempts to measure the conceptual definition of transactions money; weights are usually inversely related to the "own" interest rate of the money component; cash	difficult to measure precisely and to obtain the necessary data

		is given the largest weight and time deposits the smallest	

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savings. Table 3 outlines some advantages and disadvantages of different measures of money for targeting purposes. Narrow measures of money are more controllable, more likely to be used as a means of payment, and can be measured more accurately and with little delay. But, they exclude some bank liabilities which may have an important effect on inflation. In practice, various monetary aggregates have been targeted in different countries and at different times - and some countries have even adopted more than one aggregate at the same time. This reflects varying experiences, in practice, regarding the stability of the velocity of money.

For a number of countries, including those undergoing financial liberalisation and/or macroeconomic stabilisation (moving from a high to a lower inflation environment), velocity has been difficult to predict (see Table 4 below). Financial liberalisation usually results in a permanent increase in the demand for broad money, so that the velocity of money - the ratio of nominal GDP to the quantity of money - declines. Therefore an increase in broad money growth during the process of liberalisation may not be a precursor to higher future inflation. If this is not recognised, policy may be tightened unnecessarily. Conversely, when the demand for money declines and velocity increases, money growth will be more inflationary than before. If this is not recognised, policy may be too loose. If there are frequent unexpected changes in money velocity, pursuit of

monetary growth targets can have the disadvantage of causing frequent short-run swings in interest rates and real output.

These problems mean that over the time horizon of most concern to policy-makers, say two years, and in an environment of marked structural changes to the macroeconomy and the financial system, the impact of monetary policy on real output, and the velocity of circulation - even if it can be measured - may be unpredictable. Under these circumstances some flexibility in targeting is probably suitable even at the expense of some loss in policy transparency. For example, target ranges for money growth may be better than fixed points.

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Table 4: Impact of macroeconomic stabilisation and financial liberalisation

on the velocity of money

Definition : nominal GDP divided by-	Impact of macroeconomic stabilisation	Impact of financial liberalization

Monetary base	velocity declines (velocity *growth* temporarily declines) . The monetary base is more attractive relative to goods and services and foreign currency at lower inflation rates. Also, since inflation is less variable at lower rates there will be less uncertainty of the likely cost of holding money lower nominal interest rates reduce the opportunity cost of holding cash or (non-interest bearing) deposits at the central bank compared with other financial assets possibly a permanent increase in the time lag between changes in money growth and their effect on inflation, since at lower inflation rates households and enterprises are less eager to spend money quickly	velocity increases (over the longer term) <u>cash:</u> - increase in alternative and more convenient means of payments (cheques, debit and credit cards) - technology resulting in economising of cash holdings (automated teller machines (ATMs)) <u>free deposits at the central bank:</u> - a greater range of liquid interest-bearing assets will enable banks to economise on balances at the central bank - more efficient payment systems reduce the need

		for precautionary deposits at the central bank obligatory deposits at the central bank:* - a reduction in reserve requirements reduces obligatory deposits
Broad money	as above, unless the own interest rate on broad money falls by the same magnitude as (or more than) the inflation rate or interest rates on other financial assets	velocity declines in the *short term*, measured velocity falls as financial activity in the informal economy switches back into the formal economy

		(although this does not imply any change in total financial activity)
in the *longer run*, more competition bids banks' deposit rates up and their lending rates down; time deposits, in particular, should grow more quickly relative to nominal GDP than before		

* Obligatory deposits are usually, but not always, included within the definition of monetary base.

[9] Inflation targets are now set in Australia, Canada, Finland, Israel, New Zealand, Spain, Sweden and the United Kingdom.

[10] But it will not necessarily result in the convergence of *overall* domestic prices and price inflation.

[11] In contrast, with a money supply growth target, interest rates are reduced partially to offset such an adverse real shock. Since lower real output reduces the demand for money (line 9 in Figure 1), interest rates are cut to move money and credit growth back towards its target growth rate (line 1 in Figure 2).

Alternatives to monetary targets

Mainly because of these difficulties in predicting the velocity of money, a number of countries have abandoned intermediate monetary targets in favour of either intermediate

exchange rate targets, particularly in the case of small open economies or, more recently for a number of developed economies, final targets for future inflation.9

Exchange rate targets have the advantage of being transparent to the general public and involve setting the exchange rate against a low inflation anchor country such as Germany. Over time this will result in a convergence of tradable prices and price inflation to foreign levels.10 Exchange rate targets mean that domestic policy is being set by the monetary policy of the anchor country. Unlike monetary targets, exchange rate targets avoid the short-run fluctuations in interest rates and real output associated with unanticipated changes in the demand for money. With a fixed exchange rate, changes in money demand are matched by a change in money supply from abroad (through capital flows). They have disadvantages, though, compared to monetary targets in face of marked adverse changes to the real economy, such as a worsening in the terms of trade or productivity or a loss of export markets. Fixing the exchange rate involves fixing a relative price and prevents an adverse real shock to the economy being absorbed by devaluation. This means that the domestic economy needs to take the full adjustment. But, if wages and domestic prices are not fully flexible, real output will (at least temporarily) decline (see *Handbook No 2* for a more detailed discussion of exchange rate regimes).11

Inflation targets usually involve the preparation of an inflation forecast to compare against the target. If inflation is expected to deviate

from the target this would signify the need for a change of policy - a tightening of policy if inflation is forecast above target and a relaxation of policy if inflation is expected to be below target. Final inflation targets have tended to be set in terms of ranges rather than

fixed points. Partly, this flexibility has been built in to accommodate output shocks to the economy which also affect prices (eg changes in the terms of trade). Also it is to acknowledge the uncertainty in the precise path of the transmission mechanism and time lags in the inflation process in market-oriented economies.12 The inflation forecast itself will usually depend, at least partly, on a model which includes a number of channels of the impact of changes in interest rates. This approach has the advantage of using more information than is provided by a single money or exchange rate variable. However, since the transmission mechanism of policy may be quite complex, financial markets, enterprises and households will require a detailed but clear explanation of the inflation process.

5 Conclusions

Monetary policy involves using monetary instruments to affect the final goal(s) of policy. Central banks use a range of intermediate variables to guide their decision-making. In a market-oriented financial system, unlike in a planned economy, the central bank cannot control banking system credit and interest rates (other than its own) by decree. Instead monetary instruments are required which complement the workings of a competitive financial system.

In a market-oriented environment, interest rates play an important role in the transmission of monetary policy. Changes in central bank interest rates affect, in the first instance, the quantity and price of credit and money on the central bank's own balance sheet. This then transmits through the whole banking system and the wider economy to affect the behaviour of enterprises and households and thus inflation. The central bank’s job is to

evaluate these various channels of monetary policy and to set policy accordingly.

At one time or another most central banks have used intermediate monetary growth targets, to help guide monetary policy. This is still a successful approach for some countries, notably Germany. For others, particularly those facing financial liberalisation, money supply targets have become less reliable. Exchange rates are used by some countries as an alternative intermediate target, whereas others have adopted a direct final target for inflation.

Although in practice central banks use a variety of approaches in conducting monetary policy, most have the same final goal - low price inflation

4 Credit

Monetary policy makers and economic analysts also closely monitor *credit* or *MFI lending* because of its likely connection with spending and with the growth of monetary aggregates. Although the conceptual boundary of credit is generally clearer than that of money, analysts need to be aware that borrowers may be able to obtain funds from other sources. For example, the corporate sector may be able to issue securities, which will not be captured by the MFI lending statistics (if those securities are owned by sectors other than the MFI sector), and/or borrow from abroad. In the UK the main credit aggregate is 'M4 lending', i.e. sterling lending by MFIs in the UK to the rest of the UK private sector. Because lending by non-MFIs to individuals can be significant, the Bank also compiles and publishes a broader measure of 'lending to individuals', which can give a more accurate picture of total lending activity. Similarly, the Bank publishes a broader series of

'total finance raised in the UK by PNFCs', which measures all borrowing by companies, including their issues of securities and their borrowing in foreign currency.

In the UK, since the 1980s an important source of finance for individuals has been *mortgage equity withdrawal*. Mortgage equity withdrawal (MEW) is borrowing that is secured on the housing stock but not invested in the housing market. So the funds released through MEW can be used for consumer spending, to repay unsecured debt or to save or invest in financial assets. Broadly speaking, the Bank calculates an estimate of MEW as the difference between housing finance (net mortgage lending and capital grants) and households' investment in housing (purchases of new houses and houses from other sectors, improvements to property, and the transaction costs of moving house).32

4.1 Sectoral and Industrial Breakdown of Money and Credit

The reasons for holding money and for borrowing from MFIs vary according to the types of economic agent: accordingly, changes in money holdings and in borrowing by the various sectors have different implications for the economy. So it is useful to distinguish money and lending by sector, such as the household, non-financial corporations and financial corporations sectors. Bank of England research has shown that the relationship of sectoral measures of money and credit with economic activity is stronger than that of aggregate measures. Against this background, the Bank has compiled the sectoral breakdown of broad money and credit on a monthly basis since 1997.

32 See Davey, M. (2001), 'Mortgage equity withdrawal and consumption', *Bank of England Quarterly Bulletin*, Spring, pages 100-03 and the box 'Mortgage equity withdrawal' on page 6 of the November 1999 *Inflation Report*.

A further breakdown by *industry* (agriculture, insurance, manufacturing, real estate, services etc) of the financial and non-financial corporate sectors' deposits and borrowing also helps to improve our understanding and interpretation of the sectoral money and credit statistics. Such information on the banking sector's exposure to particular industrial sectors serves both monetary policy and financial stability purposes, because sectors may experience different economic shocks and may respond to them in varying degrees.

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5 Data on Securities

The Bank of England collects data from Issuing and Paying Agents (IPAs) on debt securities in order to compile higher quality and more accurate statistics to feed into the National and Financial Accounts. IPAs are agents that act on behalf of the issuers of securities, and are normally banks that act as an intermediary. The survey covers different product types and requires information on the type of security, the interest rate, where the product is listed, in which currency it is denominated, the issue price, amounts issued and redeemed during the month and the subsequent amount outstanding at the end of the month. Prior to the introduction of this survey, the majority of information on securities was collected using a range of commercial data providers in conjunction with publicly available information.

However, this did not capture redemptions and, as such, failed to identify such funds returning to investors. The Bank has concluded that the introduction of the monthly survey of IPAs has been valuable for the production of securities statistics in the UK. These statistics are used internally as well as feeding into the National and Financial Accounts.

The ECB is currently building a Centralised Securities Database (CSDB) with the aim of creating a source of comprehensive, reliable and up-to-date information on issuance and holdings of securities within the euro area. Under Article 5 of the Statute, it is the ECB's responsibility to ensure that these statistics are harmonised where necessary and remain relevant and accurate as securities business evolves. As such, the ECB concluded that the best way to ensure the correct treatment of securities is to compile a reference database of securities which euro area residents are likely to hold or transact in. This reference database will contain essential information about the securities, such as unique identifier, outstanding amount, nature of the instrument, currency, coupon and payment date(s), sector and country of residence of issuer, maturity as well as current market price etc and will ensure a more structured way of reporting securities data.

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6 Price Data

As well as the stocks and flows of financial activity, information about the *prices* at which that activity takes place (i.e. interest rates and yields, and exchange rates) is useful in assessing monetary conditions. Since the short-term interest rate is nowadays the main instrument of monetary policy in most economies, it is important to assess how changes in the official interest rate pass through to other rates; those rates can give information on the market's expectations of future rates and its expectations of inflation (particularly where yields on inflation-index-linked securities and on conventional securities are available). Where a particular segment of measured economic activity occurs at a *range* of interest or exchange rates, it is useful to construct a rate *weighted* by the volume of business done at the various rates.

Most central banks, including the Bank of England, compile and publish a large number of interest and exchange rates. Most of these are rates observed in the market; but the Bank of England also collects a series of 'effective' or 'average' interest rates from banks, for deposits from and borrowing by each domestic non-MFI sector. The construction of these interest rates takes the volume of business in each particular type of deposit or loan into account. Several other developed countries also collect equivalent statistics. Similarly, the Bank constructs effective exchange rate indices for sterling and other major currencies, using trade weights calculated by the International Monetary Fund, as well as yield curves for British government securities.

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7 Financial Stability Issues

The Bank is responsible for maintaining the stability of the financial system. This involves monitoring/analysing key statistical information in order to identify potential risks to UK financial stability. The Bank draws on various statistical sources to achieve this objective.

The data collected from the UK banking system have become a key input into the process of monitoring the stability of that system. The data feed into regular internal analysis of key changes in the banking system and contribute to the Bank's publications on the stability of the financial system.

The data requested for analysis of risks to financial stability vary over time as issues become more or less prominent. A key source of information is formed by the sectoral and industrial lending data, which allow analysis of the banking system's exposure to particular areas of the economy.

There has been increasing interest in the use of 'supervisory' data in macro-prudential financial stability analysis. The Bank collects 'supervisory' data on behalf of the FSA and has access to these data through the Memorandum of Understanding between the Bank, the FSA and theTreasury.

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The memorandum encourages regular information exchange between the organisations in order to minimise the reporting burden. The supervisory data contain much information of interest to financial stability analysis and are difficult to obtain from other sources. For example, capital adequacy data are available for all UK incorporated banks, so information such as the risk asset ratios and risk weighted assets can be analysed. This can be used to consider topics such as changes in risk appetite of the UK banking system as a whole or for particular 'peer' groups of banks within it.

The 'supervisory' data are provided primarily on a consolidated basis, combining all the activities of a bank and its subsidiaries in the UK and abroad. These are unlike 'statistical' data that are largely available on an unconsolidated basis. This information is of great use for analysis of the UK banking system as it is dominated by a small number of large banking groups which, due to their size, pose a potential systemic risk. Consolidated data allow a better assessment of the true risks faced by a banking group, as the exposures of the group as one entity are analysed rather than the exposures of its separate parts.

Income and expenditure data are also useful for Financial Stability purposes (for further details see Section 10.1. *Data for National and Financial Accounts*). This includes industry detail oninterest, product detail on fees and provisions data.

33 Available at http://www.bankofengland.co.uk/financialstability/mou.pdf.

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8 Financial Soundness Indicators

The development of indicators of financial soundness by the IMF responded to the need for better tools to assess the strengths and vulnerabilities of the financial system. Financial Soundness Indicators (FSIs) have emerged principally out of the increasing number of financial crises that occurred during the 1990s (for example in Mexico, Asia and Russia). These crises led to a growing recognition among the international community that there was a need for a set of financial stability statistics for the purpose of supporting national and international surveillance of financial systems. FSIs are designed to be indicators of the current health and soundness of the financial institutions in a country, and of their corporate and household counterparts. They are intended to assist, not replace, any current macro-prudential surveillance undertaken by individual countries. The project to encourage compilation and publication of FSIs is carried out under the auspices of the International Monetary Fund, and all IMF affiliated countries are encouraged to participate.

The FSIs themselves are 39 indicators,34 classified as either 'core' (priority to complete) or 'encouraged' (requested but not compulsory). Each one will be a ratio examining one aspect of a reporting country's financial system (examples include 'return on assets' or 'regulatory capital to risk-weighted assets'), to facilitate the early identification of any trends in the data that may pose a financial stability issue, so that appropriate action can be taken. Participating countries are now preparing for the compilation of FSIs as part of a voluntary coordinated compilation exercise in 2006.

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A full list of the FSIs can be found at http://www.imf.org/external/np/sta/fsi/eng/fsi.htm.

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Box D Derivatives35

Financial derivatives were first specified as separate instruments in their own right in the SNA93 and associated international statistical manuals. Their essential characteristic is that they take value from the underlying security, index or other independent variable to which each derivatives contract is linked, according to the terms agreed between the parties to the contract. The range of contracts includes options, forwards, futures, swaps, warrants and credit derivatives. Contracts may be issued in basic 'vanilla' form or can be linked together in more complex trades, one risk/product with another, or included in so-called structured trades with debt securities – in such cases the derivative is attached to, or embedded with, the parent security.

Measurement and related issues

At the current time, the derivatives category is probably the only financial instrument that is measured fully according to market value – i.e. volume multiplied by price. These data are readily available, due to standardised regular risk monitoring and price revaluation procedures applied to banks' derivatives trading books. In the UK, data are collected on gross asset and gross liability positions (potential profit and loss respectively).

The statistics on positions are at present compiled quarterly in line with UK national accounts precepts, but also every six months for the global positions of major financial institutions, on a consolidated nationality basis.

35 For more details, see CCBS Handbook No. 17, 'Financial derivatives'.

Box D Derivatives (continued)

Triennial survey

There is a triennial survey of turnover and amounts outstanding of foreign exchange (FX) and certain over-the-counter (OTC) derivatives. This is undertaken by central banks as part of a global initiative led by the Bank for International Settlements. Foreign Exchange covers spot, forward and swap transactions, whereas the OTC derivatives section includes cross-currency swaps and options, and single-currency interest rate derivatives.

The *turnover* part of the survey is completed on a locational basis, by all institutions resident in the UK that participate in the inter-dealer market and/or have an active business with large customers. For the UK, as the London FX market in particular is strongly concentrated it is not necessary to survey the entire population; rather, it is possible to obtain very high coverage via a targeted survey of around 100 institutions.

The *amounts outstanding* part of the survey is completed only by UK-owned institutions, and is reported on a worldwide consolidated basis. The data are requested on a similar basis to the six monthly statistics, but for a wider reporting population.

A summary of the global survey results can be found via the BIS website at http://www.bis.org.

Developments in official statistics.

The measurement and presentation of derivatives in official statistics is still at a relatively early stage. In the UK, the Office for National Statistics is studying the conceptual and practical issues that will need to be resolved before the collective data on derivatives can be integrated into the national accounts.36 In the international context, the BIS

Committee on the global financial system (CGFS) published a study on credit risk transfer in January 2003 - this led to the decision to extend global statistical coverage of the derivatives business of major financial institutions to credit default contracts, with effect from December 2004.

Derivatives and measures of money

The international standards specify that the current market value of derivatives contracts should be included on the balance sheets of the money-creating and money-holding sectors. On the liabilities side of the money-creating sector, it is unlikely that derivatives have sufficient monetary characteristics (liquidity and capital-certainty) to be included in 'money'. On the assets side it may be preferable to include them, along with the comparable liability positions, within a category such as the 'net non-deposit liabilities' of the money-creating sector, especially as the money-creating sector essentially manages its derivatives business on a net basis. 36 See Semken, G. (2005), 'Financial derivatives in the UK sector balance sheets and financial accounts', *Economic Trends*, Office for National Statistics, May, pages 37-44.

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9 International Frameworks and Co-operation

Consistency across areas of monetary and financial statistics is achieved within the framework of the European System of Accounts (ESA 95). ESA 95 is based on the System of National Accounts 1993 (SNA 93). SNA 93 was produced by five international organisations.37 It was approved by the Statistical Commission of the United Nations. ESA 95 was adopted into EU law by Regulation (EC) No 2223/96 of 25 June 1996. All economic statistics supplied to the European Commission must comply

with it. The ONS decided in 1998 to have one version of UK National Accounts consistent with ESA 95 and has produced the National Accounts on this basis since September 1998.

9.1 Compilation of statistics at the European Union level

At the European Union level, a *Memorandum of Understanding* sets out the respective areas of responsibility in economic and financial statistics at the ECB and the European Commission. The ECB has prime responsibility for money, banking and financial markets statistics. Responsibility at EU level for balance of payments statistics and, within the framework of national accounts statistics, for financial accounts and related statistics is shared between the ECB and the Commission. The Commission has prime responsibility for general economic statistics. In the *Committee on Monetary, Financial and Balance of Payments Statistics (CMFB)*, statisticians from Eurostat and the national statistical institutes, the ECB and national central banks are represented. The CMFB was established by Council Decision in 1991 to assist the European Commission in drawing up and implementing work programmes concerning monetary, financial and balance of payments statistics, and to offer opinions on these areas of statistics and on their links with other areas of economic statistics, in particular national accounts. The context was the need to make statistical preparations for Economic and Monetary Union (EMU).

The CMFB is an independent committee with advisory functions; it has no legislative powers. The CMFB takes part in the process of co-operation between the ECB and the Commission. Internal rules of procedure for the CMFB deal with consultations to get opinions on public finance data, underlying the Excessive Deficit Procedure.38 These procedures follow a Code of Best Practice

which guides the compilation and reporting of government accounts. The Code adopted by the Ecofin39 Council in February 2003 assigns the compilation of the government finance statistics to the national statistical institutes and where applicable to the national central banks. The 37 Eurostat, IMF, OECD, UN, and the World Bank.

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The requirement to avoid excessive deficits is laid down in Article 104 of the Treaty. The reference values of 3% and 60% for the general government deficit ratios and debt-to-deficit ratios as a percentage of GDP respectively, are specified in the Protocol on the excessive deficit procedure annexed to the Treaty.

39Ecofin consists of the economic and finance ministers from each Member State, and is sometimes referred to as the Council of Finance Ministers. 30 implementation of the *Action Plan on EMU Statistical Requirements (EMU Action Plan)* was endorsed by the Ecofin Council, in September 2000. Annual progress reports are prepared by the Economic and Financial Committee. The EMU Action Plan aims to progress the production of national data series to permit the timely compilation by the Commission of reliable key statistics for the euro area and the EU with at least 80% coverage of Member States' data. The EMU Action Plan includes a list of *Principal European Economic Indicators* (PEEI) which are scheduled to be published in the near future. The PEEI list was established and approved by the Statistical Programme Committee (SPC) in September 2002, taking into account the priorities of the main users (ECB, DG ECFIN). The PEEI list covers a broad range of non-financial macro economic statistics and sets out tight deadlines for their production and for other quality objectives.

Release dates and revisions for EU indicators are to be co-ordinated with release calendars of the respective national contributions. Ideally, EU indicators should be published at the same time as the indicators of the larger countries.

9.2 International Monetary Fund (IMF)

The IMF has published Special Data Dissemination Standards (SDDS) and the General Data

Dissemination System (GDDS) to guide member countries in the provision of economic data to the public.

IMF manuals on statistical methods, such as the *Balance of Payments Manual*, the *Government Finance Statistics Manual* and the *Monetary and Financial Statistics Manual*, are harmonised with the *System of National Accounts 1993 (SNA 93).* This provides a convenient way of ensuring consistency between monetary statistics and general macro-economic statistics. The purpose of the *Monetary and Financial Statistics Manual* is to offer guidelines for the presentation of monetary and financial statistics.

The IMF's principal statistical publication *International Financial Statistics (IFS)* has been published monthly since 1948 and contains country tables for most Fund members, including separate data for the euro area as a whole.

9.3 Bank for International Settlements (BIS)

The Bank for International Settlements (BIS) focuses on two main areas. It provides an institutional framework for cooperation in monetary and financial areas, as well as acting as a bank for central banks and international organisations, providing services related to their financial operations.

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The BIS collects international banking statistics, as well as securities and derivatives statistics from the major central banks. These data are then aggregated to provide a worldwide view of the international financial market. The quality of the BIS international financial statistics is largely based on the IMF's Data Quality Assessment Framework (DQAF).40

9.4 Organisation for Economic Co-operation and Development (OECD)

The OECD is actively involved in a wide range of conjunctural and policy analysis, and undertakes extensive statistical work in support of these activities. Member countries support this work through participation in the Organisation's committee structure. In the field of financial statistics, strategic direction is provided by the Committee on Financial Markets and the Committee on International and Multinational Enterprises. These 'parent committees' oversee a number of working groups and task forces, including the Working Party on Financial Statistics, the Working Party on Government Debt Statistics and the Task Force on Foreign Direct Investment. 40 The DQAF addresses issues under five dimensions of quality – namely assurances of integrity, methodological soundness, accuracy and reliability, serviceability, and accessibility. See Section 11.1 and http://dsbb.imf.org/dqrsindex.htm for more details.

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10 Relationship between National Central Banks and National Statistical Institutes

In order to ensure consistent and coherent monetary and financial statistics, it is necessary for national central banks and national statistical institutes in all countries to work closely and share responsibilities for statistical reporting obligations. In the UK, the relationship

between the Office for National Statistics (ONS) and the Bank's Monetary and Financial Statistics Division is governed by a 'Firm Agreement' covering the supply of data, data interpretation, quality monitoring and the development of new statistical series. Performance against the criteria set out in the Firm Agreement is monitored and forms the subject of an annual performance report by the ONS. The Bank supplies around 7,000 statistical aggregates and sub-aggregates to the ONS, many of which contribute to the detailed National Accounts and Balance of Payments published by the ONS.

This agreement is supplemented by many formal and informal meetings, including joint work in a number of areas where there is a common interest.

10.1 Data for National and Financial Accounts

In the area of annual and quarterly financial accounts, responsibility for compilation is generally shared between national central banks and national statistical institutes.

In the UK, financial and non-financial accounts are fully integrated, with consistent data sources for GDP estimates, quarterly and annual data, flows and stocks, domestic statistics and balance of payments data. Financial transactions and stocks of the financial balance sheet of the Monetary Financial Institutions sector41 are derived from monetary statistics. In this way, the financial investment of the non-financial sectors is linked to developments in the monetary aggregates. Full integration of banks' income and expenditure data into the UK National Accounts has moved a step closer after the Bank of England introduced a new form to collect the data at the beginning of 2004. In addition to a product breakdown of interest, which was already available, a full sectorisation of interest receivable and payable is now collected, making it possible for the ONS to

reconcile data fully with those received from other economic sectors. At present, income from financial services intermediation (i.e. lending and deposit taking) is considered to have no net effect on GDP, as it is seen as property income for the Banking Sector and intermediate 41 According to ESA 95, the Monetary Financial Institutions sector comprises the ESA 95 subsectors the Central bank

(S.121) and Other monetary financial institutions (S.122), which in the UK comprise banks and building societies. 33consumption for the rest of the economy. But interest receivable and payable will feed indirectly into GDP in the future, as FISIM (Financial Intermediation Services Indirectly Measured) measures are developed.

Expenditure and fees and commissions (receivable and payable) make up the bulk of the banking sector's direct contribution to GDP. Expenditure is broken down as necessary for the construction of a National Accounts top-to-bottom account for banks, and fees receivable are collected with a limited product and sector breakdown (for the calculation of current and potential service price indices).

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11 Data Quality

11.1 Data Quality and Reliability Indicators

Users of economic statistics place many different, and potentially conflicting, requirements on statisticians. Data must be both accurate and timely; they must be comprehensive and cost effective; and they must be relevant to the particular circumstances of the domestic economy while remaining comparable with data for other countries. The relative importance of these, and other, criteria varies with specific user needs, so that no unique quality ranking can be derived.

Quality assessment thus implies a multi-dimensional approach. As a first step, it requires a set of high level criteria – such as relevance and accuracy - to be defined. Thereafter, tests of compliance with these criteria must be developed. In many cases these tests give rise to qualitative statements rather than a numerical score.

In practice, no unique set of high level criteria has been agreed. For example, the IMF's Data Quality Assessment Framework (DQAF)42 and a European Commission (Eurostat) report43 have established five and seven high level criteria respectively for data quality assessment (Table 1).

Table 1: Criteria for assessing data quality

IMF framework Eurostat framework Integrity: Firm adherence to the principle of objectivity in the collection, compilation and dissemination of statistics

Accessibility: Clear data and metadata are easily available and assistance to users is adequate Accessibility

Serviceability: Statistics are relevant, timely, consistent, and follow a Relevance predictable revisions policy Timeliness

Methodological soundness: The conceptual basis for the statistics Comparability follows international standards, guidelines and agreed practices Coherence Accuracy and reliability: Source data and compilation techniques are sound, and disseminated data sufficiently portray reality Accuracy Completeness

42 Carson, C. (2001), 'Toward a framework for assessing data quality', *IMF Working Paper No. 25*, available at

http://www.imf.org/external/pubs/ft/wp/2001/wp0125.pdf.

43 Quality report prepared for the 14th meeting of the IMF Balance of Payments Working Group: Eurostat, October 2001, available at http://www.imf.org/external/pubs/ft/bop/2001/01-42.pdf.

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Quality criteria

Both the IMF and the Eurostat frameworks were designed for the assessment of entire statistical systems and processes. As a consequence, the high level criteria in Table 1 are intended to address wider questions about the statistical infrastructure, as well as comparisons between families of statistics or individual series. Thus, in developing indicators of 'integrity', the IMF is concerned with factors such as the legal and institutional arrangements for data collection; the professionalism of statistical staff; and the independence of statistics from political interference. Similarly, tests of 'accessibility' include procedures for the pre-announcement of release dates and standards for the simultaneous release of data to all users, as well as questions concerned with ease of access and availability of methodological notes.

For users who wish to interpret a specific data point, tests of integrity and accessibility may be of secondary importance, though they still need information on a few other criteria to assess data quality. The timeliness and periodicity of data normally affects the usefulness of the information – 'serviceability' in IMF terms – while the consistency of the data with established schemes of classification or accounting frameworks determines the user's ability to place the information into context. But, for many users, it is some notion of 'accuracy' which is often synonymous with data quality.

The IMF framework develops the linked concepts of accuracy and reliability. Accuracy refers to the closeness of the estimated data to the generally unobservable 'true' value, while reliability refers to the closeness between initial and final data estimates. In general, the accuracy of a specific data observation increases over time as more information becomes available or as the checking of source data proceeds.

Measuring the accuracy of a series can be problematic. Where data are randomly sampled from a large population, measures of dispersion around the theoretical, but unobservable, true value can be derived. But if the underlying population is relatively small and highly skewed, or if the source data are volatile from period to period, then standard statistical indicators of accuracy may be more difficult to extract and to interpret.

By contrast, analysing the reliability of data is theoretically straightforward. When data are first released as a preliminary estimate and subsequently revised, eventually to become a final estimate, the size and direction of revisions are directly observable. Over time, the reliability of the first estimate as a guide to the final data can be expressed both in terms of likely bias or scale of future revisions, based on previous experience. Such information should be helpful to a user seeking to interpret the most timely data estimates.

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Revisions and reliability

In general, it is probably reasonable to say that 'accuracy' is concerned with the design of the collection system and the compilation methods, while 'reliability' concerns the practical implementation of collection and compilation.

Revisions to first data estimates can occur for many reasons. In some cases, they represent the price users pay for more timely statistics: for example, the incorporation of information that was not available to compilers at the earlier release date; or corrections to source data resulting from the identification of errors or the incorporation of more robust raw data estimates. In other cases, revisions may be a result of the introduction of methodological changes. The latter can include changes to improve the accuracy of the compiled statistics, and/or changes to reduce the cost of their production.

Revisions, or the lack of them, can also result from a policy choice. Some statistics are not revised, or are only revised within the confines of pre-announced guidelines and timetables. A nonrevision policy may exist where the statistic is widely used for administrative purposes. In the UK, the Retail Prices Index (RPI) is perhaps the best known example of a statistic subject to such a restriction.44 But a wide range of other macroeconomic statistics are open to revision only at predetermined dates and are frozen in other periods, even when changes have occurred within the underlying data used for their compilation. Such restrictions are typically imposed to preserve the coherence of a complex body of statistics, such as the National Accounts.

Reliability indicators must therefore be interpreted with some care. Statistics which score as highly reliable should not automatically be interpreted as ‘better statistics’ than those with a lower score. Reliability scores do provide users with an indication of how much weight to place on a first release of data, that is, the extent to which the first data release can be taken as a reliable guide to the final – best – estimate of the data to be published at some date in the future.

11.2 Aims and Standards – A Code of Practice

There is value in stating explicit *aims* for the statistics function of the central bank. This can help establish the credibility of the statistics. It can also be used as a permanent reminder of: (a) the prime importance of providing accurate and timely statistics; (b) who the customers are and which benefits they derive from the statistics (so that due attention is given not just to policy-makers but also to those outside the official circle, to enable them to form their own assessments of the data);

44 The Consumer Prices Index (CPI) is now the main measure of inflation for macroeconomic purposes and is, in principle, revisable. Until 10 December 2003, CPI was published as the UK Harmonised Index of Consumer Prices (HICP). Revisions are governed by European Commission procedures as harmonised indices of consumer prices are calculated in each member state of the European Union for the purposes of European comparisons, as required by the Maastricht Treaty.

37 and (c) the need to take into account the costs of producing the data, both to the central bank as compiler of the statistics and to the suppliers of data (primarily the UK banking system in the case of the Bank of England). Similarly there is value in amplifying these aims by publishing and following a *Code of Practice*, ultimately based on the UN's 'Fundamental Principles of Official Statistics'. The Bank of England has a Code, which contains standards for the quality of financial data compiled and produced by the Bank.45 Putting in place structures to ensure data quality is at the heart of the Bank of England's Code of Practice. The Code identifies seven key aspects of statistical good practice. These concern the relevance, integrity, quality and accessibility of its

outputs, the confidentiality of its inputs, the burden on data suppliers and the overall cost efficiency of the business process.

11.3 Legal Powers

Central banks and statistical agencies generally have specific legal powers to collect statistics and responsibilities derived from these powers to use them fairly and to preserve the confidentiality of the data supplied. By way of example, the Bank of England's statistical powers are specified in Section 17 and Schedule 7 of the Bank of England Act 1998 and in secondary legislation adopted pursuant to the 1998 Act. These provisions specify the range of institutions from which (and purposes for which) information can be collected and the type of data that can be collected. They require the information collected to be kept confidential and specify in which circumstances the Bank may disclose such information. The Bank of England preserves confidentiality mainly by flagging aggregates for any variable which are based on 2 or fewer respondents. Such cells can only be published subject to the written agreement of the responding institutions. The Bank of England's statutory powers also provide for legal proceedings to be instigated if respondent institutions refuse to provide data or knowingly or recklessly provide inaccurate data.

11.4 Methodological Issues

Reporting populations and cost benefit analysis

A central bank needs to be aware of the burden its data collection function places on respondents. That reporting burden should be kept to 'an acceptable level consistent with legislative requirements and balancing the needs of users against the demands on suppliers'.46 So it is important for a central bank to establish whether the uses (or

benefits) of the data it collects justify the costs to both reporting institutions and the central bank of collating these data. This trade-off

45 Available at http://www.bankofengland.co.uk/statistics/about/code.pdf.

46 Section 6 of the Bank of England's Statistical Code of Practice.

between the reporting burden placed on respondents and the needs of data users is the subject of the Bank's Cost Benefit Analysis project.47 Most central banks will collect data from a subset of the population, i.e. a reporting panel, that will adequately capture the necessary information. The reporting panel chosen will usually give a high degree of coverage (unlike most other economic data, which are gathered from surveys, based on sampling techniques).

In selecting a panel to report monetary data, the Bank of England employs a 'top slicing' approach to the banking population. This approach allows high coverage of the banking sector, and implies that the reporting burden mainly falls on the largest banks as they are unlikely to be excluded from the population for most monetary statistics.

Although the Bank of England has legal powers to collect data and can impose collection regimes, it prefers to negotiate with respondents for two reasons. First, discussions with respondents help to understand the costs of the Bank's data collections and contribute to the Bank's efforts to keep these costs to a minimum without compromising data quality. Second, advance discussions with respondents allow the Bank to obtain a better understanding of the particular markets its data collection covers. Data requirements can then be kept more consistent with existing business or reporting practices.

Sample size

Use of sampling. Sampling can be used for forms that are not needed frequently or for ad hoc surveys between full reporting dates. This avoids the cost of all respondents reporting at every reporting date. How these samples are chosen depends on the structure of the banking system. For example, if business is heavily concentrated (as generally is the case in the UK) and volatile, a 'top-sliced' sample, comprising the larger institutions, is necessary for accuracy of the total, rather than a sample spread across all different sizes of institutions.48 But if the data are also needed for administrative purposes, such as reserve requirements, there may be less scope for sampling.

Moreover, in smaller countries with a small number of banks there may also be less scope for sampling.

Random sampling will provide an unbiased sample – but for collection of banking data, this is likely to exclude some of the larger institutions which are important when compiling aggregates. Stratified sampling might also be employed for some data collections (i.e. sampling within selected strata) but again, without full coverage of the larger institutions the impact on data quality could be 47 See Holder, A. (2005), 'Cost benefit analysis workshop, 14-15 July 2005', *Monetary and Financial Statistics*, Bank of England, September (http://www.bankofengland.co.uk/statistics/ms/articles/art1sep05.pdf).

48 The way in which the reporting panels for each form were chosen in the UK is described in articles in *Monetary and Financial Statistics* in May and October 1997. The resultant guidelines are incorporated in the general reporting instructions, so that actual and potential reporters have an advance indication of when they are likely to be added or

removed from the various panels. The Bank is currently reviewing its reporting panels, as part of its Cost Benefit Analysis project.

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considered too great. An alternative would be stratified sampling but taking all the top strata(s) to

ensure the larger institutions are covered, and then sample increasingly lightly moving down the stratas.

Imputed data

In order to minimise the compliance burden on reporting institutions not all enquiries are completed by the full population. In this case, for the aggregate statistics to cover the full reporting population a process of grossing up is necessary. Grossing up can be achieved in a number of ways and in the Bank it is carried out by the creation of imputed data referred to as 'virtual' data.

'Virtual' data represent a reporting form for those banks who have not reported. For example, the core balance sheet return is reported by all banks on a quarterly basis, but only banks over a certain balance sheet size report monthly, so a 'virtual' monthly form is created for the quarterly reporting banks. This is achieved by spreading the difference between one quarter and the next evenly such that an item that is reported as 100 in Q1 and 400 in Q2 has two interim months created as 200 and 300 respectively. This type of 'virtual' data is known as 'frequency converted'. This procedure is also applied for quarterly observations for institutions which report certain data annually. In these cases, a more complicated spreading procedure is used whereby the trend over the year observed from quarterly reporters is applied to the annual reporters.

The other main type of 'virtual' data is for those banks who do not report a form at all. Here a form is generated by using data from other forms which are reported by these banks or from other banks who do report the particular form. This type of 'virtual' data is known as 'generated'.

Seasonal adjustment

Many economic statistics are subject to seasonal influences, which means that they show a typical movement according to the specific time of the year. In order to obtain an insight into the underlying activity this seasonality can be removed from the raw data using a variety of methods.

The Bank of England uses X-12 ARIMA, the latest in a range of seasonal adjustment methods developed over several decades by the US Census Bureau and Statistics Canada, with contributions from others. X-12 ARIMA is better able to deal with the seasonal characteristics of individual series than less sophisticated models.49

Deriving flows from stocks

Some countries calculate their monetary aggregates in terms of stocks only. But larger countries follow the recommended practice in the IMF manual to calculate flows. The international

49 For more details, see Thorp, John (2003), 'Change in seasonal adjustment method to X-12-ARIMA', *Monetary and*

Financial Statistics, Bank of England, December

(http://www.bankofengland.co.uk/mfsd/article/artdec03.pdf).

40 standards for national accounts (SNA93) should be used to distinguish flows (or 'transactions') from other factors that can affect balance sheet levels. This will avoid flows being calculated simply as changes in reported data for stocks.

Particular examples from SNA93 are: *Exchange rate effects.* The domestic-currency value of deposits, loans and other balance sheet items in foreign currency will change as exchange rates vary. It would be too costly to collect data on the individual transactions in foreign currency items. So flows are estimated by using information on the currency split of the stocks and movements in exchange rates between two reporting dates. This process works as follows. Stocks of foreign currency items reported in domestic currency are expressed back into their original currency, so that the flow over the accounting period can be calculated in the original currency. This derived flow is then expressed in domestic currency terms by using the average exchange rate over the period.

Other valuation effects. Similarly, other valuation changes (e.g. in securities because of changes in market price, or in these and other liabilities and assets because reporters change their valuation method) have to be excluded to arrive at flow statistics. In homogeneous markets (e.g. in government securities), but also in more heterogenous markets, there may be scope to rely on estimates to exclude this type of valuation effect (for example using market indices for asset prices). Data on flows of securities can also be collected directly or by asking reporters explicitly for details of changes in valuation, such as write-offs and other revaluations of securities and investments. The reporting of such data inevitably involves imposing a higher cost burden on reporting institutions than the use of price indices. *Changes of sector*. When institutions change sector (e.g. because they are privatised or change their country of residence), the effect of the shift of the

institution's balance sheet from one sector to another needs to be excluded from the flow statistics.

Restructuring of a corporate group. The international statistical standards give less explicit guidance on whether to include in the flow statistics the balance sheet movements caused by a corporate group's restructuring of its internal organisation (e.g. the hiving off of business by a bank into a non-bank subsidiary). The UK's practice in its banking and monetary statistics is to exclude from the 'flows' the internal group effects of the initial restructuring, but to allow any subsequent transactions between the parts of the group to affect the flow statistics.

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Misclassifications. If it is impossible or too costly to backdate the correction of an error to its beginning, the impact of the correction (e.g. of an error in sector classification) on stocks of business should be excluded from the flows.

Growth rates

There are a number of ways of calculating growth rates for statistics, but it is important that the method of calculation is transparent. A 'change' or 'flow' for each period is produced, usually by calculating the difference between the opening and closing levels and then excluding the effects of any breaks in series, changes in valuation etc. The growth rate for the current reporting period is then calculated as the current-period flow divided by the opening level.

One-period growth rate (in %): *100 where *t t g* = *Y*

−1

=

t

t

t level

Y flow

The three, six and twelve-month rates are calculated by concatenating the one-month rates (rather than dividing the flow for those longer periods by the opening level) to avoid distortions where there are breaks in the series. E.g. three-month (annualised) growth rate (in %): (((1) * (1) * (1))4 1) *100 1 2 + + + − *t t* − *t* − *Y Y Y*

42

12 Business Processes Supporting Statistical Compilation

Efficient data compilation is a key precursor to data analysis. Central banks need to ensure that their data are produced on time, as well as validate and check data for plausibility (data cleansing).

This involves a degree of contact with the reporting institutions to check that they fully understand their reporting obligations and can ensure accurate data are transmitted to the central bank.

12.1 Electronic Reporting

Where the same respondents send standard forms or files to the central bank on a regular basis, it makes sense to automate that process using some form of electronic data transmission and storage.

Files can be transmitted via private networks or (with suitable security precautions) over the Internet. Some central banks have made such systems compulsory, at least for the larger reporting

institutions. The Bank of England has chosen a voluntary system, but larger institutions are strongly encouraged to use electronic data transmission.

The software used to prepare files for transmission also incorporates the standard validation checks

used by the Bank. This enhances accuracy and timeliness of the data by allowing banks to check

that their data are valid before transmission.

12.2 Data Cleansing

Cleansing of data and the creation of aggregates require processing of reported data across various

dimensions (for example residency, currency, institution, instrument-type, and time period).

During cleansing and aggregation in a production cycle statisticians need to assess the relationships

between data across all these dimensions.50 The business processes involved are often repetitive

and place a heavy reliance on consistency. So many of the business rules (i.e. the needs of policymakers,

administrators and analysts) are incorporated in the database application. A suitable

database should be able to process data across many dimensions and provide tools to incorporate

business rules in the database. A ‘relational database management system’ is an example of such

architecture; there are numerous suppliers of this type of technology.

50 See Box E 'The life of a datum – Bank of England example' for details on data cleansing.

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Box E The life of a datum – Bank of England example

Where it begins – Banks are required under the Bank of England Act 1998 to report data to the

Bank in a timely and accurate fashion. The Bank of England issues instructions on how data

should be reported, ranging from general definitions to details on how to classify a customer

account. The forms, definitions and the criteria for reporting are available in paper form, or on the

Bank of England website (http://www.bankofengland.co.uk/statistics/reporters/defs). Banks are

also given an annual reporting schedule.

Data transmission

Banks send their data to the Bank either on paper, or electronically, with the latter the preferred

(and growing) system. Banks can either set up their own system using the Bank's technical

specification (see http://www.bankofengland.co.uk/statistics/reporters/electronic) or use a software

company recognised by the Bank of England. These companies ensure that the validations in the

definitions folder are built in to the software solutions, so that simple mistakes are corrected early

in the data compilation process.

Banks transmitting data electronically send an encrypted file either via a modem to the Bank's

mailboxes or via Internet e-mail to a dedicated address at the Bank. Once received, the Bank

decrypts the data (ensuring the sender is correct and checking for a digitised signature) and the

Bank's systems confirm whether the form is in the correct format. The guidelines for this are very

strict and the reporters have to adhere to all formatting and validation rules.

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Box E The life of a datum – Bank of England example (continued)

Data cleansing

If the data are in the correct format, they are processed by the Bank's in-house statistical system,

which checks the validations. These validations are a list of arithmetic checks, which can range

from simply stating that total assets must equal total liabilities on a balance sheet return, to

validations that span a variety of different returns. If any validation is not met, the system highlights this and the reporting bank is asked to amend its reported data.

Once validated, these data are checked by analytical teams within the Statistics Division, who run

reports on the plausibility of the data. The parameters for each report are set by the analysts and

may differ according to the type of form. The reports look at each cell on each form for each bank.

If movements are unusual or go against trend, questions may be raised on an individual bank basis.

These include asking for a detailed breakdown of the movements in a cell between two reporting

dates. The majority of banks provide customer names, which allows the Bank to check that these

have been allocated to the correct boxes on the forms. Banks know that this information is

confidential, and is used purely for statistical purposes. For example, the Bank may be aware that

a large company was taken over and that the funds were provided by banks in the UK, so answers

to Bank questions are likely to reflect this. When all data for a form have been received, the Bank

often runs ‘secondary’ checks, to look at the largest and smallest movements in the population for

every box. This may lead to additional questions being raised with banks.

Publication

Once data have been cleansed, they need to be aggregated, adjusted for seasonal effects, checked

for confidentiality etc. The Bank of England does not publish data at the individual bank level, but

only in aggregate. If there are fewer than three contributors to any particular series, the banks

concerned are asked to give their permission to publish their data. If permission is declined, the

data are suppressed.

Statistical data are published in press releases, *Monetary and Financial Statistics* and on the

Bank’s Statistical Interactive Database (http://www.bankofengland.co.uk/mfsd/iadb).

Forms

Data are typically captured on a number of Forms or Returns, which can be of varying frequency

and may have a different coverage (for further details see Box F: Introducing a new reporting

form).

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Box F Introducing a new reporting form

A new reporting form might need to be introduced for several reasons. For example, new types of instrument or trading activity may develop. It is not always possible, or desirable, to force the measurement of these new instruments into the existing suite of returns, so a new return may need to be developed. This was the case with derivatives trading, which led to the introduction of a new return in the UK in 1998. International statistical standards can change significantly over time, which may lead to changes in the basis of a return. In these cases, it may be preferable to replace an existing return with a new return to add clarity to the change; this was how compliance with the European System of National and Regional Accounts 1995 (ESA 95) was handled in the UK.

Before a new return is introduced, the Bank ensures that it has a clear understanding of the need for the data and that the data cannot be obtained or approximated from an existing source. Once the need is established, the benefits of collecting the data are weighed against the potential additional

reporting burden placed on the banking sector. This is a difficult balance to assess, but necessary
in order to keep reporting costs to a minimum. It is essential to engage with the banking industry
(which, in the UK, is undertaken through the relevant trade organisation) at the earliest possible
stage to help understand which data are readily available and which elements are difficult to
measure. For example, banks may find it easier to report balance sheet levels at a particular
moment in time rather than a total of transactions over a period of time, as the latter requires the
reporting of large and complex volumes of data.

The next stage is form design and definitions. Again, it is essential to engage with the industry to
ensure that the item titles and definitions use the correct terminology and are unambiguous. People
working in statistical departments rarely have the appropriate market experience to write
definitions to ensure consistent and correct reporting. Communication with the banking industry is
effectively a negotiation phase. Discussions will include not only the definitional and complexity

issues already mentioned but also the potential reporting population, the required frequency for the

data, the lead-in time for preparation, and the timescale allowed for each return to be submitted.

The central bank should allow as much lead-in time for preparation as possible. As a guideline, at

least a year should be allowed between the final specification for the return and the first submission

date. The timescale allowed for each return to be submitted is another balancing act between the

needs of the data providers and the data users.

The providers of software packages to the banking sector should also be kept informed about the

potential introduction of a new form. Electronic transmission of the data speeds up the compilation

process and helps to check accuracy. In addition to the forms and definitions, a list of arithmetic

validations is published with each return. These validations are built in to the software solutions

that commercial companies offer data providers, so simple mistakes are corrected as early in the

data compilation process as possible.

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Box G Statistical outputs - Publication and dissemination

The next stage in the data compilation process requires the central bank to decide which aggregate data it will publish and in what format. The Bank of England now publishes nearly all its data on the internet only, both via statistical releases and on its Statistical Interactive Database.

The Bank of England's statistical outputs traditionally took the form of paper press releases, containing key monetary and financial series, for example *Lending to individuals* and *External business of banks operating in the UK*. Since the start of 2006, all statistical releases are published on the internet only. Key data releases are also made available on wire services through some of the larger news agencies. The Bank's statistical releases are supplemented by a monthly data compendium - Bank of England: *Monetary & Financial Statistics (Bankstats)*, containing the key series and other, supplementary series and metadata of potential interest to users. In addition, *Bankstats* is the vehicle for publishing articles on current issues in monetary and financial statistics, and technical pieces on new or modified data series. Currently, *Bankstats* is published in

paper form twice a year.

The Bank's Statistical Code of Practice contains a section on accessibility. The key principle is

that the release of, and access to, statistics published by the Bank takes place in an orderly and

transparent manner. The Code sets out the circumstances where early access is allowed and the

controls governing this.

Use of the internet for data dissemination was further advanced with the introduction of the

Statistical Interactive Database (SID) in 2003 (http://www.bankofengland.co.uk/mfsd/iadb). The

SID gives users various search options to find the data they are interested in, and also allows users

to choose the time period and extent of metadata required. Data can be downloaded in several

formats (HTML, CSV, Excel and XML). The SID provides the opportunity to expand data outputs

when users express a new interest in, for example, euro denominated series that were previously

aggregated with other foreign currency series. The SID is flexible because it has neither the space

constraints of paper publications, nor the time constraints and website construction issues that are

currently associated with posting individual releases or tables on the internet.

In line with the IMF's Special Data Dissemination Standards, the Bank of England publishes an

Advance Release Calendar for its statistical publications

(http://www.bankofengland.co.uk/statistics/Calendar/2006.htm). Data are released simultaneously

through the various media, at 9.30am on the publication date.

CHAPTER 2

2. LITERATURE REVIEW

2.1 INTRODUCTION TO FINANCIAL SECTOR REFORM (FSR) IN GHANA

This chapter looks at the macro economy of Ghana and it also provides an overview of the immediate antecedents of the financial services reform in Ghana

FSR was integral part of the economic reform programme that was implemented in Ghana from 1983 (Donkor, 1997; Lesink et al., 1998; Korsah et al., 2001; Tagoe et al., 2005). Understanding FSR is enhanced with deeper insights into the antecedents, implementation and impacts of ERP/SAP. The key antecedent to ERP/SAP was the persistent poor economic performance of the country. As shown in Table 3.1 real GDP

growth and GDP per capital fell persistently from 4.3% and 1.7% to -4.5% and -7.8% respectively from 1963 to 1983. In addition, the growth in industrial outputs averaged -12.5% from 1981-1983 (Table 3.2). Detailed macro information which provides evidence of the dire economic situation is placed in tables 3.1, 3.2, 3.3, 3.4 in chapter three.

The macro situation called for stability assistance before the structural elements in the economy could be realigned. It was quite clear that the government of the Provisional National Defence Council (PNDC) sought to find the funds from the former soviet bloc countries (Donkor, 1997; Anin, 2000). This choice derived from the inability to access funds from international financial institutions on commercial terms, their ideological compatibility with the soviet bloc countries and the government's extreme reluctance to carry out economic programmes which formed part of the conditionalities for securing loans and assistance funding from the International Monetary Fund and the World Bank (IMF/WB). They viewed the IMF/WB conditions as austere and politically unpopular. However, the Soviet bloc countries were unable to provide the required funds and the PNDC had to resort to the IMF/WB for the assistance.

As anticipated, the IMF/WB insisted on a fundamental restructuring of the macro-economy based on market-led economic systems. This called for the liberalization of the economy in general, the removal of subsidies particularly on social programmes, the retrenchment of staff etc. The key aim was to restore fiscal and budgetary discipline in the economy. The principal ERP activities included Within the ERP/SAP framework FSR was seen as necessary component to be implemented at the right. This was based on

the view that a well functioning financial system was needed for economic development (Pill & Pradhan, 1997).

2.2 THE FINANCIAL SECTOR & ECONOMIC DEVELOPMENT

There is a general consensus that the financial sector is important for economic development (Long, 1991; Chandavarkar, 1992; Levine, 1997; Llewellyn, 1997; Amable & Chatelain, 2001; Gockel & Akoena, 2002). However, there is little agreement about how this sector can and should assist in development. Two main approaches have been adopted:

1 Development hypothesis view (Gerschenkron, 1962; Patrick, 1966; Goldsmith, 1969)
2 Financial liberalization hypothesis or the McKinnon-Shaw hypothesis (McKinnon, 1973; Shaw, 1973)

2.2.1 THE DEVELOPMENT HYPOTHESIS PERSPECTIVE

This is essentially a supply-led solution to developing the financial sector. It envisages proactive government intervention in early stages of development. This intervention typically comes in the form of institutional development, suppressed interest rates and directed credit policies. Institutional development takes the form of establishing state-run banks within the context of well-defined regulatory framework. Low interest rates stimulate the demand for loan products hence governments adopting this approach often

control interest rates. Furthermore, due to inherent risks and the reluctance of some banks to lend to some important sectors of the real economy, directed credits are used to ensure that those sectors are not starved of credit funds. All these take place within a *dirigiste* approach to macro economic management. Overall then, it is envisaged that credit can become a catalyst for growth in the real sector of the economy.

2.2.2 THE MCKINNON-SHAW HYPOTHESIS

This was developed simultaneously in McKinnon (1973) and Shaw (1973). They characterized interventions described above as economic repression. In their view these send wrong signals from the financial sector to the real sector. It often leads to savings reductions, misallocation of funds, capital flight and the fragmentation and decreasing use of the financial sector. Ultimately then, it leads to under-development of both the financial and real sectors.

To redress repression and its pernicious effects the McKinnon-Shaw hypothesis advocated financial liberalization. This involves leaving the determination of interest rates and foreign exchange rates to the financial markets. In addition, the allocation of credits should be left to the managers of banks who would have regard to competitive and other market imperatives. They argue that this would produce huge benefits to the economy. For example, a rise in interest rates will encourage savings, increase the supply of loanable funds and encourage banks to diversify their portfolios in line with risk-reward profiles extant on the market. It has also been noted that liberalization would deliver a more competitive market which would raise the levels of efficiency in the

sector. From the late 1970s through the 1980s until now, this thinking has become the prevailing IMF/WB orthodoxy and it underpins the FSR policies that these two bodies have recommended (or insisted upon) to developing countries.

The McKinnon-Shaw hypothesis has not been without its critics. Foremost among such critics in the 1980s included Van-Wijnberger (1983). He pointed out that the hypothesis assumes that with liberalization – in particular interest rate rises – there would a portfolio shift from unproductive assets into the banking. In their view, this claim/assumption is not supported empirically. Rather the informal sector is the source of funds coming into the formal banking sector. Nothing shows that such funds allocated and used unproductively. Indeed an argument can be made as to the quantum of loanable funds available on the informal sector that is over and above that which can be made available from the formal banking sector. This argument is based on the fractional banking reserve requirements. This means that more money into banking sector means less money for business (due to reserve requirements). In addition, less money in informal sector will squeeze out firms that borrowed there. Often for other than pure market reasons, some of these firms (e.g. small and medium-sized enterprises) are denied access to banking services (Tagoe et al, 2005). Finally, a rise in interest rates will also crowd out marginal borrowers. Thus instead of stimulating economic growth, liberalization can dampen economic activity particularly in economies with large but efficient informal sectors.

The usefulness of the McKinnon-Shaw hypothesis for Africa has also been questioned (Collier & Mayer, 1989; Stiglitz, 2002). In particular Collier and Mayer (1989) note that

there is no guarantee that market-based reform will improve competition & efficiency in an African financial sector which is dominated by few domestic banks. Liberalization might create an oligopolistic structure and risks replacing inefficient government allocation with inefficient allocation by oligopolistic banking structure. In their view one way of ensuring efficiency improvement is by enabling foreign banks to operate in the liberalized market. Such banks bring in managerial and technical expertise in areas such as risk management. Where this has not been done the resultant structure has been characterized as liberalized institutions in the context of weak organizations – that is poorly managed banks (Collier, 1998).

2.3 EMPIRICAL EVALUATION OF FSR

As the implementation of FSR continues apace, an increasing section of the literature has turned its attention to evaluating its effects in the countries in which it has been implemented. The results are mixed. For example contrary to the McKinnon-Shaw hypothesis Williamson (1999) noted that overall savings did not increase. In addition efficiency did not seem to improve in countries such as Turkey (Denizer et al., 2000; Yildirim, 2002), Korea (Hao et al., 2001), India (Kumbhakar & Sarkar, 2003) and Pakistan (Hardy & Patti, 2001). Some studies however found evidence of improved efficiency (albeit marginally in some cases) in Thailand (Leightener & Lovell, 1998), Korea (Gilbert & Wilson, 1998), Turkey (Isik & Hassan, 2003), Taiwan (Shyu, 1998; Chen, 2001) and India and Pakistan (Ataullah et al., 2004). The mixed results were also noted in the area of competition which did not seem to improve in Ghana (Buchs and Mathisen, 2005) and Turkey (Denizer, 1997). However, Brownbridge and Gockel (1998)

noted that competition in Ghana improved somewhat in terms of new entrants into the market. They however noted that the market remained highly oligopolistic. Finally in areas such as interest rate levels and financial deepening the results did not seem to back the reasoning behind financial liberalization (Pill & Pradhan, 1997).

2.3.1 EXPLAINING THE EMPIRICAL EVALUATION

For proponents of financial liberalization a strong a priori theoretical justification exists. Thus the mixed empirical results on its impact has very little to do with financial liberalization per se. Rather it has more to do with the implementation of the policy. Thus the empirical results show evidence of implementation failure and not of policy failure. The following reasons have given:

1 Because care was not taken to improve management capacity in the banks financial sector liberalization policy resulted in liberalized institutions.

2 The financial sector liberalization policies to work well the implementing country must attain macro economic stability relating particularly to inflation, and budgetary and fiscal deficits. The poor results noted post-implementation could thus be explained by the absence of the requisite stable macro economic conditions (Pill & Pradhan, 1997; Collier & Gunning, 1999; Buchs & Mathisen, 2005). This makes the sequencing of financial sector reform crucial to its success (Collier & Gunning, 1999).

3 Finally, since some of the evaluations were carried out not too long after the implementation of the liberalization policy, it can be argued that the impact has

not filtered down sufficiently for it to be noticed. In addition very little time series data exists to carry out the evaluation in a rigorous manner.

The study on which this thesis is based examined the issues raised above. Its main objective was to test whether after nearly two decades of financial sector reform in Ghana, the intended objectives have been achieved. In particular the study focused on competition, efficiency and their relationships with each other and with profitability. It does this for at least two reasons. First, it is to check whether with the passage of time in which one could reasonably expect policy objectives to bed down this has actually happened. Second, it sought to explicitly look at the implementation and sequencing argument. Full research questions and their derivative hypothesis are stated in the Methodology chapter of this thesis.

2.4 CONCLUSION OF REFORM FRAMEWORK

Competition is the measure of rivalry between firms in an industry. Industrial economics uses the Structure –Conduct –Performance (SCP) framework to explain how the structure of an industry affects competition and therefore the output, quality, and pricing decisions of firms. This then determines profits in the short run and long run. The number of firms, type of product, the extent of entry barriers, the number of market participants, and the availability of information to market participants, among other factors, affects competition, efficiency and profitability of firms in an industry. Where a large share of industry output is concentrated among few sellers and entry barriers are reasonable high, firms can make supernormal profits. Where the number of firms are large and are of

similar sizes and market output is not concentrated, firms are likely to achieve normal profits. Therefore there is a positive relationship between some measure of market concentration, competition and profitability. A very large number of empirical studies utilizing this approach include Bain (1951) Weiss (1971) Scherer (1980), Schmalensee (1989), (as cited in Neumann 2001) and Denizer (1997). Empirical works that used the SCP framework to study competition among banks in the USA include Heggestad and Rhoades (1976), and Bodenhorn (1990).

Competition among the banks would be measured by bank concentration ratio in Ghana. I used the Herfindahl –Hirschmann Index (HHI) as the main metric for competition. It was calculated and compared with Mosteller's law to ascertain whether the level of competition expected is what was observed in Ghana after liberalization. (Neumann 2001). Use of HHI and comparing it with Mosteller's law would show how competition increases as the number of banks increase after the financial sector reforms in Ghana. It would also indicate the reduction in concentration ratio as the number of new banks entrants increase. These concentration measures have been chosen because it has been used in various researches about market shares of companies in German food retailing, World-wide market shares of electronic stores and micro-process, the motor cars industry in Germany and the EU (Neumann, 2001) and the actual distribution of market shares were very close to the distribution as expected by Mosteller's Law (Neumann, 2001).

2.4.1 MEASUREMENT COMPETITION

As noted earlier I used the Herfindahl-Hirschmann Index ((HHI) as the metric for competition. It is given by the formula:

$$HHI = \sum_{i=1}^{n} Si^2$$

Si = Market share of the i^{th} firm

The HHI can be decomposed as the sum of the reciprocal of the number of banks in the industry and the product of the number of banks and variance of market shares. This is stated as follows:

$HHI = 1/n + nV$

Where n = the number of banks

V= Variance of market shares and is defined as

$$V = \sum_{i=1}^{n} (S_i - S^*\, i)^2 \quad /n$$

and $S^* = 1/n$ *where* S^* *is* mean of market share.

Large variance indicates wide dispersion of individual banks market shares from the mean of market share. This is an indication of non-competitive nature of the industry. Small variance indicates a more competitive market. Thus the nature of competition in the banking industry would be driven by both the number of firms in the industry and the dispersion of the market shares of individual firms from the market mean.

The Mosteller's prediction of competition would be used as a benchmark of competition.

$$Sj = 1/n \sum_{I=j}^{n} (1/i)$$

Where Sj = the market shares of bank j

n = number of banks

i = the rank of the bank

The gap between HHI and Mosteller's law is expected to narrow over time as competition becomes more intense in an industry.

2.4.2 EFFICIENCY & DATA ENVELOPMENT ANALYSIS (DEA)

Efficiency is a technical relationship between inputs and outputs can be measured by parametric and non parametric methods. Parametric measure of efficiency uses econometric estimation of a pre-specific stochastic production function using input-output data of firms in a sample (Berger and Mester, 1997)

Data Envelopment Analysis (DEA) is a non-parametric measure of efficiency that generates a comparative ratio of weighted outputs to inputs for each Decision Making Unit (DMU). The DEA technique does not superimpose any particular structure on the data in identifying efficient units nor make assumptions about the form of the production

function. Rather the best practice structure is empirically constructed by putting the inputs and outputs correspondence set through a linear programming that envelops the input-output correspondence of all the firms in the sample (Avkiran 2002).

This relative efficiency score is usually reported as a number between 0-100% or 0-1. A unit with a score of 100% is considered efficient and a score of less than 100% is regarded as inefficient relative to other units in the sample. The strength of DEA over a parametric functional specification is that it works well with small sample size and does not require knowledge of proper functional form of the frontier, error and inefficiency structures (Grifell-Tatje and Lovell, 1997). In addition it can deal with multiple inputs and outputs. It can incorporate non-controllable environmental factors in which a unit/units operate in. In addition there are no trade-offs about the relative importance of the inputs or outputs. However, the problem is that it assumes that measurement error and statistical noise are non-existent (Berger and Mester, 1997).

Efficiency studies in banking have used both parametric and non-parametric functions. Some of the studies that used parametric methods to estimate efficiency are (Hao et al., 2001; Isik and Hassan, 2003; Shyu, 1998; Chen, 2001; Kumbhakar and Sarkar, 2003; Hardy and Patti, 2001). Those that use used non-parametric methods (DEA) (Leightner and Lovell, 1998; Gilbert and Wilson, 1998; Yildirim, 2002). The paper would use DEA mainly because its advantages and the relatively small sample size of the Ghana banking data set.

The literature notes two main models for assessing the performance of banks relating to the efficient utilization of inputs, namely: the parametric translog cost approach and the non-parametric DEA approach. This study used the DEA approach which is discussed in this section. The choice of DEA reflected its flexibility primarily in relation to the conditions about the normality of the underlying data. DEA is able to handle non-normal data whereas parametric estimations models cannot. Further, the information required for parametric analysis is not available for this study.

DEA has input minimisation and output maximisation options in the optimisation of a function to determine efficiency. Input minimisation option was chosen because of interest of the banking industry to cost cutting (Berg et al., 1991). Overall efficiency is broken down into pure technical efficiency and allocative efficiency.

2.4.3 TECHNICAL EFFICIENCY

With k inputs, m outputs and a sample of n observations, the DEA optimisation process to determine the measure of technical efficiency for any bank j is given by:

$\text{Min}_z\, j\theta$ (1)

subject to

$Yz_j \geq y_j, x_j,$ (2)

$Xz_j \leq \theta_j,$ (3)

$\Sigma z_j = 1$ (4)

$Z_j \geq 0\ \psi_j = 1,2,\ldots\ldots n$ (5)

Where $\theta \epsilon [0,1]$ is the input saving efficiency measure for unit j (i.e. the decision making unit which uses multiple inputs to produce multiple outputs), Y is the (mxn) matrix of outputs from all units, y_j is the (mx1) vector of outputs for unit j, and X is the (mxn) matrix of inputs for all units, x_j = (kx1) vector of inputs for unit j, and z_j is the (1xn) vector of intensity weights defining the linear combination of best practice to be compared with unit j (Korsah et al., 2001).

According to Equation (2), the observed outputs of unit j must not exceed a linear combination of output of the best practice reference units. Equation (3) imposes restrictions on the use of inputs. It must not exceed the inputs use of unit j at the linear combination of reference units. The system is solved n times in order to obtain the technical efficiency score for each of the n units in the sample. The solution θ_j, measures the fraction of inputs required to produce the output vector recorded for unit j. If the recorded output cannot be produced with a smaller input vector, θ_j,*= 1. θ_j,<1 where there is pure technical efficiency.

2.4.4 ALLOCATIVE EFFICIENCY

This is calculated by deriving overall input inefficiency and pure technical efficiency and deducting the latter from the former. Using prices of factors inputs with ψ denoting the vector of these prices, the overall cost efficiency in relation to inputs is determined by a slightly different specification of system (1)-(5) as follows:

Min z , ώx (6)

Subject to

$Yz_j \geq y_j$, (7)

$Xz_j \leq x_j$, (8)

$\Sigma z_j = 1$ (9)

$Z_j \geq 0$ $\psi_j =$ (10)

In each case the optimisation process determines the input vector x_j* for each unit given the price vector ώ. The scaler ώx* is then the minimum total production cost which can be attained by j for its output level (Korsah et al, 2001).

The data on the observed input vector x_j for unit j, for this study is stated in monetary value for the three inputs rather than in units and so ώ= (1 1 1). This was because data on physical units were not available. A potential drawback to the use of such data is that it assumes that observations face similar input prices. This assumption is not unduly unrealistic as an analysis of the data shows. A comparison of the input cost vector x_j with the DEA projected efficient cost vector x_j*, enables one to determine where and by how much the operations of a unit j is cost inefficient. To quantify the overall cost (in) efficiency I used the vector x* together with the score θ_j*. This can be decomposed into technical and allocative inefficiency using the formulae (Korsah et al, 2001):

i) Overall cost efficiency = ($ώx_j$*/ $ώx_j$)

ii) Allocative efficiency = ($ώx_j$* / ώ θ_j* x_j)

iii) Amount by which overall cost inefficiency raises cost above attainable min =((ώx / $ώx_j$*)-1

iv) Amount by which technical inefficiency raises cost above attainable min =

{($\acute{\omega}x_j(1- \theta_j^*)/ \acute{\omega}x_j^*$)

v) Amount by which allocative inefficiency raises cost above attainable min= ($\acute{\omega}\theta_j^* x)/ \acute{\omega}x_j^*$)-1

Defining the inputs and outputs of banks is not straight forward. The literature notes various alternative approaches (Santos and Dyson 1999). The multiple approaches are largely due to the multi-product nature of banks. They are accentuated by disagreement on what proxies to use as measures for lending and non-lending services in banks (Clark, 1984). Two main approaches, 'the production approach' and 'the intermediation approach' remain popular (Korsah et al. 2001).

According to the production approach, banks produce services associated with individual deposits and loan accounts. They are therefore treated as outputs. It has also been referred to as the value-added approach (Bergs et. al., 1991). According to Korsah et al (2001), the appropriate output is the number of deposit accounts and outstanding loans. The inputs are usually (but not always) physical units of inputs such as labour, capital and materials (Kim 1989). The total cost for this approach is given by all operating cost (excluding interest cost) incurred in producing the specified outputs (Santos and Dyson, 1999)

From the perspective of the intermediation approach, as financial intermediaries banks link savers and investors rather than produce deposit and loan account services. Opinion here is divided as to how to treat deposits. Some argue that they should be treated as inputs whereas others favour deposits as output (Santos and Dyson, 1999). Where

researchers under this approach have treated deposits as inputs (along with labour, capital and materials) they have also expanded inputs costs to include interest costs.

In line with the vast majority of DEA studies published in the last decade, I have opted for the production approach. Within this context I would be classifying deposits as output because treating deposits as inputs make banks with more money market funding appear more efficient because they need fewer deposits (Korsah et al, 2001). For DEA analysis to give meaning results careful consideration must be given to two main issues. First, sample observations should have identical reporting formats. Placing non-homogeneous DMU's in the same sample can distort DEA results. Second, the number of observations must be substantially larger than the number of variables specified. Where the variables are many (compared to the observations) some observations will appear efficient because the sample might lack truly efficient banks with respect to the specified variables. Thus as a rule of thumb, the minimum sample size is usually calculated as twice the product of the number of inputs (Avkiran, 2002).

2.4.5 PROFITABILITY

The measure of profitability in the banking industry in Ghana that I have used is Return on Assets (ROA). This is calculated as profits after tax divided by total assets. This measure is chosen over other measures of bank profits such as return on equity (ROE) and bank stock prices for the following reasons:

Capital structure (that is division between debt and equity) may vary across the banks in Ghana therefore it may be difficult to compare ROE values across the banks as similarly argued by Denizer 1997 for Turkey.

1 Stock prices are not a good measure of performance across the banks in Ghana

because not all the banks are listed on the Ghana Stock Exchange. In addition, the stock market which was established in 1990 is relatively young and trading in bank stocks is thin. Thus, stock prices of banks may not be a good measure of performance across banks.

2 Total assets is a common denominator among banks, therefore dividing profit after tax by total assets (i.e. ROA) makes it a better measure of performance across banks(Evanoff and Fortier 1988).

2.4.6 MULTPLE REGRESSION EQUATION

The return on asset (ROA) function is specified to depend on bank and industry specific factors. Bank specific factors are expected to capture internal variables such as efficiency and market share that affect a bank's profitability. Industry variables such as market growth rate, industry structure and the intensity of competition are expected to influence profits. A log function is used on the basis that the variables to be estimated for the banking industry in Ghana might be non-linear. This follows other banking studies that applied the log functions (Turati, 2001, Ataullah et al, 2004, Bikker, J.A. & Haaf, K., 2002).

The ROA function is stated below,

$$LOGROA = \beta_0 + \beta_1 LOGDMS + \beta_2 LOGLMS + \beta_3 LOGEFF + \beta_4 LOGDMG + \beta_5 LOGLMG + \beta_6 LOGHIDMS + \beta_7 LOGHILMS + \mu$$

LOGROA= Log of ROA (Return on assets).

LOGDMS= Log of deposit market share. It is possible to translate higher deposit market share into profits if the cost of raising deposit is less than income generated. On the other hand, if cost is greater than income, higher market share could reduce

profits as has been observed in the automobile industry for Ford and GM. The sign of β_1 can therefore be > 0 or < 0.

LOGLMS= Log of loan market share. Large market share of quality loans are expected to lead to higher profits. Where quality of loans is poor it may reduce profits. β_2 can be > 0 or < 0

LOGEFF = Log of efficiency measure derived from DEA calculations. It is expected that efficiency will be directly related to profit (Efficiency Hypothesis, Denizer 1997). An efficient bank is expected to make a better use of its assets, which should lead to an increase in ROA as compared with an inefficient bank and $\beta_3 > 0$. It is expected that intense competition among banks would drive the price-cost margins down (interest rate spread). In a competitive market inefficient banks would not survive in the long run. If $\beta_3 < 0$, it implies that efficiency is not related to profit and may indicate market power and non-competitive behaviour.

LOGDMG= Log of the deposit market growth. Market growth in bank deposits represents a proxy for industry attractiveness. High growth rates may increase banks' deposits but the effect on profit may depend on many factors:

1 Ability of the bank to converts deposit liabilities into income generating assets that are greater than the cost.

2 Macro economic factors such as growth in GDP, level of interest rates and the interest elasticities for loans and credit in Ghana.

3 High growth rate under a liberalised financial sector in Ghana can attract new entry (given low entry barriers). Increase in the number of banks would increase competition and reduce profits. But in the long run efficient firms would make

normal profits. It is expected that $\beta_4 > 0$.

LOGLMG= Log of loan market growth. β_5 can be > 0 or < 0 depending on issues previously discussed above.

LOGHIDM= Log of HHI deposit market. This is a measure of competition in the deposit market. HHI is inversely related to competition. High HHI measure indicates less competition and low HHI implies high competition in the deposit market. β_6 is expected to be > 0.

LOGHILM= Log of HHI loan market. Following similar explanation above, coefficient of the measure of competition in the loan market is expected to be positive. $\beta_7 > 0$.

$\beta_{i's}$ = the coefficients of the explanatory variables.

μ= a stochastic error term which is assumed to be spherical.

2.4.7 MACROECONOMIC DEVELOPMENT IN GHANA BEFORE ERP/SAP

Ghana gained independence from the British Colonial government in 1957. The population was 8 million and was one of the world's leading exporters of cocoa.

It was considered a medium income country with its per capita income at the same level as that of South Korea and Mexico (Donkor, 1987), export earnings from cocoa, timber, rubber, gold, diamond, manganese, bauxite among others were substantial. Imports were mainly consumers items, raw materials, plant, equipments and machinery for the agro – based and manufacturing industries operating in the country. The exchange rate of the Ghanaian cedi was pegged at $1=0.6 Ghanaian cedi and £1 equal (=) 2.40 cedi in 1965, (Anin 2000). This system provided a check on excessive

expansion in the money supply and therefore controlled inflation. The government fiscal balance was favourable. Government revenue sources were import duties, excise duties, income and property taxes, cocoa exports duties, public institutions, grants and other sources. Government recurrent and capital expenditure was mainly to run public services.

After independence the Nkrumah government embarked on a Seven-Year industrial Development Plan (1963 – 1970) to modernize the economy. This was an era in which mainstream development economics gained popularity with writers such as Arthur Lewis, Scitovsky, Hirschman, Kaldor among others and prescribing development options for less developed countries to become developed. Krugman (1993) referred to this era as the glorious days development economics. Instead of a markets approach, the Nkrumah government adopted a state interventionist approach to economic growth and development. This approach was considered on the basis that state involvement in economic activities would provide the congenial environment for the private sector to respond. State participation in the economy led to the establishment of various import-substitution industries, construction of roads, bridges, hospital, schools, the Akosombo Hydro-Electric Dam and other social overhead capital with long gestation period. The view was that it would provide the permissive and congenial environment for the private sector, especially domestic entrepreneurs to overcome their inertia to invest in economic activities. This drastically increased government expenditure over revenues. For instance, total government expenditure increased from GHC 113.7million in 1960/61 to GHC 414.2million (about 264%)

increase on an annual average of 26.5% within the same period (various issues, statistical service of Ghana).

Thus the drive to modernize the economy led to an excessive increase in government expenditure over revenue leading to budget deficits (Donkor, 1987). Moreover, foreign exchange earnings that were budgeted for by the government fell far short of the actual. This was due to falling terms of trade and a reduction in the volume of most of Ghana's agricultural exports. Furthermore, the socialist ideology of Nkrumah's government affected the inflows for the implementation schedule of the industrialization plan. Deficit as a percentage of GDP increased from 1.6% in 1960 to 9.5% by 1964. it declined to 2.2% in 1970, increased to 11.3% in 1976 (International Financial Statistics 1997).

The banking sector was relatively less developed. Apart from the bank of Ghana, there were three commercial banks at independence, (what are now Standard Chartered Bank Ghana Ltd, Barclays Bank Ghana Ltd. and Ghana Commercial Bank). In the absence of adequate foreign funding, the government resorted to financing the budget deficit by borrowing from the banking sector, increasing the money supply and exerting inflationary pressures on the economy.

Despite all the investment efforts after independence, the economy did not experience the expected growth in real output and development. The export sector did not perform well and this affected export earnings which led to low industrial capacity

utilization. The trend of fiscal deficit, borrowing from the domestic banking sector and an increase in money supply continued under subsequent governments but in varying degrees. By the end of 1981, the indicators of Ghana's economic performance were unimpressive. Growth in industrial production was negative and there was low productivity and over employment in the public sector. The fiscal deficit as a percentage of GDP had increased from 1.6% in 1960 to 6.4% in 1981, inflation from 0.09% to 116.5% over the same period, (International Financial Statistics, 1997) real GDP growth and real GDP per capital growth were negative over long periods of time in the 1970s and early 1980s (see table 2.1) the fixed exchange rate in a high inflatory environment encouraged imports and discouraged exports leading to an unfavourable Balance of Payment. Shortage of foreign exchange led to rationing and use of imports license leading to shortage of essential consumer commodities.

Ghana undertook the implementation of the economic recovery programme and structural adjustment programme (ERP/SAP) under the supervision of the IMF/world Bank in the light of this poor macro-economic environment.

2.4.8 ECONOMIC REFORMS UNDER THE ERP/SAP SINCE 1983

Faced with the dire macro economic circumstances described above, the government of the Provisional National Defence Council (PNDC) sought bilateral assistance from Eastern Europe and the Soviet Union because it was unable to raise finance from the international commercial sector. This approach to the eastern (soviet) bloc in 1982

failed to raise substantial financial assistance. Therefore the PNDC government reluctantly approached the International Monetary Fund (IMF) and the World Bank for assistance. The reluctance to approach the twin institution initially was due mainly to the "conditionalities"; attached to their assistance. These often took the form of painful and unpopular restructuring and reform of the economy. In addition, previous experiences of the implementation of IMF/World Bank programmes to stabilize the economy had been followed by public unrest and military coup. For instance the Economic reforms by the Busia government in 1969/70, was followed by a military coup in 1972.

The IMF/World Bank provided both short-term and long-term assistance to Ghana for the economy to be restructured. The restructuring took place under the rubric of an Economic Reform Programme (ERP) and the Structural Adjustment Programme (SAP). The objectives of the ERP/SAP under the guidance of IMF/World Bank were to address the imbalances in the macro-economic performance of Ghana, stabilize the indicators of macro-economic performance, restructure the economy and initiate measures that would improve incentives for economic growth and development.

2.4.9 FISCAL TREND AFTER ERP/SAP

In order to correct the fiscal imbalances inherent in the economy, growth oriented fiscal strategy was pursued under ERP/SAP/ The national budget therefore served as an instrument for mobilizing resources in support of investment and other requirements considered priority for the stabilization and growth of the economy.

The reforms of the tax system improved revenue collection. Restructuring of the public sector reduced and rationalized government expenditure. Exchange rate was liberalized and price controls were removed. These reforms were to enhance economic incentives to promote production. Fiscal policy was directed at fostering economic growth through the rehabilitation and expansion of the productive capacity of the economy and to promote and equitable distribution of income and the burden of structural adjustment. The budget deficit as a percentage of GDP improved from 2.6% in 1983 to 2.2% in 1985. There was a modest surplus of 0.05% in 1986 and 1.6% in 1991 (International Financial Statistics 1997).

The reform of the financial sector became necessary because government intervention and control over the financial markets, particularly in the control of interest rates, the allocation of bank credit to government defined strategic sectors, and the control and allocation of foreign exchange led to symptoms of financial repression in the banking sector. High inflation rates in the pre-ERP/SAP era made real interest rates on deposits negative and discouraged savers from holding financial assets. There were currency appropriations or expropriations (an unorthodox means to control money supply and inflation) in 1979 and 1982. Banks accounts with credit balances of more than fifty thousand (50,000) Ghanaian cedi were frozen through a government decree which compelled banks to disclose details of account holders, (Anin 2000). These unorthodox measures affected public confidence in the banking system and encouraged formal financial disintermediation and an encouragement of the use of informal financial intermediation. The effect was a reduction in financial deepening measure in Ghana. For instance broad money to GDP ratio was around 20% from

1964-1974 and peaked 29% in 1976. By 1984, it had decreased to 12.5%. The currency to M2 ratio was 35% in 1970 and increased to 50% in 1983 reflecting financial disintermediation from the formal banking sector. Bank deposit to GDP which was 19.5 in 1977, reduced to 7.4% in 1984, (Brownbridge and Gockel, 1998).

Sectoral credit control discouraged banks from allocating available funds efficiently. This is because the guidelines for the credit to priority sectors did not make provision for risk differentials and transaction cost. Agricultural and industrial projects in particularly have long gestation period and considered high risk by the banks. Credit to priority sectors fell short in real terms of the maximum permitted and non-priority sector loans often exceeded their ceiling. In some cases, funds allocated to priority sectors are divested into non-priority sectors. Credit to the priority and non-priority sectors are divested into-priority sectors. Credit to the priority and non-priority sector – i.e non-government sector as a percentage of GDP reduced from 9.8% in 1977 reduced to 3.6% of GDP (Brownbridge and Gockel, 1998).

One of the reasons for these trends was the high government budget deficits which required high public sector borrowing requirements over the pre-ERP era. A larger proportion of the fiscal deficits were financed by borrowing from the banking sector which crowded out privates sector credits. The government took 87% of net domestic credit in 1983. by the end of 1988/89 non-performing assets (NPA) constituted about 20% of the total assets of the bank. Aggregate capital and reserves were negative 2.4

billion Ghana cedis at the end of 1989 (Bank of Ghana, quarterly economic bulletins statements 2a and 2b, in1992 in Brownbridge and Gockel, 1998).

Some of the reasons for the high NPAs were because loans to medium and small scale industries were not properly appraised due to lack of expertise an d competencies in project appraisal and risk management. Corruption among bank officials to condone and connive with prospective borrowers also contributed to the NPAs. The shortages of foreign currency meant low capacity utilization, low outputs, high production cost, and low revenues. The industries were unable to service the interest and principal of their loans. In addition, some of the macroeconomic reforms and the restructuring of the economy in 1983-1988 also contributed to the magnitude of the NPA's in the book of the banks. For instance, the the liberalization of the exchange rate led to large devaluation of the Ghana to foreign currencies. The Ghana cedi (GHC) depreciated from 2.75 cedis = 1 US dollar in 1978 to GHC30 = 1 US dollar in 1983. This increased the cedis equivalent of loans denominated in foreign exchange and the shortage of foreign currency aggravated the capacity utilization of the industries and some closed-down (Anin 2000).

Relatively poor central bank supervisor regulatory guidelines in terms of accounting and financial reporting by the banks enabled the commercial banks to conceal their insolvency. There were no accounting rules for the following:

1 The period for the recognition of loan loses.

2 The provision for non-performing assets

3 The accruals of interest on advances and loans

Banks maintained capital and reserves of at least 5% of their total deposits rather than using the risk profiles of assets 450, there were no limits on exposure to a single loan borrower. The extent of the insolvency and financial distress in the banking sector came to light after diagnostic studies were undertaken in 1987 as part of the groundwork for the implement of the Financial sector Adjustment Programme (FINSAP) (Brownbridge and Gockel, 1998).

In nutshell, by 1988, there were 9 banks in Ghana of which 6 were state-owned banks. Out of the three foreign owned banks, government acquired 40% minority ownership through legislation in the 1970s. Given state ownership and control of these banks, by the end of 1988, the banks had granted huge advances and loans to state owned enterprises that were established as part of the post independence import substitution drive. Majority of the banks, with the exception of the 3 with foreign equity participation, became insolvent as a result of the bad debts and investment in commercial ventures that were unsuccessful. The liquidity of the banking industry was threatened and the ability to supply credit was affected, including the priority sectors that sectoral credit controls and financial policies aimed to support. Thus by 1988, the banks had huge no-performing assets on their balance sheets which threatened the liquidity position of the banking industry.

2.5 Reforms under the Economic Recovery Programme (ERP)

In June, 1983, an exchange reform programme set the stage for a flexible exchange rate policy and progressive liberalization of the exchange and trade system in Ghana.

It was four-stage strategy.

1 Export bonus and import surcharges

2 A multiple exchange rate system

3 A discrete adjustment system

4 Formal devaluation under a managed flexibility system.

Because of the initial aversion to devaluation in some circles, the authorities had to introduce a special scheme of bonuses on foreign exchange receipts and surcharges n exchange payments. This marked the beginning of the process towards a more realistic exchange rate, as well as flexible exchange policy. Exporters got more cedis for on US dollar exchanged at the banks, while anyone buying a dollar exchanged at the banks, while anyone buying a dollar had to pay more cedis for it.

The operation of the new scheme resulted in a multiple exchange rate system, as two rates, ¢23.375 per US dollar and ¢29.975 per US dollar, emerged and were applied to specified receipts and payments. The two rates yielded a weighted average rate of 24.7 per US dollar, implying a depreciation of about 89 per cent in terms of the US dollar (or 798 per cent in terms of the local currency). In real terms, the exchange rate that emerged was close to what it should have been in 1972, i.e 25.00 per US dollar (instead of the pegged 2.75)

Having successfully achieve the initial devaluation, a policy of managed flexible was adopted during1984-85, in order to prevent the re-emergence of the severe misalignment of relative prices, thereby avoiding any weakness in the balance of payments. Under the policy, exchange rates were adjusted quarterly so that the weighted average rate moved in accordance with an index measuring the differential between the inflation rate in Ghana and that of her main trading partners.

It became evident that the system of bonuses and surchages had become extremely cumbersome for trade transactions and the transitory arrangement was reviewed in March 1984 . It was then decided to unify two rates at ¢30 per US dollar, resulting in a devaluation of about 91 per cent. Subsequently, the exchange rate of the cedi was adjusted periodically in line with the real exchange rate rule which had been adopted under the managed flexibility policy.

Nonetheless, by the end of 1984, the exchange was still considered to be overvalued and further action was needed to reach a more appropriate exchange rate that would help balance of payments and fiscal policy targets. Accordingly, the cedi rate was adjusted to ¢35 per US dollar in December 1984, and the authorities then adopted a system whereby the exchange rate was adjusted more frequently, to reflect the actual depreciation in the real exchange rate.

By the end of January, 1986, when the last discrete adjustment in the official exchange rate took place before an auction system was introduced, the exchange rate of the cedi had been increased systematically to ¢90 per US dollar. Consequently, the real effective exchange rate had depreciated by about 92 per cent from its end-March 1983 position.

At that stage of the exchange rate reform, the black market remained vibrant mainly because of the rationing of foreign exchange still going on in the official banking system for the importation of consumer goods. Imports into Ghana remained controlled within the framework of an annual import programme. Unto the October 1986 reform, the import licensing system operated two different import foreign exchange form the banking system, and a special import licence that required the importer to use personal foreign exchange resource.

Nonetheless, pending more radical reforms, this scheme was streamlined and gradually liberalized in 1985, when the positive list that limited the range of goods that could be imported was replaced by a short negative lists, with all goods not explicitly mentioned being deemed freely importable, this marked the beginning of the liberalization of import trade in Ghana. As a result, there were virtually no restrictions on imports, significant progress was made towards correcting the severe overvaluation of the cedi and achieving a managed flexibility system. But the pegged exchange rate arrangement, and the series of devaluations that were implemented, did not prove sufficient to reach an appropriate exchange rate.

At mid- 1986, the cedi was still considered substantially overvalued, as evidenced by the large differential between the official and the parallel market exchange rates (about 100 per cent), the deterioration in the net external reserves position of the BoG during the first half of 1986, and the need to maintain restrictive international payment practices to support the official exchange rate.

The auction market

The next stage towards the floating of the cedi was the introduction of the Foreign Exchange Auction Market (FEAM) in September 1986. The intention was to accelerate the adjustment of the cedi to a more appropriate level and, given the problems in inherent in fixed but adjustable exchange rate arrangement, to shift to a market arrangement for an independent float. It was thought that, after having established a dual exchange rate system as a transitory measure, the tow official rates were unified in the context of a 'retail' auction of foreign exchange to the public. The FEAM was felt necessary at that stage to circumvent further sizeable devaluations needed to contain the excessive demand for foreign exchange and also to improve Ghana's balance of payments performance. It was also a way of depolitising the issue of exchange rate, as the market-determined rate would provide both the political authorities and the general public with a more objective indication of the equilibrium exchange rate for the cedi

In addition, floating the cedi in the framework of a weekly auction market was seen as providing for a continues process of determining the exchange rate in line with fundamental principles, whereas the previous pegged regime had implied large discrete devaluations.

To facilitate the move to the floating arrangement, a transitional mechanism (retail auction) was designed. On September 19, 1986, a dual exchange rate system was introduced by the authorities. Under that system there were two 'windows'.

The exchange rate for the first window was fixed at ¢90.00 = US$ 1, while the rate for the second window was determined by supply and demand for foreign exchange at a weekly auction conducted by the BoG. Foreign exchange to cover debt service

payments on official debt contracted before January, 1, 1986, as well as imports of petroleum products and essential drugs, was provided through the first window. To reflect the duality of the rates, the surrender of foreign exchange earnings to the central bank was effected at two different rates. Earnings from exports of cocoa and residual oil products were surrendered at the first window rate, ¢90.00 per US dollar. All other foreign exchange transactions, covering almost two-thirds of external payments and receipts, were conducted through the weekly auction: this was the second window.

Concurrently, a new import licensing scheme was introduced in October whereby licences for imports of virtually all consumer goods by the private sector were issued: 'A', 'S' and 'G':

1 Licence A allowed the holder to bid for foreign exchange through the auction and was initially issued for the importation of drugs and raw materials, spare parts, capital goods and intermediate goods

2 Licence B permitted holders to use their own foreign exchange resources to import goods, provided that such imports were covered by the existing special licence regulations

3 Licence G was issued to government organizations for the importation of essential goods and services, This permitted ministries, departments agencies to use foreign exchange directly allocated by the government, outside the BoG auction.Compared with the previous Import Licensing Scheme, the new one had two distinctive features. Firstly, with the introduction of Licence A, virtually all none-consumer goods became eligible for foreign exchange cover

from the banking system (i.e., from the foreign exchange auction); such access had previously been given to a more limited range of goods and only to importers who had acquired a specific import license. Secondly, since there were no quantitative restrictions on the number of Licence A's that could be issued, the monopoly rents that could accrue to importers under the previous system were eliminated because of limitations on the number of specific import licences.Under the dual rate system, the Bog auctioned foreign exchange on a weekly basis to final users only – hence the 'retail' nature of the auction. Authorised dealer banks played a limited intermediary role in that set-up, centralizing bids for auction funds from their clients and channeling them to the BoG for further processing.As a corollary to the selection of the auction as the institutional foundation for the market arrangement of Ghana's exchange rate system, the partial surrender requirement continued to be applied. Apart form the amount of foreign exchange that the exporters could keep under the existing retention privilege scheme, all foreign exchange earnings were to be repatriated and sold to the BoG, directly or through commercial banks. After taking into account the demand for foreign exchange by ministries, departments and agencies, which were covered outside the auction, but at auction-determined rate, the BoG decided on the amount of foreign exchange to be auctioned. The marginal rate was used to settle all foreign exchange transactions through the second window.One of the objectives of the auction system was to bring abut a further depreciation of the cedi, and to ensure a substantial reduction in the difference between the

official and parallel market exchange rates. In the event, the official rate depreciated from ¢128 per US dollar at the first auction to ¢152 at the last, held in December 1986. that was able to reduce the spread to about 25 per cent, compared with around 100 per cent prior to the introduction of the auction. By the end of December, the effective exchange rate had depreciated by 43 per cent since December 1985 and by 94 per cent since March 1983.Later, the auction was modified in several ways, with a view to giving it a firm grounding for a floating system. More importantly, the two windows were unified in February 1987 in the context of an auction market at the prevailing rate of ¢150 per US dollar. From then on, and until April,27, 1990, all transactions through the banking system were settled by applying the exchange rate determined at the weekly retail auction.In the framework set by the October 1986 reform, and following the exchange rate unification, the authorities gradually widened access to the auction to expand the coverage of the exchange arrangement that more closely represented market conditions. The expansion involved the implementation of a number of measures. Access to the auction was broadened significantly through the inclusion f additional categories of consumer goods and services payments on the list of transactions eligible for funding in the auction.Current invisible payments were liberalized during the 1987-89 period.Foreign exchange regulations ere modified to curb the amount of foreign exchange being held in retention accounts, especially Ghana Cocoa Board (Cocobod) foreign exchange retention accounts.During the period January 1987 to April, the auction marker functioned fairly

smoothly. In response to increased demand for foreign exchange resulting from the liberations of currently international transactions, the BOG progressively increased the supply for foreign exchange to the auction market. In addition, the efficiency of the auction market improved considerably. There was a significant narrowing in both the difference between the highest and lowest bids, and the difference between the highest bid and the marginal rate., as market participants became more familiar with the functioning of the auction market,the foreign exchange bureaux the success of the foreign exchange auction marketed encouraged the authorities to move towards the liberalization of the foreign exchange market in Ghana. The authorities allowed the establishment of foreign exchange (forex) bureaux. The main aim was to absorb the still-thriving black market for foreign exchange, and move towards a fully realistic exchange rate that would reflect supply and demand conditions. It was a major institutional change that proved effective to the extent that it led to the virtual absorption of the black market. Moreover, while the forex bureaux system made the structure of Ghana's official exchange arrangements temporarily more complex, it facilitated its eventual unification in early 1990.Forex bureaux were allocated to be operated as separate entities by any person, bank or institution licensed by the BoG under existing regulations. Operators were authorized to engage in the purchase and sale of foreign exchange at freely negotiated rates, each bureau being free to quote its buying its buying and selling rates. However, subjects to certain rules and regulations issue and enforced by the BoG, the

bureaux were not required to identify their sources of foreign exchange; similarly, sellers of foreign exchange to the bureaux were not required to disclose their sources.On demand side, all bona fide imports and service payments were allowed to be funded through the bureaux; in a in addition, capital transactions, although illegal in certain cases(since controls on capital transactions continued to be applied), were a source of demand for foreign exchange in the market. On the supply side, the key resources were foreign exchange from exporters, private remittances and foreign currency held by the public.The first licensed forex bureau opened in April 1988 in Accra. By the end of June, more than 140 were operating; increasing to 180 by March 1990. The volume of transactions increased steadily; during the first four months of 1990, total reported sales of foreign exchange by bank and non-bank bureaux amounted to US$13,4 million a month, equivalent to about 40 per cent of total supply effected through the auction.Between 1988 and 1990, the exchange rates quoted by forex bureaux remained close to parallel market rates; there was no longer an advantage in transacting business in the black market.Unification of the forex bureaux and retail auction rates After setting up the institutional and regulatory framework for the unification of bureaux and auction rates, the Ghanaian authorities went on to establish a wholesale auction for foreign exchange in April 1990, and decided at the same time to discontinue the retail auction. The new auction operated along the lines of a composite exchange rate system, combining a nascent inter bank market and a wholesale auction to be used by the BoG to price and distribute foreign

exchange to authorized dealers.As the unification was accompanied by the liberalization of payments for current international transactions, notable progress was made towards currency convertibility of the cedi. Under the unified exchange market, the exchange rate of the cedi was determined freely in the context o a two-tier foreign exchange market that combined the weekly selling price in the wholesale auction with the extended inter-bank market. The reform strategy land experience gained in the reform process during this period showed that a gradual yet major reform of the exchange rate system, supported by judicious macroeconomic policies, could pave the way for the liberation fl the exchange and trade systems, and the eventual convertibility of the local currency.By the end of 1989, the realignment of the cedi to the major currencies, especially the dollar and the pound sterling, was almost complete, and the cedi was virtually floated to find its own level in the exchange market. Initially, however, it did need the intervention of the BoG in the wholesale auction market to stabilize the exchange rate and achieve a more realistic rate base on a unified foreign exchange market.The wholesale foreign exchange auction permitted authorized dealer banks and eligible forex bureaux to purchase foreign exchange from the BoG for and on behalf of their customers and also on their own behalf to meet their import finance requirements. Authorised dealer banks processed bid applications received from customers and submitted aggregate demand at each bed rate to the Bog. Based on the supply of foreign exchange by the BoG and the aggregate demand submitted by the dealers, the exchange rate was determined using a special formula

quota known as 'the Dutch Pricing System'.The wholesale auction was modified in April 1990 to permit authorised dealer banks and eligible forex bureaux to purchase forex bureaux to purchase foreign exchange directly from the BoG as principals for resale (at a margin) to their end-user customers, and also to meet their own foreign exchange requirements. In March 1992, an inter-bank foreign exchange market was developed whereby authorized dealer banks and eligible forex bureaux bought and sold foreign exchange among themselves. The BoG also participated in the inter-bank market. To further strengthen the process of liberalization of the foreign exchange market, the personal remittance quota for expatriate employees in the private sector was abolished.With the virtual unification of the two rates, the Bank was able to eliminate the remaining restrictions on payments and transfers for current international restrictions. By the end of June 1990 there was no administrative control on imports, and all goods, except five listed items, were qualified to be funded through the foreign exchange auction.The forex bureaux and the wholesale foreign exchange auction constituted the official foreign exchange market in the first half of 1991. The former gradually became more popular with the public, as their volume of transactions increased throughout the year. In July, the flexible exchange rate policy, pursued under the ERP since 1983, began to show positive results. The supply of foreign exchange to the wholesale auction as well as the forex bureaux improved considerably and there was some stability in the exchange market and in the macroeconomic environment. The 5.3 per cent growth rates, and the fall in the inflation rate

from 123 per cent in 1983 to 18 percent, were indicative of the growth potential of the EPR.

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2.5.1 Controlling for the Regulation of the Banking Sector

The regression estimated in columns 1-4 is: General Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales+↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10 Concentration + ↓11 Regulation + ε. General Financing Obstacle is the response to the question "How problematic is financing for the operation and growth of your business?" Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not. Exporter is a dummy variable that indicates if the firm is an exporting firm. Manufacturing and Services are industry dummies. Sales is the logarithm of sales in US$. Number of Competitors is the logarithm of the number of competitors the firm has. Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. Regulation is one of four regulatory variables. Restrict is an indicator of the degree to

which banks' activities are restricted outside the credit and deposit business. Fraction denied is the share of bank license applications rejected. Banking Freedom is a general indicator of the absence of government interference in the banking sector. Credit registry indicator is a summary variable of the amount of information and the number of institutions that have access to borrower information from credit registries in a country. The regression is run with ordered probit. The regression estimated in columns 5-8 is: Bank Finance = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9

Growth + ↓10 Concentration + ↓11 Regulation + ε.. Bank Finance is a dummy variable that takes on the value one if the firm receives bank finance, and zero The regression is run as probit. Detailed variable definitions and sources are given in the appendix. P-values are reported in parentheses.

General

Financing

Obstacle

General

Financing

Obstacle

General

Financing

Obstacle

General

Financing

Obstacle

Bank

Finance Bank Finance Bank Finance Bank Finance

Government 0.047 -0.009 0.059 0.099 -0.013 -0.069 -0.034 -0.033

(0.381) (0.877) (0.182) (0.165) (0.855) (0.421) (0.585) (0.718)

Foreign -0.315 -0.328 -0.352 -0.410 -0.086 -0.077 -0.042 -0.041

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.181) (0.258) (0.463) (0.589)

Exporter -0.036 -0.058 -0.026 0.006 0.298 0.265 0.320 0.260

(0.329) (0.141) (0.392) (0.904) (0.000)*** (0.000)*** (0.000)*** (0.000)***

Manufacturing -0.084 -0.054 -0.092 -0.198 0.145 0.221 0.124 0.112

(0.079)* (0.320) (0.019)** (0.002)*** (0.039)** (0.008)*** (0.039)** (0.169)

Services -0.277 -0.220 -0.278 -0.407 -0.006 -0.002 -0.053 0.048

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.923) (0.978) (0.354) (0.540)

Sales -0.021 -0.012 -0.016 -0.021 0.036 0.033 0.042 0.037

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)***

(0.000)***

Number of Competitors -0.014 -0.021 0.025 0.036 -0.016 -0.099 -0.063 0.115

(0.797) (0.717) (0.587) (0.602) (0.843) (0.273) (0.333) (0.228)

Inflation 0.188 0.683 0.253 0.187 -0.397 -0.678 -0.058 -0.613

(0.176) (0.000)*** (0.015)** (0.217) (0.031)** (0.001)*** (0.651) (0.001)***

Growth -7.239 -6.355 -6.256 -8.092 2.571 2.213 2.361 6.532

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.017)** (0.052)* (0.006)*** (0.000)***

Concentration 0.171 0.263 0.226 0.521 -0.132 -0.186 -0.122 -0.393

(0.080)* (0.019)** (0.004)*** (0.000)*** (0.385) (0.298) (0.333) (0.017)**

Restrict 0.041 0.005

(0.000)*** (0.724)

Fraction denied 0.107 0.007

(0.026)** (0.923)

Banking Freedom -0.165 0.215

(0.000)*** (0.000)***

Credit Registry 0.209 -0.046

(0.092)* (0.803)

Constant -0.568 -0.361 -1.345 -0.440

(0.000)*** (0.037)** (0.000)*** (0.010)**

0.034 0.027 0.037 0.050 0.071 0.077 0.101 0.092

Observations 4783 3926 6716 3254 3335 2542 4693 2460 indicate significance levels of

10,5, and 1 percent, respectively.

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Table VI

Concentration, Financing Obstacles and Access to Bank Finance –

The Interaction with the Regulation of the Banking Sector

The regression estimated in columns 1-4 is: General Financing Obstacle = ↑ + ↓1

Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6

Sales

+↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Regulation + ↓12 Concentration*Regulation+ ε. General Financing Obstacle is the response

to the question “How problematic is financing for the operation and growth of your business?” Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not.

Exporter is a dummy variable that indicates if the firm is an exporting firm.

Manufacturing and Services are industry dummies. Sales is the logarithm of sales in US$.

Number of Competitors is the logarithm of the number of competitors the firm has.

Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. Regulation is one of four regulatory variables. Restrict is an indicator of the degree to which banks’ activities are restricted outside the credit and deposit business. Fraction denied is the share of bank license applications rejected. Banking Freedom is a general indicator of the absence of government interference in the banking sector. Credit registry indicator is a summary variable of the amount of information and the number of institutions that have access to borrower information from credit registries in a country. The regression is run with ordered probit. The regression estimated in columns 5-8 is: Bank Finance = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Regulation+ ↓12 Concentration*Regulation + ε.. Bank Finance is a dummy variable that takes on the

value one if the firm receives bank finance, and zero The regression is run as probit. Detailed variable definitions and sources are given in the appendix. P-values are reported in parentheses.

	General Financing Obstacle	General Financing Obstacle	General Financing Obstacle	General Financing Obstacle
	Bank Finance	Bank Finance	Bank Finance	Bank Finance
Concentration	-2.568	0.289	0.955	2.241
	(0.000)***	(0.036)**	(0.001)***	(0.000)***
Restrict	-0.088		0.152	
	(0.000)***		(0.000)***	
Concentration*Restrict	0.274		-0.302	
	(0.000)***		(0.000)***	
Fraction denied	0.156		0.116	
	(0.367)		(0.664)	
	2.791	-0.132	-1.092	1.353
	(0.000)***	(0.551)	(0.019)**	(0.059)*

Concentration*Fraction denied -0.098 -0.214

(0.762) (0.671)

Banking Freedom -0.024 0.027

(0.676) (0.772)

Concentration*Banking Freedom -0.236 0.302

(0.008)*** (0.030)**

Credit Registry 1.614 1.442

(0.000)*** (0.022)**

Concentration*Credit Registry -3.133 -3.222

(0.000)*** (0.013)**

0.037 0.027 0.038 0.052 0.077 0.077 0.102 0.094

Observations 4783 3926 6716 3254 3335 2542 4693 2460

*,**,*** indicate significance levels of 10,5, and 1 percent, respectively.

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Table VII

Concentration, Financing Obstacles and Access to Bank Finance –

Controlling for the Institutional Environment

The regression estimated in columns 1-4 is: General Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales

+↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Institution + ε. General Financing Obstacle is the response to the question "How

problematic is financing for the operation and growth of your business?" Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not. Exporter is a dummy variable that indicates if the firm is an exporting firm. Manufacturing and Services are industry dummies. Sales is the logarithm of sales in US$. Number of Competitors is the logarithm of the number of competitors the firm has. Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. Institution is one of four variables. Rule of Law is the degree to which citizens trust its country's legal system. Corruption indicates the degree to which there is no corruption in a country. Institutional Development is an average of six indicators measuring voice and accountability, control of corruption, regulatory quality, political stability, rule of law, and government efficiency. GDP per capita is real GDP per capita. The regression is run with ordered probit. The regression estimated in columns 5-8 is: Bank Finance = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Institution + ε.. Bank Finance is a dummy variable that takes on the value one if the firm receives bank finance, and zero The regression is run as probit. Detailed variable definitions and sources are given in the appendix. P-values are reported in parentheses.

General

Financing

Obstacle

General

Financing

Obstacle

General

Financing

Obstacle

General

Financing

Obstacle Bank Finance Bank Finance Bank Finance Bank Finance

Government 0.052 -0.005 0.064 0.061 -0.059 -0.063 -0.037 -0.041

(0.275) (0.922) (0.145) (0.164) (0.370) (0.344) (0.548) (0.503)

Foreign -0.370 -0.382 -0.366 -0.363 -0.059 -0.060 -0.032 -0.033

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.308) (0.299) (0.578) (0.562)

Exporter -0.055 -0.040 -0.004 -0.021 0.299 0.298 0.314 0.315

(0.081)* (0.204) (0.897) (0.484) (0.000)*** (0.000)*** (0.000)*** (0.000)***

Manufacturing -0.081 -0.077 -0.077 -0.080 0.131 0.133 0.128 0.134

(0.046)** (0.059)* (0.048)** (0.040)** (0.038)** (0.036)** (0.032)** (0.026)**

Services -0.257 -0.227 -0.245 -0.239 -0.039 -0.038 -0.058 -0.051

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.511) (0.525) (0.307) (0.366)

Sales -0.019 -0.015 -0.014 -0.015 0.038 0.039 0.041 0.040

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)***

(0.000)***

Number of Competitors 0.021 -0.071 0.011 -0.012 -0.018 -0.020 -0.054 -0.066

(0.655) (0.148) (0.815) (0.802) (0.800) (0.782) (0.399) (0.306)

Inflation 0.024 0.157 -0.156 0.179 -0.263 -0.248 0.122 -0.017

(0.821) (0.133) (0.137) (0.083)* (0.057)* (0.065)* (0.356) (0.896)

Growth -5.310 -2.290 -4.247 -5.296 2.872 2.836 2.242 2.148

(0.000)*** (0.002)*** (0.000)*** (0.000)*** (0.003)*** (0.006)*** (0.010)***

(0.013)**

Concentration 0.479 0.549 0.155 0.062 -0.250 -0.248 -0.415 -0.272

(0.000)*** (0.000)*** (0.048)** (0.446) (0.043)** (0.046)** (0.001)*** (0.028)**

Rule of Law -0.120 -0.011

(0.000)*** (0.578)

Corruption -0.208 -0.004

(0.000)*** (0.822)

Institutional Development -0.377 0.165

(0.000)*** (0.000)***

GDP per capita -0.146 0.096

(0.000)*** (0.000)***

Constant -0.455 -0.493 -0.514 -1.303

(0.002)*** (0.000)*** (0.000)*** (0.000)***

0.037 0.046 0.047 0.041 0.077 0.077 0.098 0.097

Observations 6111 6111 6687 6716 4135 4135 4673 4693

*,**,*** indicate significance levels of 10,5, and 1 percent, respectively.

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Table VIII

Concentration, Financing Obstacles and Access to Bank Finance –

The Interaction with the Institutional Environment

The regression estimated in columns 1-4 is: General Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Institution + ↓12 Concentration*Institution+ ε. General Financing Obstacle is the response to the question "How problematic is financing for the operation and growth of your business?" Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not. Exporter is a dummy variable that indicates if the firm is an exporting firm. Manufacturing and Services are industry dummies. Sales is the logarithm of sales in US$. Number of Competitors is the logarithm of the number of competitors the firm has. Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. Institution is one of four variables. Rule of Law is the degree to which citizens trust its country's legal system. Corruption indicates the degree to which there is no corruption in a country. Institutional Development is an average of six indicators measuring voice and accountability, control of corruption, regulatory quality, political stability, rule of law, and government efficiency. GDP per capita is

real GDP per capita. The regression is run with ordered probit. The regression estimated in columns 5-8 is: Bank Finance = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10 Concentration + ↓11 Institution + ↓12 Concentration*Institution + ε.. Bank Finance is a dummy variable that takes on the value one if the firm receives bank finance, and zero The regression is run as probit. Detailed variable definitions and sources are given in the appendix. P-values are reported in parentheses. General, Financing, Obstacle, General, Financing, Obstacle, General, Financing, Obstacle, General and Financing

Obstacle	Bank Finance	Bank Finance	Bank Finance	Bank Finance
Concentration	1.357	1.789	0.153	0.836
	(0.000)***	(0.000)***	(0.051)*	(0.030)**
Rule of Law	-0.014	0.036		
	(0.700)	(0.523)		
Concentration*Rule of Law	-0.217	-0.097		
	(0.002)***	(0.371)		
Corruption	0.009	-0.214		
	(0.827)	(0.001)***		
Concentration*Corruption	-0.398	0.381		
	(0.000)***	(0.000)***		
Institutional Development	-0.215	-0.187		
	(0.001)***	(0.058)*		
Concentration*Institutional	-0.292	0.606		

Development (0.006)*** (0.000)***

GDP per capita -0.088 -0.060

(0.004)*** (0.275)

Concentration*GDP per capita -0.104 0.270

(0.038)** (0.002)***

0.037 0.048 0.048 0.041 0.077 0.079 0.100 0.098

Observations 6111 6111 6687 6716 4135 4135 4673 4693

*,**,*** indicate significance levels of 10,5, and 1 percent, respectively.

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Table IX

Concentration, Financing Obstacles and Access to Bank Finance –

Controlling for the Development and Structure of the Banking Sector

The regression estimated in columns 1-3 is: General Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales

+↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Bank + ε. General Financing Obstacle is the response to the question "How problematic is financing for the operation and growth of your business?" Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not. Exporter is a dummy variable that indicates if the firm is an exporting firm. Manufacturing and Services are industry dummies. Sales is the logarithm of sales in US$. Number of Competitors is the

logarithm of the number of competitors the firm has. Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. Bank is one of three variables. Private Credit is claims on the private sector by financial institutions as share of GDP. Foreign Bank Share is the share of assets in banks that are majority foreign owned. Public Bank Share is the share of assets in banks that are majority state-owned. The regression is run with ordered probit. The regression estimated in columns 4-6 is: Bank Finance = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10 Concentration + ↓11 Bank + ε.. Bank Finance is a dummy variable that takes on the value one if the firm receives bank finance, and zero The regression is run as probit. Detailed variable definitions and sources are given in the appendix. Pvalues are reported in parentheses. General, Financing, Obstacle, General, Financing, Obstacle, General and Financing

	Obstacle	Bank Finance	Bank Finance	Bank Finance		
Government	0.047	0.023	0.035	-0.054	0.021	0.014
	(0.306)	(0.682)	(0.523)	(0.404)	(0.774)	(0.846)
Foreign	-0.363	-0.335	-0.348	-0.047	-0.057	-0.047
	(0.000)***	(0.000)***	(0.000)***	(0.418)	(0.404)	(0.479)
Exporter	-0.044	-0.004	0.017	0.323	0.248	0.249
	(0.155)	(0.925)	(0.647)	(0.000)***	(0.000)***	(0.000)***
Manufacturing	-0.083	-0.132	-0.135	0.089	0.183	0.173

(0.039)** (0.009)*** (0.006)*** (0.152) (0.012)** (0.015)**

Services -0.277 -0.301 -0.292 -0.068 0.001 -0.001

(0.000)*** (0.000)*** (0.000)*** (0.244) (0.988) (0.989)

Sales -0.012 -0.018 -0.016 0.042 0.044 0.035

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)***

Number of Competitors 0.022 0.031 0.015 -0.028 0.010 -0.001

(0.632) (0.579) (0.797) (0.675) (0.903) (0.986)

Inflation 0.123 0.434 0.369 -0.209 -0.257 -0.125

(0.255) (0.001)*** (0.005)*** (0.122) (0.133) (0.477)

Growth -7.072 -8.457 -8.829 3.173 4.365 4.222

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)***

Concentration 0.352 0.223 0.253 -0.310 -0.066 -0.129

(0.000)*** (0.045)** (0.017)** (0.011)** (0.678) (0.429)

Private Credit -0.193 -0.065

(0.000)*** (0.390)

Foreign Bank Share -0.001 0.002

(0.095)* (0.072)*

Public Bank Share 0.003 -0.004

(0.002)*** (0.002)***

Constant -0.476 -0.730 -0.484

(0.000)*** (0.000)*** (0.002)***

0.035 0.038 0.041 0.084 0.083 0.081

Observations 6346 4405 4578 4357 3099 3226

*,**,*** indicate significance levels of 10,5, and 1 percent, respectively.

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Table X

Concentration, Financing Obstacles and Access to Bank Finance –

The Interaction with the Ownership Structure of the Banking Sector

The regression estimated in columns 1-3 is: General Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales
+↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Bank + ↓12 Concentration *Bank + ε. General Financing Obstacle is the response to the question "How problematic is financing for the operation and growth of your business?" Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not. Exporter is a dummy variable that indicates if the firm is an exporting firm. Manufacturing and Services are industry dummies. Sales is the logarithm of sales in US$. Number of Competitors is the logarithm of the number of competitors the firm has. Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. Bank is one of three variables. Private Credit is claims on the private sector by financial institutions as share of GDP. Foreign Bank Share is the share of assets in banks that are majority foreign owned. Public Bank Share is the share of

assets in banks that are majority state-owned.The regression is run with ordered probit.

The regression estimated in columns 4-6 is: Bank Finance = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Bank+ ↓12 Concentration *Bank + ε.. Bank Finance is a dummy variable that takes on the value one if the firm receives bank finance, and zero The regression is run as probit.

Detailed variable definitions and sources are given in the appendix. P-values are reported in parentheses.

General

Financing

Obstacle

General

Financing

Obstacle

General

Financing

Obstacle Bank Finance Bank Finance Bank Finance

Concentration 0.273 0.434 -0.128 -0.107 -0.147 0.004

(0.007)*** (0.001)*** (0.385) (0.489) (0.483) (0.986)

Private Credit -0.293 0.195

(0.001)*** (0.188)

Concentration*Private Credit 0.220 -0.618

(0.218) (0.037)**

Foreign Bank Share 0.005 0.000

(0.055)* (0.990)

Concentration*Foreign Bank Share -0.010 0.004

(0.008)*** (0.544)

Public Bank Share -0.004 -0.002

(0.049)** (0.608)

Concentration* 0.014 -0.004

Public Bank Share (0.000)*** (0.422)

0.036 0.039 0.042 0.085 0.083 0.081

Observations 6346 4405 4578 4357 3099 3226

*,**,*** indicate significance levels of 10,5, and 1 percent, respectively.

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Table XI

Concentration, Financing Obstacles and Individual Financing Obstacles

The regression estimated in Panel A is: Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of

Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ε. Financing Obstacle is the response to one of seven questions. Answers vary between 1 (no obstacle), 2 (minor obstacle), 3 (moderate obstacle), and 4 (major obstacle). Government and Foreign are dummy variables that take the value 1 if the firm has government or foreign ownership and zero if not. Exporter is a dummy variable that indicates if the firm is an exporting firm. Manufacturing and Services are industry dummies.

Sales is the logarithm of sales in US$. Number of Competitors is the logarithm of the number of competitors the firm has. Growth is the growth rate of GDP. Inflation is the log difference of the consumer price index. Concentration is the share of the largest three banks in total banking sector assets. The regression estimated in Panel B is: Financing Obstacle = ↑ + ↓1 Government + ↓2 Foreign + ↓3 Exporter + ↓4 Manufacturing + ↓5 Services + ↓6 Sales +↓7 No. of Competitors +↓8 Inflation + ↓9 Growth + ↓10Concentration + ↓11 Institutional Development + ↓12 Concentration*Institutional Development + ε The regression is run with ordered probit. Detailed variable definitions and sources are given in the appendix. P-values are reported in parentheses.

Panel A

High interest rates

Special connection

Long-term loans

Credit information Collateral

Bank bureaucracy

Bank official

corruption

Government -0.159 -0.257 -0.178 -0.110 -0.180 -0.150 -0.249

(0.001)*** (0.000)*** (0.000)*** (0.018)** (0.000)*** (0.001)*** (0.000)***

Foreign -0.222 -0.211 -0.216 -0.090 -0.283 -0.122 -0.168

(0.000)*** (0.000)*** (0.000)*** (0.014)** (0.000)*** (0.000)*** (0.000)***

Exporter 0.026 -0.079 -0.000 0.052 -0.025 -0.024 -0.162

(0.405) (0.008)*** (0.994) (0.096)* (0.401) (0.410) (0.000)***

Manufacturing -0.023 -0.057 -0.055 0.028 -0.019 -0.021 -0.044

(0.588) (0.147) (0.281) (0.505) (0.623) (0.593) (0.336)

Services -0.261 -0.116 -0.227 -0.137 -0.154 -0.131 -0.052

(0.000)*** (0.003)*** (0.000)*** (0.001)*** (0.000)*** (0.001)*** (0.234)

Sales -0.012 -0.004 -0.011 -0.004 -0.004 -0.006 -0.010

(0.000)*** (0.115) (0.000)*** (0.105) (0.052)* (0.011)** (0.000)***

Number of 0.148 -0.004 0.072 0.199 0.051 0.095 0.133

Competitors (0.002)*** (0.926) (0.172) (0.000)*** (0.246) (0.031)** (0.014)**

Inflation 0.121 -0.352 0.180 -0.616 0.027 0.081 -0.062

(0.330) (0.001)*** (0.132) (0.000)*** (0.792) (0.416) (0.591)

Growth -6.854 -5.237 -8.219 -6.757 -5.145 -3.362 -6.079

(0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)*** (0.000)***

Concentration 0.177 -0.045 0.501 0.465 -0.104 -0.408 0.474

(0.019)** (0.542) (0.000)*** (0.000)*** (0.160) (0.000)*** (0.000)***

Observations 6822 6461 5382 5955 6492 6629 5761

Panel B

High interest

rates

Special

connection

Long-term

loans

Credit

information Collateral

Bank

bureaucracy

Bank official

corruption

Concentration -0.230 -0.257 0.120 0.208 -0.176 -0.517 0.120

(0.006)*** (0.001)*** (0.230) (0.010)** (0.023)** (0.000)*** (0.179)

Institutional Development -0.596 -0.055 -0.548 -0.055 -0.072 0.022 -0.294

(0.000)*** (0.379) (0.000)*** (0.402) (0.225) (0.721) (0.000)***

Concentration*Institutional 0.264 -0.361 0.020 -0.481 -0.065 -0.206 -0.274

Development (0.013)** (0.001)*** (0.860) (0.000)*** (0.524) (0.049)** (0.032)**

Observations 6822 6461 5382 5955 6492 6629 5761

*,**,*** indicate significance levels of 10,5, and 1 percent, respectively.

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Appendix : Variables and Sources

Variable Definition Original source

GDP per capita Real per capita GDP, average 1995-99 World Development Indicators

Growth Growth rate of GDP, average 1995-99 World Development Indicators

Inflation rate Log difference of Consumer Price Index International Financial Statistics (IFS), line 64

Private Credit {(0.5)*[F(t)/P_e(t) + F(t-1)/P_e(t-1)]}/[GDP(t)/P_a(t)], where F is credit by deposit money banks and other financial institutions to the private sector (lines 22d and 42d), GDP is line 99b, P_e is end-of period CPI (line 64) and P_a is the average CPI for the year.

IFS

Law and Order Measure of the law and order tradition of a country. It is an average over 1995-97. It ranges from 6, strong law and order tradition, to 1, weak law and order tradition.

International Country Risk Guide (ICRG).

Corruption Measure of corruption in government. It ranges from 1 to 6 and is an average over 1995-97. Lower scores indicate that "high government officials are likely to demand special payments" and "illegal payments are generally expected throughout lower levels of government" in the form of "bribes connected with import and export licenses, exchange controls, tax assessment, policy

protection, or loans."	
International Country Risk	
Guide (ICRG).	
Institutional Development	Average value of six indicators measuring voice and accountability, political stability, regulatory quality, government effectiveness, control of corruption and rule of law. Each of these indicators, in turn is constructed from a wide array of survey indicators in the respective area.
Kaufman, Kraay and Zoido-Lobaton (2001)	
Restrict	Degree to which banks' activities are restricted outside the credit and deposit business
Barth, Caprio and Levine (2003, forthcoming in the JFI)	
Fraction denied	Share of bank license applications rejected. If there were no applications, the value is one
Barth, Caprio and Levine (2003, forthcoming in the JFI)	
Foreign bank share	Share of banking assets in banks that are majority owned by foreign shareholders
Barth, Caprio and Levine	

(2003, forthcoming in the

JFI)

Public bank share Share of banking assets in banks that are majority owned by the government

Barth, Caprio and Levine

(2003, forthcoming in the

JFI)

Banking freedom General indicator of the absence of government interference in the banking sector

Heritage Foundation

Credit Registry Average of four variables that indicate (i) whether the credit registry offers only negative or also positive information about borrowers, (ii) the amount of information available about borrowers, (iii) which institutions have access to the data, and (iv) whether information is available for each loan or only aggregated for each borrower. The indicator is normalized between zero and one, with higher values indicating more

Galindo and Miller (2001)

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information being available to more institutions.

Government Dummy variable that takes on the value one if any government agency or state body has a financial stake in the ownership of the firm, zero otherwise.

World Business Environment

Survey (WBES)

Foreign Dummy variable that takes on the value one if any foreign

company or individual has a financial stake in the ownership of

the firm, zero otherwise.

World Business Environment

Survey (WBES)

Exporter Dummy variable that takes on the value one if firm exports, zero

otherwise.

World Business Environment

Survey (WBES)

Manufacturing Dummy variable that takes on the value one if firm is in the

manufacturing industry, zero otherwise.

World Business Environment

Survey (WBES)

Services Dummy variable that takes on the value one if firm is in the

service industry, zero otherwise.

World Business Environment

Survey (WBES)

No. of Competitors Regarding your firm's major product line, how many competitors

do you face in your market?

World Business Environment

Survey (WBES)

Firm size dummies	A firm is defined as small if it has between 5 and 50 employees, medium size if it has between 51 and 500 employees and large if it has more than 500 employees.
World Business Environment Survey (WBES)	
Sales	Logarithm of firm sales
World Business Environment Survey (WBES)	
General Financing Obstacle	How problematic is financing for the operation and growth of your business: no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?
World Business Environment Survey (WBES)	
Collateral	Are collateral requirements of banks/financial institutions no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?
World Business Environment Survey (WBES)	
Bank bureaucracy	Is bank paperwork/bureaucracy no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?
World Business Environment Survey (WBES)	

High interest rates Are high interest rates no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?

World Business Environment

Survey (WBES)

Special connections Is the need of of special connections with banks/financial institutions no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?

World Business Environment

Survey (WBES)

Credit information Is inadequate credit/financial information on costumers no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?

World Business Environment

Survey (WBES)

Long-term loans

Is the access to long-term finance no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?

World Business Environment

Survey (WBES)

Bank official corruption Is the corruption of bank officials no obstacle (1), a minor obstacle (2), a moderate obstacle (3) or a major obstacle (4)?

World Business Environment

Survey (WBES)

Bank Finance Dummy variable that takes on value one if firm has financed its investment with loans from commercial banks, zero otherwise

World Business Environment Survey (WBES)

Small and medium size enterprises (SMEs) need external and formal finance to grow because the amounts available from internal and informal sources are inadequate (Tagoe *et al*., 2005). Their lack of access to formal credit is a critical issue that has been blamed on investor bias against them, and/or on their poor management practices (Fischer, 1995; Lizano and Mesalles, 1995; Berger and Udell, 1998; Batten and Hettihewa, 1999; Scholtens, 1999; Green *et al.*, 2002). Access relates to type (debt or equity), duration (short or long-term) and source (internal, external, formal or informal) of finance. It has been explained using the pecking order theory (Myers, 1984; Myers and Majluf, 1984; Jordan *et al*., 1998; Scholtens, 1999; Watson and Wilson, 2002), the cost of raising funds from different sources (Meyer, 1998) and the pronounced informational problems associated with SME financing (Stiglitz and Weiss, 1981; Lund and Wright; 1999, Scholtens, 1999). The cost of funds and information explanations highlight the constraints faced by SMEs because of their characteristics. The pecking order theory focuses on managerial choice, but in relation to SMEs, it has been noted that some aspects of their capital structure are better explained by external constraints (Watson and Wilson, 2002). A key feature in the solutions advocated for these constraints is the ability of SMEs to signal credibility to financiers (Berger and Udell, 1998). This

signalling can be achieved through good information management practices (Tagoe *et al*., 2005).

2.5.2 Management Practices

This paper examines the relationship between the information management practices of SMEs and their access to bank finance in Ghana. The SME sector is important because it can make significant contributions to the economy (Lund and Wright, 1999) especially in developing countries where it encourages entrepreneurship, generates employment and reduces poverty (Fischer, 1995; Mead and Liedholm, 1998; Kayanula and Quartey, 2000). Banks were chosen because they are the most important source of external finance to SMEs (Corbett and Jenkinson, 1994; Meyer, 1998; Lund and Wright, 1999).

In this study we show that SMEs that keep records and present certain types of information improve their access to bank credit. The lack of access is due to constraints in the supply of credit arising out of informational problems associated with lending to SMEs. As a result, this paper argues that in addition to equipping SMEs with technical and managerial skills, assistance schemes must aim to improve the information management of SMEs and to demonstrate that such improvements can secure better access to funds.

This study contributes to the development finance literature by confirming, integrating and extending the findings of previous studies. For instance, although the importance of information management has been noted its linkage with access to bank finance had been expressed mainly in theoretical papers. Even where they had been alluded to in empirical

work it had been in broad and general terms. Tagoe et al. (2005) provide a useful model of this linkage derived form in-depth case studies but it had not yet been tested on an extensive data set. This study accomplishes that. Further, previous empirical studies were very strong when they looked at different facets of the financing conundrum. From this perspective, the findings appeared fragmented and a more integrated approach was needed. This study was structured to fill this need and shows how the different parts are linked together. Finally, it demonstrates that although the pecking order theory might explain the capital structure of larger firms (without substantial supply-side constraints) and that of SMEs in industrialised economies, it can hardly explain the capital structure of SMEs in developing countries. This sheds some light on the financial behaviour of SMEs in developing countries and thus extends the literature in that area.

The rest of the paper is structured as follows. In the next section we define SMEs and discuss their operating context in Ghana. This is followed by a review of the SME finance literature and an outline of the research objectives, data collection and analyses methods used for the study. The next two sections present and discuss the study's findings. The discussion focuses on the theoretical and policy implications of the study, highlights the contributions and limitations of the study, and suggests ways in which future research in the area could overcome those limitations. The paper ends with some concluding thoughts.

There is no single way of defining SMEs (Storey, 1994). Most definitions use size variables such as total assets, turnover, number of employees, or combinations of these.

For example in the 1990s the United States Agency for International Development (USAID) defined an SME as a firm with less than 50 employees that sells at least half of its output – to distinguish them from those involved in subsistence activity (Kayanula and Quartey, 2000); the OECD classified firms with 500 employees or less as SMEs (OECD, 2000); and the European Union (EU) set the upper limits at 250 employees, €50 million turnover and €43 million total assets. The level of the upper limits suggests that the definitions apply mainly to industrialised economies and, as such, are context-dependent. In view of this, the United Nations Industrial and Development Organisation (UNIDO) differentiated developing countries SMEs from those in industrialised countries (Elaian, 1996). The upper limit for developing country SMEs is 100 employees whilst that of SMEs in industrial countries is 500 employees.

In Ghana employment is the most important criterion for defining SMEs (Boon, 1989; Amonoo, Acquah and Asmah, 2003) although the National Board for Small Scale Industries (NBSSI) used both employee numbers (not more than 9) and asset size (cost of plant and machinery not exceeding 10 million cedis – i.e. US$1,000 at early 2005 exchange rates). The preference for employment numbers is due to at least two flaws inherent in using monetary size metrics (such as asset value and turnover) in Ghana. First, most SMEs in Ghana do not keep proper records so it would be difficult to obtain reliable figures. Second, because of high and persistent inflation the upper limits would have to be revised frequently. Consequently, in line with previous studies of Ghanaian SMEs (e.g. Steel and Webster, 1990; Osei et al, 1993; and Aryeetey, et al, 1994) this

study uses only the employment criterion with the upper limit set at the UNIDO level of 100 employees.

In the late 1950s and 1960s Ghana adopted an industrial development policy that emphasised active state participation so SMEs were not actively encouraged. A change of emphasis in the 1970s, led to the provision of subsidised credit. This was achieved either directly by the state or indirectly through credit allocation directives given to banks who were expected to lend a certain percentage of their loan portfolio to selected sectors (including SMEs) at preferential rates. Alongside other African countries, Ghana implemented economic liberalisation policies (including financial sector liberalisation) at the behest of the World Bank and the International Monetary Fund in the 1980s (Stiglitz, 2002). These policies prohibited the state from interfering with credit allocation in the banking sector and actively subsidising SMEs. Instead, the emphasis shifted to providing technical assistance through institutions such as NBSSI, Empretec and Ghana Appropriate Regional Technology Industrial Service (GRATIS). These institutions were to help develop the technical, marketing and managerial competencies of SMEs and in a few instances to provide limited financial assistance. The government of Ghana envisaged well-developed financial markets in which SMEs with skilled and competent staff would be able to access funds for working capital and expansionary purposes. However, this ideal has not yet been realised. The SME support institutions are under-resourced and access to bank finance continues to elude many SMEs.

The state still administers very limited and decreasing amounts of externally funded loans and revolving funds through the SME support institutions and state-owned banks. However, these are perceived to be either inadequate or unattainable because they are disbursed as part of political patronage of the government in power. The current state policy is aimed at phasing out completely from lending to SMEs in order to allow the liberalised and (hopefully) more efficient financial markets to provide such funds (Government of Ghana, 2003). Although a case can be made for some types of state intervention where there is clear evidence of market failure (Stiglitz, 2002) budgetary pressures and World Bank/IMF conditionalities would not permit that. Thus, the financing lacuna is being filled by non-governmental organisations (NGOs) who run micro-finance schemes mostly in the rural areas. The World Bank/IMF and the EU have created schemes that provide matching funds to enable SMEs to buy consultancy services to improve their technical, managerial and marketing competences and to enhance their ability to attract finance from banks and other formal credit sources.

The lack of SME access to formal credit is axiomatic. Whether this is the main problem or a symptom of deeper problems (e.g. poor quality management) is hotly debated. What is clear is that SMEs finance their working capital and expansion mostly from internal sources – owners' equity and retained earnings (Aryeetey et al., 1994). Bank financing remains the most important external source of finance (Meyer, 1998; Lund and Wright, 1999) but in its absence SME owners use other sources including friends and relatives (Osei et al, 1993). This pattern of financing can be attributed to demand side factors using the pecking order theory or to supply-side constraints reflecting banks' bias against

SMEs. Those who argue for the supply-side constraints point out that banks are unwilling to lend to SMEs because of their unique characteristics. Prominent among them is the lack of transparency of SME performance and the information asymmetry issues it raises. Therefore the ability to provide credible and useful information should enhance the ability of SMEs to access bank finance. These issues are considered below.

The pecking order theory has been used to explain the capital structure of UK SMEs (Jordan *et al*., 1998; Watson and Wilson 2002). It posits that firms prefer to finance growth in such a way that they retain most (or all) of the accruing benefits and provide as little information as possible to external parties. Therefore growth is financed in the following order: first retained earnings, then debt, and finally equity (Myers, 1984; Myers and Majluf, 1984). Further, a pecking order within debt financing starts with hire purchase finance, through short- to long-term financing. However, the use of short-term financing by SMEs may be due more to supply-side constraints than to their preference (Watson and Wilson, 2002).

Because of their sizes and ages SMEs are unlikely to have accumulated enough retained earnings to be able to meet all the financial requirements of growth internally. As a result, external financing is vital. For various reasons, banks are the most important source of external finance to SMEs (Corbett and Jenkinson, 1994; Lund and Wright, 1999). First, in addition to the supply of credit, SMEs rely on banks for transactions and deposit services (Meyer, 1998). Second, the costs of issuing securities directly to the public are prohibitive. In many developing countries, public markets for raising finance

are poorly developed (or non-existent), leaving only private markets dominated by banks (Batten and Hettihewa, 1999). Finally, the financial conditions of SMEs are opaque to outsiders. This makes it very costly for investors to obtain information on which to base their financing decisions. Banks, playing their normal intermediation role, are better placed to evaluate the SMEs. Being permanently placed between the ultimate borrower and the ultimate lender, banks act as delegated monitors of SME credibility (Diamond, 1984; Scholtens, 1999). In addition, they are better able to handle the risks involved in SME lending with well-diversified portfolios of small loans (Meyer, 1998; Scholtens, 1999).

Despite its importance, SMEs still lack access to bank finance, particularly in developing countries where banks have not looked upon SMEs as an important part of their loan portfolio (Lizano and Mesalles, 1995). The information opacity of SMEs is blamed for this situation (Batten and Hettihewa, 1999). Therefore an understanding of the information context within which SMEs interact with banks is necessary to address the problem of access to bank finance. This is discussed in the next section.

Banks finance SMEs under conditions of information asymmetry, in which the principal of the SME has better information than the bank about its performance and has more control of the outcome (Fischer, 1995; Lund and Wright, 1999). This can lead to adverse selection, as banks are unable to use the price mechanism to distinguish between firms based on their risk-return profiles. It could also lead to moral hazard in which the use of high interest rates to offset risk may provide an incentive for SMEs to adopt more risky

projects. Taken together, these might lead to credit rationing for SMEs so that finance is not available for all firms with viable projects. In other words, due to information asymmetry, the market is not cleared using price adjustments. Banks, therefore, respond to increased loan demands by rationing credit instead of raising interest rates (Stiglitz and Weiss, 1981; Lund and Wright, 1999).

In situations where credit rationing is not evident SMEs are assigned to higher risk categories because of their inability to provide the information that banks can use to evaluate their repayment capacity. Banks have to spend time, effort and other resources to get such information. This generates transaction costs that are recovered through higher interest charges, which, in turn, increase the risk of default. This makes it imprudent for banks to lend to SMEs if transaction costs move beyond a certain limit (Lizano and Mesalles, 1995). So whether through credit rationing or not, informational problems hamper the smooth and efficient financing of SMEs because well-deserving investment projects may not be financed and undertaken at all or may not obtain funding at reasonable costs (Scholtens, 1999).

The posting of collateral is one of the main means by which banks manage the informational problems associated with SME lending (Collier, 1994; Mambula, 2002). It can reduce adverse selection in debt financing leading to a reduction in interest rates, which further mitigates moral hazard (Bester, 1985). This is achieved because of the "hostage effect" of collaterals – that is, they act as forms of *ex-ante* payments to banks that could theoretically improve their *ex-post* bargaining power (Scholtens, 1999).

However, the ability to provide adequate collateral depends on certain characteristics of the borrower including its age, size and mode of operation. The younger and smaller the firm, the less able it is to put up collateral. The same applies to labour intensive firms as opposed to capital intensive ones (ibid.). The situation is exacerbated in developing countries because the legal system may be too weak to repossess collateral that is offered (Hulme and Mosley, 1996) and thus restrain action against defaulting SMEs (Fischer, 1995). Even where the process has been simplified, legal action can still take a relatively long time (Lizano and Mesalles, 1995). Thus the use of collateral might be counter-productive in developing countries.

Relationship building provides another way of overcoming the problems due to information asymmetry over time (Fama, 1980, 1985). The lack of previous credit relations between banks and SMEs can hamper the latter's access to finance (Lizano and Mesalles, 1995) because it is very difficult and costly for banks to assess the riskiness of SME projects (Fischer, 1995). A long-term relationship makes it possible for both lenders and borrowers to provide and generate information to and about each other. Improved information sharing benefits both parties. Banks are able to assess risk better (during screening) and can control moral hazard; SMEs gain by obtaining more credit at lower costs (Meyer, 1998; Scholtens, 1999). However, this remedy does not deal with how the relationship starts, in the first place.

Reputation is also seen as one of the means by which informational problems can be overcome. As a SME builds its reputation the circle of firms (including banks) willing to

provide it finance widens. After receiving and repaying a loan, subsequent applications are not only more likely to be successful, but the loan size is also likely to increase and the interest rate reduced over time (Fischer, 1995; Green *et al.*, 2002).

But how does a SME start-up signal reputation? In the UK, human capital has been used as a proxy for reputation during SME start-ups (Cressy, 1996). The crucial issue here is that in a start-up there is no history of the firm's performance. In its place lenders try to assess the competence of key employees because SME performance is largely determined by the competence of key personnel (all things being equal). Such competence can be inferred from the qualifications and experience of key personnel. In addition, since reputation results from repeated games, viable SMEs can use the choice of loan maturity to signal their intent to build good reputation (Diamond, 1993). Such firms choose shorter maturity loans, which they repay on time thereby creating a reputable credit history. The use of this signalling mechanism is, however, constrained by the cash flow requirements of the projects for which funding is being sought.

Implicit in the discussion above is the notion that SMEs lack access to bank finance even though their prospects might be good. Such prospects could be project-specific or could reflect sector or industry-wide features. Industry attractiveness is one source of competitive advantage (Porter, 1980). Where there are pressures from customers and/or suppliers with strong bargaining power profitability is eroded and the industry becomes unattractive. Similar situations arise in industries with low entry barriers, high availability of substitute products and intense rivalry (often signalled by a high number of competitors). Firms operating in unattractive industries are unable to attract financing

whilst those in attractive industries attract financing at good rates. This provides us with a way of assessing the so-called bias against SMEs. If this claim is true then SMEs will still lack access to finance even when they are operating in attractive industries.

2.5.3 Information management practices

In summary, it seems that SMEs that are able to present credible information about their performances and financial conditions are more likely to start relationships with banks, signal reputation or the intent to build reputation, and therefore gain access to bank finance. This is facilitated by good information management, which is characterised by the filing, recording, analysis and reporting of basic financial, personnel and other operational information. For instance invoices, receipts and bank statements are filed, their contents recorded and used to build financial statements. Similarly, employee details such as conditions of employment, qualifications and payroll details are kept and reported should the need arise. Basic operating information covering market (pricing, orders quantities etc) supplier and production (raw materials etc) issues are also stored, retrieved and reported as and when needed. Those at the top end of information management practice are able to present rudimentary feasibility and cost-benefit analysis reports. Proper record keeping, sound (if somewhat basic) internal control systems and external validation enhance the credibility of the information (Lizano and Mesalles, 1995; Batten and Hettihewa, 1999; Webster et al., 1999; Green et al., 2002). External validation can take the form of audited financial statements and reports prepared by independent consultants. Uddin and Hopper (2003) however question their value in developing countries. They argue such attestations are often unreliable because it is very difficult to hold independent attesters legally liable for providing misleading information. In Ghana

two factors mitigate this tendency. First, the professional capacity of the local Institute of Chartered Accountants has been strengthened. This includes its ability to discipline members who are reported for professional incompetence. Second, external donors are actively involved in sourcing and co-financing consultancy services for SMEs. The selection of consultants and quality control is thus stringently carried out. At any rate the value placed on such reports becomes a matter for empirical investigation. Banks would use these independent validations if they find them useful. This study should shed light on this issue.

The principal objective of the research was to examine the relationship between the information management practices of SMEs and their access to bank finance. The main hypothesis is that better information management practices are associated with better access to bank finance. Information management practices comprised two main components, namely, record keeping and presentation of information (such as financial statements, business plans and budgets) from the records kept.

Three subsidiary hypotheses were tested to provide context for the findings and to help explain the observed relationship between information management and access to bank finance. Reputation is an important requirement for access to bank finance. For start-ups, the quality of the human capital (e.g. education of SME principal) has been used as a proxy for reputation (Cressy, 1996; Green *et al*., 2002). Thus the relationship between access to bank finance and the education of SME principal was explored as a subsidiary hypothesis. In this case, better education goes together with better access to bank finance. Second, Green *et al*. (2002) noted that SME age can be used as a measure of reputation in capital structure models. According to them, as "a firm ages, it establishes

itself as a continuing business and it therefore increases its capacity to take on more debt" (p.9). The link between SME age and access to bank finance was therefore tested. Finally, we tested the relationship between an SME's industry prospects and its access to finance. The test was based on the hypothesis that better prospects would improve access to finance.

In 2002, a survey of researcher-administered questionnaire was conducted. About 400 SMEs in Accra, the commercial and political of Ghana, were targeted. Accra was chosen because the study was focused on urban SMEs. In addition it is a because of its cosmopolitan nature all the areas of Ghana are represented to some extent in Accra. Finally, because Ghana is not a federal state the laws applicable to Accra are also applicable to other urban areas in Ghana. Within this context the 400 firms in the sample were selected from a list of SMEs available from a database that the authors were constructing from diverse databases held by SME support organizations. Out of these, 299 participated giving a response rate of nearly 75%. The respondents were either owners or managers of the SME.

The questionnaire was divided into five parts. The first part, comprising six questions, provided background information of the respondent and the SME. The second part used three questions to assess the prospects of the market in which the SME operated. In the third part, the main sources and types of business threats were identified using six questions. Together, the first three parts described the internal and external operating contexts of the SMEs. The fourth part, which comprised fifteen questions, surveyed the

information management practices of SMEs. In the final part twenty questions, covering the sources of long- and short-term funds, borrowing requirements and SME relationships with bankers, were asked. The questionnaire was developed after in-depth case studies and piloted with some SMEs. The number and form of questions were influenced by the results of the pilot tests. In all fifty questions were asked with responses calibrated on a 5-point Likert scale. A copy of the questionnaire is attached as appendix 1.

The initial results of the study were also presented at various workshops with senior managers of the banking industry generally, with SME units of specific banks (three in total) and with senior managers of two non-bank financial institutions specialising in SME lending. The aim was to ensure a triangulation of the findings.

Descriptive statistics were used to provide a picture of the operating context of the SMEs. To be able to test the main and subsidiary hypotheses, multi-item measurement scales for the relevant variables had to be constructed. As required when using multiple-item scales, their internal reliability was tested by computing the Cronbach Alpha for each scale. This examined whether each scale was measuring a single idea, and therefore whether the items that constituted the scale were internally consistent. An alpha of 0.8 and above is generally interpreted as evidence of strong reliability (Bryman and Cramer, 1999).

To test the hypothesized relationships correlation measures were computed. These showed the direction and strength of the relationship but not causality. For causality to be demonstrated three conditions have to be met. First, there should be correlation between the variables. Second, the correlations should be statistically significant.

Finally, the independent variable should be logically and chronologically prior to the dependent variable. Statistical analysis can establish the first two conditions. Theorising, observation and expert witness corroboration might assist in establishing the third condition. Spearman's rank correlation (a non-parametric method) was used because the data from the questionnaire were ordinal. Cohen and Holliday's (1982) rule of thumb was used to interpret the strength of the correlation. They suggested the following: 0.19 and below is very low; 0.20 to 0.39 is low; 0.40 to 0.69 is moderate; 0.70 to 0.89 is high; and 0.90 to 1 is very high.

Of the 299 respondents 53% were owners, 29% were managers and 18% were owner-managers. Their ages ranged from 18 to 68 (with a mean of 37 years) and about two-thirds were under 40 years. Nearly 74% of them had secondary school education, 18% were university graduates and 8% completed primary school. They represented SMEs ranging from 1 year to 42 years old (with a mean age of 7 years) and about 75% of them were less than 10 years old. Finally, they had between 1 and 100 employees (with a mean size of 9 employees) and nearly three-quarters of them employed less than 10 people (Table 1).

The main business threats facing the SMEs were the rising cost of inputs (91%), too many competitors (90%), inadequate working capital (88%), inadequate long-term funds (86%) and low prices for SME products (76%). Only half of them viewed the inability to keep record as a threat. The SMEs were, however, very upbeat in their assessment of market prospects with 93% reporting increasing market size and 89% reporting improving profitability.

The study showed that owners' capital and retained earnings were the most prevalent sources of finance, followed by borrowing from relatives and banks (Table 2). Taken at face value, it appears to support the pecking order theory. The extent to which SMEs use their own funds and retained earnings were negatively correlated with the extent to which they use bank finance. The correlation with their own funds were -0.35 for short term and –0.28 for long term finance; and that with retained earnings was -0.16 for both short and long-term finance. The correlations were statistically significant ($p < 0.01$). This means that SMEs used bank finance and internal finance as alternatives rather than as complementary sources of finance.

Access to bank finance was assessed in three ways. The first two were the success rate measures relating to short- and long-term funds. The third scale combined the first two to assess overall access to bank finance. There was high and statistically significant correlation (0.703, at the 0.01 level) between access to long-term funds from banks and the use of banks for long-term funding. This means that SMEs used bank finance where they had access to it. Given that the two sources of finance were used as alternatives, this finding shows that the lower use of bank finance relative to owner's capital had more to do with its scarcity (supply side constraint) than with pecking order preferences. In other words, SMEs would have used more bank finance rather than owner's equity but this was not available to them.

2.5.4 Information Management and Access to Bank Finance

The level of information management practice was assessed using three main scales comprising different variables. The first scale computed a record-keeping score and comprised the mean scores of nine variables. The second scale was constructed with six

variables and assessed information presentation. Finally, all the fifteen variables were combined to form an information management score (See Table 3). The scales had face validity because the constituent variables were the record-keeping and information presentation activities carried out in organisations. The alpha scores of 0.94 for the record keeping scale, 0.91 for the information presentation scale and 0.96 for the information management scale show evidence of strong internal reliability. There were moderate and statistically significant correlations (at the 0.01 level) between all three information scales and the three bank finance access scores (see table 4). This confirms the hypothesis that keeping good records and presenting credible information improves access to bank finance.

One of the key information requirements is the preparation of business plans. SMEs often lack the skills to prepare them (Batten and Hettihewa, 1999; Tagoe *et al.*, 2005) so they sometimes rely on external consultants. Of the 148 SMEs that prepared business plans, 41 used consultants at least sometimes and 128 prepared the business plans themselves. A few of them used both consultants and in-house skills. There was no statistically significant correlation between access to bank finance and in-house preparation of business plans. However, there was weak but statistically significant correlation with business plans prepared by consultants (see Table 4). This means that some banks find information presented by independent parties more credible.

The educational level of the SME principal (Cressy, 1996; Scholtens 1999) and the age of the SME (Green *et al*., 2002) were used as proxies for the reputation of the SME. Consistent with the findings of Green et al. (2002), the age of the SME did not have a

significant correlation with overall access to bank finance (Table 5). However, the correlation between level of education of the SME principal and access to bank finance was 0.193 and was statistically significant at the 0.01 level (Table 5). The weak correlation with education is not surprising since education signals reputation only at the start-up phase and most of the SMEs had been in existence for more than a year. Finally, there was moderate and statistically significant correlation (0.351) between education and information management practices (Table 6). This demonstrates that better educated SME principals tend to keep better records.

2.5.4 Industry Attractiveness and Access to Bank Finance

A firm's performance is partly determined by the attractiveness of the industry in which it operates, such that a firm operating in an industry with good prospects is expected to do well and vice versa (Porter, 1980). When firms are performing well, it is expected that they would be attractive propositions for financiers. Two measures of industry attractiveness – one positive and the other negative – were constructed. The positive measure combined scores on market expansion (that is, more customers) and profitability. The Cronbach Alpha was 0.718, which gives a strong indication of internal reliability. The negative measure comprised six scores covering competitor action, input costs and product prices. The Cronbach Alpha was 0.677, also giving indication of adequate internal reliability. The positive measure (market prospect) was not significantly correlated to the access scales. However, the negative measure (that is, the business threats) was negatively and significantly correlated (at the 0.01 level) to bank access though the correlation was weak (see Table 4). This means that banks may not

necessarily react to good market prospects but rather to bad news in their lending decisions. It could also indicate a downgrading by banks of the positive assessment of market prospects of SMEs.

Thus far five main themes have emerged from the study. First, banks are the most important external source of finance for SMEs. This confirms the extant literature (Corbett and Jenkinson, 1994; Meyer, 1998; Lund and Wright, 1999). SMEs use more of the other sources of finance not out of preference but because their access to bank finance is constrained in Ghana. This finding is contrary to the results of previous research on the financing behaviour of SMEs in the UK (Jordan et al., 1998; Watson and Wilson, 2002) and might point to important differences between the financing behaviour of SMEs in developing countries and industrial countries. Second, good information management practices are positively related to access to bank finance. This is confirms the reasoning and/or evidence provided in previous work (Binks *et al.*, 1992; Cook and Nixson, 2000). SMEs whose documents (such as business plans) are prepared by external consultants have marginally better access to funds. Consultants are perceived as more independent and skilled, and therefore, more credible (Tagoe et al., 2005). Third, SMEs with more educated principals tend to have better access to funds. Education can signal reputation of SMEs during start-ups (Cressy, 1996; Scholtens, 1999) or it might make entrepreneurs willing and able to manage information better and therefore are better able to secure access to funds (Green *et al*., 2002). As a signal for reputation the link between education and access to finance is weak. However, there were moderate links between education and information management practices (Table 6), and between information management practices and access to bank finance. Taken together these findings suggest

that the impact of education on access to bank finance might be mediated through its impact on information management practices. This observation represents a significant finding in the development finance literature. Fourth, SME age does not signal reputation and is consistent with Green et al. (2002). The reliability of age as a reputation signal is based on the premise that SMEs accumulate experience and show a track record of performance with the passage of time (i.e. with age). Thus the older an SME is the more likely it is able to demonstrate its performance. However if its information practices do not facilitate transparency of performance then the signalling effect of age might be extremely weak or non-existent. Fifth and finally, the lending decisions of banks are not affected by the positive assessment by SMEs of their operating environment. However, the extent of business threats is weakly correlated with access to finance. This might be interpreted in a number of ways. Banks might doubt the reliability of the assessment of the SMEs operating environment. Even where they share the same assessment of market prospects, they might be sceptical about the ability of the SME to benefit from the market upturn. Furthermore, due to their risk aversion in relation to SME lending some banks act on negative assessments of the external operating environments of SMEs.

Taken together, these findings lead to one conclusion – the most important issue regarding SME access to bank finance is information management practice. What is unclear at this stage is whether the premium banks put on good quality information is related to their investment opportunities. Tagoe *et al*. (2005) suggest that this might be the case with Ghanaian banks – a position supported by the Economist Intelligence Unit.

According to them Ghanaian "banks have a limited appetite for lending to small and medium-sized local businesses … This situation is exacerbated by government issues of low-risk high-yielding debt, which has produced a safe avenue for bank investments, accommodating risk-averse lending policies. The government is expected to reduce its domestic borrowing in coming years, suggesting that banks may have to build stronger relations with local private [SME] clients" (Economist Intelligence Unit, 2001, p.32).

Government of Ghana debt is issued mainly through the sale of treasury bills. The amount of treasury bills offered decreased between 2002 and 2003 both in monetary terms and as a percentage of GDP (see Table 7). In addition to that the annual yields on the treasury bills reduced drastically from 38% in 2000 to 17.3% in May 2004 (see Table 8). Yet banks continued to increase their investments in treasury bills both in absolute terms and proportionately (see Table 7). At the same time, the banks maintained reserves with the Bank of Ghana (the Central Bank) far in excess of the minimum required ratio. For example, in the case of secondary reserves, the minimum required ratio was 35% of deposits. However, the banks maintained a secondary reserve ratio of 50.8%, 44.8%, 44.8%, 47.7%, 66.4% and 68.2% respectively for all four quarters of 2002 and the first two quarters of 2003. Although interest is paid on these amounts, they are used only as last resort. In addition, although the earning assets to total assets ratios of the banks remained fairly constant, their return on earning assets reduced from 8.6% in 2000 to 5% in 2003. Thus it is apparent that the alternative investment opportunity sets for banks are decreasing in terms of both quantum and yield. Yet this has not improved SME access to bank finance. In other words, banks have funds to invest; SMEs are looking for

investment funds, yet the two groups are not doing business with each other. This contradicts the literature (Tagoe et al., 2005; EIU, 2001) and implies that informational problems can act as huge structural barriers in the SME financing.

This study contributes to the development finance literature by confirming, integrating and extending the findings of previous studies. For instance, although the importance of information management has been noted its linkage with access to bank finance had been expressed mainly in theoretical papers. Even where they had been alluded to in empirical work it had been in broad and general terms. Tagoe et al. (2005) provide a useful model of this linkage derived from in-depth case studies but it had not yet been tested on an extensive data set. This study accomplishes that. Further, previous empirical studies were very strong when they looked at different facets of the financing conundrum. From this perspective, the findings appeared fragmented and a more integrated approach was needed. This study was structured to fill this need and shows how the different parts are linked together. Finally, it demonstrates that although the pecking order theory might explain the capital structure of larger firms (without substantial supply-side constraints) and that of SMEs in industrialised economies, it can hardly explain the capital structure of SMEs in developing countries. This sheds some light on the financial behaviour of SMEs in developing countries and thus extends the literature in that area.

2.5.5 Improving SME information management and access to bank finance

The principal policy issue is how to change this situation. There are a few possibilities. First, SMEs, recognising that good information management could improve their access

to bank finance, would begin to do something about it. However, the typical SME lacks the skills and money to set up and maintain good (though basic) information systems. SME support organisations can step in and provide the necessary training. Pilot schemes in Ghana suggest that this could work with careful planning and execution (Osei-Yeboah, 2002). However, lack of resources hinders the effectiveness of such schemes. It is in this vein that two kinds of collaborations are suggested. First, the banking sector could pool resources and fund such training. This would shift the burden of improving SME information management practices from banks who do not have the necessary skills and who might also be discouraged because of free-rider problems associated with such activities in debt markets. The involvement of the banks is likely to increase the take-up rate of such courses because their presence or endorsement increases the credibility of the programme by establishing a more direct link between the acquisition and use of information management skills and improved access to bank finance (Tagoe et al., 2005). Second, in addition to banks, development partners such as the EU, USAID, DFID, DANIDA and others could co-finance such training with the banks. This is in line with the role envisioned for successful assistance schemes (Phillips, 2002). Models like this could combine both development agenda and commercial orientation (Caniels and Romijn, 2005; Miehlbradt and McVay, 2003; Hileman and Tanburn, 2000).

2.5.6 Limitation of the Study

The limitations of the study relate mainly to sample selection, the nature of the data and their combined impact on the generalisability of the findings. The sample comprised

SMEs in one urban area. Because the sampling was not random, the sample used in the study might not be representative (in a statistical sense) of urban SMEs, let alone all SMEs in Ghana. Thus great care must be taken in applying the results to SMEs in other contexts.

The data used were primarily ordinal and expressed the perception of SME owners/managers. There were no baseline data regarding actual financing data from either the banks or the SMEs. This limited the study in two ways. First, more rigorous quantitative analyses could not be undertaken. Second, perception of respondents might be biased. Care must therefore be taken when interpreting the results.

Despite these limitations, the results can be said to be indicative of the financing issues faced by SMEs because they are strongly supported by the literature and industry sources. Key officials of the leading banks in Ghana affirmed the credibility of the results when their comments were invited. Nevertheless, future research should seek to overcome the limitations noted above. One way of doing this is to work with data on actual success rates (see Green et al., 2002, for a Kenyan example). Where such data do not exist research effort could be directed at establishing such baseline data. This would overcome the issue of perceptual bias and enable more rigorous analyses to be carried out. In addition, more representative samples should be used. Many developing countries are now developing databases from which such samples could be taken using the appropriate sampling techniques.

2.5.7 Conclusion

The study examined the relationship between information management practices of SMEs and their access to bank finance (their most important source of external finance). The strength of this paper lies in its systematic examination of this relationship in the light of the various factors associated with SME financing. The large sample also permitted the use of statistical analyses that might not have much meaning with smaller samples. Detailed comparison of preliminary findings with other macro and meso level data from the banking and money market sectors strengthened the analyses and increased the credibility of the findings. The study found out that whereas other factors might explain part of the lack of SME access to bank finance, information management practices is one of the most important. Even when banks could not find new profitable projects to finance, they were still reluctant to lend to SMEs. The paper suggests that attempts to improve SME access to finance should focus, among others, on providing SMEs with information management skills. An alliance between SME assistance schemes and banks could provide the funding, overcome the risk of free-rider problems in the debt finance market and assure SMEs that the acquisition of information management skills would improve their access to bank finance.

References

Amonoo, E., Acquah, P.K., Asmah, E., 2003. The impact of interest rates on demand for credit and loan repayment by the poor and SMEs in Ghana. *IFLIP Research Paper* 03-10. International Labour Organization (ILO).

Aryeetey, E., Baah-Nuakoh, A., Duggleby, T., Hettige, H., Steel, W.F., 1994. Supply and demand for finance of small scale enterprises in Ghana. *World Bank Discussion Paper* No. 251.

Batten, J., Hettihewa, S., 1999. Small firm behaviour in Sri Lanka. *Small Business Economics*, 13, 201-217.

Berger, A., Udell, G., 1998. The economies of small business finance: the roles of private equity and debt markets in the financial growth cycle. *Journal of Banking and Finance*, 22, 613-673.

Bester, H., 1985. Screening versus rationing in credit markets with imperfect information. *American Economic Review*, 75, 850-855.

Binks, M., Ennew, C., Reed, G., 1992. Information asymmetries and the provision of finance to small firms. *International Small Business Journal* 11, 35-46.

Boon, E.K., 1989. Women in SMEs: An African example. *Courier*, 114, 74-76.

Bryman, A., Cramer, D., 1999. *Quantitative Data Analysis With SPSS Release 8 For Windows: A Guide for Social Scientists*. London: Routledge.

Caniels, M., Romijn, H.J., 2005. What works, and why, in business service provision for SMEs: Insights from evolutionary theory. *Open University of Netherlands, Faculty of Management Working Paper Series.*

Cohen, L., Holliday, M., 1982. *Statistics for Social Scientists*, London: Harper & Row.

Collier, P., 1994. Financial liberalization. In Guillaumont, P., and Guillaumont, S. (eds.) *Adjustment and development: the experience of the ACP countries*, Paris: Economica.

Cook, P., Nixson, F., 2000. Finance and small and medium-sized enterprise development. *Finance and Development Research Programme Working Paper Series* 14, University of Manchester.

Corbett, J., Jenkinson, T., 1994. The financing of industry, 1970-1989: An international comparison. *CEPR Discussion Paper 948*, London.

Cressy, R., 1990. Commitment lending under asymmetric information: theory and tests on UK startup data. *Small Business Economics*, 8, 397-408.

Diamond, D., 1984. Financial intermediation and delegated monitoring. *Review of Economic Studies*, 51, 393-414.

Diamond, D., 1993. Seniority and maturity of debt contracts. *Journal of Financial Economics*, 33, 341-368.

Economist Intelligence Unit, 2001. *Ghana: Country Profile 2001*, London: Economist Intelligence Unit.

Elaian, K., 1996. Employment implications of small scale industries in developing countries: Evidence from Jordan. *Science, Technology and Development*, 14.

Fama, E., 1980. Banking in the theory of finance. *Journal of Monetary Economics*, 6, 39-57.

Fama, F., 1985. What's different about banks? *Journal of Monetary Economics*, 15, 29-39.

Fischer, B., 1995. The Basic Problem of Financing Small Businesses. In E. Brugger, and S. Rajapatirana (eds.), *New Perspectives on Financing Small Business in Developing Countries,* San Francisco, California: ICS Press, 9-24.

Government of Ghana, 2003. *National Medium Term Private Sector Development Strategy 2004-2008.*

Green, C., Kimuyu, P., Manos, R., Murinde, V., 2002. How do small firms in developing countries raise capital? Evidence from a large-scale survey of Kenyan micro and small scale enterprises (MSEs). *Finance and Development Research Programme Working Paper*, 47, Institute of Development Policy Management (IDPM), Manchester.

Hileman, M., Tanburn, J., 2000. *The wheels of trade: Developing markets for business services*, London: IT Publications.

Hulme, D., Mosley, P., 1996. *Finance against poverty,* Vol. 1, London: Routledge.

Jordan, J., Lowe, J., Taylor, P., 1998. Strategy and financial policy in UK small firms. *Journal of Business Finance and Accounting*, 25, 1-28.

Kayanula, D., Quartey, P., 2000. The policy environment for promoting small and medium enterprises in Ghana and Malawi. *Finance and Development Research Programme Working Paper*, 15, Institute of Development Policy Management (IDPM), Manchester.

Lizano, E., Mesalles, L., 1995. Access of small enterprises to conventional sources of financing: the cases of Bolivia, Chile, Columbia, and Peru. In E. Brugger, and S. Rajapatirana (eds.), *New Perspectives on Financing Small Business in Developing Countries,* San Francisco, California: ICS Press, 25-48.

Lund, M., Wright, J., 1999. The financing of small firms in the United Kingdom. *Bank of England Quarterly Bulletin*, 39, 195-201.

Mambula, C., 2002. Perceptions of SME growth constraints in Nigeria. *Journal of Small Business Management*, 40, 58-65.

Mead, D., Liedholm, C., 1998. The dynamics of micro and small enterprises in developing countries, *World Development*, 26, 61-74.

Meyer, L., 1998. The present and future roles of banks in small business finance. *Journal of Banking and Finance*, 22, 1109-1116.

Miehlbradt, A.O., McVay, M., 2003. Developing commercial markets for business development services: BDS primer. *4th Annual BDS Seminar*, Turin.

Myers, S., 1984. The capital structure puzzle. *Journal of Finance*, 39, 575-592.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. *Journal of Financial Economics*, 13, 187-221.

OECD, 2000. *Small businesses, job creation and growth: Facts, obstacles and best practices.* Paris.

Osei, B., Baah-Nuakoh, A., Tutu, K.A., Sowa, N.K., 1993. Impact of structural adjustment on small-scale enterprises in Ghana, in Helmsing, A., and Kolstee, T. (eds.), *Structural adjustment, financial policy and assistance programmes in Africa*, IT Publications.

Osei-Yeboah, D., 2002. Financing SMEs: Experience of EMPRETEC Ghana foundation. *Proceedings of the symposium on modalities for financing SMEs in Uganda,* 45-49.

Phillips, D., 2002. The market-based approach to enterprise assistance: An evaluation of the World Banks' 'Market Development Grant Funds', *Small Enterprises Development*, 13, 26-37.

Porter, M., 1980. *Competitive Strategy: Techniques for Analyzing Industries and Competitors*, New York: Free Press.

Scholtens, B., 1999. Analytical issues in external financing alternatives for SBEs. *Small Business Economics*, 12, 137-148.

Steel, W.F., Webster, L., 1990. Ghana's small enterprise sector: Survey of adjustment response and constraints. *Industry Series Paper*, 41, World Bank, Industry and Energy Department, Washington D.C.

Stiglitz, J., 2002. *Globalization and its discontents*. Penguin.

Stiglitz, J., Weiss, A., 1981. Credit rationing in markets with imperfect information. *American Economic Review*, 73, 93-409.

Tagoe, N., Nyarko, E., Anuwa-Amarh, E., 2005. Financial challenges facing urban SMEs under financial sector liberalisation in Ghana. *Journal of Small Business Management,* 43, 2, 331-343 (July 2005)

Uddin, S.N., and Hopper, T.M., 2003. Accounting for privatisation: Testing World Bank claims. *Critical Perspectives on Accounting*, 14, 739-774.

Watson, R., Wilson, N., 2002. Small and medium size enterprise financing: a note on some of the empirical implications of a pecking order. *Journal of Business Finance and Accounting*, 29, 557-578.

Webster, B., Hare, C., McLeod, J., 1999. Records management practices in small and medium-sized enterprises: a study in North-East England. *Journal of Information Science*, 25, 283-294.

Table 1 – Respondent and SME Background

	Mode	Mean	Std. Dev.	Maximum	Minimum
Respondent age	30-39	37.5	10.56	68	18
Education	Secondary	-	-	University	Primary
SME age	5-9	7.3	6.06	42	1
No of Employee	<10	9	10.63	100	1

Table 2 – Sources of Funds

	At least sometimes (%)	
Source of Funds	Long-term Funds	Short-term Funds
1. Own capital	86	88
2. Retained Earnings	86	88
3. Relatives	38	41
4. Banks	34	30
5. Friends	16	18
6. Money Lenders	14	13
7. Enterprise Development Scheme	10	11

Table 3 – Information Practice Scales and Variables

	Record Keeping	Information Presentation	Information Management
Issue Invoices	X		X
Issue Receipts	X		X
File Invoices Issued	X		X
File Receipts Issued	X		X
File Invoices Received	X		X
File Receipts Received	X		X
Keep Employee Records	X		X
File Bank Statement	X		X
Keep Detailed Books of Account	X		X
Prepare Business Plan		X	X
Prepare Budgets		X	X
Prepare Cash Flow Statements		X	X
Prepare Income Statement		X	X
Prepare Balance Sheet		X	X
Have Accounts Audited		X	X

Table 4 – Bank finance access and information management correlation

	Access to Bank Finance		
Measurement Scales	Short-Term	Long-Term	Overall
Information Management:			
Record Keeping	0.446**	0.454**	0.460**
Information Presentation	0.414**	0.425**	0.434**
Information Management	0.452**	0.461**	0.470**
Business Plans:			
In-House Preparation	-0.029	-0.055	-0.050
Consultant Preparation	0.261**	0.271**	0.281**
Industry Attractiveness:			
Market Prospects	-0.083	-0.069	-0.087
Business Threats	-0.158*	-0.140*	-0.170**

** Correlation is significant at the 0.01 level (2-tailed) (Spearman's rank correlation). * Correlation is significant at the 0.05 level (2-tailed)

Table 5 – Correlation between education, SME age and access to bank finance

	Access to Bank Finance		
	Short-term	Long-term	Overall
SME Age	0.075	0.161*	0.118
Education	0.192**	0.214**	0.193**

** Correlation is significant at the 0.01 level (2-tailed) (Spearman's rank correlation). * Correlation is significant at the 0.05 level (2-tailed)

Table 6 – Correlation between education level and information management variables

Variables	Spearman's Rank Correlation
Record Keeping	0.352**
Information Presentation	0.308**
Information Management	0.351**

** Correlation is significant at the 0.01 level (2-tailed) (Spearman's rank correlation).

Table 7 – Bank Share of Outstanding Government Securities

	Amount (billion cedis)	% of GDP	Bank Holding (billion cedis)	Bank Holding (%)
2002 (June)	8,463	17.3	n/a	
2002 (December)	9,533	19.5	3,412	35.8
2003 (June)	10,921	16.7	n/a	
2003 (December)	9,495	14.6	3,688	38.8
2004 (January)	9,126	11.8	3,908	42.8

Source: Bank of Ghana

Table 8 – Ghana Government Treasury-Bill Rates (1996 – 2004)

	91-Day Rates (%)
1996 (Year End)	41.6
1997 (Year End)	42.8
1998 (Year End)	34.3
1999 (Year End)	31.5
2000 (Year End)	38.0
2001 (June End)	42.2
2001 (December End)	28.9
2002 (June End)	24.9
2002 (December End)	26.6
2003 (June End)	35.3
2003 (December End)	18.67
2004 (Mid-May)	17.3

Source: Bank of Ghana

Appendix

SME Access To Bank Finance Questionnaire

Dear Respondent,

The Social Finance Unit of the International Labour Organisation (ILO) based in Switzerland, has commissioned the above research under its IFLIP programme. We aim to identify and explain the opportunities and constraints that small and medium enterprises (SMEs) face in receiving credit from banks. Our findings would be used to review policies on how to assist SMEs.

We should be grateful if you could answer the questions below as best as you can. It is estimated that this would not take more than 20 minutes of your time.

Ghana was one of the first African countries to implement structural adjustment programme and financial sector reforms (FSR) in the 1980's. Despite the satisfaction of the preconditions for a successful FSR, after almost 20 years of implementation under the auspices of the IMF/World, the results have been mixed.

The arguments that FSR would increase competition, efficiency and profitability of banks have not been achieved. Whereas the deposit market has undoubtedly become more competitive, the loan market situation is a bit uncertain. In terms of efficiency, the medium banks experienced an increase at the early years of the reform but in the last five years efficiency of the medium banks have been below that of the big banks. On the other

hand, the smaller banks have persistently underperformed both medium and big banks in terms of efficiency. This indicates that size matters in the Ghanaian banking industry.

The efficiency of the foreign banks was similar to the industry average over most of the period. It is only in the last few years that they have become more efficient than the state-owned banks. Although the domestic private banks were less efficient than both foreign and state-owned banks when they were established, in the past few years the gap has narrowed and they have been just as efficient as the foreign banks.

Overall the study found a weak correlation between efficiency and profitability in the banking sector in Ghana. For both markets, there is very weak correlation between efficiency and competition. When these findings are combined with that of size decomposition of efficiency it seems that size is a more important driver of efficiency than competition. This also holds true with profitability – that is size is more important than both efficiency and competition in determining profitability.

One limitation of this study is that it did not explicitly model the impact of size on efficiency and profitability. Further studies are needed to establish the empirical link between the two variables.

Policy makers ought to look again at the determinants of competition in the Ghanaian banking industry. The finding that competition owes less to the number of firms but rather more to the actual behaviour of banks is interesting in this regard. New studies as to what those behaviours comprised might be insightful. These could look at the rate of

new technology adoption and new product development. Within this context it could look at the channels by which banks are delivering services and their impact on competition.

Since the banking efficiency seems to be size-dependent it stands to reason that attempts must be made to identify a size threshold that would lift the efficiency of banks. The recent increase in minimum capital requirements of banks announced by the Central Bank of Ghana might point to the way forward here. This might result in some mergers which would ensure that banks have the critical mass to operate within the oligopolistic structure of the sector. The minimum capital requirement should be kept under constant review by the central bank.

CHAPTER 3

3. METHODOLOGY

3.1 NTRODUCTION

This chapter surveys the implementation of financial services reform in Ghana under the rubric of the financial sector adjustment programme (FINSAP) also focuses on methodology of the studies. It details the main research objectives, related research questions and the derivative hypothesis and also discusses data sources, data collection method and analytical methods.

In June, 1983, an exchange reform programme set the stage for a flexible exchange rate policy and progressive liberalization of the exchange and trade system in Ghana.

It was four-stage strategy.

- Export bonus and import surcharges
- A multiple exchange rate system
- A discrete adjustment system
- Formal devaluation under a managed flexibility system.

Because of the initial aversion to devaluation in some circles, the authorities had to introduce a special scheme of bonuses on foreign exchange receipts and surcharges n exchange payments. This marked the beginning of the process towards a more realistic exchange rate, as well as flexible exchange policy. Exporters got more cedis for on US dollar exchanged at the banks, while anyone buying a dollar exchanged at the banks, while anyone buying a dollar had to pay more cedis for it.

The operation of the new scheme resulted in a multiple exchange rate system, as two rates, ¢23.375 per US dollar and ¢29.975 per US dollar, emerged and were applied to specified receipts and payments. The two rates yielded a weighted average rate of 24.7 per US dollar, implying a depreciation of about 89 per cent in terms of the US dollar (or 798 per cent in terms of the local currency). In real terms, the exchange rate that emerged was close to what it should have been in 1972, i.e 25.00 per US dollar (instead of the pegged 2.75)

Having successfully achieve the initial devaluation, a policy of managed flexible was adopted during1984-85, in order to prevent the re-emergence of the severe misalignment of relative prices, thereby avoiding any weakness in the balance of payments. Under the policy, exchange rates were adjusted quarterly so that the weighted average rate moved in accordance with an index measuring the differential between the inflation rate in Ghana and that of her main trading partners.

It became evident that the system of bonuses and surchages had become extremely cumbersome for trade transactions and the transitory arrangement was reviewed in March 1984 . It was then decided to unify two rates at ¢30 per US dollar, resulting in a devaluation of about 91 per cent. Subsequently, the exchange rate of the cedi was adjusted periodically in line with the real exchange rate rule which had been adopted under the managed flexibility policy.

Nonetheless, by the end of 1984, the exchange was still considered to be overvalued and further action was needed to reach a more appropriate

exchange rate that would help balance of payments and fiscal policy targets. Accordingly, the cedi rate was adjusted to ¢35 per US dollar in December 1984, and the authorities then adopted a system whereby the exchange rate was adjusted more frequently, to reflect the actual depreciation in the real exchange rate.

By the end of January, 1986, when the last discrete adjustment in the official exchange rate took place before an auction system was introduced, the exchange rate of the cedi had been increased systematically to ¢90 per US dollar. Consequently, the real effective exchange rate had depreciated by about 92 per cent from its end-March 1983 position.

At that stage of the exchange rate reform, the black market remained vibrant mainly because of the rationing of foreign exchange still going on in the official banking system for the importation of consumer goods. Imports into Ghana remained controlled within the framework of an annual import programme. Unto the October 1986 reform, the import licensing system operated two different import foreign exchange form the banking system, and a special import licence that required the importer to use personal foreign exchange resource.

Nonetheless, pending more radical reforms, this scheme was streamlined and gradually liberalized in 1985, when the positive list that limited the range of goods that could be imported was replaced by a short negative lists, with all goods not explicitly mentioned being deemed freely importable, this marked the beginning of the liberalization of import trade in Ghana. As a result, there

were virtually no restrictions on imports, significant progress was made towards correcting the severe overvaluation of the cedi and achieving a managed flexibility system. But the pegged exchange rate arrangement, and the series of devaluations that were implemented, did not prove sufficient to reach an appropriate exchange rate.

At mid- 1986, the cedi was still considered substantially overvalued, as evidenced by the large differential between the official and the parallel market exchange rates (about 100 per cent), the deterioration in the net external reserves position of the BoG during the first half of 1986, and the need to maintain restrictive international payment practices to support the official exchange rate.

The auction market

The next stage towards the floating of the cedi was the introduction of the Foreign Exchange Auction Market (FEAM) in September 1986. The intention was to accelerate the adjustment of the cedi to a more appropriate level and, given the problems in inherent in fixed but adjustable exchange rate arrangement, to shift to a market arrangement for an independent float. It was thought that, after having established a dual exchange rate system as a transitory measure, the tow official rates were unified in the context of a 'retail' auction of foreign exchange to the public. The FEAM was felt necessary at that stage to circumvent further sizeable devaluations needed to contain the excessive demand for foreign exchange and also to improve Ghana's balance

of payments performance. It was also a way of depolitising the issue of exchange rate, as the market-determined rate would provide both the political authorities and the general public with a more objective indication of the equilibrium exchange rate for the cedi

In addition, floating the cedi in the framework of a weekly auction market was seen as providing for a continues process of determining the exchange rate in line with fundamental principles, whereas the previous pegged regime had implied large discrete devaluations.

To facilitate the move to the floating arrangement, a transitional mechanism (retail auction) was designed. On September 19, 1986, a dual exchange rate system was introduced by the authorities. Under that system there were two 'windows'.

The exchange rate for the first window was fixed at ¢90.00 = US$ 1, while the rate for the second window was determined by supply and demand for foreign exchange at a weekly auction conducted by the BoG. Foreign exchange to cover debt service payments on official debt contracted before January, 1, 1986, as well as imports of petroleum products and essential drugs, was provided through the first window. To reflect the duality of the rates, the surrender of foreign exchange earnings to the central bank was effected at two different rates. Earnings from exports of cocoa and residual oil products were surrendered at the first window rate, ¢90.00 per US dollar. All other foreign exchange transactions, covering almost two-thirds of external

payments and receipts, were conducted through the weekly auction: this was the second window.

Concurrently, a new import licensing scheme was introduced in October whereby licences for imports of virtually all consumer goods by the priate sector were issued: 'A', 'S' and 'G':

- Licence A allowed the holder to bid for foreign exchange through the auction and was initially issued for the importation of drugs and raw materials, spare parts, capital goods and intermediate goods
- Licence B permitted holders to use their own foreign exchange resources to import goods, provided that such imports were covered by the existing special licence regulations
- Licence G was issued to government organizations for the importation of essential goods and services, This permitted ministries, departments and agencies to use foreign exchange directly allocated by the government, outside the BoG auction.

Compared with the previous Import Licensing Scheme, the new one had two distinctive features. Firstly, with the introduction of Licence A, virtually all none-consumer goods became eligible for foreign exchange cover from the banking system (i.e., from the foreign exchange auction); such access had previously been given to a more limited range of goods and only to importers who had acquired a specific import license. Secondly, since there were no quantitative restrictions on the number of Licence A's that could be issued, the monopoly

rents that could accrue to importers under the previous system were eliminated because of limitations on the number of specific import licences.

Under the dual rate system, the Bog auctioned foreign exchange on a weekly basis to final users only – hence the 'retail' nature of the auction. Authorised dealer banks played a limited intermediary role in that set-up, centralizing bids for auction funds from their clients and channeling them to the BoG for further processing.

As a corollary to the selection of the auction as the institutional foundation for the market arrangement of Ghana's exchange rate system, the partial surrender requirement continued to be applied. Apart form the amount of foreign exchange that the exporters could keep under the existing retention privilege scheme, all foreign exchange earnings were to be repatriated and sold to the BoG, directly or through commercial banks. After taking into account the demand for foreign exchange by ministries, departments and agencies, which were covered outside the auction, but at auction-determined rate, the BoG decided on the amount of foreign exchange to be auctioned. The marginal rate was used to settle all foreign exchange transactions through the second window.

One of the objectives of the auction system was to bring abut a further depreciation of the cedi, and to ensure a substantial reduction in the difference between the official and parallel market exchange rates. In the event, the official rate depreciated from ¢128 per US dollar at the first auction to ¢152 at the last, held in December 1986. that was able to reduce the spread to about 25 per cent, compared with around 100 per cent prior to the introduction of the auction. By the

end of December, the effective exchange rate had depreciated by 43 per cent since December 1985 and by 94 per cent since March 1983.

Later, the auction was modified in several ways, with a view to giving it a firm grounding for a floating system. More importantly, the two windows were unified in February 1987 in the context of an auction market at the prevailing rate of ¢150 per US dollar. From then on, and until April,27, 1990, all transactions through the banking system were settled by applying the exchange rate determined at the weekly retail auction.

In the framework set by the October 1986 reform, and following the exchange rate unification, the authorities gradually widened access to the auction to expand the coverage of the exchange arrangement that more closely represented market conditions. The expansion involved the implementation of a number of measures:

- Access to the auction was broadened significantly through the inclusion f additional categories of consumer goods and services payments on the list of transactions eligible for funding in the auction.
- Current invisible payments were liberalized during the 1987-89 period.
- Foreign exchange regulations ere modified to curb the amount of foreign exchange being held in retention accounts, especially Ghana Cocoa Board (Cocobod) foreign exchange retention accounts.

During the period January 1987 to April, the auction marker functioned fairly smoothly. In response to increased demand for foreign exchange resulting from the liberations of currently international transactions, the BOG progressively increased the supply for foreign exchange to the auction market. In addition, the efficiency of the auction market improved considerably. There was a significant narrowing in both the difference between the highest and lowest bids, and the difference between the highest bid and the marginal rate., as market participants became more familiar with the functioning of the auction market.

the foreign exchange bureaux

the success of the foreign exchange auction marketed encouraged the authorities to move towards the liberalization of the foreign exchange market in Ghana. The authorities allowed the establishment of foreign exchange (forex) bureaux. The main aim was to absorb the still-thriving black market for foreign exchange, and move towards a fully realistic exchange rate that would reflect supply and demand

3.2 Justification for the paradigm

Stock prices are not a good measure of performance across the banks in Ghana because not all the banks are listed on the Ghana Stock Exchange. In addition, the stock market which was established in 1990 is relatively young and trading in bank stocks is thin. Thus, stock prices of banks may not be a good measure of performance across banks.

Total assets is a common denominator among banks, therefore dividing profit after tax by total assets (i.e. ROA) makes it a better measure of performance across banks(Evanoff and Fortier 1988).

The financial sector Adjustment Programme (FINSAP) was undertaking as part of the IMF\WORLD BANK ERPSAP that was started in 1983. Due to reforms in government revenue collection government expenditure composition, the chronic budget deficit was

This reduced the magnitude of government expenditure borrowing from the banking sector to finance budget. The rate of growth of money supply reduced, the rate of inflation also reduced compared to PRE-ERP\SAP period and exchange rates were liberalised and capital controls were removed. Therefore in 1988, when the financial sector reforms were implemented the indicators of economic performance were stable and significantly better.

The financial sector reforms in Ghana were intended to increase the size, improve the efficiency, and strengthen the risk management capabilities of the banks and increase the diversity of the financial system. The financial sector reforms started in 1988 and comprised two phases.

The aims of FINSAP 1 (1988-1992) were;

- Restructure banks which were distressed and to design a corporate restructuring programme for distressed banks (mostly state-owned banks)
- Improve savings mobilization and enhance efficiency in credit allocation.
- Reforms the banking laws

- Restructure the regulatory framework and improve bank supervision.
- Restructure entry conditions to encourage new entry to increase competition.
- Develop money and capital market.
- Establish a Non –Performing Asset Recovery Trust to non-performing loans of banks in the categories.

Non performing state-owned enterprise (SOES), loans guaranteed by the government of Ghana and non-performing loans granted to the private sector in order to make financially viable (Anin 2000).

The objectives of FINSAP 11 (1993-1998) were;

- To reduce state holding in state –owned banks
- Continuation of programme of restructuring the banks
- Intensify the recovery of non-performing loans by NPART
- To enhance the effectiveness of the non-bank financial institutions.

In pursuance of these objectives a Security Discount and a Stock Exchange market were established in 1990. These would provide avenues for banks and other financial institutions to mange their liquidity. Furthermore, to improve the quality of bank personnel, the Institute of Bankers and Chartered Accountants were provided support to enhance the training of personnel to improve efficiency in the delivery of banking services and risk management. The top management of key-state-owned banks were change din 1990 and new boards of directors appointment for distressed banks. In order

to improve the financial position of the Bank of Ghana, the government assumed responsibility for revaluation losses. These measures improved the capacity of the banks. This involved restructuring of the balance sheet of distressed banks, recapitalizing them and reforming their management and operating procedure. A Non-Performing Assets Recovery Trust (NPART), a special government agency was established to take over the NPAs of the banks. This allowed the amount of NPAs to be removed from the balance sheets of the banks and replaced with Bank of Ghana (BOG) bonds or offset against debt owed to the government or the BOG. This was about Ghana cedis 62billion or about 4.4% of GDP-$170 MILLION BASED ON 1989 CEDI to dollar exchange rate (Brownbridge and Gockel, 1998).

The boards of the various banks were constituted. New boards of directors were and senior executives were appointed. In addition to the provision of technical assistance, there were restructuring and strengthening of credit policies, credit appraisal, loan monitoring and loan recovery systems. The banks rationalized their operations, reduce staff number through redundancy, and closed lost making branches. The state has progressively reduced its holdings in state owned banks through a privatization programme. The government holdings in number of banks have reduced from eight banks in 1988 to three banks in 20054.

The Banking Act of 1963 was revised with a Banking Act of 1989 and a Non-Bank Financial Institutions (NBFI) Act of 1993. Standard accounting procedures and reporting were introduced and the capacity of the Bank of Ghana supervision department was

strengthen. A new minimum paid up capital requirement was set for Ghanaian owed bank, (0.2billion cedis) foreign owned (0.5 billion cedis) Commercial Banks and development banks. The Bank of Ghana now has the mandate to amed the minimum paid up capital when it deems necessary (Anin, 2000). In 2004/2005 the minimum paid up capital was increased 7 billion GHC by the Bank of Ghana.

A new capital adequacy ratio has been set at 6% of adjusted risk assets and banks are to maintain reserve funds with transfers out of annual profits. The law mandates the Bank of Ghana to set minimum liquid assets ratios, exposure limits 25% of the net worth of the banks for secured credit to a single customer and 10% for unsecured credit to a single customer. Also exposure limit to customer with a link to a bank's own directors has been limited to a maximum 2% of the net worth of the bank for secured loans and 2 to 3% for unsecured loans (Brownbridge and Gockel, 1998). This is to avoid some of the unscrupulous loans and advances that crated high loan default rates in the pre ERP-SAP era. The Banking Law also restricts equity investments and loans which the banks can extend to their subsidiaries. In addition banks cannot directly engage in non-banking business. On the other hand, the law does not set limits on banks foreign currency exposures.

3.3 RESEARCH PROCEDURES

The following research objectives underpinned the study:

- To what extent has FSR achieved its objectives?
- What accounts for the results?

- What are the theoretical and policy implications of the results?

In order to achieve the above research objectives answers were sought for the following research questions:

1. Was FSR implemented as intended?
2. Has the banking sector become more competitive under FSR?
    a. In absolute terms?
    b. Compared to benchmark (or standard)?
3. Has the banking sector become more efficient?
    a. Overall?
    b. Certain segments? (e.g. foreign v domestic; state v private)
4. Is profitability in the banking sector driven by efficiency?
5. Does the relationship between competition, efficiency & profitability hold under FSR?

5.2 RESEARCH QUESTIONS AND HYPOTHESES

Hypotheses were then developed for each research question as follows:

- RQ1: Was FSR implementation properly sequenced?
    - H1.1: FSR timetable was properly sequenced
- RQ2: Does FSR lead to a more competitive banking sector? (In absolute terms? Compared to benchmark or standard?)
    - H2.1: FSR leads to more competitive banking system (in absolute terms)
    - H2.2: Competition in the banking sector is driven more by bank behaviour than by the number of firms.

- H2.3: Competition in the banking sector approaches required standard as FSR becomes more embedded

- RQ3: Did the banking sector become more efficient under FSR?
  - H3.1: The banking sector was more efficient in the latter years than at the beginning of FSR
  - H3.2: Bigger Banks are more efficient than smaller banks
  - H3.3: Foreign banks are efficient than domestic banks
  - H3.4: Privately-owned banks are more efficient than state-owned banks
- RQ4: Is efficiency correlated to the profitability of the banking sector under FSR?
  - H4.1: Efficiency is not correlated to profitability at the start of FSR
  - H4.2: Efficiency is correlated to profitability at the latter stages of FSR
- RQ5: Does the relationship between competition, efficiency & profitability hold under FSR?
  - H5.1: Greater competition leads to greater efficiency
  - H5.2: Profitability is determined by efficiency & level of competition

The following tests were then constructed to test each hypothesis.

Hypothesis 1.1:

The literature argues that policy makers must ensure that macro stability has been achieved before implementing FSR. The attainment of such stability was envisaged under SAP. Thus one test for H1.1 is to check whether the implementation of FSR started significantly after starting the implementation of ERP/SAP. A second test is to look at the macro figures prior to and including the early years of FSR.

Hypotheses 2.1 to 2.3

The main competition index used is the Hirschman Herfindahl Index (HHI). Section X above gives details about HHI and its decomposition. For the competition benchmark, I used Mosteller's law. This is also discussed in chapter 3, Section 3.6 above.

- ☐ For H2.1: Construct HHI
- ☐ For H2.2: Decompose HHI into the number and market share variance components and correlate both with HHI
- ☐ For H2.3: Construct random (expected) HHI using Mosteller's law and compare with actual (empirical) HHI

Hypotheses 3.1 to 3.4

To calculate efficiency I used Data Envelopment Analysis (DEA), a non-parametric relative efficiency measure (see section X above for explanation of DEA). Within that context the following tests were conducted:

- ☐ Specify input-output relationship under DEA

  The inputs use were fixed assets, staff costs and non-staff operating costs. The outputs were deposit amounts, loan amounts and commissions and fees earnings. The figures were adjusted for inflation. Thus real rather than nominal figures were used.
- ☐ Compute efficiency scores under DEA using panel data
- ☐ Find average efficiency score for each year

For Hypothesis 3.1

- ☐ Compare the efficiency scores on a time series basis using graphs

For hypothesis 3.2

- ☐ Split the data by size (into big, medium and small)
- ☐ Compute average efficiency for each size group
- ☐ Compare the efficiency scores over time using graphs

For hypotheses 3.3 to 3.4

- ☐ Split the data by ownership (into foreign, domestic-private and domestic state-owned)
- ☐ Compute average efficiency for each size group
- ☐ Compare the efficiency scores over time using graphs

Hypothesis 4.1 to 4.2

- ☐ Construct profitability index based on return on assets (ROA)
- ☐ Split data into start of FINSAP & latter stages of FINSAP
- ☐ Run correlation of efficiency & profitability for each data set (without lagging efficiency relative to profitability)
- ☐ Run same correlation as above but with lag.

Hypothesis 5.1 and 5.2

- ☐ Run correlation between competition & efficiency
- ☐ Run regression with profitability (ROA) as dependent variable and market structure (competition), efficiency and others (such as market growth) as independent variables. The choice of independent variables reflected firm-

specific and industry-related factors. The actual regression model is presented in section X below.

- Watch for statistical significance & the signs of the coefficients

5.3 DATA ISSUES

The data used for this study comprised mainly of the financial statements (income statement and balance sheets) of banks for 1998 to 2004. In order to transform the data into appropriate units (such real instead of nominal figures) I picked monetary and macro-economic data.

The data were picked from different sources. The primary source was the supervision department of the Bank of Ghana (the Central Bank). All banks submit both prudential information and financial statements to them to fulfil legal requirements. This data was supplemented with data from the Ghana Association of Bankers. And to complete the process of triangulation data were picked from individual banks. These were mainly to clarify and decompose aggregate figures.

The data collection methods used for the study were as follows:

- Archival research
- Document review
- Focus group discussions with banking industry & 3 major banks

5.3.1 OTHER ISSUES

Since this is a study that relied primarily on quantitative data and computations, less emphasis was placed on qualitative issues. Nevertheless, the qualitative issues that came to my attention were used to provide/enhance the meaning of the quantitative data and to provide context for the findings

In many centres, deals are now captured in the front office by means of direct dealer input (DDI) and from that point forward the whole processing procedure is performed electronically. Where such systems are in use, paper dealing tickets are not produced, and several of the procedures described in this section are not required. This section of the manual must therefore be applied to suit the circumstances which pertain in each individual centre**.**

The back office / treasury operations department is responsible for:-

(i) the accurate recording of positions

(ii) the verification of deals

(iii) the timely and accurate settlement of deals

(iv) recording the utilisation of limits (unless covered by middle office)

(v) the supply of management information relating to trading activities (ditto)

(vi) the correct implementation of operational and procedural controls.

(vii) the confirmation of all transactions completed by dealing room staff.

Close co-operation with the dealing room is a fundamental duty of the back office / treasury operations dept., but under no circumstances may any back office / operations staff trade nor may any dealing room staff become involved in any of the back office / operations routines.

Deals must be verified by comparing the details on dealing tickets with the centre's records by midday (latest) following dealing date. The verification process applies to all deals whether Money Market, Foreign Exchange or other treasury products and should be undertaken by two back office staff, one of whom must be a signatory.

DM3 (DealManager for Windows) Sites Only - Checking of deals to computer journals may take the form of a simple number count of transactions processed. Any amendments or cancellations must be properly authorised at signatory level and evidenced by signature.

User manuals for computer systems must be read in conjunction with the Market Operations Manual; should there be conflicting instructions, Group Market Risk must be consulted for clarification.

In centres where a manual exchanges daybook is still maintained, completion of the exchanges daybook and the balancing of the open positions should not be undertaken by the same person.

Some of the duties and routines described in this section may be performed automatically by the computer system. The same standard of control should apply whether procedures are manual or computerised.

Handover Certificates - When a person takes over the duties of Treasury Operations Manager, a Handover Certificate should be signed to the effect that the incoming official has checked and verified the centre's records and procedures, as appropriate.

Every foreign exchange deal and branch booking must be recorded in the exchanges daybook (manual centres). Branch bookings may be bulk entered. This is the prime trading record, which can take the form of a manual or computerised report. A computerised daybook is acceptable provided the system is equipped to show real time currency open positions. In the DM3 sites, this will be a combination of the currency open position report and the deals list report. If there is no computerised daybook then a manual one must be kept by the back office and agreed with the figures shown in the dealers' roughs at regular intervals during the day.

The manual Exchanges Daybook must record:

- the previous closing balance (in both foreign and local currency)

- the value date of the individual contract

- the contract number

- the counterparty

- the exchange rate

- the amounts bought and sold (in both foreign and local currency)

- the new balance (in both foreign and local currency)

Foreign exchange transaction processing systems (e.g. DM3) that have the capability should incorporate a standard rate tolerance check in order to identify any deals input by the front office that are outside current market rates. The tolerance to be used for foreign exchange is a maximum of plus/minus 2% from the system's revaluation rates. Violations of the rate, which on systems such as DM3 are identified on screen immediately a deal is struck, should be investigated to verify the accuracy of the rate.

In manual centres, a separate Exchanges Daybook page is required for each foreign currency. Cross currency deals must be entered twice, once as a purchase in the Exchanges DayBook of one foreign currency and secondly as a sale in the Exchanges Daybook of the other foreign currency.

Balances in the Exchanges Daybooks must be agreed with the Treasurer from time to time during the day especially when the Treasurer is expected to be absent for some time. As a minimum this agreement must be undertaken before the mid-day break and at cut off time. The Treasurer (or appointed deputy) must initial the balances in the Exchanges Daybooks to signify his agreement with them.

For computerised centres, a real-time statement of all currency positions must be produced for agreement with the Treasurer after a check has been made to ensure that all input at both dealing room and back office / treasury operations levels is complete. The Treasurer (or appointed deputy) should initial this report to signify his agreement with them. The report should then be retained for future audit.

Computerised centres may use the automated daybook or the deal lists produced by the system, but those centres which are still manual must record every deal in the deposits daybook. A separate daybook should be kept for each currency only when the volume of business justifies this.

The deposits daybook must show:

- Counterparty
- Interest rate
- Principal amount
- Interest amount
- Start date
- Maturity date

Deposit Raisings and Placings

General

Procedures for Raisings and Placings covering Day Books, Dealing tickets, deal confirmations manifolds, and maturity procedures are essentially the same as those for foreign exchange transactions and are not repeated here.

Interest Accruals

Interest must be accrued at least monthly.

All interest payable to and receivable from another branch or subsidiary must be recorded on separate work sheets for:

- each currency
- interest payable or receivable
- each individual branch/subsidiary.

This requirement is to facilitate agreement of intra-group interest.

Separate work sheets should be maintained in a similar manner to show total interest payable to and receivable from banks and to show total interest payable to and receivable from customers.

Dealing Tickets

In those centres where direct deal input is in operation the procedures described in this section do not apply.

Dealing tickets can be actual paper tickets or they can be entered directly into an appropriate deal capture computer system that has been programmed for this purpose. Such computer systems must be approved by the business and must be approved in accordance with local and Group IT guidelines. For all new treasury systems Group Market Risk should additionally be consulted.
Upon receipt from the dealing room, a back office / treasury operations clerk:

- ensures that the ticket is time stamped and has been initialled by the dealer. Any amendment or addition to a dealing ticket, other than the completion of the settlement instructions (e.g. rate, amount, value dates), must be authorised (i.e. initialled) by the dealer and by a signatory.

NB: In centres where deal capture systems are in use and dealing tickets are computer generated from dealers' input, provided the dealing ticket has the dealer's name/initials printed upon it, there is no need for it to be initialled separately.

- checks the value date (for foreign exchange deals) or the start and maturity dates (money market deals) against the calendar to ensure that this is a business day in both settlement centres. In certain centres this will be a computerised facility and the back office / treasury operations system supervisor must ensure that the system currency calendar is kept up to date.

- checks conversion calculations (unless automatically converted by the system). (Foreign exchange deals only)

- calculates interest to maturity and inserts on ticket, if not done automatically by the system. (Money market deals only)

- checks the dealers' Reuters printout (where applicable) against the dealing ticket for accuracy of counterparty, rates, value/maturity dates, settlement instructions and contract type

- checks and agrees settlement instructions with the counterparty where it is still the practice to do so (and where standard settlement instructions (SSIs) do not apply), and enters these settlement instructions on the ticket

- calculates and records any brokerage payable on the brokerage record

- initials "checker" box on dealing ticket

- where deal verification is required by the back office, any counterparty limit violations, missing SSIs or general warning messages must be referred to the back office / treasury operations supervisor for investigation.

- enters the transaction in the exchanges/deposits day book, as appropriate. (For centres with an on-line computer: codes the dealing ticket and inputs it to the system, reporting to the section head any excesses over bank/customer limits resulting from input)

- initials "daybook" box on the dealing ticket

- enters the amount on the cash flow diary under the value date or start & maturity dates (as appropriate), unless the computer system provides a suitable alternative and initials the "diary" box on the ticket

- enters transaction on counterparty limits record (for centres without a fully computerised system)

- attaches the correct blank manifold formset to the ticket for further processing (only those centres without automatic confirmation production)

- collects the confirmation from the computer printer (or typist where centres do not have automatic computer production)

- records the manifold contract number against the deal on the manual Foreign Exchange/ Deposit Daybook, as appropriate, (where these are still used) and on the dealing ticket

- checks the typed/printed confirmation against the ticket and passes it, together with the dealing ticket and Reuters/telex print out, for checking and signing, where appropriate (see section: 5.5 Confirmations). <u>All details must be thoroughly and independently checked by two officials.</u>

Confirmations

General

Confirmations are issued by both parties in respect of foreign exchange, money market transactions and other products, but written confirmations of some same day local currency money market deals are not always received from certain counterparties or where it is market practice not to do so, for example, settlements under a Central Bank RTGS umbrella . Otherwise, it is the Bank's policy to issue confirmations for all transactions dealt by its dealing room staff. Confirmations should be delivered to counterparties by the fastest available means, e.g. SWIFT, fax, etc.

The issue of confirmations enables both parties to agree all details of every transaction (i.e. dealing date, currency amount, rate, currency/local equivalent, value date(s) and payment instructions) in order to avoid risk of loss through error or disagreement.

Other types of confirmation or enquiry may be received from counterparties and these should be handled with the same level of control as deal confirmations. For details regarding Bien Trouvé letters see page **Error! Bookmark not defined.** of this manual. Letters enquiring about the Bank's status under the Financial Services Act or similar should be forwarded to Group Market Risk, London, who will arrange for a reply to be sent on behalf of the Group.

Control of Confirmation Stationery

Not controlled stationery as such, but the following "best practices" should be applied:-

Manual Centres

Use manually typed multi-part manifolds incorporating confirmation, office copy, Reuters hard copy and entries:

- hold bulk stocks in locked accommodation and record in control register noting release into working stock

- hold working stock under control of designated official in the backoffice / treasury operations department

- spoiled forms should be destroyed by shredding, wherever possible

Computerised Centres

Confirmations must be produced automatically by the system after dealer and/or back office input:

Paper confirmations:

- will consist of outward confirmation and office copy)

- hold bulk stocks in locked accommodation and record in a central register noting release into working stock

- working stock to be held under the control of a designated official in the back-up area

- spoiled forms should be destroyed by shredding, wherever possible

Electronic confirmations:

- printed copies should be filed with copies of the dealing tickets.

Group Market Risk should be consulted on the format of confirmations for new instruments and products should this not be available from DM3 (or other computer system used).

Outward Confirmations - General

The checking of outward confirmations against dealing tickets and Reuters conversations etc. is of great importance to ensure that losses due to mistakes are avoided.

Outward mail confirmations that are SYSTEM GENERATED need not be signed, unless local market and/or product practice dictate otherwise. Such confirmations must bear the phrase "Computer generated confirmation - no authorised signature required". This phrase

may be applied automatically by the computer or if necessary, by means of a rubber stamp.

Outward mail confirmations which are prepared by other means must be checked by one person and signed by another. They need bear only one signature.

Where SWIFT confirmations are used, the standards applied to the release of the confirmations would be at least as high as those for mail confirmations, although some systems generate SWIFT confirmations on dealer input. The purpose of this is to ensure that the maximum time is available for banks' automatic confirmation checking systems to complete their routines before settlement takes place. See also Straight Through Processing in section **Error! Reference source not found.**.

Under no circumstances may dealing room staff be involved in the checking or despatch of confirmations and they must never sign outward confirmations**.**

Outward Confirmations – Handling Procedures

The confirmation manifold must be split and the counterparty's copy despatched no later than the morning after the dealing date.

The office copy of our confirmation together with the original dealing ticket, the counterparty's and the broker's confirmations (where applicable) must be filed in maturity date order, and within maturity dates by transaction number order.

Where a centre is required by local regulations to maintain a set of records in deal date order, the 2nd copy of the dealing ticket should be used for this purpose. The 3rd copy of the dealing ticket, found in some centres, is no longer required and should be destroyed.

Manual Centres Only

The remaining pages of the manifold, consisting of entries (except maturing risk entries) and SWIFT/telex requisition forms, must be handed back to the daybook/back office/ treasury operations clerk, together with the dealing ticket. For FX Forward contracts this forms the Manifold Diary**.** FX Spot deals are to be retained in the 'Overnight File'**.** For Deposit deals, this forms the Placings & Raisings Manifold Dairy. Where the deal is a Forward/Forward**,** the start leg should be filed within the main raisings and placings manifold diary. Superfluous manifold pages must be destroyed.

The entries (except maturing risk entries) and the SWIFT pages of the manifold must be filed with the dealing ticket in maturity date order.

Maturing risk entries must be filed in maturity date order by counterparty name alphabetically to form the Counterparties Register.

The manifold diary must be locked in fire-resistant accommodation when not in use.

For foreign exchange transactions, the outstanding manifolds must be agreed with the spot and forward risk ledgers at least once a month, preferably just before revaluation.

Amendments

All records must be amended as appropriate; if a fresh confirmation is produced it must state that it supersedes the previous confirmation. Where computer systems require it, an amendment voucher must be prepared and properly authorised.

Inward Confirmations

Inward confirmations must be checked by the back office / treasury operations dept., and NEVER by dealing room staff. Under no circumstances may mail containing inward confirmations be delivered to the dealing room.

Any broker or counterparty sending mail addressed directly to a dealer must be sent a confidential letter setting out the Group's policy and asking for their co-operation in respecting it.

Inward confirmations should be checked on the day of receipt as prompt checking significantly reduces the possibility of loss through error. Deals value dated today should, in particular, be checked promptly.

Inward Confirmations for Spot Foreign Exchange Transactions.

Some financial institutions might decline to issue confirmations for FX spot transactions. Market Risk, Group Risk, who will write to the bank concerned on behalf of the Group, and under advice to the relative centre.

Manual Centres Only

Upon receipt of the confirmation a clerk (under the direct supervision of a signatory):

- checks all details on the inward confirmations against the relevant dealing ticket

- if in order, files the confirmations together with the office copies of outward confirmation and the dealing ticket in maturity date order. Any broker confirmation received subsequently should be added to this file.

- if not in order, confirmations together with office copies, must be handed to the signatory for investigation.

Confirmation Auto-Matching Systems

Systems such as SMART and SWIFT Accord automate the matching procedure in many centres. Where centres introduce such systems these must be approved by the business and must be approved in accordance with local and Group IT guidelines. For all new treasury systems Group Market Risk should additionally be consulted.

Discrepancies between Confirmations

If the check of the inward confirmation against the dealing ticket reveals discrepancies, or if there is any reason to doubt the veracity of the confirmation, the matter should be referred to the signatory who will,

- check the signature (signed confirmations only)

- advise Management of the discrepancy

- if the discrepancy involves amount, value date, rate or payment correspondent, check with available records of the actual deal (/Reuters dealing/voice logging etc.) then refer to dealer without delay. Where the responsibility for the error rests with your dealing centre then the dealing ticket is to be suitably amended with dealer's initials and date, and the deal must be corrected in the computer or manual records.

- if the deal has not yet matured, issue new confirmation marked 'Amended Confirmation - supersedes contract Ref. No.....'

- make a suitable note on the original office copy, daybook and cashflow diary (where maintained) of the reference number of new contract

- if the deal has already matured, immediate action must be taken to avoid loss

- details of the error must be noted on office copy where counterparty is at fault, the back office must make urgent contact with them to ensure deal corrected and request issue of a new confirmation.

- where the broker is at fault, dealer to arrange corrective action direct with the broker and advise the back office accordingly.

- advise Management regularly of the position until resolved.

Non-Receipt of Counterparty Confirmations

These procedures are to be applied by those centres that do not use an automatic confirmation matching system.

If no confirmation has been received from a bank or non-bank financial institution counterparty within the following deadlines:-

SWIFT connected banks	-	4 working days
Non-SWIFT banks	-	10 working days**
Corporate Customers	-	14 working days**
Brokers	-	5 working days**

a chaser should be sent.

If a confirmation/acknowledgement has STILL NOT been received after expiry of the following deadlines, which are in addition to those mentioned above:-

SWIFT connected banks	-	4 working days
Non-SWIFT banks	-	10 working days**
Corporate Customers	-	14 working days**
Brokers	-	5 working days**

- Purpose of Capital

(a) Its principal function is to serve as reserve for unexpected losses.

(b) It provides protection for depositors and creditors.

(c) It promotes public confidence in a bank.

(d) It restricts the excessive growth of assets

- Components of Capital

(a) Primary emphasis is placed on those elements of capital, which provide a permanent and a readily available support against unexpected losses.

(b) Capital may be classified into two distinct categories.

i. Tier 1 (Core) Capital

ii. Tier 2 (Secondary or Supplementary) Capital.

- **Tier 1 (Core) Capital**

Core Capital = Equity + Disclosed Reserves

- **Equity**

(a) Permanent and paid-up capital of ordinary (common) shares (stocks).

(b) Non-cumulative perpetual preference shares. (i.e. Permits the suspension of dividends without the holder accumulating a claim on the resources of the bank in lieu of such payments and also non-redeemable).

- **Disclosed Reserves**

Accumulated (post-tax) retained earnings that are identifiable within the bank's published accounts (and that are not encumbered by any liability, i.e. free from all known or anticipated losses).

- **Tier 2 (supplementary) Capital**

(a) The tier 2 capital consists of elements of capital that have the capacity to absorb unexpected losses but are less permanent in nature.

(b) They include the following:

i. Undisclosed Reserves

ii. Cumulative non-redeemable Preference Shares

- Undisclosed reserves should be post-tax earnings, not encumbered (by any known liability) and not routinely used to absorb normal loan and operational losses.

- Cumulative perpetual preference shares should be fully paid-in and should not contain any covenants that permit redemption by the holder.

iii. Revaluation Reserves

These arise from the formal revaluation of assets typically property, plant & equipment.

iv. Latent Revaluation Reserves

(a) This is relevant to banks that have substantial amounts of investments in equities on their balance sheets held at historical cost.

(b) It is limited to 55% of the value due to its volatility and tax obligations.

v. General Provisions and Loss Reserves

(a) If they are created against a possibility of future losses, then they are not ascribed to any known / anticipated losses.

(b) They are therefore available to meet unexpected losses and are often included in the secondary capital.

vi. Debt / Equity (Hybrid Capital) Instruments

(E.G. Redeemable preference shares, Cumulative preference shares, Debentures and Term subordinated debt).

In order to qualify for secondary reserve, the instrument should be:

(a) Fully paid-in.

(b) Unsecured.

(c) Subordinated (to the claims of other creditors).

(d) Should not be redeemable at the initiative of the holder.

(e) Their initial maturity should not be less than 5 years and the remaining maturity, not less than 1 year.

Definition of Capital

- From the bank's point of view capital is the funds available to it to do business – Economic Capital.
  (a) Equity
  (b) Reserves
  (c) Debt Capital Instruments

- From the supervisor's point of view capital is the funds available to the bank to absorb unexpected losses – Regulatory Capital.

Same as above but with restrictions as discussed earlier.

Level of Capital

Risk Weightings

No	Item	Previous	Basle Committee	Current	Comment
	Short-term Investments (Bills)				
	Cash & Balances				
12	Government	0	0	0	
1	Cash on Hand (Cedi)	0	0	0	
13	Bank of Ghana	0	0	0	
14	Public Enterprises & Institutions	100	100	100	
2	Cash on Hand (Forex)	100	0	0	
15	Gov't & Bank of Ghana guaranteed	0	0	0	
3	Claims on Bank of Ghana (Cedi)	0	0	0	
4	Claims on Bank of Ghana	100	0	0	
	Loans & Advances (Forex)				
16	Government guaranteed	100	20	20	
5	Claims on Other Banks (Cedi)	100	20	20	
17	Guaranteed by multilateral banks	100	20	20	e.g. AfDB, IBRD, EximBank, etc.
6	Claims on Other Banks (Forex)	100	20	20	
18	Public Enterprises	100	100	100	e.g TOR, GNPA,
7	Claims on Discount Houses (Cedi)	0	20	20	Cocobod, GOIL
19	Public Institutions	100	100	100	e.g. SSNIT
8	Claims on Discount Houses (Forex)	0	20	20	
20	Private Enterprises	100	100	100	
9	Cash items in process of collection	100	20	20	Cheques drawn on other banks
21	Individuals	100	100	100	
10	Claims on other Fin Inst. (Private sector)	100	100	100	
22	Home Mortgage	50	50	50	Residential mortgage
11	Claims on other Fin Inst. (Public sector)	100	50	50	occupied by the borrower or rented.

23	**Export Sector**	**50**	**100**	**50**	**To encourage export financing**
	Long-Term Investments & Securities				
24	**Government**	**0**	**0**	**0**	
25	**Bank of Ghana**	**0**	**0**	**0**	
26	**Commercial Banks**	**100**	**100**	**100**	
27	**Other Financial Institutions**	**100**	**100**	**100**	
28	**Public Enterprises & Institutions**	**100**	**100**	**100**	
29	**Private Enterprises**	**100**	**100**	**100**	
30	**Gov't & Bank of Ghana guaranteed**	**0**	**0**	**0**	
31	**Other Assets**	**100**	**100**	**100**	
32	**Fixed Assets**	**-**	**100**	**100**	**Previously, net fixed assets was deducted from both capital and**

					asset base.
33	**Contingent Liabilities**	**100**	**100**	**100**	**Converted to on-balance sheet by multiplication by a CCF.**
34	**Bonds (Performance, Bid, Warranties, etc.) (Class 1 risk weighted assets)**	**25**	**50**	**50**	**For residential mortgage occupied by the borrower or rented.**
35	**Short-term Self Liquidating L/Cs (Class 2 risk weighted assets)**	**10**	**20**	**20**	**For exports financing only.**

- By law capital should be equal to or more than 10% of total Risk Weighted Assets (RWAs).

Risk Weighted Assets

- Unexpected Losses may arise from 3 broad areas of the bank's activities namely Credits, Operational and Market (i.e. Trading).

- Credit risk (i.e. the risk of counterparty failure)

  This may arise from claims on the following:

  (a) Sovereigns/Central banks

  (b) Public Sector Entities (PSEs)

  (c) Multilateral Development Banks (MDBs)

  (d) Banks

  (e) Securities Firms

  (f) Corporates

  (g) Retail Portfolios

- Operational Risk

  It is the loss resulting from inadequate or failed internal processes, people and systems or from external events.

  Note

  This includes legal risk but excludes strategic and reputational risks.

- Market Risk

  It is the loss that may arise from the trading activities of the bank.

This includes positions held in financial instruments and commodities either with trading intent or for hedging. (i.e. Forex, Investments & Interest Rates).

Computation

The total risk weighted assets is determined as follows:

(a) Multiply the capital requirements for operational and market risks by the reciprocal of the minimum capital ratio of 10%. (i.e. capital requirement x 10).

(b) Add resulting figures to the sum of risk weighted assets for credit risk.

Let capital requirement for operational risk be $K_{(op)}$

Let capital requirement for market risk be $K_{(mk)}$

Let risk weighted assets for credit risk be $RWA_{(cr)}$

Let risk weighted assets for operational risk be $RWA_{(op)}$

Let risk weighted assets for market risk be $RWA_{(mk)}$

Then:

$RWA_{(op)} = K_{(op)} \times 10$ (i.e. 10% of 3 yrs avg. AGI x 10)

(Gross Income is defined as Net Interest Income + Non-Interest Income.

$RWA_{(mk)} = K_{(mk)} \times 10$ (i.e. 5% of AFOP x 10)

(The AFOP is the bigger of the Gross Aggregate Position or the Overall Open Position)

EG:	USD	Short	360 (-)
	GBP	Long	300 (+)
	EUR	Long	200 (+)
	JPY	Long	100 (+)
	CHF	Short	40 (-)

Gross Aggregate Position = 360+300+200+100+40 = 1000

Overall Open Position = 300+200+100 = 600

Thus total risk weighted assets, $RWA_{(total)}$ will be:

$$RWA_{(total)} = RWA_{(cr)} + \{K_{(op)} \times 10\} + \{K_{(mk)} \times 10\}$$

$$= RWA_{(cr)} + \{100\% \text{ AGI}\} + \{50\% \text{ AFOP}\}$$

Capital Adequacy Ratio (CAR)

Minimum Capital Required = $RWA_{(total)}$ x 10%

$$CAR = \frac{\text{Adjusted (Tier 1 capital + Tier 2 capital)}}{RWA_{(total)}} \times 100$$

Capital Adequacy Computation - Format

No	Item	Amount (¢'b)
1	Paid-up Capital	
2	Disclosed Reserves	
3	Permanent Non-Cumulative Preference Shares	
4	Tier 1 Capital (1+2+3)	-
	Less:	
5	Goodwill/Intangibles	

6	Losses not Provided For	
7	Investments in Unconsolidated Subsidiaries	
8	Invest in the Capital of Other Banks & Fin. Institutions	
9	Connected Lending of Long Term Nature	
10	**Net Tier 1 Capital (4-5-6-7-8-9)**	-
11	Undisclosed Reserves	
12	Revaluation Reserves	
13	Subordinated Term Debt (Limited to 50% of 4)	
14	Hybrid Capital	
15	**Tier 2 Capital (11+12+13+14**)(Limited to 100% of 4)	-
16	ADJUSTED CAPITAL BASE (10+15)	-
17	TOTAL ASSETS (less Contra Items)	
	Less:	
18	Cash on Hand (Cedis)	
19	Cash on Hand (Forex)	
20	Claims on Bank of Ghana:	

	i. Cedi Clearing Account Balance	
	ii. Forex Account Balance	
	iii. Funds under SWAPS	-
	iv. Bills and Bonds	-
	v. Repos	
21	Claims on Government:	
	i) Treasury Securities (Bills and Bonds)	
	ii) Stocks	
22	80% of Cheques drawn on other banks	
23	Goodwill / Intangibles	-
24	Investments in Unconsolidated Subsidiaries	-
25	Invest in the Capital of Other Banks & Fin. Institutions	-
26	Connected Lending of Long Term Nature	-
27	80% of claims on Discount Houses (Cedis / Forex)	-
28	80% of claims on Other Banks (Cedis/Forex)	
29	50% claims on other Fin Insts. (Public Sector) (Cedi/Forex)	
30	80% of loans guaranteed by government	
31	80% of loans guaranteed by multilateral banks	
32	50% of Residential Mortgage Loans	
33	50% of Export Financing Loans	
34	ADJUSTED TOTAL ASSETS (17-18-19,-……..,-33)	-
	Add:	

	Contingent Liabs (Net of cash margins & provision)	
35	Commercial Letters of Credit Outstanding	
36	Guarantees / Bonds / Indemnities	
37	Acceptances	
38	Endorsements	
39	Revolving Underwriting Facilities	
40	Note Issuance Facilities	
41	Standby Letters of Credit to Other Banks	
	Less:	-
42	50% of class 1 risk weighted off-balance sheet items	
43	80% of class 2 risk weighted off-balance sheet items	
44	Net Contingent Liabs. (35+36+....+41-42-43)	-
	Add:	
45	50% of Aggregate Forex Open Position	-
46	100% of 3yrs Average Annual Gross Income	-
47	**ADJUSTED ASSET BASE (34+44+45+46)**	-
48	Adjusted Capital Base as percentage of Adjusted Asset Base: (16/47 X 100)	
49	CAPITAL SURPLUS/DEFICIT {16 – (10% of 47)}	-

No	Metropolitan & Allied Bank Ltd. 30/09/2004 Item	Previous	Current
		¢'b	¢'b
1	Paid-up Capital	29.68	29.68
2	Disclosed Reserves	(17.85)	(17.85)
3	Permanent Preference Shares	-	-
4	Tier 1 Capital (1+2+3)	11.83	11.83
	Less:		
5	Goodwill/Intangibles	-	-
6	Losses not Provided For	-	-
7	Investments in Unconsolidated Subsidiaries	-	-
8	Net Fixed Assets (Including Revaluation Reserves)	4.99	-
9	Invests in the capital of Other Banks & Fin Insts.	-	-
10	Connected Lending of Long Term Nature	-	-
11	**Net Tier 1 Capital (4-5-6-7-8-9-10)**	**6.84**	**11.83**
12	Undisclosed Reserves	-	-
13	Revaluation Reserves	-	-
14	Subordinated Term Debt (Limited to 50% of 4)	-	-
15	Hybrid Capital	-	-
16	**Tier 2 Capital (12+13+14+15+16)(Limited to 100% of 4)**	**-**	**-**
17	ADJUSTED CAPITAL BASE (11+16)	**6.84**	**11.83**

31	50% of claims on Other Fin Insts. (Public Sector) (Cedi/Forex)		-
32	100% of claims on Government	157.06	157.06
	Less:		
33	Cash on Hand (Cedis)	2.93	2.93 -
34	Cash on Hand (Forex)		3.41
35	Claims on Bank of Ghana:		-
	i. Cedi Clearing Account Balance	4.29	4.29
36	ii. Forex Account Balance	**82.46**	**55.44** 3.62
	Add: Contingent SWAPS / Tip Fund	5.06	5.06
37	iv. Bills and Bonds	-	-
38	v. Repos	0.19	0.19
39	Claims on Government:	-	-
40	i. Treasury Securities (Bills and Bonds)	43.65	43.65
41	ii. Stocks	13.68	13.68
42	80% of Cheques drawn on other banks	-	1.40
43	Standby Letters of Credit to Other Banks	-	-
44	Goodwill / Intangibles	-	-
45	**Less:**		
46	Net Fixed Assets (Including Revaluation Reserves)	4.99	-
47	Investments in the Capital of Other Banks & Fin Institutions	-	-
28	Connected Lending of Long Term Nature	-	-
29	Net Contingent Liabs. (37+38+...+43+44+45)	0.19	0.19 -
30	**Add:**		

31 50% of claims on Other Fin Insts. (Public Sector) (Cedi/Forex)
32 100% of claims on Government 157.06 157.06
Less:
33 Cash on Hand (Cedis) 2.93 2.93 -
34 Cash on Hand (Forex) 3.41
35 Claims on Bank of Ghana: -
i. Cedi Clearing Account Balance 4.29 4.29
36 ii. Forex Account Balance 82.46 55.44 3.62
Add: Contingent SWAPS / Tip Fund 5.06 5.06
37 iv. Bills and Bonds - -
38 v. Repos 0.19 0.19
39 Claims on Government: - -
40 i. Treasury Securities (Bills and Bonds) 43.65 43.65
41 ii. Stocks 13.68 13.68
42 80% of Cheques drawn on other banks - 1.40
43 Standby Letters of Credit to Other Banks - -
44 Goodwill / Intangibles - -
45 Less:
46 Net Fixed Assets (Including Revaluation Reserves) 4.99 -
47 Investments in the Capital of Other Banks & Fin Institutions - -
28 Connected Lending of Long Term Nature - -
29 Net Contingent Liabs. (37+38+...+43+44+45) 0.19 0.19 -
30 Add:

47	50% of AFOP		2.25
48	100% of 3yrs Average Annual Gross Income		32.55
49	ADJUSTED ASSET BASE (36+46+47+48)	82.65	90.43
50	Adjusted Capital Base as percentage of Adjusted Asset Base: (17/49 X 100)	**8.3%**	**13.1%**
51	Capital Surplus/Deficit {17 – (10% of 49)}	1.88	2.79

3.4 Ethical Considerations

Since 1988 interest rate ceiling on deposit and loans have been abolished. Banks new competitively determine their deposit and loans rate based on market forces. The bank uses the Bank of Ghana rediscount rate as their base rate. Interest rate liberalization is expected to encourage competition in the mobilization of deposits and lending of funds. The direct tools of monetary policy (direct credit control, administratively determined interest rate), have been replaced with market-based system of indirect monetary control [Open market Operations (OMO), discount rate]. Sectional credit guidelines were also removed and a clause that all banks were to allocate, at least 20% of their loan portfolio to agriculture was abolished in 1990).

With the implementation of ERP/SAP, Ghana's macroeconomics environment was established, the fiscal deficit was reduced to manageable level and FINSAP was properly

sequenced in Ghana. The question to ask after 18 years of IMF/World Bank financial sector reforms in Ghana, is whether the reforms have achieve their stated objectives/ given the background of financial sector reforms demonstrated above, the time is appropriate to evaluate the objectives of FINSAP and to ascertain whether competition and efficiency has increased in the banking sector. In addition, the period is long enough to empirically investigate whether competition and efficiency are related to profitability in the banking industry in Ghana.

Table 3.1 Real GDP Growth & Per Capita Growth

Year	Real GDP Growth (%0	Real Per Capita Growth (%)
1961	3.4	0.7
1962	4.0	1.4
1963	4.3	1.7
1964	2.2	-0.5
1965	1.4	-1.3
1966	-5.1	-7.2
1967	2.6	0.6
1968	0.4	-1.7
1969	5.6	3.5
1970	9.2	7.5
1971	5.3	2.2
1972	-3.0	-5.9

1973	2.9	0.2
1974	7.1	4.6
1975	-14.3	-16.5
1976	-3.6	-5.4
1977	1.8	0.3
1978	9.4	8.0
1979	-1.7	-3.4
1980	0.6	-1.7
1981	-3.0	-5.6
1982	-6.7	-9.7
1983	-4.5	-7.8
1984	8.4	4.9
1985	5.0	1.3
1986	5.0	1.5
1987	4.5	1.1
1988	5.4	2.1
1989	4.8	1.7
1990	3.0	0.0
1991	5.1	2.0
1992	3.5	0.6
1993	4.7	2.1
1994	3.6	1.0

1995	4.3	1.7
1996	4.9	2.3

Source; computation from World Bank data

Table 3.3: selected Macro-Economic Indicators (%)

Period	Industry	Manufacturing	Mining & Quarrying	Electricity & Water	Construction
1981-83	-12.5	-15.6	-10.2	-10.4	10.1
1984-89	9.7	10.6	8.3	20.2	5.1
1990-96	4.1	2.6	6.8	8.5	6.6

Source; Statistical Service of Ghana

Table 3.3: Selected Macro-Economic Indicators (%)

Year	Average inflation rate	Gross domestic savings to GDP	Gross domestic investment to GDP	Current account to GDP
1980	50.1	4.9	5.6	0.07
1981	116.5	3.9	4.4	-0.56
1982	22.3	3.7	3.3	-0.12
1983	122.8	3.2	3.6	-0.09
1984	39.6	4.2	6.9	-0.01

1985	10.4	6.6	9.6	-0.04
1986	24.6	5.8	9.4	-0.01
1987	39.8	3.9	10.4	-0.01
1988	31.4	5.4	11.3	-0.01
1989	25.2	5.6	13.2	-0.01
1990	37.2	6.3	15.3	-0.01
1991	18.0	8.3	16.8	-0.01
1992	10.1	2.2	13.7	-0.01
1993	25.0	-1.1	15.9	-0.02
1994	24.9	4.8	16.7	-0.01
1995	59.5	10.3	19.0	-0.01
1996	46.6	7.7	13.8	-0.01

Table 3:4: Annual Inflation Rate (Base year 1977)

Year	Inflation		Year	Inflation
1970	3.9		1984	39.6
1971	8.7		1985	10.4
1972	10.1		1986	24.6
1973	17.7		1987	39.8
1974	18.1		1988	31.4
1975	29.8		1989	25.2

1976	56.1		1990	37.2
1977	116.5		1991	18.0
1978	73.3		1992	10.1
1979	54.2		1993	25.0
1980	50.1		1994	24.9
1981	116.5		1995	59.5
1982	22.3		1996	46.6
1983	122.8			

3.5 Conclusion

COMPARISON BETWEEN THE EXISTING BANKING

LAW (PNDC L225) AND THE NEW BANKING BILL –

HIGHLIGHTS OF MAJOR PROVISIONS

	ISSUE	EXISTING LAW	NEW BILL		JUSTIFICATION
1.	**Supervisory Functions of Bank of Ghana**.	Section 18 denotes general function which is not focussed	Section 2 specifies functions and responsibilities.		The role of Bank of Ghana in ensuring the safety, soundness and stability of the banking system requires legitimacy.

2.	**Licensing of Banks**	Sections 1 – 4 did not adequately elaborate on openness and transparency of licensing procedures and gave a room for the exercise of wide discretion by Bank of Ghana.	Sections 3 – 22 provide detailed provisions for granting and withdrawal/revocation of licences and specify what banking business entails. Explicit provisions made for representative offices of foreign banks.	1.	Entry and exit rules should be transparent
				2.	Define the domain of banking as required by BASLE Core Principles of Supervision
				3.	Entry and exit authority is insulated from political manoeuvres thereby entrenching Bank of Ghana's independence.
				4.	Prescription of penalty for defiants.
				5.	Approval should be granted for opening of representative office of foreign banks.
				6.	Bank of Ghana could be compelled to give reasons for the rejection of an application for a banking licence.
				7.	Deadline should be set for processing of application.
				8.	Power to deal with unlicensed institutions.

3.	**Ground for revoking of licence**	Section 4(3) fails to specify grounds for revocation of licence apart from operational demeanour in Section 22.	Section 13-14 give grounds for revoking licence relating to falsehood, misrepresentation, violations of conditions and inability to commence operations by a new bank.	1.	Issuance of banking licence should be based on accurate and truthful information.
				2.	Time limit should be set for operationalizing licences issued.
				3.	Revocation process should be transparent.
4.	**Inspection of suspected institutions doing banking without licence**.	Not provided	Section 18 empowers Bank of Ghana to inspect the records of persons suspected on reasonable grounds of doing banking without valid licence.		BOG should be empowered to flush out unlicensed entities from conducting banking business.
	ISSUE	**EXISTING LAW**	**NEW BILL**		**JUSTIFICATION**
5.	**Display banking licence**	Not Provided	Section 19 requires the display at the head offices of banks, copies of their banking licence for	1.	The public should be informed of the legitimacy of the banking institution being dealt with.

			the information of the public. This may be amended to include branch and agency offices for wider coverage of the public.	2.	To detect the existence of unauthorized banking institutions and deal with them appropriately.
6.	**Capital Adequacy Ratio**				
i.	Stipulated ratio and prior approval	Section 8 stipulates 6% and that Bank of Ghana may vary the ratio either particularly to a bank or generally to all banks with prior approval of the Minister of Finance	Section 23 specifies a ratio of 10% and a higher ratio prescribed by Bank of Ghana without prior approval from the Minister of Finance.	i. ii.	To conform to international standards which stipulates a minimum ratio of 8%. Ensure Bank of Ghana's independence.
ii.	Additional capital	Not provided	Section 24 – Bank of Ghana may require a	ii.	To provide capital cushion for identified risk

	backing		bank to maintain additional capital banking.		concentration.
iii.	Consolidated computation of the ratio.	Not provided.	Section 25 – Bank of Ghana may require banks with subsidiaries to compute the ratio on consolidated basis.	iii.	To provide capital cushion for subsidiaries whose unfavourable performance may have adverse impact on the bank's performance and financial condition.
				iv.	To enable Bank of Ghana assess the situation and institute prompt remedial measures.
				v.	To protect depositors and forestall any adverse systemic effect in the banking industry.
iv.	Schedule of Computation	Risk schedule to the Law	Section 23 to be provided by Regulation	vi.	To ensure that the schedule is reviewed from time to time to confirm with international standards without recourse to an amendment of the law.

	ISSUE	**EXISTING LAW**	**NEW BILL**	**JUSTIFICATION**

7.	Approval from Bank of Ghana for payment of dividend out of free reserves	Not provided	Section 30(3) requires Bank of Ghana's approval for payment of dividend out of reserves due to inadequacy of profit for the year or unsatisfactory report on the accounts by auditors.	Bank of Ghana to ensure that dividend is paid only after a bank's compliance with basic prudential norms and provision made for contingency losses.
8.	Transfer of shares affecting significant shareholdings and controlling interest to other parties.	Section 15 does not highlight on transfer of significant shareholdings and control of banks.	Section 34 – 37 requires Bank of Ghana's approval for dealings in shares that affect significant shareholdings; control of banks through sale of whole or part of business of banking, amalgamation or merger or reconstruction to other parties.	Bank of Ghana to ensure that ownership and control of banks are in the hands of fit and proper persons to safeguard the interests of depositors and the orderly growth and development of the banking system.

9.	Disclosure of interest by directors	Not provided.	Section 39 requires persons assuming office as a director of a bank to disclose professional interests, investments in firms, companies and institutions and shall not participate in deliberations and decisions affecting such interests.	To forestall any conflict of interest of directors in the affairs of the bank.
10.	Intervention of Bank of Ghana in appointments.	Not provided	Section 40 requires for the appointment of Managing Director and Deputy Managing Director in consultation with Bank of Ghana. Bank of Ghana may direct the removal of a director considered not fit and proper.	To ensure that affairs of banks are managed and controlled by persons of substance, repute, competence, etc.

11.	Prohibition of advances against security of own shares	Section 12(a) limits such prohibition only to the banks own shares.	Section 41 expands the prohibition to cover shares of holding company, subsidiaries of banks and shares of any subsidiaries of its holding company.	To avoid insider dealings and to accept collaterals which values are easily determinable and realisable.
	ISSUE	**EXISTING LAW**	**NEW BILL**	**JUSTIFICATION**

12.	Restrictions on unsecured exposure to directors, significant shareholders, firms or companies with directors' interest etc. without prior approval from Bank of Ghana.	Not provided	Section 43(1) prohibits unsecured exposure to directors, significant shareholders, firms or companies with directors' interest and directors' relatives without the prior approval of the Bank of Ghana.	To ensure repayment by applying the underlying collateral.
		Not provided	Section 43(3) requires only the Board to have the authority to approve or sanction such financial exposures.	To forestall any undue influence on officers by a director to approve such exposure.

		Not provided	Section 43(4) requires that no financial exposure shall be written off or waived fully or partially without the sanction of the Board and the prior approval in writing of the Bank of Ghana.	To instil sanity and ensure legitimacy for write offs.
13.	Requirements for lending to related parties.	Not provided.	Section 45 requires due deligence and circumspection to be exercised in granting credit facilities to related parties and approval should be given by not less than three quarters of the directors.	To safeguard the interest of the bank in ensuring repayment.
14.	Restriction on establishment of subsidiary company.	Not provided.	Section 46 requires Bank of Ghana's prior approval for banks to establish subsidiary company.	To ascertain the extent of a bank's financial commitment and the impact on its finances.
				To ensure that fit and proper persons control and manage the affairs of the company.

15.	Investment in other institutions	Not provided	Section 48 limits a bank's equity investment in a body corporate other than its subsidiaries to 10% of net own funds.	To control the extent of a bank's investment in other entities.
	ISSUE	**EXISTING LAW**	**NEW BILL**	**JUSTIFICATION**
16.	Variation of prudential limits for lending and investments	Not provided	Section 51 empowers Bank of Ghana to vary any of the prudential limits for lending and investments for all the banks or a particular bank for a period deems fit.	To enable Bank of Ghana to effectively regulate banks in crisis.
17.	Investigation or scrutiny of bank's affairs	Not provided	Section 56 empowers Bank of Ghana to conduct investigations into a specific matter relating to a bank's affairs.	To further strengthen Bank of Ghana's supervisory function and ensure speedily remedial action.

18.	Powers of on-site examiners.	Not elaborate enough	Sections 57-62 provide wide powers for performance of on-site examination and enforcement action.	To enhance the supervisory powers of Bank of Ghana to deal effectively with enforcement actions.
19.	Prohibition of floating charge	Not provided	Section 86 prohibits a bank from creating a floating charge on an undertaking or a property of the bank or part of the property of the bank.	Property of the bank should not be generally encumbered in favour of any party since depositors constitute the major creditors.
20.	Information sharing	Not provided.	Section 85 provides for publication of consolidated information by Bank of Ghana in the public interest and sharing of supervisory information on confidential basis with other official agencies, both domestic and foreign, responsible for the safety and soundness of the financial system.	Bank of Ghana to apprise the public of matters of interest and also share supervisory experience with other regulators in line with BASLE Core Principles of Banking Supervision.

Auditing Requirements/Special Audit

Submission of Returns/Performance Reporting

Over exposures/Risk Exposures

Liquidity Regulation

Emergency Powers

Problem Bank Resolution

Liquidation Processes

Report on Trends and progress from 90 to 120

Offences and Penalties

CHAPTER FOUR

FINDINGS

This chapter reports the findings of the various hypotheses that constitute the research questions.

6.1 RESEARCH QUESTION 1

Research question 1: Was FSR implementation properly sequenced?

The research question was restated formally as a hypothesis as follows:

Hypothesis 1.1: FSR timetable was properly sequenced.

As noted in the methodology chapter, the literature argues that policy makers must ensure that macro stability has been achieved before implementing FSR. The attainment of such stability was envisaged under SAP. Thus one test for H1.1 is to check whether the implementation of FSR started significantly after starting the implementation of ERP/SAP. A second test is to look at the macro figures prior to and including the early years of FSR.

With respect to the first test, Ghana started implementing ERP/SAP in 1983. FSR was implemented 5 years later – i.e. from 1988. Indeed the implementation took place during the second phase of ERP/SAP. This suggests that the sequencing with respect to time was right. However, it can be argued that time really means little if it was not used to achieve macro stability in respect of inflation, real GDP growth and real industrial growth. With respect to inflation Table 6.2 shows that though inflation was quite high it was generally on a dramatic downward trend with the exception of two years in the 1983-1988 period. During the same period, real GDP growth rate had stabilized around 5% compared to negative growth in the preceding period. Finally industrial growth for the period before ERP was -12.5%. However between the implementation of ERP and FSR (i.e. between 1984 and 1989) industrial growth was 9.7%. Taken together the evidence suggests that although perfect stability (particularly with inflation) had not been achieved, a reasonable level of stability had been attained. Thus one can conclude with some caveats (noted above) that FSR was properly sequenced.

Table 6.1: Growth rates of industry & subsectors (%)

Period	Industry	Manufacturing	Mining & Quarrying	Electricity & Water	Construction
1981-83	-12.5	-15.6	-10.2	-10.4	10.1
1984-89	9.7	10.6	8.3	20.2	5.1
1990-96	4.1	2.6	6.8	8.5	6.6

Source: Statistical Service of Ghana

Table 6.2: Annual Inflation Rate (Base year 1977)

Year	Inflation
1983	112.8
1984	39.6
1985	10.4
1986	24.6
1987	39.8
1988	31.4
1989	25.2

Table 6.3: Real GDP Growth

Year	Real GDP Growth (%)
1983	-4.5
1984	8.4
1985	5.0
1986	5.0
1987	4.5
1988	5.4
1989	4.8

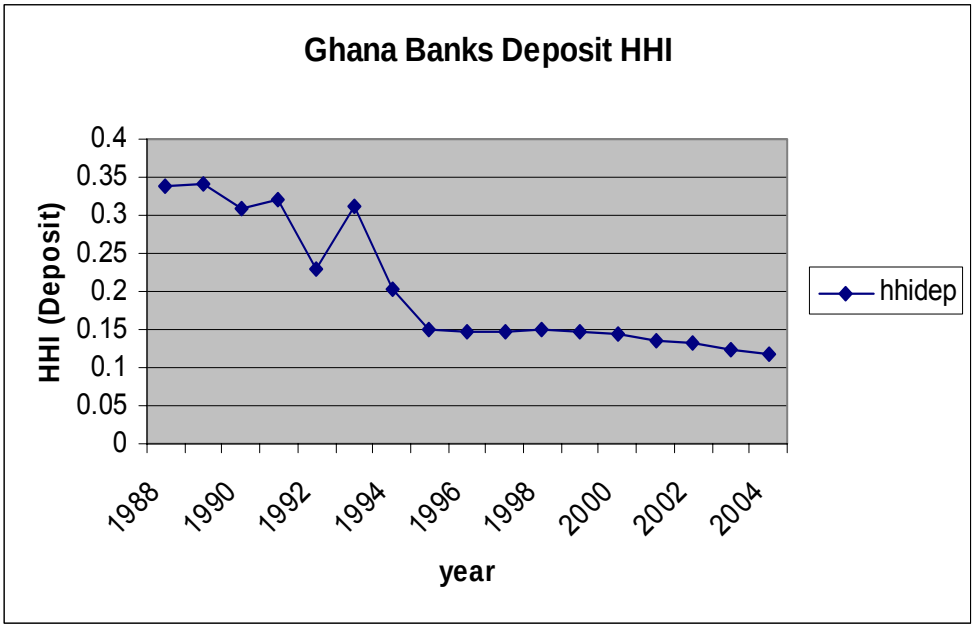
6.2 RESEARCH QUESTION TWO

Research question 2: Does FSR lead to a more competitive banking sector in absolute terms and when compared to a benchmark/standard?

This research question comprises two hypotheses, the results of which are presented below

Hypothesis 2.1: FSR leads to more competitive banking system in absolute terms

For the deposit market:



According to the graph above and the Table 5.4 below, the following can be noted:

- HHI fell overall
  - Steep fall from 1988 to 1992
  - Brief rise in 1993
  - Steep fall in 1994 & 1995

- Remained the same 1996 to 2000
- Steady but very gentle fall from 2001 to 2004

This means that overall competition is increasing.

Table 6.4: HHI of Deposit and Loan markets

Year	HHI Deposit	HHI Loans	HHI Mosteller	No. of Banks
1988	0.3396	0.1688	0.1873	9
1989	0.3418	0.1859	0.1873	9
1990	0.3077	0.1867	0.1569	11
1991	0.3219	0.1483	0.1569	11
1992	0.2297	0.1606	0.1451	12
1993	0.3131	0.1342	0.1451	12
1994	0.2146	0.1284	0.1451	12
1995	0.1501	0.1181	0.1569	11
1996	0.1483	0.1214	0.1263	14
1997	0.1465	0.1444	0.1186	15
1998	0.1503	0.1551	0.1263	14
1999	0.1464	0.1607	0.1263	14
2000	0.1429	0.1661	0.1117	16
2001	0.1368	0.1830	0.1056	17
2002	0.1317	0.1234	0.1056	17
2003	0.1256	0.1295	0.1002	18

2004	0.1202	0.1153	0.1002	18

But what is driving competition? Is it the number of banks or the actual competitive behaviour of the banks?

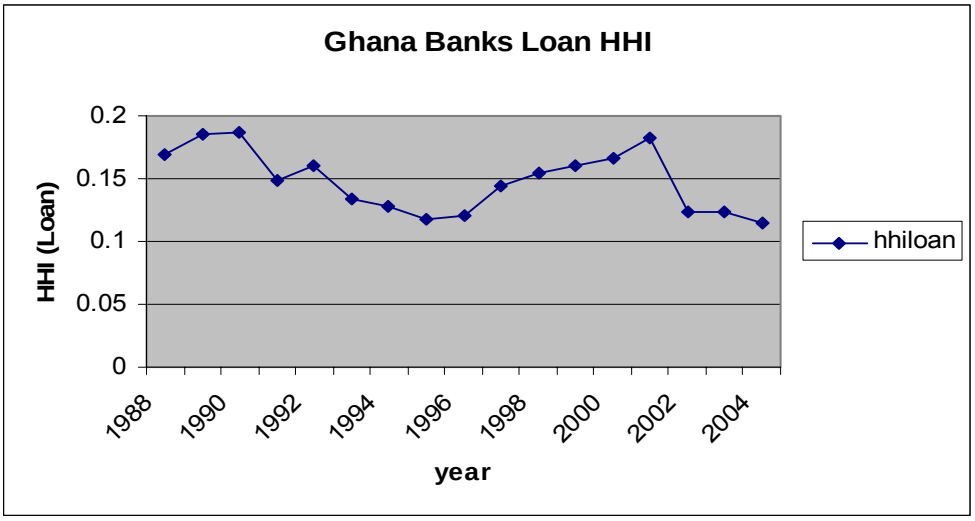
Table 6.5: Correlation between HHI and Components of HHI (Deposit Market)

	Market Share Variance	No. of Banks
HHI : Pearson correlation	0.993**	-0.840**
: Significance (2-tailed)	0.000	0.000
Number of observations	17	17

** significant at the 0.01 level

The table above indicates that with respect to the deposit market, the competitive behaviour of banks is more influential in determining the level of competition than the actual number of banks operating in the sector.

For the Loans Market



From the graph and Table 6.4 above the following observations can be made:

- HHI 2004 < HHI 1988 (general increase in competition)
  - Rise from 1988 to 1990
  - Brief fall in 1991
  - Brief rise in 1992
  - Gentle fall from 1993 to 1996
  - Steady rise from 1997 to 2001
  - Steep fall in 2002
  - Gentle fall in 2003 & 2004

In summary although there was increased competition the picture is more erratic and the level of increase in competition from 1988 to 2004 is not much.

Table 6.6 shows us what is driving in this market.

Table 6.6: Correlation between HHI and Components of HHI (Loans Market)

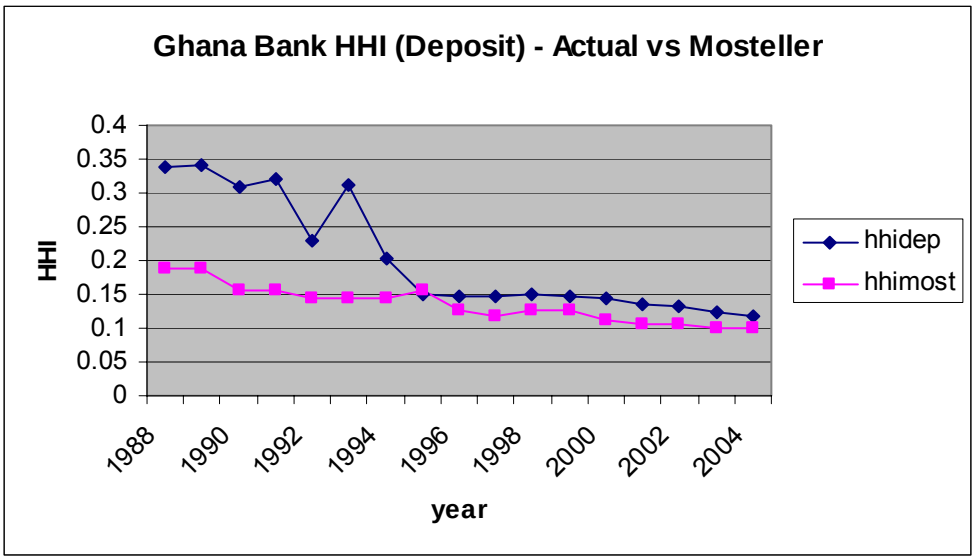
	Market Share Variance	No. of Banks
HHI : Pearson correlation	0.983**	-0.377
: Significance (2-tailed)	0.000	0.136
Number of observations	17	17

** significant at the 0.01 level

This shows that the number of banks is completely irrelevant to the level of competition which is driven entirely by the competitive behaviour of the banks.

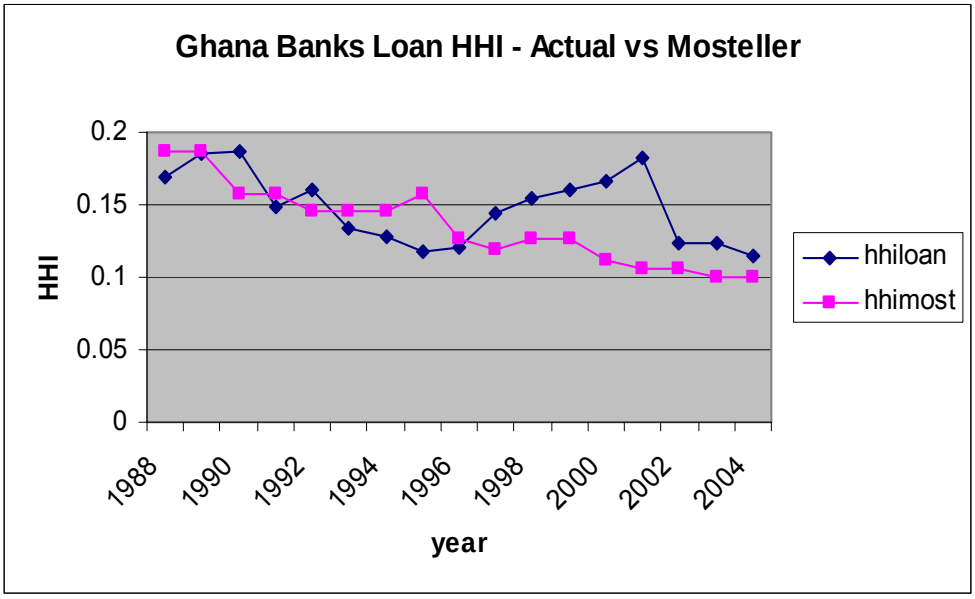
Hypothesis 2.2: Competition in the banking sector approaches the required benchmark as FSR becomes more embedded

The graph below and Table 6.4 present the findings for the deposit market.



- Expected (random) competition more intense than actual
  - Gap wider from 1988 to 1994
  - Converged in 1995
  - Diverged in 1996
  - Converging (i.e. gap becoming smaller) from 1997 to 2004

For the loan market the graph below and Table 6.4 show the results



The following observations can be made:

- Period started with actual competition more intense than expected (1988; 1993 to 1996)
  - In 1989 to 1992 the market bucked the trend
- Ended with expected competition more intense than actual (1997 to 2004)
  - Gap widened from 1997 to 2001
  - Gap narrowing from 2002 to 2004

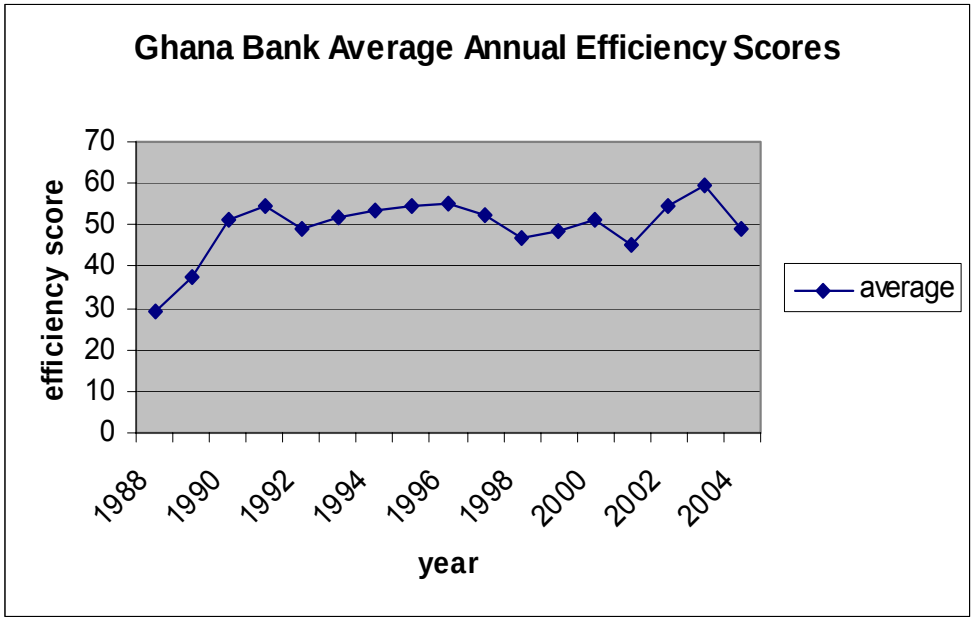
6.3 RESEARCH QUESTION THREE

Research Question 3: Did the banking sector become more efficient under FSR?

This comprises three hypotheses, the results of which are detailed below.

Hypothesis 3.1: The banking sector was more efficient as FSR progressed

The graph below provides evidence



The following broad observations can be made:

- Overall efficiency increased from 1988 to 2004
  - Increased from 1988 to 1991
  - Was more or less stagnant from 1992 to 2004
    - Notable exceptions include a rise in 2003 but dropped to normal levels in 2004

Hypothesis 3.2: Bigger banks are more efficient than smaller banks

The table below provides evidence.

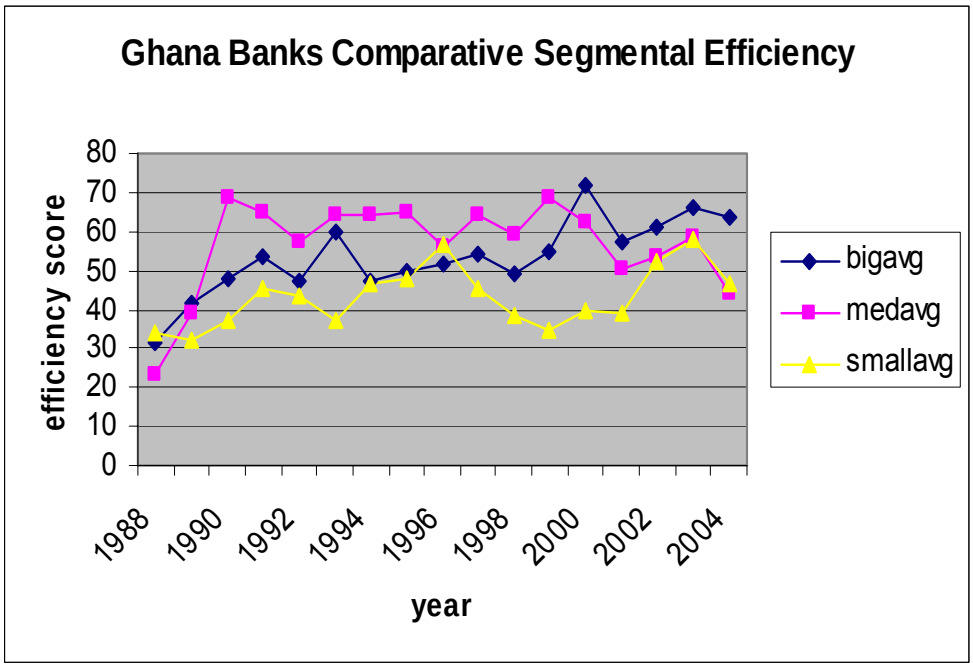


Table 6.7: Efficiency by size of bank

year	industry	big	medium	small
1988	29.49	31.55	23.1	33.82
1989	37.65	41.66	39	32.29
1990	51.43	47.66	68.79	36.9
1991	54.57	53.36	64.77	45.28
1992	49.08	47.11	57.57	43.47

1993	52.06	59.98	64.48	37.37
1994	53.28	47.42	64.07	46.9
1995	54.69	49.6	65.07	48.13
1996	55.37	51.61	56.1	56.57
1997	52.14	54.13	64.33	45.3
1998	46.78	49.29	59.31	38.56
1999	48.64	55.08	68.8	34.36
2000	51.44	71.62	62.11	39.97
2001	45.01	54.34	50.4	39.18
2002	54.31	60.84	53.79	52.56
2003	59.31	66.25	58.58	57.68
2004	49	66.38	44	46.87

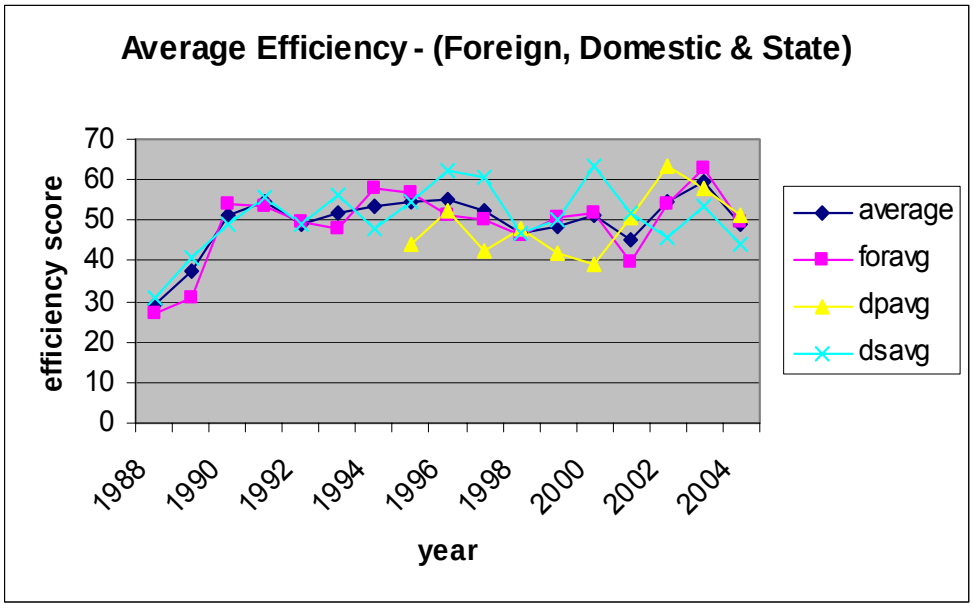
The following observations can be made:

- On average the medium banks were more efficient over the period
- The big banks became more efficient than the medium banks from 2000
- On the whole the small banks were least efficient

Hypothesis 3.3: Foreign banks are more efficient than domestic banks

Hypothesis 3.4: Domestic private banks are more efficient than state-owned banks

Evidence is provided below in relation to the two hypotheses stated above.



The following observations can be made:

- At the initial stages (i.e. from 1988 to 1993) there was no difference in efficiency between the domestic and foreign banks.
- Thereafter the picture is mixed (with SOEs outperforming foreign banks except in the latter 3 years, i.e. from 2002 to 2004).
- Initially state banks were more efficient than domestic private banks. However since 2001 the domestic private banks have been more efficient than the state banks.

6.4 RESEARCH QUESTION FOUR

Research Question 4: Is efficiency correlated to the profitability of the banking sector under FSR?

This research question comprises two hypotheses.

Hypothesis 4.1: Efficiency is not correlated with profitability in the early years of FSR

Over the entire period efficiency was related to profitability as Table 6.8 below shows:

Table 6.8.: Correlation between profitability & efficiency (1988 to 2004)

	Efficiency
Profitability : Pearson correlation	0.173*
: Significance (2-tailed)	0.015
Number of observations	198

* significant at the 0.05 level

However, there seem to be no correlation between profitability and efficiency in the early years of FSR (as Tables 6.9 & 6.10 show)

Table 6.9: Correlation between profitability & efficiency (1988 to 1992)

	Efficiency
Profitability : Pearson correlation	-0.226
: Significance (2-tailed)	0.300
Number of observations	23

Table 6.10: Correlation between profitability & efficiency (1993 to 1997)

	Efficiency

Profitability : Pearson correlation	-0.045
: Significance (2-tailed)	0.733
Number of observations	61

Hypothesis 4.2: Efficiency is correlated to profitability in the latter years of FSR

The results are presented in Table 6.11

Table 6.11: Correlation between profitability & efficiency (1998 to 2004)

	Efficiency
Profitability : Pearson correlation	0.289**
: Significance (2-tailed)	0.002
Number of observations	114

** significant at the 0.01 level

The correlation is weak though statistically significant. This means that in the latter stages profitability and efficiency move together although not strongly.

6.5 RESEARCH QUESTION FIVE

Research Question 5: Does the relationship between competition, efficiency & profitability hold under FSR?

This research question comprises two hypotheses.

Hypothesis 5.1: Greater competition leads to greater efficiency

For the deposit market the following evidence is presented.

Table 6.12: Correlation between efficiency & competition (deposit market)

	Efficiency
HHI : Pearson correlation	-0.132*
: Significance (2-tailed)	0.046
Number of observations	229

* significant at the 0.05 level

There is weak correlation but it is statistically significant.

For the loan market the following evidence is presented.

Table 6.13: Correlation between efficiency & competition (loan market)

	Efficiency
HHI : Pearson correlation	-0.191**
: Significance (2-tailed)	0.004
Number of observations	229

* significant at the 0.01 level

Statistically significant but weak correlation.

Overall this means that there is a weak relationship between efficiency and competition in both markets. Where competition increases it is associated with weak increases in efficiency and/or vice-versa.

Hypothesis 5.2: Profitability is determined by efficiency and level of competition

Regression model

The relevant statistics are presented below (see Tables 6.14 & 6.15 below)

The following observations can be made:

At the start of FSR profitability was determined primarily by the bank's market shares in each of the deposit and loan markets. The coefficient for the deposit market share is negative whilst the coefficient for the loan market share is positive.

During the second stage of FSR profitability is driven by the bank's market shares in each of the deposit and loan markets and by the rate of growth in the loan market. The coefficient for the deposit market share is negative; the coefficient for the loan market share is positive; and the coefficient for the rate of growth in the loan market is positive.

In the post-implementation period, profitability is determined by the bank's market share in the loan market and by the level of competition in the deposit market. The coefficient of the loan market share is positive and the coefficient of HHI (a concentration measured used as the proxy for competition) is positive.

Table 6.14 Regression Model Summary

		R	R Square	Adjusted R Square	Std. Error of the Estimate	Change Statistics				
Period	Model					R Square Change	F Change	df1	d	
FSR1	1	.621	.385	.356	.56568	.385	13.148	1	2	
	2	.712	.507	.458	.51887	.122	4.960	1	2	
FSR2	1	.444	.197	.172	.59385	.197	7.870	1	3	
	2	.645	.416	.378	.51460	.219	11.615	1	3	
	3	.705	.498	.447	.48526	.081	4.862	1	3	
FSR3	1	.468	.219	.209	.58113	.219	21.571	1	7	
	2	.629	.396	.380	.51424	.177	22.336	1	7	

a Predictors: (Constant), DMSLOG

b Predictors: (Constant), DMSLOG, LMSLOG

d Predictors: (Constant), LMSLOG, DMSLOG

e Predictors: (Constant), LMSLOG, DMSLOG, LMC

c Predictors: (Constant), LMSLOG

f Predictors: (Constant), LMSLOG, HIDEPLOG

Table 6.15: Regression Model Coefficients

			Unstandardized Coefficients		Standardized Coefficients	t	Sig.
YEAR	Model		B	Std. Error	Beta		
FSR1	1	(Constant)	-4.812	.393		-12.254	.000
		DMSLOG	-.451	.124	-.621	-3.626	.002
	2	(Constant)	-4.476	.390		-11.466	.000
		DMSLOG	-.843	.210	-1.160	-4.019	.001
		LMSLOG	.551	.247	.643	2.227	.038
FSR2	1	(Constant)	-2.461	.274		-8.979	.000
		LMSLOG	.246	.088	.444	2.805	.008
	2	(Constant)	-2.878	.267		-10.771	.000
		DMSLOG	-.486	.143	-.803	-3.408	.002
		LMSLOG	.608	.131	1.097	4.656	.000
	3	(Constant)	-2.095	.435		-4.813	.000
		DMSLOG	-.574	.140	-.947	-4.090	.000
		LMSLOG	.709	.131	1.278	5.396	.000
		LMGLOG	.477	.216	.304	2.205	.035
FSR3	1	(Constant)	-2.690	.177		-15.187	.000
		LMSLOG	.217	.047	.468	4.644	.000
	2	(Constant)	2.918	1.197		2.438	.017
		LMSLOG	.212	.041	.458	5.133	.000
		HIDEPLO	2.800	.592	.421	4.726	.000

		G					

a Dependent Variable: ROALOG

BANK COMPETITION, FINANCING

OBSTACLES AND ACCESS TO CREDIT

Thorsten Beck, Aslı Demirgüç-Kunt and Vojislav Maksimovic

First Draft: February 2002

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Abstract: Theory makes ambiguous predictions about the effects of bank concentration on access to external finance. Using a unique data base for 74 countries of financing obstacles and financing patterns for firms of small, medium and large size we assess the effect of banking market structure on financing obstacles and the access of firms to bank finance. We find that bank concentration increases financing obstacles and decreases the likelihood of receiving bank finance, with the impact decreasing in size. The relation of bank concentration and financing obstacles is dampened in countries with well developed institutions, higher levels of economic and financial development and a larger share of foreign-owned banks. The effect is exacerbated by more restrictions on banks' activities, more government interference in the banking sector, and a larger share of government-owned banks.

Finally, it is possible to alleviate the negative impact of bank concentration on access to finance by reducing activity restrictions.

Keywords: Financial Development; Financing Obstacles; Small and Medium Enterprises;
Bank Concentration
JEL Classification: G30, G10, O16, K40

Beck and Demirgüç-Kunt: World Bank; Maksimovic: Robert H. Smith School of Business at the University of Maryland. We would like to thank Arturo Galindo and Margaret Miller for sharing their data on credit registries with us, and Patrick Honohan and participants at the Fedesarrollo seminar in Cartagena for useful comments. This paper's findings, interpretations, and conclusions are entirely those of the authors and do not necessarily represent the views of the World Bank, its Executive Directors, or the countries they represent.

1

1. Introduction

While the recent empirical literature provides empirical evidence on the positive role of the banking sector in enhancing economic growth through a more efficient resource allocation, less emphasis has been put on the effect of the banking market structure.1 Theory makes conflicting predictions about the relation between bank market structure and the access to and cost of credit. While general economic theory points to

inefficiencies of market power, resulting in less loans supplied at a higher interest rate,

information asymmetries and agency problems might result in a positive or nonlinear

CHAPTER FIVE

CONCLUSIONS & RECOMMENDATIONS

EXECUTIVE SUMMARY

The government intervened extensively in financial markets in Ghana for two decades in an attempt to control the cost and direction of finance. Public sector commercial banks and DFIs were set up and administrative controls imposed on interest rates and the sectoral allocation of bank credit. Much less attention was accorded to prudential regulation.

The financial repression of the 1970s and early 1980s had destructive consequence of the depth and institutional strength of the banking system. Financial depth collapsed after the mid 1970s under the impact of sharply

negative real interest rates, the lack of remunerative outlets for banks incurred large losses as a result of enterprise. Very weak credit procedures and corruption. By the mid 1980s the public sector banks were insolvent with large volumes of non performing assets (NPAs) on their books.

Since the late 1980s a financial sector reform programme has been implemented, the objectives of which include developing a liberalized market oriented, more competitive, efficient and prudently managed banking system. The insolvent public sector banks were restructured, with NPAs removed from their balance sheets and reforms to their management and operating procedures implemented. A revised banking law was enacted in 1989, and in 1993 legislation was enacted to provide for prudential regulation of NBFIs administrative controls over interest rates and credit were removed and market oriented monetary policy, involving regular securities auctions, introduced.

Given the extent of institutional deterioration in the banking system, the reforms have achieved significant progress. The public sector have adopted more explicitly commercial operating and credit policies, appear to be under much less political procedures and internal controls and reduced staffing levels.

Since the restructuring was carried out, all but one of the public sector banks has been profitable and able to comply partly die to the availability of government and BOG securities which offer a remunerative but almost risk free investment out let for the banks funds. Loans and advances have accounted for only around 20% of the banks total assets during the 1990s hence their availability to undertake commercially viable lending activities to the private sector was yet to be fully tested.

The reforms have strengthened both prudential regulatory framework and the supervisory capacities of the BOG. Banks are submitting relevant financial

data on a regular basis to the supervisors and on site inspections are being carried out.

Several new banks with private sector participation have been established since the late 1980s alongside a range of NGFIs. There is some limited competition into banking markets, although it has been mainly confined to the segments of the credit and deposit markets serving corporate and institutional customers. The new entrants have avoided retail banking outside the large cities, and the quality of service provision in retail banking still leaves much to be desired.

Despite the improvements to the institutional structure of the banking system brought about by the reforms, the banking system was still very shallow and performs very little intermediation between savers and borrowers in the private sector. Bank deposits amounted to only 12.8% of GDP and bank credit to private sector amounted to only 5.3% of GDP in 1994. A major cause of this is the lack of macroeconomic stability.

High rates of inflation have prevented positive real interest rates form being attained on many classes of interest bearing deposits, including most saving deposits, the private sector was crowded out of credit markets with the banks investing heavily in requirements imposed to restrain monetary growth, but also because the high nominal lending rates increase the risk involved in lending to the private sector. As a consequence financial reforms have probably had only a limited impact on enhancing the efficiency of intermediation in banking markets.

After almost two decades of conservatism which left the private sector starved of directly needed loan finance, our study shows that Ghana's banks for the past four years are finally returning to the basics of bank lending out their deposits. Altogether, nine banks increased their portfolios relative to their investment portfolio. These were Ghana Commercial bank, Standard Chartered bank, Barclays bank Ghana, SG-SSB bank, Trust bank, National Investment bank, First Atlantic Merchant bank, Ecobank Ghana, Agricultural Development bank, Amalgamated Bank and Unibank saw their investment portfolio rise relative to their loan portfolios. Several reasons have been given

for the banking industry's new found appetite to lend to the private sector, but ultimately, they all bail down to the market improvements in macro-economic stability achieved in past years.

Ghana was one of the first African countries to implement structural adjustment programme and financial sector reforms (FSR) in the 1980's. Despite the satisfaction of the preconditions for a successful FSR, after almost 20 years of implementation under the auspices of the IMF/World, the results have been mixed.

The arguments that FSR would increase competition, efficiency and profitability of banks have not been achieved. Whereas the deposit market has undoubtedly become more competitive, the loan market situation is a bit uncertain. In terms of efficiency, the medium banks experienced an increase at the early years of the reform but in the last five years efficiency of the medium banks have been below that of the big banks. On the other hand, the smaller banks have persistently

underperformed both medium and big banks in terms of efficiency. This indicates that size matters in the Ghanaian banking industry.

The efficiency of the foreign banks was similar to the industry average over most of the period. It is only in the last few years that they have become more efficient than the state-owned banks. Although the domestic private banks were less efficient than both foreign and state-owned banks when they were established, in the past few years the gap has narrowed and they have been just as efficient as the foreign banks.

Overall the study found a weak correlation between efficiency and profitability in the banking sector in Ghana. Moreover, or both markets, there is very weak correlation between efficiency and competition. When these findings are combined with that of size decomposition of efficiency it seems that size is a more important driver of efficiency than competition. This also holds true with profitability – that is size is more important than both efficiency and competition in determining profitability.

Limitations of the study

One limitation of this study is that it did not explicitly model the impact of size on efficiency and profitability. Further studies are needed to establish the empirical link between the two variables.

Policy makers ought to look again at the determinants of competition in the Ghanaian banking industry. The finding that competition owes less to the number of firms but rather more to the actual behaviour of banks is interesting in this regard. New studies as to what those behaviours comprised might be insightful. These could look at the rate of new technology adoption and new product development. Within this context it could look at the channels by which banks are delivering services and their impact on competition.

Since the banking efficiency seems to be size-dependent it stands to reason that attempts must be made to identify a size threshold that would lift the efficiency of banks. The recent increase in minimum capital requirements of banks announced by the Central Bank of

Ghana might point to the way forward here. This might result in some mergers which would ensure that banks have the critical mass to operate within the oligopolistic structure of the sector. The minimum capital requirement should be kept under constant review by the central bank.

The future outlook for the market

This will always be an area where computers play a relatively minor role.

Nevertheless there may be some scope for using a computer, for example in making predictions based on chartist analysis and trends, Elliot wave theory and other such technical applications. Other uses for a computer in this field will largely be restricted to mailbox-type facilities for market comment and predictions; whether a computer is any more use than a crystal ball here is for individual portfolio managers to judge for themselves.

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The role of the Middle Office

It is a standard principle that for a check or control to be effective, it should be administered by someone independent of the person being controlled. In the case of reserves management, this means that the administration of the various controls, limits and so on which cover

the reserves managers should be conducted by someone other than, and independent of, the reserves management unit itself.

Similarly, it is sensible for valuations and profit figures to be calculated by someone other than the portfolio managers, to eliminate any suspicion of "favourable pricing" or of losses being hidden.

It is not essential for these two functions of portfolio control and portfolio

evaluation to be combined, but given the overlap between the two there is much merit in doing so and this is increasingly the way many central banks work. The norm and best practice is for the two functions to be carried out by a single unit separate from the reserves managers, and this is usually known as the Middle Office. (The name is by extension. The dealers and portfolio managers are often known by the collective term "the Front Office", and the settlement function is usually called "the Back Office". The compliance and control function, which sits

between the Front and Back offices and was in many central banks the last to be set up as an independent unit, thus naturally became known colloquially as "the Middle Office", whether or not it had some more formal name such as Compliance Unit or Risk Monitoring Division.

The effectiveness of the Middle Office relies greatly on its separation from the reserves management function. The Middle Office should not therefore be involved in any actual reserves management trading decision, and by extension should also have no input into decisions

on, for example, the positioning of the benchmark. These are for the reserves management unit and their line management. Rather, the Middle Office plays a "before and after" role:

- before trading, the Middle Office determines (with senior management) what instruments, credits, currencies etc are to be permitted, and will set limits for all of them. It will establish the procedures that the reserves managers should follow, and will set up all the necessary legal agreements and documentation.
- after trading, the Middle Office checks that everything has been correctly recorded, and that none of the limits, controls and other elements of compliance have been breached. It will report any breaches to senior management, and should also provide valuations and profit reports to the reserves managers. Finally the Middle Office is usually the main conduit to the internal and external auditors, and may also handle external data releases on the reserves.

This separation benefits both the Middle Office and the reserves management unit.

However, the Middle Office is nevertheless part of the central bank, and one question which needs to be resolved is the level at which the Middle Office management comes under the senior management of the bank. If this is at too junior a level, there is always the risk that the reserves managers will be able to overrule or simply ignore anything that the Middle Office says that inconveniences them. But a Middle Office which is too separate from and distant from the reserves management operation can be equally damaging if their decisions are

in conflict with the overall policy for the reserves as set by senior management. The Middle Office management needs to be sensitive to the requirements of those that are actually managing the reserves; there is no point in setting such tight limits and controls on risk that the reserves managers' task is made impossible!

One issue that arises is the role of the Middle Office in computer support and development for the reserves management operation. There is often a dilemma here between the need for the computer support team to be fully familiar with markets and the reserves management operation, and the need also for the computer systems to be separate from the portfolio managers themselves so that there is no risk of the systems being tampered with by portfolio managers seeking to influence the evaluation process. This need to preserve the integrity of the computer system from possible interference argues for the computer support function to be outside the reserves management unit; in any event, the reserves managers will usually not have either the time or the skills required to maintain complex computer systems. But a completely separate computer specialist team may find it a challenge to have the deep knowledge of the markets and market practices that is required to build a system which is both effective and user-friendly. Once again this is a role that can often be filled to good effect by staff of the Middle Office, who are both separate from the reserves managers and also fully conversant with the market.

Contact with the market

This is a difficult area for many central banks. Reserves management requires important decisions involving large transactions with the market to be delegated to relatively junior staff, and this is often in conflict with the more general style of central banking where, typically, contact with the outside world is treated with great care and reserved for the more senior echelons of staff only. But contact with the market cannot be avoided and moreover must occur at the portfolio manager level. It is thus very important that the portfolio managers are fully familiar with

the way in which their counterparties operate and view the relationship between the central bank and themselves.

A market contact can act for a central bank in a number of ways, for example as a custodian, as a debt management adviser, as a general adviser on investment issues, as a source of training expertise and as a counterparty for reserves management deals. This section considers the last of these, which is the main area the portfolio managers are involved in and also the main area in which financial loss can occur if the relationship goes wrong or is not under control.

In many markets a house puts its services and expertise at the disposal of clients but not its own balance sheet. For example, in the FX and commodity houses, houses usually act as brokers or middle-men between principals. In the securities markets, however, houses usually act as principals themselves. To do this, they run books, and in managing their own positions they often seek to initiate trades.

This element of securities trading, the fact that a securities house may approach a central bank to propose a trade, requires the central bank portfolio managers to trust them more than one needs to trust a broker, and this requires regular contact and dealing as part of building a relationship. On the securities house side, the establishment and maintenance of this relationship is the task of the salesman, while it is also a key duty of the central bank portfolio manager. Both sides will need to establish and maintain close contact so that they understand and trust each other. Because of the effort involved, most salesmen will have only a few (under 20) accounts. This introduces an interesting dynamic: not only is the central bank dependent on the salesman, therefore, but the salesman is also dependent on the central bank, and on his relationship with it.

Nevertheless portfolio managers need to be aware of the potential for conflict of interest for the salesman, between the interests of the securities house in general as his or her employer, and the health of the relationships with his clients. The potential for conflict of interest is usually reduced by the fact that the salesman does not run positions himself; instead he acts as the link between the trading desk in the securities house on the one hand and his clients on the other. But there is still a potential for conflict and a balancing act: if the salesman puts the interests of his traders too high he will not do much business and will lose his clients, while if he puts the interest of his clients too much to the fore he will lose money for his employer and possibly his job.

It is here that the central bank portfolio manager can contribute to a successful partnership. He or she needs to be able to judge when the salesman needs some help and when to hold out for a hard bargain. An open co-operative approach is more likely to be reciprocated with genuinely helpful service than a poker-face, while on the other hand a portfolio manager who tries to "score off" the houses he or she deals with will find that they will reciprocate here too. Despite the fact that the securities house is on the other side of the deal, so that a slight change in the price of a deal that benefits one must cost the other, relationships in reserves management should not be adversarial and the best relationships are usually not "us against them", but "them helping us to beat the market". Senior management should accept that building such relationships requires skills and activities not typically found in other parts of the central bank; in particular a degree of corporate hospitality which would perhaps be inappropriate elsewhere in the

central bank may need to be sanctioned.

Other constraints affecting official reserves management

To close this chapter we look at four constraints on a central bank's reserves management operation that are often overlooked. These are Situation, Staffing, Systems and Settlement.

A central bank's geographical situation is clearly not something that the senior management of the bank can easily change! Nevertheless it is important to bear in mind the constraint it imposes when deciding

the reserves management style. If telephone communications are irregular or unreliable, or wire service information is unavailable or prohibitively expensive, this will militate against a style that takes large positions in fast-moving markets. Equally, the central bank's time zone may be relevant: it is easier to manage a yen portfolio actively, for example, from

Asian time zones than it will be from a European or American base.

Staffing is a major issue for all central bank reserves management operations. The skills required for reserves management are typically not widely found elsewhere in central banks and the reserves management unit often has to devote considerable resources to training newcomers to the team. The "learning curve" is typically steeper and longer than in other functions and areas in the central bank. This places a premium on keeping staff once they have benefited from this extensive(and expensive) training. Unfortunately, portfolio management is a very marketable skill and, especially for central banks situated in major financial

centres, the threat of losing staff to the market is considerable. This places an emphasis on simplicity of operation and on documentation: a central bank cannot afford to lose too much of its accumulated knowledge when staff resign, and the best defence against this is to ensure that no single part of the operation is controlled by or understood by only one person. Systems issues can also constrain a central bank's reserves management operation.

It is essential that the IT systems can handle everything the reserves managers wish to do, otherwise there is a risk that positions may get out of control and risks and losses may escalate. IT systems for reserves management are however complex and expensive, and sufficient resources need to be devoted to their construction and ongoing maintenance.

Finally, settlement and accounting problems have the capacity to be a major constraint on reserves management. It is pointless trading in instruments that the settlement office cannot settle, and even if the deal can be settled, it is very dangerous to trade in instruments which the accounting system cannot value or account for properly. This in particular is an area where the Middle Office must act as the liaison between the reserves managers and the more administrative side of the bank; to the extent that, if the portfolio managers propose a new instrument, they should not be allowed to trade in it until the Middle Office has formally checked that it can be correctly handled by the settlement and accounting parts of the bank.

Reporting

The importance of reporting

Given the great degree of delegation in reserves management, the importance of maintaining overall responsibility and control as the counterpart to this delegation has already been observed (see section 2.5). As well as a formal structure of decision-making and a formal monitoring system to ensure that limits are adhered to, this requires a

comprehensive reporting system, through which senior management can observe the consequences of the investment decisions their portfolio managers have undertaken.

However, portfolio performance reporting is not simply the method by which senior management see how much return the portfolio managers have earned, important though this is both in monetary terms and for more general staff appraisal and management purposes. It is also the way in which senior management can assess their own decisions (is the benchmark correctly positioned? Is the policy on liquidity, or on credit, operating as desired?). It provides the base data for more public reporting and accountability, for example to parliament. And through published data and the statistics on reserves holdings given to the IMF it adds to the data available to those pursuing international financial stability and can act as an early warning of financial strain on a country's foreign exchange position.

Internal reporting

An internal reporting system should be regular, frequent, and timely. Reports should be regular so that there is no possibility of awkward or unpleasant news being covered up. They should be frequent so that management can maintain close control and stop a situation getting out of hand before it goes too far. And they should be timely (ie, reporting should be as soon after the period being covered as possible) to ensure that if there are problems senior management can act before

serious damage is done.

The content of the internal reports will be largely for each central bank to decide for itself. But as a minimum, internal reports should cover the external environment, the portfolio manager's response, and the results of actions taken. Thus a well-constructed report will give, as a minimum:

- a (brief) description of economic and market developments over the reporting period, to show management that the portfolio manager has been alert in his or her market analysis;
- a description of the various positions taken during the month in response to market movements, to show management how the portfolio manager responded to his or her analysis of the market and what changes were made to the portfolio;
- an analysis of the results of these actions and the returns made on the portfolio, to show how the profits earned relate to the positions taken.

Note that the purpose of the description of economic and market developments is to support the positions and returns analysis, not to provide an in-depth economic assessment. Quite apart from the fact that the essence of the end-month note is timeliness, and overlong economic analysis will slow down its production, others in the central bank will be doing similar analysis anyway, and the reserves managers are unlikely to be the best placed to do this work. A more detailed report might also include a forward-looking section to set out for management how the portfolio manager expects the market to

develop, and how he or she is positioned to take advantage of this. This may or may not include such

details as scenario testing or stress testing, but should certainly include a list of all open positions (with, if possible, their current mark-to-market valuation). A full position report might therefore read as follows: Position A long position of $20 mn 10 year treasury notes Opened 17 June 2000, at 100-19 (yield 5.54%) Rationale Downtick in market seemed overdone; bull trend looks still in place Current level 101-7 (yield 5.46%) on 1 July 2000; profit in position $125,000 Strategy Trend expected to continue, target to close 101-16 Stop loss position to take trade off 101-00; would lock in $81,250 profit A report such as this should be presented to management for each open position, with supporting text as required to explain the positions further or to explain how they fit into the portfolio manager's overall analysis of the market and strategy for the portfolio. Other elements of the report will depend more on individual circumstances and senior management preferences, but might include details of cash usage over the month, limit observances, risk positions, a breakdown of deals done with each counterparty, and so on.

As already stated in chapter 6, it is essential that hard figures such as positions, limit observances and returns are reported by the Middle Office. This is to avoid any risk that portfolio managers could amend or hide uncomfortable news. Equally, judgmental elements of the report must come from the person responsible; ie the portfolio manager. This is to ensure that the reason behind every position or

profit is given by the person taking it or making it. The final report might therefore be structured as a body of text (analytic report, from the portfolio manager) with an annex of figures (factual report, from the Middle Office accounting unit).

External reporting

External reporting of a central bank's reserves management operation serves two main purposes. The first is Accountability: the reserves are public assets and the central bank should account to the public for its management of them. The exact method of making public the results of the reserves management operation (eg in the central bank's annual report, or in a special report to parliament) and the degree of detail that is reported, is for each central bank to decide. The most detailed reports will not only set out the size of the reserves but also explain the reserves

management process, the benchmark used and perhaps even the returns due to active management against that benchmark. Not all central banks will want or feel able to go into this much detail but as a minimum the central bank's report should be sufficient to show that the reserves are all accounted for and are being managed according to established procedures. The second purpose of external reporting is for Information, both to the IMF and others in the official sector and to other market participants. The size of the reserves can show how much intervention a country has been doing, and can also provide reassurance to creditors on the creditworthiness of the country. More

detailed figures (as set out by the IMF's current Data Dissemination Standards) provide valuable data for those in the official sector whose remit includes the maintenance of international financial stability. Particularly for this purpose, it is important that the data is kept up to date: confidence in a country's external position can quickly be lost if regular reserves data releases start to be delayed or withheld from publication.

The cost of liquidity

It has already been stated that liquidity usually comes at a price. This is because in normal markets and comparing assets of like credit quality, the more liquid an asset is the more expensive (ie lower yielding) it is, as holders are prepared to pay a premium for the liquidity. But this is not the only cost of liquidity that needs to be borne in mind.

For assets that are held with a view to selling them to raise cash, the central bank

will need to factor in the liquidation or selling costs. The wider the "spread" between buying and selling price, the larger the cost of selling the asset. Moreover, the estimation of the liquidation costs needs to be done for a number of possible market scenarios; for example calm orderly markets, disturbed or volatile markets, and crisis markets. Although a given bond might trade on a narrow or tight spread in calm markets, in crisis conditions a forced seller may well have to accept a much larger discount.

For this reason central banks are increasingly turning to the repo market as their preferred source of cash liquidity. If a bond is sold outright, the discount on the price obtained compared to the "fair market" price is lost for good. But if a bond is repoed, ultimate ownership stays with the central bank, and the reserves avoid the loss that comes from a forced sale at a poor price. In addition, the central bank avoids the risk that it will be forced to sell "at the bottom of the market", ie at a time when yields are abnormally high and so prices are depressed. Nevertheless, using the repo markets to raise cash is not without its costs and drawbacks. On the one hand, securities can only be reopened for their current (cash) value, so that in periods where prices are depressed the central bank will find that the amount of cash it can raise using the reserves as collateral is correspondingly reduced. As well as this, though, counterparties will require a haircut (ie, will deliver less than full value in cash against the reposed securities) to protect their exposure, and as markets become more volatile (and also in some cases as the creditworthiness of the borrower is seen to be under pressure) this haircut will grow. And finally, repoing securities can result in more work administratively, especially if the repos are "rolled" (ie the loans renewed on their expiry). Despite all these extra costs and complications, the advantages of repo as a way of raising cash at short notice are generally seen to outweigh the disadvantages. For those central banks whose investment guidelines permit repo and whose settlement

operation can handle it, therefore, repo has increasingly become the preferred route for liquidity management.

Designing a liquidity strategy

This section considers the problem of deciding how liquidity should be held, and in what asset classes. The discussion is more technical in nature than much of the rest of this handbook and may be omitted by the general reader.

The problem of designing a liquidity strategy is essentially one of constrained optimisation. Following the decision by senior management on how much to hold in the liquidity portfolio overall, the task is to maximise the return on the portfolio given the probability distribution of liquidity demands and the costs associated with liquidation. The constraint is the requirement to be able to supply specified

minimum amounts of cash at notice periods ranging from 0 days upwards. As a first step, the permitted types of asset (bonds, bills, assets for repo, etc) should be classified into *liquidity classes* according to the minimum number of days' notice required to raise cash against them. For example, cash can be raised for same day value through repoing US treasuries, whereas it will take at least 4 days to raise cash using Yen T-bills. The problem then falls into two parts: first, a decision on how much to invest in each class, and second, a decision over which assets to hold within each class. (Note that an asset may fall into different liquidity

classes depending on whether the central bank aims to raise cash from it via an outright sale or via repo. But it cannot of course be used for both).

The amount to hold in each liquidity class is determined directly by the minimum liquidity constraint mentioned above. This will be a straightforward read-across. More interesting is the second question, and this will require an assessment of the trade-off between expected returns and the cost of raising cash using that asset. This is where the optimisation part of the process takes place. For the resulting liquidity portfolio to be useful in all circumstances, the expected returns and expected liquidation costs for the various asset classes need to be assessed under various market conditions; the optimum portfolio under calm market conditions may not have acceptable characteristics under volatile or crisis conditions. The resulting liquidity portfolio that is finally chosen will probably be a compromise between the portfolio that yields the most in normal situations, and the one that is least badly affected by crisis market conditions, and the precise nature of the compromise will be driven by such factors as how risk-averse the central bank is. Greater caution would usually be advisable in circumstances where the starting assumptions contain sizeable uncertainties.

Active management

The rationale for active management

Active management is the term usually given to the operation of the most junior level of reserves management staff. These are usually the portfolio managers, and the main distinguishing feature of their work is that, unlike the higher levels whose decisions affect the notional benchmark portfolios, they are dealing in real securities and real portfolios directly with the market. The second distinguishing feature is that, with all the strategic and policy decisions taken at higher levels, the portfolio managers can concentrate on trading to generate excess return.

The legitimacy of a central bank trading its reserves portfolios for profit has been discussed in section 2.2 above, and it is generally accepted that central banks are fully entitled to so invest their reserves as to maximise the gain they can make on them. This is not to say that central banks have *carte blanche* to deal and seek profits without restraint; a central bank should always manage its reserves in such a way that it does not destabilise markets, take advantage of privileged information or hinder another central bank's operations or objectives. But this still leaves

considerable freedom of manoeuvre, especially for smaller central banks whose operations are not large enough adversely to affect markets or prices.

The main reason for active management is that it can be profitable, and these profits can offset the costs of running the reserves management operation. Indeed, for some central banks, the profits on the reserves can be considerable. But there are two other reasons for

senior management to allow their portfolio managers actively to seek profit. Firstly, it is an excellent way of motivating junior staff: the measure of profits earned is a real and highly visible indicator of success, and can also show senior management which of their staff have a "feel" for the market. A portfolio manager who is making correct market decisions in his or her portfolio

trading will generate profits; this gives him or her an immediate confidence boost and management a clear indicator of the sound basis of the operation. Secondly, active management helps keep the portfolio managers closely involved in the market. This will both keep their trading skills sharp and fresh, and make them a valued and hopefully respected counterparty. If a central bank only enters the market irregularly and occasionally, it may find that its traders are unfamiliar with the market when a crisis forces the central bank to act.

A final bonus from an active style of portfolio management, and the close

involvement with the market that this will entail, is that the portfolio managers should become adept at spotting small signals in the market and will become a valuable surveillance asset for the central bank as a whole. Often a financial crisis first surfaces in the markets (perhaps through a rumour spreading among the dealer community or an unusual price movement) and a central bank whose reserves managers are in constant touch with the market and their counterparties will be

well placed to learn about such events and developments early.

The decision-making process

Active management involves taking on risk in order to add excess returns. Risk is therefore an integral and essential part of active management. It should not be avoided, but controlled and used. The key to successful active management is deciding when and how much to take risks. There are broadly speaking two types of active management. Outright trading (ie taking outright positions long or short of one's benchmark) tends to lead to a few large positions. If successful it can generate large returns but they are liable to be highly volatile and the central bank adopting this approach must be prepared to accept sizeable losses as well. Relative value or technical trading, on the other hand, seeks to exploit situations where one asset is temporarily cheap compared to similar assets. This tends to lead to many "small risk, small return" trades as the portfolio managers exploit imperfections in the market, and less volatile returns. For most central banks, this latter style will tend to dominate, but there will also be room in all but the most risk-averse central banks for an element of outright trading. Whichever style of trading is adopted, an important element of successful active management is a structured decision-making procedure. One effective such procedure is the "Four Ps" method:

- Process information
- Predict the future
- Position the portfolio

−Profit The first element of this method is to process the information already in the market. The market contains an enormous amount of information, and no investment manager can expect to manage a portfolio successfully if this information is not made use of. Without this base, the wrong investment decisions will be taken even if the rest of the analysis is correct. One important element of this is to know which markets should be studied. It is seldom enough to study merely the markets which one is directly involved in, as other markets which the central bank does not invest in may influence those it does. For example, even an investor restricted entirely to US fixed income securities will need to observe movements in the US equity market: because other investors can and do invest in both markets and switch between the two, movements in the equity market can influence the bond market.

Secondly, the information gleaned from the market must be used to predict the future. It is no surprise to say that this is easier said than done! But it is essential that for every trade that the portfolio managers put on there is a sound rationale, and that rationale should always include a prediction of the future price movement of the asset bought or sold. Without this, the positions taken by the portfolio managers cannot be held with any confidence and any profits that are generated will owe more to luck than skilled judgment.

Modern computer systems and wire service databases (eg Bloomberg) contain huge amounts of analysis and data on the past. However, analysis of the past will not automatically produce profitable trades, if

the relationship between the past and the present is not properly understood. The past is only a guide to the future, and the more circumstances are changing or have changed, the less reliable the guide

will be. Portfolio managers need to understand the present, not merely rely on the past repeating itself.

Having tried to predict the future movement of the markets, the portfolio manager should position the portfolio accordingly. This is another area where inexperienced portfolio managers often make mistakes. On the most basic level, a portfolio manager who does not know what positions he or she is running cannot manage them with confidence or any long term success. But while positions which depend on a single event occurring are easy to monitor, analyse and understand,

positions with multiple plays embedded in them are more complex and can confound even quite experienced portfolio managers, causing unexpected losses.

Generating active management profits is not a matter of luck. Nor does it rely on "a better crystal ball" – ie some superior forecasting techniques. Instead it requires methodical and disciplined processes, the maintenance of good relationships and detailed analysis of the market. Successful portfolio management needs a combination of understanding the market and understanding the positions in one's

portfolio, and portfolio managers who do not have these two understandings may
make some profits for a while but will not make sustained profits.

Risk measurement and monitoring

An important difference between active management and other parts of reserves management such as benchmark setting or liquidity management is the attitude to risk. Most central banks will adopt a relatively risk-averse approach to their reserves management operation, and risk minimisation will usually play a major role in such elements as the choice of neutral benchmark positions, the regime for controlling credit risks, and so on. As observed above in section 3.3, however,

Examples of positions with multiple embedded plays

position with yield curve and duration elements

A portfolio manager who is bearish on the market sells $10mn 5 years and buys $10mn 2 years. Although this looks like a simple shortening trade it combines both a duration (market direction) play and a yield curve play between the 5-year sector and the 2-year sector.

As a result the play can lose money even if the bearish call is correct, for example if 2 year bonds rise in yield by much more than 5 year

bonds (a bear flattening, a typical response to an unexpected tightening by the Federal Reserve).

B: A cross market position with multiple elements

A portfolio manager believes that the spread between euro bonds and US treasuries will widen, and seeks to profit by selling 5 year Treasuries and buying 5 year OBLs. This trade contains a cross market spread trade as the portfolio manager intends. But, depending on how the FX position is managed, it also contains either a currency trade (if the $ proceeds from the sale of the Treasury position are used to buy euro to buy the euro position) or, if the portfolio manager does not also undertake the FX trade, two yield curve trades (from 5 years to cash in $ and from cash to 5 years in euro). As a result, what seems on the surface like a simple spread trade between two bonds also depends on some or all of: FX rates, $ cash rates, euro cash rates and the slope of the two yield curves. There are many ways in which this trade can lose money even if the portfolio manager's expectations for the spread element of the trade prove correct. active management is materially different, in that it involves the deliberate taking on of extra risk in the pursuit of extra return. A central bank's attitude to risk is therefore an essential element of its decision on how much active management to undertake.

Although each central bank will need to establish its risk tolerance for itself, there is a well-recognised pattern to the evolution of attitudes to risk. In the very early stages of reserves management, risk is simply ignored, and is therefore not an issue. Few central banks are content

to stay at this stage however, and the next step is usually therefore for the reserves managers to calculate the risks being run.

There are a number of issues here, and some of them are explored below, but however the risks are calculated, the net result is a measurement that senior management can use to determine whether the positions being run are suitable given the central bank's overall attitude to risk.

In nearly every case where this is done the "knee-jerk reaction" is a degree of surprise at the risks being run and a strong desire from senior management to reduce them! However, this too is a temporary state and in mature reserves management operations it gives way to the realisation that proper investment management does not shun risk but uses it in a controlled way to generate returns.

The main question facing senior management is then the setting of appropriate numerical limits (ie, setting an upper bound on the amount of risk being run) to be commensurate with management's risk appetite.

A rather different question is what kind of risk measurement the central bank should adopt. This will depend on a number of factors, including the style of trading the reserves managers do, the instruments that the reserves will be invested in, the degree of sophistication of the IT systems, and so on. For a central bank whose reserves management operation is characterised by infrequent deals only, and limited to simple instruments such as straight fixed income bonds, then there is little need for a highly complicated risk

management structure and much advantage to be gained from simplicity: the simpler the risk system the less likely it is to be misunderstood by portfolio manages and senior management. However, a more active central bank which includes more complex instruments such as derivatives in its reserves management operation will wish to consider more sophisticated measures of risk. Three of the main questions a central bank will need to consider

are:

- the handling of complex positions, eg cross-market or cross-currency;
- the handling of non-linear risk;
- the frequency of risk measurement and analysis.

Single position risk, often called outright risk (eg a position long or short a holding of bonds) is comparatively simple to measure. Management can either set an absolute nominal limit for deviations from the benchmark (for example “no holding to be more than ±$10 mn from the benchmark”) or, with slightly more sophistication, employ a measure which recognises that longer bonds tend to move more in price (ie “be more volatile”) for a given change in yield levels. Two such measures are delta (duration) and PV01. PV01 (“the price value of an 01”)

measures the amount by which a holding will change in value for each 1 basis point change in yield, and can be used to compare positions held in different bonds. For example, a holding of $20 mn 4 year

bonds and a holding of $10 mn10 year bonds carry equal position risk (ie, have the same PV01 measure) despite the former being twice as large in nominal terms. This is the traditional approach to risk management for professionally managed portfolios. It is built around an analysis of the portfolio's current holdings or positions; the rationale for this is that the investor cannot predict what might happen to his portfolio, ie where his portfolio is going, unless he first knows where it is now. Because of the inherent relative stability and predictability of fixed income markets, as compared for example with equity, commodity or property

markets, knowledge of the present carries with it more certainty about the immediate future than in other more volatile markets, and a wide range of position-based measures of risk such as those mentioned above were therefore developed for fixed income portfolios.

However, these measures suffer from a number of drawbacks and limitations. Firstly, they are all static, whereas fund management takes place in a moving environment. To a certain extent, this can be overcome with simulations and what-if analysis, but the quality of the information obtained from such exercises is very reliant on the quality of the forecasts fed into them, and in addition the assumption that the investor would hold his portfolio unchanged as various scenarios unwound around him has always been a little unrealistic.

Second, the risk measures are absolute, whereas markets move between calmer and more volatile phases. A position which is justifiable in calm markets might be too risky in more turbulent times.

Traditional risk control methods, in which management for example lay down how much a portfolio may vary from a preset benchmark, struggle to respond adequately to varying market conditions, and the danger is that in order not to allow too much risk in difficult markets, management set limits so tight that no worthwhile positions can be taken even in more
favourable conditions.

Third, traditional measures are too simplistic when assessing the risks in more complex portfolios. For example, a position short $20 mn 4 year bonds and long $10 mn 10 year bonds has no PV01 risk (ie it will not gain or lose value on a general change in the level of the yield curve). But it is nevertheless exposed to changes in the slope of the curve. And similarly, a position short $20 mn 4 year government bonds and long $20 mn 4 year bonds issued by another issuer (eg an agency) has no PV01 risk either, but it is not without risk as it is exposed to spread
risk (ie the difference between yield levels on government bonds and on the other issuer's bonds).

Lastly, the traditional techniques struggle to handle newer instruments such as derivatives adequately. Even before the explosion of derivatives in the last 10 years or so, such basic and well-established investments as callable bonds (ie bonds with an embedded option) posed problems for the more traditional measures such as duration. A fall in general yield levels which results in a callable bond

being more likely to be called will shorten the duration of any holding of that bond markedly.

For all these reasons, portfolio managers have increasingly looked for different tools to assess how risky the positions in their portfolios are. Until the rise of the options markets, the main counter to all the four failings above was intuition and experience. The volatility of markets was known to be important, but before options it was difficult to quantify rigorously. Similarly, correlations between markets could be calculated, but the tools to use such correlations in mathematical risk models were rudimentary at best. A method which aims to meet these needs is "Value at Risk", or VaR. VaR is a different kind of risk measure in that it attempts to assign a probability to the riskiness or amount the position might lose. Given a probability *p* (usually 95% or 99%) and a time horizon *t* (eg 1 day or 5 days), then the statement that "a given position has VaR of $*x* mn" means that, with probability *p*, the position will not

lose more than $*x* mn over the next *t* days. Such a statement is often of great value to senior management as it coincides closely with their need to control the level of potential losses. Moreover, VaR can be used with great effect to measure not just the riskiness of a position but of a whole portfolio, even one made up of different instruments (bonds, futures, etc) and currencies, and it is therefore extremely valuable for the more sophisticated reserves management operations in which cross-market and cross-currency plays are present.

The second issue a central bank needs to consider is the treatment of non-linear risk. Such risk arises from positions which change their nature as markets move; depending on the level of the market, therefore, the risk in the position may change sharply. For example, a position in futures will usually depend on the identity of the cheapest-to-deliver (CTD) bond. At a given level of the market the CTD bond may change. In these circumstances, the risk characteristics of the futures position

will undergo a discrete and potentially quite large change. Similar discrete changes occur in options positions (eg as an option moves into or out of the money) and even, as mentioned above, in such "simple" instruments as callable bonds. More complicated financial structures have proved very difficult if not impossible to analyse with static portfolio statistics, largely because their response function to market moves (ie the way in which their price changes given a change in general market levels) is not only not linear but in many cases not even continuous or differentiable (in the mathematical sense).

For such positions, and despite the drawbacks mentioned above, the best tool for risk analysis remains scenario or "what-if" testing. This consists of recalculating the value of a portfolio under a given scenario; for example "all yields higher by 50 bp", or "all yield curves steeper". Management need to set the scenarios and

Box 3: The pros and cons of VaR

A full analysis of the calculation and use of VaR is beyond this short handbook. The methodology is still comparatively new, and not without its critics. It relies heavily on past correlations between market sectors continuing to hold into the future in calculating the probability of future losses. Those who favour the use of VaR point to its ability to reflect changing market circumstances (ie, to take into account when markets are calm and when they are volatile), its ability to combine all the positions in a portfolio into one risk measure and its relevance and ease of understanding for senior management, for whom the concept of "maximum amount we mightlose" is especially valuable.

Against this, VaR is complicated to calculate (and so reliant on IT systems – portfolio managers cannot easily calculate VaR numbers themselves while considering a trade),dependent to a great extent on the parameters chosen (the probability *p* and the time period *t*mentioned above being but two of the factors involved), reliant on the assumption that market movements are normally distributed (there is evidence that in fact they have fat tails) and open to the criticism that it oversimplifies risk in distilling a whole portfolio into just one number. Finally, critics claim that VaR can lull senior management into a false sense of security. Even using 99% probabilities, the VaR figure is not an absolute upper bound on losses or a guarantee that greater losses will not occasionally be sustained. 99% represents 3 standard deviations; 4 and 5 standard deviation events can and do occur and losses can exceed the calculated VaR figures when they do.

Must use judgment as to how likely a given scenario might be and which scenarios to test, but the method is a powerful one and often the best way to handle positions whose nature changes as markets change.

Finally, central banks have to consider how often the risks in their positions need to be calculated and monitored. To trade with confidence that they will not breach limits, portfolio managers need to be able to assess the risks in a proposed trade (an d the risks in their overall position were the trade to be done) before agreeing to the trade. The ideal is to have on-line measurement and monitoring, complete with a facility that allows portfolio managers to enter a proposed trade and examine the

consequences of doing it in real time. In this way no trade should ever result in a limit being breached. However the IT support necessary to provide this may not be practical for some central banks, and, especially for those with less complex operations or who are not using e.g., VaR, it will usually be sufficient to have a daily position report (perhaps run overnight as a batch computer job) which the portfolio managers can trade from the next day.

Limits and controls

It is stating the obvious to say that the amount of risk that the active management operation can take on has to be subject to limits and controls. These limits and controls fall into three broad categories:

– controls which identify what can and what cannot be done (eg which

markets, which currencies, which instruments the reserves managers may invest in);

– for operations, positions etc which are allowed, limits which put a numerical upper bound on how much can be done;

– for all allowed operations, details of the process portfolio managers must follow. The decision about which markets, currencies and so on can be invested in is one for senior management, and will often be taken alongside other top-level decisions such as the make-up of the benchmark and the style of the reserves management operation overall. Once set the list of acceptable markets, instruments etc will probably not change very frequently. Many central banks publish a list of what they are permitted to do, both for wider public information and accountability and to assist counterparties in serving them. Adherence to this set of controls is usually very easy to monitor and indeed if the list has been shared with counterparties they will often query any attempt to deal in unauthorised instruments themselves, thus assisting in compliance.

Numerical limits on permitted operations are also essential, to stop the portfolio managers running excessive and potentially damaging risks. Their exact form will depend on the methods the central bank is using to quantify the risks in the portfolio positions, as described in the previous section, and the absolute size of the limits obviously

depends on each central bank's own situation (overall size of reserves, risk appetite, etc).

Finally, senior management must lay down the process that portfolio managers must follow. The list below is not exhaustive but issues here will include:

- the procedure for recording trades. For example, who has the authority to trade and to enter trades into the computer system, how soon should trades be entered into the system, how should limits be checked, whether competing prices should be obtained for each trade (see Box 5 below), and so on;
- whether or not to operate a "soft" limit system. A "soft limit" is an amount or level that is below the limit set by management. It is treated as a warning that a position is approaching the limit. For example, management may set a limit of 100, and then set a soft limit of 80, with the proviso that any positions which cross the soft limit are reported. In effect, management are saying to their portfolio managers "You are allowed to hold a position with risk over 80 but management will monitor it closely to ensure you do not breach the limit of 100";

Different responses to limits

Portfolio managers react very differently to numerical limits and management should be aware of their responses when setting limits. Some portfolio managers always use the maximum available to them under the limit. This sort of person always puts the full amount they

are allowed to behind each decision. While this will maximise profits if they are right, it does not give room for increasing positions and is more
likely to lead to breaches of limits by mistake.

Another common response to numerical limits is extreme caution. Portfolio managers often like to hold some of their limit in reserve, both so that they can add to a position and to ensure they do not breach a limit by mistake. Experience shows that this response is the more
common of the two, and, perhaps surprisingly, the most common amount of usage of a limit seems to be around one-third. While this should make limit breaches very unlikely indeed, such practice risks not using the full freedom and risk tolerance that senior management would
like to see used, and can mean lower returns as a result.

- the procedure for handling limit breaches: how they are reported, to whom, and whether breaches should involve disciplinary measures;
- how to handle breaches that arise because of a movement in market
rates. A position which is within limits when opened may subsequently move outside limits as a result of market movements. Typically the two responses that management can have to this are firstly to sanction the breach, or secondly to require that the position

be brought once again within limits. There are advantages and disadvantages to both; the former results in positions which have more risk than management would normally allow, while the latter may result in positions being forcibly reduced or even closed at disadvantageous prices.

Compliance and the Middle Office

Compliance

A central bank's reserves management operation is subject to various constraints. Some of these constraints are "hard" constraints, such as the number of staff thecentral bank has, the state of its IT systems and accounting systems, its ability

Box 5: Competition in prices

The issue of whether portfolio managers should be required always to obtain competing prices for every trade (ie, prices from a number of different sources to prove they have dealt "at the best terms") is often debated. In the past, when markets were often relatively opaque to central banks and the market level or price of a bond was not immediately clear, there was much merit in the practice. Today, with the much greater access to live market prices, there is less need,

though for routine outright deals executed at the initiative of the central bank a case can still be made for putting a group of counterparties in competition, not least because the knowledge that they are from time to time in competition helps ensure they make a habit of offering keen pricing.

Two cases however where portfolio managers should not be required to obtain competing prices are firstly where they have a very large order to execute, and secondly where a trade is proposed to the central bank by a counterparty. In the first instance, asking more than one counterparty to price the deal merely advertises the central bank's position widely; for large positions this may make it more difficult to execute on fine terms. And in the second instance, to ask counterparty B to price up counterparty A's idea may at best be unproductive (B may not be positioned to do the deal) and at worst may discourage A from showing the idea in the first place.

In general therefore, an absolute requirement to show competing prices on all trades is usually best avoided actually to settle in the back office the trades done in the front office, and so on.

These are explored more in section 6.4 below. Other constraints are more "soft" constraints, such as the style of business, protecting the central bank's reputation for integrity, and operating within the law and within any contracts that have been signed. Compliance is mainly aimed at ensuring that adherence to all these soft constraints.

Compliance has four main functions:

−For the central bank itself, compliance to its own rules and the rules of the market will protect its reputation for proper conduct.

−For the owners of the assets (whether the central bank's own management or some other part of the authorities such as the Finance

Ministry), compliance ensures that their assets are being managed safely and in accordance with their wishes. Compliance ensures that the rules, limits and controls that management set down are adhered to, and that the assets are available for use as and when required.

−For the central bank's counterparties, compliance provides the confidence that the central bank is acting legally and properly. Compliance ensures that the portfolio managers have the authority to trade and that the deals so done will not be struck down as illegal or exceeding the central bank's powers.

−For the central bank's reserves management staff, compliance gives them guidelines on the proper conduct of their business, and the security that providing they follow those guidelines they will be protected against recrimination and being asked to bear undue responsibilities in the event of problems.

There are five main elements of Compliance. These are Legal, Regulatory, Risk measurement, Credit risk control, and Ethics, or the general conduct of business. With regard to Legal Compliance, central banks in general and their reserves management operations in particular, are not above the general law and must ensure that they obey it. This is particularly the case with any activities conducted

outside the jurisdiction of the domestic legal system, as of course so much of

reserves management is, because here the central bank cannot expect any special treatment from the courts in the event of a dispute. Central banks will also need to ensure that their business relations are concluded with proper contracts, and these should be so drafted as to protect any special rights the central bank has (for example sovereign immunity, freedom from domestic taxation and withholding tax, etc). Finally, a very important part of Legal Compliance is to check that

changes in the law do not invalidate existing arrangements.

Regulatory Compliance is similar to Legal Compliance, but is more concerned with the regulations of the markets that the central bank is operating in rather than the general law. Central banks are not exempt from regulations set by other authorities. Generally the more commercial their activities, the more they will be subject to regulations. On the other hand, a central bank may well be outside or exempt from regulations in its own country, whether set by itself or by other parts of the home authorities. However, before a central bank decides not to comply with domestic regulations, careful thought is required as to why they should be exempt. The importance of Risk Measurement and Monitoring has been described in chapter 5 above. It is best practice to have risk measured and reported by someone other than the portfolio managers, to provide an independent check on their activities. Often this fits most neatly into a compliance

function, and this is the subject of section 6.2 below. One important difference between risk controls and legal and regulatory constraints is that the risk limits are internally set constraints, and the consequences of a breach are therefore in the main internal rather than public. Credit Risk controls, and in particular the decision on whether or not to deal with another bank or institution, are a special case of risk measurement. However, they merit special treatment because of the position central banks have in their domestic banking system. A decision not to accept a bank as a counterparty may well be misinterpreted by the market, who will wonder whether the central bank knows something about the soundness of the bank in question. It is therefore vital that the credit risk function is separate, and is seen to be separate, from any banking supervisory duties the central bank has. How separate is for each central bank to decide i.e., whether there is a complete ban on the passing of information from the supervisors to the reserves managers, or whether some information, say of a more general nature, can pass and if so at what level of management. The final part of compliance, the Conduct of Business, is a nebulous subject, with no hard edges. Often counterparties will be more forgiving of a central bank than they might be of other market participants, and will be willing to do what a central bank asks of them even if it is unusual or verging on the unethical. It may seem therefore that a central bank has considerable latitude in how it chooses to conduct its reserves management business, and that it can "get away" with sharp practice. However this

is a short-sighted approach. Central banks are generally very highly regarded for their ethical standards, and this is worth protecting. A central bank that is caught bending ethical rules may find its reputation takes a long time to recover. Moreover, all central banks are the losers if any member of the family is a major transgressor of the unwritten rules of behaviour. And a central bank's
ability to require other market participants to operate in accordance with a market code of conduct will suffer if it is known to have a lax attitude itself to obeying market standards.

In summary, compliance may not seem important but it is an essential element of successful reserves management. Some compliance issues concern the law, and these should always be a priority. Others concern risk control; these too are essential for anything other than the simplest operations. Ethics may seem the optional extra but attention to ethical standards is crucial to preserving a central bank's reputation and ability to deal effectively. Weak compliance standards will not necessarily result in immediate losses either in returns or in reputation, but it will damage a central bank's long-term success, and not only in the area of reserves management.

Fast forward

The nation's bank in the 21st century

GHANA'S ECONOMY ENTERED THE 21ST CENTURY RAVAGED BY inflation. On assuming office, President John Agyekum Kufour committed his administration to macroeconomic discipline and the pursuit of stability.

Four decades of chronic deficit financing had corroded the economy. The central bank's independence, mandated in 1957, had long since evaporated in the wake of the 1963 Act which had, in effect, made the Bank the fiscal tool of government. It granted extensive rights to the Minister of Finance, rendering the Bank powerless in the policy-making process and unable to take corrective measures in the event of a monetary crisis. For example, it vested the power to determine interest rates in the government; political consideration rather than economic ones could prevail.

Free market rules, or no rules at all, had played havoc with monetary policy when, as the 20th century closed, governor Kwabena Duffuor sought to make a start in bringing discipline to the scene. His successor as Governor, Dr Paul A. Acquah, picked up the baton. As he saw it, Ghana, with a GDP of almost ¢50 billion cedis, fitted the typical small open economy model. Nevertheless, there were several practical complications:

- Commodity imports accounted for 50 per cent of GDP and most payments were redenominated in US dollars. Cocoa and gold accounted for 60 per cent of export earnings and the inflows

were seasonal. Oil imports were about a third of imports, and oil payments were large and lumpy. Taxes related to international trade made up 23 per cent of total government revenue. This meant that the economy was exposed to recurring shocks and cyclical swings in international commodity markets.

- The trade and payments system was free of restrictions for current international transactions; such controls as were in place could be ingeniously circumvented.
- The exchange rate floated freely, and interest rates were fully liberalized; the interbank exchange rate co-existed with daily quotations in an extensive retail market.
- The structure of the central government budget was such that significant portions of the deficit were typically financed on the domestic market through Treasury bills. The funding levels were volatile. Persistent budget deficits led to a large stock of public debt, much of it taken up by the central bank, fuelling inflationary pressures
- Strong inertial inflationary expectations were embedded in the economy due to a history of high inflation and exchange rate volatility. This had allowed dollarisation to take hold. Significant foreign exchange deposits were held in the banking system.
- Because of the lingering confidence problems and high transaction costs, a large proportion of the money stock was

held outside the banking system and was highly dependent on the cocoa season.

- Finally, the economy was surrounded by countries in the CFA franc zone that had low inflation and currency stability. Their currency, managed by a common central bank, had been pegged to the French franc, and now the euro. Many of these countries produced the same primary commodities for export as Ghana; unrecorded cross-border trade permitted price-related diversion of export products and arbitrage in currency trading.

It was against this background that the Bank0o of Ghana and its new Governor, Dr Acquah, began to reinvigorate discipline monetary policy, 'to promote and maintain the stability of the currency of Ghana, and direct and regulate the currency system in the interest of economic progress'. Empowerment came with a new Bank of Ghana Act 2002 (Act 612). It was a landmark in the history of the BoG, providing for operational independence and autonomy so that the central bank could function as is the case in most developed and rapidly developing countries. The act state that:

1. The primary objective of the Bank is to maintain stability in the general level of prices
2. without prejudice to subsection (1) the bank shall support the general economic policy of the government and promote economic growth and effective and efficient

> operation of banking and credit systems in the country, independent of instructions form the government or any other authority.

The act also enhanced the Bank's powers to concentrate on its core business. An innovative provision in the bank of Ghana act was the establishment of a monetary policy committee to be responsible for (a) the initiation of proposals for the formulation of the monetary policies of the bank, and (b) the provision of the statistical data and advice necessary for the formulation of monetary policies.

The monetary policy committee was inaugurated on September 9, 2003, by president kufour. It consisted of the governor (Paul Acquah) the first and second deputy governors (Mr. E Asiadu-Mante and Mr. L. Van Lare Dosoo) the banks head of monetary policy analysis (Mr. Kassim Yahya) The head of banking operations of the bank (Mr. Millison Narh); and two ministerial appointees Dr. Nii Kwaky Sowa of the centre for economic policy analysis, and Dr Bartholoma Nii Armah of the institute of Economic Affairs.

In his inaugural address, the president observed that in the past, over interference of government in the management of monetary policy led to hyperinflation, budget deficits and general economic instability. It undermined good accounting practices and generated economic malaise and political instability of the state. It is worthwhile to point

out that a successful central bank is not one that adopts a rigid and theoretical stance on the independence given it by the law. A better central bank is one which recognizes the political and economic reality in the management of monetary policy. Money cannot be managed in a vacuum. Flexibility should be the watchword and there need to be constant and functional consultation between the Bank and the fiscal and executive authorities of state'.

The committee's policies are directed at controlling inflation. At bi-monthly meetings, it assesses economic developments in the country and considers threats to macroeconomic stability – high oil prices, for example. The committee also reviews forecasts of future price developments to guard against transient price shocks, a process assisted by the Bank's transparent communication with market participants. It then sets the prime rate which signals the stance of the monetary policy.

Governor Acquah had determined to redirect macroeconomic policy from one of 'considerable fiscal relaxation and monetary accommodation to one of fiscal and monetary stringency'. Ghana has been under a regime of fiscal dominance that fits the classic textbook account: a regime in which fiscal considerations drive government spending, determine the size of the government budget, and where the budget shortfall is financed by the central bank by raising seignorage revenue (through in inflation tax). An independent central bank need

not accept the need to provide such seignorage. As well, a strong parliamentary budget oversight that enforces disciplined fiscal rules need not accept seignorage targets that are inconsistent with stability and output goals.

There is no dispute that the interaction of fiscal dominance and monetary policy explains much about current economic conditions: the money market is driven by the dynamics of the domestic public debt, which for some time has been snowballing and now needs to be stabilized. Regulations exist that essentially seek to cope with the effects rather than attempt to deal with the causes of macroeconomic instability – factors, including dollarisation, that also constrain the development of efficient financial markets.

The essence of the task of monetary policy is to find ways of strengthening the credibility of macroeconomic policies and of breaking entrenched inertial inflationary expectations and intrinsic fears of episodic fiscal surprises.

A year into Governor Acquah's tenure, inflation had declined from 40.5 per cent to 21 per cent. With relative stability returning to the foreign exchange market, the depreciation of the cedi against the US dollar slowed to less than 5 per cent as against 49.5 per cent in the previous year. By 2006 the depreciation against the dollar was 1.1 per cent. Furthermore, international reserves increased by US$57 million,

which was equivalent to 1.5 months of import cover, compared to less than one month at the end of the previous year.

Monetary policy over the last five years has had to be focused on breaking the strong inflation expectations and the cycle of currency depreciation in the economy. The central bank, therefore, armed with its new statutory independence under the Bank of Ghana Act (2002) and its newly-strengthened supervisory powers under the Banking Act, has pursued the goal of price stability through an inflation-targeting process, within a monetary-fiscal programme oriented towards stabilisation. Anti-inflationary monetary policy provided support to the government progamme of fiscal consolidation in which the domestic debt to GDP ratio was cut from 23.7 per cent in 2002 to 14.7 per cent in 2006. This was achieved on the back of strong government revenue growth (an increase of six percentage points of GDP to 24 per cent over the period) and with the aid of external debt relief (under the heavily Indebted poor Countries initiative and the Multilateral Debt Relief initiative).

The economy has responded well to these policies. The economic stabilization has taken hold with significantly reduced inflation, rising output growth, improved external account balances and rising foreign exchange reserves. Headline inflation has been reduced from 40 per cent to just above 10 per cent at the close of 2006 and is projected to fall within single digits in 2006 – a key objective of monetary policy.

The exchange rate of the cedi has been relatively stable against the major currencies. GDP growth has risen steadily from 4.5 per cent in 2001 to 6.2 per cent, averaging 5.5 per cent over the past five years.

On the basis of the Bank's revitalized performance, Ghana obtained its first sovereign rating of B+ in 2005, and a recent assessment which maintained the B+ rating with a January 2007 upgraded positive outlook by Fitch Ratings. The solid foundation laid by the central bank since the beginning of the 21st century has raised the prospects of Ghana gaining access to international capital markets.

A programme of structural and policy reform in the financial sector has been implemented over this period aimed at positioning the sector for growth.

Universal banking was introduced in 2003 to replace the three-pillar banking model which segmented the sector into development, merchant and commercial banking. The policies leveled the playing field and opened the financial sector to competition and entry of new banks. The banking industry has grown into 23 universal banks diversified in geographical origin, corporate character and reach in the global financial markets. In line with the central bank's recapitalization policy, banks are now well capitalized, sound and liquid; and the industry's expanding loan portfolio has improved in quality. The sector is now positioned to facilitate effective delivery of

financial services. The policy priority is to develop an efficient domestic capital market underpinned by a payments infrastructure and settlement system that would make the financial system robust, competitive and resilient.

To establish the foundations for such a market for capital and financial markets, the critical components include the Real Time Gross Settlement system (RTGS) for high value inter-bank settlements. The Central Securities Depository system (CSD) introduced a year ago ensures electronic security of title to investments in government debt instruments and would soon be extended by legislation to cover equities and securities listed on the Ghana Stock Exchange. The retail payment system infrastructure will be complete with the installation this year of a common platform with a domestic switch for all banks together with a smart card based on biometric identification that can be sued for a wide range of payment transactions on a safe, efficient, and low-cost basis. This will provide an adequate framework for the central bank to monitor the smooth functioning of the payment system and to ensure financial stability and maintain public confidence.

Human resource, technological advance

Fundamental to achieving the Bank's overall ambitions was an upgrade of its own working practices. Necessarily, the process began with scrutiny of levels of staffing, some of them harking back to an

earlier age of banking. The Human Resource Department published a plan whereby volunteers might leave with attractive compensation packages, including incentives and counseling. The Governor introduced PIP – the Process Management Improvement Programme – designed 'to ensure optimal performance in all areas of operation; to achieve a streamlined organization that consolidates like functions and processes, and eliminates waste, redundancies and obsolete systems; to increase speed, effectiveness and efficiency in the delivery of services throughout the Bank, and to reduce costs and increase revenues year on year'.

Staff training is a crucial element here. A new training centre is part of the Cedi House refurbishment; strong emphasis is placed on in-house seminars and professional training complemented by foreign training programmes to enhance staff skills in the core areas of the Bank's mandate. In line with the objective of recruiting and retaining the best people, a thorough review of compensation packages is taking place and working environments are being improved, as at the Cedi House and the Takoradi regional office.

Governor Acquah's PIP project dealt first with organizational streamlining, then it moved on to technological innovation, enabling the Bank to operate with the same tools as international financial institutions, and those of the commercial banks it regulates. A project known as Impact 05 (Integrating and Modernising processes to

Achieve Continuous Transformation), launched in February 2005, injected information and communications technology into the Bank's activities: a state-of-the-art data centre and a local area network linked head office and regional centres.

Customer service now benefits from access to online information. The bank has taken steps to develop a fully automated cheque processing system, Ghana Inter-bank Settlement System; it has joined SWIFT (the Society for Worldwide Inter-bank Financial Telecommunication), instituting a full complement of internet and e-mail facilities and currency counting and processing systems.

In November 2004, the Bank established the Central Securities Depository (CSD) system as part of the measures to support the development of a bond and equity market in Ghana. The main objectives of the CSD system are: (a) to serve as a central location where records of beneficial ownership of debt and equity instruments are recorded in electronic form; (b) to undertake the transfer of securities by book entry and to clear and settle payments for such securities; and (c) to promote the replacement of paper or physical certificates of securities with electronic book entries in the depository. Furthermore, the CSD has opened accounts for investors in government securities through participating banks, discount houses and brokerage firms. Bills issued by the government as well as electronic certificates are maintained for holders of such bills.

Ultimately, electronic booking will affect listed equity and debt securities on the Ghana Stock Exchange, over the counter securities, mutual funds and unit trusts. Through all these measures the Central bank is continuing to develop a secondary and liquid market for government debt instruments and building a secure environment around the capital market infrastructure to improve security and investor confidence.

Finally, the BoG has developed a system-wide Business continuity Plan to ensure that in the case of major crisis the Bank will continue to operate. The plan will guarantee a systematic maintenance and recovery of operations so that there will be no interruption of the Bank's activities resulting from natural disasters, technological failures, human error or terrorism. In addition, the Bank has improved its security systems with the installation of close circuit television surveillance, access control for personnel and vehicles, walk-through metal detectors, and fire and intruder alarm equipment. With all these measures in place, the Bank can boast of maintaining a good housekeeping operation.

Good housekeeping involves the Bank's confidence in its internal operations and in its ability to be proactive with customers and colleague institutions. Therefore, review and reform procedures are high on its agenda at all times.

A new payment infrastructure is directed at reducing risks and increasing efficiency in payment and settlement systems to that they will be in line with current international standards. The first phase of the Bank's Payment Systems Development Programme – the period from 1995 to 2005 – included the automation of cheque clearing, the establishment of a Real Time Gross Settlement system and the introduction of the paper credit clearing system. This was followed by the replacement of the image-based automated cheque-clearing system by electronic cheque clearance and the introduction of an Automated Clearing House to handle bulk electronic debit and credits.

To encourage the introduction of electronic retail payment products within the banking community in Ghana, the BoG is currently introducing platforms to ensure interoperability among automated teller machines owned by different banks (the Ghana National Net Settlement Service has linked more than 70 ATMs of five banks), networked Electronic Funds Transfer at Point of Sale systems, e-money or stored value cards and telephone and internet banking.

The introduction of the Ghana Inter-bank Settlement (GIS) system provides a real-time gross settlement service for banks to make high value or time-critical payments on their own behalf and on behalf of their customers., the system also allows for the settlement of not clearing positions of banks from the cheques (debit) and credit clearing systems as well as the payment log of Treasury Bill

transactions from the Central Securities Depository. For example, payment transactions through the GIS system for 2005 showed that during the year the volume and value terms increased to 48,749 and ¢372.168.50 billion. Similarly, with respect to low-level payment, the cheque and other instruments Clearing System remained the most important inter-0bank paper payment stream in terms of volume and value. Although widely used by various businesses, its use by individuals continued to be limited as a result of its many shortcomings. The volume and value of cheques cleared in 2005 increased to 4.776,690 and 122,290.93 billion.

The paper Credit Clearing System, which was introduced in 2004, continued to offer a safe and more efficient method for making small-value payments. The volume and value of credit clearing operations in 2005, for example, increased to 11,260-,000 and ¢149,771.63 billion.

The central bank provides technical support for the legal and regulatory framework of the country's financial system. With other stakeholders, the central bank has initiated the consideration of a number of financial sector bills for enactment into law. Their status is as follows:

The bill & Cheques Bill and The Money Laundering Bill are still in draft;

The Foreign Exchange Act, 2006 (Act 732) provides a legal framework for liberalized capital account. It overhauls the Exchange Control Act of 1971 (Act 61), removing the uncertainty about the rules governing transactions in the foreign exchange market, investment and capital flows into the country It simplifies the documentation and approval procedures that burdened the system, thereby liberalising the system and effectively opening the economy to the global markets;

The Banking (Amendment) Bill – passed by parliament, but yet to be sent to the President for assent – deals with offshore banking, establishing an International Financial Service Centre for international banking services to mange non residents' deposits, funds and transactions in a country other than the country of the depositor.

The bill introduces three licensing structures: Class I, Class II and General Banking. Class I provides domestic banking business; Class II caters for international banking or investment banking in currencies other than local currency, and allows for trading on foreign exchange business licence is to provide both domestic and international banking business.

Reports and controls

Armed with a new Bank of Ghana Act, the BoG has heightened activity in its commitment to accountability and transparency in all

sectors of its operations, in keeping with international standards and best practices. The Bank has continued to comply with the International Financial Reporting Standards in its reporting and disclosures. The Bank has also been implementing the risk-based audit which was adopted in 2004 in compliance with international practice as stipulated y the Institute of Internal Auditors.

The Central Bank commenced its restructuring process in 2002 beginning with an organizational change that will reposition the Central Bank to refocus its attention on it score business.

Control by committee

Five committees currently advise and supervise the functioning of the Bank: Human Resource, Corporate Governance, Economy and Research, Strategic planning and Budget, Audit.

The Human Resource Committee assesses and establishes policies and procedures relating to recruitment, training, staff performance and reward systems.

The Corporate Governance Committee deals with bank regulation and supervision, external relations, the general functions o the Bank and compliance wit statutory obligations.

The Economy and Research Committee is responsible for economic, banking and financial matters, and collaborates with the Research Department.

The Strategic Planning and Budget Committee advises on major policy issues. The Audit Committee establishes the Bank's accounting procedures and controls. It ensures compliance with statutory and international requirements, and considers audit reports on the Bank's operations.

A wide-raging agenda

Other issues that may come to the attention of the Board from time to time include: the rural banking system in Ghana; the introduction of the National Health insurance Scheme and its implications on health service provision for Bank staff; medication of risk assessment methodology to protect the Bank's position; the pravitisation programme in Ghana; the salt industry.

Continuing change

In June 2003, the Bank launched its 'Reshape The Future Programme', with the objective of downsizing the organization and outsourcing non-core functions. The first phase was the institution of a voluntary early retirement scheme which resulted in the departure of 483 staff members. With the deployment of currency processing machines, 427 cash counters were also disengaged from the Bank.

To avoid duplication f work and to benefit from synergies, the Bank has de-emphasised development financing as a direct central bank function. It has merged the Rural Finance Department with Financial Markets, and Non-bank Financial Institutions with parts of other departments. The creation of new departments such as Money Policy and Financial Analysis provides statistical and analytical support to the Monetary Policy Committee. The External Financial Relations Department was created to manage the Bank's relationship with other national central banks and international financial institutions such as the IMF and the World Bank.

A Special Studies Unit created within the Research Department to analyse economic and financial issues and their implications for price stability. The Research Department also has a Financial Sector Stability Analysis Unit that proposes measures to prevent systematic crisis within the sector and performs stress tests based on capital adequacy, profitability and liquidity of the various banks in Ghana.

A Performance Management Unit within the Human Resource Department is devoted to increasing staff productivity. To enhance the quality of public debt management, the Bank has also established a Division on Public Debt.

The Bank's Investigation and Consumer Reporting Office (ICRO) serves as the main watchdog organization in Ghana's banking industry, primarily to ensure that high quality service is provided by the banks. It aims to protect the rights of customers and advise and inform on their fights and responsibilities. Further, it reviews reports on fraud and defalcations in banks to determine their nature and scope; and it maintains a database of ex-bank staff whose departures were due to fraudulent activities so as to prevent their reappearance in the banking industry.

The Bank's strong prudential supervision continued o support the building of a sound, competitive and resilient financial system, moving to a risk-based approach with its focus on continuous assessment of institutions on-and off-site.

A financial Investment Trust (FIT) was formed by the Bank in 2001 to handle the Bank's interest in several subsidiaries and companies which it helped to establish in the past, when the Bank was requested to serve those functions. The FT now owns and manages the Bank's investment portfolios.

Unfinished business

The Bank's progress is, of course, not conducted in isolation. It contributes to and reflects the surrounding society. Operating in a climate f democratic security and political stability, where its prudent

fiscal and monetary policies are confidently practiced, the Bank encourages private-sector led growth and reassures foreign investors that Ghana is a good destination for their funds. The Ghana Stock Exchange has been among the world's top performing exchanges; Ghana is set to become the financial hub of West Africa.

SELECTED BIBLIOGRAPHY

There is a very wide range of books on investment management, and an equally wide range of books on bond mathematics. For the latter, the following may be of interest:

Forthcoming Bank of England CCBS handbook "Basic Bond Analysis". To obtain a copy see www.bankofengland.co.uk/ccbs/ccbshand.htm

On the specific subject of reserves management, a seminal work is:

Blackman, Dr Courtney "Managing foreign exchange reserves in small developing countries", published by the Group of 30 as Occasional Paper No 11, 1982. Two more recent expositions of the issues are given by:

Cassard, Marcel and David Folkerts-Landau "Risk Management of sovereign assets and liabilities", IMF Working Paper WP/97/166, 1997. Has an extensive bibliography attached. Contact www.imf.org

Greenspan, Alan "Currency reserves and debt". paper given to the World Bank Conference on reserves management, Washington DC,

April 1999. See

www.bog.frb.fed.us/boarddocs/speeches/1999/default.htm

For a further discussion look at: Nugée, John "The use of external managers in central bank reserves management", in the Hong Kong Monetary Authority Quarterly Bulletin, Issue number 8 (August 1996). See www.hkma.gov.hk For a consideration of the optimal duration of reserves, look at the following paper: Ilmanen, Antti "Does duration extension enhance long-term expected returns?",

Salomon Brothers technical fixed income research, July 1995. Contact the author direct at Salomon Smith Barney for a copy, address antti.ilmanen@ssmb.com Several central banks describe their reserves management practices in detail in their annual reports. The following list is by no means exhaustive: Reserve Bank of Australia

www.rba.gov.au

Hong Kong Monetary Authority www.hkma.gov.hk

Reserve Bank of New Zealand www.rbnz.govt.nz

Handbooks in this series

The CCBS has continued to add new titles to this series, initiated in 1996. The first 14 are available in Russian, and the first eleven in Spanish.

1 Introduction to monetary policy

2 The choice of exchange rate regime

3 Economic analysis in a central bank: models versus judgement

4 Internal audit in a central bank

5 The management of government debt

6 Primary dealers in government securities markets

7 Basic principles of banking supervision

8 Payment systems

9 Deposit insurance

10 Introduction to monetary operations

11 Government securities: primary issuance

12 Causes and management of banking crises

13 The retail market for government debt

14 Capital flows

15 Consolidated supervision

16 Repo

17 Financial Derivatives

18 The Issue of Banknotes

Handbooks: Lecture series

As financial markets have become increasingly complex, central bankers' demands for specialised technical assistance and training has risen. This has been reflected in the content of lectures and presentations given by CCBS and Bank staff on technical assistance and training courses. In 1999 we introduced a new series of *Handbooks*: *Lecture Series.* The aim of this new series is to give wider exposure to lectures and presentations that address topical and technically advanced issues of relevance to central banks. The following are available:

1 Inflation Targeting: The British Experience

2 Financial Data needs for Macroprudential Surveillance -

What are the key indicators of risks to domestic Financial Stability?

All CCBS Handbooks can be downloaded from our website

www.bankofengland.co.uk/ccbshand.htm

BOOKS

The CCBS also aims to publish the output from its Research Workshop projects and other research. The following is a list of books published or commissioned by CCBS:- Lavan Mahadeva and Gabriel Sterne (eds) (October 2000): *Monetary Frameworks in a Global Context,* Routledge. (This book includes the report of the 1999 Central Bank Governors symposium and a collection of papers on monetary frameworks issues presented at a CCBS Academic Workshop). Liisa Halme, Christian Hawkesby, Juliette Healey, Indrek Saapar and FaroukSoussa (May 2000): *Financial Stability and Central Banks: Selected Issues for Financial Safety Nets and Market Discipline*, Centre for Central Banking Studies, Bank of England*. E. Philip Davis, Robert Hamilton, Robert Heath, Fiona Mackie and Aditya Narain (June 1999): *Financial Market Data for International Financial Stability*, Centre for Central Banking Studies, Bank of England*.

Maxwell Fry, Isaack Kilato, Sandra Roger, Krzysztof Senderowicz, David

Sheppard, Francisio Solis and John Trundle (1999): *Payment Systems in Global Perspective*, Routledge. Charles Goodhart, Philipp Hartmann, David Llewellyn, Liliana Rojas-Suárez and Steven Weisbrod (1998): *Financial Regulation; Why, how and where now?*

Routledge. Maxwell Fry, (1997): *Emancipating the Banking System and Developing Markets for Government Debt,* Routledge.

Maxwell Fry, Charles Goodhart and Alvaro Almeida (1996): *Central Banking in Developing Countries; Objectives, Activities and Independence,* Routledge.

Forrest Capie, Charles Goodhart, Stanley Fischer and Norbert Schnadt (1994): *The Future of Central Banking; The Tercentenary Symposium of the Bank of England*, Cambridge University Press.