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Taxation of Financial Intermediation

Measurement Principles and Application to Five African Countries

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and
Patrick Honohan

Hidden taxes on the financial system, such as interest rate ceilings, reserve requirements, and the currency tax are often heavier than explicit taxes. Interest rate ceilings may distort financial intermediation more than other taxes.

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This paper — a product of the Financial Policy and Systems Division, Country Economics Department — is part of a larger effort in PRE to examine the effects of economic regulation on the financial sector. Copies are available free from the World Bank, 1818 H Street NW, Washington DC 20433. Please contact Wilai Pitayatonakarn, room N9-003, extension 37666 (83 pages with figures and tables).

To measure distorting taxes (explicit and implicit) on the financial sector of five African countries, Chamley and Honohan view taxation more broadly than is customary.

They go beyond the currency tax and reserve requirements to include the quasi-tax effects of interest rate ceilings. Under this broader approach, the true scale of taxation on financial intermediation is much higher than is commonly appreciated.

The level of tax has varied widely over time and between countries, but has been a significant element in total government revenues, especially during fiscal crises induced by commodity slumps. Between 1978 and 1988, this kind of tax accounted for an average 4 percent to 7 percent of GDP in three of the less macroeconomically stable economies (Ghana, Nigeria, and Zambia) and close to 2 percent of GDP in the two more stable economies sampled (Côte d'Ivoire and Kenya). Expressed as a percentage of M2, the tax rate has gone as high as 90 percent.

By any reckoning, the financial sector has been more heavily taxed than other sectors. Even excluding the currency tax, which does not directly affect the banking system, taxes collected averaged the equivalent of several times the value added of the banking system in the three high-tax countries. That is a serious disincentive to financial intermediation and surely too high for economic efficiency.

Different types of tax distort behavior differently. In relatively less developed financial markets such as the five studied, interest rate ceilings may impose higher welfare costs than explicit taxes or reserve requirements.

Surges in inflation in the five countries correlated with high taxes on the financial sector. Governments reforming taxes on the financial system should consider building in mechanisms (adjusting administered interest rates, for example, or moving to explicit, such as value-added, taxes) to reduce the sensitivity of financial sector taxes to the inflation rate.

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TAXATION OF FINANCIAL INTERMEDIATION:

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Christophe Chamley and Patrick Honohan

1 INTRODUCTION

The wide variety of financial structures and financial experience in sub-Saharan Africa motivates our study. Most countries in the region have experienced boom and bust cycles in their primary export products and this has contributed to macroeconomic imbalances. In several countries the result has been a very variable inflationary experience, with episodes during which financial intermediation has been carried out under the most difficult circumstances, particularly when inflationary surges have been accompanied by nominal ceilings on interest rates. Other countries - notably, but not exclusively, those in the Franc and Rand zones - have experienced low inflation in most years.

Although the authorities may not have thought of themselves as doing so, they have, to a greater or lesser extent, been imposing taxes on financial intermediation. The purpose of this study is to set out a practical method for analyzing how inflation, interest ceilings, reserve requirements and like impositions have had tax-like effects and how they can be compared with explicit taxes. Using this method we compute estimates of the varying magnitudes of the total taxation of financial intermediation in five African economies during recent years. Our study has continued by exploring the macroeconomic and fiscal dynamics which, in our view, have contributed to the use of heavy taxation on the financial sector in certain countries and for certain periods. Finally we examine the likely impact of these taxes on efficiency.

2 FINANCIAL SECTOR TAXATION: DEFINITION AND MEASUREMENT

2.1 Explicit and implicit taxes

In most countries a variety of tax and quasi-fiscal instruments affect financial institutions and financial intermediation. Some are explicit taxes and are included in the tax code. Others are not defined explicitly and are not treated as taxes in the budget accounting. Yet these implicit forms of taxation, or quasi-taxes, can be the most powerful tools for generating revenues from the financial system. The debate on the taxation of financial system and on seignorage is often confusing because the fiscal instruments are not properly defined.

Explicit taxes. Included among the explicit taxes may be any or all of:

- tax on gross receipts of banks,
- value added tax,
- tax on loan balances,
- taxes on bank transactions (e.g. stamp duties),
- tax on bank profits.

These taxes are all included in the tax code and in budgetary accounting. As with other taxes, the rates may change, but the changes tend to be relatively small. Furthermore, any changes are normally announced in advance and specified as part of the tax code. The amount of revenue that such explicit taxes on the financial system generates may be significant, but rarely exceeds five per cent of the amount of financial assets.

In our calculations of explicit taxation we concentrate on the taxes imposed on interest income or on value added. Transactions taxes are both small in the sample countries and arguably of minor importance in the context of intermediation services. Bank profits taxes are part of the normal income tax code (subject to a caveat noted below).

In addition to explicit taxes on the financial sector (and generally dwarfing these in importance) are other forms of government intervention such as interest rate ceilings, reserve requirements and the implicit tax on currency holdings. Though there are other reasons for some of these interventions[1], their main objective is to secure credit for the government itself or for preferred sectors at lower than market interest rates. Presumably the government could achieve the same allocation of credit by

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1 It is hard to find a convincing argument that such quasi-fiscal instruments are corrective measures rather than distorting ones.

paying market rates of interest on its own borrowings and by subsidizing the use of credit by the preferred sectors. But this would be at the cost of imposing taxation elsewhere in the economy to cover the additional budgetary cost. Therefore they can be seen as implicit taxation.

In our sample of countries, the main implicit or quasi-taxes are

- the tax on currency,
- reserve requirements or forced lending imposed on commercial banks and carrying below-market interest rates,
- interest ceilings on bank loans and deposits.

Unlike explicit taxes, the implicit ones do not belong to the tax code and are not included in the budget. They are imposed at variable rates not specified in advance and difficult to measure even after the event. They tend to generate very variable - and sometimes very large - flows of revenue, sometimes even greater than 100 percent per annum of the initial value of the asset being taxed.

Since the rates are so variable, it is not clear how well they are anticipated by market participants and thus how exactly they enter into behavioral decisions in the market. This can make it difficult for governments to pursue a time-consistent policy with regard to such taxes[2].

Tax on currency. Under this heading is entered the implicit tax imposed on holders of currency by virtue of the fact that, unlike other forms of government debt, currency does not pay interest. The higher the rate of anticipated inflation, the higher the nominal interest rate that is being avoided. Government can avoid paying interest on currency because it retains a monopoly of issue, and it is this monopoly profit that constitutes the tax. The currency tax is often referred to as seignorage (a term which, as explained in a later section, has several different but closely related meanings).

Note that the institution of currency does provide intermediation services. The holding of currency represents a very liquid claim - much more liquid than other forms of lending to the government, and it transfers loanable funds from the holder to the government. For this reason we have not hesitated to include the currency tax as part of the taxation of financial intermediation.

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2 A government abjuring a surprise inflation may not be credible; the market may discount such "surprise" inflations anyway.

Reserve requirements. In many countries, though not all, the Central Bank requires banks to respect certain minimum or maximum balance sheet ratios. Some of these are purely prudential ratios, such as the minimum ratio of shareholders' funds to risk assets, or the minimum ratio of liquid assets to liquid liabilities, or the maximum share of capital committed to any one borrower. Others have a function in monetary control, especially the specification of a minimum holding of designated reserve assets. Yet others amount to a forced investment in specified assets for the purpose of sectoral credit policy.

In general, a well-designed set of *prudential* requirements do not bite in the case of a bank which is operating in a "safe and sound" manner. Indeed for many developing countries the recommendation would be to increase the severity of the requirements and their enforcement. Therefore, such requirements should be seen as corrective rather than distortionary and they are therefore excluded from the scope of our study.

The use of reserve requirements for *monetary control* follows a variety of models, but the essential feature is the imposition of a requirement on each bank to hold a minimum amount (in proportion to either credit outstanding or deposit liabilities) of specified reserve assets, usually including vault currency and specified deposits with the Central Bank. The total supply of the reserve assets is potentially under the control of the Central Bank. If the requirement is biting, then by altering the supply of reserve assets, the Central Bank can achieve a change in the monetary aggregate (credit or deposits) to which the required ratio is expressed. A system of reserve requirements is sometimes held to be more effective if it involves a slight penalty, ensuring that the requirement bites.

Typically, however, the designated reserves all carry a very low interest rate - often zero - with the effect that the penalty bites more than is necessary. In effect the difference between the market interest rates on short-term securities and the interest rate (if any) paid on the designated reserves represents a tax. Once again, as in the case of currency, the government is borrowing at below market interest rates.

Some may argue that, since banks would hold some cash reserves anyway and considering the high liquidity of the reserve assets, these assets should not bear a high interest rate. However, minimum vault cash needs for banks are very small. Furthermore, the reserve assets are not all that liquid considering that they are not available, dollar for dollar, to meet a

deposit withdrawal so long as the reserve requirement remains in effect. For the most part the reserves absorb resources that would otherwise be lent out at a remunerative rate of interest.

The tax equivalent of interest rate ceilings. In many countries there are ceilings on bank lending rates. These serve a variety of policy objectives. For instance, they may inhibit unsustainable speculative or distress borrowing by unsound banks. But in many cases the interest rate ceilings are well below what would be market-clearing rates even in the absence of such prudential problems. The gap between the market-clearing rate and the ceiling can be considered as a tax.

To the extent that government is the borrower, the benefit of the tax goes directly to it. Were it not for the interest rate ceiling, the government would have to pay out more in interest; the additional expenditure would eventually have to be covered by some tax. So the interest rate ceiling acts as a substitute for an explicit tax. Alternatively, one can see that a ceiling on bank lending rates is equivalent to a situation where, though there is no ceiling, the government imposes a tax equivalent to the difference between the ceiling and the market clearing rate of interest.

When the borrower is not the government, the proceeds of the tax are effectively earmarked for the favored borrower. Note that not all potential borrowers can get the loans they would demand at the distorted interest rate; there will be rationing. Hence the benefit does not go to borrowers as a whole, but only those who are successful in obtaining credit. In the case of a ceiling on deposit interest rates, the proceeds of the tax goes to the bank. (In either case, the ultimate incidence of the tax is, of course, a different matter.)

Equilibrium response of the financial system to taxes. All of these taxes will have repercussions through the financial system, as it responds to altered incentives. As an illustration of how a developing country financial system might respond to these taxes, a simple formal model has been developed, and is described in Appendix 1. It is confined to the steady state and shows how uncontrolled interest rates, bank lending and screening behavior and the government's budget may be affected by such taxes. The model assumes that bank lending rates are controlled and that reserve requirements are in effect, but that deposit rates are freely negotiated. It also examines the effect of a tax on bank interest receipts and of policy-induced changes in the rate of inflation.

The analysis suggests that different taxes will affect the system in different ways. For instance, the model predicts that changes in reserve requirements or in the government bill rate[3] will alter deposit interest rates, but will leave lending behavior by the banks unchanged. In contrast, a change in the ceiling on lending interest rates affects the total quantity of bank lending and the effort made by banks to screen lending proposals, but leaves deposit interest rates unchanged.

While these predictions are model-specific, they do suggest that the welfare implications of financial sector taxation may depend on the exact mix of taxes and quasi-taxes, and not simply to the total tax take from the financial sector. These points are taken up in a later section.

Other Implicit Taxes There are other implicit taxes or subsidies that are relevant for the financial system, but which we do not include in our calculations:

(i) Differential effect of direct taxes. Income tax can affect the financial system differentially from other parts of the economic system to the extent that it is collected more effectively from that sector, with other sectors escaping with a lower actual burden. This can be an important consideration, especially so far as withholding taxes on interest paid are concerned. However, improvements in tax administration should mean that the degree to which tax collection from other sectors is less effective will decline over time. Accordingly, this issue may best be seen as a distortion arising from the failure to collect other taxes adequately.

(ii) Deposit insurance and protection fees. An increasing number of countries are adopting explicit deposit insurance or deposit protection schemes. Banks pay a fee, but if the fee is lower than the risk involved, the existence of insurance may be regarded as a net subsidy to the financial sector. Explicit deposit insurance has not been part of the sample systems during the bulk of the period under review.

(iii) Ex post bail-outs of failing banks. Use of large budgetary funds to bail-out the depositors and sometimes other claimants on failing banks has happened or in progress in most of the countries in our sample and in many others too. The sums can be very large in relation to one-year's GNP - as much as 10 per cent or more in a few cases. To some extent the bail-outs can be seen as an offset to the implicit taxes, and this may even have been intended by the authorities. However, their incidence is unlikely to be exactly symmetrical to the taxes. Provided they are a prelude to improved supervision

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3 This result assumes the existence of a government bill or bond which is freely traded. If no such bill exists, the response of bank lending, bank deposit rates and bank intermediation behavior, will be quite different: a change in lending rate ceilings will be transmitted to deposit rates, and a change in reserve requirements will affect lending behavior, though only to the extent by which the marginal wedge to intermediation costs is altered. These differences indicate that the likely impact of different taxes depends on the degree to which free markets are available to banks and non-banks.

and regulation of the banking system so that the failures are unlikely to recur, ex post bail-outs can arguably be seen as a lump-sum subsidy, with no direct impact on intermediation costs[4].

(iv) Other rents provided to banks. Examples of these would be the rents conferred on banks by virtue of restrictions on entry, and the value of foreign exchange allocations provided at false prices. The former is potentially quite important, and it is noteworthy that interest rate liberalization in several of the countries of the sample was accompanied by a widening of bank margins. On the latter, the severe mis-valuation of foreign exchange in several of the countries in the sample resulted in much rent-seeking activity. In the case of Nigeria huge profits accrued to privileged banks through this channel. These subsidies do not, however, directly relate to intermediation, which is the main concern of this paper.

(v) Sectoral credit guidelines. Several governments pursue sectoral credit objectives through moral suasion. Even when no special rate of interest is mandated for the credit (or when any subsidy is funded by the government or by low-interest rediscounts) such requirements, if enforced, can involve an transfer from the non-preferred sectors and thus represent a form of implicit earmarked tax[5]. Such sectoral programs are enforced with varying degrees of severity; deviations from the targets are common. This, combined with the extreme difficulty of quantifying the size of the transfer leads us to conclude that the safest simplification is to assume that they are not binding as a tax.

2.2 Some definitional issues

2.2.1 Measurements.

In line with the previous discussion, the measurements presented in this paper fall under four headings: (a) the currency tax. (b) below-market interest on compulsory reserve requirements and other forced investments by banks. (c) below-market ceilings on bank interest rates. (d)

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4 In some cases they can also be seen as a partial compensation for the implicit burden placed on the financial system by pressuring it to make politically motivated loans that were never repaid.

5 The most severe type of directed credit program would specify the borrowers and the interest rates - far below market - at which these borrowers are to obtain funding. Less severe would be a requirement to lend a certain share of resources to particular sectors, again at below the interest rates charged to non-preferred borrowers, with the preferential interest rate financed from the banks' operations. Both of these types of constraints are analogous to reserve requirements and are considerably more onerous than the sectoral requirements. To the extent that such requirements have been imposed in the countries being studied, they have not been explicitly documented. Clearly there have been many loans made at the behest of powerful political groups, and their poor performance has undoubtedly contributed to the widespread bank failures. We have, however, refrained from assuming, in our measures, that the losses of the banking system over the years could be wholly or partly assigned to this political interference in the credit process, and from counting them as one of our implicit taxes.

explicit taxes collected from banks. Quantifying these taxes in a credible way is not easy. Apart from the problems of gathering reliable data there is the conceptual difficulty of measuring the market clearing rate of interest on short-term risk-free paper (r^*) which is the key variable. We cannot hope to estimate it precisely, especially in very distorted market conditions. Several approaches were explored:

Measure 1 begins with the idea that the expected rate of inflation as a guide to likely market clearing nominal interest rates on the assumption that in equilibrium the market clearing rate of interest is normally positive, though it might be small[6]. This assumption is implemented by taking actual inflation as a proxy for expected inflation and taking it that the market clearing rate of interest is at least one per cent higher. Specifically we took r^* to be one per cent above the actual future inflation rate[7], except where this was lower than the actual interest rate on treasury bills[8], in which case r^* was set equal to the actual rate.

Measure 2 adopts a different and more subjective approach. For it we attempted to identify periods during which the comparative absence of interest rate controls could justify the assumption that actual rates during those periods were close to market clearing rates. The jump in interest rates which occurred at the beginning of such periods of liberalization was taken as a measure of the gap between actual and market clearing interest rates for other periods. Thus measure 2 assumes that the degree of repression was constant outside of the periods identified as liberal.

Measure 3 takes the actual foreign interest rate adjusted for actual exchange rate change[9] as a measure of r^*, while *Measure 4* differs only by using the parallel market exchange rate instead of the official one. These two measures are marred by the fact that sharp movements in the

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6 Note, for example, the often quoted figures for US Treasury bills, the annual average real yield on which during the the second and third quarters of the century was as little as 0.2 per cent.

7 Actually we used the continuously compounded rate equivalent to four-quarter inflation. Using four quarters instead of, say, one has the advantage of making the measure robust to noise in the data; but it also means that the measure has difficulty in pinpointing the timing of rapid changes in taxation as occurred in Zambia 1984-87.

8 For Cote d'Ivoire, where there are no treasury bills, the official money market rates were used.

9 This is close to the approach adopted by Giovannini and de Melo (1989)

value of the US$ in the early 1980s were not discounted in advance by international money markets. Accordingly, interest rates in, for example, most European centers were far below what Measure 3 would give as the market clearing rate for 1979-83.

Measure 5 takes the growth in base money as a rough indicator of expected inflation[10] and assumes that r^* is one per cent higher.

Our judgment is that the measure 1 results are probably the most useful and trustworthy. The degree of subjectivity involved in measure 2 makes it difficult to assess impartially; on average it gives lower rates of tax than measure 1. Measures 3 and 4 are marred by the unanticipated swings in industrial country exchange rates: in practice these measures gave the highest estimated tax revenue. Measure 5 provides a kind of check on the other measures; like measures 1 and 2, it shows Ghana, Nigeria and Zambia as having the overall highest rates of tax.

Apart from measure 2, all of the measures considered share the feature that, at least to some extent they identify actual with expected. Thus what may truly have been *surprise* inflations are taken as having been anticipated. Of course the tax was levied anyway, but its effect on behavior does depend on whether it was anticipated. It may therefore be that the measures presented overstate anticipated tax rates.

(a) Currency tax. The tax base is the total currency in circulation outside banks (bank holdings come under reserve requirements). The tax rate is taken to be one below r^*, described above (the one per cent being a provision for costs of maintaining the currency issue). For reference we also calculate the traditional cash flow measure of seignorage: the change in the money stock.

(b) Below-market interest on bank reserves. For reserve requirements satisfied by holding Central Bank or government obligations, the tax rate is taken to be the difference between the interest rate paid (mostly zero) and the market-clearing rate for this kind of instrument, effectively r^*. In addition we decided to include (the generally small amount of) excess reserves on the grounds that these would have been remunerated in a market environment.

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10 Of course this is a very rough measure: base money growth would be influenced by GDP growth, as well as by the forces of financial innovation.

(c) Ceilings on bank interest rates. Here again the problem is to assess the level of the equilibrium interest rate that would be determined in a free-market. Clearly market clearing rates for bank loans are generally somewhat higher than those for risk-free assets. The picture is complicated by the possibility that adverse selection considerations could result in some equilibrium credit rationing of the Stiglitz-Weiss type for higher risk loan categories. Furthermore, in the countries which we are studying, interest ceilings often varied according to the category of loan. Measuring the gap between interest rate ceilings and the market-equilibrium rates is necessarily a very subjective matter. In practice most of the calculations which we report are simply based on the gap between r* and treasury bill rates, on the assumption that this gap approximates the relevant average gap for bank lending rates. Only for measure 2 do we apply a judgment as to whether the bank lending ceilings were more or less constraining than the actual rates for treasury bills[11].

(d) Explicit indirect taxes. We select only the most important of these for our calculations; in practice this comes down to including only Cote d'Ivoire's tax on bank interest receipts, the so-called TPS. This tax may be seen as a kind of sales tax on financial services provided by banks. An argument can certainly be made for including financial services within the scope of a general sales tax (this point is taken up in a later section). However, interest receipts is not the appropriate base for such a tax and the effective rates in Cote d'Ivoire have been far higher than those imposed on value added elsewhere in the economy.

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Thus the overall tax calculation may be written (in an obvious notation).

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(R* - 1%)*CURRENCY +
(R* - RRES)*RESERVES +
(R* - RTB)*GOVTBORROWING +
(R* - RTB + MARGIN)*NONCOVTBORROWING +
INDIRECT TAXES
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11 It is in the area of bank ceilings that our measures are on the weakest data foundations. This is why we have nevertheless preferred to take a simple approach than to try to incorporate subjective elements.

This expression can be evaluated for the stocks outstanding and the interest rates relevant at any moment in time, and summed over time to get annual averages. The approach adopted here was to take end-year stock figures and apply the implicit rates of tax in effect at end-year to these stocks[12].

2.2.2 Tax rates: percent of what?

Unlike the analysis of tariffs, excises or income taxes, for example, there are no conventional or generally accepted ways of expressing the burden of financial sector taxes in a simple or summary way. For example, in the case of an import tariff, if our main interest is in the effect on consumer prices, we will often use the statutory rate of tariff, i.e. the tariff expressed as a percentage of the net price of the good. A sales tax is usually expressed in the same way. Alternatively, if we are interested in the structure of protection which local producers receive from the tariff, we will carry out an "effective rate of protection" calculation, effectively expressing the tariff as a percentage of the local value added component of the locally produced good. For other purposes, it may be of interest to compare the revenue from a particular tax with total government revenue or expenditure, or with overall economic activity or national income.

The main problem in approaching the same question for financial sector taxes is not only the fact that there is no statutory rate of tax, but also the complication that most taxes may have their impact on suppliers of funds, on users of funds, and on the providers of specific factor services.

In practice we can report the taxes as a share of (a) the stock of financial assets affected by the tax, (b) the flow of income from those affected assets, or national income generally, or (c) government revenue or expenditure.

For (a) we report percentages of M2. The reader should bear in mind, however, that (as shown in the model of Appendix 1) different taxes are likely to affect borrowers and lenders differentially. Furthermore, in some countries a high proportion of the tax falls, at least in the first

12 Data sources are listed in the data appendix. In a few cases interpolations or extrapolations had to be made from published data.

instance, on currency holders as opposed to those holding banks deposits. Expressing the taxes as a share of M2 is necessarily a very summary indicator.

In order to express the taxes by analogy with income tax (approach (b)), it would be appropriate to compute some measure of the flow of imputed income from the holding of financial assets or more generally of the flow of consumption services from financial intermediation in the economy. In the absence of readily available statistics on the share of financial intermediation services to GDP we confine ourselves to representing the taxes as a share of GDP. The reader may wish to assume that the flow of financial intermediation services represents approximately the same proportion of GDP in the countries being studied.

Data on government revenue is available for most of the sample period, and extrapolations have been used for missing data. Comparing the total of implicit and explicit financial sector taxes to the usual concept of government revenue (i.e. approach (c)) gives an indication of the relative degree to which government relies on the financial sector for revenue. Note that, except in the case of the TPS in Cote d'Ivoire, all of the financial taxes reported are implicit ones and therefore represent a supplement to the quoted government revenue figures.

Since several of the sample countries have suffered from very high rates of inflation, a refinement must be introduced to the usual data on inflation and GDP flows to avoid potentially serious distortions. This requires using instantaneous, or continuously compounded, rates of inflation and interest. The matter is explained fully in Appendix 3.

2.2.3 A digression on different concepts of seignorage.

When a government facing budgetary problems resorts to printing money to bridge a financing gap, this may be expected to add to inflation or eat into foreign reserves. It is worth distinguishing this *cash flow* which the government obtains by using the printing press from the *tax* on the holders of currency resulting from the reduction in its value caused by inflation uncompensated by any interest payment. The former is equal to the actual increase in the stock of currency; the latter may be approximated by the product of the inflation rate and the initial stock of currency (in which case it is often termed the inflation tax). Actually, since a rapid increase in the stock of currency will often result in a roughly proportional increase in the price level, the cash

flow and the tax may often be approximately equal; but it is the tax concept that is more relevant for our study, while the cash flow concept is relevant for analysis of deficit financing and macroeconomic stability. Since both of these concepts are referred to as seignorage in the literature, this section expands on the distinction with a view to clarifying the matter.

The fundamental point to bear in mind is that the tax impact of printing currency derives from governments' monopoly on currency issue and their use of that monopoly to generate revenue. Provided the quantity of currency is not expanded too rapidly, its usefulness, supported by legal tender laws, ensures that it will remain in demand. In all countries, the average cost of maintaining the stock of paper currency is sufficiently low (despite the need to replace soiled bills) to make the issue of currency a potentially profitable business. With very few exceptions nowadays, governments ensure that they benefit from this potential by reserving the right to issue paper currency to themselves or to a government-owned currency board or central bank. The resulting profits are known as seignorage.

Though it might appear that its capacity to generate seignorage is a magical property of money, on closer inspection it becomes obvious that the government, in collecting seignorage, is merely behaving in the way of any monopolist trying to capture part of the consumer surplus inherent in the product by selling at a price above marginal cost. As with any monopolist, a social inefficiency results: people economize too much on the holding of currency. The socially efficient outcome would prevail if currency bore interest at the a rate sufficiently high to make the choice between the issue of currency and of treasury bills a matter of indifference for the government. If currency were produced under competitive market conditions, this is the rate of interest which would emerge, i.e. the market-clearing rate for floating rate, very small denomination perpetuities. We term it the "efficient currency rate of interest (ECR)".

If paying the ECR, the currency issuer is making zero profits at the margin. In a steady inflation environment, the ECR would presumably be close to the rate of inflation, assuming that real interest rates were generally small. Some authors have used the rate of inflation as an estimate of the ECR for this reason. On the other hand, in an environment where market-clearing real interest rates cannot be relied upon to

be small, it seems likely that the ECR would be closer to existing short-term market-clearing rates of interest, such as Treasury bill rates or the curb-market rate on first-class corporate promissory notes.

Thus the tax element of seignorage arises from the gap between the ECR and the actual rate of interest on currency - zero. Instead of issuing perpetuities at market rate, the government has issued them at zero interest using its monopoly power. Even if there is no new issue of currency in the current year, yet the holders of currency may, if real interest rates are high, be taxed in this year by virtue of the continued failure to pay them interest. This is the currency tax: the base is the stock of currency and the rate of tax is the (unobserved) ECR.

To take another example, even if the rate of inflation is zero there is a currency tax if the ECR is positive. On the other hand, if the ECR and the inflation rate are both zero, then there is no currency tax, even if currency holdings are growing to meet the demands of a growing economy.

The financing side of currency issue is different. When the budget deficit needs to be financed, one option is the issue of currency. Once again we see currency as a perpetuity, which can be used for financing because of its inherent attractiveness (convenience yield). The rate of interest paid is zero, which means that, in equilibrium, the real value of currency holdings will be such that the marginal convenience yield is rather high. New issues by the government will quickly result in a fall in the value of each unit of currency (rise in the general price level) to restore the equilibrium real value of total currency holdings. Note that no compulsion need be involved in the issue of currency: the interchangeability of each currency note ensures the acceptance of new issues. It is not the recipient of the new currency that pays the currency tax, but all of the holders of currency. Furthermore, if there is an increasing demand for currency, it may be the case (in a country with no inflation or a falling price level) that no currency tax exists even in a year when new currency is being issued to meet the growing demand.

The literature is not sufficiently clear on this distinction between the currency tax and the financing aspect of currency issue. That is because most of the literature focuses on simple cases of steady inflation and low real interest rates. In such circumstances, the rate of growth in currency may indeed be approximated by the rate of inflation,

as may the ECR. Whenever such circumstances prevail the three calculations come to the same number. In other words, under such circumstances, the growth in currency (cash flow or financing effect), would approximately equal the inflation rate times the currency (inflation tax), or the measure used in this paper (currency tax). Empirical applications in less stable environments force us to be more specific and precise in our measurements. Indeed, the difference between the cash flow measure of seignorage and our evaluation of the currency tax was as high as several percent of GDP in some years for some of the countries in our study.

While most empirical studies have employed the cash flow approach to measuring seignorage, and are thus implicitly focussing on the financing aspect, in the present context the fiscal approach is clearly the relevant one.

3 EMPIRICAL FINDINGS

3.1 Main observations

Though they remain somewhat speculative, the calculations which we have made (Table 1) imply that financial sector taxation 1978-88 has averaged as much as 4-7 per cent of GNP per annum in some African countries (Ghana, Nigeria and Zambia), whereas it has remained in the region of 2 per cent for others (Cote d'Ivoire and Kenya)[13]. This may be compared with total explicit tax revenue varying between about 10 and 25 per cent of GNP in most countries in sub-Saharan Africa. Expressed as a percentage of the broad money stock M2, the tax rates are much higher, averaging over 30 per cent in Ghana[14] and reaching 90 per cent there in 1982. Our estimates are much higher than traditional cash-flow seignorage measures which come out at around 1 per cent of GDP for all but Ghana, which had 3 per cent.

By any reckoning, the financial sector has been very heavily taxed in comparison with other sectors. For instance, the average tax collected has in all cases exceeded the value added of the banking system[15]. Even excluding the currency tax, which does not bear directly on the banking system, the average tax collected has been a multiple of the value added of the banking system in the three high-tax countries. Apart from the taxation of export commodities and perhaps some luxury imports, it would be hard to find a significant sector that is taxed as heavily in developing countries. Some caveats are in order. For example a part of the tax will have been passed to depositors in the form of a reduction in the pure rate of interest on savings, a part will have been borne by the consumers of banking services. Furthermore, an important point to bear in mind that in some cases the magnitude of the inflation may have come as a surprise: such unanticipated taxes may have involved lower efficiency losses to the extent that they did not induce the changes in behavior which would have occurred

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13 Except where otherwise stated, all data refers to Measure 1. Table 3 summarizes the results obtained with the other measures. Although the numbers are quite different, Ghana, Nigeria and Zambia remain the highest tax countries for most years.

14 In Nigeria and Zambia the corresponding averages are 17 and 15 per cent, with Cote d'Ivoire and Kenya averaging 8 and 5 per cent respectively.

15 Complete data on value added in the banking system is not available, but rough calculations indicate that (measured at factor cost) it is unlikely to exceed 1.5 per cent of GDP under normal circumstances in any of our countries.

if they had been anticipated. Nevertheless, it is clear that this level of taxation has, one way or another, provided a very serious disincentive to financial intermediation.

For each country there has been a considerable year-to-year fluctuation in the rate of financial sector taxation (Table 1 and Figures 1 to 5). These fluctuations are correlated with fluctuations in the rate of inflation. This is largely because a high rate of inflation would imply a high rate of market-clearing nominal interest rates. The rate of most implicit financial sector taxes and some explicit ones is linked to actual or estimated market-clearing rates of nominal interest.

As elaborated below, episodes of interest rate or exchange rate liberalization are not always associated with a reduction in all forms of financial taxation notably because of the increase in inflation.

The implicit financial sector taxes have been more heavily used when the system of regular taxes is insufficient to achieve a fiscal balance - often because government expenditure has been expanded in line with a transitory boost in receipts arising from an export boom. When such a fiscal crisis occurs, implicit taxes on the financial system bear, almost by definition of a fiscal crisis, most of the burden of the budget gap[16]. This explains the high variance of the effective rates and their unpredictability.

Some authors[17] have argued that optimal tax policy would result in seignorage and other financial sector taxes being high when other taxes are high and low when the others are low. But because financial taxes seem to be used in times of fiscal crisis, and not in an optimally pre-planned manner, this theoretical pattern does not correspond to the African experience[18].

Countries which have maintained price and exchange rate stability over a long period have not employed onerous financial sector taxes. Even the high rates of explicit taxation on the financial system in Cote d'Ivoire have not been comparable in magnitude to the implicit taxes employed elsewhere.

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16 Cf. the finding of Kiguel and Neumeyer (1989) for Argentina.

17 Obstfeld (1989) provides references.

18 However, there is a positive correlation between the different components of financial sector taxation in each country.

It is not evident from the data that there is a substantial sensitivity of money holdings to short-term fluctuations in the return on monetary assets, but persistent distortions, such as prevailed in Ghana before 1983, have had a significant impact[19]. It may be that the biggest impact of taxes on money holdings is only felt if the tax is maintained for several years.

3.2 The role of commodity and fiscal cycles.

Reviewing the evidence from our sample of sub-Saharan African countries during the 1980s, and in some cases the 1970s, a distinctive pattern emerges. In particular, the overall policy with regard to the stability of the currency, and specifically exchange rate policy, is an important determinant of the degree to which countries have had recourse to financial sector taxation. Such recourse tends to be greatest after the collapse of a commodity price boom.

The lowest incidence of financial sector taxation in the sample is in Kenya and Cote d'Ivoire. *Cote d'Ivoire's* fixed exchange rate policy for forty years has limited the divergence of its inflation rate from that of France[20]. Without high inflation the usual mechanisms for obtaining revenue: the currency tax, nominal interest rate ceilings far below market-clearing levels and onerous reserve requirements, were not easily available to Cote d'Ivoire[21]. As with the other countries, Cote d'Ivoire responded to export commodity price booms by expanding the program of public expenditure. As elsewhere, public expenditure wa slow to return to sustainable levels when the boom ran out. However, Cote d'Ivoire managed to finance some of its excessive expenditure (and the resulting current account balance of payments deficit) through foreign borrowing, including borrowing from the regional Central bank[22].

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19 The question of shifting demand for money in Ghana is addressed in Appendix 2. The apparent failure of money balances to respond to opportunity cost in Nigeria and Zambia is evident from Appendix Figure A6.

20 Cf. Appendix Figure A4, also Honohan (1990a).

21 Much the same story can be told of Cameroon, originally envisaged as part of the sample, but dropped from our sample because its experience paralleled Cote d'Ivoire in most important respects.

22 The effect of these borrowings on regional credit expansion tended to be partly offset by surpluses in other members of the currency union, see Honohan (1990b).

It is not surprising that, with implicit financial taxes limited by the effects of exchange rate policy, Cote d'Ivoire turned to explicit indirect taxes, notably the TPS on bank interest receipts, to support revenue. But the comparatively modest yield of TPS only serves to emphasize the limited revenue potential of explicit taxes by comparison with implicit taxes. On average, the TPS has raised about one-half of the financial sector taxation in Cote d'Ivoire.

Nigeria, Ghana and Zambia also maintained fixed or slowly moving exchange rates during much of the period under review. However the situation was very different here. The fixed exchange rates were applicable only to a fraction of international transactions, chiefly exports. Allocations of foreign exchange for imports at the official exchange rate were very limited. Hence, most imports were purchased with foreign exchange acquired at an informal parallel market exchange rate greatly depreciated with respect to the official rate. In Ghana and Zambia the operation of false official exchange rates had the effect of taxing non-government exporters by not allowing them to obtain the true local currency value of their exports[23].

The true marginal cost of foreign exchange for these three countries was far less stable than the official rate, and domestic inflation, which was very rapid during certain periods, reflected this discrepancy. For example, quarterly inflation in Nigeria approached an annualized rate of 50 per cent during 1983, a year during which official exchange rate depreciation was in single figures (cf. Appendix Figure A1). In 1983 inflation in Ghana was almost 150%.

These high inflation rates combined with severely controlled interest rates allowed the governmen to generate significant implicit revenues from the financial system. Th generally applied in the downswing of a commodity boom. The main episodes to which this clearly applied are the Nigerian inflationary surge of 1982-3, the Zambian of 1975-76 and the Ghanaian of 1981-82.

> The decline in *Nigerian* oil revenues during 1981-83 was at first partly absorbed by a considerable expansion in the fiscal deficit during 1981 and 1982 (cf. Appendix Figure A5)[24]. For instance, imports continued to grow rapidly during 1982 despite the sharp fall in export

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23 In Nigeria, the state-owned oil company was the main entity paying this tax, indeed the net effect of the arrangements was to provide a subsidy to the private sector, specifically the banks, through the allocations - limited though they were - of foreign exchange at the official rate.

24 There is an interesting account of the dependence of Nigeria's budget on the petroleum business in Gelb (1989).

receipts. This large fiscal deficit was at first funded at the Central Bank with comparatively little pressure on the domestic banking system. There was a corresponding drawdown of foreign reserves, but by early 1983 90 per cent of the reserves of just two years before had been eroded. Government turned to the domestic banking system in a large way. Inflation accelerated dramatically. The total financial taxes as a share of GNP at end-1982 and end-1983 were computed at about 8 per cent of GNP.

The main episode of taxation of the financial system before 1985 in *Zambia* occurred in 1975-1977. As with previous booms in 1966 and 1969-70, the soaring price of copper in 1973-74 induced an expansion in government expenditure which was not scaled down until 1978. The resulting deficit, which reached 20 percent of GDP, was financed mostly by borrowing from commercial banks and from the Central Bank, the latter fuelling inflation (the monetary base increased by 50 percent in 1975). Total financial taxes jumped to about 7 per cent of GDP.

The dynamics underlying the rapid high inflation in *Ghana* in 1982-83 are a little more complex. This was, after all, only the final episode in a story of economic collapse which extended over several years. Here too there was, just before the acceleration of inflation, a decline in export receipts, due partly to increased smuggling in the face of a declining producer price offered for cocoa by the state marketing board, and partly to a disastrous harvest. But there was also a progressive loss of confidence in money (cf. Appendix Figure A3) culminating in the so-called currency "reforms" in which large cash holdings were partially demonetized. Although currency in circulation expanded by 75% during 1981, the last stages in the Ghanaian inflation were driven as much by a flight from money as by the increases in the stock of currency or of credit going to government. At end-1982 we computed total financial taxation running at 13 per cent of GNP (or over 90 per cent of M2), about one-half of this being attributable to the currency tax.

Kenya provides an intermediate case. The exchange rate was not fixed rigidly as in Cote d'Ivoire, but access to foreign exchange was considerably freer than in Nigeria, Zambia and Ghana in the early 1980s. Inflation did not reach the levels experienced in the other three countries - quarterly inflation never exceeded an annualized rate of 25 per cent during the 1980s. Nor were interest rates held as low as elsewhere. Nevertheless, for Kenya too it is possible to discern an commodity-fiscal-inflation tax cycle.

The end of the 1976 coffee boom was followed by further terms of trade shocks in 1979-80 resulting in a serious budget deficit largely financed by borrowing from the Central Bank of *Kenya* (cf. Appendix Figure A2). The resulting monetary expansion was accompanied by an acceleration of inflation to about 20 percent in 1982. Total financial taxation in this period averaged about 3 per cent of GNP - twice the average for 1977-88. A subsequent successful stabilization was derailed by a new coffee boom in 1986. Government expenditure was increased drastically, and, although the resulting deficit could be financed in 1986 without placing pressure on external reserves, it resulted in a balance of payments crisis in 1987 when coffee prices

fell. Once again, monetary financing resulted in a modest pick-up of inflation, even though the monetary impact of the deficit was limited by higher holdings of reserves by the banks. Total financial taxation did not increase substantially in this second episode, notably because lending rate ceilings were no longer binding.

3.3 Economic reforms and financial taxation.

Fiscal stabilization programs have clearly been associated with reduced reliance on financial sector taxation in the countries which we have examined. However, the same cannot unambiguously be said for measures of structural reform and liberalization. Nigeria, Ghana and Zambia have undertaken relevant structural reforms which went beyond fiscal retrenchment to include a far-reaching liberalization of the exchange rate as well as at least some liberalization of interest rates.

Though the reforms were implemented over time, the main rationalization of the exchange markets can be dated fairly precisely. Thus in Ghana the multiplication of the official price of foreign exchange by a factor of 11 occurred on October 12, 1983, providing perhaps the clearest signal of the government's change of heart with regard to economic policy. Likewise the introduction of the Kwacha foreign exchange auction on October 4, 1985 (which quickly had the effect of almost tripling the local price of foreign exchange), combined with substantial increases in interest rates, marked the beginning of Zambia's eighteen month experiment with liberalization. The introduction of a two-tier foreign exchange market in Nigeria on September 29, 1986 (also increasing the price of foreign exchange by a factor of about three) was an important step in the Nigerian reforms.

But examination of the data does not suggest that these reforms coincided with a reduction in all forms of financial sector taxation. For example, although *Zambian* inflation had already picked up during 1985 (reflecting the effects of a slump in copper output on the fiscal position), the effective devaluation of the currency resulted in a further surge (prices rose 25 per cent in one quarter - see Appendix Figure A1)[25]. Thereafter inflation subsided, but the surge had added to the currency tax. The liberalization of interest rates reduced the implicit tax through interest rate ceilings, but added to pressure on the budget, which was partly eased through the increased financing provided through successive increases in

25 Pinto (1988) has explained the phenomenon whereby a devaluation of the official exchange rate may weaken the parallel rate too, thereby contributing to inflation even where most imports are paid for through the parallel market.

banks' reserve requirements[26]. Thus the liberalization actually contributed to an increase in some components of financial taxation, at least in its early stages. However, the abandonment of the reforms in early 1987, accompanied by the reimposition of interest rate ceilings and a worsening of inflation as government expenditure increased once more, led to much higher rates of financial sector taxation - reaching over 18 per cent of GDP at end-1988, or some 60 per cent of M2.

In *Nigeria* too, the reforms of 1986, coinciding as they did with a weakening price of oil, were followed by a sharp acceleration of inflation (cf Appendix Figure A1). As interest rates remained low in nominal terms, presumably influenced by moral suasion, implicit taxation of the financial sector soared to record levels - over 8 per cent of GDP at end-1987.

In *Ghana*, a gradual return of confidence has increased the base of financial sector taxation since the reform (Appendix Figures A2 and A3), but the tax rates have remained comparatively modest - less than one-seventh of their peak levels.

3.4 Crowding out.

One of the largest components of implicit financial sector taxation, as measured here, is the earmarked tax coming from interest rate ceilings. In those countries where most of the banking system's assets represent claims on non-government borrowers, the benefit of this tax is transferred directly to these borrowers. It is worth noting, therefore, that in each of the countries in our sample, the government's share in total domestic credit has shown a secular growth. Each of the governments have thus not only increased financial sector taxation at times of crisis, but they have progressively increased the proportion of those taxes which do not simply return to non-government borrowers.

The most conspicuous example of this crowding out is *Ghana*. In the early 1970s, non-government credit occasionally exceeded that to government. Thereafter, however, the government took an ever larger share. After 1977, the decline in real monetary holdings seriously limited the government's ability to generate financing through this route and real credit, both government and non-government, fell until the reforms of 1983. Since then real money demand has recovered somewhat (though remaining far below the

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26 Because these developments were so varied during a short period of time, not all of these phases can be clearly seen in the end-year data of Table 1.

levels achieved in the mid-1970s), but government has continued to take most of the credit available. (Government credit was about six times as large as non-government towards the end of the period under review.

In *Cote d'Ivoire*, the jump in credit to the government in the period 1979-83 represents the major recourse of government to the financial system. Because Cote d'Ivoire has access to the regional Central bank, this increase was possible despite no sharp reduction in real non-government credit and despite a fall in real money holdings.

4 EFFICIENCY COSTS

The question of the efficiency costs of financial sector taxation has proved a very controversial matter in the literature. Some authors have argued that the financial sector should remain wholly untaxed on grounds of economic efficiency (cf. Kimbrough, 1989). The argument is that financial intermediation provides services that are more analogous to intermediate goods in production rather than final consumption goods. A standard tax efficiency argument, going back to the classic papers by Diamond and Mirrlees (1971), states that no tax distortions affecting production decisions are desirable when a full range of consumption taxes are available; the economy should produce on the production frontier, with needed tax revenue being obtained through influencing the choice of consumption bundle along that frontier.

But are financial intermediation services only part of the production process, or do they enter directly into consumption[27]? Models of money and banking which assume that money contributes directly to consumption value or those which rely on the assumption that money holdings are motivated by a "cash-in-advance" requirement for consumption[28] are among those which imply that at least some financial services should be taxed in an efficient tax regime. Furthermore, in developing countries, the government's ability to tax consumption efficiently is somewhat limited, implying that some deviation from the ideal of no production distortions may prove necessary.

A different argument against taxing the financial sector is that such taxation discriminates against productive investment. If so, and if investment is already below the social optimum for other reasons (for example because of increasing returns to investment), this would be an argument for limiting the contribution of the financial sector to budget revenue. However, such an argument requires establishing that the supposed discrimination actually occurs.

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27 The relevance of this question is explored in Chamley (1985).

28 Theoreticians have employed the cash-in-advance approach to model formally the holding of money for transactions purposes (cf Englund, 1989, Englund and Svensson, 1988). Basically they assume that purchases cannot be made by an economic agent during a certain period of time unless she has a sufficient cash balance at the beginning of that period. This transactions constraint thus motivates the holding of cash balances. By employing such models it is possible to compute the utility derived from cash balances.

This section makes no attempt to resolve these efficiency issues. Our purpose is instead to highlight the fact that different forms of financial sector taxation may have quite different efficiency implications. Section 4.1 reviews some of the effects based mainly on the formal model of Appendix 1. Section 4.2 looks at some practical issues of design in improving financial sector taxation.

4.1 Efficiency impact of different financial sector taxes

While collecting revenue for the government, the taxes and quasi-taxes which are being examined here also distort economic decisions and probably result in deadweight welfare losses. Thus, to take the best-known example - the currency tax, not only does the existence of high inflation imply a quasi-tax revenue to the government from the private sector's holding of currency balances but, as already mentioned, there is an additional deadweight or efficiency loss to society because of the degree to which the private sector responds to this tax by unnecessarily economizing on currency holdings.

Different types of financial sector tax influence different marginal costs and benefits and cause different incentive distortions. The simplest way of thinking about the efficiency costs of quasi-fiscal distortions to banking would be to consider a certainty framework where banks simply channel all deposits to borrowers for investment. The equilibrium rate of return would be represented at the intersection of the supply curve of deposits (depending on depositors' alternative uses for funds[29]) and the demand curve for loans (depending on the marginal productivity of investment). In such a simple model, any tax collected from the process would be equivalent and could be considered as a tax on loans or on deposits; the efficiency costs of such a tax could be estimated by a Harberger triangle at the intersection of supply and demand in a standard manner, with the marginal efficiency cost about twice the average cost.

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29 A caveat on the supply of deposits is in order: As Shaw pointed out many years ago, a consequence of credit market imperfections is that the purchase of investment goods (or any bulky item such as durables) requires the accumulation of cash balances prior to the purchase of the good. This cash-in-advance demand for money may actually increase in high inflation circumstances. This could be part of the explanation for our failure to observe any clear negative relation between inflation and the level of money balances in countries such as Nigeria or Zambia. (When the inflation rate reaches very high level such as in Ghana, its tax burden exceeds the cost of substituting other assets for money, and the velocity rises.) In this case the Harberger measurement would underestimate the efficiency cost of taxation.

Such an analysis needs to be expanded to deal with the various distortions that are inherent in banking and other financial markets faced with imperfect and asymmetric information. For one thing, banks spend real resources in assessing the viability of borrowers' proposals and in monitoring the performance of borrowers.

The fact that such monitoring is costly may mean that fixed interest loan contracts are in many circumstances the best way of coping with potential incentive problems that may arise. This may partially explain why most bank loans are made on a fixed interest basis (cf Diamond, 1984). The drawback of this type of financial instrument is that all the windfall gains of an investment are captured by the investor, whereas the bank cares only about the probability that the return covers the loan payment and the distribution of return when the return falls short of the payment due. One can show that in this context the marginal productivity of loans is greater than the lending rate. Thus the fixed-interest contract drives a wedge between the social returns on investment projects and the bank's incentive to lend to support them. When account is taken of these weaknesses of the risk-sharing arrangements inherent in the fixed interest loan contract it becomes clear that there may therefore be a residual distortion or inefficiency even when the interest rate equilibrates the loan market.

The fact that the loan market may already be distorted before any government intervention is considered has implications for the likely magnitude of the deadweight or efficiency costs imposed by taxes. Simple partial equilibrium models of the deadweight costs of taxation imply that, while a small tax imposed on an undistorted market generates only a small deadweight loss, the same small tax imposed on an already distorted market can result in quite severe deadweight losses. Therefore these information and contract design problems are important in judging the relative efficiency of different forms of financial sector taxation.

In order to cast some light on these issues, we refer again to Appendix 1, which outlines a simple model of a controlled and taxed banking system reflecting some of the features of the African economies which are being studied. In particular, as already mentioned, the model includes an explicit treatment of reserve requirements and lending rate ceilings. It also models the type of risk-free instrument which has typically been available in most of these countries, namely a government bill whose interest rate is set by the authorities at a level which may be sufficient to

attract voluntary holdings by the banking system. The model assumes an uncontrolled deposit interest rate, corresponding to the actual situation in several of the countries.

The model give special attention to the role of banks as assessors of the quality of loan applications[30]. We assume that the banks have the ability to screen loan proposals and thereby acquire more precise information about the likely success of the loan than is generally available. This screening is costly, and the banks will only undertake it to the extent that it contributes to their profitability. Because of the imperfect nature of fixed interest contracts discussed above, the banks do not have the incentive to make the socially optimal amount of lending, or of screening for lending. That is so even in the absence of taxes or controls; any additional disincentive coming from policy - even a small additional distortion will have significant welfare costs.

For this reason those taxes which induces the banks to shift away from lending (and into risk-free government bills, for example) are likely to have the greater welfare costs. According to the model, ceilings on bank lending rates are the worst from this point of view: they reduce the return on lending activities and so reduce lending and loan-screening by banks. In contrast, measures such as reserve requirements, taxes on bank interest receipts and changes in the rate of interest on government bills do not reduce lending. (They do influence deposit interest rates[31] and hence the total volume of resources intermediated by the banking system[32], but this results in a reduction in banks' holdings of government bills rather than in their lending[33]).

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30 This emphasis on ex ante credit appraisal coincides with the views of Fama (1985) as to what is the key distinguishing feature of banks. A slightly different perspective is adopted by Diamond (1984), who sees the banks as being uniquely qualified to monitor the performance of borrowers ex post. Other authors have emphasized the liquidity creation function of banks (and have therefore been interested in bank runs and crises, cf. Diamond and Dybvig, 1983), or in the provision of transactions services, cf. Englund (1989), Englund and Svensson (1990).

31 The Appendix gives a number of formulas for the impact of reserve requirements and other taxes on deposit interest rates.

32 This refers to the case where government bill interest rates are being held voluntarily by the banks. The Appendix also discusses the more complicated case where no government bills are voluntarily held.

33 This result derives from the fact that the banks face diminishing returns on their loan portfolio due to the cost of screening; in contrast the return on government bills is fixed. Therefore new deposits are, at the margin, placed in government bills.

The conclusion, unquantified and tentative though it must be[34], is that the deadweight loss from the introduction of lending rate ceilings may be significantly higher - for equivalent revenue - than that from reserve requirements or the inflation tax[35]. It is therefore worth noting interest ceilings on non-government lending are very important quantitatively. They accounted for one-third of the total of taxes and quasi-taxes in Kenya, Nigeria and Zambia, and between 15 and 20 per cent for the other two.

4.2 Criteria for better financial sector taxation.

The high variability of the effective rate of financial sector taxation, as illustrated by the data from African countries, is largely attributable to the fact that both implicit and explicit financial sector tax rates are not invariant to the price level or the rate of inflation. An ideal tax

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34 Our model does not, for example, explicitly consider the impact of moral hazard and adverse selection on interest rates, a topic which have been widely discussed in recent years following Stiglitz and Weiss (1981). Higher interest rates will generally convert some potentially viable projects into non-viable ones; furthermore borrowers may shift in favor of riskier behavior if interest rates are higher. For both these reasons the average effective rate of return to banks on loans (net of default) does not increase as fast as the contractual rate. There may be a value of the contractual rate such that the average effective rate reaches a maximum. No bank will lend at a rate higher than this value. This implies that the observed schedule between the lending rate and the level of loans is subject to a ceiling. However, note that this ceiling is put in place by private markets; although it may mean that government intervention to place a ceiling on lending rates is less constraining than it appears to be, it does not mean that binding interest ceilings have lower marginal efficiency costs.

Another welfare aspect of interest ceilings which has not been considered in the model relates to the tendency of governments to use financial sector taxation at times of fiscal crisis. Because of the fear that this will happen again, agents are reluctant to expose themselves to financial sector taxation by, for example, having large currency holdings (Ghana is the best example of this withdrawal of the private sector from the financial system as a result not only of high inflation but of the confiscatory nature of the currency reforms). Such precautionary behavior effectively increases the equilibrium interest rate for domestic government borrowing, as the private sector hedges against government recourse to the inflation tax (especially as, because of time inconsistency, the government can not normally precommit itself to a non-inflationary policy). These higher interest rates will result in other taxes being imposed to cover the interest costs, and it is possible that the efficiency costs of these taxes could be greater than the distortions caused by the imposition of an interest ceiling. Accordingly, there might be offsetting welfare gains to the usual losses from an interest rate ceiling imposed in such circumstances.

35 There is also the point that, to the extent that not all of the borrowers who benefit from the low interest rate were intended beneficiaries of the policy, there is an unintended redistribution involved in having interest rates ceilings.

structure would achieve such invariance or "super-neutrality". This cannot be fully achieved in regard to currency, but it could at least be accomplished for the banking system by eliminating interest rate ceilings or at least varying them in line with inflation rates, by paying variable interest rates on reserve requirements and by avoiding taxes based on nominal interest receipts of banks. Furthermore, in order to limit distortions affecting the competitiveness of the banking system the appropriate base for indirect taxation of the banking system is the value added of the banking system. These points are elaborated in this section.

4.2.1 The typical financial sector quasi-tax is sensitive to the rate of inflation.

Most tax systems are not invariant to the rate of inflation or even to the level of prices. A stable tax structure would raise the same real resources at all price levels and at all rates of inflation. A value-added tax, for example, will do this. An excise fixed as a number of units of local currency per tonne will not; at a higher nominal price level, this tax will raise less in real terms. A progressive income tax, with the bands fixed in nominal terms, will raise more real revenue at a higher nominal price level. We can call a tax which raises the same real resources at different *price levels* an indexed tax. A tax which raises the same real resources regardless of the *rate of inflation* is a super-indexed tax.

Not all indexed taxes are super-indexed. For instance, a tax on interest receipts of a bank at a fixed percentage rate may be indexed. If the price level is rising at a steady rate, the nominal value of the bank's loans will tend to grow at the same rate. With the constant inflation rate, there is no reason to suppose that the nominal interest rate will change. Thus the revenue from this tax will also grow at the rate of inflation, and will therefore be constant in real terms. This kind of tax is indexed. But now consider the revenue from the same tax, at a higher, but still constant, rate of inflation. Again the real revenue is constant, but it has a different - higher - real value than it had at the lower rate of inflation to the extent that the nominal rate of interest has increased to compensate for the higher rate of inflation. The tax is not super-indexed.

Most financial taxes, linked as they are to nominal interest rates, are not super-indexed. This applies to the currency tax, reserve requirements tax and the impact of nominal interest rate ceilings, for example. It means that their impact can be dramatically different at different rates of inflation and nominal interest rates. In some cases, especially with nominal interest rate ceilings, but also with reserve requirements tax, the tax goes up more than in proportion to the nominal interest rate. It is this feature which forges the link between fiscal crises and financial sector taxation.

Since the currency tax is inherently not super-indexed, there is a second-best argument[36] that taxes that affect bank deposits should also be sensitive to the rate of inflation. However, the diminishing relative importance of currency in monetary holdings implies that this argument is becoming progressively weaker over time. In general it seems desirable to move in the direction of super-indexed taxes. Short of full interest liberalization, such super-indexation could be helped by linking administered interest rates to some key rate which was adjusted in a flexible manner in response to market pressures, or at least to changes in expected inflation. This would tend to stabilize the implicit tax revenue from reserve requirements and from bank lending rate ceilings. So far as explicit taxes are concerned, the merits of the VAT could be considered in this context.

4.2.2 VAT on the Financial System.

One favored approach to the rationalization of indirect taxation in the economy in general is to tax final consumption expenditure at an uniform rate. Administratively the most effective way of doing this is to move to value added as the base for taxation. The application of VAT to the financial sector has been a controversial issue in industrial countries[37], especially because the sophistication of industrial country financial markets makes it quite all to easy for avoidance techniques in respect of any financial sector tax. As a result, the financial sector

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36 This argument is fully discussed by Englund, 1989. See also Brock, 1989 who quantifies the issue for developing countries.

37 Hoffman, Poddar and Whalley (1987) and Mintz (1989) are interesting recent contributions which clarify many of the issues involved in applying VAT to banking services. See also Gillis (1987).

has been largely exempted from VAT in industrial countries. For developing countries which already tax their financial systems in a distorting manner, it is arguable that a move to value-added would represent an improvement. In particular, by removing pure interest flows from the scope of tax, such a move would reduce the bias in favor of curb credit markets. Furthermore, a properly designed VAT on banking would be super-neutral. It is important to define carefully what is meant by value added in the banking system in order to achieve the hoped-for efficiency gains.

Value added in the banking system is generally calculated by reference to the difference between gross receipts on the one hand, and the sum of interest and intermediate goods expenses on the other. Thus, a stylized operating account of an African commercial bank might look like this (based on published figures for the largest bank in Cote d'Ivoire in 1986):

Income:		Expenditure:	
Interest	35	Interest	18
Fees and Commissions	5	Loan-loss provisions	5
		Depreciation	2
		Materials	4
		Wages	8
		Profit before tax	3
Total	40	Total	40

A standard definition of the contribution of the banking system to the total value of 40 is the contribution of the primary factors of production employed by the banking system. Borrowed funds are not a primary factor of production, so that the interest which the bank pays on its borrowings must be subtracted from the 40. Intermediate consumption represents a portion of the value of banking output which is contributed indirectly by other industries, whose output has been used by the banking industry; this too must therefore be subtracted from the 40. Provisions for bad or doubtful debts must also be subtracted; the purpose of these provisions is to offset a potential overstatement of receipts. (To the extent that the bad debts for which provision had not been made were not realized in the longer term, this would depress the item "interest, etc." in subsequent years). Depreciation represents a bringing

to current account of an appropriate proportion of future replacement expenditures; to the extent that these will be expenditures on intermediate consumption, this too must be subtracted. We are left with the final two items, representing profits before tax and other expenses, primarily payroll expenses, to wit the payment to the factor of production labor. A rough estimate of the value added of the bank would therefore be 11.

Note that in this presentation the bank's interest (and other) receipts can be seen as composed of two elements: first, a pure interest element passed through to the depositor and second, an element to cover the cost of the intermediation services provided by the bank. While a comprehensive expenditure tax, such as a value added tax, would not consider the pure interest component as taxable, there is no good reason for excluding the intermediation services in a comprehensive VAT, and applying the general rate of VAT to them. The definition presented here would be perfectly appropriate in this context.

Note that a comprehensive VAT would allow VAT paid by banks as a credit against the VAT due from producers within the VAT net to the extent that it is producers that buy banking services. This creates an important practical difficulty in identifying how much of bank's value added is attributable to services provided to particular customers. This is an illustration of the administrative problems which can arise, and which have led industrial countries to exempt banking services from VAT: after all, the banking services provided to producers within the VAT net will effectively be subject to VAT at the next point of sale[38]. Only those banking services which are provided directly to consumers or to non-VAT registered producers will escape. This, however, is potentially a serious drawback in the context of countries whose tax regime is far from comprehensive, as is the case in most of Africa.

While the introduction of a comprehensive VAT on financial services may pose difficult administrative problems, and while it should be noted that application of the general rate of VAT to financial services would raise only a small fraction of the revenue derived at present from implicit taxes, nevertheless our approach suggests that whatever regime of indirect taxation is imposed on the banking system should be designed with the model of VAT as an ideal reference point.

38 Furthermore, the value-added of producers supplying inputs to banks will effectively be subject to a double tax since the VAT paid by the suppliers will form part of the charge made by the bank to its customers, while the customers will not receive a credit for it.

5 CONCLUSIONS

In this paper we have measured the distorting taxation on the financial sector of five African countries. Our method has taken a broader concept of taxation than is customary, going beyond the currency tax and reserve requirements to include the quasi-tax effects of interest rate ceilings. This broader approach reveals the true scale of financial sector taxation to be very much higher than is commonly appreciated. Though the level of taxation has varied widely over time and between countries, it has been a very significant element in total government revenue, especially at times of fiscal crisis induced by commodity slumps. On average over the decade 1978-88 this taxation collected between 4 and 7 per cent of GDP in three economies exhibiting less macroeconomic stability (Ghana, Nigeria and Zambia), and in the region of 2 per cent of GDP for the two more stable economies in the sample (Cote d'Ivoire and Kenya). Expressed as a percentage of M2, the rate of tax has gone as high as 90 per cent.

By any reckoning, the financial sector has been very heavily taxed in comparison with other sectors. Even excluding the currency tax, which does not bear directly on the banking system, the average tax collected has been a multiple of the value added of the banking system in the three high-tax countries. Apart from the taxation of export commodities and perhaps some luxury imports, it would be hard to find a significant sector that is taxed as heavily in developing countries. Such a level of taxation is a very serious disincentive to financial intermediation and is surely too high for economic efficiency.

Different types of financial sector taxation have different distorting effects on behavior. Some forms may reduce the rate of interest to depositors, discouraging financial saving; other forms may lead banks to choose riskfree government securities rather than making the effort to screen potential lending opportunities. Because built-in microeconomic inefficiencies already reduce bank lending to non-government borrowers below the optimal level, it is especially desirable to avoid any further reduction in such lending. Pursuing this line of reasoning, our theoretical analysis suggests that, in relatively less developed financial markets such as those of our sample countries, interest rate ceilings may impose greater welfare costs for equivalent revenue than other forms of taxation such as explicit indirect taxes or reserve reuqirements.

Surges in inflation in the sample countries have been correlated with high financial sector taxation. What has often happened is that, under pressure of an expanding budget deficit, governments have turned to inflationary financing. Although we do not consider the broader questions of policy consistency that this potential for inflationary financing entails, we suggest that governments should consider the merits of making revenue less sensitive to the rate of inflation. This would require a more flexible approach to the determination of interest rates, to ensure that administered rates do not fall far below market-clearing levels. So far as explicit taxes are concerned, the burden of a VAT-type of tax would be much less sensitive to the rate of inflation than taxes based on gross interest receipts of banks.

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Data Sources

Inflation: consumer price index (4th quarter average: IFS, line 64). CPI for 1989 are World Bank staff estimates

Bank reserves: IFS, line 14-14a (14-14a-14e for Ghana).

Currency outside banks: IFS, line 14a.

Government loans: IFS, line 22a.

Non-government loans: IFS, lines 22a+22d+22f for Cote d'Ivoire and Nigeria, 22c+22d for Ghana, 22a+22d for Zambia, and 22a+22b+22c+22d+22f for Kenya.

GDP: IFS, line 99b. For late years World Bank staff estimates are used (1987 Cote d'Ivoire, 1988 Ghana and Cote d'Ivoire, 19[illegible] all five countries).

M2: IFS, line 34+35.

International Interest Rate: LIBOR US$, IFS line 60ldd.

Exchange Rate: IFS, line ae for Cote d'Ivoire and Kenya and line ag for Ghana, Nigeria, and Zambia.

Treasury bill rate: IFS, line 60c (4th quarter average). This was augmented for Cote d'Ivoire by the money market rate from La Zone Franc and World Bank files; for Ghana by the Bank of Ghana Annual Report and for Nigeria by the Central Bank of Nigerial Annual Report. As explained in the text, assumed gap between actual and market lending rates were measured by comparing actual Treasury bill rates with estimates of market clearing rates.

Parallel market exchange rate: World Currency Yearbook for 1978-86 and Currency Alert for 1987-89.

Government Revenue: calculated from the government revenue to GDP ratio, in African Economic and Financial Data (1989) Cote d'Ivoire 1980-85, Ghana 1980-86, Kenya, Nigeria and Zambia, 1980-87. Other years extrapolated using the somewhat different series in Trends in Developing Economies (1989).

Other data including the TPS for Cote d'Ivoire before 1986 and the rate of remuneration on bank reserves were based on World Bank files and some extrapolation.

Table 1: Taxation of the Financial Sector

At End-Year	1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Average
COTE d'IVOIRE												
% of GDP	3.0	5.8	1.7	1.7	2.2	2.0	1.8	1.6	0.9	1.1	1.1	2.1
% of M2	9.7	20.7	6.7	6.6	8.6	8.1	6.5	5.4	3.1	3.7	3.7	7.5
% of Govt Revenue	N.A.	N.A.	6.9	7.0	8.8	7.4	6.1	5.8	4.1	5.5	5.6	6.4
GHANA												
% of GDP	2.8	12.1	10.9	1.6	13.1	0.6	1.4	2.4	2.8	1.9	1.7	4.7
% of M2	14.9	62.5	72.9	11.9	91.1	7.6	13.2	21.1	24.8	15.9	13.3	31.8
% of Govt Revenue	N.A.	N.A.	190.9	30.7	236.5	8.7	15.1	19.8	19.9	13.4	12.8	60.9
KENYA												
% of GDP	1.3	3.9	2.9	3.1	1.0	0.9	0.8	0.9	0.8	1.0	0.9	1.6
% of M2	3.8	12.2	10.3	11.4	3.3	3.2	2.8	3.4	2.9	3.5	3.4	5.5
% of Govt Revenue	N.A.	N.A.	13.0	14.1	4.5	4.1	3.6	4.1	3.9	4.4	4.0	6.2
NIGERIA												
% of GDP	1.4	2.8	4.0	1.0	8.0	7.5	0.7	2.5	1.0	8.6	6.3	4.0
% of M2	7.1	13.4	15.0	3.9	31.8	26.4	2.4	8.9	3.9	40.6	29.2	16.6
% of Govt Revenue	N.A.	N.A.	25.0	7.8	65.1	67.7	6.7	18.7	5.7	48.4	35.5	31.2
ZAMBIA												
% of GDP	2.3	2.8	3.3	3.3	6.0	6.5	10.6	4.5	7.8	11.7	18.9	7.1
% of M2	8.9	9.5	12.0	11.9	18.4	20.7	40.1	22.4	33.5	40.8	62.1	25.5
% of Govt Revenue	N.A.	N.A.	13.6	14.1	25.4	27.9	47.8	19.7	33.4	58.4	111.4	39.1

Note: Based on Measure 1.

Table 2: Taxation of the Financial Sector
(% of GDP)

At End-Year		1981	1982	1983	1984	1985	1986	1987	1988	Average
COTE d'IVOIRE	Currency Tax	0.8	1.0	0.9	0.9	0.8	0.7	0.8	0.8	0.8
	Reserve Requirement Tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Int Ceiling Tax (Govt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Int Ceiling Tax (Non-Govt)	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Indirect Tax	0.9	1.2	1.1	0.9	0.8	0.3	0.3	0.3	0.7
	Total	1.7	2.2	2.0	1.8	1.6	0.9	1.1	1.1	1.6
	of which to government	0.8	1.0	0.9	0.9	0.8	0.7	0.8	0.8	0.8
GHANA	Currency Tax	1.0	6.0	0.4	1.0	1.5	1.6	1.4	1.3	1.8
	Reserve Requirement Tax	0.5	2.7	0.2	0.2	0.3	0.5	0.2	0.3	0.6
	Int Ceiling Tax (Govt)	0.0	2.4	0.0	0.1	0.2	0.1	0.0	0.0	0.3
	Int Ceiling Tax (Non-Govt)	0.0	2.1	0.0	0.1	0.4	0.5	0.2	0.2	0.4
	Indirect Tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	1.6	13.1	0.6	1.4	2.4	2.8	1.9	1.7	3.2
	of which to government	1.6	11.0	0.6	1.3	2.0	2.3	1.6	1.5	2.7
KENYA	Currency Tax	0.9	0.5	0.6	0.5	0.6	0.5	0.6	0.6	0.6
	Reserve Requirement Tax	0.3	0.3	0.3	0.2	0.3	0.3	0.4	0.3	0.3
	Int Ceiling Tax (Govt)	0.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Int Ceiling Tax (Non-Govt)	1.7	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.2
	Indirect Tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	3.1	1.0	0.9	0.8	0.9	0.8	1.0	0.9	1.2
	of which to government	1.4	0.8	0.9	0.7	0.9	0.8	1.0	0.9	0.9
NIGERIA	Currency Tax	0.4	1.9	1.9	0.5	0.7	0.5	1.8	1.3	1.1
	Reserve Requirement Tax	0.3	1.2	0.9	0.3	0.5	0.3	1.1	0.7	0.6
	Int Ceiling Tax (Govt)	0.1	1.2	1.7	0.0	0.6	0.0	2.0	1.2	0.9
	Int Ceiling Tax (Non-Govt)	0.2	3.7	3.1	0.0	0.7	0.1	3.7	3.1	1.8
	Indirect Tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	1.0	8.0	7.5	0.7	2.5	1.0	8.6	6.3	4.5
	of which to government	0.8	4.3	4.4	0.7	1.8	0.9	4.9	3.2	2.6
ZAMBIA	Currency Tax	0.7	1.0	1.2	1.7	1.1	1.4	1.9	3.6	1.6
	Reserve Requirement Tax	0.6	0.9	1.0	1.4	0.9	2.8	2.9	4.3	1.9
	Int Ceiling Tax (Govt)	0.3	1.3	1.1	2.1	1.0	1.6	3.5	4.3	1.9
	Int Ceiling Tax (Non-Govt)	1.7	2.8	3.2	5.3	1.5	2.0	3.4	6.8	3.3
	Indirect Tax	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
	Total	3.3	6.0	6.5	10.6	4.5	7.8	11.7	18.9	8.7
	of which to government	1.6	3.2	3.3	5.3	3.0	5.8	8.4	12.1	5.3

Note: Based on Measure 1

Table 3: Taxation of the Financial Sector
(% of GDP)

At End-Year		1978	1979	1980	1981	1982	1983	1984	1985	1986	1987	1988	Average
COTE d'IVOIRE	Measure 1	3.0	5.8	1.7	1.7	2.2	2.0	1.8	1.6	0.9	1.1	1.1	2.1
	Measure 2	2.0	2.1	2.1	2.1	2.6	2.4	2.2	1.9	1.3	1.5	1.5	2.0
	Measure 3	1.6	9.5	17.3	11.0	11.0	7.8	1.8	1.6	0.9	7.0	1.1	6.4
	Measure 4	1.6	7.5	18.7	12.8	12.5	4.9	1.8	1.6	0.9	6.3	1.1	6.3
	Measure 5	1.6	1.7	1.7	1.7	2.2	5.2	7.5	1.6	0.9	1.1	N.A.	2.5
	Cash flow*	1.6	0.9	0.8	-0.4	0.5	1.7	0.9	0.3	-0.4	-0.2	N.A.	0.6
GHANA	Measure 1	2.8	12.1	10.9	1.6	13.1	0.6	1.4	2.4	2.8	1.9	1.7	4.7
	Measure 2	3.1	3.2	2.4	2.9	2.2	1.3	2.4	1.5	1.2	1.1	1.2	2.0
	Measure 3	1.4	1.9	2.1	1.6	37.3	4.7	2.3	4.7	7.6	2.6	3.2	6.3
	Measure 4	8.3	1.4	25.0	13.7	0.8	0.6	4.4	4.7	1.2	3.2	1.5	5.9
	Measure 5	2.0	4.5	7.3	1.6	4.3	3.3	1.9	4.2	2.6	2.8	N.A.	3.4
	Cash flow*	1.2	3.5	4.7	1.0	3.3	4.5	4.9	2.4	2.7	2.1	N.A.	3.0
KENYA	Measure 1	1.3	3.9	2.9	3.1	1.0	0.9	0.8	0.9	0.8	1.0	0.9	1.6
	Measure 2	1.3	1.2	1.2	1.4	1.6	1.6	1.5	1.6	1.7	1.8	1.7	1.5
	Measure 3	1.7	4.7	14.2	8.0	3.0	3.8	0.8	0.9	0.8	3.4	4.5	4.2
	Measure 4	2.8	3.6	17.5	9.9	0.8	3.8	0.7	1.3	4.4	1.1	1.2	4.3
	Measure 5	5.8	0.3	0.4	4.6	0.8	0.9	1.4	6.8	3.1	1.0	N.A.	2.5
	Cash flow*	0.9	0.7	0.9	0.2	0.5	0.3	0.7	1.2	1.1	0.6	N.A.	0.7
NIGERIA	Measure 1	1.4	2.8	4.0	1.0	8.0	7.5	0.7	2.5	1.0	8.6	6.3	4.0
	Measure 2	2.2	2.3	3.1	3.1	3.3	3.4	3.6	3.4	2.2	0.8	-0.1	2.5
	Measure 3	0.4	1.7	8.8	4.1	4.8	4.1	9.6	46.0	7.2	6.7	10.8	9.5
	Measure 4	0.4	1.3	4.2	10.8	38.8	0.8	2.6	28.3	0.8	18.3	-0.1	9.7
	Measure 5	2.6	11.3	0.6	1.2	0.6	0.8	0.7	0.7	3.4	7.1	N.A.	2.9
	Cash flow*	0.5	1.8	1.3	0.6	0.9	0.1	0.0	0.3	1.2	2.3	N.A.	0.9
ZAMBIA	Measure 1	2.3	2.8	3.3	3.3	6.0	6.5	10.6	4.5	7.8	11.7	18.9	7.1
	Measure 2	3.4	3.8	3.6	3.7	4.4	4.2	2.7	1.2	3.6	4.8	5.1	3.7
	Measure 3	2.0	4.4	7.3	4.4	20.1	14.8	30.3	18.0	2.2	7.0	24.8	12.3
	Measure 4	0.4	5.1	0.9	6.1	15.1	30.2	18.5	17.3	2.2	64.5	3.0	14.9
	Measure 5	0.5	3.2	3.6	3.4	3.2	3.8	4.4	20.9	5.3	12.4	N.A.	6.1
	Cash flow*	-0.2	0.9	1.2	0.5	0.7	1.0	0.9	2.4	2.2	3.6	N.A.	1.3

*Seignorage using traditional cash flow measure.

FIGURE 1

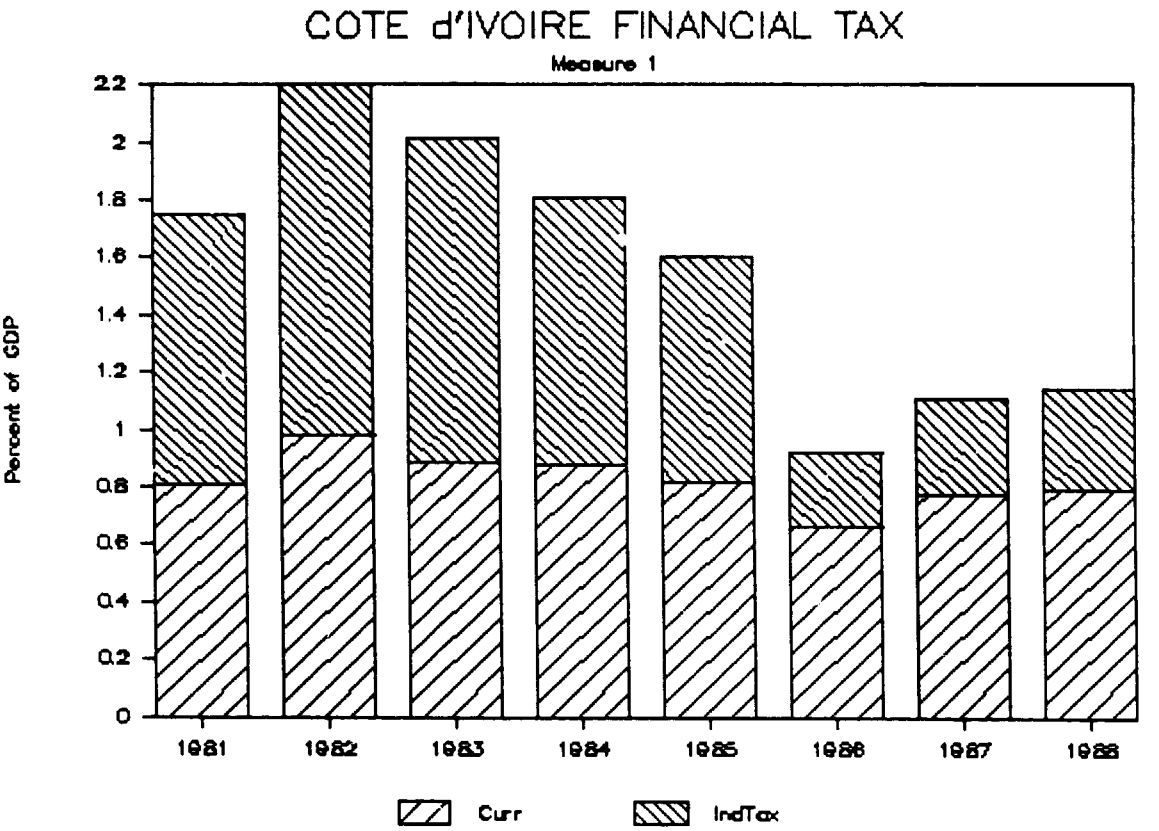

COTE d'IVOIRE FINANCIAL TAX
Measure 1
Percent of GDP
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1981
1982
1983
1984
1985
1986
1987
1988
Curr
IndTax

FIGURE 2

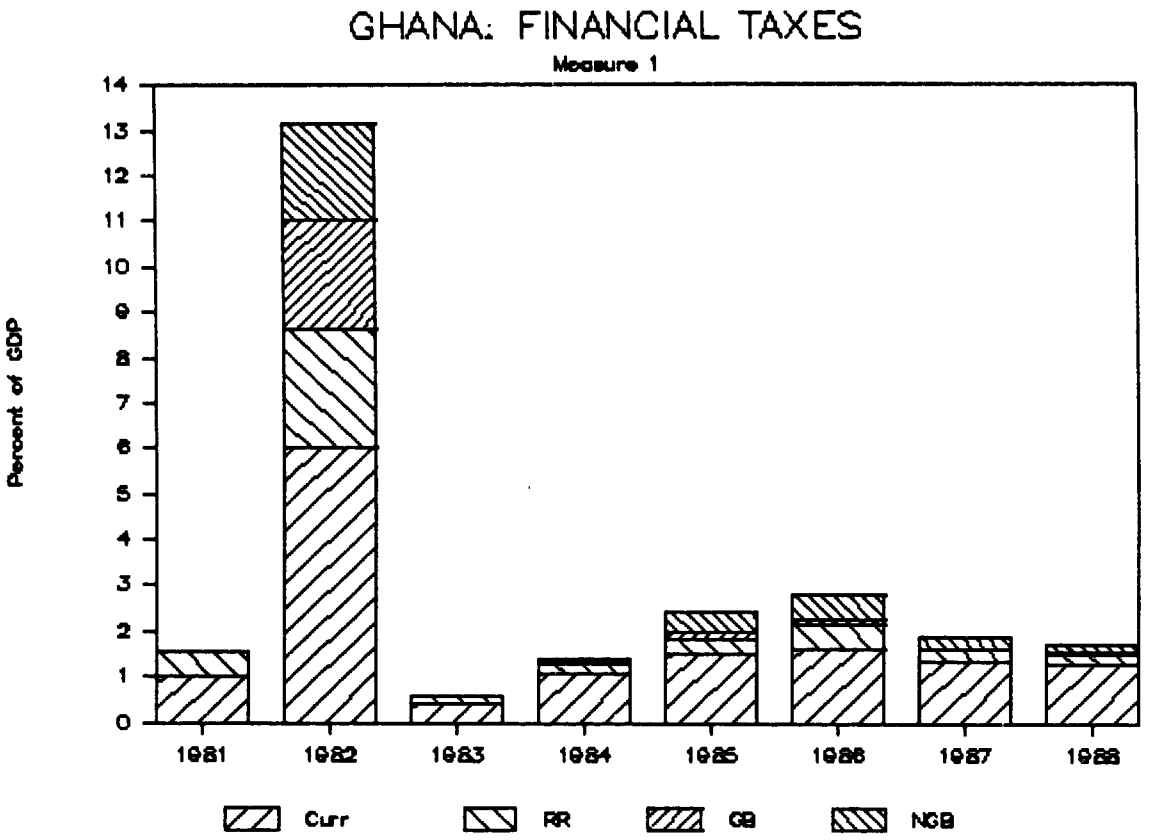

GHANA: FINANCIAL TAXES
Measure 1
Percent of GDP
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1981
1982
1983
1984
1985
1986
1987
1988
Curr
RR
GB
NGB

FIGURE 3

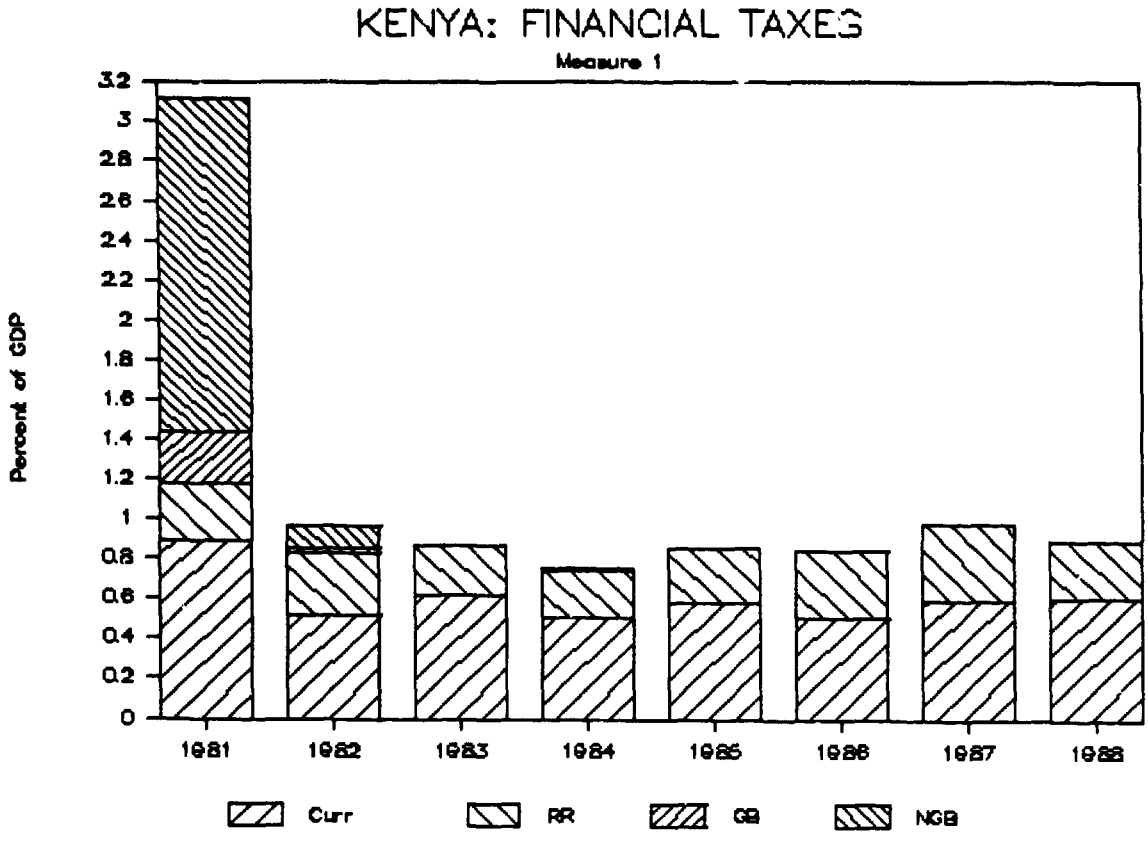

KENYA: FINANCIAL TAXES
Measure 1
Percent of GDP
3.2
3
2.8
2.6
2.4
2.2
2
1.8
1.6
1.4
1.2
1
0.8
0.6
0.4
0.2
0
1981
1982
1983
1984
1985
1986
1987
1988
Curr
RR
GB
NGB

FIGURE 4

NIGERIA: FINANCIAL TAXES

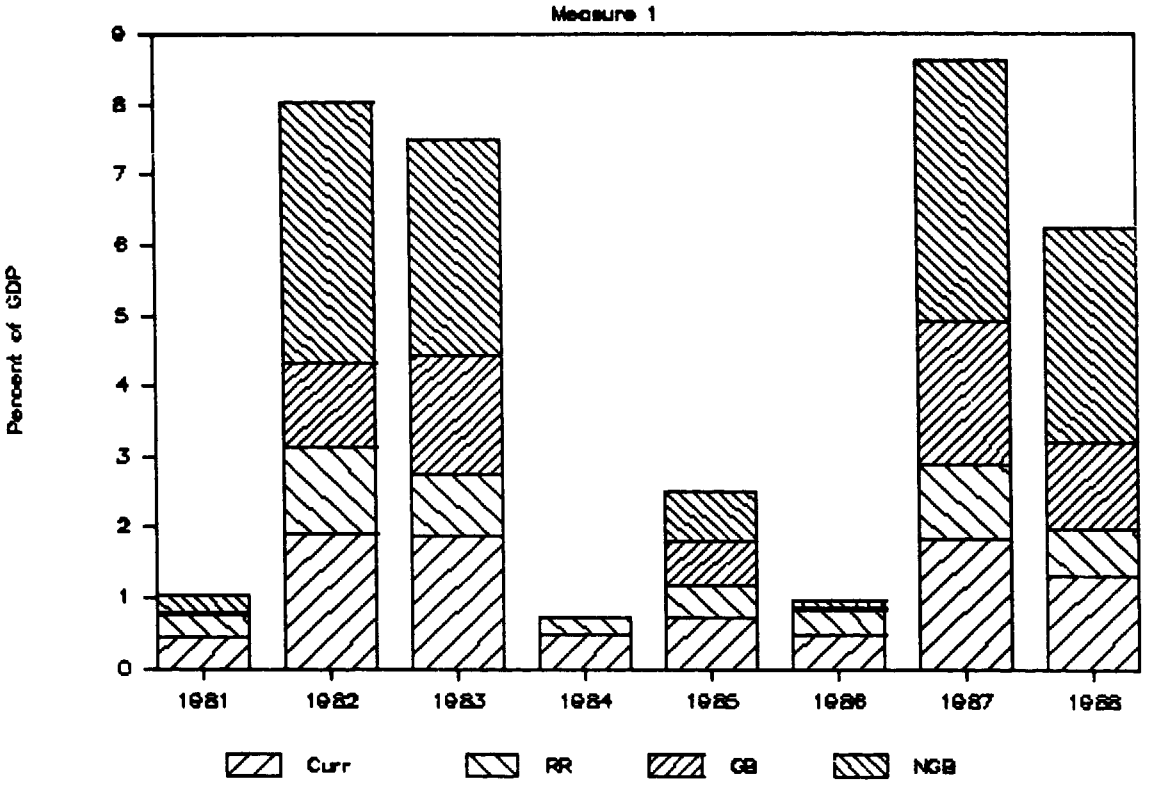
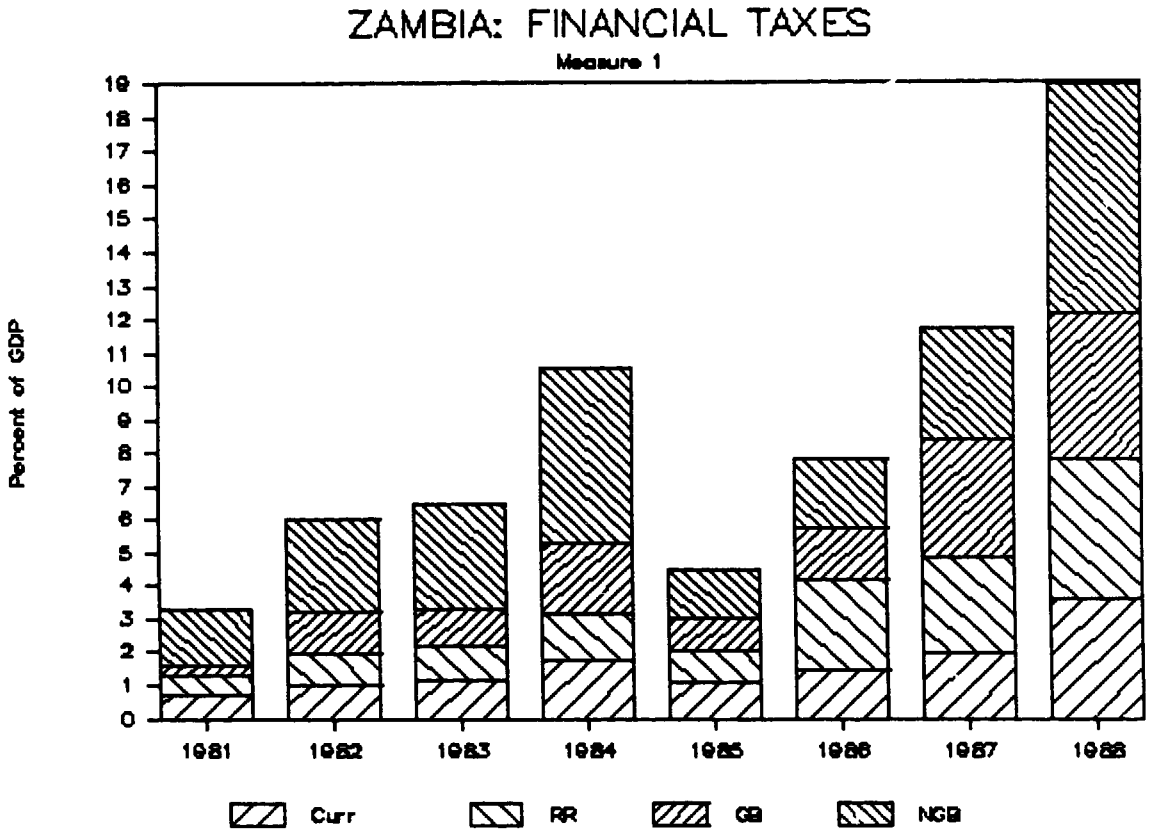


FIGURE 5


ZAMBIA: FINANCIAL TAXES
Measure 1
Percent of GDP
19
18
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
1981
1982
1983
1984
1985
1986
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1988
Curr
RR
GB
NGB

APPENDIX 1: A SIMPLE MODEL OF BANK TAXES

1 Introduction and summary

Implicit and explicit taxation of the financial sector have an impact both on budgetary flows and on the behavior of the financial system. It is useful to have a formal model within which these effects arise. This paper presents a simple model of banking sector behavior under a policy of interest rate ceilings, reserve requirements and taxation. It also shows how these policy instruments impact the budget constraint of the government. The objective is to provide sufficient institutional detail to allow an understanding of the roles of different types of tax and imposition, even at the cost of precluding tidy analytical solutions for issues such as optimal levels of taxation.

The key role of banks modelled here is that of selecting good loan projects. This is a function on which the banks are able to spend resources, provided sufficiently high interest rate spreads are allowed. Policy interventions will indirectly influence the rate of remuneration of deposits, the scale of individual banks and of the banking system as a whole and the amount of resources devoted to screening loan applications. Specifically the model assumes ceilings on bank lending rates, reserve requirements which are remunerated at below-market interest rates and a tax on gross interest receipts.

The effect of variations in these policy instruments on bank behavior varies according to whether the bank has access to government (or foreign) bonds at an attractive rate of interest. If so (the interior solution case), the rate of interest on deposits is fully determined by the intermediation cost wedge imposed by the reserve requirements between the bond rate and the deposit rate; but this wedge has no impact on the scale of lending. Lending rate ceilings have no impact on deposit rates, but they do influence the scale of lending in the banking system and the degree to which resources are devoted to screening; these effects being related to the implied maximum permitted spread above deposit rates.

If there is no attractive investment alternative (the corner solution) the size of the intermediation cost wedge and the maximum permitted spread over deposit rates both affect the scale of lending and to exactly the same extent. In this case the deposit rate still differs from the marginal return on free funds by the reserve requirements wedge, but the marginal return is now dependent on the the interest rate ceiling.

The impact of the tax on gross interest receipts is analysed within the same framework: in general it is equivalent to, or can be offset by simultaneous adjustments in the other instruments.

Using a consistent framework and notation with the bank behavior model, Section 3 presents an analysis of the impact of these policies on the government's budget. This provides in particular a simple formula for evaluating the total implicit flow of revenue to government.

The inherent inefficiencies in the lending process and the likelihood that the uncontrolled banking system's spending on screening resources is less than the social optimum leads us to suggest in Section 4 that those measures that achieve the desired floe of revenue with the least impact on the lending side of bank behavior are to be preferred. This turns out to be an argument especially against lending rate ceilings.

2 The model

2.1 The nonbank sector

Our model of the nonbank private sector is very simplified. The sector has an exogenous endowment of purchasing power and begins each period with an inherited wealth being the stock of currency C and bank deposits D. With these resources and facing real interest rates r^C and r^D as well as a potential lump-sum tax T^N, the sector chooses its current consumption and new holding of currency and deposits to maximize an utility function which depends on the sum of current utility (depending on consumption, together with holdings of currency and deposits) and the real value of next period's starting wealth. Next period's wealth equals the starting value of currency and deposits plus interest less erosion in the real value due to inflation plus entrepreneurial income γ. From this set-up we may deduce that the demand for currency and bank deposits depends on the two real rates of return, and we assume that these demand functions display gross-substitutability. Thus we write the two demand functions as:

$$D = g(r^D, r^C),$$

$$C = h(r^D, r^C).$$

with,

$$g_1 > 0 \quad g_2 < 0$$
$$h_1 < 0 \quad h_2 > 0$$

The second argument of g is suppressed below when appropriate. Note that, when no interest is paid on currency, the real rate of interest on currency is simply the negative of the rate of inflation, assumed to be known with perfect foresight:

$$r^C = -\pi.$$

Entrepreneurial income γ arises from investments financed by bank loans. The nonbank private sector has a range of risky projects which can only be financed by loans. Any project which receives bank finance will mature after one period. If its terminal value exceeds the amount due to the bank, the surplus accrues to the nonbank private sector in the form of entrepreneurial income. If the project's terminal value falls short of the

amount owed, the bank suffers a loan-loss, but the non-bank sector does not suffer any loss. (It will be clear that this abstracts from a number of interesting problems in risk-sharing and moral hazard.)

2.2 Behavior of the banking system

We model a banking system subject to certain interest rate controls and reserve requirements. Specifically banks may hold reserves at the central bank, government bonds, and loans a. They issue deposits d. For simplicity we neglect the banks' capital and vault cash holdings. Controlled interest rates are those on government bonds r^B, on bank reserves r^R and on bank loans r^A. (These are real rates of interest; a change in the expected rate of inflation without a change in a controlled nominal interest rate therefore implies a change in these rates). A regulated minimum percentage q of deposits must be held in the form of reserves at the Central Bank. The deposit interest rate r^D is competitively determined as is the number of banks.

The banking system is composed of identical banks. Each bank faces parametric values of all interest rates and a fixed cost k of operations; but the yield on its loan portfolio also depends on the resources it uses to make credit assessments, as these will reduce loan losses. Based on a simple screening mechanism described below, the default rate on loans f is assumed to be inversely related to the monitoring effort x and positively related to the quantity of loans a and the number of banks n competing in the market. Thus the profit of each bank may be written:

$$\mathcal{P} = (r^A - f(x,a,n) - x)a + r^R qd + r^B((1-q)d - a) - r^D d - k.$$

$$f_x < 0 \quad f_a > 0 \quad f_n > 0.$$

Screening loan projects. The bank chooses projects from a population for which the rate of return w is a stochastic variable with density function $\phi(w;s)$. At some cost, the bank can establish a screen which will accept only projects with a certain minimum value of the parameter s. The mean return on a portfolio screened to parameter level s is:

$$E = \int_0^\infty w d\phi(s) = \int_0^{r^A} w d\phi(s) + \int_{r^A}^\infty w d\phi(s).$$

The mean loan losses experienced by a bank from such a portfolio is:

$$f = \int_0^{r^A} (r^A - w)\,d\phi(s).$$

The entrepreneurial income $\mathcal{Y}$ accruing to the non-bank private sector equals the total return on all approved projects less the amount paid to the banks.

$$\mathcal{Y} = \mathfrak{E} - r^A a + f$$

$$= \int_{r^A}^{\infty} (w - r^A)\,d\phi(s).$$

We assume that the parameter s has a monotonic influence on the density function $\phi(w;s)$, so that:

$s_1 > s_2 \rightarrow$ $$\int_0^{r^A} w\,d\phi(s_1) > \int_0^{r^A} w\,d\phi(s_2)$$

$$\int_{r^A}^{\infty} w\,d\phi(s_1) > \int_{r^A}^{\infty} w\,d\phi(s_2).$$

$(\rightarrow$ $$\int_0^{\infty} w\,d\phi(s_1) > \int_0^{\infty} w\,d\phi(s_2)).$$

This implies a monotonic relationship between s and default rate f. The cost ax of obtaining enough projects satisfying the screen s is assumed to depend on the number n of competitor banks and the total value of the loan portfolio. Accordingly a functional relationship $f(x,a,n)$, may be deduced for the default rate, as used above.[1]

Note that the bank's choice of x minimizes the sum of the default rate f and the screening cost x, whereas the social optimum would call for maximizing the mean return $\mathfrak{E}$ less the cost x. Under the assumptions given, there is a less than optimal amount of screening x.

Simplifying the profit function: The profit function can be rewritten as:

$$\mathcal{P}(a,d,x;z) = \mathcal{P}^1(a,x;\lambda) + \mathcal{P}^2(d;z) - k,$$

where

1 We neglect the possible dependence of the function f on the controlled loan interest rate r^A.

$$\mathcal{P}^1(a, x; \lambda) = (\lambda - f(x, a, n) - x)a.$$

$$\mathcal{P}^2(d; z) = (r^L q + r^B(1-q) - r^D)d.$$

$$\lambda = r^A - r^B.$$

$$z = \{r^A, r^B, r^L, q\}$$

λ is the regulated spread between loan rates and the government bond rate, while z is the vector of all policy instruments. The first term in this decomposition of the profit function is independent of the level of deposits and the second term is independent of the portfolio of the bank. With the deposit rate r^D determined by competition between banks, the coefficient of d is zero[2], giving:

$$r^D = r^B - q(r^B - r^L). \tag{1}$$

This allows us to concentrate on the first term in the profit function $\mathcal{P}$. The bank cannot lend more than its deposit resources net of required reserves. Accordingly,

$$0 \leq a \leq (1-q)d$$

2.3 Market equilibrium

We distinguish between two distinct situations, first the interior solution, where the banks are voluntarily holding government bonds and second the corner solution where the government bond rate is too low and none are held. The response of the system to policy changes is quite different in these two polar situations[3].

Although each bank takes the deposit rate as parametric, the market supply of deposits is downward sloping:

$$nd = g(r^D). \tag{2}$$

We assume excess supply of loan proposals at all relevant interest rates, though the net return on these loans is also downward sloping in view of the incidence of defaults.

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2 If the deposit rate were regulated, it would have to be less than $r^L q + r^B(1-q)$ and the supply of deposits would be exogenous to each bank.

3 The interior solution can also be interpreted as the solution which will prevail if the banks are allowed to hold foreign investments freely.

Competitive market equilibrium implies zero profits. Therefore the value added of each bank is $(ax + k)$. Because of (1) zero profits implies:

$$(\lambda - f(x, a, n) - x)a = k. \tag{3}$$

(a) The interior solution. If the bank's maximising choice of monitoring effort and portfolio mix leads it to an interior solution, with nonzero holdings of both government bonds and loans, the first-order conditions imply:

$$f_x(x, a, n) = 1. \tag{4}$$

$$f_a(x, a, n) - ka^{-2} = 0. \tag{5}$$

The equilibrium is given by equations (1) to (5); this system has a recursive pattern, with equation (1) determining r^D. Equations (3), (4) and (5) represent a simultaneous system determining x, a and n; finally the level of deposits d is determined from equation (2), knowing r^D, x, a and n. The impact of the policy variables q and r^R is on the deposit rate r^D. The policy variable λ does not affect r^D, but it does affect the portfolio decision. This pattern of causality is shown in figure 1.

An increase in λ will surely increase the number of banks. This can be seen by totally differentiating the zero-profit condition (3), recalling (5) and applying the envelope theorem (or (4) and (5)) to obtain[4]:

$$\frac{\delta n}{\delta \lambda} = \frac{1}{f_n} > 0. \tag{6a}$$

Therefore, since r^D is unaffected by λ,

$$\frac{\delta \log d}{\delta \lambda} = -\frac{\delta \log d}{\delta \lambda} < 0. \tag{6b}$$

Thus, an increase in the regulated spread λ will reduce the deposit portfolio of the individual bank, while leaving overall deposits in the system unchanged.

While the impact of λ on the x and a is indeterminate in general, assumptions on the second derivative of the default function f may determine its sign. For example, assuming that the marginal return on monitoring effort f_x is independent of the number of loans ($f_{xa} = 0$) would

4 Note that the crowding-out condition $f_n > 0$ is essential for the existence of equilibrium.

allow one to show that the impact of λ on x and a has the same sign as $-f_{xn}$ and $-f_{an}$ respectively. The first of these will be positive if the marginal return on monitoring declines with the number of competing banks; the second would be negative if an increase in the number of banks worsens the impact of increasing loan volume on defaults. These three assumptions ($f_{xa} = 0$; $f_{xn} < 0$; $f_{an} > 0$) would then imply:

$$\frac{\delta a}{\delta \lambda} < 0 \quad \frac{\delta x}{\delta \lambda} > 0 \tag{6c}$$

I.e. an increase in λ increases monitoring expenditure but under these assumptions would actually reduce the volume of loans per bank. Since the number of banks would increase, the impact on total loans could be positive. As an alternative assumption, which does not require $f_{xa} = 0$, we may specify the functional form of f as exponential:

$$f = \nu \exp\{-\alpha x + \beta a + \gamma n\}$$

This eliminates the somewhat implausible negative impact of λ on loan size. Once again, $f_{xn} < 0$; $f_{an} > 0$, but this time $f_{xa} < 0$. For the exponential form we obtain explicit solutions:

$$\frac{\delta a}{\delta \lambda} = 0 \quad \frac{\delta x}{\delta \lambda} = 1 \tag{6c'}$$

We conclude under the exponential assumption that an increase in the allowable spread will expand the use of factor resources for monitoring by the banking system, that it will reduce the deposit portfolio of the individual bank (and therefore shrink its holdings of government paper), and that it will increase the number of banks. The loan portfolio of the individual bank would be unaltered in this situation.

The other policy variables, i.e. the reserve requirements and the interest rates on reserves and on government bonds affect the system in this interior solution only through their direct impact on the deposit interest rate, (so long as we are considering compensated policy changes, i.e. those which do not affect the allowable spread λ).

Specifically, the relation between the deposit rate, the rate on required reserves and the government bond rate, which in this interior solution case is the marginal yield of free funds, can be rewritten,

$$r^D = r^B - \mu,$$

where,

$$\mu = \frac{q}{1-q}(r^D - r^R).$$

The term μ can be thought of as the marginal wedge to intermediation costs added by the reserve requirements. This formulation becomes useful when looking at the corner solution in which government bonds are not bought.

The comparative statics of policy actions in the interior solution is straightforward and are set out in Table 1. If we treat the available policy instruments as λ, μ, r^R, and q, these divide into two groups; the first is λ: increases in this lending margin increase total loans an and screening activity x; they lower d and the quantity of government bonds sold, while leaving the deposit interest rate r^D and therefore total deposits D unchanged. Relaxations in the remaining policy instruments all increase r^D, as well as each bank's deposits d and total bond sales, while leaving the lending portfolio, resources spent on lending and the number of banks unchanged. (If the instruments are treated as r^A, r^R, r^R, and q, then relaxations in the last three without an increase in r^A will have the effect of reducing λ and thus causing a contraction in lending activity.)

(b) The corner solution: no voluntary purchases of government bonds. If the interest rate on government bonds is set too low, then none will be bought. In solving the system, this implies replacing (1), which no longer holds, by (1'):

$$a = (1-q)d \qquad (1')$$

Apart from this only one other change needs to be made: (3) is replaced by (3'):

$$f + x - (\lambda' - \mu) + \frac{k}{a} = 0 \qquad (3')$$

where

$$\lambda' = r^A - r^D$$

and μ is as defined above.

If λ' and μ are taken as parametric, the system, (3'), (4) and (5) is still a self-contained one determining x, a and n. Equation (1') then determines d, knowing a. Finally (2) determines r^D. The pattern of causality is shown in figure 1. The implication of this recursive pattern is that the

derivatives of x, a, and n with respect λ' are as before; with respect to μ they are equal in size but with opposite sign to those with respect to λ'. However the impact of λ' on the deposit interest rate is no longer zero: an increase in λ' increases both the asset size per bank and the number of banks so that there must be an increase in total deposits and therefore in the deposit interest rate.

The comparative statics of policy actions in the corner solution differ somewhat from that in the interior solution. Again these are set out in Table 1. Clearly r^B is not a relevant instrument in this case provided it remains below the point at which bonds will be bought voluntarily. Treating the remaining policy instruments as λ', μ, and q, the division is now between q and the others. A lowering of q without any modification of the others will actually lower interest rates enough to reduce total deposits by the amount of reserves released and leave lending activity unaltered. Relaxation of the other two instruments will increase deposit interest rates and lending activity. (If the instruments are treated as r^A, r^B, and q, then a relaxation in q will have a small positive effect on lending activity.)

2.4 Explicit tax on interest receipts

Several countries impose a tax on all interest receipts of the banks. This can readily be added to the model in the form of a tax rate τ. Thus the profit of the bank becomes:

$$\mathcal{P} = ((1-\tau)r^A - f(x,a,n) - x)a + (1-\tau)r^L qd + (1-\tau)r^B((1-q)d - a) - r^D d \quad (\bar{R})$$

After substitution, and after replacing λ with $\lambda' = (1-\tau)(r^A - r^B)$, this modification affects only $\mathcal{P}^2$ and thus only the deposit interest rate condition (1'). We conclude that a change in the rate of tax τ compensated by a change in the allowable lending rate will have its impact only on and through the deposit rate[5].

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5 At low values of λ and τ, an increase in τ will, for given r^A, actually increase the after tax margin λ', and thereby encourage increased use of resources x. But at higher values of λ or τ the opposite is the case. The criterion is:

$$\tau = 1 - \frac{r^A}{2r^D}.$$

In Cote d'Ivoire the TPS rate appears to have been just lower than this criterion during the 1980s. This was also true in Thailand and, except for 1984-85, the Philippines.

For the corner solution, replacing μ by

$$\mu^{*} = \frac{q}{1-q}(r^{\ell} - (1-\tau)r^{\ell}),$$

(as well as replacing λ by λ^{*}) is sufficient to allow use of the previous analysis.

The comparative statics are once again set out in Table 1. If we treat the available policy instruments as $\tau, \lambda^{*}, \mu^{*}, r^{\ell}$, and q, the impact of τ in the interior solution case is similar to that of, say q; in the corner solution, changes in τ have no effect because of the compensating changes in the policy rates of interest induced by holding λ^{*}, μ^{*} constant. (If the instruments are treated as $r^{\ell}, r^{\ell}, r^{\ell}$, and q, then τ has a similar effect to q or to r^{R} in the interior solution case, provided λ and τ are small, and a similar effect to r^{R} in the corner solution case.)

2.5 Inflation

This section sketches the implications of inflationary financing. To a large extent this is a straightforward extension in steady state, but it should be noted that the complex expectational issues involved in changing inflation rates and transitions from one steady state to another are not treated here. We take it that all behavioral relationships of the economy ensure that there exists a stationary state with no expansion of currency and no changes in the ceiling interest rates or in the reserve requirements and in which the inflation rate is zero. Because all behavioral equations have been expressed as dependent on real rates of return, steady state inflation with perfect foresight will be characterized by a constant rate of expansion of all nominal aggregates at the rate of inflation.

Provided that all controlled interest rates are indexed to the rate of inflation, the solution of the bank behavior model will be as before. Fully anticipated inflation introduces no distortion into this model provided interest rates on all assets are indexed. However, as this proviso must extend to interest paid on currency, most interesting cases violate it. Therefore we briefly consider two alternative scenarios: (i) all controlled nominal interest rates except that on currency indexed to rate of inflation and (ii) all controlled nominal interest rates fixed and do not move with inflation. In either case, the explicit tax rate on interest receipts is effectively increased if, as is usually the case, the tax base is nominal interest receipts.

(i) If currency does not bear indexed interest then a higher rate of inflation will result in an increased supply of deposits to the banks. This upward shift in the deposit supply function will result in a higher quantity of deposits and holding of bonds by the banks in the *interior* solution case, but no change in the (real) deposit interest rate. The spread λ is unchanged. In the *corner* solution case the upward shift in deposit supply will result in a lower real deposit interest rate, higher deposit holdings and, because of a higher $\lambda + \mu$, more banks and more spending x.

(ii) If all of the controlled interest rates are lower by the higher rate of inflation then λ will not change, but (in the *interior* solution) the nominal deposit interest rate will be lower by the rate of inflation, possibly resulting in lower deposits and lower bank holding of bonds. In the *corner* solution, there will probably be a reduction in μ, as banks bid for deposits, and this will tend to reduce the number of banks and the spending x.

3 The government's budget constraint

The government has non-distorting non-interest expenditure G and non-distorting, non-financial taxes T^N. The traditional budget constraint is;

$$G + (r^B + \pi)B + (r^R + \pi)Q = T^N + T^F + \Delta B + \Delta C + \Delta Q. \qquad (9)$$

This shows the deficit being financed by expansion of the bond issue, by printing currency and by increase in the required reserves. In a steady state with constant inflation, fixed interest rates and reserve requirement ratio each of these financing options is fully determined. A higher reserve requirement will lower the quantity of bonds held voluntarily by the banking system as will a lowering of either the rate of interest on bonds or on reserves. A higher (but constant) rate of expansion of nominal government debt, including currency, will also, through its influence on inflation and through this on the deposit supply function lower the amount of bonds voluntarily held by the banking system.

In steady state inflation, B, C and Q will all grow at the same proportional rate.

The augmented budget deficit recognizes the subsidy being given to bank borrowers on both sides of the constraint:

$$G + \sigma A + (r^B + \pi)B + (r^R + \pi)Q = T^N + T^F + \sigma A + \Delta B + \Delta C + \Delta Q. \qquad (10)$$

Maintaining the same level of non-interest expenditure, including whatever expenditure is needed to keep the banks borrowers at equivalent levels of net interest, but removing interest ceilings, reserve requirements and financial taxes T^F, would involve additional non-distorting taxes z, where,

$$G + (\bar{r}^A - r^A)A + (\bar{r}^B + \pi)\bar{B} + (\bar{r}^C + \pi)\bar{C} = T^N + \Delta\bar{B} + \Delta\bar{C} + z, \qquad (11)$$

where the barred variables represent the hypothetical rates of interest and stocks of bonds and currency in the hypothetical non-distorting situation. Because of the different interest rates, the composition of the private sector's portfolio of bonds and currency will differ from the distorting case. We choose to fix the total nominal debt of the government as the same in the actual and hypothetical non-distorting cases, with the mix between $\bar{B}$ and $\bar{C}$ determined by the rates of interest implied by the zero profit condition on currency issue. We also take the expected inflation rate to be determined by a constant rate of expansion of nominal debt equivalent to the rate of expansion of nominal debt in the actual situation. Thus,

$$\bar{r}^C = \bar{r}^B$$

$$\pi = \frac{\Delta(\bar{B} + \bar{C})}{\bar{B} + \bar{C}} = \frac{\Delta(B + C + Q)}{B + C + Q}$$

$$\bar{B} + \bar{C} = B + C + Q.$$

Subtracting, we obtain,

$$z = \bar{r}^C C + (\bar{r}^B - r^k)Q + (\bar{r}^B - r^B)B + (\bar{r}^A - r^A)A + T^F + \mathcal{R}emainder. \qquad (12)$$

The remainder arises out of portfolio shifts between different elements of the government debt as between the two situations. In fact the net effect of these shifts is of second order and likely to be negligible as may be seen from:

$$Remainder = \bar{r}^B(\bar{B} - B - Q) + \bar{r}^C(\bar{C} - C)$$

but,
$$B + C + Q = \bar{B} + \bar{C},$$

$\therefore$
$$\bar{B} - B - Q = -(\bar{C} - C),$$

$\therefore$
$$Remainder = (\bar{r}^B - \bar{r}^C)(C - \bar{C})$$

$$= Cost(C - \bar{C})$$

Where *Cost* is the percentage cost of producing currency, which can safely be taken to be a small number, perhaps one per cent per annum.

4 Welfare implications

To attempt to draw firm welfare conclusions from such a simple model would be foolhardy. It is nonetheless of interest to see what can be said on the welfare front. In terms of the utility function briefly described above, the distortions on interest ceilings, reserve requirements and taxes, relate mainly to the mix of deposits and currency chosen by the non-bank private sector, and to the entrepreneurial income. By distorting the absolute and relative real returns on currency and deposits, the government reduces welfare from the current period utility functional relative to what would be achieved in the undistorted situation with lump-sum taxation. It also tends to impact on the terminal wealth especially via the entrepreneurial income, both through influencing the volume of bank loans and the amount of screening which takes place.

In principle these effects could be evaluated by explicit choice of functional form and parameter values. That is all that could be said if the financial system were first-best efficient in the absence of distortions. In particular, small taxes would have small effects and the ranking of different small taxes in welfare terms would not really be possible. Note however that the modelling of the bank screening function highlights a built-in inefficiency in the financial system in that the bank does not internalize the entrepreneurial surplus γ in choosing between loan proposals. To that extent, the uncontrolled bank tends to underspend on loan assessment. The introduction of a small tax on the financial sector might then result in first-order welfare losses to the extent that it results in a further reduction in spending x and in loan quantity an.

This is a specific illustration of a more general problem. The informational and agency problems which exist in credit markets suggest that, even in the absence of the policy interventions being studied here, lending quantities and the use of resources for assessing lending projects may be below the first-best quantity. If so, policy interventions which further reduce the lending activity of the financial system may be regarded as likely to be more distortionary than others. Strictly speaking this provides a guideline for ranking only small policy distortions; if the policy-induced distortions are themselves large there is no presumption as to which pre-existing distortion is the most important.

If this is a good guideline, then, where the interior solution seems relevant, a relaxation of binding ceilings on lending margins would be preferred to reductions in reserve requirements or in taxes on bank receipts or increases in other rates of interest not affecting lending margins. In the corner solution the same would be true, though here a reduction in the wedge (μ) imposed by the low remuneration of reserve requirements would also have merit according to our analysis[6].

List of Variables

r^A ceiling rate of interest on loans (advances).
r^B rate of interest on government bonds (one year).
r^C rate of interest paid on currency.
r^D rate of interest on bank deposits.
r^R rate of interest on required reserves.

a quantity of loans (advances) made by individual bank. A = na.
d quantity of deposits accepted by individual bank. D = nd.
f rate of default or loan-losses of bank.
k fixed costs of bank.
n number of banks.
q required reserves as a fraction of deposits. Q = qD.
x expenditure on resources by banks, per dollar lent.
s quality parameter for a project.
w stochastic rate of return on a project.
z required amount of non-distorting tax to replace interest ceilings.

B government bond issue (stock).
C currency issue (stock).
G (non-distorting) government expenditure.
T^F tax on financial sector.
T^N non-distorting tax (non-financial sector).
γ entrepreneurial income.

σ rate of subsidy for borrowers from banks.
π expected inflation rate.

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6 This ranking is based on the steady-state analysis and does not take account of the issue of super-neutrality of taxes discussed elsewhere in this paper.

μ intermediation wedge caused by reserve requirements.

$$\mu = \frac{q}{1-q}(r^D - r^A).$$

λ allowable spread over deposit rate.

$$\lambda = r^A - r^D.$$

$\bar{r}^A$, $\bar{r}^B$, $\bar{r}^C$, market clearing rates for the case of "non-distorting government"; $\bar{r}^C = \bar{r}^B - Cost$.

Table 1: Impact of policy on bank behavior

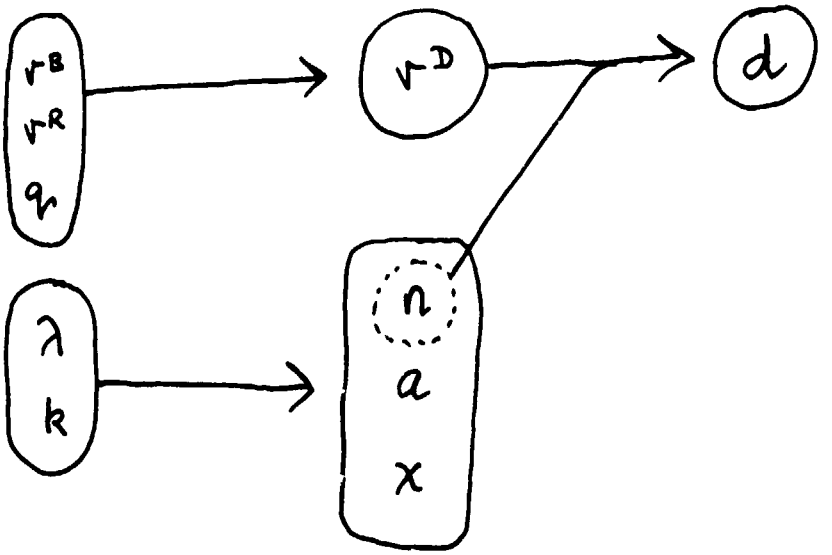
	INTERIOR						CORNER				
	x,n	a	r^D	d	D	*Bonds*	x,n	a	r^D	d	D
$\lambda \uparrow$	+	0	0	-	0	-	+	0	+	+	+
$\mu \downarrow (r^a)$	0	0	+	+	+	+	+	0	+	+	+
$r^a \uparrow$	0	0	+	+	+	+	0	0	0	0	0
$\varrho \downarrow$	0	0	+	+	+	+	0	0	-	-	-
$\tau \downarrow \mid \lambda', \mu'$	0	0	+	+	+	+	0	0	0	0	0
$r^A \uparrow$	+	0	0	-	0	-	+	0	+	+	+
$r^a \uparrow$	-	0	+	+	+	+	+	0	+	+	+
$r^a \uparrow$	-	0	+	+	+	+	+	0	0	0	0
$\varrho \downarrow$	-	0	+	+	+	+	+	0	-	-	-
$\tau \downarrow$*	-	0	+	+	+	+	+	0	+	+	+

*Assumes low values of λ, τ.

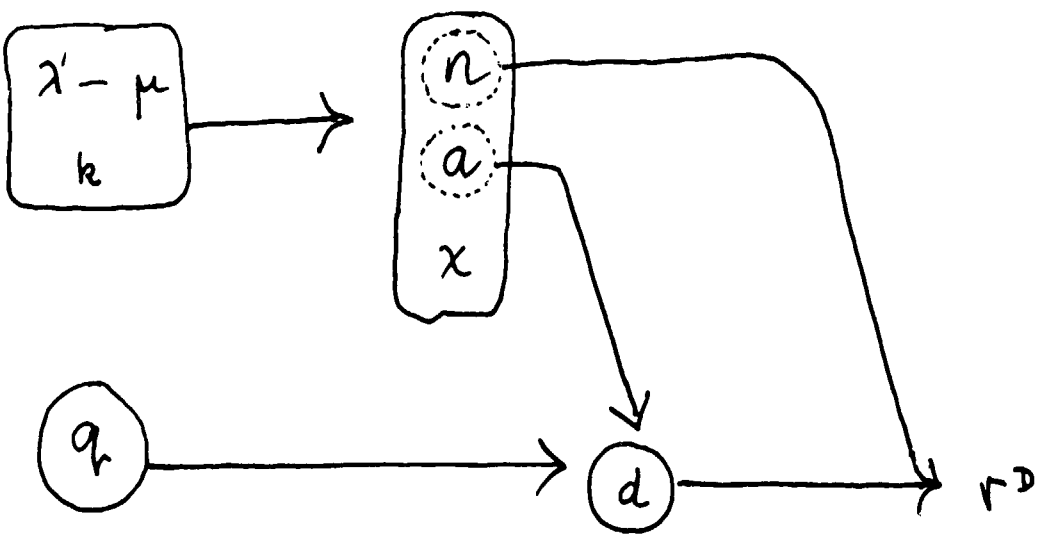
FIGURE 1

CAUSALITY IN THE MODEL

(a) INTERIOR SOLUTION



(b) CORNER SOLUTION



APPENDIX 2: COUNTRY NOTES

This appendix presents some background notes on relevant developments in the countries to complement the discussion of Section 3 in the text.

COTE d'IVOIRE

As a member of the franc zone, with a fixed exchange rate vis-a-vis the French franc for over forty years, the range of policy instruments available to the Ivorian government for raising revenue from the banking system has been somewhat constrained. The inflation rate is essentially determined externally. Over a quarter of a century cumulative CPI inflation has been almost exactly the same as in France (see Figure A4, which also plots the CPI for Cameroon[1]). Interest rate differentials have also been constrained, especially in recent years. (See Figure A1, which shows the French interest rates along with those for Cote d'Ivoire).

Although Cote d'Ivoire has been no more insulated than other countries from external commodity price shocks, these have had remarkably little influence on the monetary aggregates. Government deficits have been financed either by the Central Bank of the monetary union - hence spreading the burden across the entire zone - as in the early 1980s, or through the accumulation of payments arrears.

There is subsidized lending to the non-government sector. But because, with minor exceptions, the subsidized loans are refinanced by the Central Bank, this subsidy does not represent a tax on the financial system.

Bank lending rates are capped at rates which, for the bulk of lending, are higher, or close too, market clearing rates. Certain classes of lending (especially the sectors treated as preferential and therefore subject to lower regulated lending margins) are probably limited by interest rate ceilings, but there is no basis for arguing for a major tax source here.

Given that the rate of inflation and interest rates have been more or less externally determined, and that there are no reserve requirements it has been left to explicit taxation of the financial intermediaries to provide the bulk of whatever tax revenue is collected.

Cote d'Ivoire has generally adopted a VAT approach to indirect taxation, but financial services are taxed according to a separate regime including the taxe sur la prestation des services (TPS)[2], which is levied on the gross receipts of banks (gross interest earnings and fee income, etc.) and the new tax on loan balances (taxe sur les encours de credit, TEC). Up to 1986 the rate of TPS was 25%. During 1987 it was reduced twice so that from 1 January 1988 the figure was 10%. The TEC was introduced in 1987 at a rate of 0.05% per quarter (annualized rate of 2%). It is not known what share of the banks' revenue comes from non-VAT registered entities, but it could be in the region of one-half.

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1 Cameroon's experience with financial sector taxes is very similar to that of Cote d'Ivoire.

2 Note that TPS paid by enterprises which are registered for the VAT are deductible from such enterprises' VAT liabilities. This is an important conceptual attraction of the TPS/VAT system as it avoids double taxation of banking services insofar as they represent intermediate rather than final services. Taking the VAT system as a given, the additional revenue raised from the imposition of TPS is much less than the amount paid by the banks. Only that portion of TPS which comes from interest and other payments made by non-VAT registered persons is additional.

Cote d'Ivoire has encountered a serious problem of bank insolvency in recent years - perhaps the worst case of the five countries in the sample. As discussed in the text, both the policy environment that has contributed to these failures and the bail-out of depositors which is in progress has a quasi-tax interpretation which we do not use here.

Measure 1 Findings: Because nominal interest rates were higher than the rate of inflation throughout most of the 1980s, there is no contribution of interest rate ceilings to Measure 1. However, interest ceilings may have been a constraint in 1978-80 and there is a substantial measured contribution from them in those years giving much higher overall financial sector taxation in at end-1978 and 1979 than in any subsequent years. The reduction in the rate of TPS in April 1986 contributed to an appreciable lowering of the measured tax. Since then the TPS collects less than 0.3 per cent of GNP.

Because most of the tax is in the form of the currency tax, the relative burden on the formal financial sector is small: now less than one-third of the total.

GHANA

Ghana is the sub-Saharan country that has experienced the highest inflation rates. The values observed in 1977-1978, 1981 and 1983 were around or greater than 100 percent. Furthermore, these rates underestimate the erosion of currency because two episodes of demonetization occurred. As is always the case in these experiences, the large inflation tax reflected poor tax administration and the government deficit. It is noteworthy that the first case of triple digit inflation occurred during the cocoa price boom when the revenues of the government should have been higher than average (The cocoa crop had unfortunately been sold on the future market at pre-boom prices).

The creation of money and the resulting tax on money through inflation were not the only sources of currency tax in Ghana. Two currency reforms took place[3]: The first on March 9, 1979, when cash was exchanged at the rate of 70% for holdings of up to 5,000 Cedis, and at the rate of 50% for holdings greater than 5,000 Cedis (provided that cash holders were willing to reveal large holdings). Bank deposits were unaffected during this first reform. The currency reform reduced the currency in circulation by 39% at the time of the reform. In 1982, the largest banknote in circulation, the Ce. 50 note was demonetized. The capital levy on financial assets had two effects: first it generated an immediate impact on the money to GDP ratios. Second, it damaged the credibility of the financial system.

The decline in the real value of money induced an increase in the effective tax rate on cocoa producers: in a country like Ghana where the cocoa crop is sold to a marketing board that is controlled by the government, it is institutionally easier to increase the price level while maintaining a fixed nominal producer price than to lower the producer prices. In this institutional framework the depreciation of the currency is a fiscal instrument that has uses beyond the strict purpose of seignorage. Of course, the high taxation of producers stimulated smuggling of cocoa to neighboring Cote d'Ivoire. (Some have estimated at 40% the share of smuggling in the cocoa crops during the periods of high taxation).

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3 As discrete and presumably unanticipated events, these have not been counted in to the measures reported in the text.

During the periods of high inflation rates, the exchange rate was fixed and grossly overvalued. The purpose of this policy was to tax maintain a high tax rate on exporters (cf. Pinto, 1986). Imports were restricted by licenses. Because the nominal exchange rate was completely out of line with the scarcity of foreign exchange, an active black market developed. The parallel market premium over the official rate reached very high values.

Policy in the Adjustment Period

Following the policy shift in 1983, inflation fell sharply, though it remained relatively high reaching almost 40 percent in 1987. The experience of other countries shows that stopping inflation effectively requires a firm commitment to avoid monetary financing of the fiscal deficit. No such commitment is evident in the Ghanaian data. From the third quarter of 1984 to the same period in 1988, the monetary base increased at an average annual rate of 40 percent. This growth was obviously induced by the expansion of the credit to the government as witness the fact that total bank credit to the government grew at an annual rate of 48 percent during the same period. Thus policy did not convey a very strong signal that inflation was over. The best guarantee against the renewal of inflation would be to let the expansion of financial assets be determined by the process of financial intermediation in which banks match the savings in deposits and real investment. However, credit to the private sector increased in the adjustment period at an annual rate of only 10 percent, and this was from a very small base, because credit to the private sector had been almost eliminated before the adjustment began: it has represented less than one percent of GDP since 1984.

The Demand for Money in Ghana (1972-1988)

The first period of high inflation in Ghana occurred in 1977 when the rate exceeded 100 percent per annum. Between 1977 and 1984, the inflation rate fluctuated a great deal, with high values in 1979, 1981 and 1983[4]. In 1984 a change of policy regime took place with the implementation of the adjustment program. A glance at monetary data indicate that there was a response to the sustained inflation For example, the M1 to GDP ratio decreased from 21 per cent in the fourth quarter of 1976 to less than 12 percent in the first quarter of 1979.

Looking more closely, money demand equations were estimated to check for a shift in response to the policy change. The model estimated was of the error correction type, following the two equations:

$$y_t = a_1 p_{t-1} + a_2 x_t + u_t \qquad (1)$$

$$y_t - y_{t-1} = b_1(p_t - p_{t-1}) + b_2 u_t + b_3 z_t + e_t \qquad (2)$$

where the terms x_t and z_t represent vectors of exogenous variables, p_t is the rate of inflation, u_t and e_t are disturbances, and y_t represents the endogenous variable the real money stock.

4 Price controls were implemented at various times since 1975. Although these controls were not fully effective, nevertheless, they are likely to have affected the reporting of price indices and the measurement of the inflation rate.

Estimating this system (using instrumental variables) on quarterly data for (the log of) real M2[5] in the period before 1984 gives a reasonably good fit. Specifically, the exogenous variables x were a constant and two permanent intercept shift dummies, taking the value unity after the first quarter of 1979 and the second quarter of 1981 respectively; the exogenous variables z were a constant term and the level and lagged value of a third dummy being the sum of the other two. The equations were estimated by instrumental variables, using bank credit to government, bank credit to private sector, total credit and special deposits (all expressed as a share of GDP), as instruments, together with the lagged endogenous and predetermined variables in the first equation, and the first difference of these variables for the estimation of the second equation. The estimated equations are as follows.

M2 = - 0.328 P - 0.655 D79 - 0.486 D81 - 0.342
(3.7) (6.4) (4.0) (6.2)

RSQ = 0.894 SEE = 0.196 DW = 0.665 72:4-84:2

dM2 = - 0.304 dP - 0.302 U + 0.144 D3 - 0.065 D3(-1) -0.051
(2.6) (2.3) (3.4) (1.6) (2.1)

RSQ = 0.376 SEE = 0.110 DW = 1.906 74:1-84:2

The dummy variables in the first equation correspond to the dates where special levies were applied to financial assets. The implication of these demand functions are that the levies exerted a permanent impact on the demand for money. The estimated impact of the two shocks depressed the level of the demand for money by 62 percent, in addition of the inflation impact that is represented by the inflation term in the equation.

Note that this equation predicts only an average growth rate 1984-87 of 1.2 per cent compared to the actual 6.2 per cent; this difference is found to be significant. Furthermore, a dummy trend variable[6] included for the period after 1984 turns out to be significant when the equation is estimated over 1972-87. Indeed this dummy variable "explains" a growth of five per cent per quarter.

M2 = - 0.253 P - 0.665 D79 - 0.558 D81 + 0.019 D84 - 0.315
(3.4) (6.2) (4.7) (2.5) (6.3)

RSQ = 0.904 SEE = 0.183 DW = 0.702 72:4-88:2

dM2 = - 0.273 dP - 0.319 U + 0.151 D3 - 0.082 D3(-1) -0.034
(3.1) (2.3) (4.5) (2.4) (1.8)

RSQ = 0.477 SEE = 0.102 DW = 1.847 74:1-88:2

Analysis of the demand for money in Kenya thus suggests that inflation is an important determinant, but that confidence in the overall policy stance is also relevant in predicting money holdings.

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5 We have therefore used the real level of financial assets where the deflator is the CPI index. There are some obvious pitfalls that follow from this procedure and we will try to take them into account. For the determination of the inflation rate, we have first computed the rate of change between the price level in a given quarter and that of the same quarter in the previous year, and then we average these values over four consecutive quarters.

6 This variable is zero before the second quarter of 1984, and is a time trend thereafter.

Measure 1 Findings: Ghana gives the highest measures of financial taxation, with a peak at end-1982 of 91.1% of M2, or well over twice the explicit government revenue. At this peak, rather less than a half was currency tax. Most went to government: credit to the private sector was so low (see Figure A2) that the very low interest ceilings benefitted only a comparatively small amount of non-government borrowing. It is of interest to note (from Text Table 2) that the timepath of the cash-flow measure of seignorage is quite different from that of the currency tax, though over the decade the two average out fairly close to one another.

KENYA

Sudden changes in the prices of its main export crops, tea and coffee, have had a destabilizing effect on the Kenyan economy over the years. Two particular episodes of export boom followed by contraction both left the government overexposed, having expanded expenditure to a level that could not easily be financed in non-boom years. The first episode followed the 1976 coffee boom and coincided with the terms of trade shock of 1979-80. By the early 1980s, internal and external imbalances were seriously threatening the economy. The budget deficit - largely financed by borrowing from the Central Bank - reached 9.5 percent of GDP in 1981. The resulting expansion in the money supply was accompanied by an acceleration of inflation to as high as an annual rate of 22 percent in 1982.

From December 1982, a successful stabilization was implemented. But a second coffee boom in 1986 led to a recurrence of domestic imbalances. Government expenditure was increased drastically, resulting in a deficit that was financeable in 1986 without placing pressure on external reserves, but resulted in a balance of payments crisis in 1987 when the coffee prices fell. As in the 1981-2 deficit, the Government had recourse to the banking system for financing. This time however the financing was shared between the Central Bank and the Commercial Banks and in addition, increased holdings of reserves by the commercial banks acted to limit the monetary impact of the deficit. Nevertheless, M2 increased by 32 percent in 1986. By 1988, the government had embarked on another stabilization program; Government borrowing from the banking system fell during 1988.

In the past few years, the Kenyan government has moved gradually towards a more market-oriented interest rate regime. The policy of fixed nominal bank interest rates was eased somewhat in the early 1980s though real interest rates remained negative until 1983. Government securities are now openly auctioned and a secondary market is developing. Spreads between savings deposit rates and maximum lending rates have been increased from 3 to 5 percent for commercial banks.

Despite the two episodes of severe macroeconomic imbalance, inflation in Kenya has remained comparatively low on average. This reflects the relatively prompt adjustments which have been implemented in 1983 and 1988. Gradually too, interest rates have moved towards market clearing rates.

Measure 1 Findings: With inflation in single digits since 1984 and interest rate ceilings comparatively unconstraining, taxation on financial sector has been comparatively low since 1982. The rate of taxation has remained at or below 1 percent of GNP.

NIGERIA

The macroeconomic history of Nigeria in the 1980s is dominated by two factors, the fluctuating fortunes of oil exports and the increasing overvaluation of the Naira before 1985 and its subsequent rationalization. The decline in oil revenues during 1981-83 was at first partly absorbed by a considerable expansion in the fiscal deficit during 1981 and 1982. For instance, imports continued to grow rapidly during 1982 despite the sharp

fall in export receipts. This large fiscal deficit was at first funded at the Central Bank with comparatively little pressure on the domestic banking system. There was a corresponding drawdown of foreign reserves, but by early 1983 90 per cent of the reserves of just two years before had been eroded. Government turned to the domestic banking system in a large way. Inflation accelerated dramatically.

Following the partial fiscal correction of 1984-85, a further surge of inflation began in early 1987 corresponding to a sharp worsening of the government's deficit resulting inter alia from the fall in oil prices. This time the main contributor to domestic financing of the government was the Central Bank. The unification of the exchange rate may not have contributed much directly to inflation as many goods were already valued at parallel market exchange rates.

Exchange rate liberalization took place in stages beginning in September 1986. Although the market did not always clear, the gap between the auction market and the parallel market was substantially reduced. Also in September 1986, the ceiling on deposit interest rates was removed and that on bank lending rates increased by two per cent. Continued upward pressure on interest rates resulted in the removal of all controls on all bank interest rates in August 1987. At the same time Treasury bill and other government instrument rates were increased by 4 percentage points. Between mid-1986 and end-1987 most deposit rates had risen by between 5 and 6 percentage points, while lending rates had increased by between 8 and 10 percentage points. This still left interest rates negative in forward looking real terms. It is worth noting that the interest rate liberalization appears to have resulted in wider bank interest margins. This could imply that bank lending rates were more constrained than others before the liberalization. An attempt to incorporate this is made in the qualitative measure 2, but not in the others.

A key question to be asked in considering these inflationary surges is whether the inflation was anticipated. If not, much of the financial taxation would have been *ex post* in character. There are two reasons for believing that the acceleration could have been predicted. For one thing, the 1983-84 acceleration followed a sharp depreciation in the black-market exchange rate. Even if this was not an autonomous event, yet it should have allowed prediction of the subsequent rise in domestic prices since the black-market rate was increasingly the marginal cost of foreign exchange. Again in 1988 the sharp depreciation of both official and black-market rates during 1986 would have heralded price pressures. It therefore seems reasonable to assume that the price accelerations were predicted.

Measure 1 findings: Extremely high burdens are estimated for 1982 and 1983 and again for 1987 and 1988, corresponding to the inflationary surges. Average taxation 1982-88 was 5 per cent of GDP, and exceeded 40 per cent of M2 at end 1987. Almost one-half of this tax relates to interest ceilings on non-government lending, thus providing a contrast to Ghana. Overall, only about one-quarter was currency tax.

ZAMBIA

Before 1985, the Zambian policy regime was characterized by ceilings on interest rates. Between 1971 and 1982 lending rate ceilings gradually drifted up from 7 to 9.5 per cent, while the differential between the lending and the deposit rates hovered between 2 and 3.5 percent. The rigidity of the ceilings for lending rates was therefore passed to deposit rates, which resulted in strongly negative real rates during bouts of inflation (minus 25 percent during the inflationary episode of 1976-1977). The ceilings were temporarily lifted in 1985-86, but the increases were too small to match the acceleration of inflation. As a consequence, the real rate of return on time deposits was negative in all years (when inflation is measured with the CPI).

The levels of the standard financial ratios (M2 and M1 to GDP) are shown in the Figure A6 with a measure of the opportunity cost of money. This cost is defined as the opposite of the real rate of return, i.e., the difference between the inflation rate and the rate of return of time deposits (with a 6 month maturity). One would expect variations of the real rate of return on financial assets to affect their level. The empirical evidence does not show such an effect; if anything it suggests a positive relation between money holdings and the opportunity cost of money except at the very end of the sample period when CPI inflation rate reached almost 50 percent.

The main episode of taxation of the financial system before 1985 occurred in 1975-1977 which presents the standard characteristics of the taxation of the financial system after a commodity boom. The price of copper has a strong effect on the economy and copper booms have always led to increases of government expenditures. This occurred after the booms of 1966, 1969-1970, and again 1973-1974. The index of copper prices with respect to the domestic price index (CPI) increased from 100 to 157 between 1972 and 1974, and then fell to less than 90 in 1975 and 1976. Government expenditures which had increased in the boom, were not scaled down until 1978. The government deficit, which reached 20 percent of GDP was financed mostly by borrowing from commercial banks and from the Central Bank (and not from abroad); the real level of loans by commercial banks to the private sector fell in each year between 1975 and 1978. The loans of the Central Bank resulted in monetary expansion: the monetary base increased by 50 percent in 1975.

Revenue from financial taxes rose from about 2 percent of GDP to almost 7 percent of GDP in 1975. It is noteworthy that most of the revenues were raised by the subsidization of the government debt through interest ceilings as government borrowing increased dramatically[7]. The great increase in internal government debt at the end of the period left the government vulnerable to the temptation to reduce its value by inflation. There was no significant attempt to raise more revenues through an increase of the reserve requirement: the reserve to deposit ratio increased only from 15 percent of total bank deposits in 1975 to 20 percent in 1978. Greater reliance on increasing reserve requirements would have resulted in a lower overall inflation rate and probably less distortion on the credit markets.

The tax burden on financial assets decreased dramatically in 1979 when fiscal equilibrium was partially restored (mainly through a cut of expenditures) though the deficit was still more than 6 percent of GDP. The situation worsened in the early eighties when the deficit exceeded 15 percent in 1980 to 1982. However, inflation was relatively low during this period. A possible explanation is that in this period, the deficit was financed externally, whereas in the seventies, foreign borrowing had been very small. Interest rates ceilings were gradually raised during this period, but the real rate of return on financial assets was still negative.

Increasing reliance on domestic monetary financing, following another slump in copper exports in 1983-84, resulted in accelerating inflation during 1984 and 1985. In this period a progressive liberalization of interest rates and exchange rates took place. For example, Treasury bills, which had been quoted at less than 7.5 per cent in April 1984, reached 28 per cent by 1986, following the general deregulation of interest rates and the introduction of a daily market in Treasury bills in September 1985. Short-term bank deposit rates jumped from less than 5 per cent to 22 per cent in th same period and bank lending rates increased even faster, from 13 per cent to over 33 per cent. Note that here too, as in Nigeria, bank interest margins appear to have widened with the liberalization.

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7 These accounted for only 15% of the total of financial sector taxes in 1975 but for 82% in 1978.

The foreign exchange auction was introduced in October 1985, more than a year after the gap between official and parallel market rates had substantially widened. In the first three months following the introduction of the auction the Kwacha fell from $0.45 to $0.18 (well below the previous parallel market rate: the currency's value on the parallel market also fell); by the end of 1986 it was down to $0.08[8].

The higher interest rates and the loss of the implicit tax on exporters from the overvalued official exchange rate) contributed to a significant worsening of the fiscal position from the end of 1985. The rapid acceleration of inflation and the imposition of reserve requirements meant that the fiscal burden on the financial system has since surpassed the level of the mid-seventies. (In real terms, reserve requirements almost doubled between 1983 and 1987).

Measure 1 Findings: The burden of financial taxation has varied sharply with the surges of inflation and with the removal and re-imposition of interest rate ceilings. Since 1983 end-year measures have never fallen below 20 per cent of M2, with the highest rates in 1987 and 1988 (the latter over 60 per cent). The dip in the taxes at end-1985 is reversed at end-1986 (before reregulation) by an increase in reserve requirements and in the currency tax, as well as by a measured increase in the impact of interest ceilings[9]. (Using quarterly instead of annual figures would give a slightly different timing pattern). By end-1988, the interest ceilings have become very constraining and financial taxes have risen to almost 19 per cent of GNP, or more than the total of explicit government revenue.

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8 Following the reregulation of interest rates in February 1987, the Treasury bill rate fell to 18%, that on short-term deposits to 14.5% and on bank loans to 23.7%. When the foreign exchange auction market was abolished, the rate was appreciated to $0.125.

9 Recall that Measure 1, by definition, interprets interest rates below inflation as being subject to some policy influence, and therefore as contributing to the tax.

APPENDIX 3: MEASUREMENT PRECISION FOR HIGH INFLATION COUNTRIES TECHNICAL NOTE

If the effects of high inflation are compounded over several months, they can introduce a distortion into the measure of financial sector taxes. Our approach is to take specific points in time and to compute the tax rates in effect at those moments. This requires using instantaneous, or continuously compounded, rates of inflation and interest, as well as an estimate of the flow of income at the particular time chosen These refinements are quantitatively important: take Ghana at end 1982, for example. The inflation rate over the following twelve months was 143%. Without making the refinement the relevant interest rates would have been overstated by a factor of 1.6, and the flow of GNP overstated by a factor of 1.3. The basis for the refinements is now illustrated by a step-by-step derivation of the inflation tax on currency.

(a) Continuously compounded interest rates. Suppose a steady rate of inflation prevails so that the ECR is r (continuously compounded). Suppose further that, at the prevailing rate of inflation the desired currency holdings represent γ years of output y. Suppose that currency holdings c_t are revised every τ years on the basis of the flow of income expected before the subsequent revision. (Of course we envisage that both γ and τ would be much less than one.) Then at a moment of revision t',

$$c_{t'} = \frac{\gamma}{\tau}\int_{t'}^{t'+\tau} y_t dt$$

Tax paid on this amount (at the continuously compounded rate r) over the interval τ is

$$c_{t'}(e^{r\tau} - 1)$$

Tax as a share of output over the interval is:

$$\frac{c_{t'}(e^{r\tau} - 1)}{\int_{t'}^{t'+\tau} y(t)dt} = \frac{\gamma}{\tau}(e^{r\tau} - 1).$$

As the interval τ is reduced towards zero, the average currency holdings as a ratio to the flow of output (c/y) converges to the desired ratio γ. The limiting value of tax as a share of output is:

$$\gamma r.$$

Thus we have shown that only by using the continuously compounded interest rates in the formula will we obtain the correct tax rates.

(b) The flow of income at end-year. The rate of income flow in the above equations is not the average flow during the year, but the rate at the moment in question. If that moment is the end of the year, data is available in practice only for the income flow over the previous twelve months and the subsequent twelve months. Even if the real flow of income was roughly constant during that 24-month interval, the flow in nominal terms will not have been constant because of inflation, and simply taking an unweighted average of the two years will not give a good estimate if inflation is high. Thus, writing Y_A and Y_B for the previous and following year income flows, we have:

$$Y_A = \int_{-T}^{0} y_t dt \quad Y_B = \int_{0}^{T} y_t dt.$$

Assuming previous and following year inflation to be constant at π_A, π_B respectively, we can write

$$y_t = y_0 \exp(\pi_B t), \quad t < 0,$$

$$y_t = y_0 \exp(\pi_A t), \quad t > 0.$$

We integrate to obtain:

$$Y_A = \frac{y_0}{\pi_A}(1 - \exp(-\pi_A t)),$$

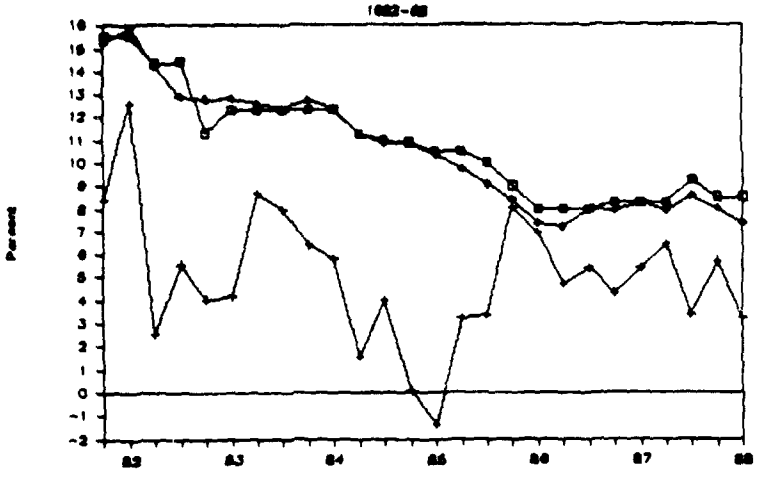
$$Y_B = \frac{y_0}{\pi_B}(\exp(\pi_B t) - 1).$$

In practice, because the assumption on constant inflation and zero growth are not quite true, these will give two different solutions when solved for y_0. We take the average of the two solutions for the formula used in the empirical calculations:

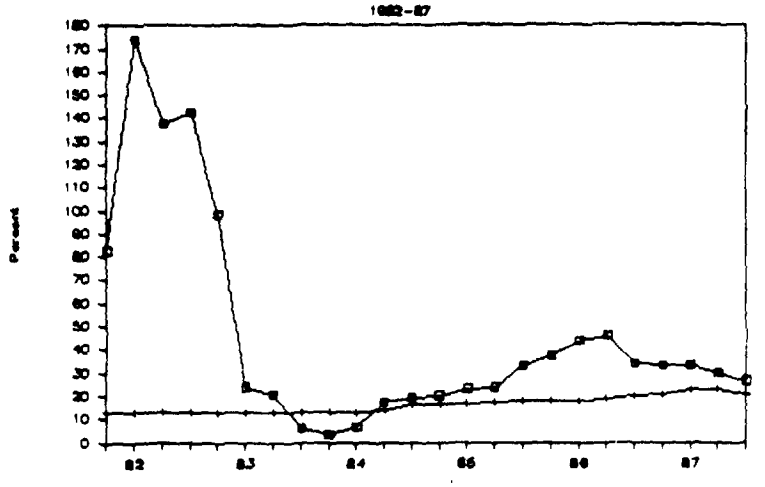
$$y_0 = 0.5\left\{\frac{\pi_A Y_A}{1 - \exp(-\pi_A t)} + \frac{\pi_B Y_B}{\exp(\pi_B t) - 1}\right\}.$$

FIGURE A1

COTE d'IVOIRE: INTEREST AND INFLATION



GHANA: INTEREST AND INFLATION RATES



KENYA: INTEREST AND INFLATION RATES

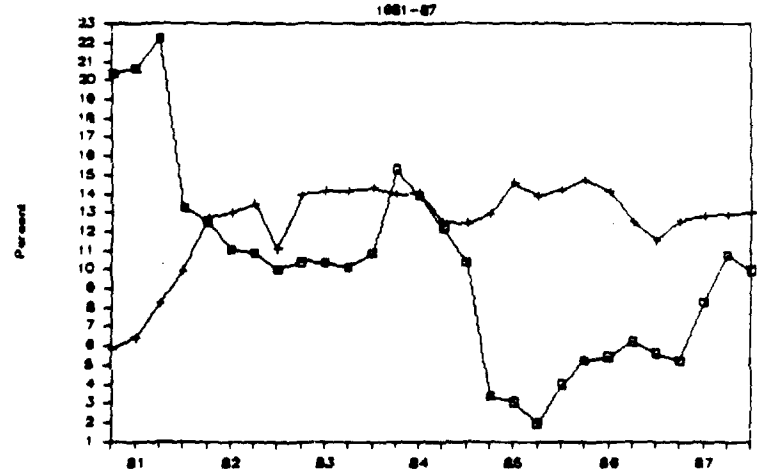
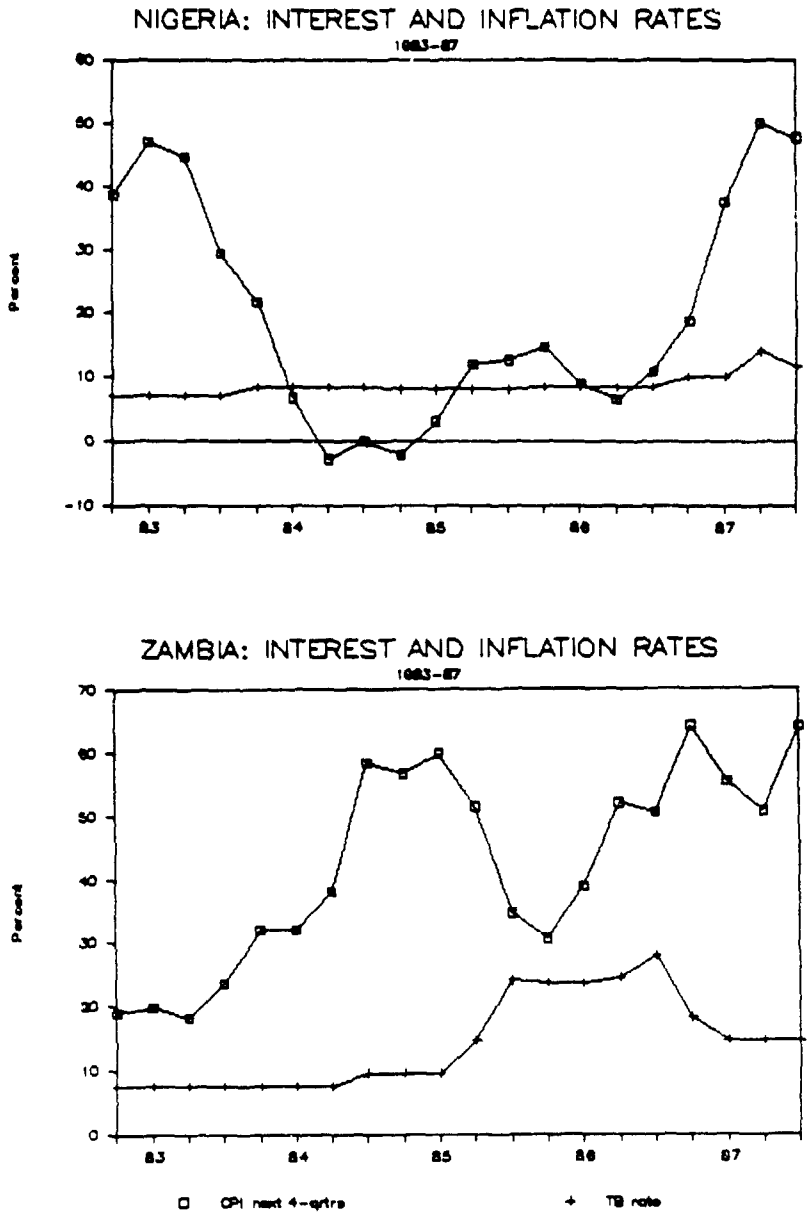
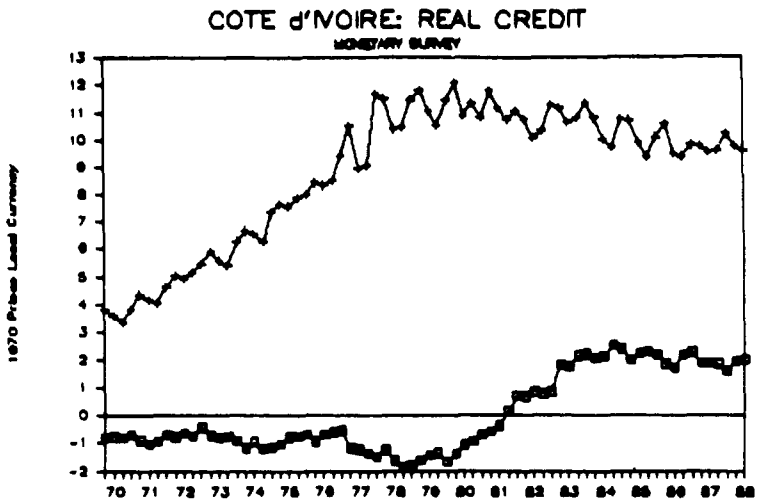


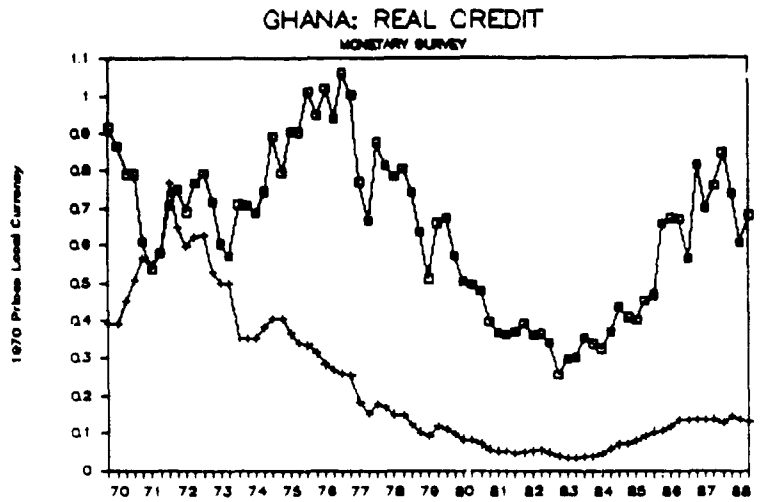
FIGURE A1 (Continued)

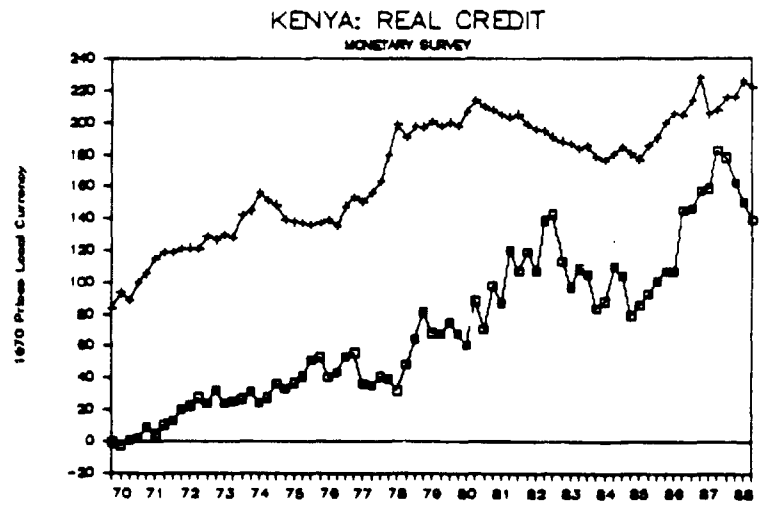


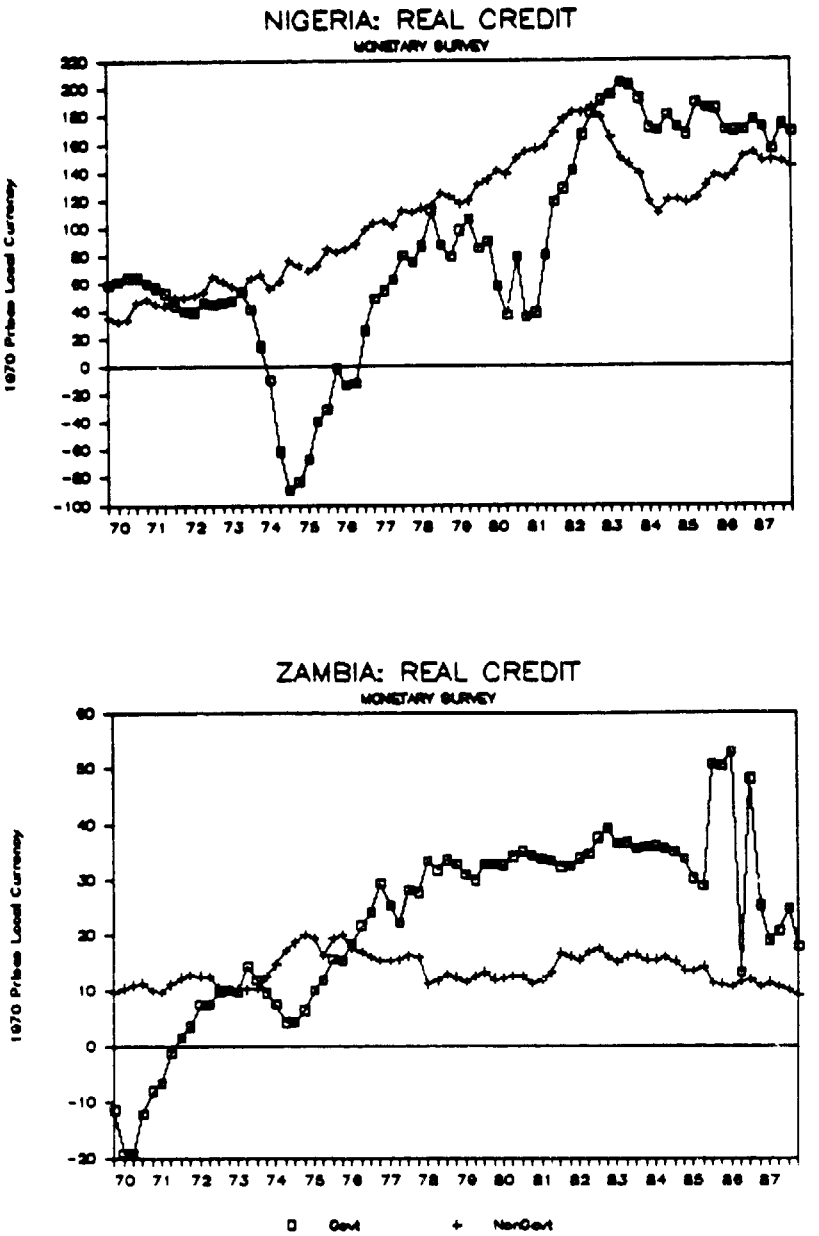
Note: These panels show the cumulative CPI growth over the next four quarter(□)and the Treasury bill rate (+). The first panel also shows the French money market rate (◊)

FIGURE A2


COTE d'IVOIRE: REAL CREDIT
MONETARY SURVEY
1970 Prices Local Currency

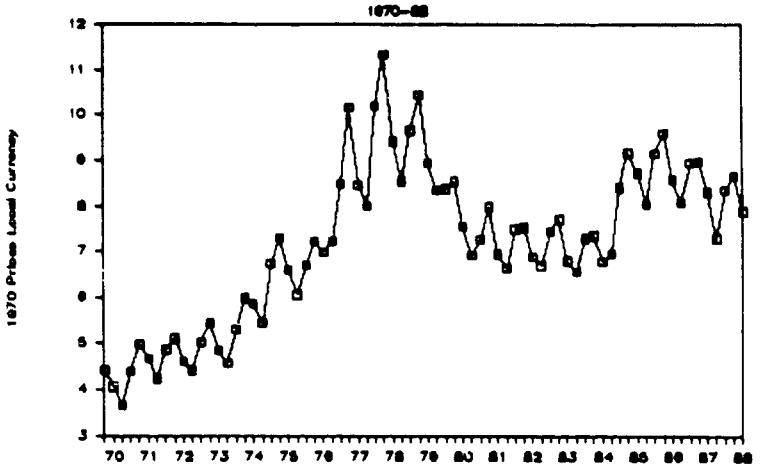

GHANA: REAL CREDIT
MONETARY SURVEY
1970 Prices Local Currency


KENYA: REAL CREDIT
MONETARY SURVEY
1970 Prices Local Currency

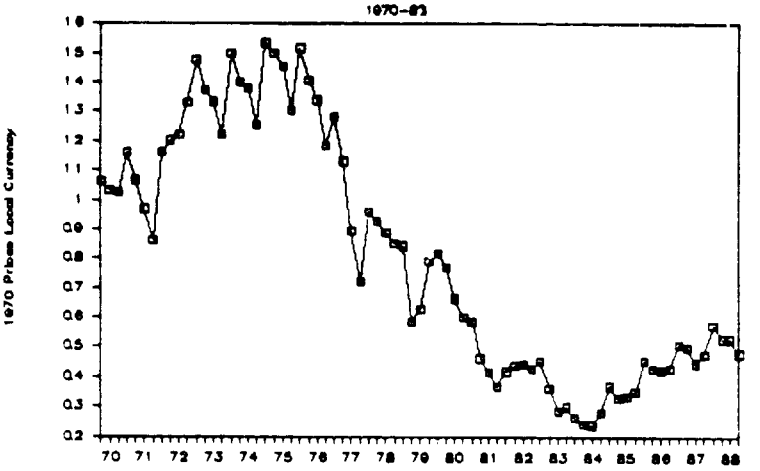


Note: These panels show the end-quarter stock of domestic credit outstanding to Government (□) and Non-government borrowers (+) deflated to 1970 price levels by the local CPI. Data is from the monetary survey i.e. including lending by Central Bank. 1970-88

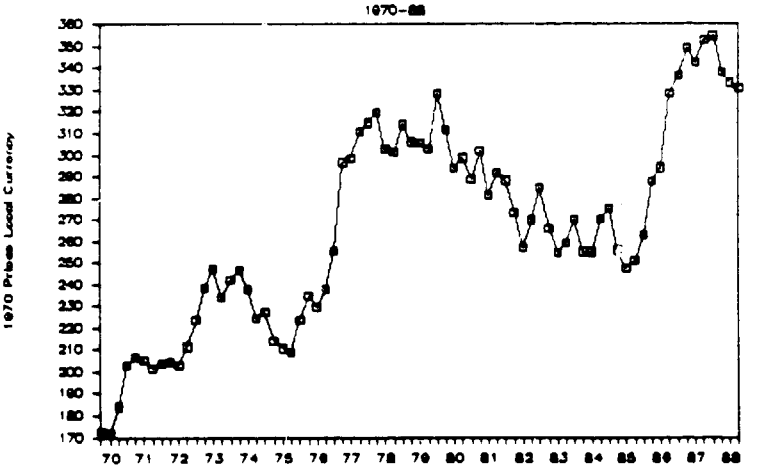
COTE d'IVOIRE: REAL MONEY M2

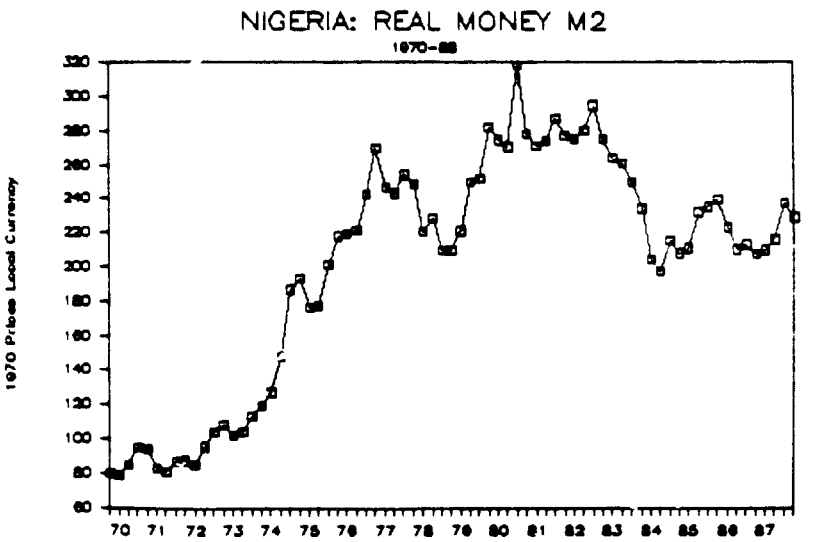


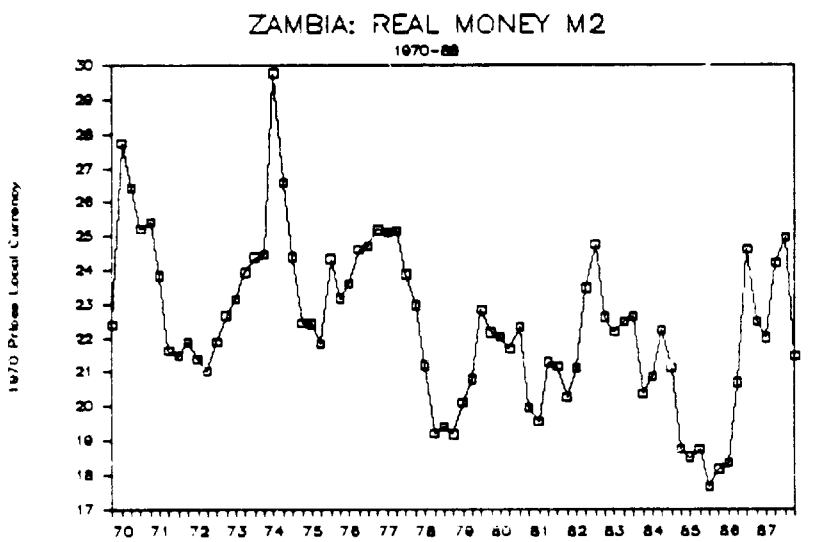
GHANA: REAL MONEY M2



KENYA: REAL MONEY M2



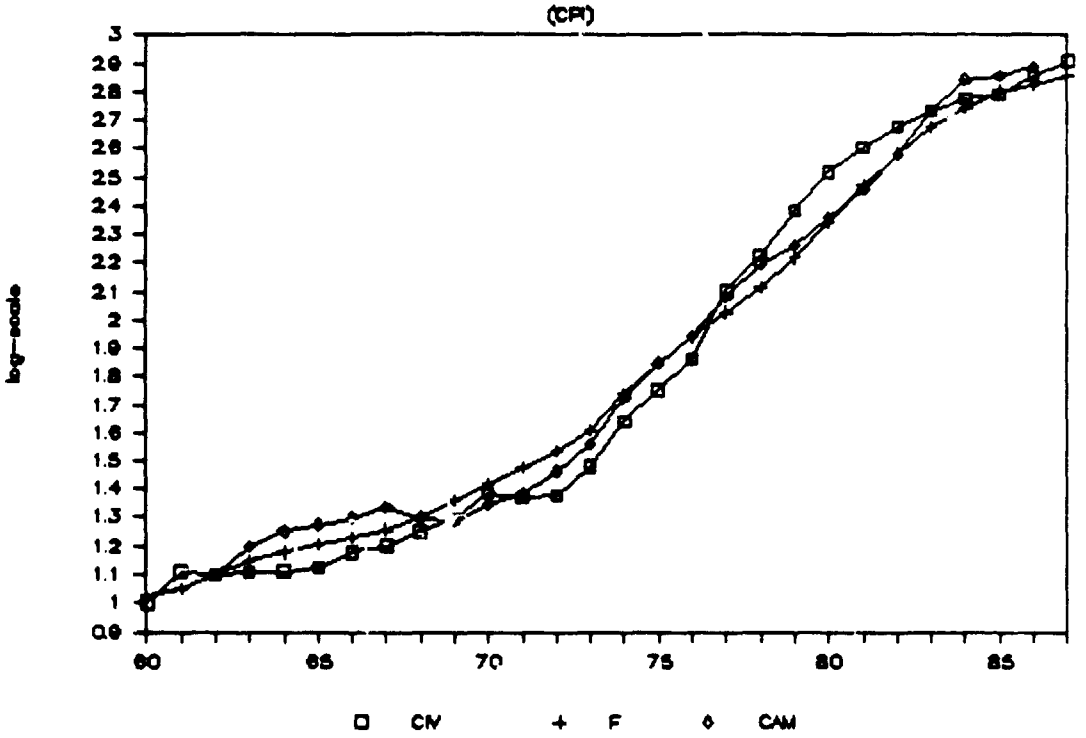




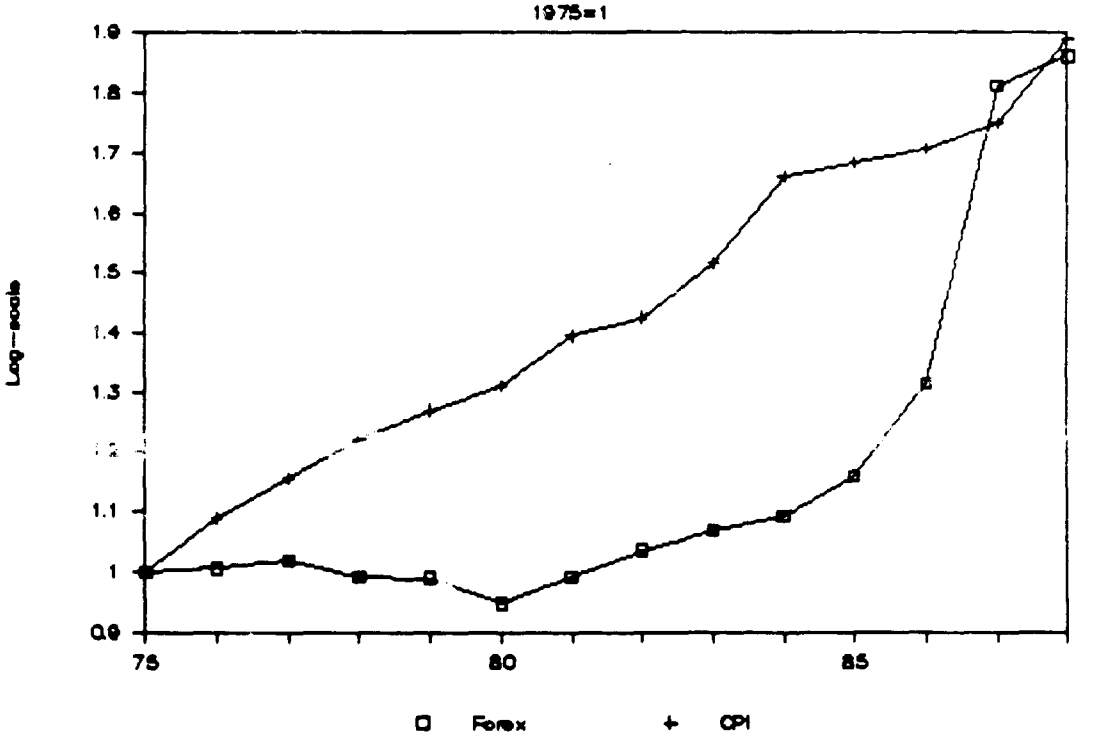
Note: These panels show the end-year stock of M2 deflated by the local CPI to 1970 prices. 1970-88

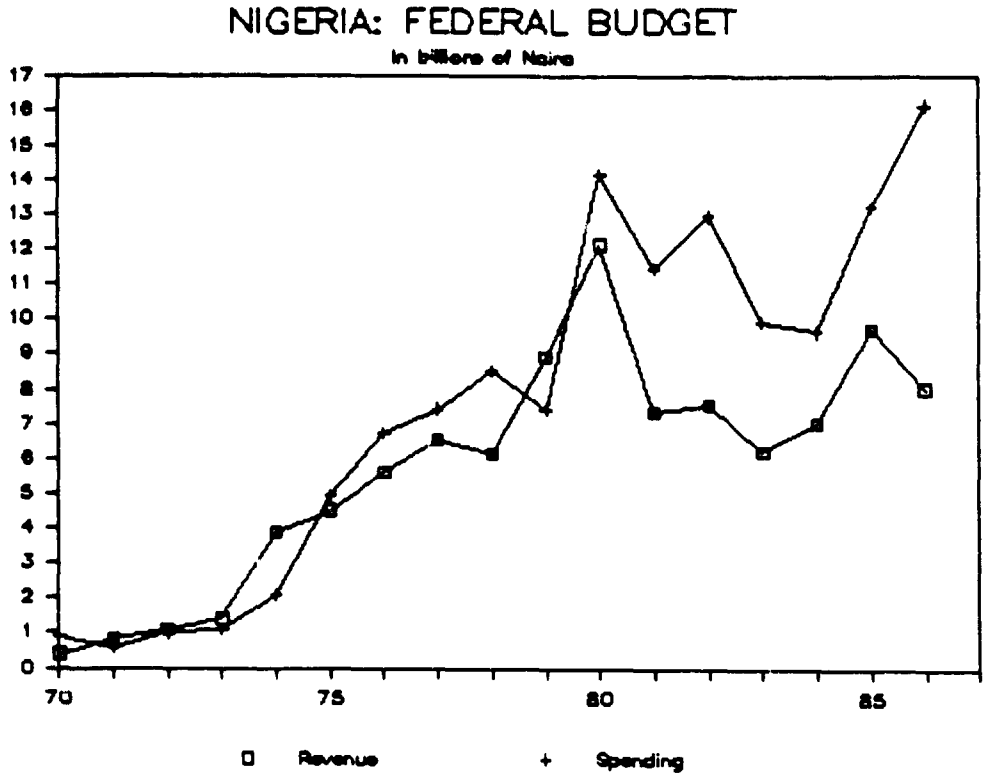
FIGURE A4

FRANC ZONE: PRICES



NIGERIA: PRICES AND EXCHANGE RATE




NIGERIA: FEDERAL BUDGET
In billions of Naira
17
16
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
70
75
80
85
Revenue
Spending

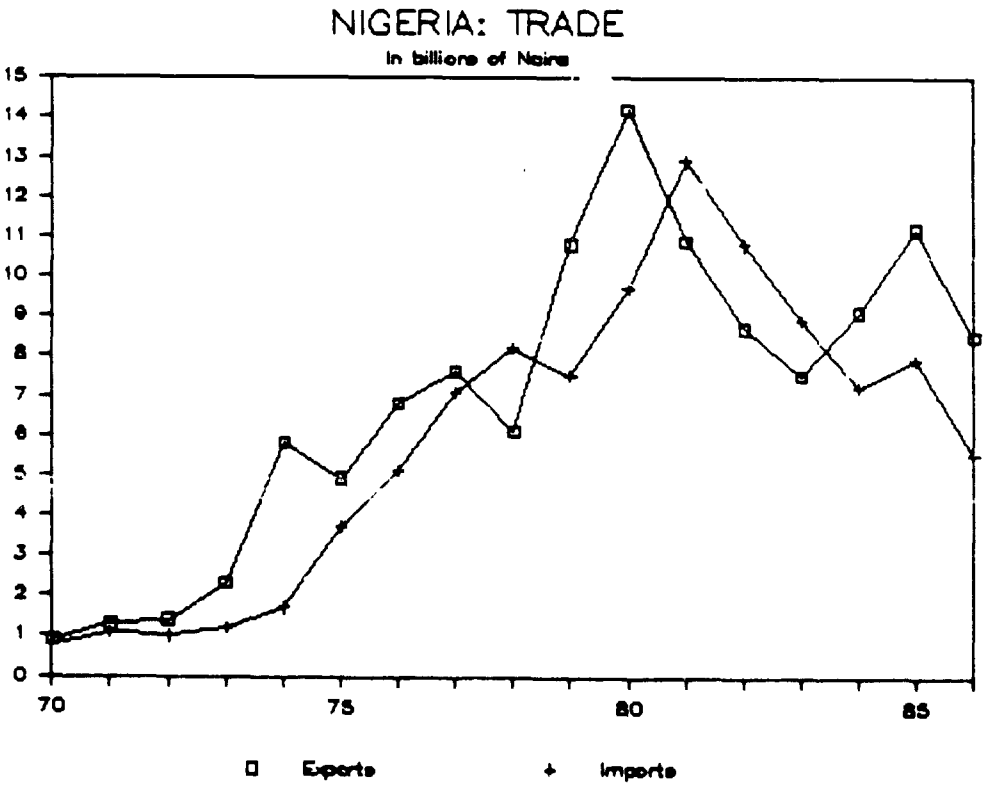
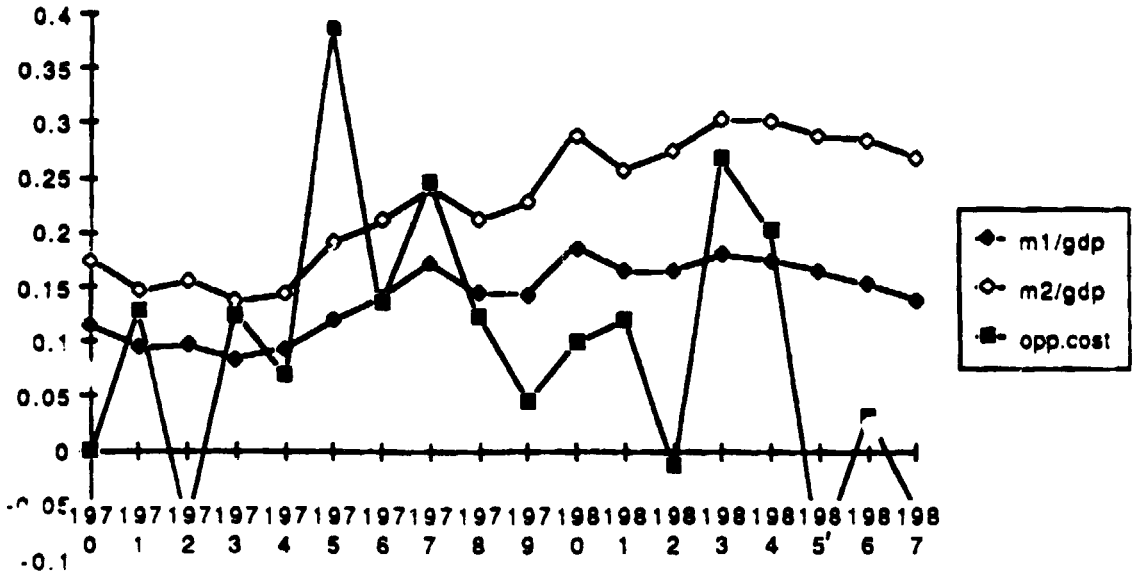

NIGERIA: TRADE
In billions of Naira
15
14
13
12
11
10
9
8
7
6
5
4
3
2
1
0
70
75
80
85
Exports
Imports

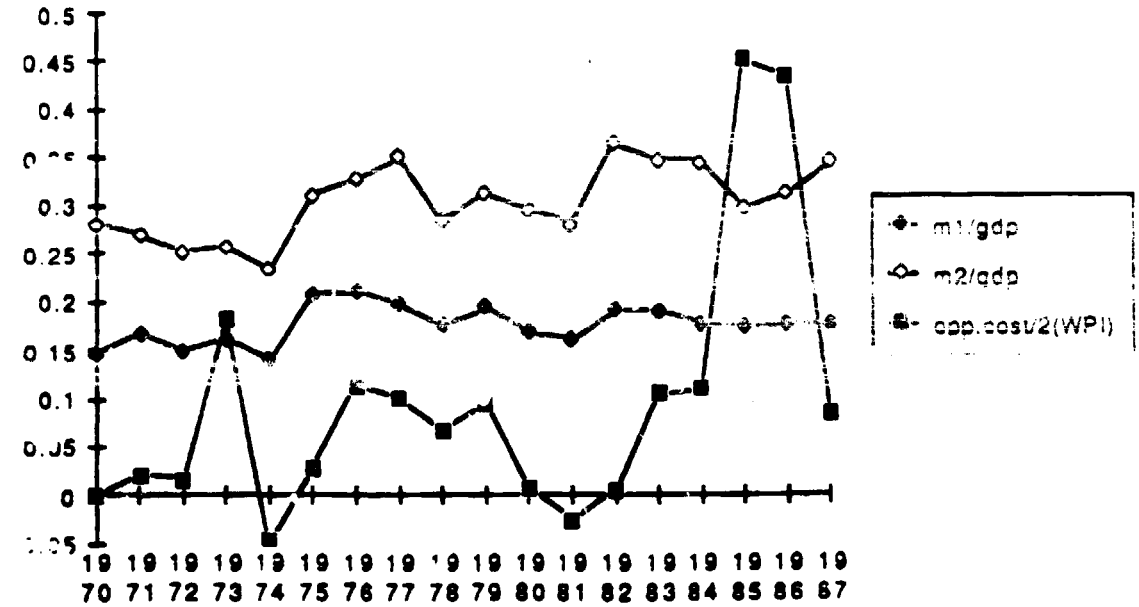
FIGURE A6

MONEY STOCK AND OPPORTUNITY COST

NIGERIA



ZAMBIA



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