INTEREST RATE MANAGEMENT IN A MULTISECTOR ECONOMY:
THEORY AND COUNTRY EXPERIENCES

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ABSTRACT

This paper addresses two questions: (i) in a country where lending rates are administratively set, should they be made uniform across sectors or should they differ? and (ii) what are the effects of a partial interest rate liberalization? It argues that if governments need to set interest rates at all, they should set different rates to different sectors depending upon differential risks. Interest rate differentials should be increasing functions of default risk. This implies that the practice, common to many LDCs, of setting low ceilings on lending rates to priority sectors, which usually tend to be riskier sectors, leads to an inefficient allocation of financial resources. Similarly, a move to a partial liberalization, where lending rates to priority activities are fixed while those to the rest of the economy are market determined, may worsen resource allocation. A brief review of actual practices in Cameroon, Malaysia and Nigeria indicates the need for a more widespread use of the simple concepts outlined in this paper in Bank economic and sector work.
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I. INTRODUCTION

1. This paper analyses the impact of relative sectoral lending rates on resource allocation. In the past, discussions of interest rate policies in LDCs have focussed on the question of what the general level of interest rates in a particular economy ought to be.\(^1\) It is argued here that more attention should be given to the way countries set relative lending rates.\(^2\) The two policy questions addressed are: (i) if lending rates are administratively set, should they be uniform across sectors or should they differ? and, (ii) what are the effects of a partial interest rate liberalization? A brief review of interest rate policies in three countries indicates that these questions are highly relevant to LDC policy makers and their advisors.

2. The paper's focus on appropriate methods of administering interest rates should not be interpreted as an argument against interest rate liberalization. A recent survey of Bank financial sector work concluded that: "administered interest rates are not a preferred long-run alternative and many [financial sector] reports are probably too reticent in pushing for market determined interest rates, given the potential gains which are achievable from more appropriate and flexible interest rates."\(^3\) Bearing this in mind, it is still important that the

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\(^1\) For example, see Mckinnon [1973], Shaw [1973], Fry [1978 and 1982] or Lanyi and Saracoglu [1983].

\(^2\) Previous authors such as Virmani [1984 and 1985] have also stressed the impact of relative lending rates on the allocation of credit.

\(^3\) See Myers, et. al. (1986).
implications of alternative methods of managing interest rates during the transition be considered.

3. It is argued here that there is nothing particularly desirable about a uniform lending rate. In an uncertain environment borrowers set the expected value marginal product of financial resources below the interest rate. The technical Appendix proves that the wedge between the interest rate and the expected value marginal product is an increasing function of default risk. Hence, when risks vary across sectors, a uniform lending rate will imply that sectoral expected value marginal products will not be equated. Resources will be allocated inefficiently. When different sectors in the economy have different risk characteristics, an efficient allocation of resources can be achieved by charging differential lending rates; with lending rates to risky sectors being higher than those to the rest of the economy. A rule of thumb for setting such differential rates is presented in the paper.

4. Sectors that are considered as "priority" by LDC governments are often some of the riskier sectors in the economy. Lending rates to these activities are usually kept below those to the rest of the economy. The paper argues that, by reducing their supply of credit, this policy may actually reduce investment in priority sectors. In many countries where these policies are adopted the general level of real interest rates is positive. That is, a change in the overall level of interest rates may not be needed. However, an adjustment in relative lending rates would lead to significant improvements in resource allocation.

4/ See Section IV for a justification of this statement.
5. Several countries (e.g. Malaysia, Indonesia and Brazil) have partially liberalized interest rates. They let lending rates to most sectors be market determined while maintaining ceilings on rates charged to priority sectors. The paper argues that although the move from a regime where all interest rates are administratively determined to one where some are market determined will improve resource mobilization, it worsens their intersectoral allocation. Hence, it is argued that a partial liberalization is not an appropriate first step towards a fully liberalized financial system. If countries do not want to move immediately to a complete liberalization, then a rise in lending rate ceilings would be an appropriate first step. These ceilings can be raised gradually until they are no longer binding; full liberalization is achieved. Care must be taken during the liberalization process to ensure that relative interest rates provide correct market signals.

6. The paper is divided into five sections. Section II analyses the structure of lending rates that will lead to an efficient allocation of resources under uncertainty. Section III studies the relationship between relative interest rates and the supply of credit. Country experiences are described in Section IV, and Section V summarizes the main conclusions. The analytical framework from which these conclusions are derived is presented in Appendix I, and tables with detailed country data are presented in Appendix II.
II. INTEREST RATE STRUCTURE AND EFFICIENCY

7. This section argues that the concept of a uniform lending rate is not sacrosanct. An efficient allocation of financial resources requires differential lending rates. The only exceptions to this statement are the case of complete certainty and the case where uncertainty exists but all borrowers represent the same degree of risk. These two cases never occur in practice. If interest rates are freely determined, lending rates to different sectors will differ depending upon relative risks.\(^5\) Lending rates will be positively related to each sector's default probability. Such a free market solution leads to an efficient allocation of financial resources. A simple rule of thumb that could be used by countries where interest rates are administratively determined is to set differential lending rates which equate banks' expected revenue from lending to different sectors.

A. The Case Of Complete Certainty: The Effects Of Differential Costs

8. In a world of complete certainty where there is no default risk, a uniform interest rate will lead to an efficient allocation of resources. In this setting, the condition for allocative efficiency is that sectoral value marginal products be equalized. Since entrepreneurs equate the value marginal product of financial resources to the interest rate, this efficiency condition will be achieved by charging all entrepreneurs the same interest rate. The efficient uniform rate will be equal to society's marginal cost of funds. In an open economy, the

\(^5\) In order to simplify the presentation it will be assumed, for the moment, that borrowers in each sector are identical. This assumption will be dropped in subsection C where policy implications are discussed.
marginal cost of funds will be the international interest rate plus future real depreciations of the domestic currency, which in turn will be equal to the deposit rate.  

9. Previous analysts have pointed out that banks need to cover the costs of processing and monitoring loans. Hence, it is often argued that lending rates need to be higher than deposit rates to cover such costs. Furthermore, rates ought to vary across sectors in order to reflect differential costs.

10. The above argument misses the fact that costs of providing and monitoring loans are fixed rather than variable. They do not increase with the size of the loan. Hence, they do not affect the social marginal cost of financial resources. As fixed costs, they should be reflected as a fixed fee or commission. They should not affect the marginal cost of borrowing—the lending rate. In order to maintain the level of bank profits at zero and to equalize profits from lending across sectors, fees and commissions should vary across sectors to reflect differential costs.

11. To summarize, in this textbook version of the world where there are no risks, efficient lending rates will be uniform across sectors and equal to society's opportunity cost of funds. Since borrowers equate value marginal product to the lending rate, such an interest rate structure will imply that all sectoral value marginal products are set equal to the social marginal cost of funds. Society's scarce financial resources will be allocated efficiently. Banks will cover their costs by charging fixed fees and/or commissions which vary by sector. There will be no margin between their lending and deposit rate -- there will be only one interest

6/ The paper abstracts from problems associated with the existence of reserve requirements.
rate in the economy. Like any competitive firm, banks will be making zero profits. Moreover, since fees and commissions vary depending upon differential costs, banks will be indifferent between lending to different sectors.

B. An Efficient Interest Rate Structure Under Uncertainty

12. A world of complete certainty does not exist. In practice, the world is full of uncertainty, and default risks which vary depending upon borrowers' activities are a fact of life. In this, more realistic, setting a market equilibrium will be characterized by differential lending rates. More risky borrowers will be charged higher lending rates. Such a market equilibrium, with differential lending rates, will lead to an efficient allocation of resources.

13. In the presence of uncertainty, three issues arise. The first concerns the conditions for an efficient allocation of financial resources. The second is how would competitive banks enter loan agreements with borrowers that present different risks, and in particular will the diversity of risks be reflected in the structure of lending rates. The third is whether the market equilibrium is efficient.
Efficiency Condition

14. The condition for an efficient allocation of resources under uncertainty is that the expected value marginal product of financial resources be equalized across sectors and be in turn equal to the risk free interest rate---society's marginal cost of financial resources. This condition can be derived by solving the problem of a risk neutral social planner. The planner's goal is to maximize the expected value of the economy's total output [GDP] minus the opportunity cost of financial

7/ The reader should note the difference between this condition and the efficiency condition under certainty. In the present setting where we allow for uncertainty actual value marginal products will depend upon which state of nature will occur. This is different from the certainty case where only one state of nature can occur. Hence, the term expected value marginal product replaces the term value marginal product in the efficiency condition. Expected value marginal product is the weighted average of marginal product over all possible states of nature with weights equal to the probability of each state occurring.

8/ The assumption that the planner is risk neutral is fairly standard. It is based on society's ability to spread and pool risks. Risk spreading refers to the fact that risky projects are independent of one another. Hence, a typical agent's cost of bearing the risk of each project in which he is not directly involved is negligible---see Arrow and Lind (1970). Risk pooling refers to the fact that there are a large number of independent firms in any economy, and the variance of expected output tends to zero as the number of firms increases---see Samuelson and Vickery (1964).
resources; the risk free interest rate. A maximum is obtained at the point where sectoral value marginal products are equalized in expected value terms. It should be noted that the term expected value here refers to the unconditional expectation which is the average over all possible states of nature.

The Nature Of Debt Contracts

15. In a free market, banks will charge different classes of borrowers different lending rates based upon their risk characteristics and collateral requirements. The lending rate will be higher to riskier borrowers. It will also be a decreasing function of collateral requirements. This behaviour is due to the special nature of debt contracts.

16. By definition of the debt contract, in good states of nature, when the investment project is successful, all profits accrue to the borrower and the lender only receives a fixed payment [principal plus interest]. On the other hand, in bad states of nature when the investment provides a poor return, the borrower limits his loss by bankruptcy. The lender only gets what is left of the firm plus whatever other collateral may have been provided. His income now depends upon the variable return on the project. The form of the debt contract implies, therefore, an asymmetry between the pay-offs to the lender and the borrower.9 The lender bears most of the downside risk and the borrower gets all the high profits when they occur.

17. Risk neutral lenders maximize expected profits by setting their expected marginal revenue from lending to each sector equal to their opportunity cost of funds--the risk free interest rate. These expected

returns from lending are equal to the probability of repayment times one plus the lending rate, plus the probability of default times what the lender can get in default situations in terms of collateral and whatever is left from the firm. That is, these expected returns are given by the following equation:

\[ r = (1+i)(1-q) + q \text{ col} \]

where \( r \) is defined as the banks' expected marginal return from lending, \( i \) is the lending rate, \( q \) is the probability of default and \( \text{col} \) is the marginal collateral. It is clear that if the economy consists of two sectors with identical technologies and collateral requirements, but different risk characteristics, the lender will equalize expected returns by charging the riskier sector a higher lending rate. The difference between any two lending rates will, in this case, be an increasing function of the difference between the probabilities of default.

Is The Market Equilibrium Efficient?

18. A free and competitive market will lead to an efficient allocation of financial resources.\(^{10}\) The equalization of expected value marginal products will imply nonuniform lending rates in a free market situation. This occurs because entrepreneurs do not equate expected value marginal product to the interest rate. The existence of a default possibility will imply that marginal products, in expected value terms,

\(^{10}\) There are some qualifications to this statement. For example, in situations where banks are risk averse or if there is asymmetric information the free market solution will not necessarily be Pareto Optimal.
will be lower than the interest rate. This wedge between the lending rate and expected value marginal product increases as the probability of default rises. But, sectors with high default probabilities [implying a higher wedge] will be charged higher lending rates. Hence, sectoral value marginal products are equalized, in expected value terms, although sectoral interest rates are not.

19. The amount that entrepreneurs choose to borrow at a given interest rate depends on the returns to investment net of loan repayments. This net return is strictly positive when the loan is repaid fully. If entrepreneurs go bankrupt they lose a fixed amount. Hence, they choose to borrow an amount such that the expected marginal productivity of investment, conditional on a return sufficiently high to avoid bankruptcy, is equal to the interest rate on the loan charged by the bank. Note that this conditional expected marginal return is, by definition, always higher than the unconditional expectation. It is the average marginal product in those states of nature when debt is repaid [i.e., the good states of nature only]. Whereas the unconditional expectation is the average over all possible states of nature. That is, there is a divergence between the producer's and society's perception of expected benefits. The expected marginal return of invested funds is higher for the entrepreneur than it is for society, because the entrepreneur limits his downside risk through bankruptcy.11

11/ This is the main difference between the certainty and uncertainty problems. Under certainty the entrepreneur sets marginal product equal to the interest rate. Under uncertainty, expected value marginal product will be set lower than the interest rate.
20. However, this does not imply that in a competitive market entrepreneurs invest an amount that is too high from a social point of view. In the competitive equilibrium the upward shift of the demand for funds as a function of the loan rate exactly offsets the increase of the loan rate that is due to the risk of default: the expected marginal productivity of investment considering all states of nature [the social marginal productivity], in risky sectors is set equal to the risk-free interest rate. Therefore, the market allocation of resources is identical to that of a planned economy that maximizes the expected value of total output, and the equilibrium is Pareto optimal.

21. The above result may be surprising at first. However, a simple remark may help understanding it. The privately efficient loan contract between lender and borrower maximizes the net return to the entrepreneur, subject to a profit constraint for the lender; that is, the break-even constraint [i.e. the expected profit to lender, net of the opportunity cost of funds which is the risk free interest rate, is equal to zero]. This contract is therefore identical to an efficient contract that maximizes the sum of the return to the borrower and the net profit of the lender. But this sum is equal to the expected value of output in all states of nature minus the risk free interest rate. It follows immediately that the objective of the privately efficient contract is the same as that of the social planner and that the previous result is true. One can also see that the result depends on the assumption that bankruptcy does not induce any loss of production.

22. To summarize, Under uncertainty borrowers set the expected marginal product of financial resources below the interest rate. This wedge between expected productivity and the interest rate is an increasing function of the probability of default. However, in a free market, this
behaviour will be exactly offset by the fact that riskier borrowers will be charged a higher interest rate. Hence, expected marginal productivities will be equalized across sectors and set equal to the risk free rate—society’s marginal cost of funds. Banks’ expected revenue from lending to any particular sector will also be set equal to the risk free interest rate. They will cover fixed costs by charging fees and commissions that may vary across sectors. Thus, like any risk neutral competitive firm their expected profits will be zero. Moreover, at the margin, they will be indifferent between lending to different sectors.

C. How Should LDC Governments Set Relative Lending Rates?

23. LDC governments operate in a world of uncertainty and differential risks. Hence, instead of setting uniform lending rates, governments should set rates that reflect differential risks. A rough rule of thumb that may be followed when determining relative lending rates is to ensure that banks’ expected revenue from lending is equalized across sectors. To this effect, the following formula could be used as a general guideline:

\[(1 + i_1)(1 - q_1) + q_1 Col_1 = (1 + i_2)(1 - q_2) + q_2 Col_2 - 1 + \rho\]

where subscripts 1 and 2 refer to any two sectors; \(i, q, Col\) and \(\rho\) refer to the lending rate, the probability of default, collateral on the marginal unit lent and the risk free interest rate, respectively.

24. The first two expressions in the above equation approximate the expected marginal revenue from lending to a particular sector. It is roughly equal to one plus the lending rate times the probability of repayment plus collateral times the probability of default. Use of the above formula will imply that sectors with higher default risk will be
charged higher lending rates. Similarly, a sector's lending rate will fall relative to the rest of the economy if its collateral requirements increase.

25. A numerical example may clarify what the use of the above formula implies. Consider an economy with two sectors. The probability of default for firms in sector 1 is 5%. Sector 2, the riskier sector, has a probability of default of 10%. Both sectors face the same collateral requirements of 30% and the risk-free interest rate is 10%. Using the above formula, the government would set sector 1's lending rate at 14% and sector 2's lending rate at 19%. If the collateral requirements for sector 2 were doubled, then the lending rate implied by the formula would fall to 15.5%. On the other hand, if the default risk in that sector doubles, while the collateral requirements remain unchanged, the lending rate implied by the formula would rise to 30 percent.

26. The formula tries to replicate the market solution, but there are three problems associated with its use. First, governments do not observe the distribution of returns to the firms in different sectors. They only observe actual default probabilities which are a function of interest rates. Changing relative lending rates will alter the observed default ratios. Hence, governments should try to determine the possible directions of change in default probabilities before using the formula.

27. Second, increases in default risk lead to an extremely rapid rise in the interest rates calculated using the formula. For example, if due to the underdevelopment of the legal system banks cannot recover any collateral in a default situation, and if the probability of default for a certain sector is 40 percent, then at a 10 percent riskless rate the lending rate charged to that sector would be 83 percent.
28. In this situation, government has to decide whether such a high rate is appropriate. If in fact production in this sector is extremely risky, then society may be better off if very little of its scarce financial resources are channelled to it. The risky sector should be charged an extremely high lending rate. The lending rate calculated using the formula should be used.

29. On the other hand, if the high default probability being observed is due to the existence of some other distortion; e.g., a weak legal system which provides an incentive for borrowers to cheat. Government should intervene to directly remove the distortion, and hence reduce the risks perceived by lenders. In the example presented in para. 27, if improvements in the legal system reduce the default rate to 20 percent, the lending rate calculated using the formula would fall from 83 to 37 percent.

30. Third, differences in the risk characteristics of borrowers who operate in the same sector do exist. Hence, setting the same lending rate to all borrowers who operate in the same sector would lead to a misallocation of resources. On the other hand, it is impossible for governments to set a specific lending rate for each actual and potential borrower in the economy.

31. The above problem can be remedied by treating all government determined lending rates as ceilings. Sectoral lending rates should be based on the default probability of the more risky borrowers in the sector. In this case, less risky borrowers will be able to obtain loans at below the ceiling rate for that sector. Thus, actual lending rates could be made to reflect inter as well as intra-sectoral risk differentials.
32. Although the three problems described above imply that some judgement is needed for its proper application, the formula presented here does provide a useful guideline to countries where interest rates are administratively determined. In a free and competitive market, commercial banks will equalize their expected returns from lending to different sectors. Hence, use of the above formula by countries that control interest rates will bring the sectoral allocation of credit in these countries closer to what would have been an efficient market solution.

33. It was shown here that a competitive market solution with differential lending rates is efficient. If countries need to set interest rates at all, they should try to set rates that would mimic an efficient market solution. Having a uniform lending rate should not be a policy goal. Such a uniform rate is not consistent with an efficient allocation of resources under uncertainty. Setting differential rates based upon the above formula would help some countries mimic the market solution.
III. INTEREST RATE POLICIES AND THE SUPPLY OF CREDIT

34. Most LDCs neither set a uniform lending rate nor differential rates that are proportionate to risk. In fact, they set lending rates that are inversely related to risk. In most countries, sectors with high default risk are also designated as "priority" sectors. Policy makers consider a market equilibrium where interest rates for these sectors are higher than for the rest of the economy unacceptable. They try to subsidize priority sectors by setting their lending rates below those charged to the rest of the economy. Similarly, many countries that have liberalized interest rates continue setting preferential rates to "priority" sectors. These policies have a negative impact on the amount of credit supplied to these sectors. Governments try to offset the effect of distortionary interest rates on the supply of credit by imposing selective credit controls. However, in many cases, these controls have proven to be either ineffective or too costly.

A. The Effect Of Setting Low Lending Rates To Priority Sectors

35. In the absence of effective credit allocation schemes a policy of setting artificially low lending rates to "priority" activities would be counterproductive. It will lead to a fall in the amount of loans going to these sectors. The rationale behind this argument is straightforward.

12/ For example, in Cameroon agriculture is considered as a priority sector, as is small scale industry in Malaysia. It should be noted, however, that not all "priority" sectors are risky. For example, governments often designate public enterprises as priority sectors. Given government backing, the default probability for these enterprises is relatively low.

13/ See subsection C for examples.
Profit maximizing banks will reduce their supply of loans to sectors where interest rates are low relative to risk. Credit to these sectors will be supply constrained. Less borrowing and investment will occur. The benefits of low interest rates will only be reaped by the few producers who actually receive the rationed credit.

36. The above argument can be explained most simply with the help of the diagram in Figure 1. The DD and SS curves in that diagram refer to the demand and supply curves for loans to any particular sector. In that diagram $i^*$ and $L^*$ refer to the equilibrium level of the interest rate and the equilibrium quantity of loans, respectively. Suppose that the government decides that $i^*$ is too high so it sets an interest rate ceiling equal to $i_1$. At the new ceiling, borrowers demand more loans; the quantity of loans demanded rises from $L^*$ to $L_d$. But, lenders supply less loans; loans supplied fall from $L^*$ to $L_s$. The market will be supply constrained. The actual quantity of loans provided to that sector falls from $L^*$ to $L_s$. Excess demand equal to the difference between $L_d$ and $L_s$ is observed.

![Figure 1: The Effect of an Interest Rate Ceiling](image)

37. It is often argued that many of the priority sectors face distortions, such as low producer prices, which influence the incentive to
increase production and therefore justify setting a low lending rate. This argument is wrong. Low producer prices lead to a fall in the demand for loans and hence, in a free market situation, result in lower interest rates and less loans being channeled to the affected sector. If, in addition to this distortion, government sets a low lending rate ceiling the amount of loans channeled to that sector will fall even further.

38. The above discussion can be explained with the help of the diagram in Figure 2. Consider the loan market for any particular sector where the demand and supply curves are given by DD and SS. A market equilibrium is given by the interest rate $i^*$ and quantity of loans $L^*$. Now a distortion (e.g. low producer prices) which causes a decline in loan demand is introduced in the product market. The demand curve shifts downwards to $D'D'$. A new equilibrium is achieved at $i_1$ and $L_1$. Note that as a result of the distortion in the output market both the interest rate and the volume of lending decrease. If government tries to subsidize that sector by setting a low lending rate ceiling equal to $i_2$, lending will fall even further; from $L_1$ to $L_2$.

Figure 2: The Effect of a Distortion in the Product Market
39. The aim of low lending rate ceilings is to provide a subsidy to priority sectors. It has been argued here that these policies are counterproductive. If indeed a subsidy is warranted, then a direct interest rate subsidy provided through the fiscal budget or a preferential rediscount scheme managed by the Central Bank may be a preferred approach. In terms of Figure 1, an interest rate subsidy would cause the supply curve to shift to the right. Hence, priority producers will end up receiving more credit at a lower cost. No rationing will occur.

B. A Partial Liberalization And The Allocation Of Resources

40. A policy of liberalizing lending rates to some sectors of the economy and not others will lead to a movement of resources out of the controlled sectors. In many countries this is a permanent arrangement. It is viewed as a way of moving from a "very distorted" credit market to a "less distorted" one. However, the reduction in the share of priority sectors - the sectors for whom lending rate ceilings are usually maintained, in total credit implies that such a change in policy is not necessarily welfare improving. In other countries, a partial liberalization is seen as a first step towards a complete liberalization. It is argued here that the distortion implied by this initial step may cause governments to abort the liberalization effort.

41. A partial liberalization has an adverse effect on the amount of lending to priority sectors. Profit maximizing banks respond to this policy change by reducing lending in support of priority activities and raising lending to the newly liberalized sectors of the economy. Once more, policies that were designed to encourage priority sectors end up harming them.

14/ For a more detailed exposition of this argument see Virmani (1985) or World Bank Reports Nos. 4085-TH and 5270-EC.
42. The above argument can be further explained by the use of the diagram in Figure 3. Consider the loanable funds market for the priority sector of the economy where, prior to the partial liberalization, the demand and supply curves are given by SS and DD. The government fixed lending rates to that sector at $i_1$ with the result that the volume of actual lending is given by $L_1$. Excess demand equal to the difference between $L_d$ and $L_1$ is observed. When the government liberalizes lending rates to other sectors of the economy while maintaining the ceilings imposed on lending to the priority sector, the supply curve will shift to $S'S'$. This fall in supply reflects the fact that the rise in rates to other sectors implies an increase in the opportunity cost of loans to the priority sector. Banks reduce lending to that sector at all interest rate levels. Hence, the volume of lending falls to $L_2$, and excess demand increases.

*Figure 3: The Effect of a Partial Liberalization*

43. In some cases a partial liberalization is seen as a step towards liberalizing all interest rates. Governments often consider it prudent to first "try the water". Hence, in the first phase they liberalize rates to sectors which they consider unimportant and maintain ceilings on rates to
44. This approach can be misleading. The partial liberalization will lead to a movement of resources out of the controlled sectors and may cause government to undo the liberalization. This could occur although, in most cases, a complete liberalization will bring about an increase in credit to priority sectors. A preferred approach to effect a gradual liberalization is to start by liberalizing deposit rates. Lending rate ceilings which are based on the formula presented in Section III, so they reflect relative risks, may be maintained. Government can then start shifting all ceilings upwards until they no longer become binding. Thus, a complete liberalization could be achieved gradually, and at the same time transitional relative lending rates continue to provide correct market signals.

C. Interest Rate Policies and Selective Credit Controls

45. The policy of maintaining especially low lending rates to "priority" activities is usually associated with the imposition of selective credit controls. As argued above, low lending rates lead to a fall in the volume of credit going to "priority" activities. Hence, nearly all countries that adopt this type of interest rate policy have been eventually forced to impose credit allocation schemes. The most common type of targeted credit policies is the imposition of quantitative restrictions on bank lending portfolios. The goal is to ensure the availability of some minimum amount of credit to "priority" activities despite the low lending rates.

15/ This subsection simply presents a summary of the literature on selective credit controls. A paper providing a more in-depth analysis of the issue is currently being prepared in CPD.
46. Experience with selective credit controls has not been very encouraging. In many cases they are not successful in channelling resources to "priority" sectors. Recent empirical analyses from countries as diverse as Ecuador, Nigeria and Brazil indicate that such schemes have very little impact on the allocation of investible resources.\textsuperscript{16} Adjustments in lender and borrower behavior tend to reduce the impact of selective credit controls. The shares of priority activities in total credit continue to decrease despite government's intervention in the credit allocation process.

47. Even when credit allocation schemes are effective their costs are usually high. They distort incentives in the financial system and lead to a decline in savings mobilization. They frequently lead to a fall in bank profits. Thus, in a country like Thailand they have reduced banks' ability and/or willingness to mobilize savings through higher deposit rates or through the opening of new branches.\textsuperscript{17} In other countries, the costs of such programs imply too high a burden on nonpriority borrowers. For example, it is believed that the high cost of borrowing in Turkey in the early 80's was partially due to these schemes.\textsuperscript{18}

48. Inappropriate interest rate policies which distort the allocation of credit are rarely offset by the imposition of selective credit controls. In many cases these controls have had little impact on the allocation of investible resources. If effective, they tend to reduce

\textsuperscript{16} See World Bank reports Nos. 5270-EC and 4051-UNI.

\textsuperscript{17} See World Bank report No. 4085-TH.

\textsuperscript{18} See World Bank report No. 4459-TU.
banks' deposit mobilization efforts. This problem should be tackled directly either by adjusting existing interest rate schedules or by freeing all interest rates simultaneously.
IV. COUNTRY EXPERIENCES

49. The arguments presented in the preceding sections are often inadequately recognized. Country experiences, presented in this section, indicate the need for a more widespread use of these simple concepts in Bank economic and sector work.

A. Cameroon: Controlling All Rates and Preferential Rediscounting

50. Interest rate policies in Cameroon are typical of those in Francophone Africa. All interest rates are set by the Central Bank in conjunction with the Ministry of Finance. They have been traditionally fixed at low levels. Ex-post real deposit rates have been negative during most of the seventies and early eighties. They moved from -7.2 percent in 1975 to 0.1 percent in 1980, then fell again to -7.9 percent in 1982. These rates have increased in recent years. This has been due to an upwards shift in nominal interest rate schedules as well as a reduction in inflation. In 1984, real deposit rates were mainly positive. Hence, some may argue that there is no need for a general rise in Cameroonian interest rates. There is a need, however, for a change in the structure of interest rate schedules.

The Present Structure of Lending Rates

51. Agriculture is regarded as the main priority sector. Lending rates to this activity are set at around 4.25 percentage points below those to the rest of the economy. Banks' profit margin from lending to agriculture is around -2.5 percentage points. This is the case although agriculture in Cameroon is more risky than other activities, such as
services, for example. A recent financial sector report on Cameroon argues that high risk and inadequate collateral are an important cause of low lending to agriculture.\textsuperscript{19} From the point of view of allocative efficiency, lending rates to agriculture should be higher than those charged to other sectors of the economy.

52. The present structure of interest rates does not encourage bank lending to agriculture. Faced with negative profit margins on agricultural lending, banks do not use their own funds to finance this priority activity. The Central Bank rediscouts a large proportion of total credit at low rates, however. By using the rediscount window, banks can earn a margin of 2.25 percentage points on medium term loans to agriculture. But, this margin is still lower than the 3.25 percentage points they could earn from rediscounting loans to other, less risky, sectors.\textsuperscript{20}

**Relative Lending rates And The Allocation Of Resources**

53. Although present policies were meant to encourage the use of agricultural credit, they have had the opposite effect. The share of agriculture in total credit has been declining steadily. It fell from 6.4 percent in 1978 to 5.0 percent in 1980 and then to 3.2 percent in 1984. This has occurred at a time when the difference between nonpriority and priority interest rates was rising from 1.5 percentage points in 1978 to 2.75 percentage points in 1980 and then to 4.25 percentage points in 1984.

\textsuperscript{19} See World Bank Report No. 5226-CM, p. 78.

\textsuperscript{20} Commercial banks continue to bear the default risk for rediscounted loans.
54. This is in line with the discussion in the previous section. As lending to agriculture became less profitable than lending to other sectors, banks reduced the proportion of agricultural loans in their portfolio. Although the demand for credit by agricultural producers remained high, or even increased, the volume of agricultural lending, which is supply constrained, decreased in relative terms. Excess demand for credit increased.

55. The existence of excess demand implies that there is an incentive for both borrowers and lenders to avoid the interest rate regulations. In a highly controlled system like Cameroon's, where the Central Bank has to approve every individual credit application before the commercial bank can provide the loan, very little overcharging occurs. One or two banks try to raise the effective cost of loans by requiring borrowers to hold compensating balances, but these remain in the minority. The vast majority of agricultural producers are rationed out of the credit market.

56. The decline in lending has had a negative impact on the sector's growth. It reduced agricultural producers' ability to mobilize resources for investment and working capital. The Bank has argued that an increase in credit to agriculture is needed.21 The Bank's conclusion is based upon a judgement that the expected marginal product of credit in that sector is high relative to other sectors of the economy. This means that inappropriate interest rate policies have caused a misallocation of resources. Changing relative interest rates would, by raising the volume of agricultural credit, increase allocative efficiency.

21/ Ibid. p.33.
World Bank Policy Recommendations

57. Past recommendations made by the Bank have stressed the need to raise commercial bank profits from all types of lending and to make them uniform across sectors. Such a policy change would clearly be a move in the right direction. A more than proportionate increase in the profitability of loans to priority sectors so that they are as profitable as loans to nonpriority sectors will have a positive effect on the allocation of credit. The share of priority sectors in total credit will rise.

58. However, the analysis presented here indicates that these recommendations are not sufficient. The analysis of commercial bank margins has to factor in the differential default costs. Present policy proposal do not equate commercial banks' expected returns from lending to different sectors. Efficiency considerations require that lending rates to risky sectors in Cameroon, of which agriculture is the largest, be higher than those to the rest of the economy. Recent Bank recommendations continue to have lower lending rates to this sector.

A Lesson For The Future

59. The Cameroonian experience provides an important lesson. An analysis of whether interest rates are positive in real terms is not a sufficient indicator of the need for policy changes. It should be complemented with a study of relative interest rates and the allocation of credit. A change in relative interest rates may be more important than a simple change in their overall levels. Recommendations on setting relative interest rates should take into account differential risks.

22/ Ibid. pp. 61-62.
B. Malaysia: A Partial Liberalization With Sectoral Credit Targets

60. Malaysia is one of several countries that moved towards liberalizing interest rates during the late seventies and early eighties. By the end of 1978 all interest rates, except for a few lending rates to priority sectors, had been liberalized. This partial liberalization has led to an increase in resource mobilization but may have worsened their allocation by causing resources to move out of the priority sectors.

Recent Changes In Relative Lending Rates

61. Small scale industry is one of the government’s main priority sectors. Nominal lending rates to this sector have not been changed since 1978. Yet, these rates have continued to be positive in real terms; with ex-post real lending rates averaging 3 to 4 percent during the five year period 1980-84. That is, present interest rate policies in Malaysia do not violate the rule of keeping all rates positive in real terms. Based on this criterion, there is no need for a change in policy. An analysis of relative interest rates indicates, however, that present policies should be modified. Bank reports have argued that small scale industry in Malaysia is much riskier than other sectors of the economy. This implies that lending rates to that sector should be higher than average.

62. Prior to the partial liberalization, interest rates were administered so that lending rates to this priority sector were more or less similar to those in the rest of the economy. In 1978 they were only 0.4 percentage points below average lending rates. A complete liberalization would have led to an increase in lending rates to all sectors. But, the increase in the priority sector’s rate would have been higher than average. Priority interest rates would have been higher than

those charged to nonpriority borrowers; as is consistent with an efficient allocation of resources. The partial liberalization brought about the opposite result. Interest rates to nonpriority activities rose immediately, and have continued to rise since then, while those to priority sectors remained unchanged. Hence, the difference between nonpriority and priority lending rates increased from 0.4 percentage points in 1978 to 2.3 percentage points in 1981 and then to 3.25 percentage points in 1985.

Relative Lending Rates And The Allocation Of Credit

63. Present policies have discouraged lending to priority sectors. With a rise in profit opportunities in the liberalized sectors of the economy, banks increased the proportion of their loans to these sectors at the expense of priority activities. Prior to the partial liberalization, commercial bank lending to small scale industries was rising steadily. It rose from 0.9 billion 1980 Ringgits in 1973 to 2.1 billion in 1978—an average annual increase of .16.3 percent in real terms. Its share of total lending was also rising; from 13 percent in 1973 to 15.2 percent in 1978. All of this changed after 1978. Except for 1979 when the definition of small scale industry was broadened, this sector’s share of total bank lending has fallen dramatically. It fell to 11.3 percent in 1980, then to 9.4 percent in 1983 and 7.0 percent in 1985—less than half of its 1978 share. Real lending to this sector has also been falling in absolute terms. After a peak of 2.9 billion 1980 Ringgits in 1979 it stood at 2.7 billion in 1985.

64. The decline in lending has had a negative impact on this sector’s growth. The Bank has been arguing that there is a great deal of underutilized potential caused by lack of credit to that sector.24 That

24/ Ibid. p. 35, p. 82 and p. 80.
is, according to Bank reports, the change in relative lending rates has caused a misallocation of financial resources.

65. The government tried to increase lending to small scale enterprises by imposing selective credit targets. In 1979, one year after the interest rate liberalization, banks were required to ensure that credit to small scale enterprises outstanding at the end of 1980 was equivalent to at least 20 percent of their total outstanding credit as of end 1979. When banks failed to comply, new guidelines were issued in 1981. These required that credit to small scale enterprises as of end 1981 and end 1982 be equal to 12 percent of total credit outstanding as of end 1980. Once more banks did not comply and this sector’s share of total credit continued decreasing. Therefore, in 1983 the guidelines were changed again. Now, banks were only required to maintain the share of lending to small scale enterprises at 1982 levels. Banks failed to comply with this modest target. Selective credit guidelines have proven to be ineffective.

66. Given the observed excess demand for priority credit, one would expect that some of these firms would try to obtain loans at the free interest rate. Anecdotal evidence indicates that indeed this does occur. Nevertheless, as was demonstrated above, official data shows a decline in loans to this sector of the economy, and Bank reports argue that too little credit is channeled to small scale enterprises. A change in relative interest rates is needed to counter current trends.

The Effect Of The Partial Liberalization On Savings Mobilization

67. The partial interest rate liberalization did have some benefits. These were in the form of increased financial resource mobilization. Faced with greater profit opportunities, banks increased their deposit
mobilization efforts. The rate of growth of the ratio of M2 to GNP, a commonly used measure of financial resource mobilization, increased from an average annual rate of less than 3 percent between 1973 and 1978, the five year period immediately preceding the partial liberalization, to a rate of 5 percent between 1978 and 1985. Total lending increased dramatically. The growth rate of the ratio of total loans to GNP rose from an average annual rate of 5.6 percent in the period 1973-78 to 10.1 percent in the period 1978-85. The partial liberalization did increase the overall level of financial intermediation.

Policy Lessons

68. A return to pre-1978 policies would probably bring about an increase in the priority sectors' share of total lending. An improvement in financial resource allocation would occur. However, total resources mobilized by the financial system will decrease. A preferred strategy for the future is to liberalize priority interest rates. Failing this, an improvement in resource allocation may be brought about by increasing the ceilings on priority lending rates.

69. The lesson learned from the Malaysian experience is straightforward. Partial liberalizations will typically harm the sectors which they aim to promote, even when accompanied by selective credit controls. Interest rate ceilings coupled with credit allocation guidelines are often an inefficient method of subsidizing priority activities.

C. Nigeria: A Case for Gradual Reform

70. All interest rates in Nigeria are controlled and until very recently were negative in real terms. The government relies on a very elaborate credit allocation scheme which is not very effective. A comprehensive financial reform is needed. The government has, however,
been unwilling to undertake a reform program. The analysis presented here indicates that a policy of gradual reform would be feasible in this case. Initially, lending rates to the more risky sectors would be raised. Once relative interest rates are adjusted to reflect risk characteristics, a change in the overall levels of interest rates could come as a second step.

**The Existing System**

71. As is common in other countries, priority sectors in Nigeria tend to be riskier sectors. They include agriculture and small scale industry, for example. Historically, lending rates to these sectors were kept below those to the rest of the economy. This policy changed in 1984 when a uniform lending rate of 13 percent was set. This uniform rate has been highly negative in real terms. In 1984 the real lending rate stood at around -23 percent. Obviously, these interest rate policies are neither conducive to resource mobilization nor to their efficient allocation.

72. The government attempts to offset the bias against priority lending, caused by the interest rate regime, through a set of restrictions on banks’ portfolios. Banks are required to lend a certain proportion of total funds to each sector. But, as in Malaysia, these controls are ignored by banks, and hence have very little effect on the allocation of credit. Although the mandated share of priority sectors in total commercial bank credit has been rising in the last ten years; from 58 percent in 1977 to 78 percent in 1986, their actual share of total credit has remained fairly stable over the same period, fluctuating at around 67 percent. Their share of merchant bank loans has been actually decreasing. Falling from 71 percent in 1977 to 62 percent in 1985; at the same time as mandatory priority lending for this group of banks was rising from 70 percent in 1977 to 79 percent in 1985.
The Need For Reform

73. The above description indicates that a comprehensive reform of the financial system is needed. A first best approach would be to completely liberalize the system. Failing that, a comprehensive change of current regulations should be undertaken. Such a change should have three components. First, a change in relative lending rates so that they reflect the different risk characteristics of various sectors. Second, a change in the system of setting the overall level of interest rates so that deposit rates reflect the opportunity cost of holding domestic financial assets and are more conducive to financial savings mobilization. Third, the elimination of selective credit controls.

74. The government has been unwilling to undertake financial reforms of the magnitude described in the previous paragraph. However, it may be persuaded to carry out a partial reform. A change in relative interest rates, which can be carried out within the existing institutional framework would be an appropriate first step towards more comprehensive reforms. Since the country is starting from a situation where real rates are negative, the change in relative rates should be achieved by raising lending rates to risky sectors rather than reducing rates to less risky ones. The amount of increase in these rates should be based upon an analysis of differential default probabilities. Such a policy change will improve resource allocation with more credit flowing into priority activities.

A Missed Opportunity For Reform

75. In FY 86 the Bank financed the second livestock development project in Nigeria. The staff appraisal report noted that the interest rate to be charged to farmers will be 9 percent; in accordance with
Central Bank of Nigeria's guidelines, and that this rate is negative in real terms. As stated in Bank reports, agriculture is riskier than other sectors in the economy. Hence, a policy of higher lending ratios rates for agriculture would have increased efficiency. Yet, this approach was not pursued since it was felt that it may be inappropriate to have lending rates that are not uniform across sectors.

The case of Nigeria demonstrates how a preoccupation with a uniform lending rate which implies that all interest rates need to be adjusted simultaneously, could hamper the process of financial reform. In fact, changes in a few interest rates would be a positive step in the reform process. Such a step may prove to be more politically feasible than a complete overhaul of existing systems. It is certainly preferable to inaction.


26/ See, e.g., Ibid. p. 7.
V. CONCLUDING REMARKS

77. Relative interest rates are important determinants of the allocation of resources. The Bank has spent a great deal of time and effort convincing countries that their general level of interest rates ought to be made positive in real terms. In environments where interest rates are regulated, the Bank should also emphasize the importance of setting sectoral lending rates that provide correct market signals.

78. A comprehensive interest rate liberalization is the preferred solution to problems associated with interest rate structures. It ensures an efficient allocation of financial resources. Failing that, the type of policies advocated here would help improve resource allocation in countries that continue to administer lending rates.

79. In a world of uncertainty and differential risks, lending rates should vary across sectors. Hence, the recommendation of a uniform lending rate across sectors as promoting efficient resource allocation is not appropriate. The setting of sectoral lending rates should be based upon an analysis of differential default risks.

80. Low lending rate ceilings coupled with selective credit controls is usually an inefficient way of subsidizing priority sectors. It has often led to a decline in the amount of credit going to the sectors it aims at subsidizing. In countries that adopt this policy, a change in relative interest rates should be sought. Such a change would have a greater impact on resource allocation than a simple, proportionate increase in all interest rates.

81. The move from a regime where all lending rates are controlled to one where only those to priority sectors are controlled and others are freely determined will increase resource mobilization, but worsen its
intersectoral allocation. Such a partial liberalization should not be treated as a permanent state of affairs. It is not even an appropriate first step towards a complete liberalization. The Bank should advise countries that have adopted this policy to liberalize interest rates to priority sectors or at least raise the ceilings on these rates.
Bibliography


THE ANALYTICAL FRAMEWORK

This appendix presents an analytical model of financial intermediation under uncertainty. It shows that in an undistorted financial market lending rates to riskier sectors will be higher than to sectors that are less risky. Despite this nonuniformity of lending rates, the competitive equilibrium is Pareto Optimal. Expected value marginal products will be equalized across sectors.

Overview of The Model

Consider a small open economy producing two traded goods $x_1$ and $x_2$ using one factor of production, $L$. The small economy assumption implies that goods' prices, $p_1$, and $p_2$, are determined exogenously. Firms face technological uncertainty with sector 2 being riskier than sector 1. Firms in both sectors have no initial endowment of the factor of production. Hence, the representative firm in sector $j$ needs to borrow an amount $(B_j)$ equal to $wL_j$, where $w$ is the price of $L$, before the beginning of the production process. Banks collect deposits on which they pay a market determined deposit rate $d$, and provide loans to both sectors. Perfect competition prevails in both productive sectors and the banking industry. This is an intermediate run model. So perfect competition implies that agents treat prices as given, but that profits are not necessarily zero in expected value terms.

Firms

Firms operating in each sector are identical. The representative firm in section $j$ has a concave production function which is given by:
where θ_j is a non negative random variable which can take values between mj and M_j. Its density function f_j(θ_j) is known to all agents in the economy. Firms in sector j will repay their debts only in "good" states of nature when:

\[ p_jθ_jg_j(\frac{B_j}{w_j}) ≥ (1 + i_j)B_j \]  

where i_j is the interest rate banks charge on loans to sector j. Define Ω_j as:

\[ Ω_j(B_j) = \frac{(1 + i_j)B_j}{p_jg_j(B_j/w_j)} \]  

That is, Ω_j is the realization of θ_j which allows the firm to exactly pay back its debt. At values of θ_j below Ω_j the firm goes bankrupt and its entire revenue is transferred to the banks. For values of θ_j which are less than or equal to Ω_j, \( Ω_j^r \) will be zero, and they are an increasing function of θ_j as long as it is greater than Ω_j. Hence, firms profits will be truncated from below. They are described by the following function:

\[ Ω_j^r = \begin{cases} 0 & \text{if } θ_j < Ω_j(B_j) \\
\frac{B_j}{p_jθ_jg_j(\frac{B_j}{w_j})} - (1 + i_j)B_j & \text{if } Ω_j(B_j) < θ_j \end{cases} \]
Being risk neutral, the representative firm's optimization problem is given by:

$$\max_{j} \left( \sum_{j} \int_{\Omega_{j}} \frac{M_{j}(B_{j})}{r_{j}(\theta_{j})} d\theta_{j} + \sum_{j}^{M_{j}} \frac{B_{j}}{\omega} \left[ p_{j} g_{j}(\frac{B_{j}}{\omega}) - (1 + i_{j}) B_{j} r_{j}(\theta_{j}) d\theta_{j} \right] \right)$$

(5)

Define $E(\theta_{j} | \theta_{j} > \Omega_{j})$, the expected value of $\theta_{j}$ given that it is greater than $\Omega_{j}$ as:

$$E(\theta_{j} | \theta_{j} > \Omega_{j}) = \frac{\int_{\Omega_{j}}^{M_{j}} \theta_{j} f_{j}(\theta_{j}) d\theta_{j}}{\int_{\Omega_{j}}^{M_{j}} f_{j}(\theta_{j}) d\theta_{j}}$$

(6)

Hence, the first order condition for a maximum is given by:

$$(1 + i_{j}) = p_{j} g_{j}(\theta_{j} | \theta_{j} > \Omega_{j})$$

(7)

That is, the firm equates the cost of borrowing to the value marginal product of borrowed funds in those states of nature where it does not go bankrupt.

Equation (7) yields a demand curve for funds which may be written as:

$$B_{j}^{d} = B_{j}^{d}(p_{j}, i_{j})$$

(8)
where

\[ \delta B^d_j \over \delta p_j \geq 0 \quad \text{and} \quad \delta B^d_j \over \delta I_j \leq 0. \]

Banks

Competitive banks treat lending as well as deposit rates as given. For simplicity, it is assumed that they are not required to hold any reserves. At values of \( \Theta_j \) which are greater than \( \Omega_j \), banks are repaid principal plus interest, otherwise they receive the firm’s entire revenue. The representative bank’s profit from lending to sector \( j \) \((\Pi^b_j)\) is given by

\[
\Pi^b_j = \begin{cases} 
(1 + i_j)B_j - dB_j & \text{if } \Omega_j \leq \Theta_j \\
p_j\Theta_j\left(B_j \over w\right) - dB_j & \text{if } \Theta_j < \Omega_j
\end{cases}
\]

Its optimization problem is given by:

\[
\text{Max} \quad (1 + i_1)B_1 \int_{\Omega_1}^{M_1} f_1(\Theta_1) \, d\Theta + p_1\Theta_1\left(B_1 \over w\right) \int_{\Omega_1}^{M_1} g_1(\Theta_1) \, d\Theta
\]

\[+ (1 + i_2)B_2\int_{\Omega_2}^{M_2} f_2(\Theta_2) \, d\Theta + p_2\Theta_2\left(B_2 \over w\right) \int_{\Omega_2}^{M_2} g_2(\Theta_2) \, d\Theta \]

\[+ \left(1 + i_3\right)B_3\int_{\Omega_3}^{M_3} f_3(\Theta_3) \, d\Theta + p_3\Theta_3\left(B_3 \over w\right) \int_{\Omega_3}^{M_3} g_3(\Theta_3) \, d\Theta \]

\[+ \left(1 + i_4\right)B_4\int_{\Omega_4}^{M_4} f_4(\Theta_4) \, d\Theta + p_4\Theta_4\left(B_4 \over w\right) \int_{\Omega_4}^{M_4} g_4(\Theta_4) \, d\Theta \]

\[+ 2 \Pi^b_2 \]  \(9\)
\[-(1 + d)(B_1 + B_2).\]

The first order conditions for a maximum are given by:

\[
(1 + i_j)\sum_j f_j(\Theta_j) d\Theta_j + p_j g_m \sum_j \Theta_j f_j(\Theta_j) d\Theta_j = (1 + d) \quad (10)
\]

\[j = 1, 2\]

The bank will equate its expected marginal returns from lending to sector \(j\) to the deposit rate. Note that, in general, one would not expect \(i_1\) and \(i_2\) to be equal. From equation (10), the assumption that sector 2 is riskier than sector 1 implies that if prices and production technologies in both sectors are the same \(i_2\) will be greater than \(i_1\).

A supply function for loans to each sector can be derived from equation (9). It may be written as:

\[
B^S_j = B^S_j(i_j, d, P_j) \quad (11)
\]

\[
\frac{\delta B^S_j}{\delta i_j} > 0, \quad \frac{\delta B^S_j}{\delta d} < 0, \quad \text{and} \quad \frac{\delta B^S_j}{\delta P_j} > 0.
\]

---

1/ Where increasing risk is defined as a mean preserving spread in the distribution \(\Theta_j\). See Rothschild and Stiglitz (1970).
Equilibrium

To close the model, we add an equation describing households' supply of bank deposits \( D \). Households can hold their wealth \( W \) in either of three forms: domestic financial assets (deposits with commercial banks), foreign financial assets or real assets (inflation hedges). The return on bank deposits is \( d \), on foreign financial assets is the foreign deposit rate \( (d^f) \) plus the expected rate of depreciation of the domestic currency \( (\hat{e}) \), and the return on real assets is the inflation rate \( (\pi) \). The assumption that the three assets are imperfect substitutes yields the following household supply function for bank deposits:

\[
D^s = D(d, d^f + \hat{e}, \pi)W \tag{12}
\]

where

\[
\frac{\delta D}{\delta d} \geq 0, \quad \frac{\delta D}{\delta (d^f + \hat{e})} \leq 0 \quad \text{and} \quad \frac{\delta D}{\delta \pi} \leq 0
\]

Thus, the market equilibrium is given by:

\[
B^d_1(p_1, i_1) = B^s_1(i_1, d, p_1) \tag{13}
\]

\[
B^d_2(p_2, i_2) = B^s_2(i_2, d, p_2) \tag{14}
\]
\[ B_1^g(i_1, d, p_1) + B_2^g(i_2, d, p_2) = D(d, d^f + \pi)W \quad (15) \]

The competitive equilibrium is efficient in the sense that expected value marginal products in both sectors are equated to the deposit rate. This can be seen by noting that equation (10) can be written as:

\[(1 + i_1)\Omega_1 \int_{\Omega_1} f_1(\theta_1) + p_1 g_{1m_1} \int_{\Omega_1} f_1(\theta_1)d\theta_1 = \]

\[(1 + i_2)\Omega_2 \int_{\Omega_2} f_2(\theta_2) + p_2 g_{2m_2} \int_{\Omega_2} f_2(\theta_2)d\theta_2 = (1 + d) \quad (16) \]

From the firms' optimization problem we have

\[(1 + i_j) = p_j g_j \frac{\Omega_j \int_{\Omega_j} f_j(\theta_j)d\theta_j}{\Omega_j \int_{\Omega_j} f_j(\theta_j)d\theta_j} \quad (17) \]

Substituting (16) into (15) and adding yields:

\[ p_1 g_{1m_1} \int_{\Omega_1} f_1(\theta_1)d\theta_1 + p_2 g_{2m_2} \int_{\Omega_2} f_2(\theta_2)d\theta_2 = 1 + d \quad (18) \]
That is, as was shown by Lamdany (1986), although at equilibrium one observes lending rates that vary across sectors expected value marginal products are still equated.
Table 1: CAMEROON

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Source: IFS. Ministry of Finance.
### Table 2: MALAYSIA

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<td>M2/GNP (%)</td>
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<td>65.1</td>
<td>64.6</td>
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**Source:** IFS and Bank Negara Malaysia’s Annual and Quarterly Report, various issues.
### Table 3: NIGERIA

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**Source:** IFS, Nigeria RED and Nigeria CEM.