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## RESEARCH REPORT SERIES

Number 5

Financial Capital Flows and  
Portfolio Behavior of Thai Commercial Bank

by

Nimit Nontapanthawat



คณะเศรษฐศาสตร์  
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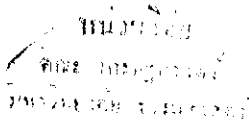
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# FINANCIAL CAPITAL FLOWS AND PORTFOLIO BEHAVIOR OF THAI COMMERCIAL BANKS<sup>1/</sup>

by Nimit Nontapunthawat

## I. Introduction

It is well known among Thai economists that Thai commercial banks have been relying on foreign sources of fund for the last two decades. Despite an unprecedented effort to expand its loan and rediscount facilities to commercial banks during the last decade,<sup>2/</sup> the Bank of Thailand remains less important to Thai commercial bank as a source of additional fund in comparison to foreign commercial banks. A detailed analysis of foreign borrowing of Thai commercial banks has been made by this author in his Ph.D's Thesis.<sup>3/</sup> This study is intended to investigate another important aspect of financial capital inflows, the effect of the inflows on portfolio behavior of Thai commercial banks.

Although a major portion of foreign borrowing of Thai commercial banks has been reported as "import L.C. refinancing," where L.C.

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<sup>1/</sup> Financial support for this research from the Rockefeller Foundation is gratefully acknowledged.

<sup>2/</sup> A detailed discussion of this matter can be found in Nimit Nontapunthawat, "Financial Capital Flows in the Balance of Payments of Thailand," Ph.D.'s Thesis, Purdue University 1973 (Appendix A). A Thai version of this appendix is in "Foreign Borrowing of Thai Commercial Banks", Essay in Honors of Professor Puey Ungphakorn.

<sup>3/</sup> Nimit Nontapunthawat, Ibid. Essay in Honors of Professor Puey Ungphakorn.

stands for "letters of credits", to the opinions of those who are well familiar with the operation of Thai commercial banks, foreign credits had not been limited to import financing only.<sup>4/</sup> How and in which ways these foreign credits have been used, however, remain a mist. It is the objective of this study to clear this mist. The author is well aware of the data problem and the different financial structure within which the Thai commercial banks have been operating compares to financial institutions in a financially more developed economy. We hope, nevertheless, that in the process of this study; a model of portfolio behavior suitable of explaining allocation of Thai commercial banks' resources could be built and some answers could be given to the questions of how and in which ways these foreign credits are utilized by the banks and how useful are these foreign financial capital to the Thai economy.

A survey of developments in portfolio accounts of Thai commercial banks from 1962 (the year in which a modern era of the Thai commercial banking starts) to 1973 are presented in Section II.<sup>5/</sup> Section III contains the theoretical framework for this study the empirical results obtained from the application of the theoretical framework to data on foreign borrowing and portfolio accounts of Thai commercial banks are presented in Section IV. A summary section concludes the study.

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<sup>4/</sup> See, for example, Dan Usher, "Thai Interest Rates," Journal of Development Study, April, 1967.

<sup>5/</sup> The year 1962 is the year in which the "Commercial Banking Act B.E. 2505" was promulgated and is taken as the start of modern banking in Thailand.

## II. A Survey of Developments in Portfolio Accounts of Thai Commercial Banks.

The first part of this section explains major accounts in the balance sheet of the Thai banking sector. The distribution of these major accounts (especially on the asset side) is investigated in part 2. Part 3 discusses differences in portfolio behaviors of banks incorporated in Thailand and branches of foreign banks. A comparison between relative shares in the total credit of different sectors in the economy and the relative sizes of the sectors in the economy concludes the section.

### 1. Major Accounts in the Balance Sheet of the Thai Banking Sector.

The principal assets and liabilities of the Thai banking sector are listed in the hypothetical consolidated balance sheet shown in Table II-1. The assets of the Thai banking sector are divided into, 7 categories: required reserves (RR), cash and balance with banks (including cash on hand, foreign currencies on hand, and balance with foreign bank and other banks in Thailand) CAB, Loans and Overdrafts (LOV), discount (DIS), private trust receipts (PRT), government securities (GOS) and other assets (OA). The liabilities of these Thai banks include deposits (DEP), borrowing from foreign banks (BOF), borrowing from the Bank of Thailand (BOT) and capital account (CAP). The first three accounts on the liability side represents sources of loanable funds for the Thai banking sector. The capital account, is not directly related to the amount of money the commercial banks could lend to their customers but it is an important

determinant of the ability to expand credits of Thai commercial banks because of the regulation set by the Bank of Thailand that a bank must maintain a capital account equal to a certain percentage of its risk assets.

Table II-1  
Consolidated Balance Sheet of Commercial Banks  
in Thailand

Assets		Liabilities Plus Capital Account	
Required Reserves	RR	Deposits	DEP
Cash and Balances with banks	CAB	Borrowing from the Bank of Thailand	BOT
Loans and Overdrafts	LOV	Borrowing from Foreign Banks	BOF
Discounts	DIS	Capital Account	CAP
Government Securities	GOS		
Other Assets	OA		

Level of deposits in the banking sector is not by itself a good indicator of the extent to which the commercial banks can make use of the fund. A certain percentage of deposits must be kept as required reserves. Besides, total deposits comprises of demand deposits, saving deposits, and time deposits, each of which has different rates of turn-over. To really capture the extent to which the commercial banks can make use of aggregate deposits in the banking sector, same variable must be constructed to measure the lendability of deposits in the banking

sector from the banks' point of view. This variable may be defined as

$$LED = \frac{DEP-RR}{ADT},$$

where LED = variable representing lendability of deposits from commercial banks' point of view

RR = required reserves

and ADT = average rate of deposit turn-over.

The average rate of deposit turn-over is defined as

$$ADT = \left(\frac{DD}{DEP}\right) r_{DD} + \left(\frac{SD}{DEP}\right) r_{SD} + \left(\frac{TD}{DEP}\right) r_{TD},$$

where DEP, DD, SD and TD represent total deposits, demand deposits, saving deposits and time deposits respectively and  $r_{DD}$ ,  $r_{SD}$  and  $r_{TD}$  represent the rates of deposit turn-over for demand deposits, saving deposits and time deposits respectively. The rate of deposit turn-over for each type of deposit is defined as debits to deposits to deposits ratio.

Table II-2 shows the importance of deposits (as represented by the LED variable), borrowing from foreign banks (BOF) and borrowing from the Bank of Thailand (BOT)<sup>1/</sup> as sources of commercial banks' loanable fund from 1962-1973. As expected, the most important source of

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<sup>1/</sup> Borrowing from the Bank of Thailand may be in the form of loans obtained by advanced pledging of government guaranteed securities or rediscount.



Table II-2

Deposits, Borrowing From Foreign Bank, and  
Borrowing From the Bank of Thailand 1962-1973  
(in million baht)

End of Year	Deposits <sup>1/</sup>	Borrowing From Foreign Bank	Borrowing From the <sup>2/</sup> Bank of Thailand
1962	5,590	1,507	104
1963	7,013	1,766	98
1964	8,272	2,171	165
1965	9,467	2,481	244
1966	12,177	2,630	377
1967	13,799	2,564	299
1968	17,168	2,539	398
1969	19,763	2,942	297
1970	23,132	3,208	787
1971	30,209	3,284	1,296
1972	38,245	3,486	1,263
1973	39,624	6,899	2,882

<sup>1/</sup> as represented LED variable

<sup>2/</sup> sum of loan against government securities and rediscount.

Source: Bank of Thailand Monthly Bulletin.

fund for the Thai commercial banks is deposits. As shown in the Table, the deposits adjusted for lendability increased rapidly between 1968 and 1972. The increase resulted from the actual increase in the level of deposits in the banking sector as well as the reduction in the average rate of deposit turn-over due mainly to the increasing share of time deposits in the total. The slow down in the increment of deposits adjusted for lendability in 1973 is due mainly to the increase in the average rate of deposits turnover.<sup>2/</sup> The increase in the rate may be induced by high rate of inflation and political instability after the October 14 Uprising.

Borrowing from foreign banks has been the second most important source of fund for the Thai commercial banks throughout the 1962-1973. The implementation of the Voluntary Foreign Credit Restraint Program to restrict Loans to foreigners by U.S. banks in February 1965 slowed down the flows of this foreign fund to the Thai commercial banks up until 1972. The shortage of fund in the Thai banking sector in 1973 led to rapid increases in the amounts borrowed from foreign banks as well as from the Bank of Thailand as shown by the approximately two-fold increases in the amounts borrowed from these two sources in 1973 from 1972's level

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<sup>2/</sup> The average rate of deposits turnover fell from 1.40 in 1967 to 1.16 in 1972 and then jumps to 1.40 again in 1973 probably as a result of high level of economic activities as the rate of growth of real GNP jumped from 4.0 percent in 1972 to 10.3 in 1973 and the high rate of inflation as the consumer price index for urban area increased by 15.5 and wholesale price index by 20.3 percent for the year.

The amount borrowed from the Bank of Thailand was small prior to 1970. After 1970, the amount borrowed from the Bank of Thailand was substantial but still less than half of the amount borrowed from foreign banks in the corresponding year. The liquidity shortage caused by a big increase in the average rate of turnover in 1973 led to more than two-fold increase in the amount borrowed from the Bank of Thailand during the year.

According to section 10 of the Commercial Banking Act B.E. 2505, a commercial bank shall maintain capital funds in proportion to total assets at a ratio not less than that prescribed by the Bank of Thailand and approved by the Minister (Minister of Finance); such ratio shall not be less than five per centum and not more than fifteen per centum. Total assets used to calculate the ratio shall not include cash deposits with other banks inside or outside the Kingdom, Thai Government securities and any other assets as the Minister may prescribe.

By virtue of the Commercial Banking Act B.E. 2505, Bank of Thailand gave a notice on May 1, 1962 that a commercial bank has to maintain capital fund at not less than 6 percent of its total assets (as defined above). This ratio has been revised to be at not less than 7.5 percent of its total assets as from October 1, 1970, at not less than 9 percent of its total assets as from October 1, 1971. On January 30, 1974, the Ministry of Finance announced in Clause 2 of notification to commercial banks excluding shares and debentures issued by the Bank for Agriculture and Agricultural Co-operatives or Industrial Finance Corporation of

Thailand, loans secured from commercial banks by customers using government securities or government guaranteed securities or debentures or bonds issued by Ministry of Finance to guarantee the principal and interest, bills of exchange issued according to letter of credit opened with a commercial bank for the cost of export of goods, certificates of buffer stock issued according to the law on the control of tin, immovable properties used as a place for business or used by officials and employee of the bank in conducting banking business, total account balances between offices of the same juristic person, liabilities in the exchange of foreign currencies in advance and many other small items from total assets used to calculate capital account-risk assets ratio. This notification, however, does not affect commercial banks' portfolio behavior during the period understudied.

The impact of this portfolio regulation on portfolio behavior of commercial banks can be measured by the variable  $CAR^*$  which is defined as the difference between actual capital account-risk assets ratio and the capital account-risk assets ratio, the commercial banks are required to maintain by law.

Table II-3 shows the actual capital account-risk assets ratio, the capital account-risk assets ratio which commercial banks are required to maintain by law and the difference between the two ratios as measured by  $CAR^*$  variable. The lower the value of this variable, the higher the restrictiveness of this type of regulation would be on commercial banks' ability to expand credits. As shown in column 1 of this table, with the

Table II-3

Capital Account-Risk Assets Ratios<sup>1/</sup>  
1962-1973  
(in percent)

End of Period	(1) Actual Ratio	(2) Require Ratio	(3)* CAR = (1)-(2)
1962	9.37	6.00	3.37
1963	8.44	6.00	2.44
1964	9.63	6.00	3.63
1965	10.00	6.00	4.00
1966	10.36	6.00	4.36
1967	10.48	6.00	4.48
1968	10.45	6.00	4.45
1969	10.50	6.00	4.50
1970	10.45	7.5	2.95
1971	11.02	9.0	2.02
1972	11.48	9.0	2.48
1973	9.99	9.0	0.99

<sup>1/</sup> Capital account used to calculate the ratio comprises paid up capital, statutory reserves, other reserves, net profit after distribution and assets required to be maintained in Thailand by foreign bank branches.

Source: Bank of Thailand Monthly Bullentin.

exception of 1963 the actual capital account-risk assets ratio exhibits an increasing trend throughout the 1962-1972 period. This together with the fact that the required capital account-risk assets ratio remained constant at 6 percent from 1962 to 1969 made the value of the CAR\* variable increased substantially during the 1962-1969 period. The rapid fall in the value of the CAR\* variable in 1970 and 1971 is due entirely to the increase in the required ratio. The Thai banking sector managed to raise its capital account-risk assets ratio and thus the value of the CAR\* variable in 1972. A substantial reduction in the actual ratio caused by a drastic increase in commercial banks' credit expansion in 1973 led to a more than two-fold reduction in the value of the CAR\* variable in this year.<sup>3/</sup>

It is clear from the above discussion that the sudden down turn in the value of the CAR\* variable after 1969 was caused mainly by the Bank of Thailand's action requiring commercial banks to maintain higher capital fund relative to their risk assets. The variation in the CAR\* variable can not thus be taken as determined entirely by the endogenous forces of demand for and supply of commercial banks' credits during the period understudied. During the later part of the period, exogenous forces played a dominant role in determining the value of the CAR\* variable. Therefore, it would not be surprised if the increase in the value

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<sup>3/</sup> It was alleged that a large portion of the increase in commercial banks' credit is used to finance speculative inventory aggravating further the already serious inflationary pressure in the country.

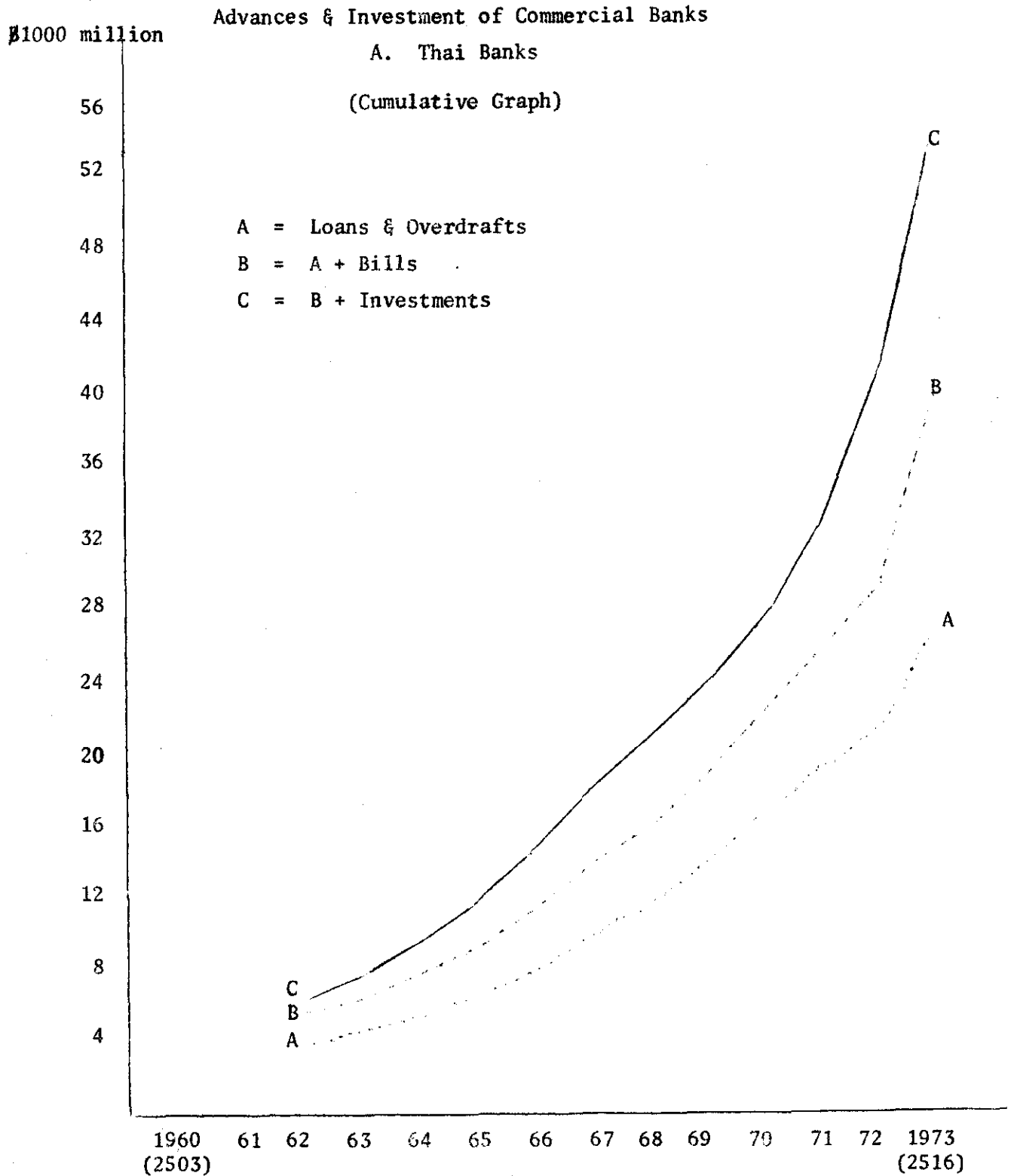
of the CAR\* variable coincide with the reduction in a particular type of credit extended by the commercial banking system since commercial banks may be forced to reduce some risk assets in order to raise capital account-risk asset ratio to a desired level.

On the asset side of the portfolio, the impact of changes in required reserves on portfolio behavior of Thai commercial banks has already been accounted for in the construction of the variable representing lendability of total deposits in the banking sector (the LED variable<sup>4/</sup>). Figure II-1 shows the cumulative graph of the remaining four important assets of the Thai banking sector namely loans and overdrafts, discounts, investments and cash and balances with banks. As shown in the Figure, loans and overdrafts have been the most important assets of the Thai banking sector and accounted for approximately half of the total assets shown in the Figure throughout the 1962-1973 period. Figure II-2 indicates that nearly all of the assets classified as investments are government bonds and treasury bills. (Other investment consists mainly of government guaranteed securities). Since in Thailand, commercial banks can borrow from the Bank of Thailand by pledging government or government guaranteed securities as guarantee in advance within the amount agreed upon by the two sides, Thai government securities, including government guaranteed securities government bonds and treasury bills, are thus considered to be

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<sup>4/</sup> Fixed assets accounts for nearly all of 'Other Assets' and thus will not be analyzed here.

Figure II-1



Note: Monthly Average.

Source: Bank of Thailand Monthly Bulletin.



Figure II-1

Advances & Investment of Commercial Banks

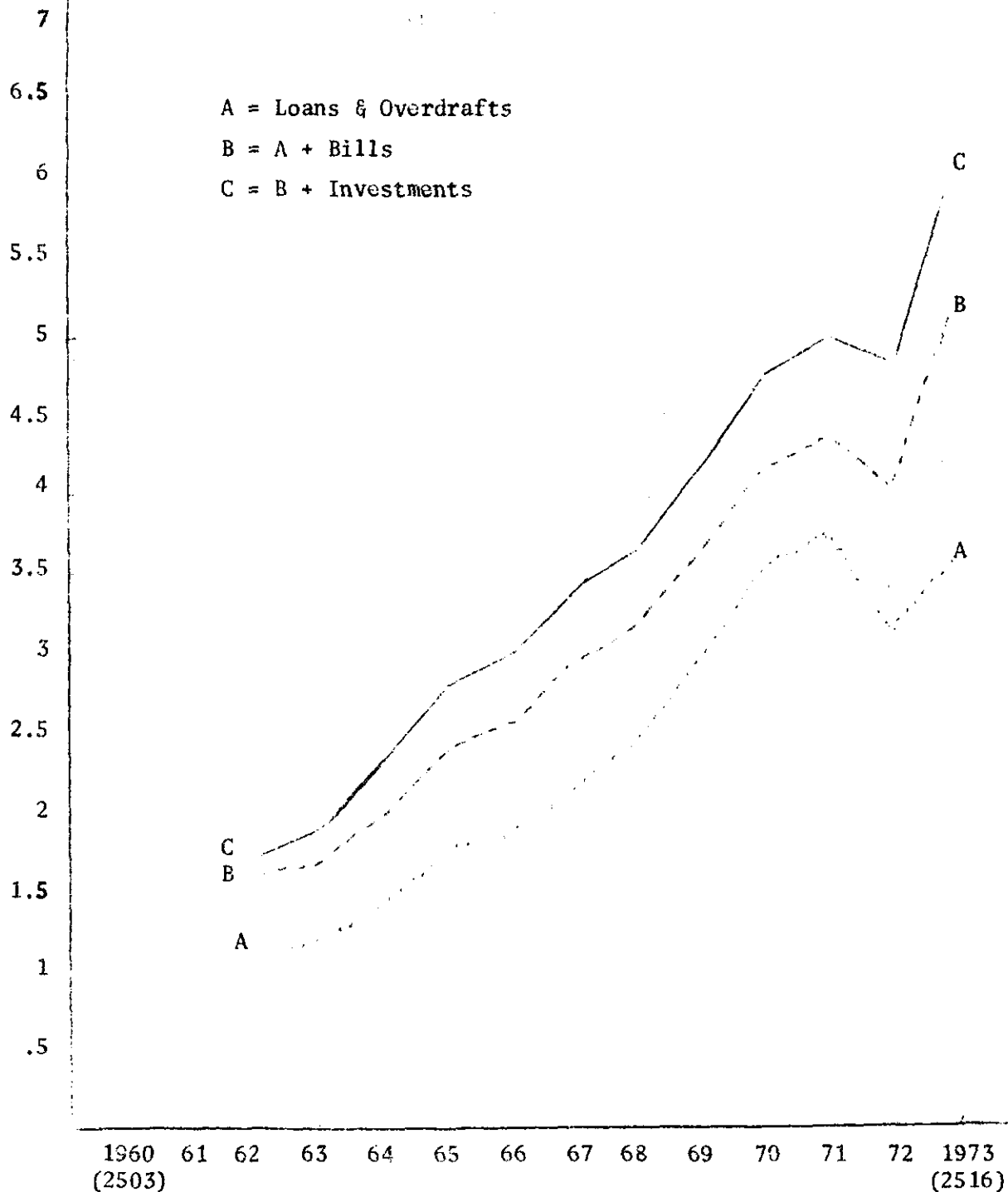
฿1,000 million

B. Foreign Banks  
(Cumulative Graph)

A = Loans & Overdrafts

B = A + Bills

C = B + Investments



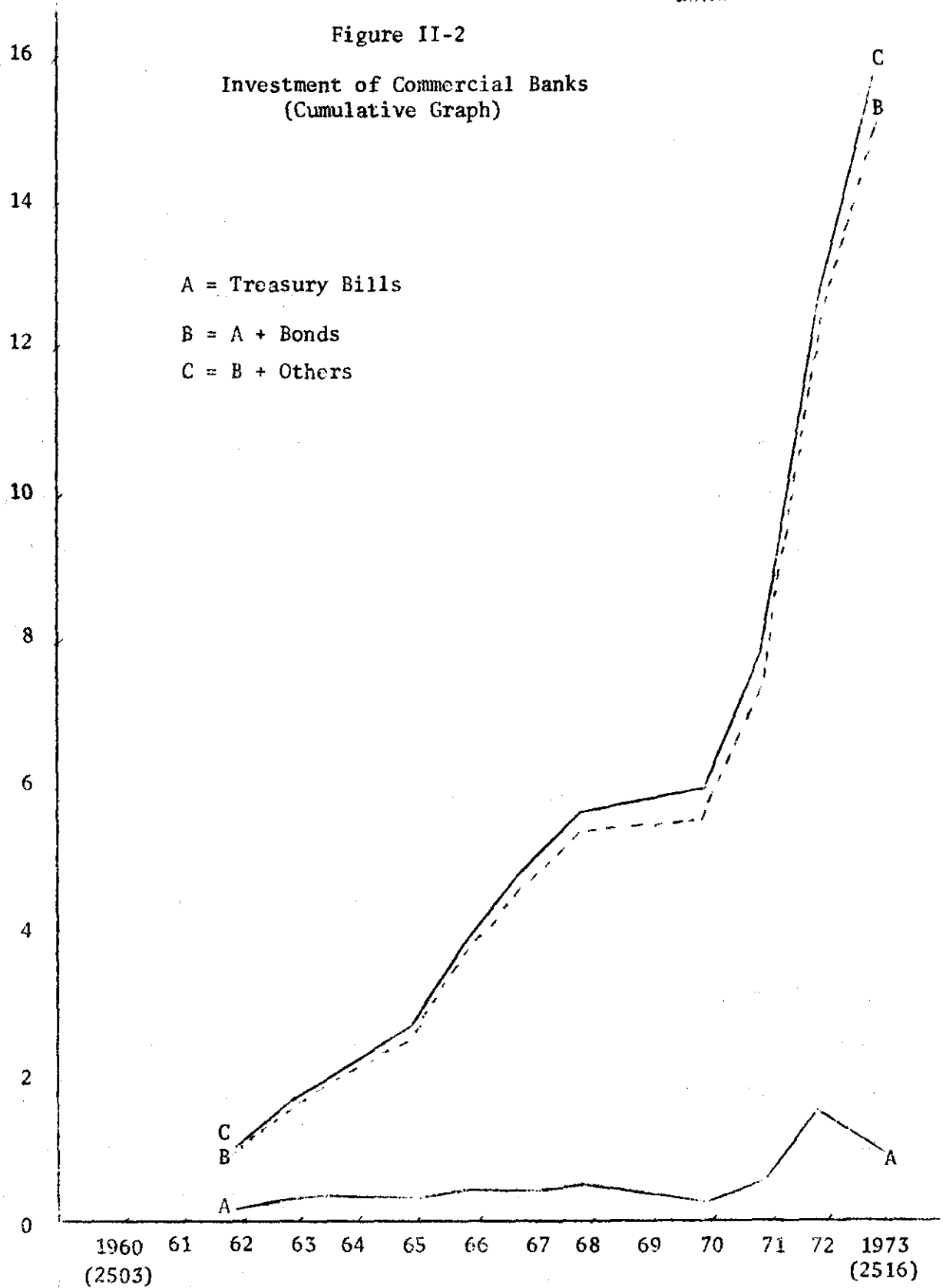
Note: Monthly Average.

Source: Bank of Thailand Monthly Bulletin.

฿1000 million

Figure II-2

Investment of Commercial Banks  
(Cumulative Graph)



Note: Monthly Average.

Source: Bank of Thailand Monthly Bulletin.

very liquid assets. It is thus appropriate to treat the sum of cash on hand and balances with banks and investments as liquid assets.<sup>5/</sup>

## 2. Distribution of Major Asset Accounts in Commercial Banks' Portfolio.

This part is divided into 3 subsections. The first subsection explains the distribution of loans and overdrafts among various sectors of the economy. The distribution of discounts credits to export, import and domestic sectors is discussed in the second subsection. The third subsection investigates the distribution of total commercial bank credits to facilitate domestic trade, foreign trade and for industrial undertakings.

### A. Distribution of Loans and Overdrafts Among Various Sectors of the Economy.

Among various types of credit extended by the commercial banking sectors to the private sector, loans and overdrafts are considered to be of longest in maturities and thus likely to have larger effect on capital formation (including inventory) than any other types of credit supplied by commercial banks. Figure II-3 shows the distribution of this type of credits among various sectors of the economy during the 1962-1973 period. It is clear from the cumulative graph in this figure that with the exception of agriculture, mining, export and imports sectors, loans and overdrafts extended to all other sectors by the banking system have shown substantial increases in volumes. The graph indicates that major

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<sup>5/</sup> The Bank of Thailand defines liquid assets as the sum of government (including government guaranteed, securities and cash and balances with banks as used in this study).

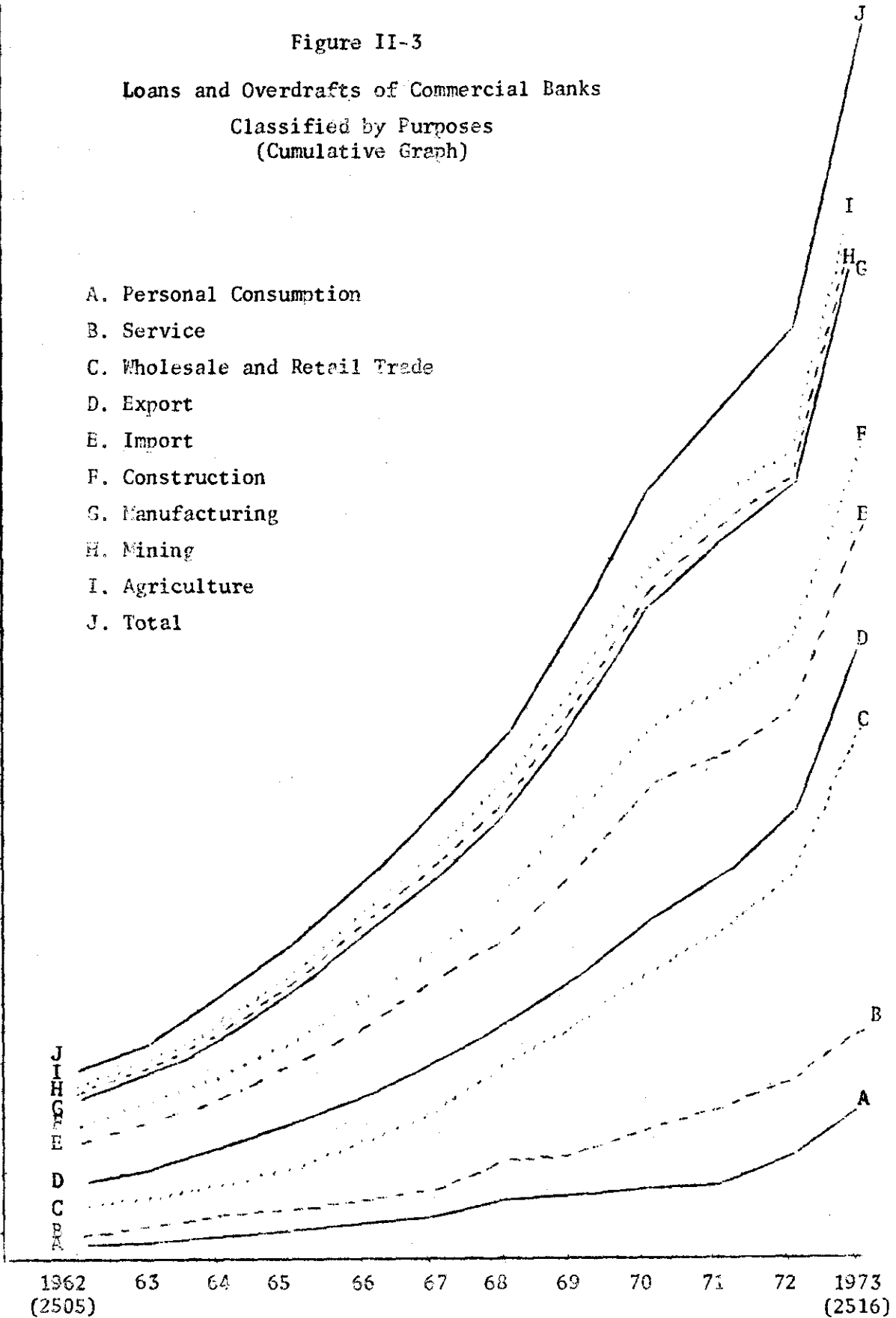
฿100 million

Figure II-3

Loans and Overdrafts of Commercial Banks  
Classified by Purposes  
(Cumulative Graph)

344  
336  
328  
320  
312  
304  
296  
288  
280  
272  
264  
256  
248  
240  
232  
224  
216  
208  
200  
192  
184  
176  
168  
160  
152  
144  
136  
128  
120  
112  
104  
96  
88  
80  
72  
64  
56  
48  
40  
32  
24  
16  
8

- A. Personal Consumption
- B. Service
- C. Wholesale and Retail Trade
- D. Export
- E. Import
- F. Construction
- G. Manufacturing
- H. Mining
- I. Agriculture
- J. Total

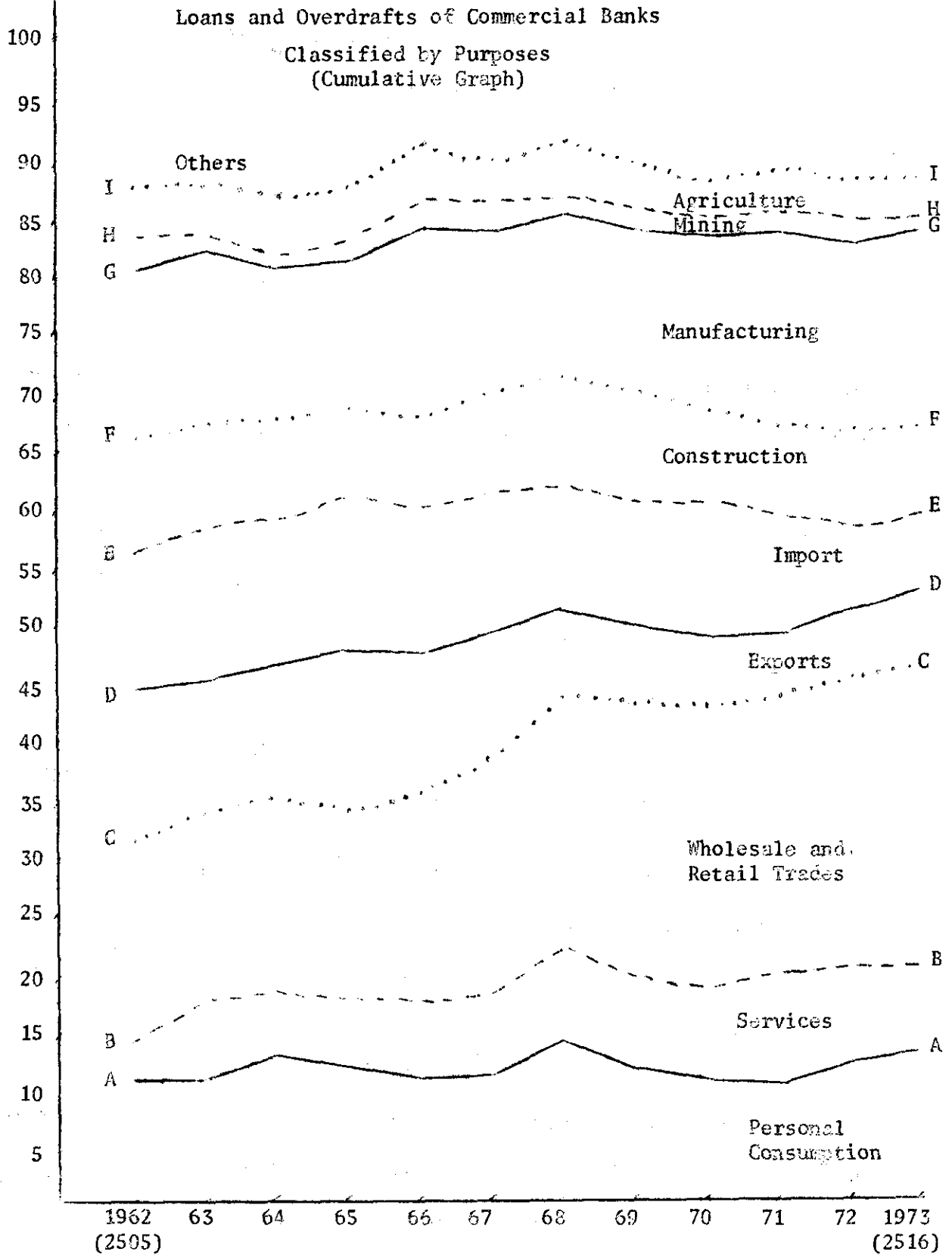


Source: Bank of Thailand Monthly Bulletin

portions of this type of credits has been used to finance trades, domestic and foreign. Although credits extended to finance export and import trades has been stagnant or shown some decreasing trend after 1970, the volume of this type of credits received by the foreign trade sector remains substantial being smaller in volumes only to that extended to finance retailed and whole-sale trades. It is clear from the graphs that credits extended to finance industrial undertakings, wholesale and retailed trades, personal consumption, services and other business (mainly banking and other financial business) have shown substantial increasing trends throughout the period understudied with rapid increase after 1970.

Figure II-4 shows the percentage distribution of loans and overdrafts over different sectors of the economy. The Figure confirms what have already been said above. The relative shares of this type of credits received by the import and export sectors fell almost consistently throughout the 1962-1973 period. In 1962, these foreign trade sectors received approximately 35 percent of loans and overdrafts extended by the commercial banks. By 1968, the share was reduced to 25 percent of total credits and was reduced further to approximately 15 percent of total credits by 1973. The share of the foreign trade sectors in total loans and overdrafts extended by the banking sector, therefore, fell by approximately 20 percent over a twelve-year period. The fall in the share of the two foreign trade sectors has been accounted for mainly by the gain in the share of loans and overdrafts received by the wholesale and retailed trade sector. In 1962, this domestic trade sector received approximately

Figure II-4



Note: in percent

Source: Bank of Thailand Monthly Bulletin.

15 percent of this type of credits. The share of wholesale and retailed trade sector in this type of credits rose to approximately 20 percent by 1968 and by 1973 it accounted for more than 25 percent of total loans and overdrafts. It is clear from the above discussion that approximately half of the twenty percent fall in the share of loans and overdrafts received by the foreign trade sectors has been offsetted by the increase in the share of the domestic trade sector. Figure II-4 indicates that the remaining half has been offsetted mainly by the gains in the share of loans and overdrafts extended to finance personal consumption, services and industries. The shares in the total loans and overdrafts received by agriculture, mining and construction industries show small decreasing trends. Other industries, mainly banking and other financial business, shows a small gain in relative share.

Several factors may be thought of as responsible for a drastic fall in the relative share of total loans and overdrafts received by the foreign trade sectors. Among them are:-

- (1) A switch from a long term to a short term credits in the finance of foreign trade,
- (2) A fall in the relative size of foreign trade sectors to domestic sector
- (3) During the 1962-1973 period, the importance of branches of foreign banks which concentrate mainly in financing foreign trades in the Thai financial scene has been reduced to a relatively insignificant role. Banks incorporated in Thailand becomes the only dominant force in the Thai

financial market and their operation has evolved gradually into a modern line of commercial banking

(4) The appearance of the new important financier of foreign trade, the finance company.

Figure II-5 shows the amount outstandings of domestic, import, export bills discounted by commercial banks and private trust receipts.<sup>6/</sup> The cumulative graphs in this figure illustrates that total discounts of import and export bills in 1975 was approximately 3,600 million baht, nearly four times the amount discounted in 1962 and twice that of 1970. During the 1962-1973 period, credits extended to importers in the form of private trust receipts also increased tremendously, from approximately 700 million baht to more than 3,600 million baht. A switch from long-term to shorter term credits in the financing of imports must play some part in a reduction in the relative share of total loans and overdrafts received by the importers during the period as well as in a small reduction in the absolute amount of this type of credits received by the importers from 1970 to 1972. However, even in the case of private discounts, the relative share of import and export bills was falling after 1965, from a peak of approximately 65 percent of total bills discounted to merely 35 percent of the total in 1973. These evidences are presented in Figure II-6. The fall in the relative shares of import bills in the total amount of bills discounted is explained partly by the increase in credits received by the importers

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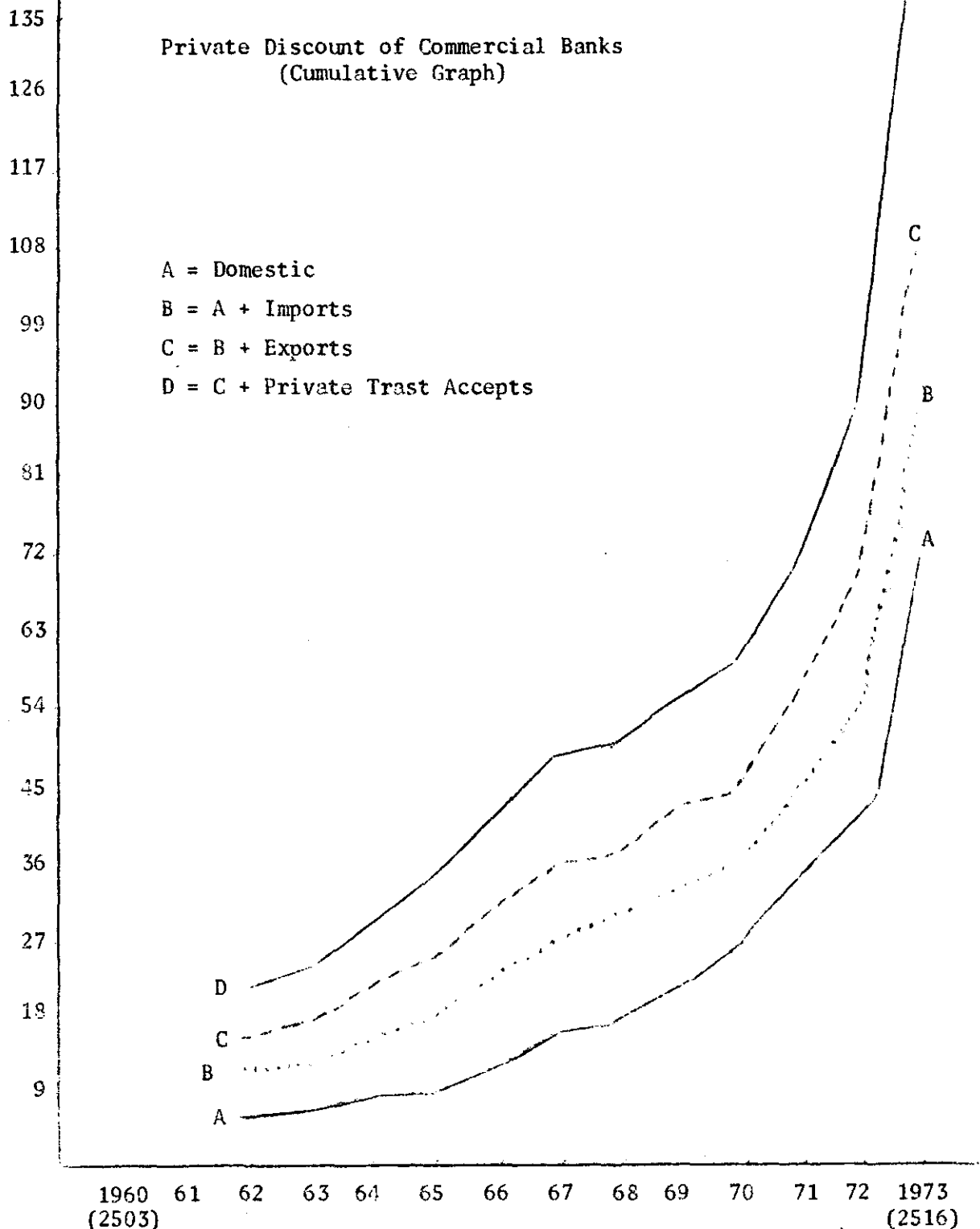
<sup>6/</sup> Private trust receipts are short-term credits extended to importers after the imported products have reached Thailand.



฿100 million

Figure II-5

Private Discount of Commercial Banks  
(Cumulative Graph)



Note: Monthly Average.

Source: Bank of Thailand Monthly Bulletin.

Figure II-6

Distribution of Bank Discounts



Note: in percent

Source: Bank of Thailand Monthly Bulletin.

in the form of private trust receipts and rising interest rates in the important money markets abroad especially in the United States and the Eurodollar markets after 1968 and restrictions on lending to foreigners by banks in the United States under the Voluntary Foreign Credit Restraint Program implemented by the U.S. government in 1965.<sup>7/</sup>

Despite a strong measure taken by the Thai government to reduce imports in order to correct balance of payments difficulties in mid 1970,<sup>8/</sup> and the subsequent de factor devaluation of the baht following the two U.S. dollar devaluations, Thai import sector has maintained its relative size compares to the other sectors of the economy. Figure II-7 confirms this assertion. In case of export, Thai export had been stagnant and the share of export sector in GNP had been falling for most of the period

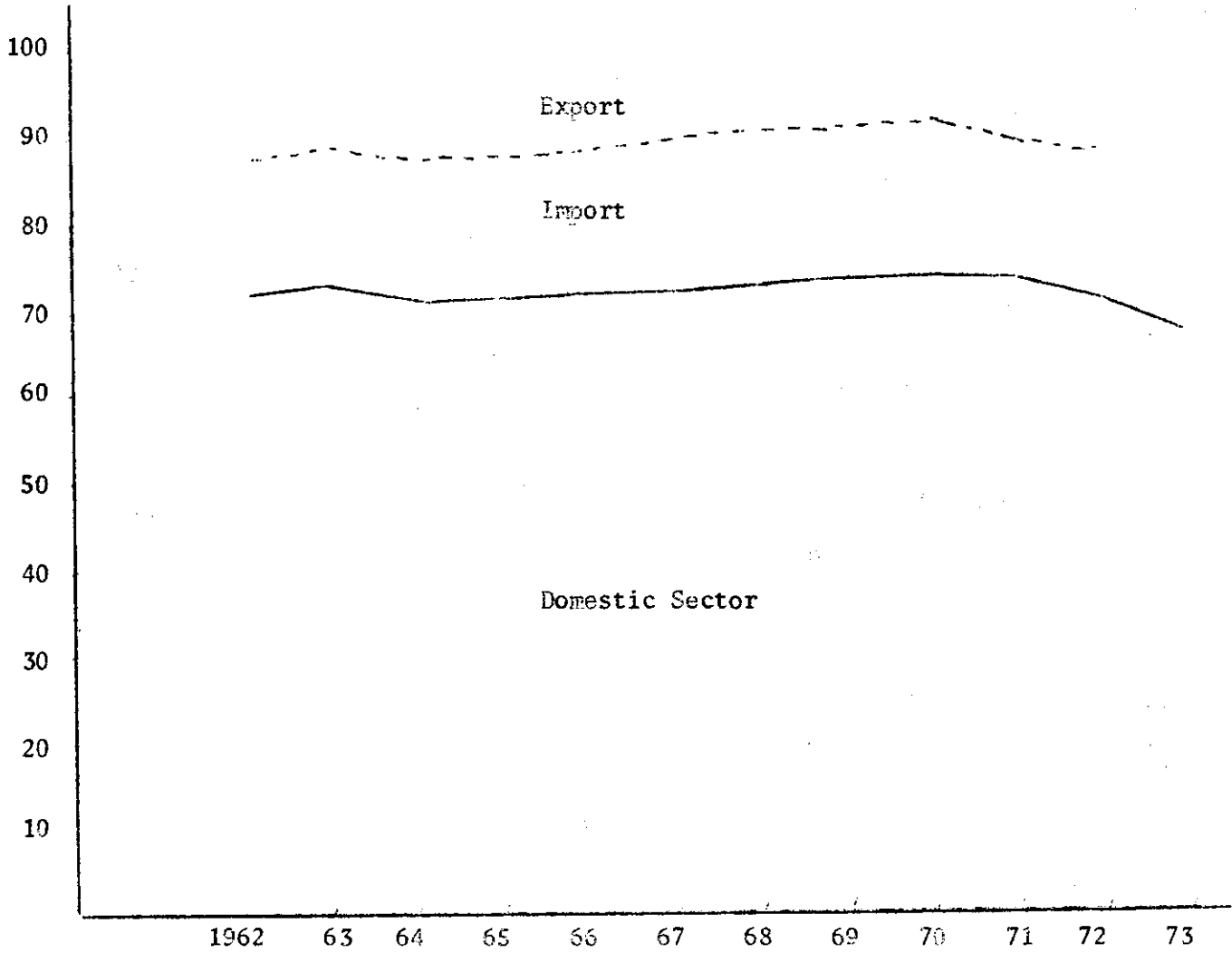
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<sup>7/</sup> In an attempt to stem the outflows of U.S. financial capital to foreign countries, the U.S. government asked each bank having substantial foreign claims to impose a voluntary ceiling on the size of its foreign assets in February 1965. For details of the Voluntary Credit Restraint Program, see Nimit Nontapunthawat, "Financial Capital Flows in the Balance of Payments of Thailand," an unpublished Ph.D.'s Thesis Purdue University.

<sup>8/</sup> Thailand faced with small balance of payments deficit of 914 million baht in 1969. The deficit, however, grew quickly. During the first six months of 1970, balance of payments deficit amounted to 683 million baht which is more than 3 times of the deficit for the corresponding period of 1969. This development caused great alarm among the authorities concerned and subsequently led to the increases of import duties on nearly 200 items.

Figure II-7

Relative Sizes of Domestic and Foreign Sectors  
(Cumulative Graph)



Note: in percent

Source: Bank of Thailand Monthly Bulletin

understudied except the last three years. The bumper crop in 1971 and the commodity boom following the world wide crop failure and probably also the de facto devaluation of the baht stimulated exports and raised the share of this sector in GNP bank to the 1962's level.

Figure II-7 indicates that the fall in the relative size of import sector should not be used to explain the reduction in relative shares of total loans and overdrafts received by this sector and stagnation of this type of credits extended to the importers but there are evidence that export stagnation may be one of the factor accounting for the fall in the share of bank credit received by this sector.

Table II-4 shows relative shares of Thai banks and foreign branches in total deposits and total credits in 1962, 1965, 1968, 1971 and 1973. It is clear from this table that the relative shares of foreign branches in both the total deposits and the total credits fell continuously throughout the 1962-1973 period. The relative share of foreign branches in total deposits fell more rapidly than their share in the total credits. In 1962, the share of foreign branches in total deposits was 17 percent. It fell to a mere 6.3 percent of total deposits in 1973 or nearly three fold reduction. The fall in relative share of foreign branches was less dramatic in case of relative share in total credits. In 1962, credits extended by branches of the foreign banks accounted for 20.8 percent of the total. It was, reduced to 10.5 percent of the total in 1973 or only two-fold reduction. The other important feature of difference in portfolio behaviors of Thai banks and foreign banks which can be derived from

Table II-4

Relative Positions of Thai Banks and Foreign Branches  
As Measured by Their Relative Shares in  
Total Deposits and Total Credits

(in millions of baht) (numbers in parenthesis are relative shares)

End of Year	Total	Deposits		Total	Credits	
		Thai Banks	Foreign Branches		Thai Banks	Foreign Branches
1962	7,789 (100)	6,464 (83.0)	1,325 (17.0)	8,733 (100)	6,917 (79.2)	1,816 (20.8)
1965	13,437 (100)	11,827 (88.1)	1,610 (11.9)	15,520 (100)	12,480 (80.4)	3,040 (19.6)
1968	23,738 (100)	21,367 (90.0)	2,371 (10.0)	25,972 (100)	22,084 (85.0)	3,888 (15.0)
1971	37,243 (100)	34,360 (92.3)	2,883 (7.7)	40,270 (100)	35,075 (87.1)	5,195 (12.9)
1973	57,522 (100)	53,903 (93.7)	3,619 (6.3)	66,811 (100)	59,767 (89.5)	7,044 (10.5)

Sources: Bank of Thailand Monthly Bulletin.

Table II-4 is that total credits-total deposits ratio of foreign branches is always higher than that of Thai banks. In the opinion of the author, this is due mainly to the fact that foreign branches, have higher accessibility to foreign money markets than most of the Thai banks and thus can afford to keep lower excess reserves than most of the Thai bank. Rozental, however, believes that a relatively low total credits-total deposits ratio in the case of Thai banks is due mainly to the fact that most of the Thai bankers have other business besides being bankers. His reasoning is as follow:-

"A banker who is at the same time the manufacturer of one product and the importer of yet another could, for instance, feel that a vigorous expansion of his earning assets, while possibly indicated from a banking stand point, would ran counter to his manufacturing or trading interests. Even if a loan or an advance were not made to a direct competitor, it might be made to one who would eventually competing with some of the non-banking activities of the lenders....." (p.151)<sup>9/</sup>

3. Differences in Portfolio Behaviors of Banks Incorporated in Thailand and Branches of Foreign Banks.

In the past commercial banks in foreign countries set up branches in Thailand with the primary purpose of financing trades between Thailand and their countries, virtually all of the credits extended by these branches

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<sup>9/</sup> Alek A. Rozental, "Finance and Development in Thailand," Praeger Publishers, 1970.

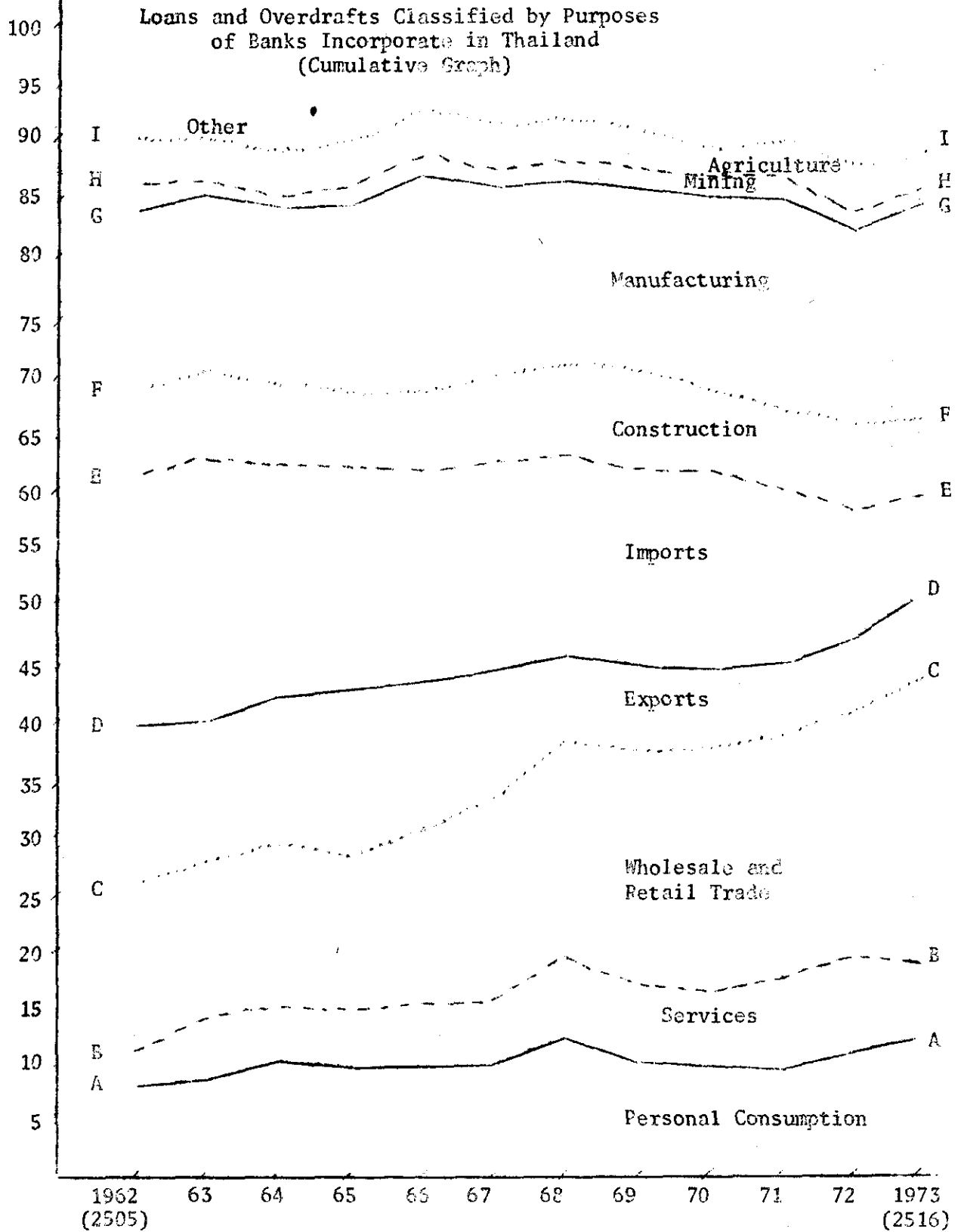
were to importers and exporters. More recently, branches of foreign banks have been extending credits to domestic sector as well but as late as 1970, there are evidences that more than half of total credits extended by foreign branches were to the foreign trade sector.

Figure II-8 shows the percentage distribution of total loans and overdrafts extended by banks incorporated in Thailand from 1962-1973. The similarity between the cumulative graphs in this figure and those in Figure II-4 implies a complete domination of banks incorporated in Thailand in the bank credit market.

Figure II-9 shows the percentage distribution of loans and overdrafts extended by banks incorporated abroad (foreign banks). It is clear from the cumulative graphs in this figure that in case of foreign banks, credits extended to importers and exporters, although shows a declining trend in the relative share of the total, continue to account for a very large portion of the total even in 1973. In 1962, loans and overdrafts extended to importers and exporters together accounted for approximately 75 percent of the total in the case foreign branches. In the same year, banks incorporated in Thailand gave importers and exporters less than 25 percent of total loans and overdrafts extended. Importers and exporters received nearly 40 percent of total loans and overdrafts extended by branches of foreign banks in 1973. This, however, is very high in comparison to a share of approximately 15 percent in the case of banks incorporated in Thailand.

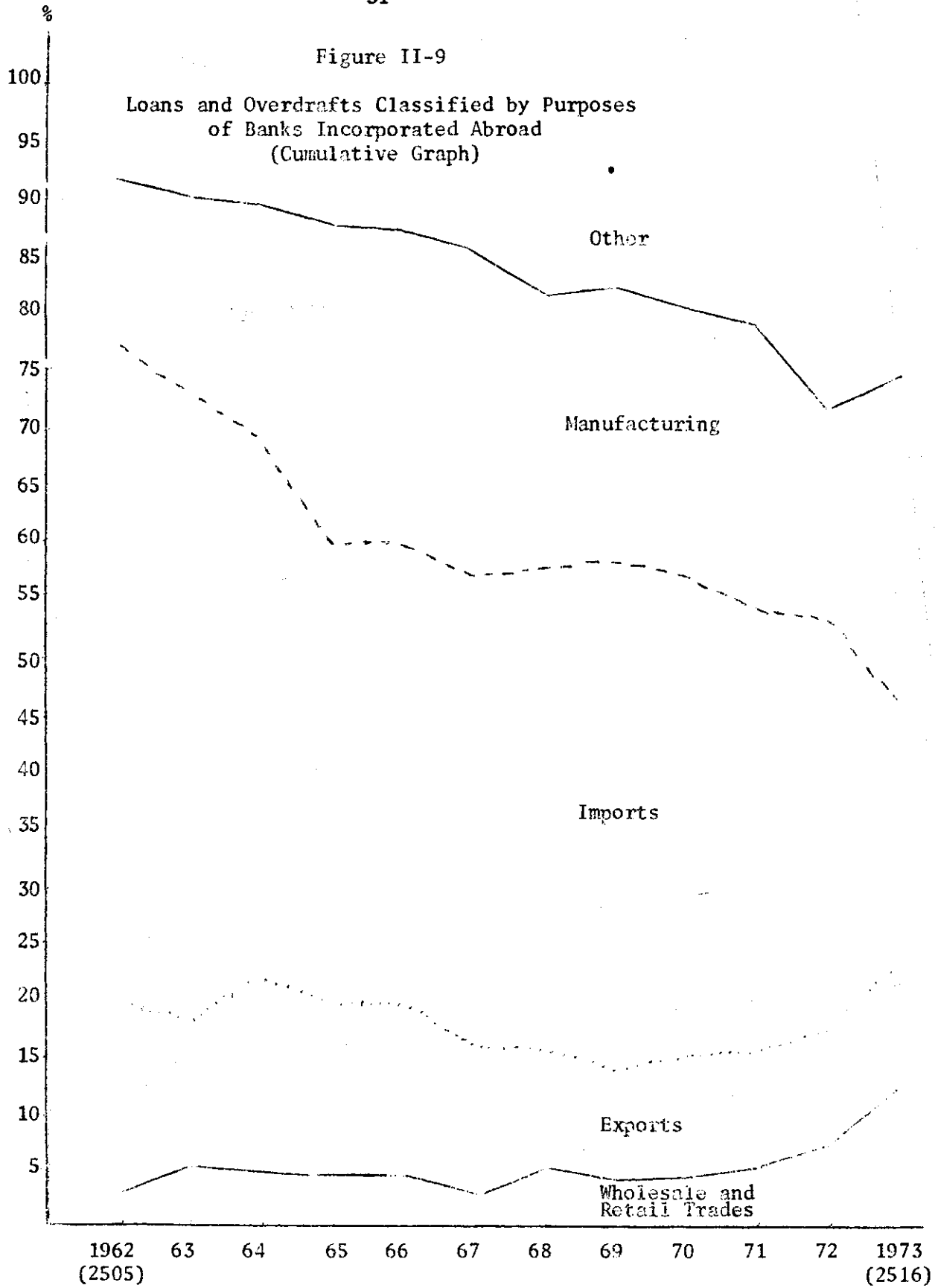


Figure II-8



Note: in percent

Source: Bank of Thailand Monthly Bulletin.



Note: in percent

Source: Bank of Thailand Monthly Bulletin

The distribution of total discounts of domestic and foreign bills between Thai banks and foreign branches has not been compiled, but there are evidences that relative share of foreign bills in total discounts is higher in the case of foreign branches than in the case of Thai banks.

Figure II-9 also indicates that in case of foreign branches loans and overdrafts are extended mostly for the purpose of financing imports, exports, and industrial under takings, and among the three, financing of import trade is dominant.

The above discussion suggests that the declining role of foreign branches in the Thai financial market must be one of the important factors, besides a switch to a shorter term financing, behind the drastic fall in relative share in total loans and overdrafts received by importers and exporters as well as a small reduction in the absolute amounts of this type of credits received by the foreign trade sectors after 1970.

#### 4. Relative Shares in the Total Credits and Relative Sizes of Various Sectors in the Economy.

Distribution of total bank credits among various sectors of the economy has not been compiled until 1969 even though distribution of the major type of bank credits, loans and overdrafts, can be traced back to as early as 1962. Moreover, classification of the economy into various sectors in the compilation of GDP and GNP and in the distribution of bank credits are not exactly matched. The purpose of the discussion on

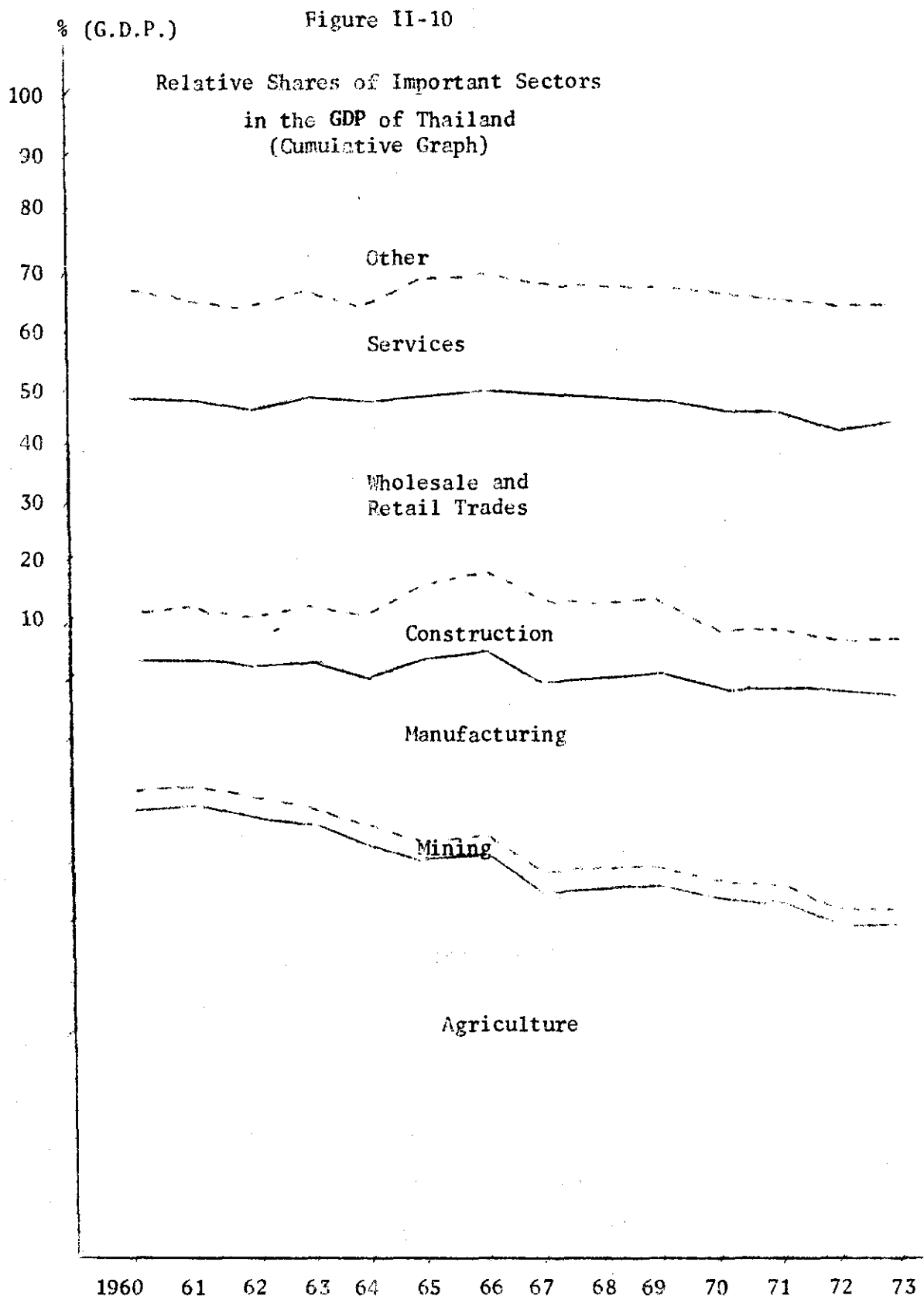
relative shares in the total credits as compare to the relative sizes of various sectors in the economy is to point out some important characteristics of commercial banks' credit expansion in the 1962-1973 period.

Figure II-10 illustrates relative sizes of various sectors of the Thai economy. As can be seen from the cumulative graphs in this Figure, the agricultural sector continues to be the biggest sector of the Thai economy, although its relative size established a declining trend throughout the period. It is also clear from the graph that the fall in the relative size of the agricultural sector has been offsetted largely by the increase in the relative size of the manufacturing sector. The relative sizes of all other sectors do not establish any apparent trends.

A visual comparison of relative sizes of various sectors of the economy in Figure II-10 with the relative shares of these sectors in the total amount of total loans and overdrafts extended by the Thai banking sectors reveals several interesting features.

Firstly, the agricultural sector which accounts for more than 30 percent of the economy for most of the years during the period has never received more than 5 percent of this major type of bank credits. From the graphs, it is pretty clear that a fall in the relative size of the agricultural sectors induced a decline in the share of agricultural sector in total loans and overdrafts as well.

Secondly, the increase in the relative size of the manufacturing sector induced an increase in the relative share in total credits



Note: in percent

Source: Bank of Thailand Monthly Bulletin.

received by this sector less than proportionally.

Thirdly, the relative shares in the total credits of manufacturing, construction and services sectors have been greater than their relative sizes in G.D.P.

Fourthly, a declining trend in the relative size of wholesale and retail trade sector during the 1962-1966 period coincides with a period of stagnation in the relative share of this sector and the expansion of this domestic trade sector from 1967 to 1973 leads to drastic increase in the relative share of this sector in total loans and overdrafts extended by the banking sector.

A comparison of Figure II-10 and Figure II-4 uncovers one striking feature, relative share of the sector in the total credits and its trend seem to move in the same direction with relative size and changes in the relative size of that sector in the G.D.P. A demand determined model of bank portfolio behavior seems to be appropriate in explaining the distribution of bank credits among various sectors of the economy.

A drastic contrast between the relative size of the agricultural sector in the G.D.P. and the relative share of total loans and overdrafts received by this sector seems to support the accusation that Thai commercial bank has been reducing or making little attempt to extend credit to the agricultural sector especially the farmers, leaving them at the mercy of money lenders in the village. The blame, however, should not be put entirely on the shoulder of commercial banks. There are many factors

which may be responsible for small share in the total banking credits received by the agricultural sector besides little effort taken by commercial banks to give credits to the farmers. Among them are the small producer or small-holder type of agricultural sector in Thailand and the negligence on the part of government itself to provide facilities for commercial banks to make it feasible for banks to extend credits to the farmers without incurring unreasonably high administrative cost and unacceptably high risk by commercial banks' standard. Moreover, it is true in any country that agricultural sector received less than proportional share of total banking credits in comparison to credits received by the other sectors. In most countries credits to farmers are usually extended by the institutions set up by the government for this particular purpose rather than private institutions like commercial banks.

Finally, the above analysis seems to suggest that in this so called "Modern Phase" of the commercial banking in Thailand, Thai commercial banks, especially the domestically incorporated banks, have expanded their activities beyond providing accommodation to exporters, importers and wholesale traders. It is true that in case of short-term credits, classified in the balance sheet as discounts and private trust receipts, the credits are used mainly to finance foreign and domestic trades but

this is the case even for commercial banks in the most advanced countries of the world. In the case of longer-term credits, loans and overdrafts, less than 50 percent of the total is extended for trade financing purpose throughout the 1962-1973 period. The share of the foreign and domestic trade sectors fell from approximately 50 percent of the total in 1962 to less than 40 percent of the total in 1973. (See figure II-4). However, even at the end of 1973, more than 50 percent of total bank credits are used to finance trade both domestic and foreign trades. This, however is not unexpected since the name of the institution "commercial bank suggests that its main function is to finance "commerce".



### III. The Theoretical Framework

The purpose of this chapter is to construct a portfolio behavior model which can be used to explain credit expansion of the Thai banking sector and the effect of financial capital flows on the credit expansion behavior. There are two competing hypotheses regarding bank portfolio behavior. They are the accommodation principle implied in the commercial loan theory of banking and the profit maximizing principle which underlined recent developments in bank portfolio theory and research. Under the profit maximizing principle, the individual commercial bank is viewed as an economic unit whose goal is to maximize (long-run) profit. Given its net-worth, its utility function and characteristics and distribution of its liabilities, the commercial bank would try to structure its portfolio of assets in such a way as to yield the maximum return subject to the above constraints. The distribution of its asset portfolio will depend, among other things, on the costs of liabilities and returns on assets. The accommodation principle of commercial bank behavior holds that proper banking practice is to accommodate the legitimate demands of business, commerce and production. The accommodation principle **implies that the demand for bank loans determines bank portfolio behavior more than any things else.**

The model to be constructed in this study will be based on the demand determined criterion of bank portfolio behavior as specified in the accommodation principle. Several reasons may be cited in support of basing the model on this principle.

Firstly, Thai commercial banks are subjected to ceiling rate regulations on both the earning asset instruments and deposit liabilities and the ceiling rates are binding on both sides of the portfolio for almost all times. This makes it almost impossible for commercial banks to adjust the rates they charge their customers according to the demand and supply of loanable funds as well as adjusting the rates paid to their depositors on various types of deposits to achieve the desired level of deposits. The only action, the commercial banks can take to affect the size or the composition of their portfolios is to turn down applicant for loans when they are in short of reserves or to go out soliciting loans from prospective credit-worthy customers when they have excessive reserves. They can not vary their lending rates on various types of credits to attract prospective borrowers or to discourage them from borrowing. Variation of lending rates on various types of bank credits can not also be used to affect the distribution of total credits. Moreover, there is question on the viability of turning down applicants for loans from prime customers and the banks can go after the prospective borrowers only when demand for loans already exists. In case of deposits, an individual bank can improve its service to attract more deposits from other banks but little can be done in case of banking sector as a whole. Under this circumstance, commercial banks' portfolio behavior has little relation to the rate of interest.

Secondly, little information on the interest rates, Thai commercial banks actually charge their customers on various types of credit has been made public. There are evidence, however, that the rates are

equal to or a bit below the ceiling rates specified by the Bank of Thailand. Table III-1 shows the structure of the ceiling rates specified by the Bank of Thailand on various types of commercial banks' debits and credits. As can be seen in the Table, during the 1962-1973 period the Bank of Thailand rarely changes the structure of the ceiling rates. The major changes occurred only in 1966 and 1972. The structure of ceiling rates on various types of commercial banks' credits and debits together with the reason pointed out earlier indicates that in case of Thai commercial banks both lending rates and borrowing rates are behaving more as parameters than as variables. Moreover, the change in ceiling rates may not have significant impact on bank lending behavior, because for most of the cases the spread between deposit rates and lending rates have been maintained. Both the lending rates and the deposit rates of Thai commercial banks are thus likely not the major determinant of portfolio behavior of Thai commercial banks.

This section is divided into 3 parts. Part I investigates factors which influence total volume of bank credits and constructs the equation explaining total lending of the banking sector. Factors affecting distribution of total lending among various types of bank credits and the construction of equations explaining these component equations are dealt with in part II. Part III discusses distribution of each type of credit among different sectors of the economy and the equations purport to explain the distribution.

Table III-1 Structure of Interest Rates

(Per cent per annum)

	End of											
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
A. Bank of Thailand												
Loan Rate	8	8	8	7	7	7	7	11	9	9	8	10
Rediscount Rates on:												
Export bills	5	5	5	5	5	5	5	5	5	5	5	5
Bills on raw materials for industrial use	-	5	5	5	5	5	5	-	-	-	-	-
Bills on sales on credit of industrial products	-	-	5	5	5	5	5	-	-	-	-	-
Bills arising from industrial under- takings	-	-	-	-	-	-	-	5	5	5	5	5
Bills arising from the purchase of agricultural products	-	-	-	-	-	-	-	-	-	5	5	5
Agricultural bills	-	-	-	-	-	-	7	7	7	7	5	5
B. Commercial Banks												
"Call money" rate	6-12	6-12	6-12	6-12	6-12	6-12	7-10	7-11	9-10	9-10	7-8	9.3
Loans and Overdrafts												
Loans for exports	12	10	10	10	9	9	9	9	9	9	8½	8½

Table III-1 (Continued)

(Per cent per annum)

	End of											
	1962	1963	1964	1955	1966	1967	1968	1969	1970	1971	1972	1973
Loans of industrial enterprises against collateral of immovables and movables	15	15	15	15	12	12	12	12	12	12	11½	11½
Others	15	15	15	15	14	14	14	14	14	14	14	14
Discount Rates on:												
Commercial bills	15	15	15	15	14	14	14	14	14	14	14	14
Export bills	12	10	10	10	9	9	9	9	9	9	8½	8½
Bills on raw materials for industrial use	15	15	15	15	10	10	10	10	10	10	9½	9½
Bills on sales on credit of industrial products	15	15	15	15	10	10	10	10	10	10	9½	9½
Export bills <sup>1/</sup>	7	7	7	7	7	7	7	7	7	7	7	7
Bills on raw materials for industrial use <sup>1/</sup>	-	7	7	7	7	7	7	-	-	-	-	-
Bills on sales on credit of industrial products <sup>1/</sup>	-	-	7	7	7	7	7	-	-	-	-	-
Bills arising from industrial undertakings	-	-	-	-	-	-	-	7	7	7	7	7
Bills arising from the purchase of agricultural products <sup>1/</sup>	-	-	-	-	-	-	-	-	-	7	7	7

Table III-1 (Continued)

(Per cent per annum)

	End of											
	1962	1963	1964	1965	1966	1967	1968	1969	1970	1971	1972	1973
Agricultural bills <sup>1/</sup>	-	-	-	-	-	-	12	12	12	12	10	10
Deposits												
Demand deposits	0-½	0-½	0-½	0-½	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$
Demand deposits (subject to a maximum drawing of 4 cheques per month)	4½	4½	3	3	-	-	-	-	-	-	-	-
Savings deposits	4½	4½	4½	4½	3½	3½	3½	3½	3½	3½	3½	3½
Time deposits:					$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$
Less than 3 months	5	½	½	½	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$	$\frac{1}{100}$
3-6 months	6	5	5	5	5	5	5	5	5	5	5	5
6-12 months	8	6	6	6	6	6	6	6	6	6	6	6
12 months and over	8	7	7	7	7	7	7	7	7	7	7	7
Foreign currency deposit	-	-	-	-	-	-	-	12	12	12	12	12

<sup>1/</sup> Applicable to those bills rediscounted at the Bank of Thailand.

A. A Structural Equation for Total Lending of Commercial Banks in Thailand.

Under the accommodation principle and under the restrictions governing commercial banks operation discussed above, total volume of bank lending depends mostly upon the availability of lendable funds in the banking system and demand condition for bank credit in the market. The availability of lendable funds in the banks depends, among other things, on the amount of deposits in the banking sector, the distribution of total deposits among demand, saving and time deposits, the required reserves ratio specified by the Bank of Thailand, the ability to secure loans from the Bank of Thailand as well as from commercial banks abroad, the existing liquid assets in the banking system and the difference between actual capital account-risk assets ratio and the required ratio as specified by the Bank of Thailand. Demand for bank credits in the market depends upon the level of economic activities in the market which can be gauged either by GNP or GDP (Gross Domestic Product) and the availability of lendable funds from the alternative sources. In the case of Thailand, until very recently, the only alternative source of credits is from the unorganized market on which little study has been made and no quantitative information can be obtained. Credits extended by finance companies, most of them are affiliates of commercial banks became sizable only after 1971. In 1972, credits extended by all finance companies amounted to 4,700 million baht which is only 10 percent of total bank credits in that year. Commercial banks can thus be taken as the only dominant financial institution in the organized money market in Thailand.

As mentioned earlier, the effect of the amount of total deposits, its combination and required reserves ratio regulations on the volume of total bank credits will be summarized in the variable LED constructed in Section II. Other things being equal, the increase in the value of this variable would lead to an increase in the volume of total bank credits extended.

From the above discussion, a structural equation for total lending of commercial banks in Thailand can be written as:-

$$TBC = f(\overset{+}{LED}, \overset{+}{CAR^*}, \overset{+}{LAS}, \overset{+}{BOF}, \overset{+}{BOT}, \overset{+}{GDP}) \quad \dots\dots(III-1)$$

where

TBC = total bank credits received by the private sector,

LED =  $\frac{\text{total deposits} - \text{required reserves}}{\text{average rate of deposit turn-over}}$

CAR\* = difference between actual capital account-risk assets ratio and required capital account-risk asset ratio,

BOF = variable representing ability to obtain credits from foreign sources of Thai commercial banks,

BOT = variable representing ability to obtain credits from the Bank of Thailand,

GDP = Gross National Product,

LAS = Liquid Assets,



and the signs above the variables represent the expected signs of the partial derivatives of TBC with respect to the explanatory variables. Other things being equal, an increase in each of the variables would lead to an increase in TBC.

Some modifications need to be made and additional information provided before equation (III-1) can be applied to explain total lending of Thai commercial banks.

In Thailand, the GDP data has been compiled only on an annual basis. Annual data will thus be used for all variables **in this study**. The only exception would be the LED variable. In this study, we would assume that commercial banks expect the value of the LED variable at the end of the year to be the average of the actual values at the middle and at the end of the year.

It would be more appropriate to assume that in determining how much total lending should be increased during any particular year, commercial banks would look at the spread between the actual capital account-risk assets ratio and the required capital account-risk assets ratio and liquid assets existing at the beginning of the year. The values of the CAR\* and LAS variables in equation III-1 should thus be lagged by one year period.

Thai banks can obtain credits from the Bank of Thailand either in the form of loans against government bonds or in the form of rediscount. All commercial banks in Thailand could draw up a stand by loan-agreement

with the Bank of Thailand by pledging their government bonds in advance against any drawing to be made under such loan agreement. Under this system, a particular bank would be required to issue a promisory note up to the contracted amount to cover its debit balance from the clearing. The ability of commercial banks to obtain loans from the Bank of Thailand in any particular year can thus be measured by the existing stand-by loan agreement at the beginning of that year. However, the data on total amount of stand-by loan agreement between Thai commercial banks and the Bank of Thailand are considered confidential and thus are not accessible. Under this circumstance, the author has no choice but to use actual amount of total loans from the Bank of Thailand at the end of the year as proxy for the existing amount of stand-by loan agreement between commercial banks and the Bank of Thailand .

There are two things which may be cited in support of using actual amount of total loans obtained from the Bank of Thailand by commercial banks at the end of the year as proxy for the existing amount of stand-by loan agreements between commercial banks and the Bank of Thailand at the beginning of the year. One is, with the possible exception of loans for export, the interest rates on all other loans extended by commercial banks to their customers are substantially higher than the rate paid by commercial banks when they borrow from the Bank of Thailand (see the structure of the interest rates in Table III-1). In this case, it would always be to the commercial banks' advantage to borrow from the Bank of Thailand whenever they are in shortage of reserves and the demand

for loans comes from customers other than exporters. The other is that the amount of stand-by loan agreement each commercial bank can establish with the Bank of Thailand will be determined by the Bank of Thailand according to the need of a particular bank as seen by the Bank of Thailand. Under this circumstance, it would be very difficult for any commercial bank to have the amount of stand-by loan agreement with the Bank of Thailand in excess of its need by a wide margin.

The demand determined nature of commercial banks' borrowing from the Bank of Thailand in the form of rediscount is even more pronounced. Selective control has been used by the Bank of Thailand to check the volume of rediscounts of commercial bank papers since the inception of discount facilities in 1959. The control includes regulations on types of commercial bank papers eligible for rediscount, the percentage of the face value of the papers which can be rediscounted, the maturities of papers eligible for rediscount, and the maximum discount rate commercial bank can charge their customers for the papers to be rediscounted at the Bank of Thailand. During the period understudied, the Bank of Thailand fixed its discount rate and the maximum rate commercial banks can charge their customers for the papers to be rediscounted at the Bank of Thailand at 5 and 7 percent respectively. (only the agricultural bills were fixed at 7 and 9 percent from 1968 to 1971) With no change in these two rates and strict regulations on types, percentage of face-value and maturities of commercial bank papers that can be rediscounted, commercial banks have little or no control over the volume of papers rediscounted at the Bank of Thailand. They, in this case, merely serve as a middle men between

the Bank of Thailand and the customers who have commercial papers which are eligible for rediscount at the Bank of Thailand and get a two percent interest-rate spread in return for performing this service. Under this circumstance, actual amount of commercial bank papers rediscounted at the Bank of Thailand is an appropriate variable representing ability of commercial banks to obtain credits from the Bank of Thailand in the form of rediscount. The ability of commercial banks to obtain credits from the Bank of Thailand in any particular year will thus be represented by the actual amount of total borrowing and rediscount at the Bank of Thailand at the end of the year.

Most of the foreign Exchange financing available to Thai commercial banks is in the form of line of credits extended to Thai commercial banks by their correspondent banks abroad. These lines of credit may run up to one year. Thai commercial banks also have to pay a penalty rate of 0.5 percent for any unutilized lines of credit. There is thus a cost for Thai commercial banks to establish lines of credit in excess of their needs. In this case, actual total borrowing of Thai commercial banks from abroad would be a good approximation of total value of existing lines of credit which represents ability of Thai commercial banks to obtain credits from abroad. Since information on annual value of existing lines of credit extended to Thai commercial banks by their foreign banking correspondents is not accessible, actual total foreign borrowing of Thai commercial banks will be used as its proxy in this study.

Substituting the LED by  $\bar{LED}$  where  $\bar{LED}$  is the average value of the LED variable at mid year and at the end of the year, lagging the  $CAR^*$  and LAS variables by one period and linearizing the equation yield.

$$TBC_t = a_0 + a_1 \bar{LED}_t + a_2 CAR_{t-1}^* + a_3 LAS_{t-1} + a_4 BOF_t + a_5 BOT_t + a_6 GDP_t \dots\dots\dots (III-1)$$

All  $a_i$ ,  $i = 2, 3, \dots, 6$  are expected to be positive. There is no a priori expectation regarding the sign of  $a_0$ .

B. Structural Equations for Components of Total Bank Lending Classified by Types of Credit.

There are three major types of bank lending; loans and overdrafts (LOV), discount (DIS) and private trust receipts (PTR). Loans and overdrafts are considered to be credits of longer maturity than discounts and private trust receipts. Generally speaking, on the supply side of the transaction, all variables which have positive effects on total volume of bank lending such as  $\bar{LED}$ ,  $CAR_{t-1}^*$ , LAS, BOF and BOT are likely to have positive effect on the amount outstandings of loans and overdrafts, discounts and private trust receipts as well. However, we can not preclude the possibility that some of these variables, for example,  $\bar{LED}$ ,  $CAR_{t-1}^*$  and  $LAS_{t-1}$  turn out to have negative effects on credits of shorter maturities, namely, discounts and private trust receipts simply because the increases in values of these variables encourage commercial banks to switch from low yield short-term lending to higher yield longer-term credits.

On the demand side of the transaction, GDP remains to be the appropriate variable representing demand for loans and overdrafts as well as discounts. Since private trust receipts are credits extended to importers only, total imports is the approximate variable designating demand for this type of credits<sup>1/</sup> To investigate whether longer-term credit in the form of loans and overdrafts is substitute or complement to shorter-term credits in the form of discount and private trust receipts the sum of total discounts and private trust receipts (DPR) is included in the equation explaining total loans and overdrafts (LOV) and total loans and overdrafts is included in the equation explaining total discounts. Assuming the relationship among variables to be in linear form, the equations for components of total bank lending classified by types may be written as:-

$$LOV_t = b_0 + b_1 LED_t + b_2 CAR_{t-1}^* + b_3 LAS_{t-1} + b_4 BOF_t + b_5 BOT_t + b_6 GDP_t + b_7 DPR_t \dots (III-2),$$

$$DIS_t = c_0 + c_1 LED_t + c_2 CAR_{t-1}^* + c_3 LAS_{t-1} + c_4 BOF_t + c_5 BOT_t + c_6 GDP_t + c_7 LOV_t \dots (III-3),$$

$$PTR_t = d_0 + d_1 LED_t + d_2 CAR_{t-1}^* + d_3 LAS_{t-1} + d_4 BOF_t + d_5 BOT_t + d_6 IMP_t + d_7 (GDP - IMP)_t \dots (III-4).$$

where  $DPR_t$  is the sum of discounts and private trust receipts at the end of period t and  $IMP_t$  is cumulative volume of total imports in period t.

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<sup>1/</sup> When the importers fail to make payments to commercial banks according to the conditions set down at the time when they open letters of credits with the banks, they are required to sign the agreement which would, in effect, make the imported goods the property of the banks. The banks would then allow the importers to sell the goods to obtain money to pay the debt.

Only total loans and overdrafts is used in equation (III-3) instead of the sum of total loans and overdrafts and private trust receipts because the purpose of including other type(s) of credits in this equation is to investigate whether longer-term credits in the form of loans and overdrafts are considered substitutes or complements to short-term credit in the form of discounts. Adding private trust receipts which are short-term credits to total loans and overdrafts would cloud the investigation. Since private trust receipts are credits extended only to importers, the amount outstanding of this type of credits should be directly related to the value of total imports and indirectly related to other types of economic activities represented by the variable  $(GDP-IMP)_t$ .

Other things being equal, we have a strong expectation that  $b_1$ ,  $b_2$ ,  $b_3$ ,  $b_4$ ,  $b_5$ ,  $b_6$ ,  $c_6$ , and  $d_6$  are positive; weak expectation that  $c_1$ ,  $c_2$ ,  $c_3$ ,  $c_4$ ,  $c_5$ ,  $d_1$ ,  $d_2$ ,  $d_3$ ,  $d_4$ ,  $d_5$  are positive and  $b_7$ ,  $c_7$  and  $d_7$  are negative and no a priori expectation regarding  $b_0$ ,  $c_0$  and  $d_0$ .

#### C. Structural Equations for Distribution of Each Type of Credits.

In this subsection the construction of equations purported to explain the distribution of total loans and overdrafts and total discounts among different sectors of the economy is discussed. In this study, loans and overdrafts of commercial banks are classified by purposes into loans and overdrafts for agriculture (AGRL), mining (MNGL), manufacturing (MFGL), construction (CONL), banking insurance and real estate (BIEL),<sup>2/</sup>

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<sup>2/</sup> Also includes loans and overdrafts extended to other types of financial institution i.e. finance companies.

SERVICES (SEVL), wholesale and retail trades (WRTL), personal consumption (CSPL), imports (IMPL), exports (EXPL) and others (OTHL). Total discounts is divided into discount of domestic, import and export bills. In the demand determined type of model, we would expect, the amounts of loans and overdrafts extended to agriculture, mining, manufacturing, construction, banking insurance and real estate and services industries to be positively related to the sizes of these industries in the G.D.P. and negatively related to the size of the rest of the economy. Analogously, loans and overdrafts extended to finance personal consumption, imports, exports should be related to total private consumption, total imports and total exports of the period respectively and each of them should be negatively related to all other types of expenditures in the GDP.<sup>3/</sup> All else being equal, we would expect the variables i.e.  $\overline{LED}_t$ ,  $CAR_{t-1}^*$ ,  $LAS_{t-1}$ ,  $BOF_t$ , and  $BOT_t$  which have positive relation with total loans and overdrafts to relate positively to each of its components as well. However, negative relation with some of the components may occur if commercial banks consider borrowers in the industries as having low credit-worthiness or residual borrowers and thus would receive credits as demanded only when supply

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<sup>3/</sup> Two approaches are used in the compilation of Gross Domestic Product; the value added approach and expenditure or product approach. In the value added approach the economy is divided into 11 industries and the GDP is defined as the sum of the value added by each of these 11 industries. The GDP is defined to be the sum of consumption expenditures, gross fixed capital formation and exports of goods and services less imports of goods and services in the expenditure or product approach. In both approaches Gross National Product is defined as GNP less net income from abroad.



of lendable funds in the banking sector is plentiful and would receive less than the amount demanded or non otherwise or in case some of sectors are excluded from certain methods of financing for example domestic bills from being rediscounted by foreign banks or import bills from being re-discounted at the Bank of Thailand. Assuming relationship among variables to be linear, we can write the equations for components of total loans and overdrafts as:-

$$\begin{aligned} \text{AGRL}_t &= c_0 + c_1 \overline{\text{LED}}_t + c_2 \text{CAR}_{t-1}^* + c_3 \text{LAS}_{t-1} + c_4 \text{BOF}_t + c_5 \text{BOT}_t + c_6 \text{AGR}_t \\ &+ c_7 (\text{GDP-AGR})_t \dots \dots \dots \text{(III-5)}, \end{aligned}$$

$$\begin{aligned} \text{MNGL}_t &= f_0 + f_1 \overline{\text{LED}}_t + f_2 \text{CAR}_{t-1}^* + f_3 \text{LAS}_{t-1} + f_4 \text{BOF}_t + f_5 \text{BOT}_t + f_6 \text{MNG}_t \\ &+ f_7 (\text{GDP-MNG})_t \dots \dots \dots \text{(III-6)}, \end{aligned}$$

$$\begin{aligned} \text{MNFL}_t &= g_0 + g_1 \overline{\text{LED}}_t + g_2 \text{CAR}_{t-1}^* + g_3 \text{LAS}_{t-1} + g_4 \text{BOF}_t + g_5 \text{BOT}_t + g_6 \text{MNF}_t \\ &+ g_7 (\text{GDP-MNF})_t \dots \dots \dots \text{(III-7)}, \end{aligned}$$

$$\begin{aligned} \text{CONL}_t &= h_0 + h_1 \overline{\text{LED}}_t + h_2 \text{CAR}_{t-1}^* + h_3 \text{LAS}_{t-1} + h_4 \text{BOF}_t + h_5 \text{BOT}_t + h_6 \text{CON} \\ &+ h_7 (\text{GDP-CON})_t \dots \dots \dots \text{(III-8)}, \end{aligned}$$

$$\begin{aligned} \text{BIEL}_t &= i_0 + i_1 \overline{\text{LED}}_t + i_2 \text{CAR}_{t-1}^* + i_3 \text{LAS}_{t-1} + i_4 \text{BOF}_t + i_5 \text{BOT}_t + i_6 \text{BIE}_t \\ &+ i_7 (\text{GDP-BIE})_t \dots \dots \dots \text{(III-9)}, \end{aligned}$$

$$\begin{aligned} \text{SEVL}_t &= j_0 + j_1 \overline{\text{LED}}_t + j_2 \text{CAR}_{t-1}^* + j_3 \text{LAS}_{t-1} + j_4 \text{BOF}_t + j_5 \text{BOT}_t + j_6 \text{SEV}_t \\ &+ j_7 (\text{GDP-SEV})_t \dots \dots \dots \text{(III-10)}, \end{aligned}$$

$$\begin{aligned} \text{WRTL}_t &= k_0 + k_1 \overline{\text{LED}}_t + k_2 \text{CAR}_{t-1}^* + k_3 \text{LAS}_{t-1} + k_4 \text{BOF}_t + k_5 \text{BOT}_t + k_6 \text{WRT}_t \\ &+ k_7 (\text{GDP-WRT})_t \dots \dots \dots \text{(III-11)}, \end{aligned}$$

$$\begin{aligned} \text{CSPL}_t &= l_0 + l_1 \text{LED}_t + l_2 \text{CAR}_{t-1} + l_3 \text{LAS}_{t-1} + l_4 \text{BOF}_t + l_5 \text{BOT}_t + l_6 \text{CSP}_t \\ &+ l_7 (\text{GDP}-\text{CSP})_t \dots \dots \dots \quad (\text{III-12}), \end{aligned}$$

$$\begin{aligned} \text{IMPL}_t &= m_0 + m_1 \text{LED}_t + m_2 \text{CAR}_{t-1}^* + m_3 \text{LAS}_{t-1} + m_4 \text{BOF}_t + m_5 \text{BOT}_t + m_6 \text{IMP}_t \\ &+ m_7 (\text{GDP}-\text{IMP})_t \dots \dots \dots \quad (\text{III-13}), \end{aligned}$$

$$\begin{aligned} \text{EXPL}_t &= n_0 + n_1 \text{LED}_t + n_2 \text{CAR}_{t-1}^* + n_3 \text{LAS}_{t-1} + n_4 \text{BOF}_t + n_5 \text{BOT}_t + n_6 \text{EXP}_t \\ &+ n_7 (\text{GDP}-\text{EXP})_t \dots \dots \dots \quad (\text{III-14}), \end{aligned}$$

$$\begin{aligned} \text{OTHL}_t &= p_0 + p_1 \text{LED}_t + p_2 \text{CAR}_{t-1}^* + p_3 \text{LAS}_{t-1} + p_4 \text{BOF}_t + p_5 \text{BOT}_t + p_6 \text{OTH}_t \\ &+ p_7 (\text{GDP}-\text{OTH})_t \dots \dots \dots \quad (\text{III-15}), \end{aligned}$$

where AGR, MNG, MNF, CON, BIE, SEV, WRT, and OTH represent GDP generated in agriculture, manufacturing, construction, banking insurance and real estate business, service wholesale and retail trade and all other industries in the GDP respectively; CSP, IMP, and EXP represent private consumption expenditures, total imports and total exports while these variables with the letter L behind them represent amounts of loans and overdrafts received by the corresponding industries or sectors and the difference between GDP and each of these variables represents competing demand for the industry or sector represented by that variable.

We have a weak expectation that  $e_i, f_i, g_i, h_i, i_i, j_i, k_i, l_i, m_i, n_i$  and  $p_i$  for  $i = 1, 2, \dots, 6$  are positive,  $e_7, f_7, g_7, h_7, i_7, j_7, k_7, l_7, m_7, n_7$  and  $p_7$  are negative and no a priori expectation regarding  $c_0, f_0, g_0, h_0, i_0, j_0, k_0, l_0, m_0, n_0$  and  $p_0$ .

In case of total discounts, discount of domestic bills (DOMD) is expected to be positively related to the difference between the GDP

and the size of foreign trades (GDP-FRT) and negatively related to the size of the foreign trade (FTR), discount of import bills (IMPD) is expected to be positively related to total imports and negatively related to the difference between the size of GDP and total imports (GDP-IMP), finally discount of export bills is expected to relate positively to total exports (EXP) and negatively relate to the difference between the size of GDP and total exports (GDP-EXP). Other things being equal, we would also expect the increase in each of these variables;  $\overline{LED}_t$ ,  $CAR_{t-1}^*$ ,  $LAS_{t-1}$ ,  $BOF_t$  and  $EOT_t$  to lead to the increase in the volume of each type of the bills being discounted by the banks. However, we can not preclude the possibility that the increases in the value of one or more of the above variables, all else being equal, to lead to a reduction in the volume of each type of the bills being discounted if such increases encourage commercial banks to switch to longer-term financing in the form of loans and overdrafts. Assuming the relationship to be in linear form, the above discussion suggests that the equations for the components of total discount should be:-

$$DOMD_t = q_0 + q_1 \overline{LED}_t + q_2 CAR_{t-1}^* + q_3 LAS_{t-1} + q_4 BOF_t + q_5 BOT_t + q_6 (GDP-FRT)_t + q_7 FRT_t \dots \dots \dots (III-16),$$

$$IMPD_t = r_0 + r_1 \overline{LED}_t + r_2 CAR_{t-1}^* + r_3 LAS_{t-1} + r_4 BOF_t + r_5 BOT_t + r_6 IMP_t + r_7 (GDP-IMP)_t \dots \dots \dots (III-17),$$

$$EXPD_t = s_0 + s_1 \overline{LED}_t + s_2 CAR_{t-1}^* + s_3 LAS_{t-1} + s_4 BOF_t + s_5 BOT_t + s_6 EXP_t + s_7 (GDP-EXP)_t \dots \dots \dots (III-18).$$

We have a weak expectation that  $q_i, r_i, s_i$  for  $i = 1, 2, 3, 4, 5, 6$  are positive and for  $i = 7$ ;  $q_i, r_i$  and  $s_i$  are negative and no a priori expectation regarding the signs of  $q_0, r_0$  and  $s_0$ . Other things being equal, the component equation which has negative coefficient for variable representing own demand in the estimate implies that borrowers in that sector are, in general, of lower credit worthiness than borrowers in the sector with positive coefficient for variables representing own demand in the sector. The value of t-statistic of the coefficient of variable representing own demand obtained from the estimation would be used to measure the degree of reliabilities of negative or positive response to demand for credits in the sector by the banks.

#### IV. Empirical Results

The equation for total bank lending, the component equations for bank lending classified on a type basis and the component equations for the distribution of total lending for each type of credits to different industries or sectors of the economy have been specified in Section III. Part A of this section discusses empirical estimate of the equation for total bank lending and estimates of the component equations of total bank lending classified on a type of credit basis. Estimates of the component equations for the distribution of each type of credits to different industries or sectors of the economy are examined in part B.

Estimates of the equations reported in this section are estimates resulting from direct application of linear regression program to the structural equations. The estimated coefficients are reported with their t-ratios (below them in parentheses). For each equation, the standard error of estimate of the equation, SEE; the coefficient of determination adjusted for degree of freedom,  $R^2$ ; and the Durbin-Watson statistic, DW are also shown.

##### A. Estimates of Total Bank Lending and Total Lending on a Type of Credit Basis.

The estimate of the equation for total bank lending together with the essential statistics are reported below:

$$\begin{aligned} \text{TBC} = & -3510.4 + 0.261\text{LED} + 5.430\text{CAR}_{t-1}^* + 0.583\text{LAS}_{t-1} + 0.124\text{BOF} \\ & (0.86) \quad (0.67) \quad (1.30) \quad (0.07) \\ & + 4.537\text{BOT} + 0.101\text{GDP} \\ & (2.02) \quad (1.04) \end{aligned}$$

$$\text{SEE} = 917.6; \quad R^2 = 0.999; \quad \text{DW} = 1.22. \quad \dots(\text{IV-1})$$

As it turns out all of the variables have expected signs but the t-statistic for the coefficient of BOF is extremely low. Only t-ratio for BOT is significant at 95 percent level. However, from the value of coefficient of determination,  $R^2$ , we can say that, the independent variables in this equation determine 99.9 percent of the movement in total credit expansion of commercial banks. There is evidence that level of total bank credit expansion (TBC) is significantly correlated with the level of aggregate demand as represented by GDP as shown by the relatively high value of t-statistic for the coefficient of this variable.

As discussed above this study divides total bank credits into three types; loans and overdrafts, discount and private trust receipts. The amount outstanding of the third type of credits is small in comparison to the first two types. It is included in this study for the sake of completeness. The estimates of the equations explaining the expansion of these three types of credit are reported below:-

$$\begin{aligned} \text{LOV} = & -2481.5 + 0.485 \text{LED} + 5.576 \text{CAR}_{t-1}^* + 1.474 \text{LAS}_{t-1} \\ & (2.70) \quad (1.23) \quad (4.18) \\ & + 2.768 \text{BOF} + 7.625 \text{BOT} + 0.068 \text{GDP} - 3.795 \text{DPR} \\ & (2.31) \quad (5.02) \quad (1.24) \quad (4.88) \end{aligned}$$

$$\text{SEE} = 512.0 \quad R^2 = 0.999 \quad \text{D.W.} = 2.19 \quad \dots(\text{IV-2})$$

$$\begin{aligned} \text{DIS} = & -214.0 + 0.136 \overline{\text{LED}} + 1.151 \text{CAR}_{t-1}^* + 0.243 \text{LAS}_{t-1} \\ & (3.80) \quad (1.22) \quad (4.54) \\ & +0.645 \text{BOF} + 1.539 \text{BOT} + 0.001 \text{GDP} - 0.148 \text{LOV} \\ & (3.34) \quad (5.21) \quad (0.11) \quad (3.43) \end{aligned}$$

$$\text{SEE} = 103.4 \quad R^2 = 1.00 \quad \text{D.W.} = 2.65 \quad \dots\dots (\text{IV-3})$$

$$\begin{aligned} \text{PTR} = & 23.4 - 0.010 \overline{\text{LED}} - 0.389 \text{CAR}_{t-1}^* + 0.076 \text{LAS}_{t-1} \\ & (0.11) \quad (0.29) \quad (0.29) \end{aligned}$$

$$\begin{aligned} & 0.285 \text{BOF} + 0.032 \text{BOT} + 0.035 \text{IMP} - 0.005 (\text{GDP-IMP}) \\ & (0.69) \quad (0.07) \quad (0.27) \quad (0.12) \end{aligned}$$

$$\text{SEE} = 149.8; \quad R^2 = 0.994; \quad \text{D.W.} = 1.55 \quad \dots\dots (\text{IV-4})$$

$$\begin{aligned} \text{PTR} = & 28.3 + 0.002 \overline{\text{LED}} + 1.322 \text{CAR}_{t-1}^* + 0.107 \text{LAS} + 0.179 \text{BOF} \\ & (0.04) \quad (1.62) \quad (0.56) \quad (0.57) \end{aligned}$$

$$\begin{aligned} & 0.421 \text{BOT} + 0.012 \text{IMP} - 0.010 (\text{GDP-IMP}) \\ & (1.09) \quad (0.12) \quad (0.31) \end{aligned}$$

$$\text{SEE} = 110.8; \quad R^2 = 0.996, \quad \text{D.W.} = 2.30 \quad \dots\dots (\text{IV-4})'$$

All of the variables explaining total loans and overdrafts (LOV) have expected signs and satisfactory values of t-statistics. The values of t-statistic for liquid assets ( $\text{LAS}_{t-1}$ ), borrowing from the Bank of Thailand (BOT) and competing demand for bank credits in the forms of discounts and private trust receipts (DPR) are significant at 99 percent level and those for borrowing from abroad (BOF) and lendability of deposits are significant at 95 percent level. The t-statistic for other two variables  $\text{CAR}_{t-1}^*$  and GDP are closed to being significant at 90 percent level. The statistics for the estimated equation are also satisfactory. The estimate of the equation implies, among other things, that both foreign banks and the Bank of Thailand are important sources of additional funds for

Thai commercial bank, short term credits (DPR) are competitive with relatively longer-term credit (LOV) and increase in lendability of bank deposits as well as liquidity of bank assets would encourage banks to extend more longer-term credits.

The same as in the case of equation explaining total loans and overdrafts (LOV), all of the estimated coefficients of the independent variables explaining total bank discount (DIS) in equation (IV-3) have expected signs and with the exception of GDP, the t-statistics for all other variables have relatively high values. The t-statistics for the variable  $\overline{LED}$ , BOT and  $LAS_{t-1}$  are significant at 99 percent level and those for BOF and LOV are significant at 95 percent level. The estimated equation (IV-3) provides additional evidences that both for foreign banks and the Bank of Thailand are important sources of last resort for Thai banks, long-term and short-term credits are competitive and the increase in lendability of bank deposits and volume of liquid assets encourage banks to expand more credits.

As is evidenced from the graphs presented above, demand for bank credits tends toward longer-term maturity during the period of the analysis. This fact is probably responsible for the relatively insignificance of GDP as determinant of total discounts as compares to its role as determinant of total loans and overdrafts.

The estimates of the equation explaining private trust receipts (PTR) as shown in equation (IV-4), is, in general, not satisfactory.



None of the estimated coefficients are significant at 90 percent level. A reestimation of this equation after substituting LAS for  $LAS_{t-1}$  improves the estimate substantially as all of the coefficients of the independent variables have expected signs and the coefficient of  $CAR_{t-1}^*$  become significant at 90 percent level and that of BOT get close to being significant at 90 percent level. LAS is substituted for  $LAS_{t-1}$  in equation (IV-4)' because private trust receipts is a short-term credit and thus is as likely to be influenced by the liquid assets outstanding at that particular period as liquid assets outstanding at the end of last period. This approach will be used to improve the estimates of all equations explaining short-term assets when  $LAS_{t-1}$  variable fails to perform satisfactorily.

The relatively poor estimates of the equation explaining private trust receipts (PTR) may be due to the residual nature of this type of credit.<sup>1/</sup>

B. Estimates of the Equations Explaining Distribution of Each Type of Credits on a Sector Basis.

This part will present the estimates of the equations explaining distribution of bank credits between domestic and foreign sector first. The presentation of the estimates of equations explaining distribution of loans and overdrafts and discounts among various sectors of the economy concludes the empirical presentation.

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<sup>1/</sup> See footnote 1 of section III.

Estimates of the equations explaining expansion of bank credits to import, export and domestic sectors are presented below.

$$\begin{aligned} \text{IMPT} = & -833.44 - 0.157 \overline{\text{LED}} + 3.764 \text{CAR}_{t-1}^* + 0.502 \text{LAS}_{t-1} - 0.449 \text{BOF} \\ & (1.02) \quad (1.71) \quad (1.18) \quad (0.66) \\ & +0.914 \text{BOT} - 0.191 \text{IMP} + 0.010 (\text{GDP-IMP}) + 0.502 \text{LAS}_{t-1} \\ & (1.28) \quad (0.88) \quad (1.93) \quad (1.18) \\ \text{SEE} = & 245.9, \quad R^2 = 0.997, \quad \text{D.W.} = 1.81 \dots (\text{IV-5}) \end{aligned}$$

$$\begin{aligned} \text{IMPT} = & -937.3 - 0.068 \overline{\text{LED}} + 3.780 \text{CAR}_{t-1}^* + 0.265 \text{LAS}_{t-1} + 0.513 \text{BOT} \\ & (1.00) \quad (1.89) \quad (1.28) \quad (1.50) \\ & -0.090 \text{IMP} + 0.062 (\text{GDP-IMP}) \\ & (0.64) \quad (1.68) \\ \text{SEE} = & 223.7, \quad R^2 = 0.007, \quad \text{D.W.} = 1.98 \dots (\text{IV-5}) \end{aligned}$$

$$\begin{aligned} \text{EXPT} = & -353.4 + 0.081 \overline{\text{LED}} + 1.004 \text{CAR}_{t-1}^* - 0.153 \text{LAS}_{t-1} + 0.614 \text{BOF} \\ & (1.88) \quad (0.76) \quad (2.40) \quad (1.87) \\ & -0.116 \text{BOT} + 0.063 \text{EXP} - 0.908 (\text{GDP-EXP}). \\ & (0.32) \quad (1.19) \quad (0.57) \\ \text{SEE} = & 129.3, \quad R^2 = 0.997, \quad \text{D.W.} = 2.92 \dots (\text{IV-6}) \end{aligned}$$

$$\begin{aligned} \text{EXPT} = & -358.1 + 0.075 \overline{\text{LED}} + 1.158 \text{CAR}_{t-1}^* - 0.148 \text{LAS}_{t-1} + 0.525 \text{BOF} \\ & (2.13) \quad (1.03) \quad (2.63) \quad (3.18) \\ & +0.072 \text{EXP} - 0.007 (\text{GDP-EXP}) \\ & (1.72) \quad (0.57) \\ \text{SEE} = & 117.5, \quad R^2 = 0.997, \quad \text{D.W.} = 2.84 \dots (\text{IV-6}) \end{aligned}$$

$$\begin{aligned} \text{DOMT} = & 789.6 - 0.111 \overline{\text{LED}} - 8.087 \text{CAR}_{t-1}^* + 1.735 \text{LAS}_{t-1} + 0.148 \text{BOF} \\ & (0.70) \quad (1.81) \quad (5.20) \quad (0.16) \\ & +3.279 \text{BOT} + 0.263 (\text{GDP-FRT}) - 0.498 \text{FRT} \\ & (2.85) \quad (4.35) \quad (3.83) \\ \text{SEE} = & 454.3, \quad R^2 = 0.999, \quad \text{D.W.} = 3.09 \dots (\text{IV-7}) \end{aligned}$$

It is rather surprising to find out from equation (IV-5) that coefficients of variables representing foreign borrowing (BOF) and a proxy for demand for credits by importers (IMP) are negative and have low  $t$ -values even though it is generally known that a large portion of foreign borrowing of Thai commercial banks is directly related to imports. The explanation for the lack of positive response of credits extended to importers to total imports can probably be made this way. During the period of this study, the structure of Thai imports has been changed as can be seen from the fact that in 1962 imports of consumption goods and intermediate products accounted for approximately 32 and 17 percent of total imports of the country respectively, but by 1973, the shares of the corresponding two types of imports were approximately 20 and 30 percent. The reduction in the share of consumption goods the imports of which is mostly financed through commercial banks in the total imports and the increase in the share of intermediate products a large portion of which is financed directly by the mother companies is like to make credits extended to importers by commercial banks fail to keep pace with total imports.

The same explanation can be made for the lack of positive response of foreign borrowing of Thai commercial banks to total credits extended to the importers.

Only a slight improvement is observed in the equation explaining total credits extended to importers when the BOF - variable is dropped from the set of independent variables as shown in equation (IV-5)<sup>1</sup>. The variables  $CAR_{t-1}^*$ , BOT and (GDP-IMP) are significant at 90 percent level

of confidence.

The significant positive correlation between BOT and IMPT implies that eventhough import bills are not eligible for rediscount at the Bank of Thailand, a significant portion of borrowing from the central bank in the form of loans must be used to finance imports.

A better estimate is obtained for the equation explaining total credits extended to exporters in equation (IV-6). The signs of coefficients BOT and  $LAS_{t-1}$  needs additional classification. Export bills receive priority in the Bank of Thailand's discount policy. The negative relationship between total credits extended to exporters and borrowing from the Bank of Thailand may be due to rapid expansion of discount facilities to exporters during the period of this study but total exports had been stagnated for most of the period especially from 1964 to 1970. This made total discounts of export bills by the Bank of Thailand increase at a fast rate while total credits extended to exporters remained sluggish throughout most of the period.<sup>2/</sup>

It is rather difficult to explain why the increase in liquid assets at the end of last period ( $LAS_{t-1}$ ) leads to a reduction in total credits extended to exporters. One of the explanation is that export

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<sup>2/</sup> For detailed analysis of Bank of Thailand's discount policy, see Nimit Nontapunthawat, "Financial Capital Flows in the Balance of Payments of Thailand," an unpublished Ph.D.'s Thesis, Purdue University, 1973 (Appendix A).

financing is mostly short-term in nature and the increase in  $LAS_{t-1}$  encourages commercial bank to extend longer-term credit. The emergence of institution competing with commercial banks in export financing market near the end of the 1960's is another explanation for the above outcome.

Equation (IV-6)' reestimates equation (IV-6) dropping BOT as an explanatory variable. As can be seen from the equation, the estimate shows substantial improvement as the t-statistic for the coefficient of every explanatory variable in the equation is higher than corresponding t-statistic in equation (IV-6) and the standard error of estimation (SEE) and Durbin-Watson statistic (D.W.) are also improved. The coefficients of the variables;  $\overline{LED}$ ,  $LAS_{t-1}$  and BOT are significance at 95 percent level confidence and the variable EXP is significance at 90 percent level. Equations (IV-6) and (IV-6)' indicate that foreign borrowing is an important source of fund for financing of export. But, this is expected.<sup>3/</sup>

The estimate of the equation explaining total credits extended to domestic sector in 1962 which accounted for more than a half of total credits and increased continuously to more than three-fourths of total credits in 1973 (equation IV-7) reveals three important aspects of portfolio behavior of Thai banking sector:-

Firstly, there is a strong evidence in support of an accommodation principle of commercial banking as can be seen by the fact that the

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<sup>3/</sup> See Dan Usher, "Thai Interest Rates," Journal of Development Study, April 1967.

t-statistic for the coefficient of variable (GDP-FRT) is significant at 99 percent level.

Secondly, credits extended to foreign sectors (FRT) are competing with credits extended to domestic sector as supported by the fact that the coefficient of variable FRT has negative sign and its t-statistic is significant at 99 percent level.

Thirdly, only borrowing from the Bank of Thailand is significantly and positively related to total credits extended to domestic sector. Foreign borrowing does not seem to be an important determinant of credit extended to the private sector as can be seen from the fact that the t-ratio for BOT is significant at 95 percent level while the t-ratio for BOF is very close to zero.

Table IV-1 shows the estimates of the equations explaining distribution of total loans and overdrafts (LOV) among 10 important sectors of the economy namely, agriculture, mining and quarrying, manufacturing, construction, banking, insurance and real estates, services, wholesale and retail trade, private consumption, imports, exports and others. As is seen from equation (IV-8), the only significant determinant of loans and overdrafts extended to the agricultural sector (AGRL) is GDP-ACR which is a competing demand for loans to the agricultural sector. But, the fact that the sign of the coefficient of this variable is positive implies that nonagricultural activities have positive influence on credits extended to the agricultural sector. Eventhough the t-ratio for the coefficient

Table IV-1

Estimates of the Equations Explaining Total Loans and Overdrafts and Its Distribution Among Various Sectors of the Economy

(1)	LOV	=	-248.55	+ 0.485LED	+ 5.576CAR*	+ 2.768BOF	+ 7.625BOT	+ 0.068GDP	- 3.795DPR	+ 1.474LAS	SEE = 512.0	R <sup>2</sup> = 0.999	D.W. = 2.19	(IV-2)
				(2.70)**	(1.23)	(2.31)**	(5.02)***	(1.24)	(4.88)***	(4.18)*** <sup>t-1</sup>				
(2)	AGRL	=	-159.40	- 0.007LED	- 0.052CAR*	- 0.012BOF	- 0.009BOT	+ 0.004AGR	+ 0.009(GDP-AGR)	+ 0.005LAS	SEE = 36.1	R <sup>2</sup> = 0.995	D.W. = 2.68	(IV-8)
				(0.56)	(0.16)	(0.17)	(0.09)	(0.57)	(2.03)*	(0.28) <sup>t-1</sup>				
(2)	AGRL	=	-157.86	- 0.004LED	+ 0.013CAR*			+ 0.003AGR	+ 0.008(GDP-AGR)	- 0.0002LAS	SEE = 30.3	R <sup>2</sup> = 0.994	D.W. = 2.40	(IV-8)
				(0.57)	(0.05)			(0.65)	(2.37)**	(0.02) <sup>t-1</sup>				
(3)	MNGL	=	-105.56	+ 0.0009LED	- 0.237CAR*	- 0.012BOF	+ 0.073BOT	+ 0.051MNG	+ 0.041(GDP-MNG)	- 0.031LAS	SEE = 32.1	R <sup>2</sup> = 0.987	D.W. = 2.06	(IV-9)
				(0.08)	(0.82)	(0.18)	(0.83)	(0.59)	(0.99)	(1.35) <sup>t-1</sup>				
(3)	MNGL	=	-121.73	+ 0.002LED	- 0.023CAR*		+ 0.060BOT	+ 0.042MNG	+ 0.004(GDP-MNG)	- 0.034LAS	SEE = 28.8	R <sup>2</sup> = 0.987	D.W. = 2.00	(IV-9)
				(0.33)	(0.90)		(1.41)	(0.64)	(1.10)	(2.64)** <sup>t-1</sup>				
(4)	MNFL	=	-1209.15	+ 0.020LED	+ 0.317CAR*	+ 0.395BOF	+ 0.690BOT	+ 0.296MNF	- 0.021(GDP-MNF)	- 0.241LAS	SEE = 127.2	R <sup>2</sup> = 0.999	D.W. = 1.83	(IV-10)
				(0.47)	(0.28)	(1.33)	(1.88)*	(2.57)**	(0.84)	(2.69)** <sup>t-1</sup>				
(5)	CONL	=	-383.68	- 0.013LED	+ 0.035CAR*	- 0.234BOF	+ 0.048BOT	+ 0.014CON	+ 0.018(GDP-CON)	+ 0.086LAS	SEE = 106.8	R <sup>2</sup> = 0.995	D.W. = 1.65	(IV-11)
				(0.26)	(0.04)	(0.89)	(0.17)	(0.11)	(0.77)	(1.60)* <sup>t-1</sup>				
(5)	CONL	=	-212.37	+ 0.024LED	+ 0.059CAR*	- 0.139BOT	+ 0.059CON	+ 0.002(GDP-CON)	+ 0.054LAS		SEE = 104.0	R <sup>2</sup> = 0.994	D.W. = 1.11	(IV-11)
				(0.88)	(0.06)	(0.82)	(0.59)	(0.16)	(1.38) <sup>t-1</sup>					
(5)	CONL	=	-55.27	+ 0.034LED	+ 0.306CAR*		+ 0.093CON	- 0.004(GDP-CON)	+ 0.043LAS		SEE = 101.0	R <sup>2</sup> = 0.993	D.W. = 1.09	(IV-11)
				(1.40)	(0.36)		(1.06)	(0.29)	(1.21) <sup>t-1</sup>					
(6)	BIEL	=	362.53	- 0.016LED	+ 0.390CAR*	- 0.186BOF	- 0.132BOT	+ 0.738BIE	- 0.025(GDP-BIE)	+ 0.215LAS	SEE = 104.1	R <sup>2</sup> = 0.998	D.W. = 2.63	(IV-12)
				(0.37)	(0.42)	(0.95)	(0.50)	(3.54)**	(2.11)*	(3.77)*** <sup>t-1</sup>				
(6)	BIEL	=	250.81	+ 0.41LED	+ 1.249CAR*			+ 0.502BIE	- 0.277(GDP-BIE)	+ 0.131LAS	SEE = 116.5	R <sup>2</sup> = 0.997	D.W. = 3.07	(IV-12)
				(1.34)	(1.35)			(2.68)	(2.27)**	(3.83)*** <sup>t-1</sup>				
(7)	SEVL	=	-615.90	+ 0.050LED	+ 0.538CAR*	+ 0.162BOF	+ 0.086BOT	+ 0.346SEV	- 0.032(GDP-SEV)	- 0.114LAS	SEE = 40.0	R <sup>2</sup> = 0.999	D.W. = 2.43	(IV-13)
				(3.79)***	(1.46)	(1.78)*	(0.80)	(5.09)***	(4.12)***	(4.30)** <sup>t-1</sup>				
(8)	WRTL	=	-367.89	+ 0.015LED	- 1.361CAR*	- 0.224BOF	+ 0.576BOT	+ 0.207WRT	- 0.019(GDP-WRT)	+ 0.254LAS	SEE = 267.0	R <sup>2</sup> = 0.998	D.W. = 1.56	(IV-14)
				(0.17)	(0.56)	(0.45)	(0.86)	(2.27)**	(0.52)	(1.93)* <sup>t-1</sup>				

(Table IV-1 continued)

(8)' WRTL	=	-453.70	+ 0.419LED	- 1.241CAR*	+ 0.334BOT	+ 0.207WRT	- 0.026(GDP-WRT)	+ 0.215LAS	SEE = 248.9	R <sup>2</sup> =0.998	D.W.=1.29(IV-14)	
			(0.70)	(0.56)	(0.89)	(2.42)**	(0.88)	(2.33)** <sub>t-1</sub>				
(9) CSPL	=	-222.38	- 0.008LED	+ 0.045CAR*	- 0.123BOF	+ 0.147BOT	+ 0.008CSP	+ 0.013(GDP-CSP)	+ 0.182LAS	SEE = 111.9	R <sup>2</sup> =0.998	D.W.=2.89(IV-15)
			(0.19)	(0.04)	(0.34)	(0.41)	(0.27)	(0.32)	(1.27)			
(9)' CSPL	=	-487.30	+ 0.003LED	- 0.122CAR*	+ 0.038BOT	+ 0.015CSP	+ 0.001(GDP-CSP)	+ 0.138LAS	SEE = 101.3	R <sup>2</sup> =0.998	D.W.=3.00(IV-16)	
			(0.12)	(0.12)	(0.25)	(0.72)	(0.05)	(2.52)** <sub>t-1</sub>				
(9)" CSPL	=	-627.30	+ 0.018LED	+ 0.692CAR*	+ 0.210BOT	+ 0.016CSP	- 0.011(GDP-CSP)	+ 0.118LAS	SEE = 93.2	R <sup>2</sup> =0.998	D.W.=2.91(IV-17)	
			(1.02)	(0.90)	(0.91)	(1.24)	(0.52)	(2.32)** <sub>t-1</sub>				
(10) CTHL	=	199.46	+ 0.003LED	- 0.211CAR*	+ 0.052BOF	+ 0.076BOT	+ 0.029OTH	- 0.005(GDP-OTH)	- 0.006LAS	SEE = 84.5	R <sup>2</sup> =0.910	D.W.=3.12(IV-18)
			(0.07)	(0.28)	(0.24)	(0.35)	(0.36)	(0.52)	(0.10)			
(11) IMPL	=	-850.91	- 0.186LED	+ 3.287CAR*	- 1.103BOF	+ 1.187BOT	- 0.297IMP	+ 0.124(GDP-IMP)	+ 0.507LAS	SEE = 428.0	R <sup>2</sup> =0.953	D.W.=1.56(IV-19)
			(0.69)	(0.86)	(0.93)	(0.96)	(0.79)	(1.03)	(0.69)			
(11)' IMPL	=	-978.86	+ 0.032LED	+ 3.326CAR*	+ 0.204BOT	- 0.051IMP	+ 0.033(GDP-IMP)	- 0.074LAS	SEE = 421.8	R <sup>2</sup> =0.942	D.W.=1.43(IV-20)	
			(0.25)	(0.88)	(0.32)	(0.19)	(0.48)	(0.19)				
(12)' EXPL	=	-551.69	- 0.006LID	+ 0.798CAR*	+ 0.102BOF	+ 0.094BOT	+ 0.075EXP	+ 0.071(GDP-EXP)	- 0.077LAS	SEE = 122.2	R <sup>2</sup> =0.987	D.W.=3.02(IV-21)
			(0.14)	(0.64)	(0.33)	(0.28)	(1.49)	(0.55)	(1.28)			

Note: \* significance at 90 percent level

\*\* significance at 95 percent level

\*\*\* significance at 99 percent level



of AGR which represents the size of the agricultural sector is low, the sign of this coefficient is positive and this imply that there is some positive response to demand for credits from agricultural sector by commercial banks. The reestimation of this equation dropping the variables BOT and BOF reported as equation (IV-8)' improves the estimate but only the two variables (GDP-AGR) and AGR remain as significant determinators of credits extended to the agricultural sector.

No variable is significant at 90 percent level in the estimate of equation explaining loans and overdrafts extended to the mining sector (equation IV-9). But, when the foreign borrowing variable, BOF, is dropped from the set of explanatory variable and the equation is reestimated, the variable  $LAS_{t-1}$  becomes significant at 95 percent level but have a negative sign and the variable representing borrowing from the Bank of Thailand is closed to being significant at 90 percent level. There is some weak evidence of positive response to demand for credits in this sector by commercial banks as shown by positive coefficient of MNG, the proxy for demand for credits from this sector. Borrowing from the Bank of Thailand seems to be the only significant factor contributing positively to the increase in credits extended to the mining sector during the period.<sup>4/</sup>

All variables except  $LAS_{t-1}$  have expected signs in equation (IV-10) which explains the behavior of loans and overdrafts extended to

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<sup>4/</sup> The Bank of Thailand started to extend its discount facility to the mining sector in 1963.

the manufacturing sector. The coefficient for  $LAS_{t-1}$  and MNF which is a proxy for demand for credits in this sector are significant at 95 percent level. The coefficient for borrowing from the Bank of Thailand (BOT) is significant at 90 percent level while the coefficient for borrowing from abroad (BOF) is closed to being significant at 90 percent.

Equations (IV-11), (IV-11)', and (IV-11)" reveal that both foreign borrowing and borrowing from the Bank of Thailand are not significantly and positively related to loans and overdrafts extended to the construction industry. Equation (IV-11) shows that only the variables representing lendability of deposits ( $\overline{LED}$ ), proxy for demand (CON) and liquid assets lagged one period ( $LAS_{t-1}$ ) are significant positive contributors to loans and credits extended to the construction industry by commercial banks (CONL). But only the coefficient of variable  $\overline{LED}$  is significant at 90 percent level.

The same observation can be made from the estimates of the equation explaining loans and overdrafts extended to banking, insurance and real estate business. Borrowing from the Bank of Thailand as well as from foreign sources does not contribute positively to the amount of loans and overdrafts extended to this sector, but all other variables except a proxy for competing demand (GDP-BIE) do. All of the explanatory variables in equation (IV-12)' have satisfactorily high values of t-statistic. Even the variables  $\overline{LED}$  and  $CAR_{t-1}$  which have relatively low values of t-statistic are getting close to being significant at 90 percent level.

All of the explanatory variables explaining loans and overdrafts extended to the service sector except  $LAS_{t-1}$  have expected signs and all except borrowing from the Bank of Thailand (BOT) have satisfactorily high values of t-statistic. Positive response to demand for credits by commercial banks is strongest in this sector. The t-statistic for coefficient of SEV, a proxy for demand is significant at 99 percent level. This is no surprise since in the latter part of the period under studied the American military and military related activities in this country made investment in entertainment business one of the most profitable one and thus made this sector expanded at a very rapid rate.

The estimates of the equation explaining expansion of loans and credits to the wholesale and retail trade as reported in equation (IV-14) and equation (IV-14)' tell us that only demand condition in this sector and the amount outstanding of liquid assets at the end of last period are significant determinators of this type of credits as supported by the fact that the t-ratios for the two variables are significant at 95 percent level.

In general, estimates of equation explaining commercial banks' expansion of loans to finance private consumption (CSPL) reported as equations (IV-15), (IV-15)', and (IV-15)'' are far from being satisfactory since all variable except  $LAS_{t-1}$  have low values of t-statistic even though in equation (IV-15)'' all explanatory variable have expected signs. Little conclusion can be drawn from these estimates. But, the fact that the coefficient of  $LAS_{t-1}$  is the only coefficient which has high value of t-statistic (significant at 95 percent level) seems to indicate that

commercial banks may treat consumers who usually borrows small amount of money in comparison to other borrowers as residuals in their portfolio decision. The relatively high value of t-statistic for the coefficient of CSP implies some positive response to consumers' demand for credits during period of relatively rapid increase in per capita income and thus rapid increase in demand for consumer's durables.

The estimates of the equation explaining loans and overdrafts to the importers reported as equation (IV-16) and equation (IV-16)<sup>1</sup> are in generally not satisfactory as the t-statistic for the coefficient of every explanatory variable is low. The poor result of estimation may result from the change in the structure of Thai imports and method of financing explained above and the fact that credits extended to importers by commercial banks are divided into three major types; loans and overdrafts, discount and private trust receipts and switching between this three types of import financing may blur the relationship between explanatory variables and explained variable.

Estimate of the equation explaining commercial banks, extension of loans and overdrafts to exporters reported as equation (IV-17) is only slightly better than in case of imports. The only conclusion that might be drawn from this estimate is that there is significant positive response to demand for loans by exporters as the t-statistic indicates that the estimated coefficient is close to being significant at 90 percent level.

The estimate of the equation explaining loans and overdrafts

extended to all other sectors (equation IV-18) is the poorest of all the equations being estimated. But, this is the usual outcome for most of the residual type of equation.

In conclusion, given the fact that there had been little or no change in the interest rates commercial banks can charge their customers and the ceiling rates on various types of commercial banks' credits prescribed by the Bank of Thailand had been binding for most of the cases, the distribution of commercial banks' credits among various sectors of the economy would be determined by the demand condition in these sectors, the supply (of loanable fund) condition in the banking system, the Bank of Thailand's regulations and the credit-worthiness of borrowers in each sector in the eyes of commercial banks. Other things being equal, the stronger the responsiveness of commercial banks to demand for loans in the sector, the greater the credit-worthiness of borrowers in that sector. The examination of the estimated equations reported in Table IV-1 reveals that there are signs of positive responses to demand in all sectors except imports as coefficients for variables representing demand condition are positive for all but the import sector.<sup>5/</sup> However, judging from the values of t-statistic, the positive response to demand is reliable at 95 percent level only for demand in manufacturing; banking, insurance and real estates, service and wholesale and retail trade sectors. The evidence in support

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<sup>5/</sup> The probable reasons behind the negative response to demand for loans and overdraft extended to importers has already been explained above.

of positive response to demand is particularly weak in cases of agriculture and mining and quarrying sectors. The evidences seems to imply that positive response to demand is weak only in the sectors whose activities are usually taking places in rural or unurbanized area such as agriculture and mining and quarrying and positive response to demand is particularly strong for sectors whose activities are concentrated in the cities or urbanized area such as manufacturing, banking, insurance and real estates, wholesale and retail trade and service sectors.

There is no concrete evidence to say that, for the same type of credits (loans and overdrafts in this case), demand for loans from different sectors are competing with one another. Evidences that demand from all other sectors putting together is competing with a particular sector demand can be observed in 6 out of 10 cases but, judging from the t-statistic of variable representing competing demand the evidences are reliable only in two sectors namely; banking, insurance and real estates and service sectors.

Eventhough the estimate of the equation explaining total loans and overdrafts (equation IV-2) provides evidence that both borrowing from the Bank of Thailand and from foreign banks contribute positively to the increase in total loans and overdrafts extended by commercial banks, we can probably conclude from the estimates of the component equations in Table IV-1 that we can not pick out any particular sectors as a principle beneficiary of the increase borrowing from these two sources of additional resource. The positive relationship between borrowing from the

Bank of Thailand and lending is significant at 90 percent level only in the case of lending to the manufacturing sector (equation IV-10). In case of foreign borrowing it is significant at 90 percent level only in case of lending to the service sector.

The estimates of the equations in Table IV-1 seems to indicate that the increase in liquid assets at the end of last period ( $LAS_{t-1}$ ) would be quite certain to lead to an increase in loans and overdrafts extended to construction; banking, insurance and real estates; wholesale and retail trade and private consumption sector and a reduction in loans and overdrafts given to mining and manufacturing sectors. It is difficult to find explanation for such findings.

The variable LED shows strong positive relationship only with loans and overdrafts extended to the service sector and significant positive relationship only with loans and overdrafts extended to the construction industry. There is no substantial evidence to conclude that variable  $CAR_{t-1}^*$  which measures the different between actual capital account-risk assets ratio to the capital account-risk assets ratio set by the Bank of Thailand affect bank lending to any particular sector since non of the coefficients of this variable is significant at 90 percent level.

#### Estimates of Component Equations for Total Discount

Total discounts by commercial banks are divided into three components, discount of domestic bill (DOMD), discount of import bills (IMPD)

and discount of export bills (EYPD). The estimates of the equations explaining the components of total discount are reported in Table IV-2.

As shown by equation (IV-18) and equation (IV-18)', the single most important determinant of domestic discount is borrowing from the Bank of

Thailand and borrowing from foreign banks **does not have significant relationship** with credits extended in the form of discount to the domestic sector.

This finding conforms closely to the real condition in the country since rediscount facilities for domestic bills are available only at the Bank

of Thailand and during the period covered in this study the Bank of Thailand, in conjunction with national policy for industrialization, had continuously expanded discount facilities to bills arising from industrial undertakings.<sup>6/</sup>

The negative sign of the coefficient of variable (GDP-FRT) which is a proxy for demand together with the positive sign of coefficient of this variable in equation (IV-7) indicates that during the period under studied more and more domestic business is financed through loans and overdrafts rather than discount (see figure II-4).

All of the coefficients of explanatory variables in equation (IV-19)" which is the best estimate of the equation explaining discount of import bills except LAS have expected signs. But only the coefficient of  $CAR_{t-1}^*$  is significant at 90 percent level and only coefficient of borrowing from abroad (BOF) getting close to being significant at this level. The fact that in case of imports coefficient of foreign borrowing is

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<sup>6/</sup> See Nimit Nontapunthawat, ibid., p. 65.



Table IV-2

Estimates of the Equations Explaining Total Discount and Its Components

(1)	DIS	=	-213.96 + 0.136LID + 1.151CAR <sup>*</sup> <sub>t-1</sub> + 0.645BOF + 1.539BOT + 0.001GDP - 0.148LOV + 0.243LAS <sub>t-1</sub>	SEE = 103.4	R <sup>2</sup> =0.9998	D.W.=2.65
			(3.80)*** (1.22) (3.34)** (5.21)*** (0.11) (3.43)** (4.54)***			
(2)	DCMD	=	53.24 + 0.037LID - 0.275CAR <sup>*</sup> <sub>t-1</sub> - 0.087BOF + 1.493BOT - 0.010(GDP-FRT)+0.026FRT+0.148LAS <sub>t-1</sub>	SEE = 104.1	R <sup>2</sup> =0.9996	D.W.=2.53(IV-18)
			(1.03) (0.27) (0.41) (5.67)*** (0.73) (0.87) (1.94)*			
(2)'	DOMD	=	51.43 + 0.044LID - 0.304CAR <sup>*</sup> <sub>t-1</sub> + 1.406BOT - 0.011(GDP-FRT)+0.019FRT+0.145LAS <sub>t-1</sub>	SEE = 97.9	R <sup>2</sup> =0.9996	D.W.=2.23(IV-18)
			(1.43)* (0.31) (9.57)*** (0.81) (0.82) (2.03)*			
(3)	IMPD	=	-54.01 + 0.039LID + 0.867CAR <sup>*</sup> <sub>t-1</sub> + 0.368BOF - 0.305BOT + 0.071IMP - 0.020(GDP-IMP)-0.081LAS <sub>t-1</sub>	SEE = 157.1	R <sup>2</sup> =0.968	D.W.=2.50(IV-19)
			(0.40) (0.62) (0.85) (0.67) (0.51) (0.46) (0.30)			
(3)'	IMPD	=	8.01 - 0.003LID + 1.051CAR <sup>*</sup> <sub>t-1</sub> + 0.122BOF + 0.024IMP - 0.003(GDP-IMP)-0.045LAS <sub>t-1</sub>	SEE = 147.3	R <sup>2</sup> =0.964	D.W.=1.97(IV-19)
			(0.04) (0.81) (0.56) (0.21) (0.10) (0.12)			
(3)''	IMPD	=	-238.53 + 0.20LID + 1.171CAR <sup>*</sup> <sub>t-1</sub> + 0.239BOF + 0.070IMP - 0.014(GDP-EXP)-0.071LAS	SEE = 129.4	R <sup>2</sup> =0.973	D.W.=3.06(IV-19)
			(0.31) (1.51)* (1.12) (0.70) (0.45) (0.40)			
(4)	EXPD	=	198.74 + 0.087LTD + 0.206CAR <sup>*</sup> <sub>t-1</sub> + 0.511BOF - 0.210BOT - 0.012EXP - 0.015(GDP-EXP)-0.076LAS <sub>t-1</sub>	SEE = 90.8	R <sup>2</sup> =0.996	D.W.=2.63(IV-20)
			(2.87)** (0.22) (2.21)** (0.84) (0.32) (1.56)* (1.69)*			
(4)'	EXPD	=	190.22 + 0.076LID - 0.484CAR <sup>*</sup> <sub>t-1</sub> + 0.350BOF + 0.004EXP - 0.013(GDP-EXP)-0.068LAS <sub>t-1</sub>	SEE = 87.8	R <sup>2</sup> =0.995	D.W.=2.33(IV-20)
			(2.88)** (0.57) (2.83)** (0.13) (1.46)* (1.60)*			
(4)''	EXPD	=	625.84 + 0.132LID + 1.760CAR <sup>*</sup> <sub>t-1</sub> + 0.741BOF + 0.051BOT - 0.098EXP - 0.029(GDP-EXP)-0.062LAS	SEE = 62.2	R <sup>2</sup> =0.998	D.W.=2.98(IV-20)
			(4.62)*** (2.15)** (4.04)*** (0.25) (2.13)**(3.41)** (1.98)*			

Note: see Table IV-1.

positive in the discount equation and negative in the loans and overdrafts equation (equation IV-16) implies financing of imports through foreign channels is mostly through rediscount of import bills.<sup>7/</sup>

All estimates of the equation explaining discount of export bills by commercial banks, equations (IV-20), (IV-20)' and (IV-20)", show a very significant positive relationship between foreign borrowing and discount of export bills by commercial banks. In equation (IV-20)", the coefficient of BOF is significant at 99 percent level. In fact all of the variables in this equation except the variable representing borrowing from the Bank of Thailand (BOT) are significant at 90 percent level or higher. The negative relationship between the variable representing demand, EXP and total discount of export bill in this equation together with the positive relationship of EXP and loans and overdrafts extended to exporters in equation (IV-17) imply an increasing percentage of exports had been financing through loans and overdrafts and less through discount during the period.

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<sup>7/</sup> This type of import refinancing is generally called "banker acceptance" in the United States. The word "accept" comes from "accept to pay" that is foreign banks accepts to pay for the imports in lieu of Thai banks.

V. Summary of the Empirical Implication and Suggestion.

The above analysis of the empirical results provide substantial evidences in support of the accommodation theory of commercial banking in Thailand. Given the cheap credit policy of the Bank of Thailand and the fact that the ceiling rates on various types of credit prescribed by the Bank of Thailand were almost always binding during the period of this study, there is a big question mark on the feasibility of profit maximizing principle or maximizing profit through variation of interest rates in Thailand. Given the strictly binding ceiling rate on deposits and on various types of bank credit, and the spread of around 4 to 7 percent between time deposit rate and bank lending rates, a satisfactory level of profit has been guaranteed for commercial banks with prudent management on the asset side of their balance sheet. Given the deposit rates and ceiling rates on bank lending, commercial banks' profit would depend upon how good is their screening of their borrowers. The better the screening, the higher would be their profit. The allocation of bank credits among borrowers would in this case depend more on credit-worthiness of their customers than on the interest rate banks can charge these customers. The customers with least credit worthiness would have to stand at the end of the service line. During the period of reserve shortage those stand at the end or near the end of the service line would be turned away and their access to the relatively cheap credit in the organized market is temporary cut. This low credit-worthy customers would then have to borrow in the unorganized market and pay much higher price for the credits.

The cheap credit policy thus produces a paradox of cheap credit where only a small privilege group of credit-worthy borrowers whose business have already well established enjoy the fruit of cheap price of credits. The less fortunate, less credit-worthy customers would enjoy the fruit of cheap credits only in the period of reserve glut or non at all. The fact that positive response to demand is particularly strong in the manufacturing, service, wholesale and retail trade and banking, insurance and real estate sectors and particularly weak in agriculture and mining and quarrying sectors provide some evidences in support of the above argument.

There is strong evidence that both foreign banks and the Bank of Thailand are important sources of last resort for Thai commercial banks. But, no clear cut conclusion can be made on which sectors of the economy benefit from additional fund obtained from abroad and from the Bank of Thailand and which sectors do not from the estimates of the component equations foreign borrowing seems to contribute positively to credits extended to importers, exporters and borrowers in the service and manufacturing sectors and additional fund obtained from the Bank of Thailand contributes positively to credits extended to manufacturing and mining and quarrying sectors.

The model as constructed provides a very good estimates for total credits extended by commercial banks as well as for total major types of credit in commercial banks' portfolio. Less satisfactory estimates were obtained in case of component equations. Many factors may be cited as responsible for the less satisfactory results obtained in the estimation

of the component equations. Among them are.-

1. The classification of loans and overdrafts by purposes reported to the Bank of Thailand by commercial banks may not be good enough to be used as variables representing total loans and overdrafts extended to the various sectors of the economy by Thai commercial banks. The defect is likely to be originated from the difficulty of classifying which activities are in which sectors and which activities are not. The classification would be particular difficult in case of credits extended to customers who have many businesses or multiproduct firms.

2. At the time of this study, there is no long enough series of total bank credits (discounts plus loans and overdrafts) classified by purposes which if available would be better variables representing total credits received by various sectors of the economy and would certainly provide better estimates of the component equations than the use of distribution of only a portion of total credits (eventhough it is a largest portion), loans and overdrafts.

3. The technique of estimation of the component equations may not be the best one. At first the author of this study wants to use the technique of component equations in the estimation.<sup>1/</sup> But, in order for this technique to bear its full fruit, constrained as well as stacked estimation must be employed. Since time and resource do not allow for the development of such a program in Thailand.

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<sup>1/</sup> See Nimit Nontapunthawat, Ibid., p. 65.

the original design is abandoned.

The policy variable  $CAR_{t-1}^*$  which measures the effect of the difference between actual capital account-risk assets ratio to the capital account-risk assets ratio specified by the Bank of Thailand on bank lendings shows some effect on total bank lending (TBC) as well as on the amounts out standing of two important types of bank credits; discount and loans and overdrafts. But, none of the coefficients of this variable in the equations explaining total bank credits, total discounts and total loans and overdrafts are significant at 90 percent level. The effects of this policy variable on the distributions of total credits as well as total loans and overdrafts and total discounts are also weak as evidenced by the fact that the value of t-statistic for the coefficient of this variable is significant at 90 percent and the coefficient has expected sign only in one of the component equations, the equation explaining total credits extended by commercial banks to importers and in the equation explaining total private trust receipts (equation (IV-5) and equation (IV-4)'). It is thus quite safe to say that changes in capital account-risk asset ratio by the Bank of Thailand does not have significant effect on bank lending, total as well as its distribution.

Since there is only one change in required reserve ratio from 6 percent of total deposits to 7 percent of total deposits on May 1972, the effect of policy measure on bank lending as well as on the distribution of credits through the variable  $\overline{LED}$  should not be significant. It may thus be appropriate to conclude that during the period of this study

policy measures have little or no effect on bank lending as well as on the distribution of credit. The only significant influence of the Bank of Thailand's policy action on bank lending and distribution of bank credits is likely to be through its expansion of discount facilities to export bills and bills arising from industrial undertakings during the period as can be seen from a very high t-statistic of the variable BOT in equation explaining discount of domestic bills and export bills.<sup>2/</sup>

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<sup>2/</sup> Bills eligible for discount facilities at the Bank of Thailand must be discounted at commercial banks first. Commercial banks are usually allowed to take a spread of two percent between discount rate at commercial banks for this type of bills and the discount rate at the Bank of Thailand in acting as agent for the central bank.

BIBLIOGRAPHY

Bank of Thailand, Annual Economic Report, Bangkok, Thailand, (several issues).

Bank of Thailand, Monthly Bulletin, Bangkok, Thailand, (several issues).

Brainard, W.C. and J. Tobin, "Pitfalls in Financial Model Building,"

Paper and Proceedings of the American Economic Association, May 1968.

Carson, Deane, ed., Money and Finance: Readings in Theory, Policy and Institutions, 2<sup>nd</sup> ed., New York, John Wiley, 1972 see Andersen, Leonall C. and Albert, E. Burger, "Asset Management and Commercial Bank Portfolio Behavior: Theory and Practice," Lawrence, Robert J. and Duane Lougue; "Determinants of Correspondent Banking Relationships," Meltzer, Allen H., "Major Issues in the Regulation of Commercial Banks," Carson, Deane, "The Economics of the Money Market," and Willis, Parlor B., "Money Market Instruments and Relationships,"

Deleeuw, Frank, "A Model of Financial Behavior," in J.S. Duesenberry, et. al., eds., The Brookings Quarterly Econometric Model of the United States, Chicago = Rand Menally, 1965.

Gramlich, E.M. and J.H. Kalchbrenner, "A Constraint Estimation Approach to the Demand for Liquid Assets," Federal Reserve Special Studies Paper No. 3, December 1959.



Hendershott, Patric H., "Recent Development of the Financial Sector of  
Econometric Models," Journal of Finance, March 1968.

Johnston, J., Econometric Methods, New York: McGraw Hill, 1963.

National Statistical Bureau, Office of the Prime Minister, National Income  
Statistics of Thailand, (several issues).

Usher, Dan, "Thai Interest Rates," Journal of Development Study, April,  
1967.