



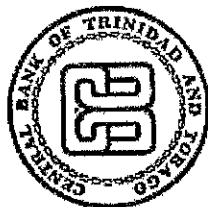
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**SIMPLE APPROACHES TO
MEASURING AND MANAGING
TRINIDAD AND TOBAGO'S
COMMERCIAL BANKS FOREIGN
CURRENCY EXPOSURE**

**Mr. Rudolph Matthias et al
Economist II
Central Bank of Trinidad and Tobago**



CENTRAL BANK OF TRINIDAD AND TOBAGO

Simple approaches to measuring and managing Trinidad and Tobago's commercial banks foreign currency exposure

Rudy Matthias
Leslie Ann DesVignes
Gillian Pollidore
Charles De Silva

ABSTRACT

This paper measures commercial banks' exposure to foreign exchange risk and suggests a simple approach to managing that exposure to ensure the stability of the domestic financial system. Experience from other developing countries has shown that failure to place prudential limitation on banks' foreign exchange exposure can lead to financial instability and ultimately to devastation of the real economy. Various measures have been used to measure the risk from foreign exchange exposure. These measures suggest that domestic commercial banks' foreign exchange exposure has increased in recent years, and in particular, since exchange controls were lifted in 1993. The evidence also suggests that the larger the exposure, the greater the risk. Since risk varies with exposure, the paper suggests an additional capital charge to limit banks' exposure to such risk.

SIMPLE APPROACHES TO MEASURING AND MANAGING TRINIDAD AND TOBAGO'S COMMERCIAL BANKS FOREIGN CURRENCY EXPOSURE

INTRODUCTION

Recent domestic financial deregulatory measures such as the flotation of the Trinidad and Tobago currency and other financial liberalisation measures in the domestic economy and across the globe have been associated with an increase in Trinidad and Tobago's commercial banks foreign currency activities. For example, over the six-year period, April 1993 to March 1999, total foreign currency assets at banks increased from US\$218 million to US\$908 million, an annualised real growth rate of over 20 percent. For much of this period, banks held open foreign currency positions.

With the flotation of the currency, banks became exposed to exchange rate risk on these open positions, stemming from unexpected changes in exchange rates. When foreign currency assets are greater (less) than liabilities, a depreciation of the domestic currency generates exchange rate gains (losses). Exchange rate movements affect both the income statement and balance sheet. In the latter case, this happens when foreign currency accounts are converted to domestic currency at the end of the bank's reporting period. The larger the absolute size of open positions, the greater the exposure to currency risk.

Given the pace of financial globalisation, the risk of an open position is also greater today than was previously the case because of the contagious effects of financial crises, which have their origin in other parts of the world. The recent financial crisis in Asia provides a good example of the destabilising effects of adverse market sentiments and speculative attacks on economies, which liberalised their financial sectors, but did not put in place adequate prudential controls to safeguard the system against excessive risk taking. Hence, while recent developments in the financial sector have created opportunities for banks to make profits, they have also brought new risks.

In Trinidad and Tobago, while the Central Bank requires banks to hold a proportion of their foreign currency assets in a liquid form¹, it does not impose any limits on their foreign currency exposure², neither is there any capital adequacy requirement imposed on banks' foreign currency deposits. We must point out here, however, that while the Central Bank does not impose limits on banks exposure, all of the domestic commercial banks have self-imposed limits.

Nevertheless, considering the importance of financial stability to economic growth and the new risks to which commercial banks in Trinidad and Tobago are now exposed, regulators must consider whether limits (whether self imposed or otherwise) are enough to ensure that banks do not engage in excessive risk taking, which could destabilise the financial system. While commercial judgement dictates that banks will develop proper internal controls and risk management systems to protect their capital and depositors' funds, monetary authorities also have a duty to ensure that these systems are in place and that they are adequate. This is the main objective of prudential regulation and supervision.

¹ At present, commercial banks and non-bank financial institutions (which take foreign currency deposits) are required to hold 20 percent of their foreign currency deposits in highly liquid assets.

² We must point out here that while the Central Bank does not *impose* limits on banks exposure, *al* of the commercial banks in Trinidad and Tobago have *self-imposed* limits.

The measurement of commercial banks' foreign currency risk has been treated diversely in the literature. Even so, little account has been taken of the presence of exchange rate risk in banks' non-currency international activities or of the fact that a measure of currency risk may exist even with respect to a bank's domestic dealings where large customers may have significant foreign currency exposures. Fieleke's (1981) early study examined the forecasting ability of commercial banks. But his study did not take account of the risks involved in foreign currency activities neither did it take adequate account of the interdependencies of various currencies in a banks' portfolio.

Grammatikos et al. (1986) sought to remedy these deficiencies by recognising both exchange rate risk and interest rate risk. Interest rate risk arises when there is a mismatch between the average duration of assets and liabilities whereas exchange rate risks arise because of differences in the absolute size of foreign currency assets and liabilities. The authors also noted that diversification into different currencies with different asset-liability durations would tend to attenuate overall portfolio risk provided that risks were imperfectly correlated across currencies.

In a subsequent study of risk and return in the Australian banking system Sharpe, Vance and McDermott (1994) eschew the aggregated approach used by Grammatikos et al. in analysing the exposure of individual commercial banks. However, their measure of risk essentially replicates that used by Grammatikos et al. Both studies conclude that banks' foreign currency risk was disproportionately large relative to returns on the foreign currency portfolio. However, they also found that because of the small size of the currency portfolio relative to the banks' total portfolio this risk does not translate directly into a higher probability of bank failure. Brickley (1986) made a similar observation in his comments on Grammatikos et al. work.

This paper attempts to measure the risk exposure of domestic commercial foreign currency activities and to suggest ways of managing this risk. In Section II of this paper, various measures are used to evaluate commercial banks' foreign currency exposure. Section III assesses the exchange rate risk associated with these exposures. Section IV suggests a way of managing domestic banks' foreign currency risk, while Section V presents some concluding remarks.

COMMERCIAL BANKS' FOREIGN CURRENCY EXPOSURE

The first step in managing exchange rate risk is to measure exposure to such risk. There are two ways of doing this. Exchange rate risk can be measured by taking the position in each currency separately or by summing the positions in all foreign currencies. The former method—the single currency position—measures the potential losses or gains to the bank from a unit change in each of the currencies in which the bank has an investment. The latter measure—the overall position—gives a summary of the banks' overall foreign currency position. This approach is appropriate where banks' foreign currency portfolios are dominated by a single currency.³

The overall foreign currency position can be calculated in three ways: (1) the gross aggregate position (GAP) (2) the net asset position (NAP)⁴ and (3) the shorthand position (SP). The GAP is the sum of the value of foreign currency assets and liabilities, the NAP is calculated as assets minus liabilities while the SP is the absolute value of the greater of assets and liabilities. The choice of the most appropriate of these three measures in any circumstances depends on the correlation of exchange rate

³ Domestic commercial banks hold over 90 percent of their foreign currency portfolios in US dollars.

⁴ There is a related measure, the Net Aggregate Position, which is the absolute value of assets minus liabilities.

movements between currencies. When exchange rate movements are perfectly correlated, the most appropriate measure is the NAP. When these movements are uncorrelated, the GAP is the most appropriate. The SP measure is a compromise between the NAP and GAP; while there is some correlation, between exchange rate movements, these are no perfect.

In Trinidad and Tobago, over 90 percent of banks foreign currency portfolios are invested in US dollar investments. To simplify the analysis, we convert the remaining investments in other currencies to US dollars, rather than take each currency separately. Having done so, we are able to use any of the three methods, since any consideration of correlation of exchange rate movements among currencies no longer arises.⁵ In this paper, we use the NAP to examine exchange rate movements, but use the SP later in the analysis when we examine risk management. The NAP is useful to evaluate portfolio changes, as it is the most intuitive of the three measures.

Although because of their simplicity these methods are attractive, there are several drawbacks in using them for internal control and regulatory purposes in situations where banks hold portfolios that are diversified across various currencies. There are several reasons for this. None of these methods take *full* account of the correlation among currencies in the portfolio; they treat foreign exchange risk as independent from other portfolio risks; and they do not take account of the *size* of the variations in each currency.⁶ Naturally, where banks invest predominantly in a single currency, these factors are unlikely to have significant bearing on the analysis and results.

Table 1 gives a summary of the foreign currency component of the balance sheets of the six domestic commercial banks. As the table shows, banks' foreign exchange activities have increased considerably since foreign exchange controls were removed in 1993. This is reflected in part by the increase in the share of banks' total assets held in foreign currencies. The foreign currency component of the balance sheet has grown steadily from 20 percent in 1995 to almost 27 percent in 1999.

The table also shows that over the years, banks have been rebalancing their portfolios, by shifting funds from liquid accounts held at other banks into higher earning but less liquid investments and loans. For instance, at the end of 1993, balances held at other banks accounted for 56 percent of all foreign currency assets, whereas by the end of 1998, this account fell by 37 percentage points to 19 percent. Most of these funds were placed in investments, which increased by 19 percentage points, and new loans, which grew by another 18 percentage points over the same period. The table also shows that only in 1995 and 1998 were forward contracts (off-balance-sheet contracts) used to partly hedge open positions. In other years, forwards increased long and short on-balance-sheet positions.

Table 1 (US\$ million)*	1993	1994	1995	1996	1997	1998	1999**
Foreign currency assets to total assets (%)	N/A	N/A	20.1	20.4	22.6	26.2	27.0
Average Net Position (US\$m)							
Net Asset Position (On-Balance-Sheet)	N/A	57.5	57.5	32.7	42.9	5.6	-6.3
Net Forward Contracts (Off-Balance-Sheet)	N/A	0.5	-1.4	1.4	0.5	-6.8	-4.7
Net Position (On- and Off-Balance-Sheet)	N/A	58.0	56.1	34.1	43.5	-1.2	-11.0
Foreign Currency Balance Sheet (US\$m)							
Assets (% of total foreign currency assets)							
Due From Banks	55.5	44.1	33.2	25.0	19.2	19.6	19.1
Investments	16.0	16.4	25.7	28.3	39.1	36.4	35.2
Foreign Currency Loans	20.7	29.7	26.5	28.6	30.9	32.7	39.0
Cash and other assets	7.7	9.8	14.6	18.1	10.9	11.2	6.8
Liabilities (% of total foreign currency liabilities)							
Foreign Currency Deposits	60.8	78.4	83.9	82.6	68.4	73.0	70.8
Due to Financial Institutions	31.4	14.2	12.0	9.6	8.0	9.9	11.0
Capital and other liabilities	7.8	7.4	4.1	7.7	23.8	17.1	18.1

* The numbers in this table are arithmetic averages for each year.

** This is for the period January to September.

On the financing side of the balance sheet, deposits and amounts due to financial institutions remain the two main sources of financing. Most of these deposits belong to residents of Trinidad and Tobago; they own about 94 percent of the foreign currency deposits, which translates into about 56 percent of the foreign currency liabilities.

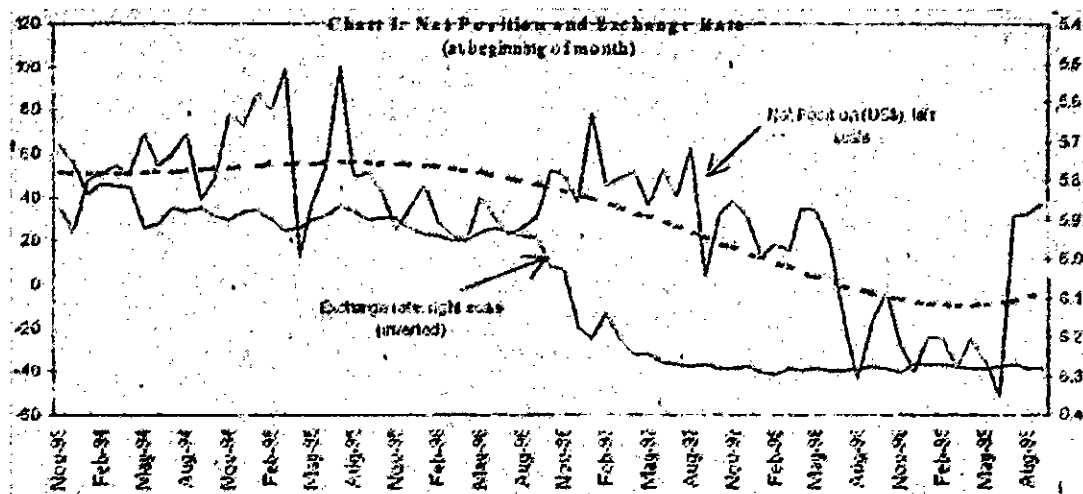


Chart 1 shows the trend of the combined NAP⁷ and the TT/US dollar exchange rates between November 1993 and September 1999. As the chart shows, in the first four post-liberalisation years, 1994 to 1997, banks' held long positions (where foreign currency assets are greater than foreign currency liabilities), whereas from the mid-1998 to mid-1999, this position was reversed to an overall short position (foreign currency assets are less than foreign currency liabilities). The chart further shows that for most of the period under review, the TT dollar depreciated against the US dollar. This means that for most of this period, banks would have expected capital gains (realised or unrealised) on their long US dollar positions.⁸ Clearly, when the exchange rate is likely to depreciate, banks are likely to build-up long positions and to reverse these if the rate is expected to stabilise or appreciate.

Exchange rate forecasting might partly explain the build-up in the NAP between October 1996 and August 1997. As Chart 1 shows, during this period, there was a steep depreciation of the US/TT dollar exchange rate. What is not easily understood is that although the exchange rate has stabilised between July 1997 and September 1999, the NAP has moved from a long position of US\$63 million in August 1997 to a short position of US\$40 million in August 1998 and back into a long position of US\$38 million by September 1999. Within the simple framework presented in the chart, there is no clear relationship between movements in the NAP and exchange rate changes; these simple correlation do not capture the full dynamics of foreign currency forecasting and investment activities.⁹

The central Bank activities in the foreign currency market may also have had a bearing on banks' foreign currency portfolio. Since in the period under review the Central Bank intervened several times to smooth fluctuations in the market for foreign currency, banks are likely to factor this into their expectations about exchange rate changes, and to use this information in rebalancing their foreign

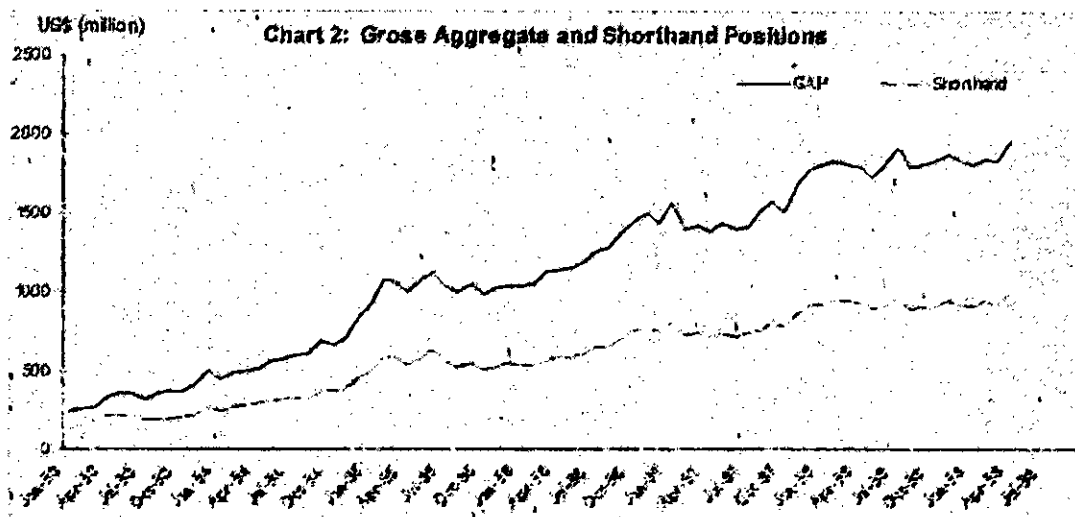
⁷ This is for all six commercial banks.

⁸ When banks hold long positions in a foreign currency, they will earn capital gains (incur capital losses) when the TT dollar depreciates (appreciates) against that currency.

⁹ Of course, exchange rate movements may be only one of a number of factors that influence changes in the NAP.

currency portfolios. Given that banks took on short positions in the period when rates were stable, this suggests that they did not expect any significant depreciation of the TT/US dollar exchange rate.

The other two measures of foreign currency exposure—the GAP and SP—are plotted in Chart 2 for the period January 1993 to July 1999. As the NAP suggests, both the GAP and the SP show that commercial banks' exposure to foreign currency risk grew at a constant pace over the period.



METHODOLOGY AND RESULTS

An important aspect of risk management is to quantify the risks associated with an investment. Since risk is the uncertainty of returns on an investment, we can view the risk associated with banks' foreign currency portfolios as the expected or ex ante standard deviation of returns on this portfolio. The ex ante standard deviation can be analysed in a portfolio framework. To do this, we follow a methodology used recently by Sharpe, Vance and McDermott (1994) to analyse the risks and returns on Australian banks' foreign currency portfolios.

As noted above, because the overwhelming share of banks' foreign currency assets is held in US dollars, we convert the small amount of investments/liabilities held in other currencies to US dollars and therefore treat the net asset position, NP_0 , as if it were fully invested in US dollar securities. We assume that these assets are held as 3-month investments, attracting a 3-month US dollar deposit rate of interest, r_0 .¹⁰ Data on US dollar Euro deposits are obtained from IFS. We denote the TT/US dollar exchange rate at the beginning of the period as X_0 . Exchange rate data and data on net asset position were obtained from the Central Bank of Trinidad and Tobago's database. We use the mid-point of the buy/sell range for the TT/US dollar as the effective exchange rate.

¹⁰ This assumption is reasonable, given that most of commercial banks' assets are of a short-term duration, such as, balances held with other banks, investments and treasuries. Similarly, on the liability side, a large share of financing comes from time deposits.

Given the beginning net asset position, NP_o , interest rate, r_o , and exchange rate, X_o , we can calculate the expected return on the net position or the change in wealth, $\Delta\tilde{W}$ for each commercial bank or for commercial banks in aggregate. A bank with a positive (negative) net asset position in US dollar deposits would expect to earn interest income (incur interest costs) at the end of the period—say at the end of one month. However, with a floating currency, the total change in the end of period wealth will also depend on the expected change in the exchange rate, $E(\Delta\tilde{X}/X_o)$. Hence, the banks' expected return or change in wealth from holding an exposed foreign currency position could be computed as:

$$E(\Delta\tilde{W}) = NP_o(1 + r_o)X_o \left[1 + \frac{E(\Delta\tilde{X})}{X_o} \right] - NP_oX_o$$

And the expected risk or *ex ante* variance (*Var*) of the foreign currency position can be calculated as:

$$Var(\Delta\tilde{W}) = [NP_o(1 + r_o)X_o]^2 Var\left(\frac{\Delta\tilde{X}}{X_o}\right)$$

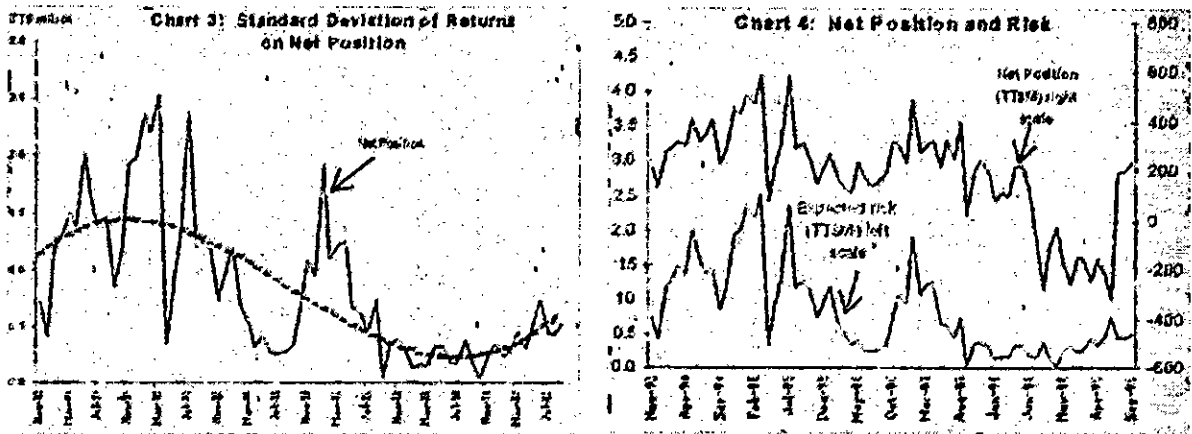
In calculating the *ex ante* variance of returns, $Var(\Delta\tilde{W})$ we assume that at the beginning of each period (each month), banks select their net asset position based on an estimate of their forecast of the variance of exchange rate changes, which is estimated from daily exchange rate changes over the previous 6 months. In effect, we calculate a rolling variance of exchange rate changes for each month from daily exchange rate changes in the most recent 6 months prior to the beginning of the period t . The *ex ante* variance therefore utilizes information only on prior changes in exchange rates.

Given the net asset position expressed in domestic currency, $[NP_o(1 + r_o)X_o]$ and an estimate of the variance of exchange rate changes, $Var(\Delta\tilde{X}/X_o)$, the *ex ante* standard deviation of returns over the sample period is given as: $\sqrt{Var(\Delta\tilde{W})}$. As the discussion above suggests, the standard deviation of the banks' return or the riskiness of the banks' foreign currency activities is determined by both the size of the net foreign currency position and unexpected changes in exchange rates. It is worthwhile to reiterate that banks are exposed to exchange rate risk only when they hold open foreign currency positions—whether positive or negative—and there is an unexpected change in exchange rates. If the banks' foreign currency assets are greater (smaller) than liabilities, an appreciation (depreciation) in the US dollar, vis-à-vis the TT dollar generates realized or unrealized capital gains (losses).

Chart 3 shows the series of monthly standard deviations of returns on banks' net positions with a trend fitted to this series. The chart suggests that while there have been large variations, in absolute TT dollar terms, in returns on the net position, these have declined substantially over time. As the chart indicates, there are two periods of relatively high volatility or risk. These are January 1994 to September 1995 and October 1996 to August 1997. Chart 4 shows that these periods of relatively high risk are associated with relatively large exposures and vice versa.

The idea the chart conveys is that the larger the exposure (the absolute dollar size of the net position), the greater, in absolute dollar terms, is the expected risk associated with this exposure. This is, of course, intuitive. In other words, the change in the absolute size of the risk was of a certain proportion of the change in the absolute size of the net position. One question that is worth investigating is whether the increasing risk was of a similar magnitude to the increasing size of the net exposures.

We test this proposition using simple regression techniques. In the first regression, we regress the actual expected risk (AR) on the absolute value of the net position (ANP). In the second equation, we regress the ratio of AR to ANP on a time trend. The first set of regression results¹¹ suggests that over 80 percent of the variation in the actual ex ante risk can be explained by variations in the absolute net position. The second set of results¹² suggests that nearly 60 percent of the variation in the actual ex ante risk normalised by the size of the net position can be explained by a time trend. Together, these results suggest that the absolute size of the risk inherent in the exposure is related to both the absolute size of the exposure and to changes in this position over time.



EXCHANGE RATE RISK MANAGEMENT

Having determined commercial banks foreign currency exposure and the risk associated with that exposure, the next step is to manage that risk to avert financial instability. Until recently, the approach commonly taken by banks and regulators in advanced and developing countries for managing foreign exchange risk has been to place limits on foreign currency exposure. The objective of these limits has been to reduce fluctuations in income due to exchange rate movements. These limits are usually expressed, either in absolute terms or as a percentage of the capital of the bank. When limits are used to control foreign exchange exposure, they are imposed on either single currency positions or on the overall foreign currency position. Single currency limits help to reduce fluctuations in income associated with bilateral exchange rate movements, whereas limits on the overall foreign currency position guard against fluctuations due to movements in the exchange rates of all currencies.

However, while direct limits help to reduce exposure and therefore help to manage foreign exchange risk, in their survey of IMF member countries Abrams and Beato (1997) found that regulators around the world are increasingly moving away from using limits for managing foreign currency risk. There are two main reasons cited for this trend. First, direct limits do not take into account other risks inherent in banks' portfolios. Secondly, while direct limits help to reduce exposure to exchange rate risk, because they are usually set independently of capital considerations, they do not require banks to

¹¹ The first set of results are: $AR = 0.00475ANP$ $R^2 = 0.813$

¹² The second set of results are: $\frac{AR}{ANP} = -8.825E-06Time$ $R^2 = 0.579$

maintain capital to cover the risk inherent in their foreign currency activities. Indeed, these are two of the main considerations, which motivated the Basle Committee to recommend VAR models as the preferred tool for managing foreign currency and other forms of market risks.^{13, 14}

In the case of Trinidad and Tobago, there are three main considerations, which support the imposition of a capital charge as against limits. First, the capital charge is an equitable way of controlling banks' foreign currency activities, since each bank can have an open position in direct relation to its capital. Secondly, while banks should be allowed to use their commercial judgement in their investment decisions, regulators can be certain that they have at least a proportion of their exposure in the form of approved capital to cover whatever losses they make on their open foreign currency positions, rather than so provide a buffer for depositors' funds. Finally, although domestic banks have self-imposed limits on their trading activities, in the absence of any regulatory requirement for them to do so, banks can change these limits and assume far greater risk than the central bank might think is prudent for the institution.

The 1995 revised capital accord¹⁵, which incorporates market risks, suggests a two step approach in imposing a capital charge for exchange rate risk. First, the SP method can be used to measure banks' overall open foreign exchange position, and secondly, on the basis of this exposure, banks should be required to maintain a capital charge of a minimum of 8% on this exposure. The capital charge for exchange rate risk must be in addition to any capital required to cover credit risk. Of course, the other two methods—GAP and SP—could also have been used to calculate exposure and for determining the capital charge. However, because there are differences in the results between these methods, a suitable capital charge would have to be calculated for each method.

Charts 5a to 5e in Appendix 1 provide some indication of the impact on qualifying capital of the imposition of a capital charge of 8 percent for exchange rate risk. It is important to explain how these charts are constructed and what they purport to show. First, we use the total risk adjusted assets to compute the 8 percent capital charge for credit risk, which we then subtract from total qualifying capital (that is, the sum of Tier I and Tier II capital). Next, we use the Shorthand method to calculate the foreign currency exposure (in TT dollar terms) for each bank. Finally, we express the residual qualifying capital, that is after subtracting the 8 percent for credit risk, as a percentage of each bank's foreign currency exposure.

The results are shown in the charts. Since this is an historical analysis, one way of interpreting the results is to say that it shows the highest levels of approved capital available to each bank to apply to any losses which the bank may sustain in its foreign currency activities. Hence, these charts provide an answer to the question: What is the highest capital charge on individual banks' foreign currency exposure that can be met by existing levels of qualifying capital, after covering credit risk? The results for the domestic banks clearly suggest that over the years, for three of the commercial banks, existing levels of qualifying capital could have met a capital charge of 15 percent.

For two of the commercial banks however, existing levels of qualifying capital would only have sustained a capital charge in the region of 5 percent or less. If we set the minimum capital ratio above

¹³ See Basle Committee on Banking Supervision (1996).

¹⁴ There are a number of other problems associated with the use of limits to manage foreign currency exposures and associated risk. Regulators could, for example, limit the type (riskiness) of investments in which banks invest, but in doing so could run into problems of having to specify each type of investment and those, which are not permitted. Daily limits can be imposed, but to be effective, these must be scrutinised on a daily basis. Something which requires vast resources.

¹⁵ See Basle Committee on Banking Supervision (1996).

5 percent, Bank 3 and Bank 4 would not have sufficient qualifying capital to meet this requirement. What this means is that if these two banks are unable to increase their approved capital they would be forced to reduce their foreign currency exposure. On the other hand, banks with ample capital can afford to take larger positions. Given that banks are unlikely to be able to increase their approved capital within the short term, the higher the capital charge, the greater the constraint on banks foreign currency exposure.

While the Basle Committee's recommendations for SP and an 8% capital charge seems feasible, supervisors may exercise some discretion with respect to banks' structural positions. Indeed, as Appendix 2 outlines, the Basle Committee recommendations provide for supervisors to exercise discretion over banks' structural positions when these are calculated. When consideration is given to structural positions, banks' capital ratios could improve dramatically.

CONCLUSIONS

This study examines commercial banks' foreign exchange risk with a view to suggesting simple ways of measuring and managing exposure to exchange rate risk. We find that since exchange controls were lifted in 1993, the foreign currency activities of commercial banks in Trinidad and Tobago have increased considerably. During this period, banks held open foreign currency positions and also rebalanced their portfolios, by moving funds out of relatively safe deposit accounts to more risky and less liquid higher earning investments and loans. We also find that the risk associated with these open positions is closely associated with the size of the positions. As the absolute size of these positions change over time, so too does the absolute size of the risk. This means that larger open positions (whether long or short), carry greater risk.

In view of the need to protect the financial system from excessive risk taking by banks, one way to control risks associated with activities in foreign currency is to control the size of these exposures. Central Banks can manage commercial banks' exchange rate risk by limiting their exposure to such risk. This can be done using any of three traditional methods. However, in accordance with the Basle Committee's recommendations, the Shorthand Position method has been used in this paper for calculating banks' exposure to currency risk and for determining the capital charge to meet this risk. In essence, banks need to maintain a minimum approved capital of 8 percent of their exposure to cover the exchange risk. This capital must be in addition to that required for credit risk.

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Appendix 1: Critical levels of approved capital for domestic commercial banks

Chart 5a: Bank 1

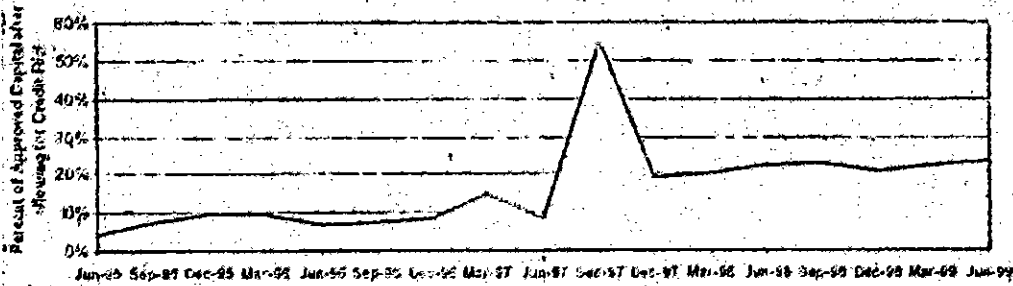


Chart 5b: Bank 2

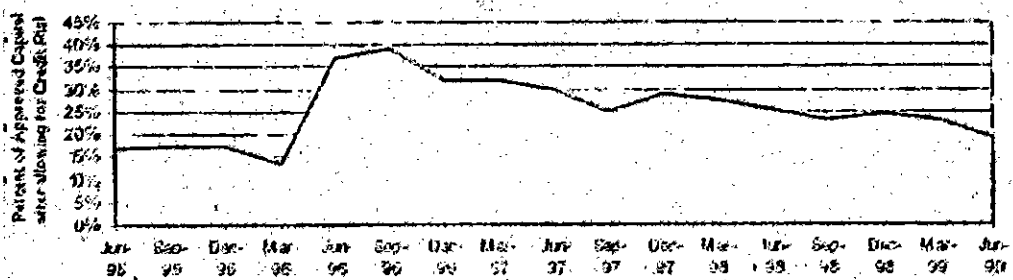


Chart 5c: Bank 3

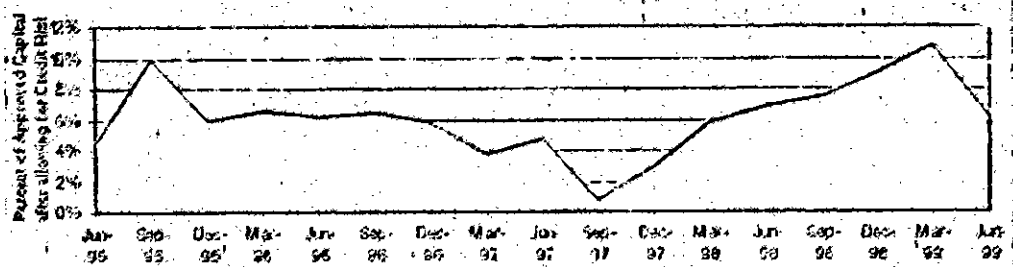


Chart 5d: Bank 4

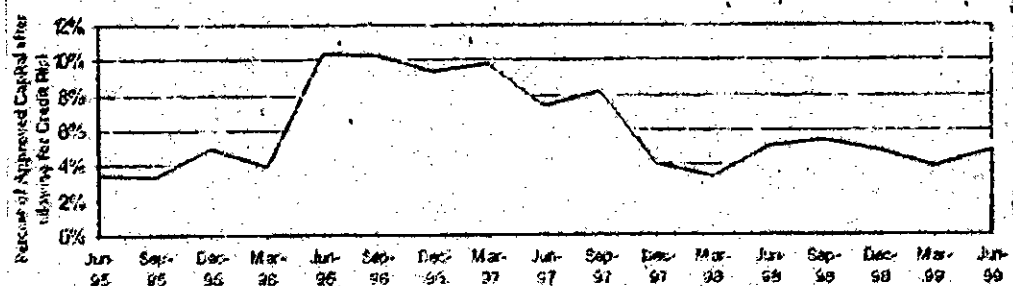
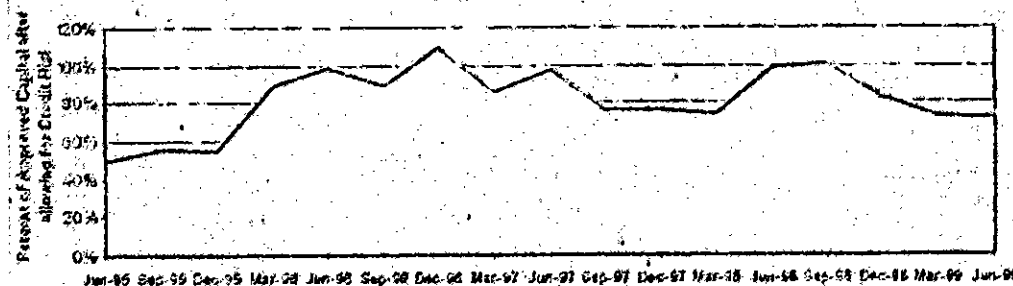


Chart 5e: Bank 5



Appendix 2: The Basle Committee on Banking Supervision Recommendations

For managing foreign exchange risk

1. These recommendations sets out a minimum capital standard to cover the risk of holding or taking positions in foreign currencies, including gold.¹⁶
2. Two processes are needed to calculate the capital requirement for foreign exchange risk. The first is to measure the exposure in a single currency position. The second is to measure the risks inherent in a bank's mix of long and short positions in different currencies.

I. MEASURING THE EXPOSURE IN A SINGLE CURRENCY

3. The bank's net open position in each currency should be calculated by summing:
 - the net spot position (i.e. all asset items less all liability items, including accrued interest, denominated in the currency in question);
 - the net forward position (i.e. all amounts to be received less all amounts to be paid under forward foreign exchange transactions, including currency futures and the principal on currency swaps not included in the spot position);
 - guarantees (and similar instruments) that are certain to be called and are likely to be irrecoverable;
 - net future income/expenses not yet accrued but already fully hedged (at the discretion of the reporting bank);
 - depending on particular accounting conventions in different countries, any other item representing a profit or loss in foreign currencies;
 - the net delta-based equivalent of the total book of foreign currency options.¹⁷
4. Positions in composite currencies, such as the ECU, need to be separately reported but, for measuring banks' open positions, may be either treated as a currency in their own right or split into their component parts on a consistent basis. Positions in gold should be measured in the same manner as described in paragraph 7 of A.4.¹⁸
5. Three aspects call for more specific comment: the treatment of interest, other income and expenses; the measurement of forward currency positions and gold; and the treatment of "structural" positions.

(a) The treatment of interest, other income and expenses

6. Interest accrued (i.e. earned but not yet received) should be included as a position. Accrued expenses should also be included. Unearned but expected future interest and anticipated expenses may be excluded unless the amounts are certain and banks have taken the opportunity to hedge them. If banks include future income/expenses, they should do so on a consistent basis, and not be permitted to select only those expected future flows, which reduce their position.

(b) The measurement of forward currency and gold positions

7. Forward currency and gold positions will normally be valued at current spot market exchange rates. Using forward exchange rates would be inappropriate since it would result in the measured positions reflecting current interest rate differentials to some extent.

However, banks, which base their normal management accounting on net present values, are expected to use the net present values of each position, discounted using current interest rates and valued at current spot rates, for measuring their forward currency and gold positions.

(c) The treatment of structural positions

8. A matched currency position will protect a bank against loss from movements in exchange rates, but will not necessarily protect its capital adequacy ratio. If a bank has its capital denominated in its domestic currency and has a portfolio of foreign currency assets and liabilities that is completely matched, its capital/asset ratio will fall if the domestic currency depreciates. By running a short position in the domestic currency the bank can

¹⁶ Gold is to be dealt with as a foreign exchange position rather than a commodity because its volatility is more in line with foreign currencies and banks manage it in a similar manner to foreign currencies.

¹⁷ Subject to a separately-calculated capital charge for gamma and vega as described in Section II (a) of A.5; alternatively, options and their associated underlying are subject to one of the other methods described in A.5.

¹⁸ Where gold is part of a forward contract (quantity of gold to be received or to be delivered), any interest rate or foreign currency exposure from the other leg of the contract should be reported as set out in A.1 and in paragraph 3 above.

protect its capital adequacy ratio, although the position would lead to a loss if the domestic currency were to appreciate.

9. Supervisory authorities are free to allow banks to protect their capital adequacy ratio in this way. Thus, any positions which a bank has deliberately taken in order to hedge partially or totally against the adverse effect of the exchange rate on its capital ratio may be excluded from the calculation of net open currency positions, subject to each of the following conditions being met:

- such positions need to be of a "structural", i.e. of a non-dealing, nature (the precise definition to be set by national authorities according to national accounting standards and practices);
- the national authority needs to be satisfied that the "structural" position excluded does no more than protect the bank's capital adequacy ratio;
- any exclusion of the position needs to be applied consistently, with the treatment of the hedge remaining the same for the life of the assets or other items.

10. No capital charge need apply to positions related to items that are deducted from a bank's capital when calculating its capital base, such as investments in non-consolidated subsidiaries, nor to other long-term participation denominated in foreign currencies which are reported in the published accounts at historic cost. These may also be treated as structural positions.

II. Measuring the foreign exchange risk in a portfolio of foreign currency positions and gold

11. Banks will have a choice between two alternative measures at supervisory discretion: a "shorthand" method which treats all currencies equally; and the use of internal models which takes account of the actual degree of risk, dependent on the composition of the bank's portfolio. The conditions for the use of internal models are set out in Part B.

12. Under the shorthand method, the nominal amount (or net present value) of the net position in each foreign currency and in gold is converted at spot rates into the reporting currency.¹⁹ The overall net open position is measured by aggregating:

- the sum of the net short positions or the sum of the net long positions, whichever is the greater;²⁰ plus
- the net position (short or long) in gold, regardless of sign.

The capital charge will be 8% of the overall net open position (see example below).

Example of the shorthand measure of foreign exchange risk

YEN	DM	GB	FRR	US\$	GOLD
+50	+100	+150	-20	-180	-35
	+300		-200		35

The capital charge would be 8% of the higher of either the net long currency positions or the net short currency positions (i.e. 300) and of the net position in gold (35) = $335 \times 8\% = 26.8$.

13. A bank doing negligible business in foreign currency and which does not take foreign exchange positions for its own account may, at the discretion of its national authority, be exempted from capital requirements on these positions provided that:

- its foreign currency business, defined as the greater of the sum of its gross long positions and the sum of its gross short positions in all foreign currencies, does not exceed 100% of eligible capital as defined on pages 7 and 8, and

¹⁹ Where the bank is assessing its foreign exchange risk on a consolidated basis, it may be technically impractical in the case of some marginal operations to include the currency positions of a foreign branch or subsidiary of the bank. In such cases the internal limit in each currency may be used as a proxy for the positions. Provided there is adequate ex-post monitoring of actual positions against such limits, the limits should be added, without regard to sign, to the net open position in each currency.

²⁰ An alternative calculation, which produces an identical result, is to include the reporting currency as a residual and to take the sum of all the short (or long) positions.

- its overall net open position as defined in the paragraph above does not exceed 2% of its eligible capital as defined on pages 7 and 8.