Chapter 5
Impact of Macroeconomic Forecasts
on the Country's Borrowing Cost

In order to analyze the impact of macroeconomic forecasts on the country's borrowing costs, this chapter is divided into two sections. First, graphical analysis of the relationships between countries' borrowing costs and their forecasts of macroeconomic variables is provided in order to determine the basic relationship between borrowing costs and each particular macroeconomic forecasts. Then, the second section provides a regression analysis that relates the country's borrowing costs to macroeconomic forecasts.
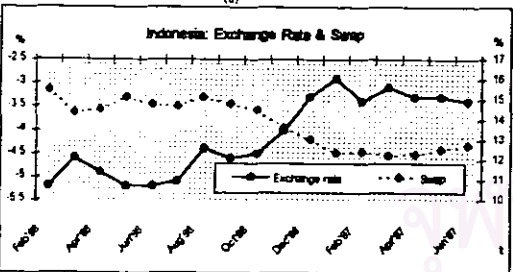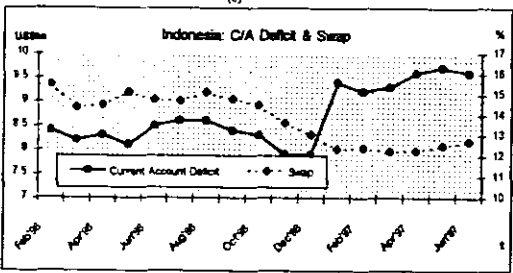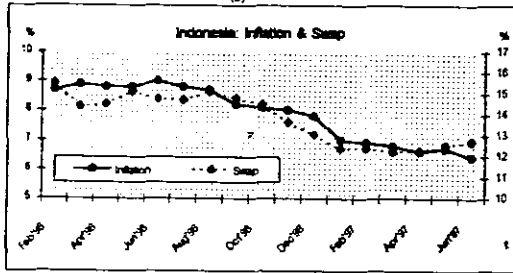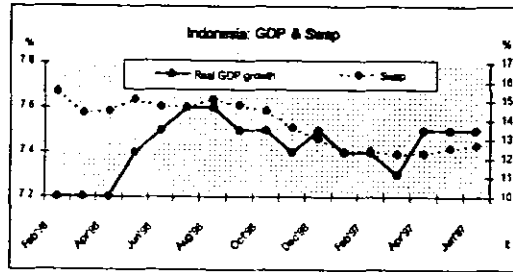
5.1 Relating Macroeconomic Forecasts to the Country's Borrowing Costs: Graphical Analysis.

Exhibit 5.1 (a) - (d) plots the macroeconomic forecasts of real GDP growth, inflation, current account deficits and percentage change in exchange rates against the cross-currency swap rates for Indonesia, Malaysia and Thailand between February 1996 and June 1997. As can be seen in Exhibit 5.1 (a), the swap rates of Indonesia and Thailand trended upward when forecasts of real GDP growth trended downward. This indicates that investors or lenders require increased premiums in investing in or lending to Indonesia and Thailand when their expected economic growth declines as they have lower ability to generate foreign earnings and hence are more likely to default. Meanwhile, the swap rate for Malaysia trended downward during 1996 as its forecast of real GDP growth declined. This is because other factors (i.e. inflation, etc.) may be more important in determining such a downward trend in the Malaysian swap rate.
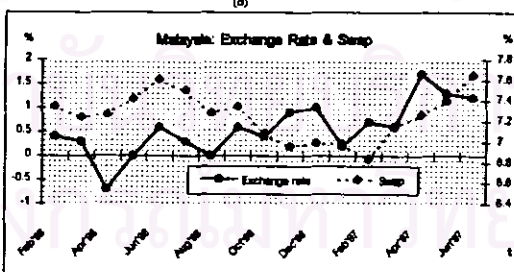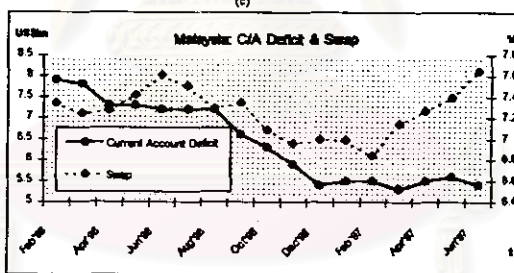
In particular, when analyzing further the relationship between swap rates and expected inflation (Exhibit 5.1 (b)), it is found that the swap rates for Indonesia and Malaysia and their expected inflation rates followed the same downward trend -

Exhibit 5.1: Graphs relating Macroeconomic Forecasts to the Swap rates.

Indonesia (a)

Indonesia: GDP & Swap

Malaysia (a)

Malaysia: GDP & Swap

Thailand (a)

Thailand: GDP & Swap

(b)

Indonesia: Inflation & Swap

(b)

Malaysia: Inflation & Swap

(b)

Thailand: Inflation & Swap

(c)

Indonesia: C/A Deficit & Swap

(c)

Malaysia: C/A Deficit & Swap

(c)

Thailand: C/A Deficit & Swap

(d)

Indonesia: Exchange Rate & Swap

(d)

Malaysia: Exchange Rate & Swap

(d)

Thailand: Exchange Rate & Swap

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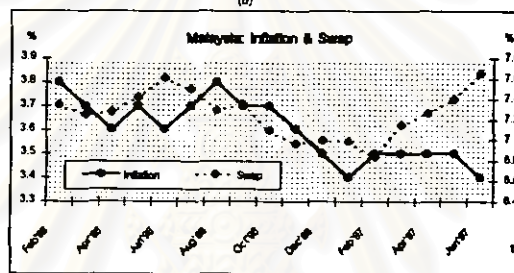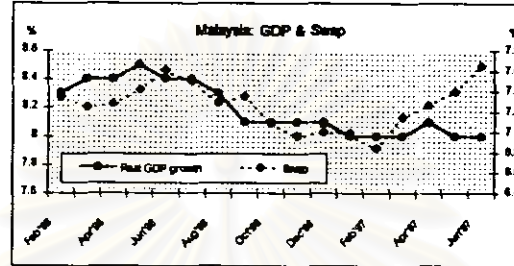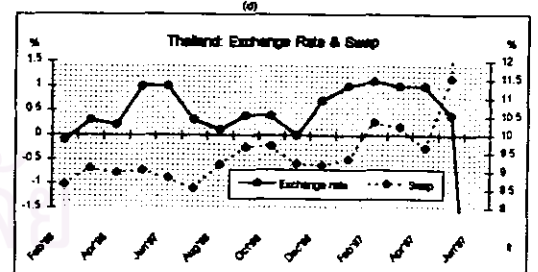
meaning that an expected decline in the inflation rates was rewarded by a decline in the country's swap rate. This is because an expected decline in inflation reduces additional costs to the economy and gives rise to an appreciation in the domestic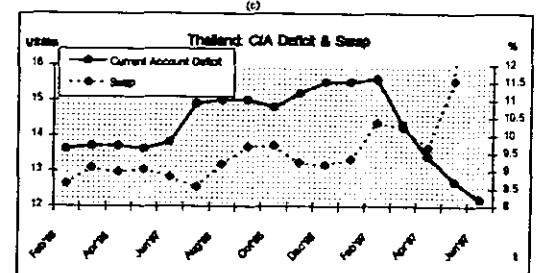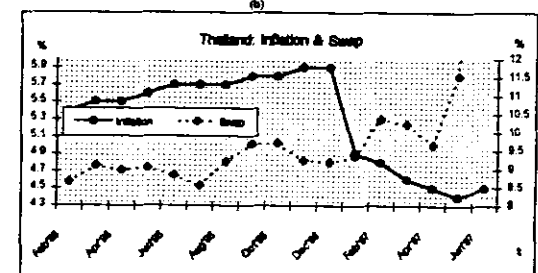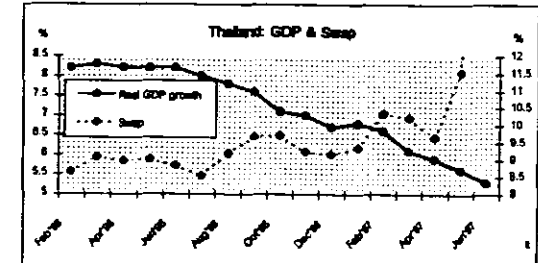 currency's value, thereby reducing the country's risk and borrowing costs. In contrast, both the swap rates and expected inflation for Thailand trended upward during 1996, reflecting increased borrowing costs corresponding to an increase in price pressure. However, a significant decline in the expected inflation rate did not give rise to a similar decline in the swap rate of Thailand during the first half of 1997, primarily because of baht speculation, which subsequently led to the financial crisis in Thailand. This increased both the country risk and the country's external borrowing costs, despite a decline in expected inflation during the first half of 1997.

Furthermore, during the 1996 the swap rates in Indonesia, Malaysia and Thailand were positively related to their forecast of current account deficits. In particular, the swap rates for both Indonesia and Malaysia trended in the same downward direction as their expected current account deficit; whereas, the swap rate for Thailand and its expected current account deficit trended upward. This means that accompanying the expected decline (increase) in the current account deficits of Indonesia and Malaysia (Thailand) which may reflect an increase (decrease) in the country's ability to generate foreign exchange from exports and hence increase (decrease) the country's creditworthiness, the external borrowing costs of the country declined (increased). However, the direction of the relationship between the swap rates and the forecast of current account deficits of Indonesia, Malaysia and Thailand were to change markedly during the course of 1997.

For the relationship between the swap rate and the forecast of the country's currency value, the graphical relationship between Indonesia's swap rate and the forecast of its currency's value can be seen clearly in Exhibit 5.1 (d). In particular, as the swap rate of Indonesia trended downward, the forecast of its currency's value (although depreciating) trended upward. This is because an expected increase in the country's currency value would alleviate existing domestic inflationary pressures and external debt problem, thereby restoring investor confidence. As a result, the external borrowing costs of the country decline as its risk decreases. However, the relationship between Malaysia's swap rate and the forecast of its currency value is

quite difficult to be analyzed graphically since forecast of the Malaysian ringgit's value was relatively volatile. Furthermore, for Thailand, although its currency's value was expected to appreciate, the swap rate was still trending upward. This suggests no influence of the forecast of baht value on the swap rate during 1996-97.

In summary, for Indonesia, the forecasts of increasing real GDP growth and currency value together with the forecasts of declining inflation and current account deficit all contributed to the decline in the swap rate during the period of study. In the meanwhile, the graphical relationship between swap rates and macroeconomic forecasts shows that the forecasts of the decline in inflation and current account deficit resulted in a decline in the swap rate of Malaysia; whereas, the forecast of a decline in real GDP growth coupled with the forecasts of the increase in inflation rate and current account deficit contributed to an increase in the swap rate of Thailand. However, although the graphical relationship between the country's swap rate and its macroeconomic forecasts provides the very basic relationship between the country's swap rate and each particular macroeconomic forecast, a better perspective of the relationship between the swap rate and the forecasts of macroeconomic variables altogether will be gained by performing the regression analysis. Thus, a regression analysis is provided in the next section.

5.2 Macroeconomic Forecasts and the Country's Borrowing Costs: a Regression Analysis.

In investigating the predictive-power of macroeconomic forecasts in explaining the borrowing costs for developing sovereigns, this section provides a regression analysis that relates one-year forecasts for the four macroeconomic variables and the market capitalization of the country's stock market to the one-year cross-currency swap rate which represents the country's borrowing costs in international financial markets. The availability of the forecast data limits the number of the macroeconomic forecasts used as explanatory variables in the regression to four variables: real GDP growth, inflation, current account deficit and percentage change in exchange rate. The results of performing the pooled cross-sectional, time series

regression analysis for the three ASEAN countries, including Indonesia, Malaysia and Thailand[*] for each month from February 1996 to May 1997 are as follows[**]:

$$SWAP_{i,t} = 17.5372 - 0.4891\ GDP_{i,t} + 0.4257\ INF_{i,t} - 0.3426\ CAD_{i,t} - 0.4335\ EXR_{i,t}$$

$$t = (11.0364) \quad (-3.1600) \quad (2.7206) \quad (3.8353) \quad (-3.1077)$$

$$- 0.0142\ MKT\_CAP_{i,t} - 1.0664\ DM\_INDO_{i,t} - 1.2425\ DM\_MY_{i,t}$$

$$t = (-4.2545) \quad (-1.5414) \quad (-1.6757)$$

$R^2 = 0.9837$ S.E. of regression $= 0.4027$

Adjusted $R^2 = 0.9808$ F-Statistic $= 343.8993$

$d = 1.7471$

The regression shows that, after taking into account the influence of structural differences between countries, the macroeconomic forecasts of real GDP growth, inflation, current account deficit and percentage change in exchange rate[***], together with the market capitalization of the country's stock market explain about 98 percent of the variation in the average borrowing cost of Indonesia, Malaysia and Thailand.

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[*] Due to the unavailability of the cross-currency swap rate which indicates the relative insignificance of the Philippines in the international financial market, the Philippines is excluded from the regression analysis.

[**] As the country's external borrowing costs, apart from the relative comparison purposes, are more sensitive to the forecast of a country's current account deficit relative to its economic size than the forecast of the absolute figure of its current account deficit, a regression was also performed using the forecast of current account deficit to GDP ratio as one explanatory variable instead of the current account deficit in US$ billion. The regression results are unsatisfactory as, in econometric sense, a multicollinearity problem exists, meaning that there is any linear relationship among the explanatory variables. As a consequence, these coefficients are statistically insignificant.

In addition, a regression was also conducted using the percentage growth of the market capitalization. The basic findings are essentially unchanged, except that the growth rate of market capitalization becomes statistically insignificant.

[***] Although there exists an endogeneity problem in the regression model as the percentage change in exchange rate is already included in the cross-currency swap rates, the percentage change in exchange rate can however be treated as an exogeneous variable in this regression model. This is because exchange rate has recently been used by many developing countries, including Malaysia and Thailand, as a policy variable in economic management.

As can be seen in Exhibit 5.2, the fitted value of the cross currency swap rate generated from the regression captures the actual value of the swap rate relatively well, meaning that this regression model is appropriate to be used in determining the cross currency swap rate (the borrowing costs) of these three countries.

Exhibit 5.2: Actual and Fitted Value of the Swap rate.
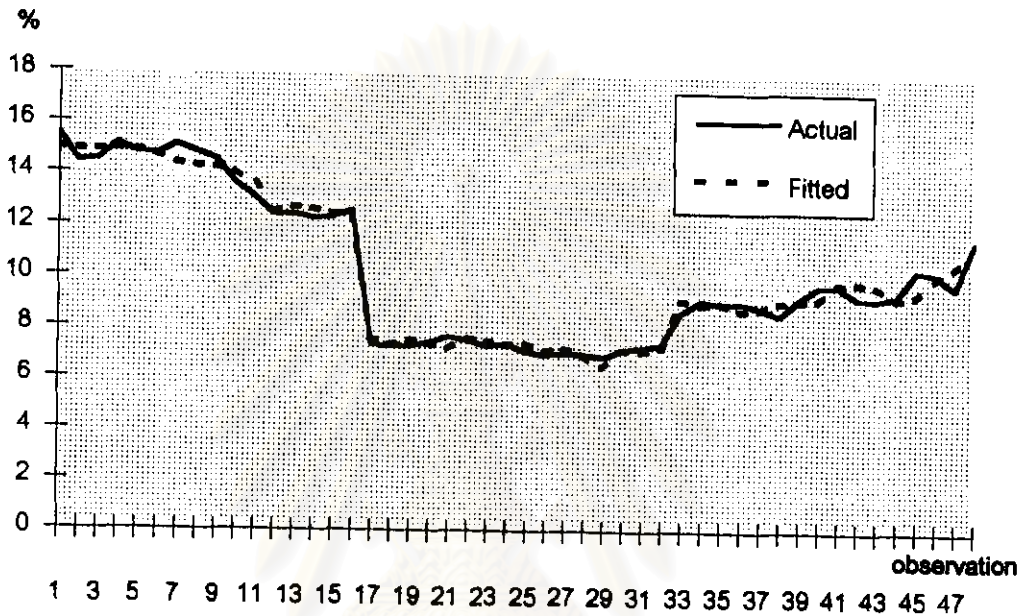
The differential intercept for Malaysia is statistically significant at the 10% level, meaning that, holding other factors constant, the average level of the swap rates for Malaysia was lower than the average level of the swap rates for Thailand by about 1.24 percent. Likewise, the significance of the differential intercept for Indonesia, although significant at the 15% level, implies that the average level of the swap rates for Indonesia was lower than those of Thailand by about 1.07 percent. The regression result, showing the lower average level of swap rates for Malaysia than for Thailand, is reasonably acceptable as Malaysia has much more political stability and effectiveness than Thailand; whereas, the result that Indonesia also has lower average level of the swap rates than Thailand seems somewhat peculiar. However, it may well be the case as Indonesia was given a slightly better score by analyst for political and

policy risk than Thailand over this period.[*] Moreover, the differential intercept for Indonesia is statistically insignificant at the 10% level.

Furthermore, the regression results show that all of the slope coefficients are highly statistically significant at the 1% level and have the expected signs (except the coefficient of current account deficit). The details of particular slope coefficients are as follows:

Real GDP growth

The real GDP growth coefficient of -0.4891 tells us that, after taking into account the impact of structural differences between countries and assuming "ceteris paribus", a 1 percent increase in the forecast of real GDP growth leads on average to approximately nearly a half percent decrease in the average swap rates for Indonesia, Malaysia and Thailand. The negative association between the forecast of real GDP growth and swap rates as generated by the regression can be explained through two channels as shown in the flow chart in Exhibit 5.3.

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[*] According to the political and policy risk assessment of the HSBC James Capel Asia, the risk scores of Indonesia, Malaysia and Thailand are:

	%	Indonesia	Malaysia	Thailand
Political Risk	**32**	**21**	**15**	**22**
Political stability	12	7	5	7
Political effectiveness	21	14	11	15
Economic Policy Risk	**68**	**40**	**35**	**41**
Monetary	21	11	12	12
Fiscal	15	9	5	8
Exchange rate management	18	11	10	12
Trade policy, deregulation and liberalization	15	9	8	8
POLITICAL AND POLICY RISK*	**100**	**61**	**51**	**63**

* The higher the score, the more risky the country.

Source: HSBC James Capel Asia, Asian Economic Insight, No. 20, December 1997, p. 13.

Exhibit 5.3: How expectations of real economic forces influence the country's borrowing costs.

*See Exhibit 5.5 for how change in domestic currency values affect risk premium and borrowing costs.
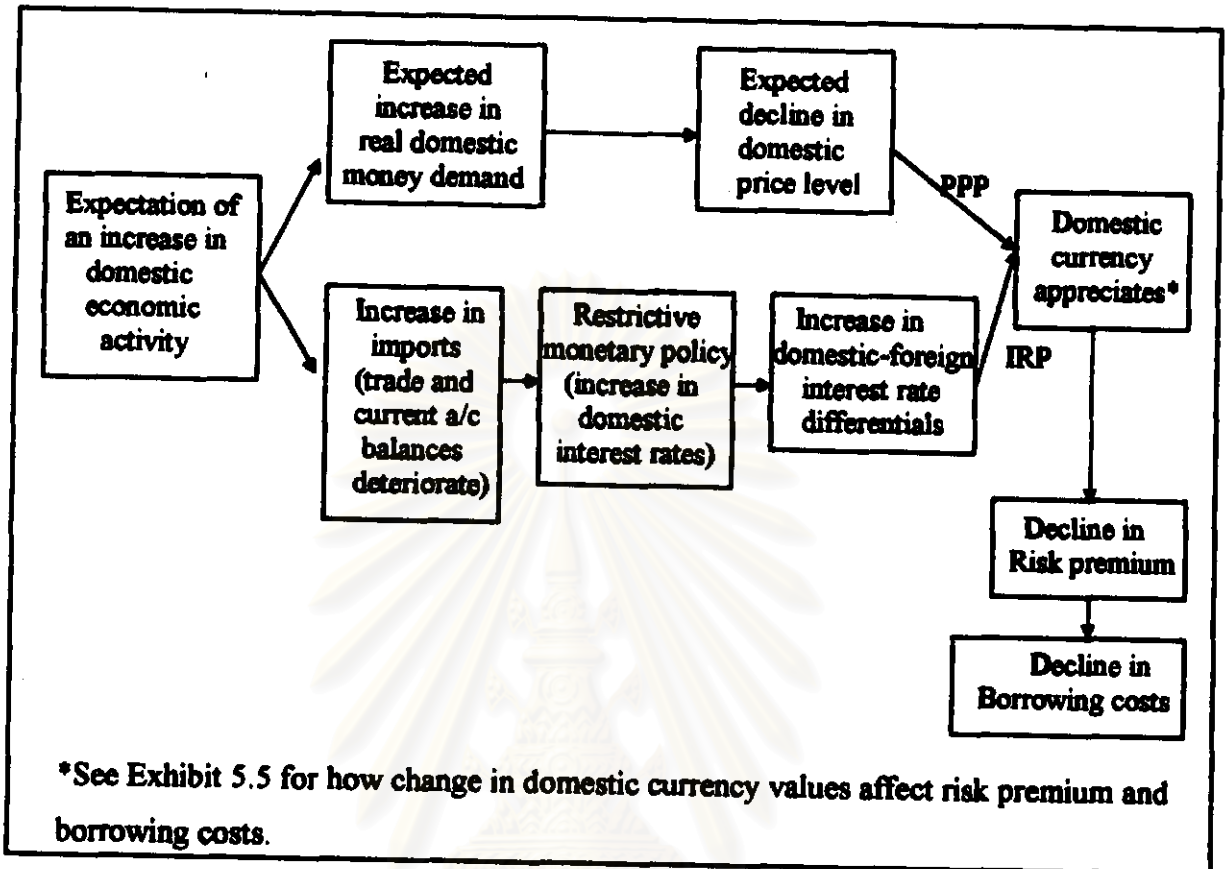
Through the first channel, corresponding to the flexible-price monetary model of exchange rate determination*, an expectation of an increase in domestic economic activity will result in an appreciation of the domestic currency that reduces the required risk premium and, ultimately the country's borrowing cost. This is because an expected increase in domestic economic activity or domestic real income will lead to an increase in the real demand for money; however, with given domestic money supply, the domestic price level will fall. Thus, via the PPP mechanism, a decline in domestic price level will result in an appreciation of the domestic currency.

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* The flexible-price monetary model explains how changes in money supply and money demand influence exchange rates, holding the assumption of continuous purchasing power parity (PPP) which states that the value of domestic currency adjusts instantaneously to equate the relative prices of domestic and foreign goods, and the assumption of uncovered interest-rate parity stating that interest rates on domestic currency-denominated assets equal the interest rates on foreign currency-denominated assets, adjusted for the expected rate of depreciation of the domestic currency. Hence, the flexible-price monetary model states that an exchange rate is influenced jointly by monetary forces, real-income forces and expectational forces.

Through the second channel, according to the Mundell-Fleming (M-F) model[*], an expected increase in domestic economic activity will result in a deterioration of the trade balance which leads to a depreciation of the domestic currency. However, in practical, a deterioration in the country's trade and even current account balances will prompt the country, particularly the developing ones with inadequate domestic savings, to implement more restrictive monetary policy or alternatively to increase domestic interest rates in order to attract more foreign capitals to finance such deficits, thus resulting in larger domestic-foreign interest rate differentials. As a consequence, international investors demand more domestic assets and are willing to exchange more foreign currency for the domestic currency. As a result of this interest-rate-induced increase in the demand for domestic assets, the country's capital account and the overall balance of payment will improve, and the value of domestic currency appreciates. Hence, a high growth rate economy will be less risky for international investors and so its borrowing cost declines.
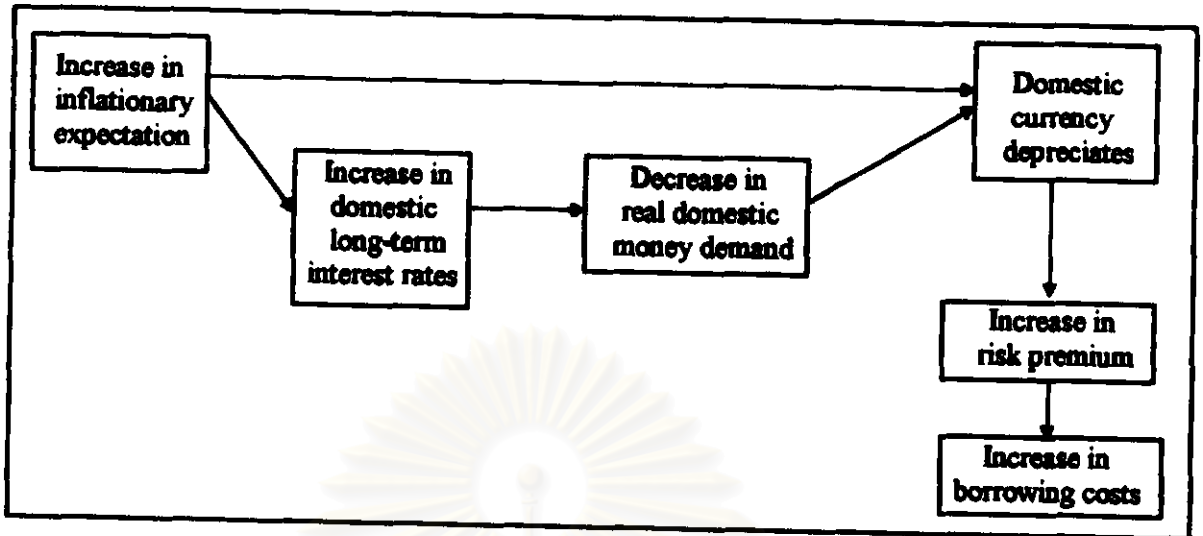
Inflation

The inflation coefficient of 0.4257 means that, after taking into account the influence of structural differences between countries and holding other factors constant, if inflation is expected to increase by 1 percent, the average swap rates of Indonesia, Malaysia and Thailand are expected to increase by about 0.43 percent. This positive relationship between inflationary expectation and swap rates corresponds well to both purchasing power parity (PPP) and the flexible-price monetary model of exchange rate determination as shown in Exhibit 5.4.

According to purchasing power parity (PPP), an expectation of an increase in relative domestic inflation will give rise to a depreciation of the domestic currency's value which increases the country's required risk premium. Thus, an expectation of an increase in inflation will lead to an increase in the country's borrowing cost.

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[*] The Mundel-Fleming (M-F) model extends the standard closed-economy IS-LM model to incorporate the role played by the balance of payment in an open economy and is essentially a short-run balance of payments flow model of exchange rate determination.

Exhibit 5.4: How inflation expectations influence the country's borrowing cost.

Similarly, corresponding to the flexible price monetary model, an expectation of a rise in domestic inflation will result in a depreciation of the domestic currency that leads to a rise in the country's borrowing cost. Although an expectation of a rise in inflation may lead to an increase in domestic interest rates and a subsequent increase in the interest rate differential between domestic and foreign interest rates, in fact the increase in interest rate differential neither increases international investors' demand for domestic assets nor attracts foreign capital inflows that drive the value of domestic currency higher as in the balance of payments flow model. This is because the increase in domestic-foreign interest rate differential reflects an increase in the expected domestic inflation rate relative to expected foreign inflation. Hence, a relative increase in domestic interest rates reflecting an increase in domestic inflationary expectations will result in a depreciation of the domestic currency. Moreover, an increase in domestic interest rates also reduces domestic money demand which also results in domestic currency depreciation. As a consequence, the country's borrowing costs should increase.

Current account deficit

Although the sign of the coefficient of current account deficit is not as expected, it is highly statistically significant at the 1% level. The coefficient of the forecast of current account deficit of -0.3426 means that, after taking into account the influence of structural differences between countries and assuming ceteris paribus, if

the current account deficit is expected to increase by US$ 1 billion, the average swap rates of Indonesia, Malaysia and Thailand will decrease by about 0.34 percent.

The negative association between the current account deficit and swap rate generated from the regression does not correspond to the balance of trade flow model of exchange rate determination*, which states that countries with current account deficits should witness an excess supply of their currencies which results in domestic currency depreciation, and the portfolio balance (PB) model** stating that the transfer of wealth from countries with current account deficits to countries with current account surpluses will cause shift in global assets demands to assets denominated in surplus countries' currencies which thus gives rise to a depreciation in the currency's value of the countries with current account deficits.

Although the sign of the coefficient of current account deficit generated by the regression is negative (not positive as expected), the swap rates in Indonesia, Malaysia and Thailand are however positively related graphically to expected current account deficits during 1996 (as can be seen in Exhibit 5.1 in the previous section). Nonetheless, the graphical relationship between the swap rates and the forecast of current account deficits has obviously changed and seems peculiar during the 1997, probably contributing to the negative sign of the expected current account deficit coefficient.

Furthermore, an expected increase in current account deficit may reflect an increase in the earnings potential of the country, thereby reducing the country risk in servicing its debt obligations. This is because an increase in the current account deficit may emanate from increased demand for imported raw materials, machinery and intermediate inputs used in export-manufacturing industry. Hence, the expected increase in current account deficit generated from strong investment demand will

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* The balance of trade flow model believes that trade-related flows of foreign exchange explains the linkage between current account and exchange rates.

** The portfolio balance (PB) model explains how exchange rates respond to shifts in the supply of and demand for financial assets via the wealth-transfer mechanism. Thus, in the PB model, shifts in the residence of wealth caused by shifts in the current account balances give rise to the high positive association between the current account and the exchange rate.

increase the country's future earnings and growth and ultimately reduce the costs of external borrowings.

Exchange rates

The exchange rate coefficient of -0.4335 means that, after taking into account the influence of structural differences between countries and holding other factors constant, a 1 percent increase (appreciation) in the forecast of domestic currency's value will lead on average to about a 0.43 percent decrease in the average swap rates of Indonesia, Malaysia and Thailand. This implies that the markets of the cross-currency swap for these three countries are not efficient as, in an efficient market[*], a 1 percent increase (appreciation) in the country's currency's value will give rise to an equivalent 1 percent decline in the cross-currency swap rate. This can probably be explained by the presence of asymmetric information[**] that leads to moral hazard problem[***] in the cross currency swap markets of these 3 countries. In particular, although the countries' currency values are expected to increase or appreciate, due to the presence of asymmetric information, investors or lenders might not be willing to invest or lend as much to these countries. This is because they are uncertain as to whether these countries are able to use the borrowed money in the productive way that enhances their ability to service their debt obligations. As a consequence, the costs of external borrowing for Indonesia, Malaysia and Thailand do not decline by an equal percentage of the increase in their currency values. The negative linkage between exchange rate expectation and the country's borrowing cost is shown in Exhibit 5.5.

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[*] In an efficient market, the prices of securities fully reflect all available information.

[**] Asymmetric information in financial markets exists when one party does not know enough information about the other party in order to make accurate decisions. Thus, asymmetric information refers to an inequality in the information among the parties concerned.

[***] As stated in the Mishkin(1995), moral hazard is the problem created by asymmetric information after the transaction occurs.

Exhibit 5.5: How exchange rate expectations influence the country's borrowing costs.
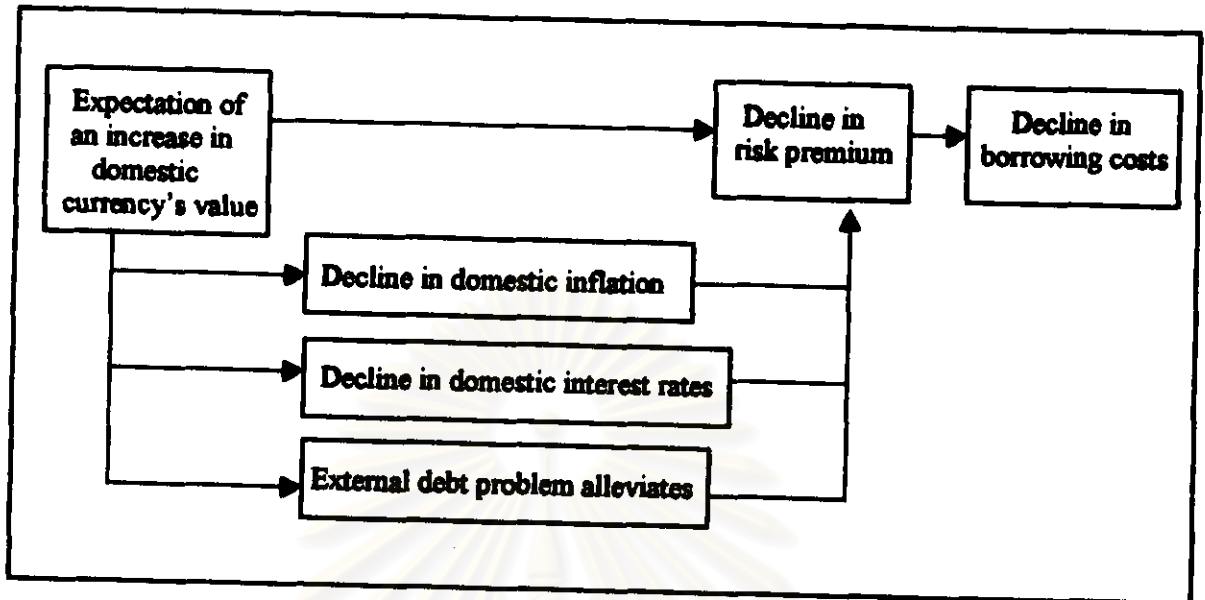
An anticipated change in the value of domestic currency affects the country's borrowing costs both directly and indirectly by influencing domestic inflation, interest rates, trade balances and external debt levels. In particular, according to purchasing power parity (PPP), which states that domestic inflation rate equals the sum of the rate of depreciation of domestic currency and foreign inflation, expectations of a rise in the domestic currency's value will lead to a decline in the domestic inflation rate that give rise to a decline in the country's borrowing costs.

Similarly, corresponding to the uncovered interest rate parity stating the equality between domestic-foreign interest rate differentials and the expected rate of depreciation of domestic currency, an expectation of an increase in domestic currency's value will give rise to a corresponding decline in domestic interest rates. When domestic interest rates decline, domestic liquidity will improve. This will in turn stimulate more domestic investment and generate higher economic activity. Hence, an expected increase in the value of domestic currency will result in the decline in the country's risk and borrowing cost.

Moreover, as most developing countries (including the ASEAN countries) are external indebted, given no change in external debt outstandings, an expected increase in domestic currency value will alleviate their external debt problems. Thus, an

anticipated increase in the value of domestic currency (reflecting improved economic condition) will give rise to a decline in country risk and, ultimately, a decline in the country's borrowing costs.

Market Capitalization

The coefficient of market capitalization of -0.01 means that, after taking into account the influence of structural differences between countries and assuming ceteris paribus, if market capitalization of the countries' stock markets increases by US$ 1 billion, the average swap rates of Indonesia, Malaysia and Thailand are expected to decrease by about 0.01 percent.*

As stock prices are one of the main leading economic indicators and generally respond to the market's view of future earnings based on the expectations of the country's economic condition, the higher the stock prices the better investors view the future economic condition. An increase in the market capitalization of the country's stock market may emanate from such increase in stock prices which reflects a more optimistic view about the country's future economic condition or from the increasing number of firms registered in the stock market which implies increased domestic economic activity, thereby attracting more foreign portfolio equity inflows which build up investor confidence in domestic market that ultimately reduce the country's risk premium. Moreover, an increase in the market capitalization of the country's stock market may positively affect business investment decisions. This is because the increase in market capitalization resulting from the increase in stock prices will reduce the cost of financing business investment spending through issuing equities. Hence, an increase in the market capitalization of the country's stock market will give rise to a decline in the country's risk premium and a decline in the country's borrowing costs.

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* Although the market capitalization of the country's stock market is statistically significant in econometric sense, it is relatively insignificant in financial economic sense in determining the costs of external borrowings of Indonesia, Malaysia and Thailand. This is because a huge increase in the market capitalization (US$ 1 billion) results in only slightly decline in borrowing costs (0.01 percent).

Furthermore, in doing an ex-post forecast by using the macroeconomic forecasts on November 1997[*] to estimate the one-year cross-currency swap rate for Indonesia, Malaysia and Thailand, it is found that the swap rate for Indonesia, Malaysia and Thailand on November 1997 would have been 14.212%, 10.3632% and 18.8945% respectively. However, their actual average swap rates on November 1997 were 19.9538% for Indonesia, 10.811% for Malaysia, and 15.2263% for Thailand. This implies that the regression model produces the forecasting errors of 28.78% for Indonesia, 4.14% for Malaysia and 24.09% for Thailand.

This relatively high percentage of forecasting errors particularly for Indonesia and Thailand may well be attributable to the East Asian financial crisis triggered first in Thailand in the mid 1997, which perhaps lessened the accuracy of the model in determining swap rates. In particular, as the data used in estimating the regression parameters are those prior to the financial crisis, the results of the regression model provided in this study are more appropriate for estimating the pre-crisis swap rates of Indonesia, Malaysia and Thailand rather than the post-crisis swap rates. This is because the regional financial crisis might cause changes in the value of each parameter in the regression, perhaps increasing the importance of additional macroeconomic variables not included in this study (such as the forecasts of the country's external indebtedness and foreign reserves), and increasing more concern on these countries' macroeconomic policies and the diversity of their economies. However, the regression model in this study remains useful for estimating the swap rates of Indonesia, Malaysia and Thailand, although its precision has declined.

In summary, a pooled cross-sectional, time series regression that relates one-year forecasts of the four macroeconomic variables including real GDP growth, inflation, current account deficit and change in exchange rate, as well as the market capitalization of the country's stock market to the one-year cross-currency swap is conducted, using monthly economic data from 3 developing ASEAN countries, namely, Indonesia, Malaysia and Thailand from February 1996 to May 1997, in order to determine the extent to which the expectations for each variable affect the

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[*] The macroeconomic forecasts for 1998 on November 1997 are the mean of the consensus forecasts obtained from *"The Financial Survey"* on November-December 1997 issue.

countries' borrowing costs in the international financial markets. The results show that the forecasts of real GDP growth, inflation, current account deficit and change in exchange rate, and the market capitalization of the stock market are important factors determining the costs of external borrowings for Indonesia, Malaysia and Thailand.

Comparing these findings with the study of Jankus (1997), it is found that, in the study of Jankus(1997), the global structure of yields of the fifteen OECD countries is determined by the expectations of two macroeconomic variables, namely, inflation and budget balances, and the market capitalization of the country's government bond market. Although the forecasts of GDP growth and current account balance do not significantly determine the global structure of interest rates in the fifteen OECD countries, they do significantly influence the borrowing rates of Indonesia, Malaysia and Thailand. This difference is due primarily to the differences in the level of development of the countries. Basically, the fifteen OECD used in the study of Jankus(1997) are developed countries while the three ASEAN countries used in this study are developing countries. This is because the current accounts of developing countries are generally in deficit, so the expectations of increased deficits in the current accounts will cause great concern among investors as to whether such deficits are sustainable since these developing countries remain dependent on foreign capitals in financing their development; whereas, this is generally not the case in most developed countries. Moreover, there is one other important aspect that deserves consideration: there may be differences in the implications for the differences in the maturities of the swap rates used in the study of Jankus(1997)—five year swap rates, and those used in this study (one year swap rates).