

## Debt Restructuring and Country Risk Assessment for Malaysia, Thailand, Philippines and Indonesia

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**Abstract:** This paper aims to investigate and compare country risk of four ASEAN countries. These countries are geographically related in South Asia. However, they are differences in the economic development and growth. The Two-Limit Tobit Model is use to study empirically the important factors affecting the debt service capacity of borrowing countries. The period is from 1970 to 2013. A quarterly-ahead debt rescheduling ratios are used as the proxy for debt restructuring. Using the debt rescheduling ratios, we emphasize the role of relative sizes of debt rescheduling in predicting external debt crisis. A special emphasis is given to the seven crises, namely, the World Oil Crisis (1973-74), IMF Crisis (1976), Crisis of 1982, Black Monday 1987, the Saving and Loan Crisis (early 1990s), the Asian Financial Crisis (1997) and the Mortgage Crisis (2007) and their predictability. The results show that crises do effect the risk of debt restructuring for Malaysia, Philippines and Thailand, but lesser extend for Indonesia, probably due to less proportion of borrowing in term of the size of Indonesia GDP.

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**Keywords:** Country risk; debt crises; ASEAN; debt restructuring

### 1. Introduction

External debt crises faced by developing countries have been generating concern among creditors and borrowers particularly over the last three decades. After the crisis once again, the increasing volume of private commercial loans to less-developed countries has increased concern about the ability of these countries to repay external obligations on time. However, it should be noted that debt service difficulties on the part of borrower countries are not a recent development. As a result, demand for sovereign credit ratings and popularity of rating agencies has increased dramatically.

This Study aims to investigate country risk and the factors by using the Two-Limit Tobit Model. We assess the riskiness of four developing countries in ASEAN over the period of 1970 to 2013. In this model, "a quarterly-ahead debt rescheduling ratios" are used as the dependent variable. Using the debt rescheduling ratios, we emphasize the role of relative sizes of debt rescheduling in predicting external debt crisis. The expected results are that Malaysia, Thailand, Philippines, & Indonesia have country risks that are highly affected by the crisis.

Table 1 shows the statistics of the Debt Stock restructure (TR), Total Debt Stock (EDT) and the GDP of the Malaysia, Indonesia, Philippines and Thailand. Thailand has the highest restructuring during the 1997 ASIAN financial crisis. But overall, all these debt restructuring are between USD 1.4 -2.15 billions.

Table 1: Debt Stock restructures, Total Debt Stock and the GDP of the Malaysia, Indonesia, Philippines and Thailand(2012)

Variable	Mean	Max
Malaysia	(Millions)	(Millions)
TR	1,750	3,500
EDT	41,700	213,000
GDP	313,029	
Indonesia		
TR	1,400	3,300
EDT	90,600	259,000
GDP	888,648	
Philippines		
TR	1,890	4,640
EDT	35,900	62,800
GDP	284,927	
Thailand		
TR	2,150	10,500
EDT	47,500	135,00
GDP	373,804	

(TR=Debt Stock restructure, EDT=Total Debt Stock)

These markets issued sovereign debt securities to raise fund for their investment needs. The main investors are institutions and individuals. These investors required a return in term of yields on the debts purchased. The sovereign debts ratios of developing economies, as a percentage over GDP has risen over the past 20 years, from 40% to about 80% in 2012. Table 2 and Figure 1 show the yield of these countries sovereign bonds. Indonesia and Thailand

have the higher yield that the Malaysia and Thailand. The reason may be due to their respective sovereign rating by the top rating agency. Many studies have look at factors the effect sovereign changes. One of the is Cheng, Lim and Annuar (2014) show that the macroeconomics factors are effecting these sovereign rating. Table 3 shows these countries respective sovereign ratings in year 2014.

Table 2: Sovereign Bonds Yields of Philippines, Malaysia, Thailand and Indonesia(%)

YTM	Philippines	Malaysia	Thailand	Indonesia
1 year	1.26	3.02	2.61	4.01
2 years	2.49	3.1	2.83	7.19
3 years	2.55	3.21	2.98	4.18
4 years	2.87	3.35	3.9	7.18
5 years	2.88	3.39	3.36	4.58
7 years	3.38	3.42	3.59	4.76
10 years	3.98	3.72	3.8	7.82
20 years	4.31	3.94	4.13	8.1
25 years	5.16	4.11	4.3	7.28

YTM – Yield to Maturity

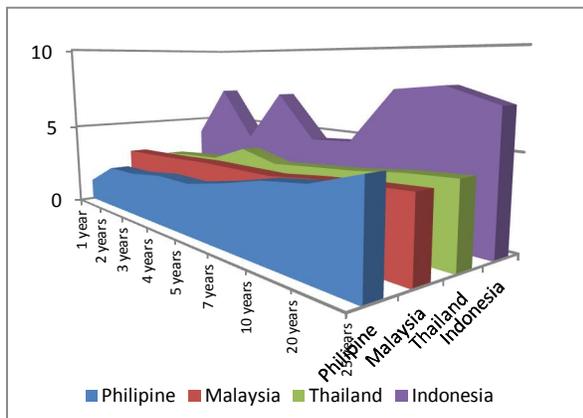


Figure 1: Sovereign Bonds Yields of Philippines, Malaysia, Thailand and Indonesia

Country risk assessment are a crucial part of the process of credit-allocation to developing countries and, therefore, their accuracy is a matter of major importance for bankers, brokers, investors, financial managers and borrowers. This paper intends to use the debt restructuring as another measure for country risks other than the rating by the rating agency. The ratings by the rating agencies are in the category forms. Whereas the restructuring debts are in the continuous ratios measurement. This paper aim to i) identify the factors of country risk. ii) To report the quarterly-ahead country risk fluctuation. iii) Comparing the four countries risk

The paper is organized as follows: the next section provides details literature review. Section three concerning the sample countries, their selection criteria, data set and the explanatory variables used in

the model. Section four discusses the results of this research. And lastly draws conclusions.

Table 3: Sovereign Rating by the Four Rating agency for Philippines, Thailand, Malaysia and Indonesia

	Philippine	Thailand	Malaysia	Indonesia
Agency	Rating	Rating	Rating	Rating
S&P	BBB-	BBB+	A-	BB+
Moody	Baa3	Baa1	A3	Baa3
Fitch	BBB-	BBB+	A-	BBB-

## 2. Literature Review

External debt crises faced by developing countries have been generating concern among creditors and borrowers particularly over the last three decades. After the crisis of 1982, Black Monday 1987, the Japanese Banking Crisis (1990s), the Mexican Peso Crisis 1994, the Asian financial crisis (1997) and the Mortgage Crisis (2007), once again, the increasing volume of private commercial loans to less-developed countries has increased concern about the ability of these countries to repay external obligations on time. However, it should be noted that debt service difficulties on the part of borrower countries are not a recent development. As a result, demand for sovereign credit ratings and popularity of rating agencies has increased dramatically.

Country risk assessment models or sovereign ratings are quite advantageous for all parties if they are accurate and able to predict the debt crises in advance. These assessments are a crucial part of the process of credit-allocation to developing countries and, therefore, their accuracy is a matter of major importance for bankers, brokers, investors, financial managers and borrowers. Thus, many studies have been done to identify the factors of country risk. The central concern of this paper is to utilize a formal statistical model to investigate debt rescheduling as well as country risk, and thereby, to enhance the efficiency of credit allocation. Feder, Just and Ross (1981), Cline (1984), Kharas (1984), Edwards (1984), Beltratti (1990), Ngassam (1991), Ozler (1992), Hajivassiliou (1987 & 1994), Hernandez-Trillo (1995), Gur (1998) and Timur Han Gur (2001) are some of the studies of this type carried out to predict debt crises and identify the factors responsible for debt repayment problems.

This paper utilizes the Two-Limit Tobit Model to determine debt rescheduling for countries over the period of 1970 to 2013. After determining the macroeconomic variables and fundamental debt ratios affecting the debt repayment capacities and debt rescheduling of the sample developing countries, the estimated debt rescheduling ratios are used to determine the percentage growth of country risk. The model is tested for its predictability of the external

debt crises a quarterly in advance with special emphasis given to the seven crises, namely, the World Oil Crisis (1973-74), IMF Crisis (1976), Crisis of 1982, Black Monday 1987, the Saving and Loan Crisis (early 1990s) the Asian Financial Crisis (1997) and the Mortgage Crisis (2007) and their predictability. The final results show that Malaysia, the Philippines and Thailand have country risks that are highly affected by the crisis. The model uses the studies of Gur (2001), where the ratio of the amount of debt rescheduled to the total debt, or rescheduling ratio, is used as a dependent variable in order to pay attention to the relative amount of debt rescheduling over total debt. Gur(2001) found that their creditscores reflect creditworthiness more accurately than some others since borrowers are correctly ranked and graded over 34 nations from 1986 until 1998.

### 3. Methodology

#### i) The Sample Data

This paper studies four developing Asian countries in the period between 1970 and 2013. The sample countries have been borrowing significant amounts of external loans from other governments, international institutions, commercial banks and private sources over the years. The first specification for country selection was the availability of compatible data for significantly long time periods. The second criterion was the amount of external debt stock and the level of external borrowing from commercial banks. As a result, Malaysia, Indonesia, the Philippines and Thailand were chosen.

This study uses data stream sets. The database of this study has 2076 observations. All the countries have experienced rescheduling in the period under study. There are 170 rescheduling observations which make up 8.18% of total observations. This represents a relatively rich data set on country risk assessment in terms of country debt rescheduling. All of the selected countries have experienced debt rescheduling from 1970 to 2013.

#### ii) Factors of the Country Risk Assessment Model

This study adopts the model discussed in the paper of Timur Han Gur (2001) and considers the demand for debt rescheduling, or alternatively, debt restructuring, which represents a debt repayment problem for a country and, therefore, a risk for lenders. Since country defaults no longer exist, we attempt to measure country default risk by using country debt rescheduling risk as a proxy. In other words, since country default is not an observable variable, debt rescheduling is substituted in the estimation of debt servicing capacity. Place (1989) points out some problems with such a change. First, debt servicing difficulty need not result in a

rescheduling agreement. Second, some rescheduling agreements are not made public, so we may be confronted by hidden information. Third, there may be a considerable length of time between the problem of debt servicing and the announcement of a rescheduling agreement. Nevertheless, debt rescheduling, or structuring, indicates that a country is experiencing severe difficulties in servicing its external debt. As a result, rating sovereign borrowers according to their debt rescheduling risk makes sense for lenders who do not want to be involved in the long and extremely painful process of debt rescheduling.

Table 4: Variables and Definitions

Variables	Definitions
EDT - Total debt stock	Sum of public and publicly guaranteed long-term external debt, private non-guaranteed long term debt, the use of IMF credit and short-term debt (estimated)
INT - Interest payments	Actual amounts of interest paid in foreign currency, goods or services in the year specified
XGS - Exports	Exports of goods and services in the year specified
C - Concessional loans	Total long-term loans with an original grant element of 25% or more
RES - International reserves	The sum of a country's monetary authority's holdings of special drawing rights (SDRs), its reserve position in the IMF, its holdings of foreign exchange and its holdings of gold (valued at year-end London prices)
PRV - Private sector LDOD	The distribution of long-term debt by private debtors including private banks
TR - Debt Stock Rescheduled	Amount of debt outstanding rescheduled in any given year

As mentioned earlier, a quarterly-ahead ratio of total debt rescheduling to total external debt,  $TR(+1)EDT$ , is the dependent variable used in this study. It will be called the rescheduling ratio in the rest of the paper. In the existing literature, the analyses focus only on rescheduling; thus, the rescheduling event is a binary dependent variable taking the values of zero and one. However, this study extends the literature by modeling the actual rescheduling ratios that are negotiated so that a 1% rescheduling ratio is actually treated as a different event from a 10% ratio. As a result, this study focuses on the total amount of debt rescheduled in estimation of country risk and

estimates the relative size of debt rescheduling, which is used to define the country risk percentage fluctuation.

In order to determine the factors responsible for debt rescheduling that in turn determine country rescheduling risk in external borrowing, this study uses a total of six economic variables. These variables are defined in Table 1 and listed in Table 3 with their expected signs.

Hence, the model to estimate is:

$$TR(t+1)EDT = INTXGS(t) + CEDT(t) + RESED(t) + EDTGDP(t) + PRVEDT(t) + TREDT(t) \quad (1)$$

Since the dependent variable takes a value of only between zero or one, the appropriate model to estimate is the Two-Limit Tobit Model (described in Appendices). The purpose of using one-period lagged values of the explanatory variables is to make the model serve as an early-warning model of country riskiness. As a result of such a setup, the estimates of rescheduling ratio for the next quarterly (t+1) are obtained by utilizing values of the explanatory variables in the present quarterly (t). In other words, the model is aimed to predict the future debt servicing capacity of the selected countries a quarterly in advance.

#### 4. Results and Discussion

Table 5: Parameter Estimates of the Two-Limit Tobit Model of Debt Rescheduling Risk

Variable	Malaysia	Indonesia	Philippines	Thailand
INTXGS	-46.34**	-0.358***	-6586*	-1.023***
CEDT	11.169	-0.201***	-6211**	-0.498
RESED	-4.346***	-0.122***	-1253	-0.109
EDTGDP	1.949***	0.006**	.1169	0.075**
PRVEDT	1.917	-0.061**	-5334**	-0.410**
TREDT	1.530***	1.462***	1.417***	0.790***
Constant	1.426*	0.110***	0.1224	0.0243
Sigma	0.0948	0.0031	0.0707	0.0070
Obs	173	173	173	173
Log-Likely hood	18.066	62.748	9.6127	112.563

\*\*\* Significant at the 1% levels

\*\* Significant at the 5% levels

\* Significant at the 10% levels

This section presents the result of our findings. The parameter estimates of the Two-Limit Tobit Model are shown in Table 2. Not all the variables used to estimate the debt rescheduling are found to be statistically significant. The significant variables are different among the countries. For Indonesia, six out of six variables are significant at 1% and 5%, all the variables have very high significance. This means that these six variables have high coefficient values that

indicate effectiveness for predicting the total rescheduling of one quarter lag for Indonesia. Whereas, for Malaysia, the Philippines and Thailand, four out of six variable are significant. Our results are reported in Table 5 and 6 and Figure 2.

In the above table, INTXGS and TREDT are the variable that are significant for all the four chosen countries. This means that INTXGS and TREDT have high coefficient values that indicate effectiveness on the coming quarter-year rescheduling size and behavior.

On the other hand, EDTGDP and PRVEDT have significant impact for three out of four countries. However, CEDT and RESED are mostly does not significantly affect the majority of the chosen countries. This means that CEDT and RESED have very few coefficient values that indicate effectiveness for the oncoming quarter-year rescheduling behavior.

Table 6: Indicators of Country Rescheduling Risk and Expected Coefficient Signs

	Expected Sign	MY	ID	PH	TH
INT XGS	+	-	-	-	-
C EDT	-	+	-	-	-
RES EDT	-	-	-	-	-
EDT GDP	+	+	+	+	+
PRV EDT	-	+	-	-	-
TR EDT	+	+	+	+	+

Some of the signs of the parameters are not in line with model predictions. Following the theory sign, concessional terms on loans, high international reserves and high degree of private sector establishment in debtor country are factors that reduce debt rescheduling likelihood and the amount of the proportion of rescheduled debt in the following year. On the contrary, interest payment burden over exports of goods and services, accumulated debt burden over GDP and previous debt service difficulties increase the likelihood of debt rescheduling risk a year later. Table 6 show the signs of the parameters, some of the coefficients signs show difference compared with the expected coefficient parameter signs for all the countries. Based on the result, the coefficient signs of RESED, EDTGDP and TREDT were follow the expected coefficient parameter signs.

Figures 2 shows the graphs of country risk fluctuation in percentage. Based on the result of this study of seven crises, we can conclude that the crises did trigger country risks. (Note: the details data set can be provided upon request)

For the Philippines, the country risk increased sharply during the IMF (1976) crisis. This means that the country was badly affected by the collapse. The seeds of the 1976 IMF crisis were sown by the huge

OPEC oil price shocks of 1972-3 leading to the potential meltdown of Britain's already weakened economy, and thus shock transmission to ASEAN countries.

For Malaysia, the country risk fluctuation have been decreased during the World Oil Crisis from 1Q1974 until 2Q1974. During the Saving and Loan Crisis, country risk in Malaysia again have increased from 1Q1991 until 2Q1991.

The fluctuations of country risk for Indonesia were quite stable. Majority of the crisis do not affect country risk in Indonesia since Indonesia banks had not much negotiated to such international financial

instruments. But for the Asian Financial Crisis 1997, an uneven country risk fluctuation did happened.

Finally, Thailand have experienced country risk go ups and downs during the Asian Financial Crisis. During 4Q1997 - 1Q1998, risks have increased and then positive again have been achieved from 1Q1998 until 2Q1998.

Whereas pre-recession economic imbalances were evident in Philippines. Philippines economy was booming before the Black Monday Stock Market Crash (1987-88), the country risk suddenly decreased at at period 4Q1985 - 1Q1986, again increased country risk at 2Q1987 - 3Q1987.

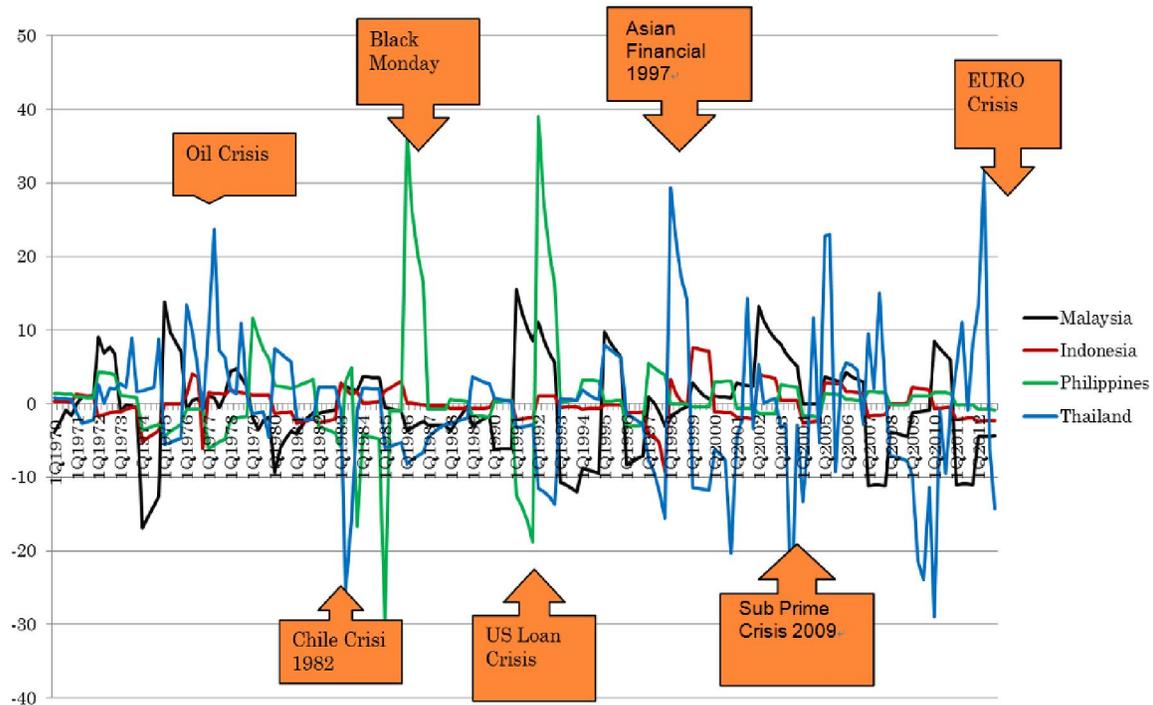


Figure 3. The country risk fluctuation in percentage of the four ASEAN countries from 1Q1970 – 1Q2013

## Conclusion

The work on country risk assessment has taken on increased importance, with both private and public institutions attempting to refine and extend the scope of their work. The goal of this paper is to estimate the risk that a country might reschedule payments on its external debt. The increasing uncertainties in the borrowers' capacity to repay their loans have raised the risk awareness of lenders in the past three decades. This paper examines the existing literature on country risk analysis and has chosen the most effective model risk assessment model using a panel data set for the 1970-2013 periods for four nations in Asean.

This study modeled actual rescheduling ratios. Therefore, the country risk results developed in this study reflects a more accurate scoring for the sample

countries as country risk fluctuates according to the amount of debt rescheduling.

This study adopted the rescheduling model from Gur (2001). Since that study only covered yearly data from 1986 to 1998, whereas our study covered 43 years from 1970 until 2013, including quarterly periods as well, the expected coefficient signs were different compared with our study. The findings in this study show that the risks score obtained explain the seven crisis. Therefore, these results could be used as an alternative to the rating by the rating agency.

Finally, further research should explore longer forecast horizons, as monthly or even daily forecasts would provide sharper forecasting power. Nevertheless, in order to measure the effects of structural breaks and to reflect them in country risk

table a successful quantitative model for each country should be supported by country-expert opinions

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