2001

An Empirical Investigation into Long- and Short-Term Indebtedness

Hing-Man LEUNG
Singapore Management University, hmleung@smu.edu.sg

AN EMPIRICAL INVESTIGATION INTO LONG- AND

SHORT-TERM INDEBTEDNESS

By

Hing-Man Leung

Department of Economics
Singapore Management University
Eu Tong Seng
469 Bukit Timah Road
Singapore 259756
Tel: +65-6822 0717
Fax: + 65-6822 0777
E-mail: hmleung@smu.edu.sg

AN EMPIRICAL INVESTIGATION INTO LONG- AND SHORT-TERM INDEBTEDNESS

ABSTRACT

The external debt position of a country often lies at the heart of her financial crisis. While it is well-known that indebtedness and in particular a surge in short-term debts often precipitate a debt crisis that is often made worse by runs on a country's foreign exchange, the reasons why a country takes a particular debt position is rarely formally explained. This paper investigates the long-term determinants of international indebtedness, the time-rates of change of indebtedness, and a nation's short- to long-term debt ratio. The data set used is the World Data CD-ROM. Six potential explanatory variables are: size, per-cap GNP, growth rate, net-exports, change in reserves, and money supply. Cross-sectional regressions are run for each year from 1984 to 1993 to establish a pattern of answers to the indebtedness problem.

1.   Introduction

The debt crisis that gripped a group of South Eastern Asian (SEA) countries since the end of 1997 has continued for more than half a year and caused much anguish to the countries concerned. Since the problem began, a sense of despair spread not only among these countries but throughout the world. A crisis typically comes suddenly and catches everyone by surprise.[1] This surprise element is even more pronounced in the SEA case, since shortly before its onset these were the very countries hailed as success stories, 'miracles' of economic growth.[2] Despite a large literature that emerged in response to the crisis in Mexico and other countries in the American continent, the sudden recurrence of another crisis inevitably begs the question, 'how much do we really know about such crises after all'?

The diagnosis on a financial crisis has a twin focus: its long-term underlying and short-term immediate causes. The literature on financial crisis can also be categorised along these two lines. Those concentrating on long-term causes typically look at balance of payments, government budgets, productivity and economic growth, monetary policies and other macroeconomic variables for clues to a country's long-term vulnerability (some recent examples of this literature include Blanchard (1983), Atkeson and Riosrull (1996), Bordo and Schwartz (1996), Cobham (1996), Otker and Pazarbasioglu (1996, 1997a, 1997b) Klein and Coutino (1996), and Bernsaid and Jeanne (1997)). Others looking for immediate causes emphasise liquidity, self-fulfilling, herding, panic and other banking behaviour, investor confidence and bank 'runs' (Cole and Kehoe (1996), Calvo and Mendoza (1996), Sachs, Tornell and Velasco (1996), Eichengreen, Rose and Wyplosz (1996), Aschheim, Christou, Swamy and Tavlas (1996), Frankel and Schmukler (1996)). Both long- and short-term factors are at work prior to a crisis although one may play a more central role than another.

A national financial crisis typically exhibits the following pattern: rising level of indebtedness, difficulty in servicing debts, increasing short-term debts to pay for interests and scheduled capital repayments, capital flights, collapsing currency, the debt-exchange crisis finally going into a downward spiral. *Our paper takes the hunt for an explanation one step backwards. Instead of asking what set off the immediate crisis we seek to explain indebtedness itself.* More specifically, we wish to find out what determines the level, movements, and the structure of a country's indebtedness.

The World Data CD-ROM provides the data source of our enquiry. Admittedly most of the variables available are either crude, incomplete, and far from ideally suited for our inquiry. We run a number of cross-sectional regressions, repeat it over a ten-year period, and establish a pattern of answers to our questions. Six potential explanatory variables are used. They are the size of the economy, per-capita GNP, growth rate, net-export, net change of reserves, and money supply. Sections two and three below explain and justify the choice of these variables.

The rest of this paper is organised as follows. The next section introduces the data set. Section three studies the levels of indebtedness, section four the time-rates of change of indebtedness, and section five the short- to long-term debt ratios. Section six summarises and concludes the paper.

2.   Data

The data used in this study is extracted from the World Data CD-ROM that contains 209 countries, each having a maximum of 730 variables, and spanning the years 1960 to 1993. For our purpose the most recent ten years from 1984 to 1993 are used. In these years only 92 countries consistently reported data on total external debt. In short our extracted data subset contains 92 countries over ten years, with six

explanatory variables plus several categories of total debts, long- and short-term debts, and population sizes.

The following table gives a comparative overview of the larger data set at 1993 (containing 163 countries that reported GNP data) and the subset of 92 countries used in this study.

Table 1: descriptive statistics of the sample at 1993 (current US$)

	Mean GNP	Mean GNP per capita	Mean total debt	Mean total debt per capita
Entire sample (163 countries)	141 bn	4,843	12.2 bn	757
Subset sample (92 countries)	141 bn	1,285	15.7 bn	873

The second column of Table 1 shows that the average size of the economies in the subset is the same as the wider sample set. The next column shows that we are picking up significantly the poorer countries in the sub-sample. The last two columns show that nations in the sub-sample are more indebted. *In short, the regressions reported in this paper focus on the poorer and more indebted nations in the world.* This selection seems natural since the poorer nations make up the chief borrowers who are the subject of our enquiry.

3.   Indebtedness

Two factors underlie the choice of the regression equations in this paper. The first is simply the availability, or rather the limitation of the data. The second factor is motivated by a small literature on *institutional lending behaviour* that explains the economic, political and social elements of such *country risks* (see for instance Krayenbuehl (1995)). Bankers and other institutional lenders use size of the economy,

per capita GNP, debt-service ratio, debt-GNP ratio, interest service ratio, reserves-imports ratio, current account-GNP ratio, and other similar ratios to gauge transfer risks. A big country, for instance, is thought by practitioners to be better able to weather currency and exchange fluctuations, and is thus in an advantageous position to secure foreign loans. Putting size, GNP per capita and other available variables on the right-hand side of the equation is admittedly crude, and the resulting model is not supported by a well-founded theoretical base. Our justification for this simple model is twofold. First, many lending institutions have used these variables for many years without formal justification, thus any systematic evidence will be valuable at this point. Second, the results from such a preliminary study throws light on the way a more sophisticated model should be built, although such models are beyond the scope of the present paper.

We therefore attempt the following OLS equation:

$$\frac{\text{TD}}{\text{GNP}} = \beta_0 + \sum_{i=1}^{i=6} \beta_i x_i + e \qquad (1)$$

where (all currency magnitudes are in 1993 US dollars):

TD/GNP = total debt outstanding / gross national product;

x_1 = size of the economy in terms of current GNP;

x_2 = per capita GNP;

x_3 = annual GNP growth rate (%);

x_4 = per capita net-export;

x_5 = net change of reserves per capita;

x_6 = per capita money supply (broadly defined); and

e = error term.

Now we discuss the choice of the six explanatory variables in turn. The coefficient on the first variable simply tells us whether a large country is more

indebted. We know a priori that there is a supply-side bias in favour of lending to larger countries, arising from the belief held by institutional lenders (see Krayenbuehl (1995)), that a larger borrower is a lower-risk borrower. Thus we expect the coefficient to be positive, other things being equal.

The second variable is per capita GNP. Notice that our data includes only countries that borrow, and excludes those that lend. Thus we are comparing the richer and the poorer *borrowers* here. Note also that growth performance is picked up by the third variable, so x_2 reflects only whether the richer borrower country is more indebted, irrespective of whether they are also the faster growers.

Bearing in mind that the data includes only borrowers, the third variable, the rate of GNP growth, captures in some ways the utilisation of funds. We can take it for granted that the faster growers are heavier investors. Then a positive coefficient on x_3 would mean that the heavier investors also borrow more heavily. It would also mean that funds are, more often than not, used for investment purposes.

The fourth variable, net-export per capita, reflects yet another view held by the practitioners that good foreign exchange earning is a good hedge against country risks. This tends to increase the supply of funds to these countries, but their demand for loans is likely to be lessened by the availability of their own exchange reserves. The fifth variable, net change of reserves per capita, will pick up further evidence on the relations between debts and internally available funds.

Finally, the sixth variable on money supply can be justified in the following way. Initially one would like to include the fiscal budget position on the right-hand side of the equation, since governments often borrow to cover budget deficits. The quality of budgetary data from the World Data turns out to be very poor for most low-income countries. Much better data are reported concerning money supply,

presumably because it is more directly measurable. Since money supply is the other variable that appears on the budget balance equation, we have opted to include it in our regression equation that follows.

The R^2 of the regression is 0.83. Many variables on right-hand side of (1) such as GNP however lead one to suspect heteroscedasticity in the regression model. A Goldfeld-Quandt test indeed reveals substantial heteroscedasticity with a Goldfeld-Quandt ratio of 224 against a critical F-ratio of 1.98. A simple way of correcting for heteroscedasticity is to divide both sides of Equation (1) with the population size. The resulting regression produces a Goldfeld-Quandt ratio of .01, which is substantially below the critical value of 1.98. The R^2 of the OLS is 0.835. Detail results are presented in Table 2 below.

Table 2: y = indebtedness (long- plus short-term debts); 1993

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Reserves (per cap)	Money supply (per cap)
$\exists_i$	4.09	2.7E-10	-.0009	-1.6E-6	-.0007	-.008	-5.5E-6
t-ratios	18.3*	1.43	-9.22*	-5.96*	-1.21	-4.93*	-2.68*

R^2 = 0.835; * = statistically significant at the 1% level; sample size = 92.

As seen from Table 2, four of the six coefficients are significant at the one-percent level. To gain further confidence in the reliability of the data however, we repeat the regression in each of the ten years from 1984 to 1992. The results are reported in Table 2a below, where a sign in brackets denotes a coefficient not statistically different from zero at the one-percentage point level. The signs of Table 2 are included in the first row in Table 2a.

Table 2a: y = indebtedness (long- plus short-term debts); 10 years compared

	Constant	Size (GNP)	Income (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1993	+	(+)	-	-	(-)	-	-	0.83
1992	+	(+)	-	-	(+)	(-)	(-)	0.77
1991	+	(+)	-	-	-	-	-	0.78
1990	+	+	-	-	+	+	-	0.82
1989	+	(+)	-	-	+	+	-	0.89
1988	+	(+)	-	-	-	+	-	0.80
1987	+	(+)	-	(+)	+	+	(+)	0.76
1986	+	(-)	-	+	(-)	+	-	0.82
1985	+	(+)	-	+	(-)	+	-	0.71
1984	+	(+)	-	+	-	+	-	0.74

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

Now we can summarise Table 2a as follows.

(a) On the size column, only one year out of ten (1990) produced a significant result, and we conclude that the coefficients overall are not significantly different from zero. *Thus the size of an economy does not have any significant impact on indebtedness*. This is somewhat surprising. It shows that lending institutions do not really favour larger countries as far as total indebtedness is concerned. This goes against the conjecture according to some that the sheer size of the economy is a guard against country risks (see Krayenbuehl (ibid.)).

(b) The GNP per capita column is clearly negative. *A high-income borrower tends to be less indebted, owing possibly to internally available funds*.

(c) Although the growth column is mostly negative, the pattern seems to suggest a negative sign for the years after 1988, but a positive one before that year. *Thus a faster-growing country tended to be more indebted in the early eighties, but conversely towards the late eighties and early nineties*. This seems as though to be saying fast-growing nations depended on foreign debts during the early

eighties, but reversed this dependence from then on. They may be paying off their debts when their incomes rise.

(d)   Although six out of ten coefficients in the net-exports column are significant, the signs do not show a clear enough pattern for a conclusive observation to be made.

(e)   Seven out of nine coefficients in the reserves column are positive. *Thus in seven out of nine years a country with a rising, or faster rising, reserve tends to be more indebted.* This is perhaps the least intuitive among all the results so far. One would expect a nation with rising reserves to have a lesser need for foreign debts. This was indeed the case in 1991 to 1993. One possible explanation for the positive signs in the eighties is a supply-side effect, with lenders possibly pushing loans to countries with rising reserves at exceptionally attractive terms.

(f)   The money supply column is clearly negative. *Thus nations with a higher money supply per capita tends to be less indebted.* They probably just substitute the need to borrow with domestic money supply.

Apart from total indebtedness, it will be interesting to study long-term and short-term debts separately. This is done in Tables 2b and 2c below.

Table 2b: y = indebtedness (long-term debts only); 10 years compared

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1993	+	(+)	-	-	(-)	-	-	0.83
1992	+	(+)	-	-	(+)	(-)	(-)	0.77
1991	+	(+)	-	-	-	-	-	0.78
1990	+	+	-	-	+	+	-	0.80
1989	+	(+)	-	-	+	+	-	0.90
1988	+	(+)	-	-	-	+	-	0.83
1987	+	(+)	-	(+)	+	+	(-)	0.77
1986	+	(-)	-	+	(-)	+	-	0.83
1985	+	+	-	+	(-)	(+)	-	0.73
1984	+	(+)	-	+	-	+	-	0.81

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

Table 2c: y = indebtedness (short-term debts only); 10 years compared

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1993	+	(+)	-	(+)	-	-	+	0.84
1992	+	(+)	-	-	(+)	(-)	(-)	0.73
1991	+	(+)	(+)	-	-	-	-	0.82
1990	+	+	-	-	+	+	-	0.88
1989	+	(+)	-	-	(+)	+	-	0.83
1988	(+)	(-)	(+)	(-)	(-)	+	(-)	0.41
1987	+	(-)	(-)	(-)	+	+	(+)	0.46
1986	(+)	(-)	(+)	(-)	(+)	+	(+)	0.51
1985	(+)	(-)	(-)	(+)	(+)	(+)	(+)	0.32
1984	(+)	(-)	(+)	(-)	(+)	(-)	(+)	0.33

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

Tables 2a and 2b are practically identical, save a difference in significance in 1985's reserves variable, and a difference in signs in 1987's money supply variable, though that is not statistically significance in both Tables. *We conclude therefore that the behaviour of long-term and total debts outstanding are very similar in all respects*, as they are summarised in points (a) to (f) in the preceding paragraphs.

We will therefore concentrate on the differences between long- and short-term debts. The first difference arises from the GNP per capita columns (the size variable again fails to exert any significant effect on short-term debt). While all the significant coefficients in this column in Table 2b remain negative, for the majority of years (six out of ten) per capita GNP did not have any significant influence on short-term debts, yet the impact on long-term debts was consistently negative. *In other words, more often than not a rich nation has just as much tendencies to incur short-term debts as a poorer nation does*.

A second, more important difference concerns with the money supply columns of the two tables. The consistently negative signs observed in Table 2b are replaced in Table 2c by a positive one for 1993, and by four other positive (albeit insignificant) ones from 1984 to 1987. At least in 1993 those with lax monetary policy also got more heavily indebted short-term, and there arises a suspicion that the same may have occurred between 1984 to 1987. *There seems to be a hint that money supply is perhaps the factor that deserves more scrutiny in hunting for the causes of debt crisis*.

4.   Time-rates of changes in indebtedness

Apart from seeking the determinants of the *levels* of indebtedness, it will also be interesting to see how such levels change over time. A simple way to approach this is to replace the dependent variable in Equation (1) by its time-rates of change, viz.

$$\frac{d\,\mathrm{TD}/dt}{\mathrm{TD}} - \frac{d\,\mathrm{GNP}/dt}{\mathrm{GNP}} = \beta_0 + \sum_{i=1}^{i=6}\beta_i x_i + e. \tag{2}$$

The time derivatives on the left-hand side are taken to be discrete changes from year t to t+1; the other variables in Equation (2) take their values at year t. The independent variables are the same as in the previous section. Again both sides of the equation are divided by the population size at each year to correct for heteroscedasticity. Ten

regressions are run for each of the debt category, and the results, concentrating on the

signs and the statistical significance, are presented in Tables 3a to 3c below.

Table 3a: y = time-rate of change in indebtedness (long- plus short-term debts);
10 years compared

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1992-3	(+)	(+)	-	+	-	+	+	0.89
91-92	(-)	(+)	-	-	-	(-)	+	0.85
90-91	+	+	-	-	(+)	+	-	0.74
89-90	+	(-)	+	-	-	+	+	0.89
88-89	+	+	-	(+)	-	+	-	0.80
87-88	(+)	(-)	+	+	-	+	(+)	0.77
86-87	+	(-)	(+)	-	-	-	+	0.93
85-86	+	(+)	-	+	-	(+)	(-)	0.96
84-85	+	(+)	-	+	(-)	(+)	(-)	0.79
83-84	+	(-)	(-)	(+)	(+)	(+)	(+)	0.57

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

Table 3b: y = time-rate of change in indebtedness (long -term debts only);
10 years compared

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1992-3	+	+	-	-	-	+	-	0.87
91-92	(+)	(+)	-	-	-	(-)	+	0.86
90-91	+	(+)	-	-	(-)	+	+	0.79
89-90	+	-	+	-	-	+	+	0.92
88-89	+	(+)	-	+	-	+	+	0.84
87-88	+	(+)	-	+	-	+	(+)	0.73
86-87	+	(-)	(+)	-	+	-	+	0.92
85-86	+	(+)	-	+	-	+	+	0.97
84-85	+	(+)	-	+	(-)	+	+	0.84
83-84	+	(+)	-	(+)	+	(-)	+	0.74

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

**Table 3c: y = time-rate of change in indebtedness (short-term debts only);
10 years compared**

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1992-3	(-)	(-)	-	+	-	+	+	0.67
91-92	(+)	(+)	(-)	-	-	(+)	(-)	0.70
90-91	(+)	(-)	(-)	(+)	(+)	(+)	(-)	0.02
89-90	(+)	(+)	(-)	+	(+)	(+)	(-)	0.11
88-89	(-)	(-)	(+)	(+)	(-)	(+)	(-)	0.02
87-88	-	(-)	+	+	(+)	+	+	0.37
86-87	+	(-)	-	+	-	+	-	0.59
85-86	(-)	+	-	(-)	-	-	-	0.63
84-85	(+)	+	(-)	(+)	(-)	(-)	(-)	0.06
83-84	-	-	+	+	(-)	(+)	-	0.75

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

These results can be summarised as follows.

(a)   *Size continues to exert little influence on the dependent variable.*

(b)   Though wealth, or GNP per capita, has a consistently negative sign throughout Tables 2a to 2c, a few positive signs emerge in Tables 3a to 3c. *In these years the richer nations were more likely to increase their indebtedness than the poorer ones.*

(c)   There are again more positive signs in the growth column in Tables 3a to 3c than in Tables 2a to 2c. In Table 3a, for example, four out of eight significant coefficients are positive whereas only three in nine are positive in Table 2a. *In short, faster-growing countries often raise their degree of indebtedness faster than the slower-growing ones, although the latter still have higher levels of indebtedness.*

(d)   Net-export clearly has a more significant and negative impact in Tables 3a to 3c than in Tables 2a to 2c. In Table 3a, for instance, all seven significant coefficients in the net-export column are negative. *In words, a country that is*

strong in exporting is less likely to increase its indebtedness than one that is weak in exporting.

(e)   The positive signs in the reserves columns in Tables 3a to 3c seem again counter-intuitive as they were in Tables 2a to 2c. Rather fewer of them are statistically significant in Table 3a, for example, as compared to those in Table 2a. A puzzle remains as to why a nation with rising reserves should increase its level of indebtedness. A possible answer, offered earlier though might not be entirely satisfactory, is lender's preference for nations with rising reserves; i.e. *there may be supply-push factors at work in the reserves column.*

(f)   The most striking difference between Tables 2a-c and Tables 3a-c lies in the money supply columns. The predominantly negative signs in the former are replaced by positive ones in the latter (see for instance Tables 2b and 2c). *A nation with large per capita money supply tends therefore to have low levels of foreign debts, but faster rising indebtedness.* Such a situation presumably will not last forever. While the underlying reasons are not immediately apparent, this result at least draws our attention to money supply as the more likely candidate for explaining debt crisis that occurred in the recent past.

5.   Short- to long-term debt ratios

Many debt crises were preceded by sharp rises in the ratio between short- and long-term debts. It will be interesting to investigate the determinants of this debt ratio. We do this in this section by putting the debt ratio on the left-hand side of the regression, the six independent variables are the same as those in Equations (1) and (2); the results are presented in Table 4.

$$\frac{STD}{LTD} = \beta_0 + \sum_{i=1}^{i=6} \beta_i x_i + e \tag{3}$$

Table 4: y = short-term debt/long-term debt; 10 years compared

	Constant	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)	R^2
1993	(+)	(+)	(-)	+	(+)	-	+	0.82
1992	(-)	(+)	+	-	+	-	+	0.55
1991	-	-	+	(-)	-	-	+	0.88
1990	(-)	(-)	+	-	-	(+)	(-)	0.76
1989	-	(-)	+	-	-	-	(-)	0.73
1988	-	-	+	(+)	-	+	+	0.83
1987	-	(-)	-	-	-	-	+	0.77
1986	-	(-)	+	-	(-)	(-)	+	0.85
1985	(+)	-	+	(-)	(+)	+	+	0.80
1984	(+)	-	+	(-)	+	(-)	+	0.79

(·) = Statistically not significantly different from zero at the 5% level; sample size = 92 in each year.

We will now summarise the contents of Table 4. We take this opportunity to compare with the findings of the two previous sets of results. The following points therefore serve also as a summary of the findings of this paper as a whole.

(a)   The column of GNP in Table 4 returns a predominantly negative sign. Recall this is the first significant impact the size variable has on any dependent variable in this study. *In short, size has no influence on a country's overall indebtedness, or on her rate of increase of indebtedness, but larger countries have lower short- to long-term debt ratios.*

(b)   The GNP per capita column is clearly positive. The positive signs are opposite to those found in the wealth columns of both sets of Tables 2a-c and 3a-c. *Richer nations therefore tend to be less indebted, have slower time-rates of change of indebtedness, but have higher short- to long-term debt ratios.*

(c)   The column of growth rates is basically (five of the six significant coefficients are) negative. This is similar to the debt-level Tables 2a to 2c, but opposed to

many cases in the rates of change Tables 3a to 3c. *Thus a faster-growing country tends to have lower overall indebtedness, higher rate of increase in indebtedness, and lower short- to long-term debt ratios.*

(d)   The net-exports column is predominantly (five out of seven significant coefficients are) negative. Recall that the signs in Tables 2a-c were inconclusive, and those in Tables 3a-c were negative. *Thus a strong exporting country tends to have lower rates of change of indebtedness, lower short- to long-term debt ratios, but the impact on the level of indebtedness is inconclusive.*

(e)   The reserves column is largely (five out of seven significant coefficients are) negative. Recall that the signs in both Tables 2a-c and 3a-c were positive. *We conclude that a country with rising reserves tends to have higher levels of indebtedness, faster rates of change of indebtedness, but lower short- to long-term debt ratios.*

(f)   Finally, the money supply column is clearly positive. Recall that the signs in Tables 2a-c were negative and those in Tables 3a-c were positive. *Thus a country with larger money supply per capita tends to lower levels of indebtedness, faster rates of change of indebtedness, and higher short- to long-term debt ratios.*

We will leave further discussions of these findings to the next section.

6.   Summary and conclusions

To fix ideas the overall findings of this paper (see also points a to f in section five) can be summarised in Table 5.

Table 5: Summary of results

	Size (GNP)	Wealth (GNP, per cap)	Growth (%)	Net-export (per cap)	Net change of Reserves (per cap)	Money supply (per cap)
Overall indebtedness	×	-	-	-	+	-
Time-rate of change of indebtedness	×	-	+	+/-	+	+
Short- to long-term debt ratio	-	+	-	-	-	+

× = No significant impact; +/- = mixed results.

We now consider each column of Table 5 in turn. The first one on *size* is interesting particularly since lending agencies supposedly regard size to offer protection against country risks. Our data offers no evidence to suggest that they do. On the other hand, larger economies are able to secure more long-term loans. To the extent that short-term loans are more volatile and subject to 'runs', *we may tentatively conclude that larger countries are less vulnerable to crisis situations*.

Next we consider the GNP per capita column in Table 5. The first two entries are as expected, from demand considerations, since richer countries typically are lenders rather than borrowers. *The last row's negative sign seems intriguing, but it would be incorrect to conclude that richer countries are therefore more vulnerable to short-term debt crisis.* The negative sign probably reflects not their particular need for short-term debts, but rather their relative independence from long-term debts.

The *growth* column is next. The two negative signs suggest that faster-growing countries are less indebted, especially in short-term debts. This is encouraging, in so far as it gives evidence that growth does not render a country more vulnerable to indebtedness and crisis attacks. *The Asian debt crisis should perhaps not be seen as a consequence of their successful growth*. The positive sign in the middle row suggests that the faster a country grow the faster will her indebtedness rise. This is not altogether surprising, until one realises that such countries will still have lower level of indebtedness in the end.

The next column, net-exports, behave quite similarly to the growth column and perhaps for very similar reasons too.

The next column is reserves. Two factors might have contributed to the two positive signs. On the one hand, lenders clearly prefer borrowers with larger and rising reserves. On the other hand, those heavily indebted must also accumulate reserves in order to service the debts. Neither of these is really surprising. The remaining negative sign is more interesting when viewed in the following way, that those countries with slower rise (or faster fall) in reserves also incur more short-term than long-term debts. One should be quite alarmed indeed when a country's short- to long-term debt rises since the reserves might probably be decreasing too.

Finally we come to the money supply column. The picture here seems mixed. Lax money supply is associated with low levels of indebtedness on the one hand, but high relative reliance on short-term debt on the other hand. The impact a lax monetary policy has on the short-term debt ratio seems more worrying, as far as debt problems are concerned, than the other variables examined in this paper.

REFERENCES

Aschheim, J., C. Christou, P. Swamy and G.S. Tavlas, 1996, A Random Coefficient Model of Speculative Attacks - The Case of the Mexican Peso, *Open Economies Review*, 7, S1, pp 553-571.

Atkeson, A. and J.V. Riosrull, 1996, The Balance of Payments and Borrowing Constraints - An Alternative View of the Mexican Crisis, *Journal of International Economics*, Vol 41, 3-4, pp 331-349.

Bensaid, B and O, Jeanne, 1997, The Instability of Fixed Exchange-Rate Systems When Raising the Nominal Interest-Rate Is Costly, *European Economic Review*, 41, 8, pp 1461-1478.

Blanchard, O. J., Debt and the Current Account Deficit in Brazil, 1983, in Armella, P.A., R, Dornbusch, and M. Obstfeld, eds., *Financial Policy and the World Capital Market: The Problem of Latin American Countries*. Chicago: University of Chicago Press.

Bordo, M.D. and A.J. Schwartz, 1996, Why Clashes Between Internal and External Stability Goals End in Currency Crises, 1797-1994, *Open Economies Review*, 7, 1, pp 437-468.

Calvo, G.A. and E.G. Mendoza, 1996, Mexico Balance-of-Payments Crisis - A Chronicle of a Death Foretold, *Journal of International Economics*, 41, 3-4, pp 235-264.

Cobham,, D., 1996, Causes and Effects of the European Monetary Crises of 1992-93, *Journal of Common Market Studies*, 34, 4, pp 585-604.

Cole, H.L. and T.J. Kehoe, 1996, A Self-Fulfilling Model of Mexico 1994-1995 Debt Crisis**,** *Journal of International Economics*, 41, 3-4, pp 309-330.

Eichengreen, B., A. Rose and C. Wyplosz, Contagious Currency Crises - First Tests, *Scandinavian Journal of Economics*, 98, 4, pp 463-484.

Frankel, J.A. and S.L. Schmukler, 1996, Country Fund Discounts and the Mexican Crisis of December 1994 - Did Local Residents Turn Pessimistic Before International Investors, *Open Economies Review*, 7, S1, pp 511-534.

Hill, H., 1996, Indonesia Industrial-Policy and Performance – Orthodoxy Vindicated, *Economic Development and Cultural Change*, 45, 1, pp.147-174.

Klein, L.R. and A. Coutino, 1996, The Mexican Financial Crisis of December 1994 and Lessons to Be Learned, *Open Economies Review*, 7, S1, pp 501-510.

Krayenbuehl, T.E., 1995, *Country Risk: Assessment ad Monitoring*, Lexington Books, Massachusetts, Toronto.

Otker, I and C. Pazarbasioglu, 1996, Speculative Attacks and Currency Crises - The Mexican Experience, *Open Economies Review*, 7, S1, pp 535-552.

------- and ------, 1997a, Speculative Attacks and Macroeconomic Fundamentals - Evidence from Some European Currencies, *European Economic Review*, 41, 3-5, pp 847-860.

------- and ------, 1997b, Likelihood Versus Timing of Speculative Attacks - A Case-Study of Mexico, *European Economic Review*, 41, 3-5, pp 837-845.

Radelet, S., 1995, Indonesian Foreign Debt – Headed for a Crisis or Financing Sustainable Growth, *Bulletin of Indonesian Economic Studies*, 31, 3, pp.39-72.

Sachs, J., A. Tornell, and A. Velasco, 1996, The Mexican Peso Crisis: Sudden Death or Death Foretold?, *Journal of International Economics*, 41, pp.265-283.

The IMF, 1997, IMF Annual Report 1997, Washington D.C.

The World Bank, 1997, World Bank Annual Report 1997, Washington D.C.

Endnotes

[1] It is almost by definition that the great majority of banks and individuals always fail to see a crisis coming. This chronic failure of judgement and foresight of course presents ample opportunity for huge sums of money to be made overnight by a shrewd, fortunate and speculating few.

[2] Both the World Bank and the IMF remain very positive about the East Asian economic prospects right up to the eve of the crisis. The World Bank, for instance, wrote in its 1997 Annual Report (p.48), "And although there are some concerns about the fragility of the region's banking systems, the risks of loss of confidence in the banking systems would be easy to overstate, since most East Asian countries have a more robust external and fiscal position than countries that have faced banking crisis elsewhere. The prospects for continued high growth in coming years remain sound, provided countries undertake the necessary important reforms." Just two years before the crisis an Indonesian economist reported that "Indonesia is not headed toward a crisis in the immediate future" (Radelet (1995), p.39).