A SAS Analysis of Some Major Economic Effects of the Asian Crisis on World Advanced and Developing Economies

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Abstract

Recent financial crises in Asian countries have generated wide fluctuations in world financial markets and international trade transactions which in turn have imposed some recessionary presssures leading to changes in macroeconomic variables and counter-economic policy measures. The purpose of this study is to estimate some of the parameters which relate the external forces of the Asian crises to the key economic variables of advanced and developing economies. Parameter estimates can be used in the specification of two models for two groups of world advanced and developing economies in an attempt to assess the comparative effects of the crises on each of the two groups. Grouping of world economies follows the International Monetary Fund's World Economic Outlook. SAS procedures utilized in this study are regression, correlation, arima and others.

Effects Scenarios

External disturbances affect economies via two main routes, financial markets and international trade transactions. In the computer age, the widespread use of the internet and of today's electronic networks, the global interaction of international trade and finance has become more intense than before. Usually, the most common source of troubles is inflation and its effects on both financial markets and international trade transactions. Another source is liquidity shortages. The so-called Asian Tigers (S. Korea, Taiwan, Hong Kong, Singapore and others) have experienced a long term fast economic growth which has led to inflation. Inflation leads to the deterioration of the domestic and international value or purchasing power of the currency of the inflated country (ASIA). In addition to inflating the prices of goods and services and commodities, inflation also inflates stock prices in the stock markets thus making investors require higher rates of return on stocks to compensate for the inflated stock prices. In such a bull market, if speculators exaggerate an increasing their demand for stocks and drive their prices far beyond their true value, they will soon enough realize that those stocks are not worth what has been paid to buy them, and therefore will start to sell them in large numbers thus driving their prices down very quickly in what is known as stock market price crash. Business firms, banks and other financial institutions hold stocks on the asset side of their balance sheets. Following a stock market crash, those firms will realize that the market value of their assets side can no longer cover the liabilities side of their balance sheets which is a situation of default and bankruptcy. When such situation happens on a large scale it leads to recession. As for the other route of inflation effects on international trade transactions, the deterioration of the currency of the inflated countries (ASIA) decreases their purchasing power and their demand for the exports of the other countries (ADVN and DEVL). The decrease in the exports of advanced and of developing countries to Asian countries will decrease their gross domestic products by a multiple of the decrease in their exports depending on the size of the export multipliers of those advanced and developing countries. It is worth noting that speculators and holders of the

deteriorating currency will rush to sell it before its value deteriorates further. Those activities will further lower the international value of the currency.

SAS and Statistical Analysis

Observations of the data set represent the rates of change in gross domestic products (GDP) of advanced (ADVN), developing (DEVL), and Asian (ASIA) country groups. The rates of change of GDP's are preferable to the absolute magnitudes of GDP because they reflect the rates of economic growth. For the years 1989 and 1999 the rates for the three country groups are: ADVN 2.9 and 2.5, DEVL 4.3 and 5.3, and ASIA 7.0 and 5.9 . The three means for the eleven years 1989-99 are ADVN 2.372727, DEVL 5.536364, an ASIA 7.445455. Pearson correlation coefficient is positive and relatively strong (.88067) between ASIA and DEVL, but it is negative and low between ADVN and DEVL (-.10291) and between ADVN and ASIA (-.14264). This is explained by the strong foreign trade and finance relations between ASIA and DEVL. As for the negative correlation's, it is quite known that a given country's GDP rate of increase depends upon the rate of increase in domestic aggregate demand plus the rate of increase of world demand for its exports. A larger rate of increase in world demand for Asian exports can very well mean a decrease in world demand for ADVN countries exports. The vigorous competition between ADVN and ASIA for selling their exports in the international markets is quite evident. Although we have no doubt that SAS regression procedure gives us accurate parameter estimates, yet we are not immune from human error. A simple arithmetic calculation of regression equation: y = a + b X, would verify that we are not in error. Given, for instance, the year 1992 where DEVL rate = 6.6 and ASIA = 9.5 we have: 1.576641 + .531831 (9.5) = 6.6290345; quite close. ARIMA forecast values for ASIA are shown below and can be used to calculate the expected rates for ADVN and DEVL. We can also use PROC ARIMA to obtain forecasts of ADVN and DEVL to compare results. Shown below a plot of the three rates from which we can observe their behavior and relative magnitudes over a period of 11 years (1989-99).

Relevant Policy Tools

If financial markets undergo wide fluctuations they may become a source of instability and policy makers may choose to design measures to stabilize those markets' behavior. The nature of such measures can be monetary, fiscal, or other selective controls. The expected interest rate level is the central influential factor which guides the financial markets behavior because of the inverse relationship between the change in interest and the changes in bonds and stock prices. Demand for and supply of stocks and bonds determine their market price levels. In parallel with interest rate is the rate of profits which rises during economic expansion and encourages the purchase of stocks. Interest rate level is a key factor in both internal and external balance. Internal balance requires a relatively low interest level whereas a relatively high level is more favorable to the external balance. Therefore, using interest to influence a fluctuating stock market means adding a third difficult task to that monetary tool.

Conclusion

The Federal Reserve has been so far responding to stock market instability by merely revising the suitability of the prevailing interest rates level to the desired performance of the economy. The Fed has not chosen to use changes in the interest rates level to influence the behavior of the stock market. Some Asian countries have imposed ceilings on the scale of speculation in currency markets. The United States and

the United Kingdom continue to adhere to the free market forces and free international trade.

SAS Code for Project

```
data crys1;
  input year advn devl asia @@;
cards;
1989    2.9    4.3    7.0
1990    2.7    4.0    5.6
1991    1.2    5.0    6.6
1992    1.9    6.6    9.5
1993    1.2    6.5    9.3
1994    3.1    6.8    9.6
1995    2.5    6.0    9.0
1996    2.7    6.6    8.3
1997    3.0    5.8    6.7
1998    2.4    4.0    4.4
1999    2.5    5.3    5.9
;
proc print data = crys1;
proc arima;
  identify var=asia(1);
  estimate p=2;
  forecast out=b1 lead=12 id=year;
proc plot data=b1;
  plot forecast*year='f' l95*year='l'
  u95*year='u' asia*year='y'/overlay;
  plot resid*year='r' / vref=0;
run;
proc means data = crys1;
proc print;
run;
proc corr data = crys1;
proc print;
run;
proc plot data = crys1;
  plot advn * year = 'a' devl * year = 'v'
  asia * year = 's' / overly;
proc print;
run;
proc reg data = crys1;
  model advn = asia / dw;
  output out=b p=p r=r;
proc print;
run;
proc reg data = crys1;
  model devl = asia / dw;
  output out=c p=p r=r;
proc print;
run;
```

References

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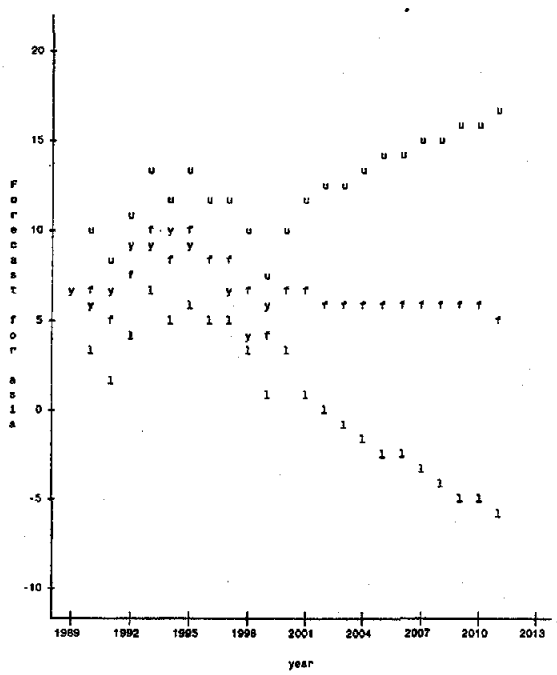
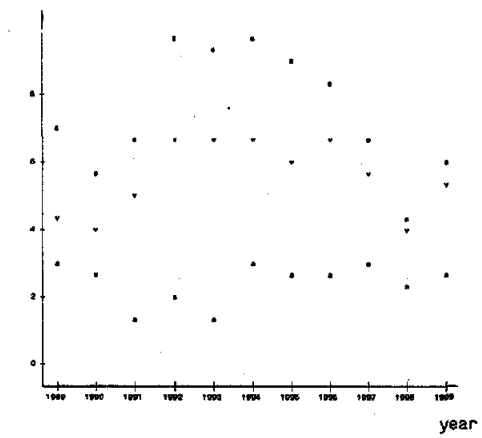
Forecasts for variable asia

Obs	Forecast	Std Error	95% Confidence Limits	
12	6.8151	1.7254	3.4332	10.1969
13	6.4526	2.7039	1.1531	11.7522
14	6.0044	3.1573	-0.1838	12.1926
15	5.9273	3.4654	-0.8648	12.7194
16	5.9530	3.7858	-1.4671	13.3731
17	5.8869	4.1122	-2.1728	13.9466
18	5.7706	4.4100	-2.8728	14.4140
19	5.6719	4.6797	-3.5002	14.8439
20	5.5920	4.9341	-4.0787	15.2627
21	5.5107	5.1784	-4.6388	15.6603
22	5.4234	5.4124	-5.1846	16.0315
23	5.3353	5.6361	-5.7112	16.3818

Plot of FORECAST*year. Symbol used is 'f'.
Plot of L95*year. Symbol used is 'l'.
Plot of U95*year. Symbol used is 'u'.
Plot of asia*year. Symbol used is 'y'.



Plot of advn*year. Symbol used is 'a'.
Plot of devl*year. Symbol used is 'v'.
Plot of asia*year. Symbol used is 's'.



The REG Procedure
Model: MODEL1
Dependent Variable: devl

Analysis of Variance

Source	DF	Sum of Squares	Mean Square	F Value	Pr > F
Model	1	9.04741	9.04741	31.10	0.0003
Error	9	2.61804	0.29089		
Corrected Total	10	11.66545			

Root MSE	0.53935	R-Square	0.7756
Dependent Mean	5.53636	Adj R-Sq	0.7506
Coeff Var	9.74188		

Parameter Estimates

variable	DF	Parameter Estimate	Standard Error	t Value	Pr > |t|
Intercept	1	1.57664	0.72840	2.16	0.0586
asia	1	0.53183	0.09536	5.58	0.0003

Obs	year	advn	devl	asia	p	r
1	1989	2.9	4.3	7.0	5.29946	-0.99946
2	1990	2.7	4.0	5.6	4.55489	-0.55489
3	1991	1.2	5.0	6.6	5.08672	-0.08672
4	1992	1.9	6.6	9.5	6.62903	-0.02903
5	1993	1.2	6.5	9.3	6.52267	-0.02267
6	1994	3.1	6.8	9.6	6.68222	0.11778
7	1995	2.5	6.0	9.0	6.36312	-0.36312
8	1996	2.7	6.6	8.3	5.99084	0.60916
9	1997	3.0	5.8	6.7	5.13991	0.66009
10	1998	2.4	4.0	4.4	3.91670	0.08330
11	1999	2.5	5.3	5.9	4.71444	0.58556