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David Lim
dlim@vtc.edu.hk

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EXPORT INSTABILITY AND ECONOMIC DEVELOPMENT: THE EXAMPLE OF WEST MALAYSIA¹

By DAVID LIM

Attempts to test economic hypotheses empirically often encounter two problems. The first is that theoretical formulations do not always result in relationships between variables which can be observed directly. Under these circumstances further relationships between the unobservable variables and other variables which can be observed will have to be specified before the original hypotheses can be tested empirically. This is a legitimate but not always successful method of circumventing the difficulty.² The second obstacle encountered is the shortage of reliable statistical data for those variables which can be observed. This is a problem that is especially serious in less developed countries where the machinery for collecting statistical data is still in its infancy. Under such conditions indirect methods have often to be substituted for direct methods in the empirical verification of economic hypotheses. The purpose of this paper is to show the presence of these two problems in, and therefore the difficulty of, substantiating the claim that export instability has been detrimental to the economic development of West Malaysia over the period 1947-70.

I

The hypothesis that export instability has affected the rate of growth of the West Malaysian economy adversely consists of three distinct but related parts. The first is the establishment that the degree of export instability in West Malaysia is high by international standards and the reasons for such instability. The second is the establishment that fluctuations in the export sector have been transmitted to the rest of the economy and the third that economic instability *per se* has resulted in a decrease in the long-term rate of growth of the economy.

The first part of the hypothesis is relatively easy to test as there is little conceptual ambiguity and the statistical data required are easily available and reliable. Various studies over the years have recorded severe fluctuations in the prices and proceeds of West Malaysian exports. Thus Coppock (1962), using the log variance method,³ found the instability indices for the unit value of exports for West Malaysia and a group of forty-five less developed countries for 1946-58 to be 29.4 and 17.6 respectively. The instability index for the total value of exports for West Malaysia for the same period was 41.9 compared to the 23.1 for the sample as a whole. In a study that covered the period 1948-57 Michaely (1962) found the index of the average year-to-year fluctuations, adjusted for trend, of export prices for West Malaysia to be the third highest in his sample of thirty-six developed and less developed countries.

The extreme instability of the export earnings of West Malaysia is also brought out in a study by Erb and Schiavo-Campo (1969). Using the Coppock log variance method they discovered that the means of the instability indices of export earnings for eighteen developed and forty-five less developed countries for 1946-58 were 17.6 and 23.0 respectively while the medians were 18.1 and 18.3 respectively. These values are considerably smaller than the 38.9 recorded for West Malaysia. There was also a significant difference over the later period 1954-66, for the index for West Malaysia was 16.5 while the

mean (median) values for the developed and less developed countries were 6.2 (6.3) and 13.4 (12.8) respectively.

A different index of instability was used by Leith (1970) in his study of the extent of export fluctuations in twenty-five developed and seventy less developed countries over the period 1948-58. A least squares linear trend line was fitted for the period and the instability index calculated as the average of the absolute percentage deviations from the trend. However, Leith's results also showed that the West Malaysian export sector experienced an above-average degree of instability for while the means (medians) of the instability indices for the developed and the less developed countries were 7.9 (7.4) and 12.0 (9.9) respectively, the index for West Malaysia was 19.6.

The findings of these studies can be accepted because in each case the degree of instability has been measured around the trend so that the growth over the period as a whole has been separated from the year-to-year deviations from the growth path. Failure to eliminate the trend will place a country, whose exports have been growing rapidly or growing at a constant rate, artificially high on the instability scale. The statistical data used for the analysis are also relatively accurate, for data on the foreign trade sector, especially if that sector is dominated by a few commodities, are easy to collect and are widely accepted to be the most reliable of all the data collected in less developed countries.

It is generally accepted that low price elasticities of supply and demand together with uncontrolled shifts in the supply and demand provide a sufficient reason for the severe fluctuations in the prices and proceeds of primary products. In the case of West Malaysia the establishment of such supply and demand conditions in the export sector is greatly simplified by the fact that the earnings of rubber and tin account for well over 80 per cent of the total export proceeds. The search for the cause of export instability can therefore be concentrated on the supply and demand conditions for these two commodities.

The price elasticity of supply of rubber producers in West Malaysia is known to be very small. For example, when annual data for 1948-61 were used Wharton (1963) obtained elasticities that varied between -0.03 and -0.01 for estates. When monthly data were used on the assumption that annual production figures would neutralize any short-run response, the elasticities obtained were again not statistically significant. Much the same conclusion was reached from the analysis on smallholders, for only one of the six price elasticities of supply estimated was statistically different from zero. The results were more or less the same when the estimating equation was expanded to include composition, mature acreage, and trend as determinants. The highest value obtained (and the only statistically significant one at the 10 per cent level) was 0.12 which indicates a low degree of price response. These results were confirmed in a later study by Stern (1965).

The price responsiveness of the producers of tin is also small. Table 1 shows the price elasticities of supply of the dredging, gravel pump, hydraulic, opencast, underground, and dulang washing sectors. The price elasticity of supply of the West Malaysian tin industry as a whole has also been included. The model of supply response used is the linear Nerlovian adjustment one and the independent variables included are the Penang ex-works price, a refined dummy variable for export control, and, of course, output lagged a year.

The elasticities have been calculated at the mean values and show that tin producers in West Malaysia are not responsive to price movements as a whole. Four of the six sectors have negative values which are not statistically different from zero. The opencast sector has a relatively high, positive, and statistically significant price elasticity of supply (0.81) but this is not representative of the West Malaysian industry as the opencast sector accounts for only about 2 per cent of the total West Malaysian output. By far the most important sectors are the dredging and the gravel pump sectors which together account for about 89 per cent of the total output. The price elasticity of output of the West Malaysian tin mining sector is therefore 0.20, which is somewhere between the -0.09 recorded for the dredging sector and the 0.33 for the gravel pump sector, and which indicates a relatively small degree of price responsiveness.

TABLE I
Price elasticities of supply by sector, 1949-69

<i>Sector</i>	<i>Adjustment coefficient</i>	<i>Price elasticity of supply</i>	<i>Sector as percentage of total output</i>
Dredging	0.73	-0.09	30.8
Gravel pump	0.15	0.33	57.9
Hydraulicizing	0.47	-0.82	1.5
Opencast	0.54	0.81	2.1
Underground	0.87	-0.13	2.9
Dulang washing	0.16	-0.24	4.8
Total	0.45	0.20	100.0

TABLE II
Price elasticities of demand for rubber and tin for the world and major consuming countries, 1953-66

	<i>Rubber</i>		<i>Tin</i>	
	<i>Elasticity</i>	<i>Standard error</i>	<i>Elasticity</i>	<i>Standard error</i>
United States	-0.04	0.18	-0.52	0.21
Japan	-0.27	0.09	-0.19	0.21
Italy	-0.06	0.14	-0.12	0.12
France	-0.08	0.05	-0.47	0.12
West Germany	-0.28	0.14	n.a.	n.a.
Canada	n.a.	n.a.	-0.29	0.26
United Kingdom	-0.01	0.07	-0.37	0.14
World	0.02	0.06	-0.20	0.12

SOURCE: K. A. M. Ariff (1972), pp. 46-7 and 57.

The price elasticities of demand for rubber and tin are also not large. Table II shows that the price elasticity of demand for rubber for the world in 1953-66 is not statistically different

from zero. Of the elasticities obtained for the six major consuming countries only that for Japan is statistically significant and this at -0.27 clearly indicates a relatively low degree of price responsiveness. The picture is more or less the same for the demand for tin. The price elasticity of demand obtained for the world is not statistically significant while the values of those that are (U.S.A., U.K., and France) are considerably smaller than one.

On the other hand, rubber and tin are strategic raw materials and their demand curves are known to shift sharply and frequently. Their income elasticities of demand have also been noted to be quite high while the development of substitutes has only served to narrow the market and therefore concentrate demand fluctuations on the two commodities (Balassa, 1964; Nehmer, 1959; Desai, 1966).

The supply curves of rubber and tin are relatively stable as the production of neither commodity is significantly affected by the vagaries of the elements (McHale, 1966; Yip, 1969). However, such stability is more than offset by the demand instability and by the price inelasticities of supply and demand for the two commodities. On the whole, it would seem that the supply and demand conditions for rubber and tin provide an entirely plausible explanation of the high degree of export instability in West Malaysia.

II

The testing of the second part of the argument against export instability, that there is a causal relationship between export instability and economic instability, also presents no conceptual difficulties. A change in the total value of exports will affect the incomes of the producers in the export sector directly. This will in turn affect their consumption and investment expenditures and so indirectly the incomes of other producers in the economy. This is the familiar multiplier effect. There is also an accelerator effect as the direct and indirect effects on the income level will influence the over-all investment climate. It can be expected that these two effects will combine to produce changes in the gross national product which are in the same direction and which, in the absence of government intervention, will be more than proportional to the initial changes in the export proceeds.

There is, however, an unfortunate tendency to measure the impact of export instability on the gross domestic product (GDP) instead of the gross national product (GNP). The latter is the correct one to use if the intention is to show how the internal economy has been affected. The gross domestic product includes profits repatriated to foreigners and will give an exaggerated picture of the degree of instability of the internal economy if the foreign companies allow the repatriated profits to fluctuate while keeping the operating costs and the payments to the host country steady.

This is more a problem of the mis-specification of the relationship between export instability and economic instability than one of an inherent conceptual difficulty in specifying the relationship between the two variables. The same observation may be made also of past attempts to specify the relationship between changes in export earnings (AX) and changes in the GNP (AY). There has been a failure to incorporate certain characteristics of under-development in the relationship with the result that the foreign-trade multiplier is often overestimated. To be more specific, the foreign-trade multiplier should, as suggested by MacBean (1966), be given as:

$$(1 - p_x - m_x - t_x)/(m_y + s_y + t_y) \quad (1)$$

where p_x is the proportion of export earnings repatriated to foreigners, m_x the proportion of export earnings paid for imports which are re-exported in a natural or processed form, t_x the proportion of export proceeds which accrues to the government through taxes on export, m_y the marginal propensity to import, s_y the marginal propensity to save, and t_y the proportion of the change in domestic income which accrues to the government through taxes whose revenues respond to changes in the domestic income and expenditure.

The first two items, p_x and m_x , are seldom deducted from the primary change in the export earnings in most of the formulae used. This has led to a considerable overestimation of the foreign-trade multiplier in those cases where the two items are important. In the case of the West Malaysian economy the value of p_x is quite significant in view of the important role of the foreign sector and the 'openness' of the economy. Over 90 per cent of the acreage under oil palm, 60 per cent of the tin output, and 42 per cent of the rubber production are under foreign ownership. There is no restriction on the outflow of investible funds from the country and every year the outflow of such funds amounts to over 21 per cent of the total export proceeds (Silcock, 1961; Wheelwright, 1965).

The import of primary commodities for re-export is a flourishing industry in West Malaysia. Thus over the period 1947-70 about 5 per cent of the gross export proceeds of rubber were imported while the proportions for palm oil and tin exports were 3 and 20 per cent respectively. If the shares of these three commodities in the total export proceeds of West Malaysia were used as weights, then the above figures suggest that the gross export earnings should be reduced by about 10 per cent.

If these two deductions together with those of t_x (0.08), m_y (0.43), s_y (0.18), and t_y (0.08) were made, then the foreign-trade multiplier of West Malaysia works out to be 0.88. If the reductions p_x and m_x were omitted, the multiplier then turns out to be artificially high at 1.33. Again it should be emphasized that this tendency to overestimate the multiplier is the result not of an inherent difficulty in conceptualizing the problem but rather one of a failure to identify certain characteristics of an open and a trade-oriented economy.

Table III shows that on a current-year basis and adjusted for trend there is a consistent relationship between the direction of change in the GNP and the export earnings in current prices over the period 1947-72. When the 3-year moving average method of obtaining the trend was used,⁴ eighteen of the twenty-four pairs of observations moved in the same direction. The evidence was less conclusive when the linear regression method⁵ and the common-sense method of subtracting the average annual increase in GNP or export earnings from the actual increase or decrease in each case were used. However, the relationships obtained are stronger than could be expected to arise from chance, an observation that is supported by the results of the simple regression analysis.

TABLE III

Relationship between deviations of GNP from trend (ΔY) and deviations of export earnings from trend (ΔX) in current prices, 1947-72

Method of trend adjustment	Number of times when ΔY and ΔX moved in same direction	Simple regression analysis $\Delta Y = a + b \Delta X$		
		<i>a</i>	<i>b</i>	<i>R</i> ²
Three-year moving average	18/24	-0.06	0.70 (6.20)	0.61
Linear regression	17/26	-0.0004	1.06 (3.92)	0.37
Actual change less average annual increase	15/25	-0.23	0.73 (6.24)	0.61

NOTE: The figures in parentheses are the 't' values of the regression coefficients. They show that the regression coefficients are statistically significant at the 0.0005 level of confidence.

It has thus been possible to establish, from the available empirical data, that there is a consistent relationship between changes in the GNP and changes in the export earnings. The evidence also shows that important leakages exist in the West Malaysian economy and that these have tended to dampen the multiplier and accelerator effects of export instability.

III

The evidence does not, however, show that economic instability in West Malaysia is of no significance. In a sample of thirty-five less developed countries which did not include West Malaysia, Coppock found the average index of instability of the GNP over the period 1946-58 to be 11x9 (1962, Table A.2). The instability index for the West Malaysian GNP, obtained by using the same formula and for the same period, is considerably higher at 1541. Only the Philippines, Colombia, and Paraguay could be said to be economically more unstable over the period.

It has often been argued that this economic instability has been detrimental to the process of economic development in West Malaysia. Considerable sympathy for the contention can be adduced on an *a priori* level but the empirical verification of the hypothesis encounters so many problems that the hypothesis may, at best, be said to remain unproven.

The *a priori* arguments are usually presented at two levels. The first emphasizes the adverse effects that economic instability has on investment. It is argued that instability results in business miscalculations and encourages a speculative mentality. Business is therefore forced to keep a highly liquid assets position and to maintain a highly flexible form of organization. The net effect is therefore to make long-term capital difficult to obtain, distort the structure of interest rates, and encourage commodity trading. Productive activities requiring substantial fixed investment are also discouraged as is the replacement of small businesses by large-scale operations using modern equipment (IBRD, 1955, p. 647).

Economic instability may also result in inflation. An autonomous increase in export proceeds generates increased incomes in the export sector which in turn may most probably lead to successful trade union pressures for higher wages. A subsequent fall in export earnings may not result in a proportionate decrease in labour costs as wages are generally 'sticky' in the downward direction and this may lead to a rise in unemployment and its attendant social and political unrests. Governments usually try to avoid such upheavals by drawing upon their gold and foreign exchange reserves to maintain the increased income level. However, such a policy cannot be expected to be maintained for long and import controls will have to be imposed. The effect of this is to shift demand to domestically produced goods and unless the production of such goods can respond adequately this will probably lead to a rise in the cost of living. This may well act as the starting-point for another round of wage increases.

The development policies of governments may also help to increase the inflationary pressures. In their efforts to accelerate the rate of development governments may adopt expansionary policies during boom periods. A downward movement in export earnings may not, however, see a reduction in government expenditures. These are also usually 'sticky' in the downward direction for political and economic reasons and governments may be forced to reduce the import of consumption-oriented goods in order to be assured of an adequate flow of intermediate and capital goods. However, unless domestic production of consumption-oriented goods can increase sufficiently to cope with the increased demand inflation may again be the result (Myrdal, 1956, pp. 238-53).

Investment under inflationary conditions, it is then argued, usually takes an unproductive direction in the form of real estate and the purchase of land. Thus Nurkse has commented that it would tend to be concentrated on 'residential construction, largely for the upper income groups and on luxury industries, while essential public installations such as railways and ports have in some cases tended to fall in disrepair' (1953, p. 117).

The second group of arguments against economic instability centres round the administrative difficulties that it creates for governments. The recurrent balance of payments crises and the constant need to impose import controls on consumption-oriented goods will divert the attention of scarce government personnel from other equally important development problems. It will also impede the import of strategic developmental products at crucial moments in the implementation of development plans. This is a problem that is especially acute in those less developed countries where the import of such products is already at a high level for then fluctuations in export earnings will lead immediately to fluctuations in the import of these goods. The ability of such countries to implement their development plans will thus be impaired with subsequent adverse effects on their rate of economic growth.

These are, in brief, the major theoretical arguments against economic instability and together they seem to constitute a very persuasive case. Perhaps the most prominent of the arguments in favour of economic instability within the context of economic development is that of Caine (1954). His argument is that export price instability will encourage rather than discourage investment as more capital may be formed when income and profits are high only periodically than when they are stable and more evenly distributed over time. Moreover, the export boom-induced investment may not be matched by disinvestment in periods of export slumps. The case of investment in the rubber industry in West Malaysia is

quoted as the classic example of the operation of the ratchet effect. The heavy capital expenditures and the large expected future income stream will not only make disinvestment impractical but will also exert constant pressure to reduce the cost of production whenever there is a fall in the price of rubber. Caine pointed out that when prices were low in 1913-14 a lot of effort went into improving the productivity and the general efficiency of the rubber industry in West Malaysia.

Another argument in favour of economic instability is that the marginal propensity to save will tend to be higher under unstable conditions because of the need to have a larger amount of reserves to cope with the contingencies. Unless the cash is deposited in banks overseas the increased savings will provide funds for the investment programme (Michaely, 1962, p. 118; MacBean, 1966, p. 113).

The preference for one school of thought or the other is, however, basically a subjective one. Whether economic instability has been detrimental to the process of growth in West Malaysia can only be established by an empirical analysis. Unfortunately the nature of the problem and the shortage of reliable statistical data make this an extremely difficult task.

IV

The conventional approach is to analyse the relationship between the rate of growth of the real GDP (\dot{Y}) or investment (\dot{I}) and export instability (\bar{X}) (MacBean, 1966). However, as the adverse or favourable effects that economic instability is theoretically supposed to produce on the economy are essentially long-term, it is difficult to specify an appropriate relationship between \dot{Y} or \dot{I} and \bar{X} . For example, an analysis based on a current-year comparison between \dot{Y} or \dot{I} and \bar{X} is meaningless because the effects that instability has on growth cannot be expected to be instantaneous. Indeed it is impossible to say even conceptually what the lag should be. The only valid observation that can be made is that the lag is conceptually more acceptable the longer it is.

On the other hand, too long a lag cannot be afforded in the West Malaysian case because there is not a lengthy and reliable time-series on either GDP or investment. The time-series on these two items does not go back beyond 1947 and even then the data for 1947-54 are subject to a large margin of error. Benham published the combined national income accounts for West Malaysia and Singapore for 1947-51 in 1951 (1951) and the West Malaysian share was then estimated on the basis of changes in the population and foreign trade of the two territories (Lim, 1967, Chapter 1). As somewhat heroic assumptions had to be made in the calculation, the GDP or investment figures so derived for West Malaysia for 1947-51 must be very tentative. Very much the same can be said of the figures for 1952-4 as these were obtained initially on a Pan-Malayan basis from an IBRD study (1955) and the West Malaysian share was estimated in the same cavalier fashion. Official national accounts statistics were not published until 1955 but the data for 1955-70 are also not very useful as there are in effect two different series. The first, for the period 1955-66, is subject to a considerable degree of error (Gill, 1967). The second is for the period 1960-70 and is not comparable to the first series as it contains major revisions made possible by the recent acquisition of a more reliable and comprehensive range of statistical data (Lim, 1973). This means that reliable figures for the GDP and investment are available only for the period 1960-70. Such a short time-series does not allow a meaningful analysis to be made between

\dot{Y} or \dot{I} and \bar{X} even on a current-year basis, let alone allowing for any time-lag for the effects of economic instability to make themselves felt on the economy.⁶

Even if the statistical data on the real GDP and investment were available it is by no means certain that the long-term effects of economic instability on the rate of growth of the West Malaysian economy could be ascertained by a single-equation model, however carefully the allowance is made for the time-lag. The essence of one aspect of the theoretical arguments is that instability can lead to either a greater or a smaller volume of investment and therefore to either a higher or a lower rate of economic growth. However, the relationship between the rate of growth of investment and economic instability is indirect and this results in problems of identification. For example, the argument that instability can lead to a higher level of investment depends on the presumption that instability encourages a higher marginal propensity to save. The problem of identifying the causal relationship exists because the capacity of a country to set aside resources for investment depends also, and perhaps to a much larger extent, on other factors. The existence of a positive and statistically significant relationship between I and X may not mean much under these circumstances. Similarly the existence of a negative and statistically significant relationship between I and X may not amount to much either. The development of a speculative mentality, the predominance of small-scale family businesses, and the presence of inflation which, it is argued, tend to affect investment adversely can be due to a host of other equally feasible reasons. The same problem exists in the establishment of the administrative argument against economic instability because inefficiency and rigidity in the administrative machinery are almost certainly also caused by other factors.

The analysis so far suggests that it is not possible to establish a case for or against economic instability from a study of the West Malaysian situation using the conventional direct approach. However, no case can be established either by using the indirect and less aggregative method of identifying the alleged consequences of economic instability in West Malaysia (Lim, 1972). Take the first alleged consequence of the case against instability, the premium for small-scale family businesses and an aversion for investment in long-term industrial projects. The available evidence shows that there is indeed a numerical predominance of small family firms but there is no reason to suppose that this is due to economic instability. The smallness of the industrial base, a consequence of the mercantilist policies adopted during the colonial era, may be a simpler and more likely explanation. Recent experience shows that long-term capital for industrial development in West Malaysia is not difficult to obtain.⁷ However, this observation does not mean much by itself because instability is only one of a large number of factors which determine investment. Consider next the alleged consequence of the loss of continuity in the implementation of development plans because of the inability of the administrative machinery to adjust adequately to the recurrent balance of payments fluctuations.⁸ Surely it would be difficult to say that the inability to adjust the composition of the country's imports is due solely to economic instability. It is clear from these examples that the attempt to establish the effects of economic instability on the rate of growth of the West Malaysian economy in an indirect way also suffers from the problem of identification.

If no meaningful conclusion can be drawn by using either the direct or the indirect method of analysis, then the case for or against economic instability must remain unproven for neither can any conclusion be drawn from the existing cross-section studies (MacBean,

1966; Ariff, 1972; and Kenen and Voivodas, 1972). Firstly, somewhat conflicting results were obtained by these studies. In an analysis of twenty-two less developed countries over the period 1950-8, MacBean found no relationship between the rate of growth of the real GDP (\dot{Y}) and export instability (\bar{X}).⁹ Neither was any relationship found between the rate of growth of real investment (\dot{I}) and \bar{X} nor between the level of real investment (Q) and \bar{X} for a slightly bigger group of countries. More or less the same conclusions were reached by Ariff in his study of thirty less developed countries over the period 1955-65, though the evidence was less compelling. On the other hand, Kenen and Voivodas, with a different measure of export instability, a bigger sample of countries, and a longer time period,¹⁰ found a statistically significant negative relationship between Q and \bar{X} , and concluded that MacBean's results on the relationship between the two variables were valid only for the 1950s. Under these circumstances it would be difficult to say whether instability as a rule deters economic development or not from the available cross-section studies.

Secondly, there is reason to doubt the statistical reliability of the study by MacBean. Time-series which were not always articulated and statistical data which were not always reliable were often used so that the results obtained could be misleading. Maizels (1968) has re-estimated the relationship between \dot{Y} and \bar{X} using the same statistical function but on the basis of a more discriminating use of the data presented by MacBean to produce an entirely different result.¹¹

Thirdly, the analytical framework provided by a cross-section approach assumes the existence of a single and unique relationship between a given degree of export fluctuations and the resultant change in the rate of growth of the real GDP for all countries. This assumption cannot really be upheld as 'differences in economic structures, in the degree of dependence of different economies on the foreign trade sector, particularly for supplies of capital equipment, and in the ways in which they adjust to short-term changes in foreign exchange earnings' (Maizels, 1968, p. 580) mean that the impact of a given degree of instability in export earnings on the long-term rate of growth of the GDP is likely to vary substantially from country to country.

A conceptually more satisfactory approach is to study the problem in each less developed country in detail. However, attempts to carry out such a study for West Malaysia encounter a number of conceptual and statistical problems that preclude the establishment of any meaningful conclusion. The search for an acceptable approach has therefore come full circle, a phenomenon that is not uncommon in the empirical verification of economic hypotheses.

University of Malaya, Kuala Lumpur

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[Footnote]

- 1 I am indebted to Tibor Barna and K. A. M. Ariff for useful comments on earlier drafts of the paper. This acknowledgement is made with the usual disclaimer.
- 2 An example of this problem is found in supply response studies. The Nerlovian adjustment model is very often used because it incorporates features which are thought to be characteristic of the production of most primary commodities, that is, technological and institutional constraints exist which allow only a fraction of the intended output to be realized. Another popular model is the Nerlovian expectations model which reflects the way in which past experience determines the expected prices and other expectational variables which in turn determine the output produced. The fundamental premises of the two models are entirely different and the distinction is important in theory. However, the estimating equations of the two models are basically the same and the existence of the 'duality' really makes nonsense of the important theoretical distinction (Nerlove, 1956).
- 3 This is given as being equal to $\sqrt[n]{V \log}$ where

$$V \log = 1/(n - 1) \Sigma [\log (X_{t+1}/X_t) - m]^2, m = 1/(n - 1) \Sigma [\log (X_{t+1}/X_t) - m],$$

X_t = value of export earnings or unit value of exports in period t, and n = the number of periods.
- 4 Three years might not have been long enough to avoid many short-term movements. On the other hand, a longer period might have captured too little of the secular movements. It would also have meant a serious reduction in the number of observations.
- 5 Exponential and linear trends were fitted to the data and the results showed that the trend was better approximated by a linear function of time.
- 6 For what it is worth the following equation was obtained by fitting a least squares line to the observations on the annual growth rates of the GDP in 1959 prices (\dot{Y})

and the percentage deviations of the merchandise exports from trend (\bar{X}) over the period 1947-70.

$$\dot{Y}_t = 7.24 - 0.14\bar{X}_{t-2}, \quad R^2 = 0.10. \quad (2)$$

(0.62)

A lag of 2 years was chosen as scatter diagram analysis revealed that such a time-lag produced the largest number of observations when the two variables moved in opposite directions to support the argument against economic instability. The figure in brackets is the 't' value and shows that the regression coefficient of \bar{X}_{t-2} is not statistically different from zero. There is, in other words, no statistical relationship between \dot{Y}_t and \bar{X}_{t-2} . However, in view of the conceptual weakness of the approach and the unreliability of the statistical data, the lack of correlation proves nothing one way or the other about the long-term effects of economic instability on economic growth in West Malaysia.

- 7 When Hume Industries (Malaysia) Co. offered its shares to the West Malaysian public they were over-subscribed by twenty-five times. This not an isolated case for when Malayan Flour Mill (Sdn.) Bhd. and Shell Refining Company (Malaysia) Bhd. floated their shares the over-subscription was twenty-fold. The potential investment capital has also found its way into Government securities. A recent floating of a development loan of M\$75m. resulted in a subscription of M\$136m. For a detailed discussion see Drake (1969).
- 8 In practice this argument is, of course, not relevant as West Malaysia does not suffer from a shortage of foreign reserves.
- 9 Both MacBean and Ariff measured export instability (\bar{X}) as the percentage deviation of export earnings from the trend. The trend was obtained by fitting a 5-year moving average to the data.
- 10 A first-order autoregressive scheme or a modified random walk approach was used to obtain the regression trend line. Sample sizes of thirty and fifty countries were used and the time-periods chosen were 1950-66 and 1956-67.
- 11 The relationships obtained by MacBean between Y on the one hand and X and other determinants on the other were:

$$\dot{Y} = 3.6 + 0.4278\dot{X}_1 - 0.0082\bar{X}, \quad R^2 = 0.4285, \quad (3)$$

(0.1267) (0.2811)

$$\dot{Y} = 4.1 + 0.3021\dot{X}_1 - 0.0089\bar{X} + 0.0002T + 0.1028R, \quad R^2 = 0.4837, \quad (4)$$

(0.1580) (0.2833) (0.0186) (0.0828)

where \dot{Y} is the rate of growth of the real GDP (1950/11-1957/8), \dot{X}_1 the rate of growth of import capacity (1950/1-1957/8), \bar{X} the instability of the importing power of exports (1948-58), T the ratio of foreign trade to income in 1957, and R the change in reserves of foreign exchange and gold (1950/1-1957/8). The figures in parentheses are the standard errors of the regression coefficients. The equations clearly show that there is no relationship between economic growth and

export instability. However, by excluding a few special cases such as Iraq from the sample and by substituting the growth in the fixed investment (\dot{I}) for the growth in the total import capacity (\dot{X}_1), Maizels was able to obtain the following counterpart to equation (3):

$$\dot{Y} = 5.6 - 0.353\bar{X} + 0.289\dot{I}, \quad R^2 = 0.785. \quad (5)$$

(0.042) (0.159)

This result suggests strongly that export instability is likely to act as an important constraint to economic growth in less developed countries. Maizel's purpose in estimating equation (5) was presumably to illustrate how a more discreet use of the statistical data could bring about a different result. However, the force of his argument is somewhat reduced by his mis-specification of the problem. The link between \dot{Y} and \bar{X} is indirect through the effect that \bar{X} has on \dot{I} . Yet \dot{I} itself is made an explicit determining variable in equation (5).