Export Instability and Development: A Review of Some Recent Findings

Within the previous two decades increasing attention has been focussed on the occurance and consequences of export instability, but as yet, researchers have produced diverse results. Disagreement has ranged from the choice of appropriate index, the relative incidence of export instability between advanced and developing countries, the causes of instability, and finally, its general economic effects. Since this general area has recently been highlighted in the latest UNCTAD conference at Nairobi, where it was regarded as being of importance, it seems appropriate to summarise and take stock of the views of professional economists to see, for example, whether proposals for commodity price stabilisation agreements can be justified on pure economic criteria. Accordingly, such a summary is presented below.

Choice of Index

Instability is generally taken to imply fluctuations around a trend. Regular export increases along a trend should obviously not be assigned any instability weighting whereas all changes which are trend deviating should. In compiling an index two problems arise. The selected trend form should approximate as closely as possible to the actual trend form (linear, log linear etc.) and the estimated trend must correctly apply to the entire time period, for if the right trend form is used and the actual trend is not constant, spurious measurements would arise. Most commonly trends have been identified by moving averages and by least squares. MacBean's

indices were calculated by averaging the deviations in export values from a five year moving average, centred on the middle year.[1]

In using moving averages one should be alert to the fact that the length of the chosen interval influences the degree of smoothing and where it is small, the moving average tends to absorb some of the short term fluctuations possibly causing an underestimation of instability. During the last ten years most writers have isolated trends with the least squares method. In his 1964 paper Massel used two measures.[2] The first was the standard error of estimate (square root of the unexplained variance), divided by the mean of the observations.

$$I = \sqrt{\frac{\Sigma\,(ut)^2}{N}} \Big/ \overline{Z}$$

I = Instability Index
ut = $Zt - (\beta_o + \beta_1 t)$
Zt = Exports in Year t.
N = Number of Years
$\overline{Z} = \frac{\Sigma\, Zt}{N}$

The second was the average annual percentage rate of change in the value of exports (trend corrected).

$$I = \frac{wt}{N} \qquad \text{where } wt = \frac{|\,ut+1 - ut\,|}{\text{max. } Zt,\ Zt+1}$$

For a sample of 36 countries, the rank correlation coefficient between these two indices was equal to .718 (at the .01 significance level) enabling Massell to obtain much the same results irrespective of which index was used. However the two indices are not so closely correlated and in certain cases large differences in country rankings occur, for example, using the first index, Columbia had the second highest instability rating but its relative position fell to 25 when judged by the second index. (In a later paper, Massell defined instability as the standard deviation of the residuals from an exponential trend.)[3]

1 A. T. MacBean, *Export Instability and Economic Development*, Allen & Unwin, 1966.
2 B. F. Massell, " Export Concentration and Fluctuations in Export Earnings: A Cross-Section Analysis ", *American Economic Review*, March 1964.
3 B. F. Massell, " Export Instability and Economic Structure ", *American Economic Review*, Sept. 1970.

Erb and Schiavo-Campo used the Coppock index where:

$I = \text{antilog} \surd\, v \log$

where $v \log = \frac{1}{N-1} \Sigma\,(\log \frac{Xt+1}{Xt} - m)^4$

$m = \frac{1}{N-1} \Sigma \log \frac{Xt+1}{Xt}$ Which depends solely on the initial and terminal value.

Although aware of the index's defects, the above authors used it to maintain comparability with Coppock's earlier results. Coppock himself tested his index and found correlation coefficients of .929 and .957 between it and those equal to the main percentage deviation from a linear and logarithmic trend respectively.[5] Using four different sets of data, Leith calculated the correlation co-efficients between Coppock's index and one based on the mean percentage deviation from a linear trend, the figures were .75, .59, .5 and 7.5[6] which showed a much smaller relationship than Coppock's own findings. In a later study, Glezakos warned that Coppock's index " especially when it is used for a short-range time series, is an almost random estimate of instability ",[7] and that to ensure reliable results, the following index was devised:

$$I = \frac{100}{\overline{X}} \sum_{t=2}^{N} \frac{Xt - X_{t-1} - b}{N-1}$$

b = slope of linear trend

Glezakos' time period was for 1953-66 while Erb and Schiavo-Campo's (using Coppock's index) was for 1954-66. A rank correlation of the two indices for the 33 countries in common to both papers, was calculated to be .83 (significant at 5%) which somewhat pre-empts Glezakos' criticism. Lawson, using two indices, the standard deviation of the observed deviations from an exponential trend, and the normalised standard error of deviation from

4 G. F. Erb, and S. Schiavo-Campo, " Export Instability, Level of Development and Economic Size of Less Developed Countries ", *Oxford Bulletin*. Nov. 71.
5 J. D. Coppock, " Foreign Trade of the Middle East: Instability and Growth ", Beirut 1966, p. 5.
6 J. C. Leith, " Export Concentration and Stability: The case of Ghana ", *The Economic Bulletin of Ghana*. Vol. 1, No. 1.
7 Glezakos, " Export Instability and Economic Growth: A Statistical Verification ", *Economic Development and Cultural Change*, July 1973, p. 671.

a linear trend found that in his investigation, it evidently " does make a difference which instability index we use ".[8] By contrast, Kenen and Voivodas felt that in their study, " the method of measuring export instability does not seem to matter very much ".[9] Where one method of compiling an index is used in a cross section study, the trends among the different countries may vary in form, thus reducing the reliability of such an index. On the other hand, if specific indices are tailored to the peculiarities of each country, one then has no valid basis for inter-country comparisons, for various methods of removing trends generate different sets of residuals, and therefore different instability measurements. No ready solution is available, and perhaps the best one can do is to group those countries whose export trends bear some conformity to a particular form.

The Relative Incidence of Instability

Using data derived from Coppock,[10] MacBean noted that the mean instability index for 45 LDCs over the period 1946-58 was 23.1 compared with a mean of 17.6 for developed countries. Accordingly, MacBean concluded that " this suggests a tendency for underdeveloped countries to have less stable export earnings. But it also suggests that this is a fairly weak tendency (and) that the differences are not large ".[11] As it happens, the differences were not that narrow, for the LDC average was 30.7% higher than that of the advanced countries. It should also be borne in mind that the figures related to both merchandise and services. Using the same method and sample of countries, Erb and Schiavo-Campo re-calculated the instability indices for a later period (1954-66) and established that though the mean index for both groups had fallen (to 13.4 for LDCs and to 6.2 DCs) the LDC mean was 117.7% greater than that of the DCs.[12] Massell noted that in the period 1950-66, the

8 C. W. Lawson, " The Decline in World Export Instability - A Reappraisal ", *Oxford Bulletin*, Feb. 1974, p. 59.

9 P. B. Kenen and C. Voivodas, " Export Instability and Economic Growth ", *Kyklos*, Vol. XXV, Fasc. 4, 1972, p. 801.

10 J. D. Coppock, *International Economic Instability*, MacGraw-Hill, New York, 1962, p. 184.

11 MacBean, *op. cit.*, p. 36.

12 Erb and Schiavo-Campo, *op. cit.*

LDCs exports were 50% more unstable than those of the DCs (merchandise exports only).[13] Similarly, Lawson observed that during 1950-59, average LDC instability exceeded average DC instability by 50% and although both groups experienced a decline during 1960-64, the LDCs were between 20 to 90% more unstable than the DCs depending on the particular measure or procedure adopted.[14] In examining 18 DCs and 48 LDCs in which both groups' exports became more stable in the 1960s compared with the 1950s, Naya noted that in the LDCs instability was on average 50% greater than the DCs in the first period, and over 100% greater in the second.[15] Glezakos found that in 1953-66 the average instability index for LDCs was approximately twice that of the DCs[16] and finally, Kenen and Voivodas' indices were generally lower in 1956-67 compared with the period 1950-58.[17] From all this, it is quite clear that there is widespread support for the view that the LDC's exports are more unstable than those of advanced countries although both groups experienced an absolute decline in instability.[18]

Causes of Instability

Commodity and geographical concentration and a specialization in primary production have generally been regarded as the major determinants of export instability. Through excessive concentration a country might be unduly exposed to the vicissitudes of a small number of goods or markets which might well be very destabilising. Diversification might improve matters provided that the enlarged number of goods or markets tend to offset one another's fluctuations. If on the other hand the components within the group tend to move in the same direction at the same time, then the potential advantages of diversification would not materialise, and a country

13 Massell, 1970, *op. cit.*

14 Lawson, *op. cit.*

15 S. Naya, " Fluctuations in Export Earnings and Economic Patterns of Asian Countries ", *Economic Development and Cultural Change*, July 1973.

16 Glezakos, *op. cit.*, p. 673.

17 Kenen and Voivodas, *op. cit.*, p. 797.

18 Askari and Weil, (" Stability of Export Earnings of Developing Nations ", *Journal of Development Studies*, Vol. 11, No. 1, October 1974) appear to be the odd men out in claiming to observe an absolute rise in LDC instability, but since their paper is distinguished by the total absence of any instability measurements, and devoid of any explanation as to how they calculated their indices, their results cannot be given much credence.

specialising on a more stable although narrower range, would fare better. Primary product exports have been assumed to be more unstable than manufactures because their demand and supply functions are more inelastic and are subject to large and frequent changes. On the demand side, shifts occur mainly in response to changing economic conditions in the developed countries' economies and occasionally in response to changing strategic/political situations, while on the supply side, sudden and unforseen changes can be attributed to the variability of weather conditions etc. Even if this were to be true of the group as a whole, it does not of course follow that every primary commodity is inherently unstable, and in any case the available evidence indicates results which in the main do not conform to general expectations.

For the period 1948-58, Coppock calculated instability indices for the total value of world trade in primary commodities and manufactures which showed manufactures (as a group) to be more unstable, with an instability index of 6.8, compared with one of 3.8 for primary products.[19] (These figures were quoted by MacBean although with reservation and caution.) However on scrutinizing Coppock's tables, Sundrum [20] detected arithmetical errors and claimed that the indices should have been 5.6 for primary products and 5.7 for manufactures. Using five different instability measurements for the same period, Sundrum yielded figures that indicated that in three cases, primary product instability exceeded that of manufactures. Moreover, employing Coppock's index and one based on an exponential trend, for the period 1957-65, primary product instability (for both sets of indices) exceeded that of manufactures.

In calculating correlations between instability (using two different indices) and primary product specialization for 37 countries, MacBean obtained low and non-statistically significant results and in multiple regression runs with three possible independent variables, in which the primary product to total export ratio was one, similarly weak findings emerged.[21] Significant although weak relationships between instability and primary product specialization emerged from Massell's (1964) multiple regressions. In a later paper (Massell 1970) where such weak results re-emerged, a negative and highly significant relationship between instability and the ratio of food to

[19] Coppock, 1962, p. 34.
[20] R. M. Sundrum, "The Measurement of Export Instability" (unpublished manuscript), 1967, p. 16.
[21] MacBean, *op. cit.*, p. 39.

total exports was discovered. As an explanation for such an outcome, the possibility was suggested that countries with a high food to export ratio may have established preferential markets which resulted in less export fluctuations. Massell's findings of a weak relationship between primary products in general and instability were borne out in Naya's study of Asian countries.

With regard to instability and commodity concentration, both Coppock and MacBean yielded low and insignificant correlation coefficients. In multiple regression analyses, MacBean, Massell (1964) and Naya, each found no significant relations, but Massell (1970) eventually came up with the normally anticipated results "supporting the hypothesized relationship between instability and commodity concentration".[22] To some extent Knudsen and Parnes supported Massell (1970), in concluding from their study that "the concentration of exports and the direction of trade are important causes of the variations in the fluctuations of export earnings".[23] The connection between instability and geographical concentration remains unclear. MacBean, Massell (1964) and Naya obtained small but negative associations (possibly because of trade agreements?) but Massell (1970) found the relationship to be a positive albeit insignificant one.

Looking at the causes of instability from an entirely different point of view, Erb and Schiavo-Campo established a significant but extremely small negative relationship between a country's size (as measured by its G.D.P.) and instability. Lawson in turn discerned a link between instability and the size of a country's export sector maintaining that "for the LDCs in the sixties, the greater the size of export earnings, the lower was their instability".[24] Naya likewise found that this applied to Asian countries. Such observations may be due to large exporters influencing their markets by causing prices to fall when their exports expand and vice versa.

The precise extent to which instability is due to supply of demand changes is generally not known. Glezakos, for instance, noted that "on average, export volume instability is higher than price instability for both LDCs and DCs",[25] but needless to say, price and quantity movements are interdependent. On finding a

[22] Massell, 1970, *op. cit.*, p. 627.
[23] O. Knudsen and A. Parnes, *Trade Instability and Economic Development*, Lexington 1975, p. 72.
[24] Lawson, *op. cit.*, p. 62.
[25] Glezakos, *op. cit.*, p. 676.

high negative correlation between food exports and instability, Massell (1970) considered such an observation to be consistent with the notion that instability is largely affected by demand changes. This may be so, since in the course of an income cycle, food demand which is relatively income inelastic, would exhibit relatively small fluctuations. This particular issue in keeping with all the other possible causes of instability has not been resolved. Bearing in mind the diversity of the countries surveyed, and the problems of drawing valid inferences from a single kind of index in cross section studies, it is not surprising that virtually no one factor has been isolated as being of fundamental importance in determining instability. The probable weights of each are likely to differ among countries, as are the effects of instability on growth, an area to which we will now turn.

Effects on Growth

While it has generally been assumed that export instability is harmful to growth, such assumptions have largely been based on appeals to intuition whereby the absence of models postulating relations and structures between variables is uncannily widespread, considering the importance attached to this problem. Let us however mention some ways in which instability could adversely affect economic growth or welfare. To begin with, investment may be hindered if instability gives rise to uncertainty, making it difficult to assess prospective yields. LDC farmers may avoid undue specialization in commodities in which their country maintains comparative advantages, thereby reducing that country's trade gains. One must of course distinguish between unstable and uncertain prospects, for even if earnings do fluctuate, average earnings may be known with some degree of assurance. Even so, an investor faced with two alternatives producing the same long run yield, is more likely to opt for the project whose short run returns are more stable. Where earnings are erratic, costs are likely to fall both on individuals and society as a whole. In the individual's case, the need for credit or the running down of savings imposes interest costs and in the long run, overall consumption is likely to be less than it would have been had earnings been more stable. If the government or other agencies attempt to smooth out fluctuations by maintaining buffer

stock schemes, then costs manifest themselves in storage or other transaction expenses. Given a country's desire to maintain regular imports, export instability is likely to force that country to hold a higher ratio of foreign reserves to imports than would normally have been the case, imposing on it the costs of maintaining reserves as such. If export instability generates import instability, and if government revenues are heavily dependent on trade taxes, government revenue instability might occur with negative repercussions on the economy at large. Where governments resort to an alternative source of funds such as deficit financing, strains in the balance of payments would appear. Not only would there be balance of payments difficulties but export instability might produce an inflationary bias in countries where domestic prices are rigid in a downward direction. Finally it has generally been assumed that exports form a higher percentage of GDP in LDCs than in DCs and therefore changes in export earnings are likely to have a stronger impact in LDCs.

In investigating the effects of instability on growth, MacBean's work has been highly significant in terms of its scope and its unexpected results. Accordingly a resume of his major findings is warranted. To begin with, MacBean disputed the notion that LDCs are more dependent on exports than DCs for his calculations yielded a ratio of trade to income of 46.6% for LDCs as opposed to 52.7% for DCs. In addition, a positive (although very weak) correlation was detected between per capita income and the ratio of trade to national income, but such an approach could be faulted for not taking into account the fact that in many LDCs, barely half of all economic activity occurs within the monetary sector. It is highly likely that ratios of trade to the monetary sector are very much greater in LDCs. Let us however proceed to enumerate the rest of MacBean's results. Correlating export and income instability indices produced no evidence of association between the two. A time series study recording the number of occasions when exports and G.N.P. fluctuated in the same direction was inconclusive. Correlations between export and investment instability were non-existent as were those between price and export changes. On the quantity of reserves countries held, MacBean claimed that these do " not appear to be significantly related to the degree of instability of exports either for underdeveloped countries or for all countries ".[26] Testing the hypothesis that countries with excessive export instability invest a smaller

[26] MacBean, *op. cit.*, p. 81.

proportion of national income, export instability and the ratio of investment to income were correlated but found to be unrelated, nor was instability shown to give rise to slow investment rates. Within multiple regression runs, a positive relationship between investment and instability was indicated and finally, export instability did not appear to affect GDP growth rates.

On checking MacBean's general results by using a larger sample of countries and two different measures of instability, Kenen and Voivodas wrote: " our findings do not contradict MacBean. We do not show any pervasive connection between the rate of economic development and degree of export instability ".[27] By contrast, Maizels felt that when certain special cases were excluded, the data MacBean presented would seem to support the view that export instability and the rate of growth of GDP were negatively related.[28] Glezakos' paper provided support for Maizels' critique, for in it he claimed that regardless of MacBean's assertions, he had found evidence that instability is indeed detrimental to LDC economic growth.[29] His data were obtained by regressing real per capita income on export instability but some doubts as to the validity of the results may be harboured. This is so, since 7 of the 40 countries placed in the LDC sample are not normally so regarded. The countries in question were Cyprus, Greece, Iceland, Portugal, Spain, Turkey and Yugoslavia. Furthermore, Glezakos took considerable pains to ensure that his per capita growth rates were calculated in real terms but there is no indication that in computing his instability indices, real export charges were considered. While in certain circumstances mixing of real and monetary variables is permissible, in this case, indices based respectively on constant and current prices could well differ appreciably causing Glezakos' results to be biased. In the most recent work on this problem, Knudsen and Parnes appeared to vindicate MacBean by stating that " export instability alone does not have a significant effect on investment or economic growth. Only when the export instability is combined with domestic instability of the economy. is a significant effect noted. In this case, the effect on investment contributes to higher rates of economic growth.[30]

27 KENEN and VOIVODAS, *op. cit.*, p. 802.
28 A. MAIZELS, Book review of *Export Instability and Economic Development*, by A. J. MacBean, *American Economic Review*, June 1968.
29 GLEZAKOS, *op. cit.*
30 KNUDSEN and PARNES, *op. cit.*, p. 132.

Relying on the permanent income hypothesis, Knudsen and Parnes believed that a large variance in transitory income (caused say by export instability) produces a need for large savings, thereby lowering the propensity to consume and " if savings are the primary source of investment and capital formation in LDCs, then a lower propensity to consume should precipitate higher levels of investment ".[31] While it is true that savings are necessary for investment, it does not automatically follow that a decline in consumption will induce capital formation, for the contraction in the market that the fall in consumption causes would in many LDCs effectively discourage investment. Even if this were not so, most of the savings arising from instability would be placed in highly liquid securities and would probably not be available for long term investments. Considering the permanent income hypothesis MacBean was convinced that if individuals behaved in the light of the model's postulates, savings would be erratic for " almost the entire amount of any increase in income will be saved (but) equally any decline in current cash income will be met by liquidation and indebtedness ".[32]

Taking stock of the above discussion, it is fair to say that the question of whether or not export instability is damaging to growth remains an open one. Writers such as MacBean have failed to detect any negative relationship, Glezakos stakes a claim for just such a situation, whereas Knudsen and Parnes take entirely the opposite view. Since diverse and heterogeneous groups of countries have been surveyed, one should anticipate a variety of reactions on the part of each country when confronted with export instability. Some may be capable of dampening the export multiplier through marketing boards or alternatively, where a large percentage of a country's export sector is foreign owned, the impact of export oscillations may fall mainly on expatriate profits. In any case, whatever the relationship, it is generally likely to be a weak one considering that instability as such has generally been declining. A country by country approach might be the only way of firmly resolving the question. As of late, few specific studies are at hand, most of which are reviewed below.

Of the five case histories by MacBean, instability did not appear too harmful in Uganda, Tanzania and Puerto Rico, whereas it exhibited moderately adverse effects in Chile and fairly substantial ones in Pakistan. With regard to Chile, Reynolds in an earlier paper

31 KNUDSEN and PARNES, *op. cit.*, p. 86.
32 MACBEAN, *op. cit.*, p. 29.

declared that the modest rate of growth observed was " perhaps less the result of instability in export earnings than of failure by the government to invest a steady or growing share of revenues in productive capital formation ".[33] Although export instability generated economic instability in West Malaysia, Lim found that on the evidence available, it was " difficult to argue that economic instability had been detrimental to economic growth ".[34] Lim's view was corroborated by Lam who in relation to both West Malaysia and Thailand stated that " export instability did not present as many serious problems as are commonly assumed, despite the heavy trade concentration and trade dependent nature of the two countries ".[35]

While the abovementioned cases tend to weaken the view that instability is harmful, it is not our intention to rule out the possibility that for various countries, negative experiences have been encountered. Since unfavourable circumstances are likely to be based on factors peculiar to individual or small groups of countries, it follows that proposed remedies of universal or more general application dealing with instability (as currently propounded in UNCTAD) are not justified on economic grounds, especially when the various pitfalls of commodity agreements are taken into account.[36]

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33 C. W. REYNOLDS, " Domestic Consequences of Export Instability ", *American Economic Review*, May 1963, p. 100.

34 D. LIM, " Export Instability and Economic Development in West Malaysia, 1947-1968 ", *Malayan Economic Review*, Oct. 1972, p. 113.

35 N. V. LAM, " Export Instability and the Financial Sectors of West Malaysia and Thailand ", 47th ANZAAS Congress, Hobart, May 1976.

36 See T. KILLICK, " Commodity Agreements as International Aid ", *Westminster Bank Review*, 1967.