EXPORT INSTABILITIES AND EMPLOYMENT FLUCTUATIONS IN HONG KONG'S MANUFACTURING INDUSTRIES

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I. MAIN FEATURES OF THE HONG KONG ECONOMY

THERE is perhaps no better example of trade dependency and export propulsion than the Hong Kong economy. With no mentionable natural resources, it is highly dependent on the import of every type of raw material for its production needs. Production for export is the sine qua non for import finance. Export is the major determinant of Hong Kong's domestic output, income, and employment. Hong Kong differs from the majority of developing economies (hereafter LDCs) in that its export performance has been remarkably successful. In terms of per capita export, it has ranked among the top ten exporting countries in the world since the early 1970s.

One of the major features characterizing Hong Kong's export pattern is the increasingly high concentration on manufactures,[1] an overwhelming proportion of which are products of labor-intensive industry.[2] According to neo-classical trade theory, an increase in exports from LDCs with a relative abundance of labor tends to favor labor-intensive industry and thus is particularly conducive to employment generation. Hong Kong's rapidly expanding export, especially to the developed countries (DCs), has provided many employment opportunities for a growing labor force, and made it possible to concomitantly achieve the twin objectives of output and employment growth. Thus, despite the fast and simultaneous increase in the size and participation ratio of the labor force, a situation akin to full employment has been the rule since the early 1960s.

Another major feature characterizing Hong Kong's manufacturing sector is

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[1] Unless otherwise specified, "manufactures" are all commodities covered by SITC 512 to SITC 899. At the outset of the 1960s, Hong Kong's exports of manufactures accounted for 90 per cent of its total domestic exports. This share rose to more than 95 per cent during the latter part of the decade, and was close to 97 per cent in 1973.

[2] In a study of the export of manufactures from LDCs to DCs during 1960–70, Mahfuzur Rahman found that Hong Kong took the lead in fourteen out of twenty-six groups of major labor-intensive commodities [21, pp. 114–29]. The commodities in which Hong Kong did not perform well were mainly resource-based categories.

fluctuation, especially at the individual industry level. Because of change in consumer tastes, trade restrictions imposed by industrialized countries, and penetration of Hong Kong's overseas markets by relatively low wage competitors, notably South Korea and Taiwan, liquidation of individual firms or even the total decline of an entire industry is a common phenomenon in the Hong Kong manufacturing sector. Aside from these external factors, Hong Kong's industries are limited by their essentially small scale and, moreover by a situation in which many small enterprises subcontract orders from larger concerns. These dependent subcontractors and the many small traditional factories constitute a "buffer" between market forces and the large and well-established enterprises. When a market declines, the small operators are usually the first to go out of business, a reason for the common remark that in Hong Kong "crude capitalism" works. Time and again Hong Kong's industrial history shows that when and wherever an opportunity opens up, there is a clustering of Schumpeterian entrepreneurs into a rising market and when the market declines, it is flooded with goods precipitating an eventual collapse in prices and contraction in trade volume. Free competition gives Hong Kong industries a Darwinian test of their ability to survive.

Being extremely trade-dependent and export-propelled, commonsense tells that fluctuations in export earnings and employment are usual part of the economic scene in Hong Kong. With manufacturing employment accounting for well over 40 per cent of total industrial employment, it is conceivable that a sudden, sharp decline in export earnings will cause a drastic fall in employment and economic activity. However, the issue of export earnings and employment variations, apart from its mere recognition, has received very little professional attention within the Hong Kong context. This study attempts to fill this gap.

Since the principal concern of this study depends heavily on the measure of variability indices and no single measure can be excepted from criticism, five different measures of instability[3] will be used and separately tested. Any industry's export receipts and employment records which, as a result of analysis, are ranked as highly unstable or stable by all the five measures, will be so by any reasonable standard. Section II briefly discusses the choice of periods, data and sample under analysis. The mathematical formulae and economic nature of the five measures employed are given in Section III, and their results are examined and compared in Section IV. Quantitative relationships between employment and export earning variations are handled in Section V. Section VI is devoted to an examination of plausible causes for variation in Hong Kong's domestic export receipts, which is followed by concluding remarks in Section VII.

II. CHOICE OF TIME PERIODS, DATA, AND SAMPLE

The overall period chosen for analysis is 1959–73, which is further split into two subperiods, viz., 1959–66 and 1966–73 for inter-temporal comparison. The

[3] Instability indices are also commonly known as variability or fluctuation indices. These terms are used interchangeably in this study.

departure year is 1959, because prior to 1959 no distinction was made in trade returns between exports of Hong Kong origin and reexports. All export data used in the present study are annual domestic exports (total exports less re-exports) at current prices, and confined to twelve of Hong Kong's major export manufacture categories. They are distinguished using the SITC (Standard International Trade Classification) three-digit or six-digit commodity classification schemes.[4]

In line with commodity classification, twelve corresponding employment groups are distinguished according to ISIC (International Standard Industrial Classification) three-digit or four-digit industrial classification schemes. Since export data are recorded according to SITC, and employment according to ISIC, the original ISIC employment statistics[5] have to be regrouped into appropriate categories to make the classification as consistent as possible with SITC, otherwise the analysis will be misleading, if not meaningless.

Both export volume and work force used in the analysis constituted some 80 per cent of their respective populations throughout the period under study. Because of the relatively large sample, any conclusion drawn from this study may be applicable to or generalized for the manufacturing sector as a whole.

III. ALTERNATIVE MEASURES OF INSTABILITY

Instabilities are concerned with divergencies between actual values of the statistical series and anticipated norms. Such divergencies may originate in the variabilities of supply and demand, the interaction of supply and demand on market conditions, and other relevant noneconomic factors. As instability must be defined with reference to a trend, its measurement will be inaccurate if the trend is incorrectly specified. In actual measurement various academic economists have adopted a number of growth norms, linear, exponential and moving average. These different norms yield different magnitudes of instability for the same series. The question of trend is therefore very important in any discussion of fluctuation. Moreover, since amplitude, duration and irregularity of fluctuations vary from one commodity or industry to another, it is difficult to capture different aspects of variability by any single measurement and thus five different measures have been adopted and tested for this study. A brief discussion of their construction and properties is presented below.

A. *Coppock's Log Variance (CLV) Measure*

Coppock's logarithmic variance measure[6] is, perhaps, the best known index

[4] They are: chemicals (512–599), textiles goods (651–657), sundry metal products (691–698), electronic and electrical goods (722–729), furniture and wood products (821, 632–633), handbags (831), clothing (841–842), footwear (851), precision instruments (861–864), plastic products (893, 899.931–899.939), dolls and toys (894.210–894.239), wigs and false beards (899.940–899.959). Figures in parentheses are SITC code numbers.

[5] Employment data in this study are from establishments registered with or recorded by the Labour Department of Hong Kong.

[6] For the detailed process of computation, see Coppock [5, pp. 23–25]. This measure has

in studies of instability. It is an antilog of the sum of squared deviations of successive annual logarithmic differences from the mean of such differences for the period, with unity subtracted from the antilog. The implication is a constant trend on a log scale, which is subtracted from successive year-to-year percentage differences. Its algebraic formula is:[7]

$$S_T{}^i(CLV) = 100\ [\text{antilog}\ (V_{\log}{}^i)^{1/2} - 1]\ , \qquad (1)$$

where

$$V_{\log}{}^i = \frac{1}{T-1} \sum (\log X_{t+1}{}^i - \log X_t{}^i - M^i)^2$$

and

$$M^i = \frac{1}{T-1} \sum (\log X_{t+1}{}^i - \log X_t{}^i)$$

$$= \frac{1}{T-1} (\log X_T{}^i - \log X_1{}^i)\ ,$$

where $X_t{}^i$ is the export receipt of the i-th commodity group in year t; T is the number of years covered by the analysis; and M^i is the hypothetical norm of the measure.

The Coppock measure is greatly influenced by the choice of first and last year of the series. In fact, its "expectations component," M^i, is solely dependent upon the initial and terminal values of the series [6, p. 266, note 1]. Therefore, this seemingly complex measure, especially when used for a short-range time series, is an almost random estimate of instability [10, p. 671].

B. *Normalized Standard Error (NSE) Measure*

Another common measure of instability is the standard error of estimate, i.e., square root of the unexplained variance divided by the mean of the observed values. This "normalized standard error" measurement is, in fact, a trend-corrected analogue to the coefficient of variation, hence it is also known as the "normalized coefficient of variation;"[8]

$$S_T{}^i(NSE) = 100(SEE^i/\bar{X}^i)\ , \qquad (2)$$

where

$$SEE^i = [\sum (e_t{}^i)^2/T]^{1/2}$$

and

$$e_t{}^i = X_t{}^i - (\hat{a}_0{}^i + \hat{a}_1{}^i t)\ ,$$

where SEE^i is the standard error of observed values from their estimates; $e_t{}^i$ is

been used by, inter alia, Staller [28], Erb and Schiavo-Campo [6] [7], and Leith [18].

[7] For the sake of clarity, the variable X in this section refers to export receipts.

[8] This measure has been used by, inter alia, Massell [22], Staller [29], Erb and Schiavo-Campo [7], Lawson [17], Kingston [15], and Soutar [27].

the discrepancy between observed and estimated values in year t; and $\bar{X}^i$ is the average of observations over the period. The constant term, $\hat{a}_0$, and the linear time trend coefficient, $\hat{a}_1$, are estimated by the least-squares method.

C. *Semilog Standard Error (SSE) Measure*

The trend component of the normalized root mean square error of equation (2) assumes a constant absolute increment or decrement of the series. However, most economic policy makers tend to plan in terms of growth rates rather than absolute increments. Therefore, it is much more realistic to use deviations from an exponential growth path. Specifically, the semi-logarithmic form of $\log X_t^i = b_0^i + b_1^i t + u_t^i$ is estimated.[9]

The standard error of the unexplained residuals from the trend estimate is then defined as the index of instability, that is

$$S_T^i(SEE) = 100[\Sigma (e_t^i)^2/T]^{1/2}, \qquad (3)$$

where

$$e_t^i = \log X_t^i - (\hat{b}_0^i + \hat{b}_1^i t).$$

D. *Modified Log Variance (MLV) Measure*

In a recent research work [19] Lin has shown that the semilog standard error measure is closely related to that of Coppock's log variance. From the semi-logarithmic form of the SSE-measure, we have for $t+1$ and t:

$$\log X_{t\ 1}^i = b_0^i + b_1^i(t+1) + u_{t+1}^i,$$
$$\log X_t^i = b_0^i + b_1^i t + u_t^i.$$

Combining these two equations, we obtain the following

$$\log X_{t+1}^i - \log X_t^i = b_1^i + (u_{t+1}^i - u_t^i).$$

Therefore,

$$M^i = b_1^i + \frac{1}{T-1}(u_T^i - u_1^i),$$
$$\doteqdot b_1^i,$$

as the term $(u_T^i - u_1^i)/(T-1)$ is negligible. Here M^i has precisely the same meaning as in the CLV-measure. Ignoring the term $(u_T^i - u_1^i)/(T-1)$, the trend component in CLV formula is equal to that of the SSE-measure. In view of this fact, we may use b_1^i is substitute M^i and rewrite equation (1) as follows:

$$S_T^i(MLV) = 100[\text{antilog}\,(V_{\log}^{*i})^{1/2} - 1], \qquad (4)$$

where

$$V_{\log}^{*i} = \frac{1}{T-1}\Sigma (\log X_{t+1}^i - \log X_t^i - b_1^i)^2.$$

[9] This measure has been used by, inter alia, Staller [29], Massell [23], Naya [25], Lawson [17], Riedel [26], Botsas [2], and Kingston [15].

For the sake of easy identification, this measure is called the modified log variance.

E. *Five-Year Moving Average Deviation (FMA) Measure*

All four alternative measures described above assume a single constant trend and are likely to exaggerate instability if more than one trend is present [20, p. 345]. For this reason, some economists prefer an index of instability which is measured as average percentage deviations of the series from their unweighted five-year moving average centered on the middle year.[10] That is,

$$S_T{}^i(FMA) = 100\frac{1}{T-4}\sum_{t=1}^{t=T-4}\left[\frac{X_{t+2}{}^i-(1/5)(X_t{}^i+X_{t\ 1}{}^i+\cdots+X_{t+4}{}^i)}{(1/5)(X_t{}^i+X_{t+1}{}^i+\cdots+X_{t+4}{}^i)}\right]. \tag{5}$$

This measure has the disadvantage of losing two years at both ends of the time series.

IV. COMPARISON OF STATISTICAL RESULTS BETWEEN ALTERNATIVE MEASURES

Using equations (1) to (5), five different sets of variability indices were computed for each of the twelve selected commodity groups, and for the corresponding twelve industrial employment groups for the subperiods 1959–66 and 1966–73 and the combined period 1959–73. The results for export proceeds instabilities are shown in Appendix Table I, and those for employment fluctuations in Appendix Table II.

Several interesting observations can be detected from these tables. All measures show that the degree of instability of the selected aggregates is significantly smaller than the unweighted average of the segregates. This conforms to the general expectation that aggregate figures tend to conceal large individual variations. It is conceivable that the timing of fluctuations for export receipts may have coincidentally led to offset each other and thereby reduce the total degree of instability.[11] The more likely change in one component offsets change in others, the stronger the tendency for the aggregate to remain stable. In addition, variability of the aggregate depends not only on the variations of individual components but also on the correlation between them.[12] It is also interesting to observe that the degree of variability of the total domestic exports is of more or less the same magnitude as our selected totals. This is an indication of a well selected sample.

In order to understand the empirical relationship between the five measures, correlation analyses are made between the five variability indices. The results are

[10] This measure has been used by, inter alia, Fleming and Lovasy [8], Fleming, Rhomberg and Boissonneault [9], and MacBean [20].

[11] For instance, see [20, p. 38] [23, p. 622].

[12] This is discussed extensively by Brainard and Cooper [3, pp. 257–78], and further by Massell [23, pp. 620–22].

TABLE I

CORRELATION COEFFICIENTS BETWEEN DIFFERENT VARIABILITY MEASURES FOR HONG KONG EXPORT RECEIPTS AND MANUFACTURING EMPLOYMENT

	Subperiod 1: 1959–66				
	CLV	MLV	SSE	FMA	NSE
CLV	1.0000				
MLV	0.9998	1.0000			
	(0.9999)				
SSE	0.9417	0.9428	1.0000		
	(0.9647)	(0.9655)			
FMA	0.4927	0.4988	0.3225	1.0000	
	(0.9767)	(0.9769)	(0.9215)		
NSE	0.3469	0.3512	0.3654	0.7268	1.0000
	(0.9235)	(0.9237)	(0.8767)	(0.9559)	
	Subperiod 2: 1966–73				
	CLV	MLV	SSE	FMA	NSE
CLV	1.0000				
MLV	0.9999	1.0000			
	(0.9999)				
SSE	0.9987	0.9985	1.0000		
	(0.9899)	(0.9903)			
FMA	0.9762	0.9765	0.9704	1.0000	
	(0.9383)	(0.9393)	(0.9658)		
NSE	0.9806	0.9808	0.9772	0.9691	1.0000
	(0.9898)	(0.9896)	(0.9814)	(0.9067)	
	Overall Period: 1959–73				
	CLV	MLV	SSE	FMA	NSE
CLV	1.0000				
MLV	0.9997	1.0000			
	(0.9999)				
SSE	0.9977	0.9973	1.0000		
	(0.9368)	(0.9382)			
FMA	0.9630	0.9617	0.9576	1.0000	
	(0.9827)	(0.9815)	(0.8948)		
NSE	0.7813	0.7826	0.8043	0.9452	1.0000
	(0.9791)	(0.9779)	(0.8540)	(0.9833)	

Sources: Computed from Appendix Tables I and II.
Note: Figures in parentheses are correlation coefficients of the employment variability indices.

given in Table I. As expected, the correlation coefficients between the original CLV indices and its modified variant for the entire period and the two subperiods are virtually equal to unity. This relationship is also shown by the high correlation between the CLV and SSE indices. In fact, not only the aforesaid three measures are highly correlated, but the actual value for each ordered pair of segregates and aggregates is more or less of the same magnitude. In general, except for the correlation coefficients between export receipt indices for the first subperiod,

and particularly those for the NSE results, which are not highly correlated, all other correlation mixes show that both export and employment variability indices, irrespective of formulae, are strongly correlated (Table I). For our empirical purposes, these results are highly desirable.

V. ESTIMATED RELATIONSHIP BETWEEN EMPLOYMENT FLUCTUATIONS AND EXPORT INSTABILITIES

By treating each classified industry as a sample observation and using cross-sectional analysis, we can find out whether interindustry differences in employment fluctuations can be explained in terms of the corresponding differences in variability of export receipts. For a higher degree of reliability in empirical results, regression analyses have been separately applied to the five corresponding sets of employment and export receipt variability indices to quantitatively determine their relationship. In each individual case, with indices of employment fluctuations as the dependent variable and indices of domestic export receipt instabilities as the independent variable, we shall test for a positive relationship between these two aspects in Hong Kong's manufacturing industries. The regression results are shown in Table II.

We begin with the NSE estimates. The regression coefficient for the second subperiod 1966–73 is significant at the 1 per cent level and has the expected sign. Its correlation coefficient implies that about six-sevenths of the variance of the dependent variable can be explained by the independent. The F-statistic shows that the relationship is highly stable. However, the regression coefficient for the first subperiod 1959–66 is highly insignificant and bears an unexpected sign. This is probably due to the following two factors:

First, from the end of World War II to 1965, growth in Hong Kong's population and employment was greatly influenced by fitful waves of migration to and from China.[13] Employment fluctuations in manufacturing industries were greatly influenced by this migration during the subperiod. On the other hand, the effect of sporadic population growth on domestic export was not found to be significant. Therefore, the first subperiod observations are probably strongly influenced by sampling fluctuations. This "sporadicity" effect is also reflected in the results for the overall period, since the estimates of that period may be regarded as the "average" experience of the two subintervals. Second, the NSE

[13] According to K. R. Chou [4, pp. 11–12], the first heavy wave of immigration into Hong Kong started in 1945 and ended in 1947, when many former residents returned, while the second wave of intensive migration to and from Hong Kong started in 1949 with the change of administration in China. This event caused a huge initial inflow of immigrants during 1949 and early 1950, but a net outflow during the latter part of 1950 and early 1951. Again a considerable net inflow was observed during the late 1951 and early 1952. There followed a period of reduced migration, subsequently intensified by the third net in-migration in 1957 and 1958. Immigrants increased substantially in the fourth large influx of 1961–63. Only from 1965 onwards did immigraiton cease to be the main factor in Hong Kong's population growth.

TABLE II

RELATIONS BETWEEN EMPLOYMENT FLUCTUATIONS AND EXPORT INSTABILITIES (ESTIMATE)

Dependent Variable	Constant	Regression Coefficients with Respect to (Standard Errors in Parentheses)			Correlation Coefficient r	F-Ratio
		Subperiod 1	Subperiod 2	Combined Period		
S_{t1} (NSE)	14.7208	−0.0309 (0.3803)			−0.0271	0.0066
S_{t2} (NSE)	−0.0872		0.7490** (0.1010)		0.9200	55.0954
S_T (NSE)	2.2404			0.5551* (0.2651)	0.5520	4.3824
S_{t1} (SSE)	15.4387	−0.1062 (0.7259)			−0.0487	0.0214
S_{t2} (SSE)	4.7711		0.8077** (0.1342)		0.8851	36.1647
S_T (SSE)	9.2987			0.5721** (0.0954)	0.8841	35.8077
S_{t1} (CLV)	−3.5702	1.6708* (0.7920)			0.5752	4.4499
S_{t2} (CLV)	2.6229		0.9221** (0.0959)		0.9498	92.2141
S_T (CLV)	10.9930			0.4524** (0.0927)	0.8392	23.8181
S_{t1} (MLV)	−3.4225	1.6537* (0.7845)			0.5749	4.4438
S_{t2} (MLV)	2.6252		0.9218** (0.0975)		0.9486	89.8837
S_T (MLV)	10.8739			0.4597** (0.0938)	0.8406	24.0805
S_{t1} (FMA)	−4.7357	1.8712* (0.6692)			0.6818	7.8197
S_{t2} (FMA)	0.7547		0.9554** (0.1738)		0.8667	30.1935
S_T (FMA)	−0.4521			1.1859** (0.1954)	0.8868	36.8299

Sources: For export instability indices (independent variable), from Appendix Table I. For employment fluctuation indices (dependent variable), from Appendix Table II.

Note: The subscripts $_{t1}$, $_{t2}$, and $_T$ stand for the subperiods 1959–66, 1966–73, and the combined period 1959–73, respectively. The regression coefficients marked with an asterisk (*) are statistically significant at the 5 per cent level, those with a double asterisk (**) at the 1 per cent level.

method involves either insufficient elimination or over-compensation for the trend factor when actual growth is nonlinear. This measure has obvious drawbacks in analyzing the fast-changing, booming situation for Hong Kong's manufacturing industries. It is perhaps more appropriate to explain variations of export proceeds and employment with reference to certain exponential growth norms.

With the SSE estimates, most probably because of the sporadic population growth mentioned above, results for the first subperiod resembled the NSE estimates. There is, however, a marked improvement in results for the entire period compared with the NSE measure. The empirical evidence supports the contention that variability indices based on exponentially detrended data perform better than those based on linearly detrended data.

The statistical results obtained from CLV indices are highly satisfactory. Here, not only did the estimated coefficient of the first subperiod yield an expected sign, it was also statistically significant at the 5 per cent level. These findings may seem to contradict our explanation of the "sporadicity" effect mentioned above. However, when one considers that the trend component of the CLV measure is only a function of the initial and terminal observation of the series, there should be no conceptual difficulty in seeing that the hypothetical growth norm may generally tend to escape the effects of intra-temporal fluctuations. With regard to second subperiod regression estimates, the value of the determination coefficient indicates that the chosen explanatory variable embodied as much as 90 per cent of the variation in the dependent variable. It is interesting to observe that in the MLV indices all regression results are virtually identical with those of the CLV indices. These results are consonant with our expectations.

The statistical significance of positive association between variables is weakest in the first subinterval, strongest in the second subinterval, and quite strong in the whole period under investigation. However, our FMA estimates reveal that the relationship is strongest in the overall period rather than the second subinterval. This implies that, most probably due to the nature of varying growth norms, the moving average deviation technique can capture the disturbances of sporadic population migration.

In summary, save for the first subperiod regression estimates of the NSE and SSE indices, all estimated coefficients bear an expected sign and are statistically highly significant, and their correlation coefficients are also reasonably high, particularly those for the latter subperiod 1966–73 and the entire period 1959–73. These findings strongly substantiate the a priori proposition that export earning instability is a highly significant determinant of employment fluctuation in Hong Kong's manufacturing industries.

VI. CAUSES OF VARIATION IN HONG KONG'S DOMESTIC EXPORT RECEIPTS

It is generally believed that export receipts of most developing countries have fluctuated widely. Such fluctuations can be largely explained by special characteristics of export structure and of the nature of commodities exported. Among the considered causes for export variation in these economies are the concentration on a limited number of exportable goods, low income and price elasticity, and a tendency for abrupt shifts in supply and demand. To these factors add a pattern of market concentration of exports which makes them more vulnerable to external changes and reduces their bargaining power vis-à-vis the

importing economies.[14] In Hong Kong, these problems are compounded. No other economy in the world exports so high a proportion of its output as does Hong Kong.[15] Hence no other economy in the world is so vulnerable to fluctuations in the world trade level.

One major characteristic of Hong Kong's export trade is its concentration on an increasingly narrow range of manufactured products. For example, in 1961, three major product groups: textiles and clothing (SITC 651–657 and 841), electrical products (SITC 722–729), and miscellaneous manufactures (SITC 891–899), accounted for 72 per cent of total domestic exports. That share rose to more than 82 per cent in 1971. Another notable feature of Hong Kong's export trade is that the bulk of manufactured exports is increasingly geared to the needs of highly industrialized economies, particularly the mass consumer markets of North America and Western Europe. In 1961, its three largest markets, the United States, the United Kingdom, and West Germany, took over 47 per cent of the total, and in 1971, these three markets absorbed over 64 per cent of Hong Kong's total domestic exports. Such concentration, whether of products or markets, may well be a factor for instability.

The objective of the present section is to provide some empirical knowledge of the likely causes of variations in Hong Kong's domestic export receipts. The variables considered in the analysis are commodity and geographic concentrations and the trade dissimilarity index. The degree of commodity concentration is measured by the Hirschman-Gini coefficient of concentration.[16] For export trade, it is defined as the square root of the sum of squares of the percentage shares of commodity receipt:

$$C=100[\Sigma\,(x_{it}/X_t)^2]^{1/2}\,, \qquad (6)$$

where x_{it} stands for the export receipt of commodity i in year t, and X_t is the total export receipts in the same year. The highest possible coefficient is 100, where all exports consist of a single good, while its lowest is $100/(n)^{1/2}$, where n is the largest number of commodities which may potentially be exported; this is the situation when exports are equally divided among all commodity groups. The coefficient of geographic concentration is defined in exactly the same manner as the coefficient of commodity concentration.

It is commonly held that movements in import prices may tend either to accentuate or mitigate the effect of export price fluctuations. And because of the competitive character of most international markets, export proceeds tend to

[14] For other factors in the literature on export variations, see Massell [23, pp. 618–25]. Of studies on causes of export variations, this article is the most inclusvie and theoretical.

[15] According to official estimates, about 90 per cent of manufacturing output is exported [13, p. 2].

[16] This coefficient was first developed by Hirschman [12, Chap. 4 and Appendix A]. It was originally used by Hirschman to measure geographic concentration only. When the index is used for measuring industrial concentration, the second principal area of its application, it is more commonly referred to as the Herfindahl index. As a result, it is sometimes known as the "H" concentration measure. For mathematical studies on the theoretical exposition of this measure, see Adelman [1, pp. 99–101].

become more unstable as export prices become vulnerable.[17] The relationship between import and export prices, according to Michaely, depends on the degree of similarity of a country's import and export pattern [24, p. 87]. To investigate this phenomenon, Michaely has proposed an index of dissimilarity in exports and imports which is:

$$D=100\sum[x_{it}/X_t-m_{it}/M_t], \tag{7}$$

where m_{it} stands for the import payment of commodity group i in year t, and M_t is the total import payment in the same year [24, p. 88]. The lowest value of the index is zero, when there is perfect similarity in exports and imports. The upper limit is 200, when there is no goods category which is both exported and imported. The values of the three variables discussed above are shown in Appendix Table III.

To estimate and test our hypothesized relationship between the variation and concentration in Hong Kong's domestic export receipts, regression analysis was used, with D(SSE) as dependent variables, and C' and G', and alternatively, C'' and G'' as independent variables, where D(SSE) stands for export deviation from its semi-logarithmic norm and is used as a proxy for export variation,[18] and C' and C'' stand for the annual numerical increment (or decrement) and annual percentage change in the degree of commodity concentration, respectively, while G' and G'' correspond to the same factors in geographic concentration. Assuming a linear relationship between them, the estimated equations using ordinary least squares were

$$D(SSE)=0.0813+0.2826C'-0.5069G', \tag{8a}$$
$$\qquad\qquad (1.6066)\quad (2.5860)$$
$$\qquad\qquad (0.4355)\quad (0.7009)$$
$$R=0.6193,\ F=3.4225,\ SEE=0.6520,$$

and

$$D(SSE)=0.0996+0.1228C''-0.2754G'', \tag{8b}$$
$$\qquad\qquad (1.6230)\quad (2.6395)$$
$$\qquad\qquad (0.4327)\quad (0.7037)$$
$$R=0.6275,\ F=3.5729,\ SEE=0.6465,$$

where figures in parentheses just below the line are t-statistics, while those in the second row parentheses are the so-called "beta coefficients."[19] The multiple

[17] For empirical evidence concerning this positive relationship, see Coppock [5, Chap. 5].

[18] Aside from both the theoretical justification that most economies tend to plan in terms of growth rate rather than absolute increment and the empirical verification that the SSE measure is closely related to CLV and MLV measures, our major preference for selecting this as the representative norm is that an inspection of residuals suggested that Hong Kong's domestic export growth was most appropriately approximated by an exponential function of time.

[19] Unlike an ordinary regression coefficient whose size varies with the units in which each variable is stated and with the changing units of measurement of the variable per se, these beta coefficients, also known as the standard regression coefficients, while simultaneously allowing for the variation associated with remaining independent variables, measure the

correlation coefficient for both equations is about 0.62 which is not particularly low, explaining almost 40 per cent of dependent variance. The *t*-statistics show that the geographic coefficient is significant at the 5 per cent level but does not acquire an expected sign; while that of the commodity coefficient failed to be significant but acquired an expected sign. The calculated beta coefficient shows that the geographic variable is substantially more important than the commodity variable.

To take into account the influence of trade dissimilarity on Hong Kong's export variations, we include D' and alternatively D'' as an additional variable in multiple regression, where D' and D'' denote the annual numerical and percentage change in the degree of trade dissimilarity. The estimated equations are

$$\begin{array}{l} D(SSE)=0.0058+0.5409C'-0.4524G'-0.0824D', \\ \qquad\qquad\quad (1.4383)\quad (2.1401)\quad (0.7812) \\ \qquad\qquad\quad (0.8335)\quad (0.6256)\quad (0.4783) \end{array} \tag{9a}$$

$$R=0.6473,\ F=2.4043,\ SEE=0.6638,$$

and

$$\begin{array}{l} D(SSE)=0.0133+0.2474C''-0.2398G''-0.0932D'', \\ \qquad\qquad\quad (1.4795)\quad (2.1033)\quad (0.8387) \\ \qquad\qquad\quad (0.8719)\quad (0.6128)\quad (0.5282) \end{array} \tag{9b}$$

$$R=0.6585,\ F=2.5522,\ SEE=0.6554.$$

With the inclusion of this variable, there is a marked change in the values of estimated regression and beta coefficients of the former two variables. The *R*-statistics show no considerable improvement. Possibly because of high multicollinearity between the commodity concentration and trade dissimilarity variables, standard errors of both concentration variables expanded with the inclusion of this latter variable. On the basis of *t*-statistics, the trade dissimilarity coefficient is shown to be statistically insignificant and yields an unexpected sign. Thus, for the period under investigation, the trade dissimilarity variable appears to do little in explaining export variations in Hong Kong.

VII. CONCLUDING REMARKS

Our investigation shows that Hong Kong has had stable, yet fast expanding export earnings and employment growth during the past couple of decades. In terms of the variability indices, we have constructed, it was found not only that export earnings and employment are highly stable, but also there is a stable positive relationship in their variations. This implies that any development policy and promotional strategy designed to mitigate the size of export earning instability will also tend to reduce the magnitude of employment fluctuation in manufacturing.

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relative importance of each variable separately. It is equal to the product of the ordinary regression coefficient and the ratio of its own standard error to that of the dependent. For further details concerning the mathematical manipulation of this statistic, see Goldberger [11, pp. 197–98].

There is one point that needs further elaboration. Despite the fact of stable relationship between export earnings and employment variations at both the aggregate and industry level, the variations are larger at the industry level. Export proceeds and employment in Hong Kong's manufacturing industries were considerably unstable over the years, but the variations tend to set each other off so that they became highly stable for the manufacturing sector as a whole.

Based on multiple regression analysis, the two most inherently plausible explanations for fluctuations in export earnings, viz., commodity and geographic concentration, are found to miss the mark. Our regressions generally show that the only statistically significant variable is geographic concentration which, however, has a sign contrary to what is expected, whereas commodity concentration was found to have an expected sign, but failed to be statistically significant. These findings are not totally unexpected. The fact that Hong Kong has enjoyed overall stable export receipts in a limited range of light manufactures lends considerable credence to Michaely's general conclusion that, ceteris paribus, instability is not due to export concentration per se, but the nature of commodities exported [24, p. 74]. Inasmuch as Hong Kong derived export earnings almost exclusively from light manufactures, which are both income and price elastic, its overall export receipts became much more stable than other countries, especially the primary-producing LDCs. Moreover, by the principle of economies of scale, production can be efficient in a small resource-poor and export-led economy only if a large proportion of that production is exported.[20] Highly diversified exports are therefore in principle incompatible with competitive exports.

In regard to market concentration, an export-propelled economy simply has to go where the market is. In other words, it is not diversification per se that matters, but the ability to diversify in times of need. What is important, therefore, is the ability to quickly react to changing external demands, which at times may call for even more concentration. Not to imply that diversification is undesirable. It is beneficial in many ways, particularly from a long-term point of view, notably in providing the economy with greater potential in production flexibility and reduced dependence on only a few foreign buyers. The problem is the more than one aspect of fluctuation in export earnings. Although diversification may mitigate one aspect of the problem, it may enhance others.[21] "Defensive" diversification may scatter resources, raise costs and lower the established selling position [30, p. 11].

Hong Kong's success in exporting light manufactures suggests that export dependency per se is not a major cause of instability. The most important factor in this remarkable performance is an ability to produce and adjust production of the right kind of commodity for the right market. An export-dependent econ-

[20] In a large sample study, Kuznets [16, p. 55] remarks that since small economies by their very nature have fewer natural resources than their larger counterparts, they have only a small number of exportables.

[21] For an illuminating exposition on the dimensionality aspect of export receipt fluctuations, see Katrak [14, pp. 556–65].

omy tends to develop beyond its boundaries. That development is, however, uneven with respect to commodity and market aspects. In order to maintain overall stable growth, trade possibilities must be pursued to the utmost; trade must be able to unravel itself from adverse developments in certain commodities and markets and promptly take advantage of favorable developments in others. Thus, prompted by the supreme necessity to export for survival, constant adjustment is the rule rather than the exception in Hong Kong's economic development. The state of Hong Kong's future export concentration or diversification will be the end-result of its export drive.

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APPENDIX

EXPORT EARNING INSTABILITY INDICES OF HONG KONG'S

Product Group	NSE-Measure			SSE-Measure		
	Sub-1	Sub-2	Overall	Sub-1	Sub-2	Overall
Chemicals	7.8	8.1	23.2	8.2	7.1	17.3
Textiles	8.9	17.7	21.9	9.9	11.0	10.9
Sundry metal products	4.5	8.5	21.5	3.9	5.5	12.0
Electronics and electricals	37.4	14.6	42.9	7.2	4.0	15.2
Furniture and wood products	6.1	13.9	26.3	6.2	8.3	17.8
Handbags	13.3	17.7	48.0	11.2	8.0	13.9
Clothing	8.7	7.0	26.4	9.0	4.4	9.1
Footwear	9.5	14.9	15.2	9.3	15.5	13.8
Precision instruments	36.2	17.9	49.9	21.0	7.8	20.5
Plastic products	13.2	8.7	14.2	23.7	6.6	18.3
Toys and dolls	16.1	2.6	19.8	5.5	7.9	11.1
Wigs and false beards	—	85.5	97.9	—	95.3	147.5
Totality of selected products (sample total)	6.9	6.4	23.4	4.2	5.4	6.5
Overall domestic exports (population total)	5.8	7.0	22.8	3.7	5.2	6.7
Simple average of the sample	14.7	18.1	33.9	10.4	15.1	25.6
Standard deviation of sample	10.9	20.9	22.5	6.0	24.4	36.9
Relative dispersion of sample	0.7	1.2	0.7	0.6	1.6	1.4

Sources: For basic export data, Census and Statistics Department, *Hong Kong Trade Statistics,* various December issues (Hong Kong: Government Printer).

Notes: 1. The term "sub-1," "sub-2," and "overall" stand for the subperiods 1959–66, 1966–73, and the overall period 1959–73, respectively.

2. The SITC codes (numbers in parentheses) for the twelve product groups are: chemicals (512–599), textiles (651–657), sundry metal products

TABLE I

SELECTED MANUFACTURE PRODUCTS FOR 1959–66, 1966–73, AND 1959–73

(%)

CLV-Measure			MLV-Measure			FMA-Measure		
Sub-1	Sub-2	Overall	Sub-1	Sub-2	Overall	Sub-1	Sub-2	Overall
8.2	9.0	11.4	8.4	9.0	11.4	5.8	6.2	5.4
12.5	12.7	9.0	12.8	12.8	13.0	6.8	3.6	5.3
4.7	7.2	7.9	4.5	7.3	8.0	3.2	5.5	4.4
9.6	4.7	10.3	9.7	4.8	10.3	10.6	5.1	8.3
9.6	11.4	14.1	9.6	11.8	14.3	5.3	6.8	5.1
21.4	9.6	17.3	21.5	9.7	17.3	12.6	10.1	10.8
14.4	5.8	11.1	14.3	5.9	11.2	5.6	4.2	4.9
14.1	14.4	14.4	14.2	14.3	14.5	8.7	6.0	7.3
27.1	9.3	19.9	27.4	9.3	20.0	14.0	5.3	10.4
27.6	9.3	20.4	27.7	9.4	20.9	4.3	7.1	5.5
5.8	6.8	7.2	5.7	6.7	7.2	6.1	3.2	4.4
—	103.7	179.5	—	103.7	179.5	—	34.3	29.8
6.5	5.3	6.3	6.6	5.4	6.4	3.4	4.0	3.6
5.8	5.3	5.8	5.7	5.5	6.0	3.1	4.1	3.5
14.1	17.0	26.9	14.2	17.1	27.3	7.5	8.1	8.5
7.6	26.3	46.2	7.7	26.3	46.1	3.3	8.1	6.8
0.5	1.5	1.7	0.5	1.5	1.7	0.4	1.0	0.8

(691–698), electronics and electricals (722.102–729.990), furniture and wood products (821 & 632–633), handbags (831), clothing (841–842), footwear (851), precision instruments (861–864), plastic products (893 & 899.931–899.939), toys and dolls (894.210–894.239), wigs and false beards (899.940–899.959).

APPENDIX

EMPLOYMENT FLUCTUATION INDICES OF HONG KONG'S SELECTED

Short Title of Industry	NSE-Measure			SSE-Measure		
	Sub-1	Sub-2	Overall	Sub-1	Sub-2	Overall
Chemicals	5.3	6.6	6.1	5.4	6.1	5.7
Textiles	3.9	7.0	7.4	6.8	7.2	10.1
Sundry metal products	4.1	4.2	4.7	4.1	4.9	4.1
Electronics and electricals	25.5	8.0	16.2	8.7	11.5	26.0
Furniture and wood products	8.1	5.0	6.8	7.8	4.6	8.3
Handbags	48.2	19.4	67.8	48.9	38.1	37.1
Clothing	9.7	2.9	12.6	10.8	2.8	8.4
Footwear	8.5	15.6	14.2	8.5	16.8	13.8
Precision instruments	18.2	10.3	17.1	25.6	10.1	31.8
Plastic products	15.8	5.3	14.9	24.9	5.8	32.0
Toys and dolls	9.6	9.4	11.1	6.2	11.5	15.8
Wigs and false beards	—	67.7	74.0	—	84.3	94.4
Totality of selected manufacturing industries (sample total)	4.5	5.5	6.0	5.7	7.0	7.1
Overall manufacturing (population total)	4.3	4.7	5.0	5.2	5.9	6.2
Simple average of the sample	14.3	13.5	21.1	14.3	17.0	24.0
Standard deviation of sample	12.4	17.0	22.7	13.0	22.2	23.9
Relative dispersion of sample	0.9	1.3	1.1	0.9	1.3	1.0

Sources: For basic employment data, Commissioner of Labour, *Annual Departmental Report,* various years (Hong Kong: Government Printer).

Notes: 1. Employment data used here refer to those establishments registered with or recorded by the Labour Department of Hong Kong. The terms "sub-1," "sub-2," and "overall" stand for the subperiods 1959–66, 1966–73, and the overall period 1959–73, respectively.

2. The ISIS codes (numbers in parentheses) for the twelve employment

TABLE II

MANUFACTURING INDUSTRIES FOR 1959–66, 1966–73, AND 1959–73

CLV-Measure			MLV-Measure			FMA-Measure		
Sub-1	Sub-2	Overall	Sub-1	Sub-2	Overall	Sub-1	Sub-2	Overall
8.2	7.5	7.9	8.1	7.6	7.9	4.8	2.5	4.0
7.9	6.3	7.9	7.8	6.3	8.0	2.1	2.8	2.5
4.7	4.7	4.7	4.6	4.8	4.8	3.4	3.1	3.0
14.1	16.3	17.7	14.1	16.4	17.7	10.3	8.2	9.6
8.6	7.2	7.9	8.8	7.0	7.9	5.6	3.3	4.7
86.2	33.6	61.5	86.2	33.9	61.7	36.6	22.9	25.7
17.7	4.1	12.2	17.7	4.3	12.8	6.3	3.1	4.3
10.0	14.1	12.7	10.1	14.2	13.0	7.7	8.2	7.1
27.8	12.5	23.3	28.0	12.5	23.5	13.2	8.1	11.4
25.9	5.3	21.4	26.0	5.2	21.7	8.1	3.3	5.5
8.6	9.0	10.3	8.6	9.1	10.4	5.2	4.8	5.1
—	98.9	90.3	—	98.9	91.7	—	32.0	32.0
8.2	5.8	7.2	8.2	5.8	7.2	3.9	2.9	3.1
7.5	4.7	6.8	7.5	4.7	6.8	3.5	2.6	2.9
20.0	18.3	23.2	20.0	18.4	23.4	9.4	8.5	9.6
22.2	25.5	24.9	22.2	25.5	25.2	9.1	8.9	9.1
1.1	1.4	1.1	1.1	1.4	1.1	1.0	1.1	1.0

groups are: chemicals (351–352), textiles (321), sundry metal products (381), electronics and electricals (383), furniture and wood products (331–332 & 381.2), handbags (332.0), clothing (322), footwear (324 & 355.9), precision instruments (385), plastic products (356), toys and dolls (356.0, 381.9 & 390.9), wigs and false beards (390.9). These short titles are used for the sake of convenience. They must always be understood to the corresponding official ISIC industry group.

APPENDIX TABLE III

HIRSCHMAN-GINI COEFFICIENTS OF DOMESTIC EXPORT CONCENTRATION, AND DISSIMILARITY INDEX OF HONG KONG'S COMMODITY TRADE COMPOSITION, 1959–73

(%)

Year	Hirschman-Gini Coefficients		Dissimilarity Index[c] D
	Commodity Concentration[a] C	Geographic Concentration[b] G	
1959	41.94	47.67	99.94
1960	43.25	47.95	102.51
1961	40.93	48.08	95.03
1962	42.68	48.83	103.34
1963	43.69	49.50	105.91
1964	45.10	50.98	112.78
1965	44.73	51.96	109.66
1966	44.59	53.52	109.26
1967	44.40	53.80	109.13
1968	45.20	55.35	112.12
1969	46.15	56.00	113.61
1970	46.08	55.55	112.90
1971	47.73	56.08	114.23
1972	47.64	56.23	110.86
1973	46.32	53.60	104.76

Sources: Census and Statistics Department, *Hong Kong Trade Statistcis,* various December issues (Hong Kong: Government Printer).

[a] Based on SITC two-digit commodity divisions.

[b] Geographic destinations are: North America, Western Europe, Soviet Union and Eastern Europe, Central and South America, Middle East, Asia, Africa, Australasia and Oceania.

[c] Based on the first nine sections of SITC one-digit commodity sections.