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EXPORT INSTABILITY, GROWTH AND CONCENTRATION IN PAKISTAN: A TIME-SERIES ANALYSIS

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INTRODUCTION

Export earnings constitute a major source of financing development expenditures in Less Developed Countries. Specially, given the absence of domestic capital goods industry base in these countries, the foreign exchange earnings through exports play an important role in the acquisition of capital equipment which is crucial in augmenting the capacity for economic growth, therefore, wide fluctuations or stagnation in export revenue adversely affects the process of economic growth. As such, it is desirable to study the instability and growth behaviour of export earnings.

Similarly, concentration in too few commodities or markets may adversely affect the export performance, since apart from causing fluctuations in export earnings as is usually postulated in the literature [1;7;8], export concentration may lead to the sluggish growth of exports. Further it may deprive the country of flexibility and structural capacity to adjust to changing patterns of demand for its exports and leave it open to political pressure by impairing its bargaining power. These factors emphasise the need to have a diversified export structure. Nevertheless success of a diversification programme depends on the extent to which this is subject to policy control. If diversification is an exogenous variable or is largely determined by such factors which can not be manipulated, then its practical importance as a policy measure may be limited. Therefore, it is necessary that we should study the determinants of export concentration.

The objective of the present study is threefold; first to explore the disaggregated sources of growth and instability of exports; second to examine the major causes of export instability and third to study the determinants of export concentration.

Numerous studies have been carried out to study the determinants of export instability and export concentration. However, all of these are based upon cross-sectional data [1;6;7;8;9;10;11]. Though the usefulness of these studies can be hardly denied, yet the relevance of cross-sectionally estimated parameters for answering questions which are of a time-series nature should not be overestimated. Moreover, the usefulness of these studies is also reduced from the point of view of any single country due to the uniqueness of problems facing different countries. In view of these considerations, Pakistan's export instability and export concentration will be studied in the framework of time-series analysis, for the period 1960-61–1979-80. So far no attempt has been made to carry out this type of analysis for Pakistan.

The plan of the paper is as follows: the first section discusses the model and methodology. Estimation results are presented in the second section, while major conclusions and policy implications are given in the third section.

I. MODEL AND METHODOLOGY

This section on model and methodology is divided into three parts. In Part A, we study the instability and growth behaviour of exports by commodity and geographic structure and also examine the growth and instability of total merchandise exports over time. In Part B, we explain the model related to export in-

stability and finally in Part C, we discuss the determinants of export concentration. Data sources are available in the Appendix.

Part A

In this part, we analyse the export instability and growth by commodity as well as by geographic structure. Fifteen major[1] commodity subgroups, out of which eight belong to the category of manufactured exports and seven belong to the primary exports, are selected for analysis in the present study. These subgroups together cover eighty to eighty five percent of total merchandise exports. However the relationship among the components of aggregate exports is uncertain, because instability and growth indices of these components may either be compensating or reinforcing in nature. Therefore instability and growth indices are computed for the aggregate primary and manufactured exports as well. The countries of destination of Pakistan's exports are classified into ninteen markets.[2] We shall identify and assess the relative contribution of each of these commodity and geographic subgroups to growth and instability of total exports.

It is important to know as to how export proceeds have performed over time in terms of growth and stability. Therefore, in order to study the inter-period export instability and export growth, the period of analysis is divided into two decades viz that of the sixties and the seventies. To have a more detailed and disaggregated view of the export's behaviour, it is further divided into four subperiods, where each subperiod consists of five years.

[1]The information on commodity subgroups is available in the Appendix.

[2]The detailed account of these markets is available in the Appendix.

The first problem is the measurement of instability. Instability is almost without exception measured as the short-term or yearly fluctuations of export proceeds around the trend growth rate. The adjustment for trend elements is necessary, otherwise a country with a strong trend growth rate would tend to register itself high on the instability scale.

The present study utilizes the average percentage[3] deviations from a secular trend that exhibits a constant percentage rate of growth, to measure instability. There exists a high degree of correlation[4] among alternative measures of instability and as such, choice of any one of them is not expected to affect the results.

In symbols, the instability index (I_x) is defined as:

$$I_x = \sum_{t=1}^{20} \left[\frac{\frac{X_t - \hat{X}_t}{\hat{X}_t}}{N} \right] X\ 100$$

where

X_t = observed value of exports in time period t

$\hat{X}_t$ = the antilog of the logarithmic least squares estimate of the secular trend[5] for time period t

N = the number of years over which the instability index is computed.

[3]This measure of instability was first used by Coppock [1] and Kingston [4].

[4]See Lam and references cited thereof [1980, p. 45-46] and Kingston [1976, p. 314].

[5]The Secular trend in exports will be estimated by using the following equation:

$$\text{Log } X_t = a_t + B\ t + U_t$$

where

t denotes time.

After measuring instability, we set out a methodology to assess the contribution of each export subgroup to total export instability. The percentage contribution of each subgroup to total export instability is computed by weighting the instability index of each subgroup by its export value, summing the weighted indices of all subgroups and then computing the share of weighted index of each subgroup in the total of weighted indices. In symbols:

$$PIC_x = \frac{I_{xi}\ \bar{X}_i}{\sum_{i=1}^{s} I_{xi}\ \bar{X}_i} \times 100$$

where

PIC_x = percentage instability contribution index corresponding to ith subgroup of exports;

S = number of export subgroups;

$\bar{X}_i$ = mean value of the exports of ith subgroup; and

I_{xi} = instability index corresponding to ith subgroup of exports.

It should be noted that it would be inappropriate to imply or suggest proposal; for the maintenance or modification of the existing composition and direction of exports just on the basis of instability behaviour demonstrated by different commodity groups and trading blocks. This is so, because the instability index in itself provides insufficient information on the export performance. The derivation of an instability index corrects for trend elements, making it completely independent of the overall level and direction of export proceeds growth. Therefore, instability analysis of different trading blocks and commodity subgroups will be supplemented with the analysis of trend growth

exhibited by them, and the contribution of each subgroup to the growth of total exports will be computed on similar lines as has been done for export instability, by calculating the percentage share of weighted growth rate of each subgroup in the total of weighted growth rates i.e.,

$$PGC_x = \frac{g_{xi}\ \bar{X}_i}{\sum_{i=1}^{S} g_{xi}\ \bar{X}_i}$$

where

PGC_x = percentage growth contribution index corresponding to ith subgroup of exports; and

g_{xi} = growth rate of ith subgroup of exports.

An attempt will also be made to see if temporary fluctuations in exports by commodity and geographic structure are a part of positive or negative trend. If fluctuations in export earnings are associated with a negative trend then it poses even a greater problem for policy makers.

Part B

In this part, we complement the foregoing analysis pertaining to the sources of instability with the analysis of causes of instability and as such test the impact of those variables which characterise the export structure of Pakistan viz, the commodity concentration (CC), the geographic concentration (GC), share of food exports in total exports (SF), the share of raw materials in total exports (SR) and the size of the export sector (X) on the total exports earnings variability (I_t). Absolute deviations from exponential trend expressed as a percentage of estimated trend value are used as a proxy for the variability of export proceeds.

The above mentioned explanatory variables are defined as follows:

We employ Gini Hirschman's[6] index to compute commodity concentration ratio with data at three digit level.[7] The Hirschman Commodity concentration index is defined as:

$$CC = \left[\sum_{j=1}^{n} \left(\frac{X_{jt}}{X_t} \right)^2 \right]^{1/2} \times 100$$

where

X_{jt} = the value of exports of commodity j in time period t

X_t = the value of total exports in time period t; and

n = the number of three-digit Pakistan Standard Trade Classification (PSTC) commodities.

Similarly the Hirschman geographic concentration ratio is defined as:

$$GC = \left[\sum_{K=1}^{n} \left(\frac{X_{kt}}{X_t} \right)^2 \right]^{1/2} \times 100$$

where

X_{kt} = the value of exports to country k in time period t.

K = number of markets.

Share of food exports in total exports (SF) is defined as the sum of PSTC 0, 1 and 4 as a percentage of total exports.

Whereas exports of raw materials (SR) are defined as the sum of PSTC 2 and 3 as a percentage of total exports.

[6]This measure of the export concentration was developed by Albert Hirschman [1945, pp. 158-162].

[7]The value of commodity concentration depends in an important way on what commodity classification is being employed. It will be higher, the higher the degree of classification. The highly aggregated classification at one digit level, tends to put distinctly different commodities in one group. Whereas a highly diaggregated classification tends to define commodities which are very close substitutes as separate goods. Hence in this study, we would employ a three-digit code.

X = value of total merchandise exports in rupee terms.

The impact of these variables on export instability is analysed below:

The instability of total exports is some average of individual performances, if exports are concentrated, then the unstable items have less chances of being cancelled out by stable items, thereby making total export earnings unstable. As such export instability is hypothesised to be a positive function of commodity concentration and therefore, a negative function of diversification. However, this hypothesis assumes statistical independence among the earnings from products falling in different three-digit PSTC groups. Otherwise, diversification would be of little help in reducing export instability.

A reasoning similar to that underlying the relationship between export instability and commodity concentration may also be applied to explain the relationship of geographic concentration with export instability. High geographic concentration leads to greater dependence on economic conditions prevalent in importing countries, and as a result, fluctuations in demand in any one of them will have a more pronounced effect on receipts of an exporting country and may therefore lead to greater instability in export proceeds. On the other hand, when export destination is diversified, then fluctuations in export receipts caused by changes in certain countries import demand, have chances of being offset by opposing changes in other countries import demand, thereby leading to less export instability. This, however assumes that markets are imperfect substitutes for one another.

Another plausible explanation about the relationship of export instability with geographic concentration is expressed by Massel [1964, pp. 56-57] which is that "countries whose exports are highly concentrated geographically tend to have more effective methods of smoothing out the fluctuations in export receipt perhaps because bilateral commodity arrangements may be prevalent in such cases ..... In many cases, it is likely that some form of commodity agreement between the exporting and importing countries tend to reduce fluctuations in export receipts". We would test with our data as to which of these two possibilities is prevalent in Pakistan's case.

Specialisation in primary exports has long been considered as one of the major causes of export instability. Primary exports are believed to have unstable demand and supply curves and therefore, may lead to a greater degree of fluctuations in export proceeds. Following Massell [9] a distinction is made between two categories of primary exports viz foods and raw materials. Food exports with relatively low income elasticity are expected to be less affected by short run shifts in demand arising from cyclical changes in income, however these are susceptible to supply induced fluctuations. On the other hand, income induced shifts in the foreign demand are expected to have a larger impact on raw material exports which have a relatively high income elasticity. If raw material exports are agricultural in nature then in addition to demand side instability, they will also be affected by fluctuations on the supply side.

The last determinant of export instability considered in our study is the size of the export proceeds. This variable was found to exert a stabilising effect on the export proceeds in the literature.[8]

I.C. In this part, we put forward the determinants of export concentration (both by commodity and geographic structure). It is hypothesised that:

$$CC = f\ (GNP,\ GNP_c,\ SP)$$

$$GC = f\ (GNP,\ GNP_c,\ SP,\ CC)$$

where

GNP = Gross National Product at constant prices;

GNP_c = Per Capita income at constant prices; and

SP = Share of primary exports (defined as the sum of PSTC 0-4) in total exports.

The rest of the variables have already been defined.

The effect of size measured by GNP would be tested on commodity and geographic concentration. Commodity concentration is hypothesised to be a declining function of the level of GNP, since the larger outputs are usually composed of a greater number of diverse products and should thus be evident in more diversified exports. Moreover, a large number of industries can not, owing to internal and external economies,[9] be maintained in small countries.

[8] Massell [9] used size of the export sector as a proxy for export share by postulating that the smaller the share of country's exports in the world market, the greater the elasticity of a foreign demand curve facing a country and the greater the effect of supply shifts on export proceeds. Surprisingly in his study, size of the export sector performed better than the actual variable viz the export share, however, both of these variables were found to be highly correlated.

Seiji [12] used size of the export sector in a similar context and it was found to be an important stabilising variable in his study also.

[9] This point has been stressed by Kuznets [5].

Likewise, geographic concentration is hypothesised to be a negative function of size. Since a small country is expected to have limited trade links because its exports[10] form only a minor part of world exports and may therefore be absorbed by one or a very few countries.

Another factor which is expected to affect export concentration and is somewhat associated with the aforementioned factor is the degree of economic development, measured by per capita income. A high degree of economic development is usually associated with a diversified production structure and is expected to lead to a diversified export structure.

Yet another factor which is expected to affect export concentration is the share of primary exports in total exports, the higher this share, the greater the export concentration. This is because the comparative advantage of a country which has a high share of primary exports, lies in the production of goods based solely either on the availability of certain natural resources or climatic conditions, which limit the choice of goods produced. On the other hand, the comparative advantage of industrialised economies is determined by the availability of factors such as capital and skilled labour, which are capable of producing a wider range of goods.

Further the high commodity concentration is expected to lead to a high geographic concentration, because a small number of commodities usually have a limited scope of demand in the world market.

[10]This reason has been suggested by Hirschman [2].

II. RESULTS

The section on results is divided into three parts. In Part A, we discuss the results related to growth and instability behaviour of commodity and geographic subgroups of exports. In Part B, we present the regression results relating to export stability. And finally, in Part C, we discuss the empirical evidence pertaining to export concentration.

Part A

The percentage instability contribution Index (PIC_x) and percentage growth contribution index (PGC_x) are particularly revealing when compared with the percentage shares in total exports. In what follows, we compare the percentage instability and growth contribution made by each subgroup with its share in the total.

Export Instability and Growth by Commodity Structure

The percentage instability contribution index (PIC_x) in Table 1 shows that the highest contributor to export instability is rice. It's share in the total instability is 24 percent. The second major contributor to export fluctuations is export of textile yarn and thread. This subgroup contributes almost 19 percent of fluctuations in the total exports. The cotton exports also account for a high proportion of total export fluctuations i.e. 16.26 percent. It is noteworthy that out of the seven subgroups of primary exports, four, namely, cotton, rice, fresh fruit and hides and skins contribute to export instability in excess of their relative shares in the total. However, the contribution of wool and animal hair and crude vegetabl

Table 1

Percentage Instability and Growth Contribution
Indices of Exports by Commodity Subgroups

Name of the Subgroups	Percentage Shares in Total Exports	PIC_x	PGC_x
Cotton	13.862	46.08	16.26	6.05
Rice	22.054	44.15	24.79	22.30
Fish & Fish Preparation	2.733	16.53	1.15	1.92
Fruit Fresh	0.820	48.08	1.004	0.775
Crude Vegetable Materials	1.99	27.96	1.42	1.748
Hides and Skins	0.366	255.36	2.38	-0.239
Wool & Animal Hair	1.329	40.08	1.35	0.00039
Leather	6.55	28.65	4.781	7.15
Textile Yarn & Thread	14.88	49.19	18.64	15.67
Cotton Fabrics Woven	15.23	23.09	8.955	14.93
Articles of Textile Manufacturing	4.763	28.48	3.454	7.14
Floor Coverings	8.758	32.50	7.25	11.28
Clothing	3.87	35.424	3.49	5.66
Footwear	0.935	36.48	0.868	0.787
Sports Goods	1.85	89.09	4.192	4.82
Primary Exports	46.58	26.74	50.07	38.48
Manufactured Exports	53.42	23.39	49.93	61.52

material to total instability is approximately equal to their relative shares, while exports of fish and fish preparation contribute to export instability less than their relative share. For the manufactured exports, only two out of eight subgroups contribute to export instability in excess of their shares in the total. On the basis of these results it can be concluded that the subgroups of primary exports exhibited a more unstable behaviour as compared to those of the manufactured exports. This is also confirmed by the results on instability indices as out of seven, five instability indices corresponding to primary export subgroups lie above the median value i.e. 36.48, while instability indices of only two manufactured export subgroups lie above the median value.

The second indicator of the performance of export subgroups i.e. the growth contribution index (PGC_x) shows that the leading contributors to export growth are rice, textile yarn and thread, cotton fabrics woven and floor coverings. Out of these the contribution of rice and cotton fabrics woven to export growth is less than their shares in the total, while that of textile yarn and thread and floor coverings is greater than their relative shares. Attention should be called to the fact that all of the primary export subgroups contribute to export growth less than their relative share, whereas seven subgroups of manufactured exports contribute to export growth in excess of their shares in the total.

The instability and the growth indices for two broad groups of exports viz the primary and the manufactured exports further confirm these results, as the primary exports contribute to

instability greater than and to export growth less than their relative share. The manufactured exports contribute to instability less than and to export growth more than their relative share. These results suggest that as the share of manufactured exports increases in the total exports, Pakistan will tend to experience lower level of export instability and the faster export growth.

The rank correlation between PIC_x and PGC_x for commodity subgroups is highly significant, being 0.902, however the rank correlation between the instability indexes and growth rates is -0.041, showing that volatile trade receipts have been associated with a negative export trend. Nevertheless this association is very weak, indicating that high correlation between PIC_x and PGC_x is the result of the relative size of the subgroups.

Table 2

Rank Correlation Coefficients among Percentage Instability Index for Exports (PIC_x), Percentage Growth Contribution Index for Exports (PGC_x), Instability Index for Exports (I_x) and Export Growth (g_x) for Commodity Subgroups

		Sample Size = 15
PIC_x and PGC_x	=	0.902*
I_x and g_x	=	-0.041

Source: Computed from Table 1.
*Significant at conventional levels.

Note: The rank correlation coefficient is significant at 5 percent level if its calculated value is either less than $\frac{-1.96}{\sqrt{n-1}}$ or is greater than $\frac{1.96}{\sqrt{n-1}}$

Export Instability and Growth by Geographic Structure

Results presented in Table 3 show that Centrally Planned Economies Europe, Asian Middle East, Other Asia, and European Economic Community contribute most to export instability. The individual contribution of each one of these subgroups is above 10 percent, while the combined contribution of all these subgroups is above 50 percent. Japan, Hong Kong, Centrally Planned Economies Asia, RCD and Other Africa also make a relatively greater contribution to instability, each one of these contributing above 5 percent to total instability. It should be noted, however, that Asian Middle East, Japan, Hong Kong and European Economic Community contribute to instability far less than their relative shares in total exports, implying that these markets did not contribute unduly to total instability. This is also evident from the magnitude of instability indices, which range between 27-49, the lowest among the instability indices corresponding to all geographic subgroups of exports.

The Centrally Planned Economies Asia, RCD and Other Africa contribute to instability in excess of their relative shares in total exports. contribution of Other Asia and EFTA to total export instability is roughly equal to their importance in total exports, while USA contributes to instability less than its relative share. Contribution of Canada, Other Europe and North Africa is in excess of their relative shares in total exports.

In Table 3 also the percentage growth contribution index (PGC_x) displays the contribution of each geographic subgroup of exports to total export growth. It shows that the major contri-

Table 3

Percentage instability and Growth Contribution Indices of Exports by Geographic Subgroups.

Name of the Subgroups	Percentage Shares in Total Exports	I_x	PIC_x	PGC_x
USA	5.72	28.3	4.23	4.25
Canada	0.774	52.97	1.07	0.946
EEC	21.86	23.96	13.63	22.12
EFTA	2.71	36.84	2.60	3.47
Other Europe	1.75	66.27	3.010	3.06
CPEE*	5.95	90.81	14.060	9.41
RCD	4.12	61.00	6.54	6.39
Japan	9.18	36.00	5.59	4.16
DMEO**	0.901	28.39	0.665	0.787
Hong Kong	9.02	32.55	7.64	4.21
LDMEO***	0.049	68.98	0.089	-
LAFTA	0.573	86.88	1.29	1.03
CACM	0.005	82.14	0.001	-
Other America	0.318	56.54	0.468	0.582
Asian Middle East	16.93	28.4	12.51	20.57
North Africa	0.824	64.34	1.38	1.05
Other Africa	4.68	43.3	5.28	5.79
Other Asia	11.72	37.29	11.37	10.10
CPEA****	2.89	73.98	5.58	1.96

Note: Pakistan made no exports to Less Developed Market Economies Oceania (LDMEO) and Central American Common Market (CACM) in the beginning of the sixties, therefore exponential trend growth rates could not be computed for them. However, instability indices for these markets are based on the linear trend.

*Centrally Planned Economies, Europe.
**Developed Market Economies Oceanian.
***Less Developed Market Economies Oceanian.
****Centrally Planned Economies, Asia.

butors to total export growth are Asian Middle East, EEC, Other Asia and the Centrally Planned Economies Europe -- the share of these subgroups in total export growth is almost sixty two percent. The RCD and Other Africa also make relatively greater contribution to export growth. It is noteworthy that except for Other Asia, all of the above mentioned subgroups contribute to total export growth in excess of their relative shares. Besides these, EFTA, LAFTA, Other Europe and North Africa also contribute to export growth in excess of their percentage shares, while the contribution of USA, Japan, Hong Kong and Centrally Planned Economies Asia to export growth is less than their percentage shares in total exports.

A simultaneous inspection of the percentage instability contribution index and percentage growth contribution index and their comparison with percentage export shares of geographic subgroups reveals that the Asian Middle East and the European Economic Community, which are the two leading customers of Pakistan's exports contribute to export instability less than, and to export growth more than their percentage shares in total exports, thus showing an exceptionally good performance. The comparison of PIC_x and PGC_x with the relative shares of geographic subgroups also reveals that export markets which contribute most to instability also contribute most to export growth. This is further confirmed by a very high rank correlation between PIC_x and PGC_x - its value being 0.918. In order to control for the relative size of subgroups, the rank correlation between l_x and g_x is calculated. However, it also turns out to be signifi-

cant at the 5 percent level – its value being 0.662[11] indicating that the export markets for Pakistan, which experienced the highest degree of trade earnings variability, also achieved the highest magnitudes of growth in trade earnings. This shows a direct linkage between variations in exports and export growth by geographic structure.

Table 4

Rank Correlation Coefficients among Percentage Instability Index for Exports (PIC_x), Percentage Growth Contribution Index for Exports (PGC_x), Instability Index for Exports (I_x) and Export Growth (g_x) for Geographic Subgroups

			Sample Size = 17
PIC_x	and	PGC_x	= 0.913*
I_x	and	g_x	= 0.662*

Source: Computed from Table 3.

*Significant at conventional levels.

Note: The rank correlation coefficient is significant at 5 percent level if its calculated value is either less than $\frac{-1.96}{\sqrt{n-1}}$ or is greater than $\frac{1.96}{\sqrt{n-1}}$

Inter-Period Export Instability and Growth Analysis

The results for the two decades show that the export instability has been relatively high, while growth rate of exports has been relatively low during the seventies as compared to that of the sixties. Many factors could be held responsible for these results e.g. the increase in the level of protectionism during the seventies, the commodity price upswing of 1973-74 and the recession which followed it and the devaluation of Pakistani rupee in 1972-73. the results for subperiods are consistent with

[11]When CPEA, which present an extreme observation, with lowest growth rate and almost highest instability index is excluded from the sample, the rank correlation between g_x and I_x turns out be even higher – its value being 0.806, which is representative of almost 97 percent of total exports.

these observations. The subperiod of 1960-61 to 1964-65 experienced the relatively low instability level and the highest growth rate. There has been a small increase in export earnings fluctuations during the subperiod of 1965-66 to 1969-70, while the growth rate of exports has declined substantially during this period. The highest level of instability is concentrated in the subperiod of 1970-71 to 1974-75, however the growth rate of exports has also been high and this is so because the important international and domestic changes took place during this period, for instance high level of inflation due to the oil crises of 1973-74 is expected to have led to greater degree of instability, and the devaluation of rupee in 1972-73 also initially raised export proceeds considerably and this has resulted in an increase in both the level of instability and growth rate of exports. During the subperiod of 1975-76 to 1979-80, export variability and growth, both came down to a relatively low level. The recession in the world economy may be singled out as a major cause for these results.

Table 5

Instability Indices and Growth Rates for Total Merchandise Exports

	I_X	S_X
1961-61 — 1969-70	20.051	11.525
1970-71 — 1979-80	25.85	8.883
1960-61 — 1964-65	19.272	21.19
1965-66 — 1969-70	20.83	7.064
1970-71 — 1974-75	42.98	21.85
1975-76 — 1979-80	8.72	7.22

Part B

The regression equation I shows that only geographic concentration is significant at the 5 percent level with a negative sign. The negative significance indicates that the higher degree of geographic concentration has led to a lower level of instability in export proceeds, confirming the hypothesis put forward by Massell [8], which is that countries whose exports are highly concentrated geographically, tend to have more effective methods of controlling fluctuations in export receipts. This seems to be the case for Pakistan also, as the country had been able to smooth out trade fluctuations to some degree by entering into trade agreements[12] with its partners, during the sixties and the Seventies. Most of these agreements were meant to secure substantial elimination of restrictions on her exports and sizeable increases in quotas for her products. These bilateral trade agreements with different countries at different points of time are expected to have insulated Pakistan from the full impact of market forces, thereby stabilising export proceeds to some extent.

In regression equation I, we introduce the size of exports, which turns out to be significant at the 15 percent level. The negative sign shows that the larger the value of exports, the smaller the degree of fluctuations implying that the size of exports has a stabilising effect on export receipts, however it's introduction in regression I reduces the value of adjusted R^2.

[12] See Economy Pakistan from 1948--1968 and Pakistan Economic Surveys [13;14]. In the absence of such commodity arrangements, geographic concentration is expected to lead to higher degree of instability, for explanation, see page 9.

Table 6

Regression Results on Export Instability

1.	I_t =	1.365 + 0.0068 SF - 0.007 SR - 0.037 GC + 0.005 CC	
		(1.02) (-0.916) (-1.82) (0.352)	
		R^2 = 0.287	$\bar{R}^2$ = 0.034 DW = 1.485
2.	I_t =	1.43 - 0.0001 X + 0.007 SF + 0.003 CC - 0.00 SR - 0.034 GC	
		(-1.16) (0.945) (0.199) (-0.668) (-1.55)	
		R^2 = 0.263	$\bar{R}^2$ = 0.013 DW = 1.512
3.	I_t =	1.26 - 0.0001 X - 0.032 GC + 0.0096 SF	
		(-1.154) (-1.569) (1.678)	
		R^2 = 0.239	$\bar{R}^2$ = 0.087 DW = 1.589
4.	I_t =	1.54 - 0.0002 X - 0.0067 SR - 0.277 GC	
		(1.44) (-1.33) (-1.32)	
		R^2 = 0.203	$\bar{R}^2$ = 0.044 DW = 1.586
5.	I_t =	1.077 + 0.0098 SF - 0.031 GC	
		(1.833) (-1.61)	
		R^2 = 0.225	$\bar{R}^2$ = 0.127 DW = 1.56

Note: t-values are given in the parentheses.

Cochrane Orcutt technique has been applied to all the regressiion equations.

The commodity concentration is also insignificant in both the regression equations. The simple correlation between I_t and CC is very low – being only 0.204. Moreover, the relationship between I_t and CC is not significant even net of other explanatory variables, therefore, it is deleted from the subsequent regression equations. The correlation between SR and SF is 0.622 which is highly significant, therefore, these two variables are also tried separately in the subsequent equation, consequently SF becomes significant at 10 percent level with a positive sign. The positive significance of SF suggests that an increase in the share of food exports in the total would tend to bring more instability in the export proceeds. The SR is also significant at a 10 percent level with a negative sign showing that the share of raw materials in the total exports has exerted a stabilising effect on export proceeds. These results imply that the supply side factors bear the responsibility of making total export proceeds more unstable, because food exports as having low income elasticity experience small fluctuations on the demand side and tend to experience greater variability due to fluctuations in the supply conditions, while raw material exports are generally affected more by the demand side fluctuations, which might have been mitigated to some extent in Pakistan's case by commodity arrangements and price pegging policies on the part of importing countries as is also suggested by a negative sign of geographic concentration.

The regression equation 5, which retains the geographic concentration and SF as explanatory variables, yields the highest value of adjusted R^2. The inclusion of the rest of the variables

in the equations 1, 2, 3 reduces the value of adjusted R^2 because some of these variables are multicollinear and therefore do not have an independent explanatory power, while others have a very weak correlation with I_t.

It should be noted that the adjusted R^2's are extremely low in all cases implying that export instability is not properly explained by its conventional determinants. Despite the differences in the period of analysis and methodology, this finding reaffirms the evidence of the some of the earlier studies [1,5,7] which also found a very low value of explained variation in export instability with heavy specialization in commodities as well as in primary exports as explanatory variables.

Part C

The first two regression equations in Table 6 evaluate the influence of size (measured by GNP) and degree of economic development (measured by per capita income) on commodity concentration. The subsequent equations include share of primary exports (SP) as well. The regression results show that the size coefficient takes the appropriate negative sign and is significant at the 1 percent level. The degree of economic development also turns out to be significant with an expected sign. The inclusion of share of primary exports in equations 1 and 2, substantially raises the explained variation, which rises from 0.38 to 0.57. However, GNP and GNP_c become insignificant in it's presence. Share of primary exports itself is highly significant indicating that type of exports is an important determinant of commodity concentration. The adjusted R^2's are around 0.57 and the DW statistic lies in the inconclusive range.

Table 7

Regression Results on Export concentration

A

(1)* $CC = 42.75 - 0.00025\ GNP$ (-2.805)

$R^2 = 0.316$ $\bar{R}^2 = 0.276$ DW = 1.86

(2)* $CC = 53.75 - 0.037\ GNP_C$ (-3.495)

$R^2 = 0.418$ $\bar{R}^2 = 0.384$ DW = 1.92

(3) $CC = 25.48 - 0.00006\ GNP + 0.205\ SP$ (-0.817) (2.88)

$R^2 = 0.619$ $\bar{R}^2 = 0.575$ DW = 1.52

(4) $CC = 29.67 - 0.012\ GNP_C + 0.900\ SP$ (-0.926) (2.4)

$R^2 = 0.624$ $\bar{R}^2 = 0.579$ DW = 1.52

B

(5)* $GC = 35.44 - 0.00007\ GNP + 0.060\ SP$ (-2.287) (2.104)

$R^2 = 0.740$ $\bar{R}^2 = 0.708$ DW = 2.18

(6)* $GC = 40.67 - 0.012\ GNP_C + 0.038\ SP$ (-2.68) (1.21)

$R^2 = 0.763$ $\bar{R}^2 = 0.733$ DW = 2.21

(7)* $GC = 33.09 - 0.0008\ GNP + 0.157\ CC$ (-3.006) (1.88)

$R^2 = 0.723$ $\bar{R}^2 = 0.688$ DW = 1.956

(8)* $GC = 39.67 - 0.136\ GNP_C + 0.106\ CC$ (-3.57) (1.25)

$R^2 = 0.763$ $\bar{R}^2 = 0.733$ DW = 2.10

Note; t-values are given in the parentheses.

*The Cochrane Orcutt technique has been applied to all the Starred equations.

Table 6 also shows that strong inverse relationships emerge between the dependent variable, geographic concentration and the independent variables, viz, size and level of economic development in all the regression equations. The share of primary exports also exerts a significant positive influence on geographic concentration (Equation 5).

The simple correlation between commodity concentration and the share of primary exports is 0.76, which is significant at 1 percent level. Moreover, the share of primary exports turns out to be an important determinant of commodity concentration, therefore, the impact of commodity concentration on geographic concentration is tested by excluding the share of primary exports from the equation and commodity concentration turns out to be significant at the 5 percent level of significance with a positive sign (Equation 7). The positive and significant coefficient of commodity concentration indicates that as the commodity diversification of country's exports becomes higher, it widens its trade connections, since the diversified commodity structure tends to be accompanied by the demand for exports in a greater number of countries, thereby leading to diversification in geographic structure. Primary exports and commodity concentration, both fall short of being significant at 10 percent level when paired with GNP_c, nevertheless adjusted R^2's are higher with GNP_c and primary exports and GNP_c and commodity concentration as explanatory variables.

III. CONCLUSIONS AND POLICY IMPLICATIONS

The study has made an assessment of the relative contribution of commodity and geographic subgroups to total export instability. This type of analysis provides useful insights into the disaggregated sources of fluctuations in total export earnings. Further the paper made an attempt to assess the relative contribution of geographic and commodity subgroups to the growth of total exports, pinpointing the major sources of export growth. The instability and growth contribution indices for commodity subgroups reveal that the manufactured exports exhibited a relatively stable and more expansive behaviour over time, in aggregate they contributed about 62 percent of growth in total exports. While results for geographic subgroups show that the Asian Middle East and European Economic Community, the two leading customers of Pakistan's exports contributed to instability less than their percentage shares and to export growth more than their percentage shares in total exports, thus putting up a very good performance.

The study also finds a high rank correlation between PIC_x and PGC_x for geographic subgroups indicating that geographic subgroups which contributed most to instability, also contributed most to export growth. Moreover, the rank correlation between the instability index (I_x) and growth rates (g_x) is also significant indicating that export instability is closely associated with rising rates of expansion in export trade by geographic structure. To the extent, export instability is a part of export expansion, it should not be a cause for concern. Since high rate of export growth is expected to lead to greater

structural capacity and better institutional framework to deal with the problems of export expansion.

The rank correlation between PIC_x and PGC_x for commodity subgroups is highly significant, nevertheless the rank correlation between instability indices and growth rates is insignificant indicating that export instability by commodity structure is not associated with commodity export growth.

Out of the three alleged causes of export instability namely (a) export specialisation in primary exports (b) commodity concentration and (c) geographic concentration, commodity concentration fails to qualify at conventional significance level, while geographic concentration and the share of the food exports emerge as significant determinants of export instability, the share of raw material exports also turns out to be significant at a 10 percent level and has a stabilising impact on export earnings. The share of food exports exerts a destabilising effect on export proceeds, implying that the supply side factors have been responsible for making total export proceeds more volatile. This is not denying the role of demand side fluctuations in the determination of export instability, however their adverse effects have possibly been mitigated by deliberate efforts like commodity arrangements and price pegging policies on the part of importing countries. This argument also gets support from the negative significance of geographic concentration, which points to the fact, that Pakistan has entered into bilateral trade agreements with its dominant trade partners and this has resulted in a reduction of degree of uncertainty and amount of instability in the demand for its exports by these

countries to some extent. A very important policy implication emerges from this result, which is, that geographic deconcentration may not help in reducing export instability. Instead, commodity arrangements may prove to be more effective from the point of view of ensuring a stable behaviour of exports.

Howeover, geographic concentration is undesirable in many other respects. Specially because it weakens the political position of a country and makes her vulnerable to all types of exploitation by the dominant trade partners, whereas commodity concentration deprives the economy of flexibility in adapting the structure of its production to changes in market conditions. Our study finds that diversification in export trade by geographic and commodity structure, is determined by country size, level of economic development and composition of exports. Whereas the composition of exports is intimately related either with the some inalienable characteristics of a country, like existence of raw materials and climatic conditions or with the availability of factors of production like capital and skilled labour. Obviously, these factors can neither be changed nor acquired in a short span of time. Moreover, the size of GNP and level of economic development are determined by a whole development operation of a country, which is a long-term process. Therefore, the practical importance of diversification at a large scale is somewhat limited in the short period of time. Our results also show that a higher degree of commodity concentration leads to a higher degree of geographic concentration, possibly by limiting the scope and magnitude of world demand for exports.

APPENDIX

NOTES ON DATA

The present study deals with international trade in goods only and does not take into account the export of services. However, this is not a serious handicap, since exports of services are very small compared to that of goods. Data on exports by commodities and on the direction of exports by areas have been obtained from Foreign Trade Statistics of Pakistan [15]. While that on GNP has been obtained from Pakistan Economic Survey [13]. Fifteen major commodity subgroups at three digit classification level are selected in the present study, which are as follows: Cotton, Rice, Fish and Fish Preparation, Fresh Fruit, Crude Vegetable Material, Hides and Skins, Wool and Animal Hair, Leather, Textile Yarn and Thread, Cotton Fabrics Woven, Articles of Textile Manufacturing, Floor Coverings, Clothing, Foot Wear, Sports Goods. Out of these Cotton, Rice, Fish and Fish Preparation, Fresh Fruit, Wool and Animal Hair and Crude Vegetabl Materials belong to the primary exports, while rest of the subgroups fall in the category of manufactured exports.

Ninteen geographic subgroups[13] are specified in the present study. American continent is divided into four markets viz. USA, Latin American Free Trade Association, (LAFTA), Central American Common Market (CACM), and Rest of America. Europe is divided into four markets viz. European Economic Community (EEC), European Free Trade Association (EFTA), Centrally Planned Economies Europe and USSR (CPEE) and the Rest of Europe. Oceania is

[13]For the details on countries included in subgroups, see Yearbook of International Trade Statistics [16].

divided into Developed Market Economies (DMEO) and Less Developed Market Economies (LDMEO). Asia is divided into six markets viz. Asian Middle East (AME), RCD, Centrally Planned Economies Asia (CPEA) Japan, Hong Kong and Rest of Asia. The other markets are North Africa, Other Africa and Canada. It should be noted that some of the countries have been treated separately viz. USA, Canada, Japan and Hong Kong because of specific reasons. USA and Canada represent Developed Market Economies America, since USA exerts an important influence on world trade, therefore it has been analysed separately. Likewise Japan represents Developed Market Economy, Asia and as such has not been aggregated with Developing Market Economies Asia, while Hong Kong has been treated separately because approximately 9 percent of Pakistan's exports go to her.

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