Pakistan's Export Possibilities

by

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INTRODUCTION

The recent uncertainties about aid flows have underscored the need for achieving an early independence from foreign aid. The Perspective Plan (1965-85) had envisaged the termination of Pakistan's dependence on foreign aid by 1985. However, in the context of West Pakistan alone the time horizon can now be advanced by several years with considerable confidence in its economy to pull the trick.

The difficulties of achieving independence from foreign aid can be seen by reference to the fact that aid flows make it possible for the policy-maker to pursue such ostensibly incompatible objectives as a balance in international payments (i.e., foreign aid finances the balance of payments), higher rates of economic growth (i.e., it pulls up domestic saving and investment levels), a high level of employment (i.e., it keeps the industries working at a fuller capacity than would otherwise be the case), and a reasonably stable price level (i.e., it lets a higher level of imports than would otherwise be possible). Without aid, then a simultaneous attainment of all these objectives at the former higher levels together with the balance in foreign payments may become well-nigh impossible. Choices are, therefore, inevitable not for definite places in the hierarchy of values, but rather for occasional "trade-offs". That is to say, we will have to choose how much to sacrifice for the attainment of one goal for the sake of somewhat better realization of another.

There is clearly a "trade-off" between the objectives of a higher GNP growth rate and that of achieving a balance in international payments. Any decision to fix the GNP growth target at a certain level must take cognizance of its effects on the balance of payments. Although a higher GNP growth rate is desirable by itself, it also directly pulls up the requirements of the economy for imports and thereby dictates a correspondingly higher rate of export growth in order to achieve a balance in international payments.

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In the same way, exports cannot be pushed out of the economy without giving consideration to GNP growth rate as also to the permissible growth rate of imports. In a general equilibrium system, there is a definite limit to which one variable can be pushed at the expense of the other. It must be realised that a definite relationship exists between rates of growth of GNP, exports and imports. It is, therefore, not enough to set targets separately for these basic variables of the economic system.

The purpose of this paper is to derive a simple method whereby it will be possible to generate export targets with reference to the growth rate, taking into account the basic characteristics of West Pakistan's foreign trade sector. This method, in effect, highlights two constraints on export maximization: the growth rates of GNP and imports. It contrasts sharply with the usual practice of determining export targets exogenously, not necessarily consistent with the targets with respect to the growth rate of GNP and imports. Then on the basis of this method, several alternative estimates of the GNP, imports and exports required to fill the import-export gap have been presented in the Appendix and analysed in the text.[1]

II. THE BASIC MODEL

The method for generating export projections from "within" the system instead of being exogenously determined is derived from the fundamental equation used in the import-export gap analysis.

The fundamental equation for the n-th year showing the basic policy variables involved is:

$$F_n = F_{n-1} + Y_{n-1}\, r(u' - e') \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (i)$$

Rewriting (i) in terms of the base-year income, we get

$$F_n = Y_o \; [\,(u-e) + (u'-e') \;\; (1-r)^n - 1] \quad \ldots\ldots\ldots\ldots\ldots\ldots\ldots\ldots (ii)$$

Where

F_n = Foreign aid in the *n-th* year,
Y_O = GNP in the base year
u = Average import ratio (in terms of GNP)
e = Average export ratio (in terms of GNP)
u' = Marginal import ratio (in terms of a marginal change in GNP)
e' = Marginal export ratio (in terms of a marginal change in GNP)

It will be noted that in this model the basic variables that must be reckoned with in formulating an appropriate policy mix for closing the import-export gap are: (i) u', the marginal import ratio (ii) u, the average import ratio (iii) e, the average export ratio (iv) e', the marginal export ratio, assumed here equal to the annual rate of growth of exports; and (v) GNP. It is also crucial to determine the time horizon, n.

[1] It may be pointed out that all these export projections have been done on the basis of the pre-devaluation exchange rate of Rs. 4.76=US $ 1. However, it is easy to convert these projections at the existing exchange rate of Rs. 11 = US $ 1 by simply dividing each figure by 4.76 and multiplying the result by Rs. 11.00.

(*ii*) u' is kept constant. In order to ensure this, we calculate the first differential for GNP, dy; and then multiply it by the postulated value for u' in order to get the first differential for imports, dm. This latter figure gives us the marginal increments in imports for each year, which are then added to the base year figure for imports. In this way, we generate the time path form. The compound rate of growth of imports over the given period has then calculated.

(*iii*) The difference between the base-year export figures and the terminal year import figures gives us the compound rate at which exports must grow in order to close the import-export gap. This is the basic figure that we require in order to calculate e'.

(*iv*) Having generated the required export figures, we can determine e' by taking the first difference, de, and dividing it by the first difference of GNP, dy, in the terminal year.

(*v*) These rates for exports and imports are conditioned ultimately by the terminal date that we choose for the gap to close down. In our case, we have chosen 5 years from the base year 1969-70. If we had chosen 10 years, then the export and import rates would have been lower.

Through this method of deriving the time paths of M and X from GNP, the three of them are related in a definite way to each other. It follows that if the import-export gap has to be closed by a finite time horizon, all these three variables must stand in a definite relationship to each other.

IV. ALTERNATIVE EXPORT POSSIBILITIES FOR PAKISTAN

An effort has been made in this section to present alternative projections of GNP, import and export growth rates required to close the import-export gap by 1975. All projections have been done on the base year 1969-70. Also in order to show the significance of setting a more distant time horizon by which independence from aid is sought, we present alternative estimates based on the assumptions that independence from foreign aid be achieved by 1980.[2]

The reasons for taking the year 1969-70 as the base year, as we have done in deriving the time paths for GNP, M and X, in preference to the year 1970-71, may be noted. The year 1969-70 was a "normal" year as compared with 1970-71, which witnessed a considerable dislocation in the country's economic activity. As a result, the rate of economic growth slowed down in 1970-71 by about 3 per cent, mainly because of the severe curtailment of imports during the year 1970-71. Also, the remarkable increase in exports in 1970-71 over the 1969-70 base included considerable diversion of our exports from the regional destination to the international destinations. In the subsequent years,

[2] It must be noted that the term "foreign aid" has been used only in a loose sense. Even after the import-export gap has been closed, foreign aid will continue to flow in to pay for interest and amortization charges on old loans. Complete independence will be achieved only when the excess of exports over imports is large enough to pay for all the current import needs plus interest and amortization on past loans.

it is to be expected that imports will also have to be increased in order to engineer a revival in the economic activity. Furthermore, the short-term acceleration in exports may slow down once the process of diversion of exports from the East Pakistan's destination to international trade destinations has been completed. Furthermore, we wish to consider implications for the rest of the economy of such diversion of export trade to international destinations.

We have used the method indicated in Section III to generate the time paths of imports and exports on different assumptions regarding the GNP growth rate, the marginal import ratio and the relevant time horizon, by which our dependence on foreign aid has to be terminated. The results of this exercise are reproduced in the 12 cases analysed in the Appendix. These 12 different time paths for imports[3] and exports have been generated by picking up different values of the basic variables of the system. The basic data of the system in the year 1969-70 are:

(*i*) Average export ratio (to GNP), e = .043

(*ii*) Average import ratio (to GNP), u = .078

(*iii*) Marginal import ratio (to GNP), u′ = .075

(*iv*) Marginal export ratio (to GNP) e′ = .14

Given these magnitudes, the task of economic policy will be to raise e to 7.8 percent of GNP, thereby making it equal to the average import ratio. However, *u* may also be lowered through import substitution below 7.8 percent. In that case e will rise to equality with this lowered figure for *u*. This equality between *u* and e can be brought about by substantially raising the marginal export ratio, *e′* over the marginal import ratio, *u′*. This task has to be completed by a stipulated time period. We have taken for purposes of illustration two time horizons—(i) 1974-75 and (ii) 1979-80. In many ways, these two time periods also indicate the two actual possibilities by which our dependence on foreign aid could be terminated, depending upon the amount of export effort the economy is capable of harnessing. Also a comparison of the results according to whether the terminal date is 1975 or 1980 should also illustrate the effects of the changes in the time horizon on the acceleration of effort required both in respect of export expansion as well as import-substitution. All this is done in the Appendix. However, in the text, for reasons of expositional simplicity, we assume that 1975 is the policy-determined time horizon.

We now present the main results of the exercise, which is reported in full in the Appendix. We continue to assume that the import-export gap can be closed by 1975; and also that export growth rate in the coming years will rise sharply in the future between, say, 20 to 25 percent per annum. Also, we assume that GNP growth rate, *in current prices*, should be revived and restored to at least 10.5 percent as observed in the previous years. As a matter of fact, depending on resource availability, it should be accelerated over the next three years to something approaching 12 percent. In order to bring out certain striking features of our analysis, the main results are presented in the form of a matrix.

[3] It may be noted that we have excluded food imports and Tarbela Dam imports from the total import figures in order to generate a more stable time path for imports.

TABLE I

ALTERNATIVE WAYS OF ELIMINATING THE IMPORT-EXPORT GAP IN WEST PAKISTAN BY 1974-75

The time horizon: 1974-75.
(i.e., n = 5)

	A $\overline{u'=.075}$				B $\overline{u'=.06}$			
r	R exp. *	e' in the terminal year	R imp**	X=M in the terminal year.	R exp.*	e' in the terminal year	R Imp**	X=M in the terminal year.
.07	20.25	.20	6.8	419.2	19.2	.17	5.8	401.1
.105	24.1	.16	10.2	490.4	22.1	.13	8.4	452.5
.12	25.7	.15	11.6	423.5	23.5	.12	9.6	479.5

Source: Appendix.

Notes: *R exp. stands for required rate of export growth.
**R imp. stands for required rate of import growth.

A couple of interesting relationships stand out prominently in this matrix.

(*i*) Read the matrix vertically, an increase in the rate of growth of GNP increases the required rates of growth of imports and exports, as also the terminal import and export values. This relationship is obvious and needs no explanation.

(ii) Not so clear is the fact that an increase in r is associated with a fall in e', the terminal marginal export ratio, (read second column in each set vertically), even though the required export rate increases. The answer to this is that a rise in the rate of growth of GNP by increasing the compound rate at which exports increase enlarges in each time period the base from which a marginal increase is measured. Furthermore, the marginal import ratio, defined as $\frac{de}{dy}$ falls when discrete changes are made in the denominator, which is enlarged more than the numerator.

(iii) Relatively more clear is the fact that (read horizontally) e' falls as u' falls, implying a more intensive import substitution. This means that a greater import-substitution effort lessens the pressure on the variable e'; and also that the growth impulses are "divided" between import substitution and export expansion.

(iv) Also clear is the fact that a fall in the marginal import ratio, u', decreases the values of all the variables, i.e., the required export and import rates, the terminal values of exports and imports, etc. For, a greater import substitution takes much of the pressure off these variables.

(v) Not shown here is the other fact that increasing the time horizon, n, decreases the values of all the relevant variables[4] (see Appendix for a confirmation of this). Thus, there is a clear trade-off between more time and more exports: the more distant the time horizon, the less intensive will be community's effort at import substitution and export expansion.

The Three Basic Cases:

We now analyse in detail each of the three cases presented in Table I.

Case—A

$n = 5$

$r = .07$

$u' = .075$

On these assumptions[5], the required rate of growth of export will be 20.25 per cent, while imports will grow at 6.8 per cent. This rate of growth of exports implies that the marginal export ratio e', will rise from 12 percent in 1970-71 to 20 percent in 1974-75. Also, in absolute terms, imports will have risen from Rs. 302 crores in the base year to Rs. 419 crores from Rs. 166 crores in the base year. Furthermore, the average import ratio, u, will have declined a little from 7.8 per cent in the year to 7.7 per cent in 1974-75; while exports will have risen to 7.7 percent in 1974-75 from 4.3 percent in the base year.

This is an interesting case, as it corresponds in some respect to what actually happend during 1970-71: GNP slowed down to 7 percent while imports grew at 6.5 percent. However, exports growth of 26.6 percent was much higher than indicated here. This comparison suggests that in a high-income equilibrium situation as in Case-A above, imports should have been higher and exports lower than the level actually obtained in 1970-71.

Case—B

$n = 5$

$r = 10.5$

$u' = .075$

Here the rate of growth of GNP corresponds to what actually obtained during 1965-66 period. On these assumptions, GNP grows at 10.5 percent rate and the concomitant import growth was 10.2 percent. The absolute imports and exports in the terminal year will have risen to Rs. 490.5 crores. As a result, the average import and export ratios will be equal to 7.7 percent of GNP. To obtain this high rate of export, the marginal export ratio, e' will have risen to 16 percent of GNP in the terminal year.

[4] See Appendix, Case IX.

[5] See Appendix, Case X.

However, if the Government also indulges in some import substitution, i.e., lowers the marginal import ratio from 7.5 percent to, say, 6 per cent, the required export ratio will be 22.1 percent, while imports will have to grow by 8.4 percent. The target for imports and exports in the terminal year will then be Rs. 452.4 crores.[6]

Case—C

$n = 5$

$r = .12$

$u' = .075$

Here, we assume that the GNP growth should be accelerated to say 12 percent, a rate 1.5 percent higher than that observed from 1965 to 1969. With this GNP growth rate, the required export rate works out at 25.7 percent, while imports will grow at a rate of 11.6 percent. The terminal year value for export and import is Rs. 523.5 crore. The marginal export ratio, e' in the terminal year is 15 percent.[7]

However, if this export rate turns out to be too high, then to maintain a GNP growth rate of 12 percent, the marginal import ratio will have to be reduced to 6 percent from 7.5 percent obtaining in 1969-70, implying a more intensive import-substitution policy. The required rate of exports and imports on these assumptions works out at 23.5 percent and 9.6 percent respectively, while the target of exports and imports in the terminal year amounts to Rs. 479.5 crore.

V. AN ANALYSIS OF PAST EXPORT PERFORMANCE

In the light of the analysis presented in Section IV, we now analyse actual export performance of West Pakistan in 1970-71 to shed further light on the working of our model. Exports in West Pakistan have grown remarkably since 1969-70, both as a result of a greater buoyancy of West Pakistan's exports to the international market and also because of a forced diversion of export trade with East Pakistan. As a combined result of these two complementary forces, exports in 1970-71 increased by 26.6 percent over the 1969-70 base. If the present momentum is continued, exports growth rate may reach in 1971-72 the very high figure of 35 percent. If these growth rates could be maintained, then there is a real possibility that the import-export gap might be closed by the end of 1975. This is the reason why we have chosen 1975 to be the time horizon by which the import-export gap has to be closed.

However, it will not be right to expect that such high rates of growth of export can be sustained for long. In evaluating Pakistan's export prospects in the light of the analytical technique described above, it must be noted that the recent remarkable increase has been brought about on top of recessionary conditions in the economy. The GNP between 1969-70 and 1970-71 slowed down by about 3 percent, i.e, the growth rate of GNP between 1969-70 and 1970-71 was 7 percent as compared with a 10.5 percent increase in the previous

[6] See Appendix, Case — VIII.

[7] See Appendix, Case — XII.

years. Furthermore, imports continued to grow at 6.5 percent during 1969-70, as in earlier years. This implied a slight decline in the marginal import ratio to GNP from 0.75 percent in 1969-70 to 0.73 percent in 1970-71, signifying import curtailment. It may sound paradoxical but is nevertheless true that recession in the economy has helped accelerate export growth; as a matter of fact, it has been one of the important contributory factors. For recession induces a fall in domestic income, which leads to the curtailment of the domestic demand both for imported goods as well as for exportable goods. Thus, the economy pulls towards a low-income level equilibrium.

Now the main task of economic policy in the coming years will be to accelerate the growth of GNP by increased investment, which would also increase domestic real income and in turn raise the demand for imports. Also, an increase in real income will increase the domestic demand of exportable products, thereby reducing their exportable surplus. Hence, a revival of economic activity will have, as its elements (i) an acceleration of growth rate of GNP (ii) a slow-down of export growth and (iii) a stimulation of import demand.

This is best shown in terms of analytical techniques stated above. In order to generate a growth rate of export of over 26.6 percent in an economy heading towards high income equilibrium, both the rates of growth of GNP and imports will have to rise considerably over the 1970-71 level. The solutions presented below should be considered as extreme cases.

The export growth rate of 26.6 per cent per annum can be achieved under two sets of assumptions:

(*a*) $n = 5$, $r = .13$, $u' = .074$

(*b*) $n = 5$, $r = 15.2$, $u' = .06$

The results of the first set of assumptions are stated in Table II.

TABLE II

ELIMINATING THE IMPORT-EXPORT GAP BY 1974-75 BY A 26.6 PERCENT INCREASE IN EXPORTS

(Rs. in crore)

Year	GNP	Export	Import
	13 percent compound annual rate	26.6 percent compound annual rate	12.4 percent compound annual rate
1969-70	3873	166.7	302.4
1970-71	4376	211.0	337.7
1971-72	4945	267.1	378.4
1972-73	5588	338.1	425.4
1973-74	6314	428.1	479.4
1974-75	7135	540.6	540.6

The results of the second set of assumptions are set out in Table III.

TABLE III

ELIMINATING THE IMPORT-EXPORT GAP BY 1974-75 BY A 26.6 PERCENT INCREASE IN EXPORTS

(Rs. in crore)

Year	GNP	Export	Import
	15.2 percent compound annual rate	26.6 percent compound annual rate	12.4 percent compound annual rate
1969-70	3873	166.7	302.4
1970-71	4462	211.0	337.7
1971-72	5140	267.1	378.4
1972-73	5921	338.1	425.4
1973-74	6821	428.1	479.4
1974-75	7857	540.6	540.6

These two cases illustrate the policy alternatives open to the government. If the import-export gap has to be closed by 1975, then in order to sustain a high export rate of 26.6 per cent, both GNP and imports must rise at rates higher than observed so far. In the first case, GNP must increase by 13 percent while imports will have to grow by 12.4 percent. If, as has been done in Case-B above, a more intensive import-substitution policy is pursued, by lowering the marginal import ratio from .07 to .06, then GNP will have to grow still more in order to produce a 26.6 percent rate of growth of exports. This is understandable; for a higher rate of GNP must compensate for a lower value of u', so as to produce the same growth rate for imports.

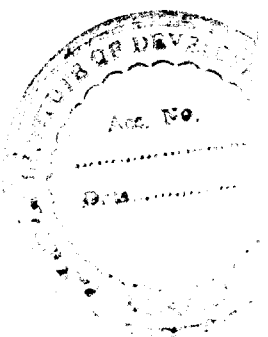
It must be pointed out that this is a high-income equilibrium solution and contrasts sharply with the low-income equilibrium obtaining in 1970-71, where a 26.6 per cent growth rate of exports has been associated with a GNP growth rate of 7 percent and an import growth rate of 6.5 percent. According to this line of reasoning, the remarkable performance of exports during the current year should not be viewed as an unmixed blessing as it is symptomatic of a low-income equilibrium situation, something that we do not want to perpetuate.

CONCLUSION

The analysis above shows various high-income equilibrium solutions under different assumptions regarding the feasible growth rate of GNP, exports and imports. The upshot of our analysis is that a certain consistency has to be maintained between the rate of growth of GNP and the rates of growth of

exports and imports. If it is not possible to accelerate exports above a certain level, then care must be taken in setting the target for the GNP, which also in a very direct way determines the target rate of growth of imports. Our analysis also shows that, contrary to the usual practice, the export targets should not be determined arbitrarily. Once we have set the GNP target, then export target must be such as is consistent with the GNP target.

Our analysis also shows that euphoria over recently witnessed growth rate of exports must be avoided, remembering that we are going through a recessionary period, which has also helped higher exports (this is in addition to the fact that there has also occurred a fortuitous rise in the international prices of raw cotton, something that may not continue). It suggests that the choice for ever-increasing exports is not really so open-ended as it is made out to be. In a growing economy in which domestic real income is increasing, there are definite limits on the capacity of the economy to generate an ever-increasing export surplus.



Appendix

ALTERNATIVE METHODS OF ELIMINATING IMPORT(M)-EXPORT(X) GAP IN PAKISTAN

Notation: e = Average Export Ratio (of GNP)
u = Average Import Ratio (of GNP)
u′ = Marginal Import Ratio (of GNP)
r = Rate of Growth of GNP
n = Number of years of the postulated time horizon

(All projections based on the pre-devaluation rate of exchange of Rs. 4.76 to U.S. $1.00)

CASE—I:

(A) *Given in Base Year 1969-70*

e = .043
u = .078
u′ = .075

(B) *Assume*:

n = 5
r = .06
u′ = .075

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports : .192 or 19.2 percent.

(*ii*) e′ (the marginal export ratio to GNP in (a) base year : .14
(b) terminal year : .22

(*iii*) e (exports as percent of GNP) in the terminal year : .077

(*iv*) u (imports as percent of GNP) in the terminal year : .077

(*v*) Projected compound annual rate of growth of imports : 0.57 or
: 5.7 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 crore

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore

(*iii*) Marginal imports ratio fixed to be 7.5 percent of GNP throughout the period.

(*iv*) Projected imports to ensure (iii) i.e., u′ unchanged at 7.5 percent.

(*v*) Calculate the export rate (compound) required to eliminate the M-X gap in 5 years.

(*vi*) Projections of GNP, X, and M, upto 1974-75.

	GNP	X	M	GAP
	6 percent compound annual rate of growth	19.2 percent compound annual rate of growth	5.7 percent compound annual rate of growth	M—X
Base Year 1969—70	3873	166.7	302.4	135.7
1970—71	4105	198.7	319.8	121.1
1971—72	4351	236.8	338.2	101.4
1972—73	4612	282.3	357.8	75.5
1973—74	4889	336.5	378.6	42.1
1974—75	5182	401.0	401.0	—

CASE—II

(A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 10$

$r = .06$

$u' = .075$

(C) *Solution Summary:*

(*i*) Required compound annual growth rate of exports. : .123 or 12.3 percent

(*ii*) e' (the marginal export ratio to GNP) in (*a*) base year: : .09

(*b*) terminal year : .15

(*iii*) e (exports as ratio of GNP) in the terminal year. : .077

(*iv*) u (imports as ratio of GNP) in the terminal year. : .077

(*v*) Projected annual compound rate of growth of imports. : .057 or : 5.7 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports Rs. 166.7 crore

(*ii*) Initial year (1969-70) value of imports. Rs. .3024 crore

(*iii*) Marginal import ratio fixed to be 7.5 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u′, unchanged at 7.5 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 10 years.

(*vi*) *Projections of GNP,* X, *and M upto* 1979-80

	GNP	X	M	Gap
	6 percent compound annual rate of growth	12.3 percent compound annual rate of growth	5.7 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4105	187.2	319.8	132.6
1971—72	4351	210.2	338.2	128.0
1972—73	4612	236.0	357.8	121.8
1973—74	4889	265.0	378.6	113.6
1974—75	5182	297.6	401.0	103.4
1975—76	5493	334.2	423.9	89.7
1976—77	5823	375.3	448.6	73.3
1977—78	6172	421.5	474.8	53.3
1978—79	6542	473.3	502.0	28.7
1979—80	6934	531.5	531.5	—

CASE—III: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume*:

$n = 5$

$r = .06$

$u' = .06$

Reduced by various methods

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports	:	.18 or 18.0 percent
(*ii*) e′ (the marginal export ratio to GNP) in (*a*) base year	:	.13
(*b*) terminal year	:	.20
(*iii*) u (imports as percent of GNP) in the terminal year	:	.074
(*iv*) e (exports as percent of GNP) in the terminal year.	:	.074
(*v*) Projected compound annual rate of growth of imports.	:	.047 or 4.7 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 crore.

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore.

(*iii*) Marginal import ratio fixed to be 6 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u′ unchanged at 6 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 5 years.

(*vi*) *Projections of GNP,* X, *and M upto* 1974-75

	GNP	X	M	Gap
	6 percent compound annual rate of growth	18 percent compound annual rate of growth	4.7 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4105	196.7	316.3	119.6
1971—72	4351	232.1	231.1	99.0
1972—73	4612	273.9	346.8	72.9
1973—74	4889	323.2	363.4	40.2
1974—75	5182	381.3	381.3	—

CASE—IV: (A) *Given in Base Year* (1969-70)

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume*:

$n = 10$

$r = .06$

$u' = .06$

Reduced by various methods.

(C) *Solution Summary:*

(*i*) Required compound annual growth rate of exports	:	.113 or 11.3 percent
(*ii*) e' (the marginal export ratio to GNP) in (*a*) base year	:	.08
(*b*) terminal year	:	.13
(*iii*) e (exports as ratio of GNP) in the terminal year	:	.070
(*iv*) u (imports as ratio of GNP) in the terminal year	:	.070
(*v*) Projected compound annual rate of growth of imports	:	4.8 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports	: Rs. 166.7 crore.
(*ii*) Initial year (1969-70) value of imports	: Rs. 302.4 crore.
(*iii*) Marginal import ratio fixed to be 6 percent of GNP throughout the year.	
(*iv*) Imports projected to ensure (iii) i.e., u' unchanged at 7.5 percent.	
(*v*) Calculate the export growth rate (compound) required to eliminate the M—X gap in 10 years.	

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports : Rs. 166.7 crore

(*ii*) Initial year (1969-70) value of imports : Rs. 302.4 crore

(*iii*) Marginal import ratio fixed to be 7.5 percent of GNP throughout the period

(*iv*) Imports projected to ensure (iii) i.e., u′ unchanged at 7.5 percent

(*v*) Calculate the export growth required to eliminate in the M-X gap in 5 years.

(*vi*) *Projections of GNP*, X, *M upto* 1974-75

	GNP	X	M	GAP
	7 percent compound annual rate of growth	20.25 percent compound annual rate of growth	6.8 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4144	200.5	322.7	122.2
1971—72	4434	241.1	344.5	103.4
1972—73	4744	289.9	367.7	77.8
1973—74	5076	348.6	392.6	44.0
1974—75	5431	419.2	419.2	—

CASE—VI: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 10$

$r = .07$

$u' = .075$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports	:	.1335 or 13.35 percent
(*ii*) $e^{/}$ (the marginal export ratio to GNP) in (*a*) base year	:	.08
(*b*) terminal year	:	.14
(*iii*) e (exports as percent of GNP) in the teminal year	:	.077
(*iv*) u (imports as percent of GNP) in the terminal year	:	.077
(*v*) Projected compound annual rate of growth of imports	:	.068 or 6.8 percent

(D) *Details of the Solution*

(*i*) Initial year (1969-70) value of exports : Rs. 166.7 crore

(*ii*) Initial year (1969-70) value of imports : Rs. 302.4 crore

(*iii*) Marginal import ratio fixed to be 7.5 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., $u^{'}$ unchanged at 7.5 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 10 years.

(*iv*) *Projections of GNP*, X, *and M upto* 1979-80

	GNP	X	M	GAP
	7.5 percent compound annual rate of growth	13.35 percent compound annual rate of growth	6.8 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4144	188.9	322.7	133.8
1971—72	4434	214.1	344.5	130.4
1973—74	5076	275.0	392.6	117.6
1974—75	5431	311.7	419.2	107.5
1975—76	5811	353.3	447.7	94.4
1976—77	6218	400.4	478.3	77.9
1977—78	6653	453.9	510.9	57.0
1978—79	7119	514.5	545.8	31.3
1979—80	7617	583.2	583.2	—

(*vi*) *Projections of GNP, X, and M: upto* 1974-75

	GNP	X	M	GAP
	7 percent compound annual rate of growth	19.2 percent compound annual rate of growth	5.8 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4144	198.7	318.7	120.0
1971—72	4434	236.8	337.3	100.5
1972—73	4744	282.3	337.3	74.0
1973—74	5076	336.5	378.0	41.5
1974—75	5431	401.1	401.1	—

CASE—VIII: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 5$

$r = .105$

$u' = .075$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports : .241 or 24.1 percent.

(*ii*) e' (marginal export ratio to GNP) in (*a*) base year : .099

(*b*) terminal year : .16

(*iii*) e (exports as ratio of GNP) in the terminal year. : .077

(*iv*) u (imports as ratio of GNP) in the terminal year. : .077

(*v*) Projected compound annual rate of growth of imports. : .102 or 10.2 percent.

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 crore

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore

(*iii*) Marginal import ratio fixed to be 5 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u′ unchanged at .075 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 5 years.

(*vi*) *Projections of GNP*, X *and M upto* 1974-75

	GNP	X	M	GAP
	10.5 percent compound annual rate of growth	24.1 percent compound annual rate of growth	10.2 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4280	206.9	332.9	126.0
1971—72	4729	256.8	366.5	109.7
1972—73	5225	318.7	403.8	85.1
1973—74	5774	395.5	445.0	49.5
1974—75	6380	490.5	490.5	—

CASE—IX: (A) *Given in Base Year* 1969-70

$e = .043$
$u = .078$
$u' = .75$

(B) *Assume*:

$n = 10$
$r = .105$
$u' = .075$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth. : .170 or 17.0 per cent

(*ii*) e' (marginal export ratio to GNP) in (*a*) base year. : .069
(*b*) terminal year : .116

(*iii*) e (exports as ratio of GNP) in the terminal year : .076

(*iv*) u (imports as ratio of GNP) in the terminal year : .076

(*v*) Projected compound annual rate of growth of imports. : 10.3 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 crores

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore

(*iii*) Marginal import ratio fixed to be 7.5 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u' unchanged at 7.5 percent.

(*v*) Calculate the export growth required to eliminate the M-X gap in 10 years.

(*vi*) *Projections of GNP,* X, *and M upto* 1979-80

	GNP	X	M	GAP
	10.5 percent compound annual rate of growth	17 percent compound annual rate of growth	10.3 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.5
1970—71	4280	195.0	332.9	137.9
1971—72	4729	228.0	366.6	138.6
1972—73	5225	266.7	403.8	137.1
1973—74	5774	311.9	445.0	133.1
1974—75	6380	364.9	490.4	125.5
1975—76	7050	426.8	540.6	113.8
1976—77	7750	499.2	596.1	96.9
1977—78	8608	584.0	657.4	73.4
1978—79	9512	684.2	725.2	41.0
1979—80	10511	800.0	800.0	—

CASE—X: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 5$

$r = .105$

$u' = .06$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports.	:	.221 or 22.1 percent
(*ii*) e' (marginal export ratio to GNP) in (*a*) base year	:	.09
(*b*) terminal year	:	.13
(*iii*) e (exports as percent of GNP) in the terminal year.	:	.071
(*iv*) u (imports as percent of GNP) in the terminal year	:	.071
(*v*) Projected compound annual rate of growth of imports.	:	.084 or 8.4 percent

(D) *Details of the Solution*:

(*i*) Initial year (1969-70) value of export.	:	Rs. 166.7 crores
(*ii*) Initial year (1969-70) value of imports.	:	Rs. 302.4 crores

(*iii*) Marginal import ratio fixed to be 6 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u' unchanged at 6 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 5 years.

(*vi*) *Projections of GNP,* X, *and M upto* 1974-75

	GNP	X	M	GAP
	10.5 percent compound annual rate of growth	22.1 percent compound annual rate of growth	8.4 percent compound annual rate of growth	M-X′
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4280	203.5	326.8	123.3
1971—72	4729	248.5	353.7	105.2
1972—73	5225	303.4	383.5	80.1
1973—74	5774	370.4	416.4	46.0
1974—75	6380	452.5	452.5	—

CASE—XI: (A) *Given in Base Year* 1969-70

$e = .043$
$u = .078$
$u' = .075$

(B) *Assume:*

$n = 10$
$r = .105$
$u' = .06$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports : .159 or 15. 9 percent

(*ii*) e′ (marginal export ratio to GNP) in (*a*) base year : .066

(*b*) terminal year : .094

(*iii*) e (exports as ratio of GNP) in the terminal year. : .067

(*iv*) u (imports as ratio of GNP) in the terminal year. : .067

(*v*) Projected compound annual rate of growth of imports. : .087 or 8.7 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 crore

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore

(*iii*) Marginal import ratio fixed to be 6 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii)—i.e., u′ unchanged at 6 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 10 years.

(*vi*) *Projections of GNP, X, and M upto* 1979-80

	GNP	X	M	GAP
	10.5 percent compound annual rate of growth	15.9 percent compound annual rate of growth	8.7 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4280	192.4	326.8	134.4
1971—72	4729	222.1	353.8	131.8
1972—73	5225	256.4	383.6	127.2
1973—74	5774	296.0	416.5	120.5
1974—75	6380	341.7	452.9	111.2
1975—76	7050	390.5	493.1	98.6
1976—77	7790	455.4	537.5	82.1
1977—78	8608	525.7	586.6	60.9
1978—79	9512	606.9	640.8	33.9
1979—80	10511	700.7	700.7	—

CASE—XII: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 5$

$r = .12$

$u' = .075$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports.	:	.257 or 25.7 percent
(*ii*) e' (marginal export ratio to GNP) in (*a*) base year	:	.092
(*b*) terminal year	:	.15
(*iii*) e (exports as ratio of GNP) in the the terminal year.	:	.077
(*iv*) u (imports as ratio of GNP) in the terminal year.	:	.077
(*v*) Projected compound annual rate of growth of imports.	:	.047 or 4.7 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports.	:	Rs. 166.7 crore
(*ii*) Initial year (1969-70) value of imports.	:	Rs. 302.4 crore
(*iii*) Marginal import ratio fixed to be 7.5 percent of GNP throughout the period.		
(*iv*) Imports projected to ensure (iii) i.e., u' unchanged at 7.5 percent.		
(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 5 years.		

(*vi*) *Projections of GNP,* X, *and M upto* 1974-75

	GNP	X	M	GAP
	12 percent compound annual rate of growth	25.1 percent compound annual rate of growth	11.6 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4338	209.5	337.3	127.8
1971—72	4859	263.3	376.4	113.1
1972—73	5442	331.0	420.1	89.1
1973—74	6095	416.1	469.1	53.0
1974—75	6826	523.5	523.5	—

CASE—XIII: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 10$

$r = .12$

$u' = .075$

(C) *Solution Summary:*

(*i*) Required compound annual rate of growth of exports. : .185 or 18.5 percent

(*ii*) e' (marginal export ratio to GNP) in (*a*) base year : .066

(*b*) terminal year : .111

(*iii*) e (exports as ratio to GNP) in the terminal year. : .076

(*iv*) u (imports as ratio to GNP) in the terminal year. : .076

(*v*) Projected compound annual rate of growth of imports. : .116 or 11.6 percent

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 cror

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore

(*iii*) Marginal import ratio fixed to be 5 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u' unchanged at 7.5 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 10 years.

(*vi*) *Projections of GNP, X, and M upto* 1979-80

	GNP	X	M	GAP
	12 percent compound annual rate of growth	18.5 percent compound annual rate of growth	11.6 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4338	197.6	337.3	139.7
1971—72	4859	234.2	376.4	142.2
1972—73	5442	277.6	420.1	142.5
1973—74	6095	329.1	469.1	140.0
1974—75	6826	390.1	523.9	133.8
1975—76	7645	462.5	585.3	122.8
1976—77	8562	548.3	654.1	105.8
1977—78	9589	650.0	731.1	81.1
1978—79	10740	770.6	817.4	46.8
1979—80	12029	914.0	914.0	—

CASE—XIV: (A) *Given in Base Year* 1969-70

$e = .043$

$u = .078$

$u' = .075$

(B) *Assume:*

$n = 5$

$r = .12$

$u' = .06$

(C) *Solution Summary:*

(*i*) Required compound annual growth rate of exports. : .235 or 23.5 percent

(*ii*) e' (marginal export ratio to GNP) in (*a*) base year. : .09

(*b*) terminal year. .12

(*iii*) e (exports as ratio of GNP) in the terminal year. : .070

(*iv*) u (imports as ratio of GNP) in the terminal year. : .070

(*v*) Projected annual compound rate of growth of imports. : .057 or 5.7 percent.

(D) *Details of the Solution:*

(*i*) Initial year (1969-70) value of exports. : Rs. 166.7 crore.

(*ii*) Initial year (1969-70) value of imports. : Rs. 302.4 crore.

(*iii*) Marginal import ratio fixed to be 6 percent of GNP throughout the period.

(*iv*) Imports projected to ensure (iii) i.e., u′ unchanged at 6 percent.

(*v*) Calculate the export growth rate (compound) required to eliminate the M-X gap in 5 years.

(*vi*) *Projections of GNP,* X, *and M upto* 1974-75.

	GNP	X	M	GAP
	12 percent compound annual rate of growth	23.5 percent compound annual rate of growth	9.6 percent compound annual rate of growth	M-X
Base Year: 1969—70	3873	166.7	302.4	135.7
1970—71	4338	206.0	330.3	124.3
1971—72	4859	254.4	361.6	107.2
1972—73	5442	314.2	396.6	82.4
1973—74	6094	388.0	435.8	47.8
1974—75	6826	479.5	479.5	—