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Constraints on Growth & Policy Options

A Reply to T.M. Srinivasan's Comment

By

A. Vaidyanathan

Centre for Development Studies

Ulloor, Trivandrum 595011

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CONSTRAINTS ON GROWTH AND POLICY OPTIONS :

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Srinivasan's comment (EPW, November 26, 1977) challenges pretty much everything I had to say on the performance and prospects of the Indian economy in my two recent articles published in this weekly (Special number of August 1977 and the issue dated 17 September 1977). Although ostensibly a comment on my articles, he has also used the occasion to launch a more general attack on opinions (especially on the role of outward oriented growth strategy) which happen to differ from his. The following response is, however, limited to criticisms which directly relate to the arguments and judgements contained in my articles. These criticisms can be grouped broadly into **four** categories: (1) those relating to the explanations for the stagnation of the economy during the last decade; (2) those questioning the basis for my assessment that it is highly improbable that the rate of agricultural growth can be stepped up to anything like the targetted levels; (3) the potentials for export-led industrialisation and their implications; and (4) the role of anti-poverty programmes. I shall deal with them in the same order.

Recent Economic Stagnation

Srinivasan unquestioningly accepts the proposition that the economy has been stagnating since 1966, but strongly disputes my contentions that (a) there has been a deceleration in food output growth during the last decade; and (b) this is a major factor in explaining the overall stagnation of the economy in this period.

The validity of using growth rates computed on the basis of 3 or 5 year averages for establishing the stability or otherwise of the behaviour of output trends was debated in the mid-sixties apparently without clinching the issue.<sup>1/</sup> It is of course better to use the observed output levels for all the years covered by the period under study and apply rigorous statistical tests to determine whether the underlying trend is steady, accelerating or decelerating. Accordingly we have tested the goodness of fit of two types of functions (namely  $\log Y = a + bt$  and  $\log Y = a + bt + ct^2$ ) to the indices of aggregate real output, crop output and foodgrain output for the period 1949-1975 as a whole, as well as for 1949-1964 and 1967-1975 separately.<sup>2/</sup> The results of the exercises are summarised in the Table below.

Trends in aggregate GNP, foodgrains production and total  
Crop output India 1949 - 1975

<u>Variable (Y)</u>	<u>Period (t)</u>	<u>Estimated equation</u>	<u>R<sup>2</sup></u>
Gross National Product	1949-1975	Log Y = 4.5425 + .034275t* (.002565)	.99
		Log Y = 4.523024 + .038214t* - .000135t <sup>2</sup> (.002565) (.000085)	.99
	1949-1964	Log Y = 4.525106 + .036464t* (.001182)	.98
		Log Y = 4.567309 + .023137t* + .000740t <sup>2</sup> * (.00369) (.000199)	.99
	1967-1975	Log Y = 4.660399 + .029182t* (.0031)	.93
		Log Y = 3.687725 + .01187t - .001708t <sup>2</sup> (.052606) (.001305)	.94
Foodgrains:	1949-1975	Log Y = 4.255399 + .026025t* (.001533)	.93
		Log Y = 4.212033 + .35121t* - .000322t <sup>2</sup> (.006406) (.000221)	.93
	1949-1964	Log Y = 4.229431 + .029528t* (.003316)	.85
		Log Y = 4.199951 + .39354t* - .000578t <sup>2</sup> (.014410) (.000824)	.86
	1967-1975	Log Y = 4.366734 + .020890t* (.008198)	.48
		Log Y = 4.839208 - .20719 + .000905t <sup>2</sup> (.179190) (.003891)	.86
All Crops	1949-1975	Log Y = 4.249914 + .026393t* (.001236)	.95
		Log Y = 4.199386 + .036992t* - .000376t <sup>2</sup> * (.004888) (.000168)	.96
	1949-1964	Log Y = 4.212589 + .031582t* (.002341)	.93
		Log Y = 4.200313 + .035674t* + .000241t <sup>2</sup> * (.010297) (.000589)	.93
	1967-1975	Log Y = 4.311225 + .023203t* (.006654)	.63
		Log Y = 4.879010 - .026799t + .001087t <sup>2</sup> (.144662) (.003141)	.64

In the case of foodgrain output, the hypothesis of decelerating growth is not corroborated by the data. Taking the period 1949-1975 on a whole, the constant growth rate function fits the data much better than the quadratic form. When we consider the period 1949-1964 and 1967-1975 separately, the constant growth rate hypotheses fits the data better in both periods. However, while the growth rate in the latter period is lower than in pre-green revolution era, the differences in growth rates are not statistically significant. The picture is substantially the same for all-crops, with the difference that though the differences in growth trends between the two periods are not statistically significant, the hypothesis of deceleration is supported by the results of regression for the period 1949-1975 taken as a whole: It will be seen that with the function  $\text{Log } Y = a + bt + ct^2$  (a) the  $R^2$  is slightly higher; (b) the value of coefficient 'C' is negative; and (c) all estimated coefficients are statistically significant at the 5% level.

In the case of total GNP, we find that while the hypothesis of deceleration cannot be sustained by the results of regression for the period 1949-1975 as a whole, tests of homogeneity of coefficients for the two sub-periods show that the differences between the slope co-efficients are statistically significant at the 5% level. Since the estimated growth rate for 1967-1975 is lower, the latter findings would seem to support the hypothesis of deceleration, the more so because the earlier period seems to have experienced an acceleration of growth. I don't know if Srinivasan's assertion about stagnation since 1966 (deceleration is obviously a more accurate description of the phenomenon) was based on any such analysis. Be that

as it may, if despite the ambivalent results of the statistical-tests, <sup>2/</sup> he can maintain that aggregate growth in the post-1966 period has declined from the trends of the first three plans, I suggest that there is at least equal justification for the proposition that growth of total crop output (though not of foodgrain) has decelerated. And, since population growth has been steadily rising over the period, all this points to a significant decline in growth of per capita food and crop output.<sup>4/</sup> Srinivasan has to come up with some convincing arguments before dismissing the suggestion that the slower growth of agricultural production during the so-called "green revolution" period, and the near stagnation of per capita foodgrain supplies since 1966, were a significant influence on the performance of the rest of the economy.

While asserting that "there could be no escape from the stagnation which has characterised the economy since 1966 without a change of economic policy", Srinivasan's policy prescriptions are curiously ambivalent: As mentioned earlier, he dismisses the behaviour of agricultural production as a factor of any major consequence in explaining recent trends in the economy. Later on he says that "by the middle sixties..... a bold thrust towards liberalisation and export orientation would have paid rich dividends (emphasis mine) given the industrial base which had been built... by them, but the process of liberalisation initiated in 1966 was not carried far enough."<sup>5/</sup> These statements, however, do not seem to quite square with his disclaimer earlier in the article<sup>6/</sup> where he says that for an economy of sub-continental dimensions "faster

export growth by itself (cannot) put the economy on a faster growth path." and goes on to accuse those who are skeptical that "a more open and less inward looking strategy" will make a dramatic difference as being "naive" or being guilty of "mischievous misrepresentation". The debate, at any rate in my view, is precisely on how significant a difference will be made to overall economic performance by this (or any other alternative) strategy and whether it can be at all considered meaningfully in isolation from other dimensions of policy.

#### Prospects for further Agricultural Growth

Irrespective of whether or not the growth of foodgrain and agricultural outputs has decelerated in the past decade, the fact remains that the growth is very slow, and far below what has been targeted. By the procedure Srinivasan himself prefers, the trend growth rates in foodgrain production (as well as total crop output) over the last 27 years has been barely 2.5 per cent a year. And it would call for a significant improvement over this performance to sustain the 3.2 per cent annual growth which form the basis of my assessment of the prospects for overall growth and which Srinivasan considers to be unduly pessimistic. He dismisses my calculations of feasible growth of foodgrain production too aggregative and as lacking in "any underlying explanatory mechanism or theory" to be taken seriously. And he cites his joint study with Parikh<sup>7/</sup> as establishing that "a sound technical basis for faster agricultural growth exists at present".

That the projections of production potentials in my paper are based on a simplified view of the determinants of crop production, that they do not take into account all the inputs which contribute to output, and that calculations based on national averages of yield responses to inputs in a country of India's size and diversity ought to be treated with caution - these are all limitations explicitly recognised in my article. <sup>8/</sup> Let me, however, also point out that these limitations are in no way unique to my exercise. The view of crop production as a function of the extent of total and irrigated areas, their allocation between crops, the amount of fertilisers used and the yield responses to irrigation and fertiliser, is basically the same as the concept underlying the Parikh and Srinivasan study. The latter, like mine, also assume additivity of responses to different inputs. Incomplete coverage of crops and inputs and failure to allow for differences in quality of irrigation are common defects of both exercises.

The PS study is significant not because it demonstrates the feasibility of large increases in agricultural production <sup>9/</sup>, but because it is far and away the most comprehensive and systematic effort to estimate fertiliser response functions for different crop varieties and regions and to work out, under specified constraints of total crop and irrigated areas in different regions of the country, the minimum requirements of fertiliser needed to sustain the Plan targets of crop production for a given future date. In the latter respect, it is a truly pioneering effort.



What is of interest for the present argument is its finding that, given (a) the limits of expansion of total crop and irrigated areas within the specified period of time (namely the fifth plan), (b) their respective regional distribution, and (c) the region-wise yield responses of different crops and varieties to the three principal sources of plant nutrients (namely N,  $P_2O_5$ , and  $K_2O$ ), it is possible to realise the planned agricultural targets for 1978-79 with a substantially smaller volume of fertilisers than assumed by the planners. This would mean that under conditions of optimal allocation as shown by the exercise, the incremental responses of crop yields per unit nutrient, and hence the rate of return to fertilisers, is more than implied in the plan calculations.

Moreover, if the response curves estimated by Parikh-Srinivasan held under conditions of mass application and we take the implied average yield response per unit of nutrient corresponding to their optimum solution, the increase in output corresponding to the increase in fertiliser and other inputs which actually occurred in the past decade should have been much higher than my estimates. This only serves to reinforce the point that fertiliser response coefficients assumed in my calculations of production potential err on the conservative side.<sup>10/</sup> As a basis for forecasting, the PS model, for all its sophistication, is not demonstrably superior to my cruder attempt. It raises more questions than it answers.<sup>11/</sup>

That the potential output growth which should have been expected on the basis of observed increases in various inputs seems to be much higher than increases in actual output in the last decade strikes me as a significant finding deserving explanation. I suggested that this divergence, as well as the fact that fertiliser use has not been growing anywhere near as fast as expected, could be explained by (or at is at least consistent with) the hypothesis that the responses actually experienced by farmers under conditions of mass application are not nearly as large as suggested by the fertiliser trials. Since these trials are quite widespread and scientifically designed, it is legitimate to assume that the data are not vitiated by any conscious biases. Therefore, the apparent discrepancy between potential and actual responses have to be explained in terms of other factors which, both Parikh-Srinivasan and I suggest, include the coverage and quantity of extension services, the effectiveness of organisations for supply of inputs, quality of irrigation, quality of management, and the like.

But such a list is no more than a restatement of generalities which have become commonplace wisdom in the subject and simply will not do as a guide for action. We need to know far more about the relative importance of these different factors, as well as the nature of corrective measures needed, than we seem to at present, before concrete changes in these aspects of agricultural programmes can be suggested. However, even when we know what sort of changes are needed, it is essential to recognise institutional constraints.



For instance the quality of irrigation, which everyone concedes to be crucial, is far more difficult and time consuming than Srinivasan allows. I recall that Minhas, during his tenure in the Planning Commission, headed a Task Force <sup>12/</sup> which made a persuasive case for an integrated programme of consolidation, levelling and shaping of land in command areas of irrigation projects as essential preconditions for efficient use of water. On the recommendation of this Task Force, a few pilot schemes for such an integrated effort in some irrigation project areas were also included in the Fifth Plan. But, to my knowledge, none of these projects has got off the ground, let alone making any significant progress in actual implementation. These problems cannot be lightly dismissed, and given our present state of ignorance, I am afraid it is a bit too facile to assert, as Srinivasan does, that "there is no reason why these (policy changes) cannot be implemented".

#### The Prospect of Export-led Growth

The other major thrust of Srinivasan's critique relates to my judgements on the potential role of an export-oriented development strategy. He argues that I, along with many others, are guilty of seriously under-estimating the scope for increasing India's manufactured exports: after all India at one time used to be a leading exporter of manufacturers, and at present much smaller countries like Korea and Taiwan export so much more than India with a bigger and more diversified industrial base does. Though disclaiming any intention to suggest that a more export-based strategy will by itself generate faster overall rate of growth in India, he severely chastises those who are skeptical of the relevance of the Korean and Taiwanese experience to India.

The skeptics of the Korean and Taiwanese 'miracles' (or rather their relevance to India) are reacting to the fervour - of which the Balassa piece which Srinivasan so enthusiastically commends is a good example - with which many international experts argue that all developing countries should emulate the Korean and Taiwanese examples and stand to gain dramatically by doing so. Skeptics are also reacting to the suggestion that all it takes to reproduce the Korean or the Taiwanese miracles is "right pricing policies". They suspect that the explanation for the extraordinary performance of these countries is rather more complex and that a proper, balanced, explanation of the Korea-Taiwan type of experience will have to take into account (a) the major role played by specialised export houses of Japan, as well as of the major distributive concerns of US and Europe in providing the know-how and market outlets, at least in the early stages of their export boom; (b) the role of the "special" political relations, again at least in the early stages, between these countries and their major trading partners; and (c) the nature of social and political arrangements which, one way or other, succeeded in achieving the necessary internal cohesion. By the same token it is also necessary to explain why other countries which followed the liberalisation/export-promotion policies (e.g. Pakistan) did not do so well.

Srinivasan dismisses the political aspects of the problem in an altogether too cavalier fashion. That neither he nor I are experts in foreign policy or politics does not make these aspects unimportant

or irrelevant to the argument. It does not take much expertise in foreign policy to sense that international trade is very much a dimension of international politics. Nations prefer particular external political alignments which serve their interests, of which the economic welfare of the population as a whole is only one element. But it would be the height of a naivette to suggest that foreign trade policies and strategy are decided purely on economic grounds (If it were so, how does one explain the reluctance of the advanced countries to permit liberal imports of labour-intensive manufactures from developing countries?) It is of course possible that Srinivasan considers the internal and external political consequences of a major change of development strategy in favour of exports will be justified by the economic gains. But he cannot brush aside those who want to know more about ramifications of such a shift in development strategy and those who have a different appreciation of the balance of gains and losses from such a shift. These are all perfectly legitimate concerns and to condemn those who voice such concerns as being naive, mis-informed or mischevious does not do credit to Srinivasan.

As for the specific case of India, I happen to agree with many of Srinivasan's propositions stated in general terms. For instance, I would agree that the manner in which the systems of controls and licensing has been actually operated, as well as the assymotry in the profitability of exports and import substitutes, have resulted in wasteful use of resources, distroted income.

distribution, and contributed significantly to the erosion of the integrity of our political and administrative process. A considerably faster expansion of labour-intensive exports could also, in principle, benefit the country by raising the overall rate of growth of incomes and employment, and lowering capital output ratios. While one may agree with such statements about the nature and directions of the effects flowing from the policy package advocated by Srinivasan, there are serious disagreements on the magnitude of the potential gains. In my September 17 paper,<sup>13/</sup> I have given some, admittedly simplified, calculations to show the order of expansion of exports as a whole, and of manufactured exports in particular, which would be needed if the targetted growth rates of 5-5.5 percent per annum in GDP were to be sustained in the face of a 3.2 percent annual agricultural growth without sacrificing price stability. Is this order of expansion in manufactured exports feasible? If so under what conditions? What is the order of correction in the exchange rate-tariff-subsidy structure needed? Is such correction alone sufficient or do we need to back it up with conscious planning of investment? And so on.

Srinivasan, however, studiously avoids committing himself on these specifics and also on the question of how much of an improvement over past performance is likely to be if his policies were followed. Does he think that we can achieve the 7 per cent annual growth rate (with agriculture growing at 4 1/2%) which the "wild optimists" of the FID (to which I was privileged to belong at that time) advocated so enthusiastically in the mid-sixties, and which

seem to have again become the magic numbers of the Janata Party's economic programme? If there were a set of programmes which will bring this to reality, one would like Srinivasan to spell it out. I certainly would be happy to be proven wrong. But if all the changes we are debating about adds, say,  $\frac{1}{2}$  to 1 percentage point to the overall growth rate, it makes but little difference to the speed with which we can solve our central problem, namely removal of abject poverty.

There is room for honest differences about the desirability of export led industrialisation per se, and more importantly on the limits within which it can help achieve a significantly higher growth rate than in the past. Srinivasan and others of his persuasion, would be fairer to their critics, and more persuasive, if they went beyond repeating the "mantrams" of decontrol, "right exchange rates" and liberalisation to provide us a detailed and dispassionate examination of the magnitude of the difference which a major shift to export-led growth strategy could make for overall growth and the implications of such a shift for the pattern of production, foreign trade strategy, internal organisation of production, attitudes to multi-nationals, and other related issues.

#### Anti-Poverty Programmes

It is in the context the difficulty of stepping up the overall growth that I stressed the necessity for greater emphasis in redistributive measures as a means of alleviating the conditions of the poor, assuming of course that everyone is serious about it.

That this requires a far tougher and more purposive fiscal policy aimed at transferring incomes from the richer regions and classes to the poorer segments is no more than stressing the obvious. The only additional suggestion I made was that a substantial part of public sector plan funds should be earmarked for development of areas where the poor are concentrated. While I would certainly prefer these anti-poverty programmes to be oriented to productive activities (in which I would include education, health and water supply), I would be willing to accept the eventuality that some of the expenditure deteriorates into doles. How effectively these programmes can be made to work in terms of ensuring productive use of funds and also ensuring that the benefits really reach the poor depends ultimately on the quality of local institutions, which raises questions beyond the economists' competence but which are nonetheless central to the problem!

Srinivasan says that the "anti-poverty" programme will itself in due course generate faster agricultural growth and hence in overall output as well. While this possibility cannot be ruled out, I am more concerned in the present context with what can, and ought to, be done in the next 5-10 years. And here, I still maintain that the constraints on agricultural growth in the medium term are so severe that to plan the scale and pattern of investment ignoring them will only mean compounding the imbalances which have characterised the economy for some time now. Srinivasan says that the existence



of a \$7-8 billion reserve by way of food and foreign exchange makes bold new departures possible.<sup>14/</sup> The departures he has in mind call for full decontrol, liberalisation, exchange rate corrections, and bolder public investment programmes. If public investment is to be increased, how should the increase be allocated as between agriculture heavy industry, light industry, social services and plain public agriculture, heavy industry, light industry, social services and plain public works? Unless there is clarity in these questions, which I suggest cannot be obtained except in relation to a well-defined judgement regarding agricultural and export prospects, "bold initiatives" will indeed be taken only to find, in the not-to distant future, that the reserves (which are not excessive in relation to the volume of our foreign trade) have been squandered to no purpose

As for Srinivasan's argument that the course of action outlined in my paper is not politically any more feasible than his package, I would readily grant that the political difficulties of any major shift of policy are indeed great. But we are not discussing how to bring about political changes, but seeking to clarify the nature of the constraints and options available in the weak, hope that debate can be made to focus on the relevant and important issues.

N O T E S

I am grateful to T.N.Krishnan and I.S.Gulati for comments on an earlier draft; to Krishnan for expert advice in the statistical analysis of time series data and the application of various tests of significance; and to Purushothaman Nair for computational assistance. Responsibility for any errors are mine.

1. The joint article by Minhas and Srinivasan published in the Statesman, Nov.14, 1966 (referred to by Srinivasan) was in response to an earlier article (also published in the Statesman) by Ashok Mitra. In a subsequent piece Ashok Mitra raised some further questions about the validity of the procedure suggested by Minhas-Srinivasan.
2. The basic data used in these regressions are official estimates of GNP at constant prices, and official indices of foodgrain and of crop output.

In all regressions, we have dropped 1965-66 and 1966-67 as being exceptionally bad years. This facilitates a more meaningful comparison of the "pre-green revolution" and "green revolution" periods. For, although the "green revolution" nominally started in 1965 (when the HYVs were introduced on a significant scale), the actual output in 1965 and 1966 were so low, due to adverse weather, that their inclusion as part of the "green revolution period" would seriously vitiate any analysis of output trends in this period. The homogeneity of the estimated intercepts, slopes and overall regressions for the two sub-periods have been tested in all cases using the Chow test. This test shows that (a) for all these variables under study, the differences in intercepts are statistically highly significant; and (b) the differences in slopes are not statistically significant in the case of foodgrains and crop output but they are significant at the 5 per cent level in the case of GNP.

3. The mere fact that from a purely statistical viewpoint the trends in two different periods are more or less the same is by itself insufficient basis to judge relative performance. If the objective conditions (by way of new technological developments, policy shifts, etc) in the two periods under comparison differ to such a degree as should have resulted in significant differences in performance, this fact needs also to be taken into account. Srinivasan himself implicitly recognises this when he introduces the distinction between the "pre-green revolution" and the "green revolution" periods.

4. Regressions of per capita food grain consumption with time suggest that the former was increasing, though at a modest rate, from 1951 through 1964. By contrast there was hardly any trend between 1967 and 1976. The estimated regression for 1951 and 1964 is

$$\text{Log } Y = 6.000975 + .010412t^* \quad (R^2 = .46) \\ (.003077)$$

The regression for 1967-76 is

$$\text{Log } Y = 6.087551 + .001344t \quad R^2 = (.006) \\ (.006014)$$

5. EPW, November 26, 1977, p.1989.
6. Ibid, p.1987
7. K.S.Parikh, T.N.Srinivasan, et al. Optimum requirements of Fertilisers for the Fifth Plan Period, Mimeo (ISI, New Delhi 1974).
8. EPW, Special Number, August 1977, pp.1357-1358.
9. Such "demonstration" has been made among others by NCAER (1962) the Perspective Planning Division (1964, 1970) and most recently by the National Commission on Agriculture (1974). The question is not whether the technical potential exists but how rapidly it can be exploited.
10. I have made a rough computation of the average yield response of the five major cereals per unit of plant nutrient implied in two of the variants considered by Parikh and Srinivasan: (a) what they call the Reference case (Table 1. p.14) of the mimeographed version of the report); and (b) case corresponding to Table 4 which gives the lowest the fertiliser requirements to reach targetted output.

The total output of the 5 cereals in 1970-71 was 89.6 million tonnes and the output in 1978-79 as estimated by the model is about 123 million tonnes. (In deriving the latter figure I have assumed a conversion factor of  $66 \frac{2}{3}\%$  between paddy and rice). The PS projections imply an addition of 6 million hectares to total area under these crops which, at the average yield level of early 1970's may contribute some 5 million tonnes additional output. PS's optimal solution seems to imply no additions to irrigated area under the cereal crops over the 1970 level. (In both cases the total irrigated area under these 5 cereals in 1978-79 is actually slightly less than in 1970-71). Their projections also do not show any significant shift in the relative proportion of area allocated to these 5



cereals (assuming that the proportion of total nutrients applied to these crops in 1970-71 is the same as implied in the PS estimates for 1978-79) ranges between 2.5 million tonnes in the reference case to 1.2 million tonnes in case 4. This gives an average incremental response of 12 to 23 tonnes of cereal per tonne of nutrient. If we were to err on the conservative side and assume that the proportion of irrigated area devoted to these 5 cereals will remain constant, about 5 million tonnes of additional output could be attributed to water (10 m. ha x 0.5t/ha) reducing the contribution of fertiliser response coefficient to 9 to 12 tonnes per tonne of nutrient. The weighted average response assumed in my calculations which, unlike the PS study, excludes  $K_2O$ , is 9 tonnes of grain per unit of nutrient. If  $K_2O$  were included, the potential additions to foodgrain output between 1960-61 and 1973-74 would be 30 million tonnes against 28 million tonnes shown in Table 1 of my paper on crop production.

11. The study for instance shows that estimates of minimum nutrient requirements is highly sensitive to whether or not scale factors are used to adjust base yield. The significance of this is hardly discussed in the Report. Nor is there any discussion of the high degree of variability in nutrient mix under different assumptions. It is mentioned that the scale factors were used to adjust base yields in such a way that fertiliser use in the base year as estimated by the model roughly corresponds to the actual. The NCAER has estimates of actual crop-wise allocation of fertilisers in 1970-71. It would be interesting to know how well the PS model predictions fit the actuals.
12. Planning Commission, Interim Report on Integrated Agricultural Development Projects in Canal Irrigated Areas (1972)
14. I don't quite understand the import of Srinivasan's criticism of my arguments regarding the size of the reserves (see his foot note 4). If we make a distinction between operational and buffer stocks, the former must necessarily be a fraction of total reserves which only strengthens my point that the existing reserves are by no means extravagantly large.

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