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Health for All by the Year 2000: Can Pakistan Meet the Target?

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I

Since the late 1970s, the "Primary Health Care" (PHC) approach in order to deliver "Health for All by the Year 2000" (HFA/2000), has been in vogue in all the underdeveloped countries (UDCs) of the world. Nearly all the developed and underdeveloped countries endorsed the proposals set out by the World Health Organization (WHO) at its Conference in Alma Ata in 1978 (WHO 1978). The signing of the Alma Ata Charter supposedly signalled the beginning of a new era which would deal with the problems of health and disease of the great majority of the individuals of planet Earth.

Pakistan was also one of the signatories of the Alma Ata Charter and has since the signing, been in the forefront of the movement. Pakistan has become a spokesman for the PHC and HFA/2000 approaches at nearly all international seminars and conferences, and those who rule and can implement policies within the country, have continued giving both the policies active oral support. The Primary Health Care approach is, at least on paper, a fairly radical approach which sets out to deal with much more than the simple problems of the health of the poor of the world. It encompasses a very wide canvas, and issues, which apparently are not related directly to health care, also fall under its terms of reference. It is the purpose of this paper to see whether Pakistan can reach the goals of Health for All by the Year 2000, using the Primary Health Care approach, a goal to which it has committed itself totally.

II

Much has been written on what the PHC and HFA/2000 approaches involve and how a country should go about putting theory into practice. The basic components of the PHC programme have been succinctly summarised by Walt and Vaughan (1981), who argue that the PHC Scheme should have as prerequisites (i) equally accessible health facilities; (ii) active participation by the community; (iii) preventive rather than curative emphasis; (iv) appropriate technology; and (v)

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nutrition, water and education to be included in the whole approach. Using these requirements, we need to see how Pakistan has faired in achieving the aim of Health for All by the Year 2000.

The PHC approach requires health facilities to be equally accessible to all. A cursory look at the distribution of health facilities in Pakistan, gives a picture which is totally opposite to that required for implementing a PHC programme. At present, in Pakistan, we have 70 percent of the country's population living in rural areas where the distribution of health facilities paints a very grim picture : for the rural population, there are only 23 percent hospitals, 34 percent Mother and Child Health Centres, 18 percent beds, 15 percent of doctors, and 5 percent of nurses (Zaidi 1985). Thus, at the outset, we have health care system which is inaccessible to the vast majority of the rural inhabitants in Pakistan. Furthermore, inaccessibility in a free market system is also determined by one's purchasing power. For that population for whom health facilities are geographically available, the price tag on purchasing health care may make it inaccessible. Although Government hospital which deliver free medical care exist in large cities, the increase in population growth and the demand for services has outstripped the supply. Thus, private medical facilities fill the gap, but they are certainly not equally accessible to all. As Banerji, writing about India says, there are two almost parallel systems functioning, "one for the 'classes' and the other for the poor masses" Banerji (1984, p. 810).

Active participation by the community in determining and fulfilling their needs is surely a very positive and important ingredient to make the PHC programme successful. Unfortunately, in a country where the democratic tradition and process is severely controlled, active participation also loses its efficiency. Furthermore, when there is a dominant group in a certain area, the participation may be active only from their side when they can influence the outcome of the discussions. In traditional feudal societies such as ours, it is the landlord in the rural areas who determines where and what type of facilities will be situated. His choice, despite what the other participants say, will be the determining factor. William and Sato (1980) had exactly this sort of experience in the case of a pilot project in primary health care in Indonesia, where the landlord did not agree to the principle of equal participation when the decisions went against his interests. Women play the most important role in administering health care in the home, and where modern facilities are unayailable, as in much of Pakistan, their role is substantially enhanced. Thus their inclusion in any sort of community participation is imperative to make a primary health care programme even partially successful. However, the position of women in a highly religious and conservative society such as ours does not permit 'active community participation'.

It is quite clear that the disease pattern in underdeveloped countries is substantially different from that in the West. The main causes of death in Pakistan are as

follows: infective and parasitic diseases, 54 percent; Malaria, 11 percent; death during birth, 7 percent; and tuberculosis, 6 percent (Government of Pakistan 1978, p. 614). The main killer of children is tetanus, followed by measles and dysentry (World Bank 1983). None of these diseases require grandiose hospitals stacked with the 'latest technology'. They simply require steps to eliminate the disease at the source. Water and sewerage play a major role in this process and the pattern in Pakistan is similar to that of other UDCs where "the most widespread diseases .... are those transmitted by human feces ... and ... these diseases spread most easily in areas without community water supply systems" (World Bank 1980 p. 13). In Pakistan in 1983, 77 percent of the urban and 22 percent of the rural population had access to potable water, while 48 percent of urban inhabitants and 4 percent of rural inhabitants had any access to sewerage and sanitation facilities (Zaidi 1985). Preventive measures such as inoculation also do not seem to reach the majority of the population. Of the 3 million babies born each year, less than 1.5 million received immunization, and then not all of these babies complete the immunization programme. Furthermore, the medical education pattern and the training done in the urban hospitals is very heavily dominated towards curing the patient and students do not interact with the community and thus fail to develop skills in preventive medicine. Their curriculum is also, mainly due to its western base, almost only curative-care oriented, where surgery and medicine receive much more emphasis than does the course in Community Medicine. This type of programme has resulted in the emphasis on doctors, and unfortunately, has minimised the role of much needed health auxiliaries (Zaidi: 1985; 1986a; 1986d; 1987b). Moreover, the role of the Government has not been very positive in developing health facilities which are preventive-oriented and it has shown a very clear bias in preferring to invest in high-technology hospitals and medical colleges rather than in Basic Health Units and Rural Health Centres which, due to their locational advantage and proxmity to the population, can act as potential centres which play the lead role in administering and delivering preventive care (Zaidi 1985).

The technology in use in the health sector depends on the model of the health sector. The technology cannot be appropriate unless the model of health care is also appropriate. As has been argued above, the model of health care in Pakistan is biased towards the urban inhabitants, and to those who can afford to pay for the high cost of medical care. This emphasis has resulted in the development of an approach to health care which is modelled on the West. The Western model, which, with its peculiarities is appropriate for the developed countries, for reasons given above, does not suit the needs of the majority of the inhabitants of Pakistan who suffer from different diseases, and whose cures are substantially different. Thus, to talk of appropriate technology out of the context of the health sector is meaningless, and the technology in use depends on the model that determines that use.

The fact that water, nutrition, housing and education have been included in the requirements for the PHC programme, underlines the fact that there is much more to health care than just medicines. They play an important part in health care, and their role is increased in the context of underdeveloped countries. The case of water has been discussed above and is of fundamental importance in the health matrix. With 6.4 individuals per room in Pakistan, one cannot speak of adequate housing conditions for the majority. As it is, this number is extremely high even if the inhabitants are healthy, but given the high incidence of disease in Pakistan, the condition is quite deplorable. Even if only one individual catches a communicable disease, he puts the other healthy individuals at great risk. Similarly, nutrition plays a major role in determining the health of an individual. This is more marked in the case of children, as malnutrition has been listed as a primary cause of death in childern under the age of five years. Furthermore, nutritional deficiencies expose the child to diseases which he would not easily succumb to if he were poperly nourished. Studies reveal that on the basis of a recommended daily allowance of 2550 calories per adult, 35 percent of the population in rural areas in Pakistan fails to reach this requirement (Irfan and Amjad 1984). As far as education is concerned, we see that the literacy rate in the country is only 26 percent, and the rate between 1972–1981 has shown only a marginal rise. The female literacy rate which is a very important factor in the health matrix is much worse than the overall rate : it is only 13 percent while in the rural areas it falls to a low of 5 percent. the primary school enrolment rate is only 50 percent and with a very high dropout rate, very few children acquire any functional literary and education.

III

Thus, one can see that Pakistan has so far not been able to achieve adequate targets which would put it on the road to achieve Health for All by the Year 2000, and thus it is more than likely that given the present structure of health care, that not only will Health not be available for All, but it is a possibility that the majority of the population will not have adequate health care by the end of the century. It is our contention that, not only has Pakistan not been heading in the right direction concerning Health for All, but that the system of health care, and the social, economic and political system which determines the system of health care is one in which it is unlikely to achieve Health for All by the end of the century, and what is essentially required is a different system which would make that likelihood possible. This point needs some elaboration.

The first prerequisite which is essential for achieving HFA/2000 is that facilities be more equitably distributed (i) to poor people, whether urban or rural, and (ii) to rural inhabitants. To alter the existing bias, two options are available (i) to

cut the budget which is allocated to urban projects and/or (ii) to increase the overall budget and leave the ratio between urban and rural unchanged.

The sections of society who live in the cities, i.e., the bureaucrats, the elite, students, workers, and professionals, are all strong enough to exert pressure on the government to implement policies that would serve their interests. As it is, these sections, many of whom are well organized, are critical of the fact that the government is not doing enough to fulfill their needs, so the question of cutting the budget allocated for the urban areas does not arise. This is one reason why the government spends 6 times as much on health services in urban areas in Pakistan than it does on rural areas (Zaidi 1985). The second option is also problematic. In 1976, the government was spending 1.8 percent of GNP on the health sector. Today this ratio is down to 0.6 percent (World Bank 1983). This is indeed a substantial loss for the health sector and the amount Pakistan is spending on health, is almost one-ninth of the amount recommended by WHO. The government keeps reminding us that Pakistan is a poor country and we cannot afford to divert funds from elsewhere to the health sector and thus we must make do with what we have. The status quo remains and as long as the government pays heed mainly to the dominant sections in society, health services will remain inaccessible.

The desire to have a preventive system rather than a curative one also poses a number of structural problems. For one, the number of facilities in rural areas which can act as a delivery point for preventive care will have to be increased, and as we have just shown above, this may not be very easy. Furthermore, the presently curative-care, Western-hospital oriented approach to medicine will also have to be changed. The most important aspect of the present health system which will have to be changed is the teaching and training programme of medical students.

The present curriculum and training programme is modelled on a health system which is quite removed from the very different reality of Pakistan. As has been argued elsewhere, "medical students are taught about diseases which occur in the developed countries from books which are written by and for doctors whose societies are very different from those in underdeveloped countries" (Zaidi 1985 p. 477). The result is that the student is alienated from his environment and is not taught how to function in his local environment and is unable to deal with simple ailments even such as snake and dog bites. A curriculum which is designed to cater for the needs of the population of Pakistan will have to have a very great emphasis on preventive factors and on the use of community medicine. This will require taking medicine out of the few large urban hospitals and into the urban slums and rural communities.

Thus, a new model of health care will have to be developed which will indigenise health care and make it accessible to all the inhabitants of the country. In order to understand why these apparently simple steps are not implemented (a change in

curriculum, greater community interaction, etc.), we need to see whose interests the present system serves, and how a new model will affect the dominance of these interests.

The present model of health care in Pakistan serves the interests of a very narrow section of society. A large part of this section is amongst the propertied and moneyed classes who are either in government (the bureaucracy, the army) or influence government policy (feudals, industrialists, professional etc.). The government must appease the dominant classes if it is to stay in office, and must provide them facilities and privileges in exchange for their support. Thus health facilities, like most other facilities in Pakistan, are focused around these dominant classes.

The income, wealth and the lifestyle of this elite differs substantially from that of the very great mass of their countrymen. The diseases of this class are also different from those of the poorer masses, where infectious and parasitic diseases which are fundamentally an outcome of the social and economic environment of the poor, are replaced by the diseases of the developed countries or of the rich of the underdeveloped countries, and heart disease and cancer become the leading killers. Since the diseases of this class are different, the institutions required to cater for them will also be different. These diseases require specialised highly technical institutions with manpower which supplements these requirements. This means that the elitist system in Pakistan will, through its system of medical education, produce doctors who can primarily deal with the diseases of the rich. The curriculum will be heavily biased in terms of curative diseases and conditions found in urban areas. Such a system of medical education will produce a certain type of doctor who functions best in the social set-up based on the model and value of the dominant class.

Furthermore, there is a desire by the elite to produce the 'best' doctors and acquire the 'latest technology. This further distorts the already distorted health structure where we begin to produce doctors who wish to specialise in fields such as cardiovascular medicine and cancer since the latest gadgets are available in the country, while 80 percent of their countrymen die each year due to basic diseases whose cure is extremely simple and makes use of simple local technology. Thus, it is essentially this select elite which requires and acquires a certain type of health system which, for numerous reasons, excludes the great majority of the country's population.

Thus, if the dominant classes continue to determine the distribution of resources within the health sector, any attempt by the government of the day to seriously consider the PHC option will fail before it gets off the ground. The government may attempt to increase facilities and provide appropriately qualified doctors in rural areas but it will not be able to do so. It cannot cut the urban proportion of the health budget. It must, thus, bring in funds from some other sector. It will have

difficulty in cutting the budget of the military or the bureaucracy as they will not permit that. Thus, it will have great difficulty in getting additional funds. If it were to attempt to alter the urban-based, curative-care medical education model, and produce a doctor more in tune with the needs of the urban poor, and of the rural inhabitants in general, the contradictions within the structure would also make these attempts fail. Most medical students belong to the privileged urban middle classes and their main aim is to maintain, if not improve, their class position (Zaidi:1986a; 1986b). They thus need (and wish) to acquire skills in line with the requirements of the moneyed classes. Under no conditions will they be willing to go to rural areas where they cannot expect to earn half of what they will in the cities (Zaidi 1986a). Further, attempts to restructure the curriculum content from one based on the Western-developed country model to an indigenous one will fail as this will not only "de-urbanize" the doctors but will also "de-internationalise" them. clearly, the middle and upper class medical students, the medical interest groups, and the dominant/ruling class at large will not permit such measures to curb their mobility.

In our discussion we have taken the view that the present model of health care in Pakistan is one which is determined by the interests of the elite whose requirements it fulfills. Thus as Navarro argues, "it can be postulated that it would be unhistorical to expect that changes towards equity can occur in the present distribution of resources, within and outside the health sector, *without changing the economic and cultural dependence and the control by the defined social classes of those resources"* (Navarro 1974 p. 22) (emphasis added). The governments commitment to primary health care and a promise to provide Health for All by the Year 2000 is only valid on paper, as the social and economic structure that determines the role of the elite in the health sector remains unchanged. This reality has to be dealt with if one intends to launch a successful PHC programme.

The examples of Mozambique, Vietnam, Cuba and Nicaragua illustrate that to begin with one has to change priorities from those focused on the elite to those focused on the people if there is a serious commitment towards Health for All. These countries have done precisely what the PHC approach requires: there has been active community participation in deciding what is best for the people. There has also been a genuine shift from a curative to a preventive care model and access across region and class has indeed been made equitable and there have been intensive programmes which provide better water, sanitation, housing, nutrition and education to the people so that the entire health matrix is incorporated (Gish 1983; Walt and Melamed 1983; Jelley and Madelay 1984). However, a prerequisite for bringing in these changes was a substantial transformation of the previous health system with its distorted priorities. It has to be understood that the health system could be changed only after the vested interests behind the system were removed. This basic prerequisite was dealt with before the PHC concept could be successfully implemented.

IV

The population of Pakistan in the year 2000 will be in excess of 130 million people. This paper has attempted to deal with a theme which will affect not only the 130 million, but their generations to come. The health of individuals and nations plays an extremely important role in determining their future and thus every government must rightly be concerned with this issue.

The government of Pakistan has, for the last nine years, spoken of the commitment to its people that it will provide health care to all of them by the end of the century. Given the social and economic conditions, and the pattern of disease in Pakistan, the primary health care approach is the most viable one to reach the goal of Health for All. The PHC approach is a radical approach which attempts to change the existing inequitable health system and brings it in line with the requirements of the majority of the 130 million.

The existing model of health care serves the interests of a very select minority, who are not necessarily concerned with the welfare of the masses. If a PHC programme was successfully implemented in Pakistan, one would have to change the existing health system in the country, thus forcing the elite to lose their privilege. This they are not willing to do. Thus, we do not have a change in the health system, and thus, the PHC approach cannot be implemented easily and in Pakistan exists only on paper. And unfortunately, the year 2000 will not bring with it health care for the majority of Pakistanis, and Health for All will remain a very distant dream.

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Comments on
"Health for All by the Year 2000: Can Pakistan Meet the Target?"

Akbar Zaidi's paper asks an extremely important and critical question. Two points are made forcefully and articulately. First, that the status quo of the health system persists with all its bias in favour of urban elites with that faction of society in position of power to decide health for whom. Second, it is the author's contention that unless society undergoes political transformation, this situation is unlikely to change and, accordingly, he reaches the conclusion that health for all by the year 2000 is improbable. To ask whether Pakistan will arrive at the goal of Health for All by 2000 means relying mainly on speculation. The author may have been better off when undertaking an academic exercise in asking the questions (1)whether there has been any change in strategy on the part of the government to provide health for a greater portion of the populace, and (2) whether trends in mortality and morbidity showed any supporting evidence of improved health coverage since 1978 (the year when Pakistan became a signatory to the Alma Ata agreement). The reason why I say this is because the criticisms the author cites of the health system have applied to Pakistan since its inception but nevertheless, changes in mortality have occured since then. These have been brought about by an extensive use of antibiotics, vaccines, and simple public health measures, all of which have led to a decline in mortality. So, when studied historically, the picture that emerges is quite different where virtually the same health system as the one we have today, with all its shortcomings, particularly its urban bias, has been effective to quite a degree. Further, mortality declines may occur again. In fact, this may have done already with the immunization campaign launched by the government which should have a reductive impact on infant mortality and, subsequently, on crude death rates. The author generally seems unaware of hard evidence which is available for doing some evaluation of whether the relatively more recent policies in the health sector are affecting mortality and morbidity.

The author, repeatedly, refers to the unsuitability of the "Western influenced" health system for Pakistan's need. But he himself is falling in the same trap of measuring success of primary health care only through the access to hospitals, health centres, and training of doctors. He neglects to mention the parallel system of indigenous health workers in whom the majority of the Pakistani populace have faith

much above that in doctors. Particularly, when using access to health facilities in Pakistan as a measure of improvement, I think we have to also keep in mind psychological access. There is evidence from a National Health Survey conducted by the Federal Bureau of Statistics (FBS) in 1983 that even where a health facility existed in the vicinity, its utilization by the community was quite low. Also, evidence from a study done using the data shows that the infant mortality rate in fact does *not* vary significantly in districts where there is no hospital or dispensary, compared to where there is such a facility. Therefore, by just improving the availability of health services may in itself not to be enough to bring about declines in mortality and morbidity.

In the same vein, the author also fails to incorporate into his discussion the particular gender differentials in health care of mortality which particularly apply in Pakistan whereas he mentions women to be important because they are half the population, he does not expand on this important theme. Cultural factors which restrict women's movement and lead to limited psychological and physical access are considered important determinants of gender differentials in mortality which even apply in urban areas. The gender bias of the health system may effectively be as serious a hindrance to Health for All by 2000 *as* class biases of the health system.

The author quite rightly points out that the disease pattern in underdeveloped countries is substantially different from the West. The diseases prevalent here, such as malaria, tetanus etc. do not need 'high-tech' to be eliminated. I think this is fortuitious from the point of view of whether Pakistan can improve its health performance with relative ease. It implies that simple and relatively, inexpensive public health measures can still bring about substantial declines in mortality and morbidity. I do not necessarily agree with the author that consequently we can afford to do away with "grandiose hospitals stacked with the latest technology".

I feel the author is totally underrating the role of recent health interventions by the government, particularly the huge immunization programme, and exaggerating the harm brought upon by the "Western base" of the curriculum of medical students. Rural health centres have been expanded substantially during the Sixth Five Year Plan period and dispensaries have been upgraded. To make an unbiased and just evaluation of the government's intent and efforts in the health sector, the author ought to evaluate the impact of these newer inputs such as Oral Rehyderation Therapy (ORT), co-opting of hakims, training of Traditional Birth Attendants (TBAs) and then measure it against the negatives – i.e. inequitable distribution of health care sources, inadequate facilities in remote areas, inadequate water supply, etc. The analysis presented does not benefit from the repeated mention of a few of the ills of our health system which may be the most resistant to change. I noticed that Akbar had written a similar paper for last year's conference and the discussant (Shamim Sahibzada) comments were that he should look:

1. At the role of the private sector in health – which he neglects to do. As recently researched this is playing an increasing role particularly in the urban areas.
2. Look at evaluation and appraisal of successful projects in the health sector, I know that UNICEF has been undertaking such studies particularly to evaluate *dai* training and immunization. Similarly, underutilization of existing health facilities is a critical area of concern.

Obviously, the author by writing two papers on a similar theme shows a commitment to research on this particular question. I feel, therefore, that he would have benefited greatly had he incorporated the previous discussant's comments into this year's paper.

I think most of us would tend to agree with Akbar Zaidi's conclusion that Pakistan will *not* achieve Health for All by the Year 2000 but not with his premise that, notwithstanding, radical socio-economic changes, this goal is impossible. I agree totally with Shamim Sahibzada's comment that a utopian solution is not always the only one, much can be achieved by way of public health education about use of water, sanitation, ORS, personal hygiene through TV and Radio. I may add that projects such as the Orangi Pilot Project and the UNICEF Project at Baldia, both based in Karachi's *Katchi abadis,* present impressive models of how a small degree of intervention has led to very successful implementation of sanitation, health and education projects, by a very poor community itself making most of the investment. The author, may for future reference, be able to make some positive suggestions to put Pakistan on the right road to Health for All by the Year 2000, by studying the evaluation reports of these projects.

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Food and Nutrition in Pakistan (A Cross-regional Study)

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Though the nutritional status of an individual is the outcome of complex interaction of a host of environmental factors, income is the mirror-image of a household's purchasing capacity. Another major factor in determining nutritional status in developing countries is considered to be the family size.

Higher income levels are regarded as a prerequisite for the improved nutritional status of household [Berg (1973); Levinson and Morinda (1974); Seyoam, Kindaue and Gebru (1986)]. It is posited that, with improvement in a household's income, the absolute expenditure on food is likely to go up as also the intake of four essential nutrients.[1] It has been observed in various studies that food intake level in developing countries varies significantly across income classes (Seyoam, Kindaue and Gebru (1986). A World Bank study underscored the fact that serious and intensive nutritional deficiencies that exist in almost all developing countries are largely a reflection of poverty (World Development Report 1980).

A large family size may adversely affect the nutritional status of every member of a household because it may be associated with decreased per capita human impact i.e. the allocation of food per member is likely to decrease with the increase in the number of household members which, in turn, may have a negative effect on per capita nutrient intake.

The main objective of this study is to evaluate the intake of energy, protein, vitamins and minerals by rural and urban households across income groups and provinces. A relationship between household income and size with food nutrients will be developed to see the impact of these economic and demographic variables on the level of nutrient intake. This analysis may be very fruitful because preferences for food nutrients so obtained can be useful in indicating which foodstuffs are preferred to meet the required allowance of the four important nutrients.

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[1] Calories, Protein, Vitamins and Minerals.

METHODOLOGY

The data employed in this study is classified on the basis of different income groups selected from the rural and urban structure in Pakistan. Food items have been selected from the Household Income and Expenditure Survey for the year 1979. Food nutrients are calculated from the Food Composition Table Planning and Development Division, (1985). Four nutrients i.e. energy, protein, vitamins and minerals are considered to be important indicators of the nutritional status of a household. To estimate an average level of intake of various nutrients, the quantities of various food items consumed by different income groups are multiplied by its constituents contained in 1000 grams of the given food items. The work is carried out for rural and urban sectors of all the four provinces. The impact of household income and size will be tested for nutrient intake of different income groups. Adequacy of this relationship will be examined through a log-linear function.[2]

RESULTS

Energy and Protein Intake

A number of nutritionists have strongly argued that protein is inefficiently metabolized whenever energy intake is inadequate for human requirement [Goldman and Ranade (1974); Butt and Mahmood (1986); Food and Agricultural Organization (1974)]. They emphasize that adequacy of energy intake must receive first consideration so that any additional protein supplied to meet the estimated protein needs will be efficiently utilized for body growth, and repair and maintenance. The figures of energy intake by households in rural areas of the Punjab and NWFP as reported in Table 1, are almost equal to the recommended allowance of energy.[3] Other provinces are deficient in energy intake. The most deficient groups belong to Baluchistan and the urban areas of Sind. Carbohydrates are the main source of energy intake in Pakistan. Protein intake is more than the recommended allowance but, in fact, in most of the regions, particularly in the lower income groups, it is utilized more for energy purposes rather than for growth and maintenance of the body. Table 3 also highlights the sources of energy, protein, fats and carbohydrates. In all urban areas the percentage of animal protein is higher than that of rural areas. The opposite results are observed in the case of fats. In rural areas of Punjab and Sind 55 percent and 44 percent of fat intake is from animals. The greater use of 'desi

[2] $\text{Log } xi = i + i \log Y + i \log S$

where

xi = Stands for various food nutrients consumed by a household

S = Household Size

Y = Household income (in Rs).

[3] The recommended allowances of various nutrients, as reported in Table 2 are calculated keeping in view the age and sex distribution of the population in rural urban areas.

Table 1

Food Nutrient Intake by Region

		Punjab		Sind		NWFP		Baluchistan	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Calories	(kcal)	2326	2045	2067	1816	2264	2011	1782	1792
Protein	(gm)	68	59	56	51	64	56	50	50
Fats	(gm)	44	47	48	48	45	51	36	40
Carbo-hyderates	(gm)	419	348	353	294	407	334	313	309
Calcium	(mg)	584.21	502.45	522.94	405.59	437.34	446.30	340.34	334.11
Iron	(mg)	29.77	24.75	23.67	20.50	27.85	23.22	21.52	20.23
Thiamin	(mg)	2.05	1.68	1.54	1.38	1.90	1.54	1.49	1.47
Riboflavin	(mg)	1.11	0.98	0.98	0.85	1.01	0.93	0.78	0.78
Niacin-B	(mg)	10.09	16.52	16.73	15.13	18.40	16.09	15.10	15.36
Carotene	(mcg)	689.93	742.99	509.68	588.06	671.49	718.54	466.50	585.82
Ascorbic Acid	(mg)	30.62	36.54	24.23	30.91	28.22	33.40	18.51	27.11

Table 2

Food Nutrient Requirement by Region

		Punjab		Sind		NWFP		Baluchistan	
		Rural	Urban	Rural	Urban	Rural	Urban	Rural	Urban
Calories	(kcal)	2339	2355	2296	2290	2241	2350	2462	2232
Protein	(gm)	29	29	28	28	27	29	31	29
Calcium	(mg)								
Lower Limit		440	440	440	440	440	440	440	
Upper Limit		540	540	540	540	540	540	540	
Iron	(mg)								
Lower Limit		7.68	7.64	7.39	7.16	7.52	7.46	7.65	6.97
Upper Limit		14.87	14.99	14.27	13.59	14.83	14.34	14.99	14.23
Thiamin	(mg)	0.93	0.94	0.91	0.90	0.93	0.89	0.99	0.93
Riboflavin	(mg)	1.40	1.40	1.37	1.36	1.34	1.42	1.48	1.39
Niacin	(mg)	15.44	15.54	15.16	15.12	14.79	15.48	16.42	15.39
Vitamin A	(mcg)	600.20	603.20	578.62	580.40	558.53	597.59	623.17	586.17
Ascorbic Acid	(mg)	26.06	26.18	25.52	25.25	25.05	25.97	27.22	25.67

Table 3

Animal viz-a-viz *Vegetables Sources*

(in percent)

	Calories		Protein		Carbo-hyderates		Fats	
	Animal	Vege-table	Animal	Vege-table	Animal	Vege-table	Animal	Vege-table
Punjab								
Rural	13	87	15	85	2	98	55	45
Urban	11	89	19	81	2	98	35	65
Sind								
Rural	14	86	22	78	3	97	44	56
Urban	11	89	24	76	2	98	27	73
NWFP								
Rural	19	81	15	85	2	98	31	69
Urban	11	89	22	78	2	98	29	71
Baluchistan								
Rural	7	93	14	86	1	99	26	74
Urban	8	92	19	81	1	99	22	78

ghee' (butter oil) is the main cause. In the urban areas preference for poultry, fish and mutton are the cause of higher animal protein intake.

The same is true for the adverse effect of household size. The results obtained for household size elasticity for animal protein in case of rural Punjab are opposite to those obtained for other provinces (Table 4). Here the household size elasticity for energy from animals is positive. This may be due to the reason that large families are in a position to look after a larger number of livestock. On the other hand, in urban areas of Sind the adverse effect of household size on energy intake is greater than the positive effect of household income. This shows that the incidence of malnutrition in this region of Pakistan is mainly due to growth in household size and lower purchasing power. There may be other reasons like varied diet patterns, illiteracy, and ignorance, etc.

Vitamins and Minerals

In this paper, five major vitamins i.e. Thiamin (Vitamin B), Riboflavin Vitamin (B2), B Carotene (Vitamin A) and Ascorbic Acid (Vitamin C) and two minerals i.e. iron and calcium are analysed across income groups and urban rural areas of the

Table 4

Household Income and Size Elasticities of Various Food Nutrients

	Punjab		Sind		NWFP		Baluchistan	
	Urban	Rural	Urban	Rural	Rural	Urban	Rural	Urban
Calorie Intakes								
Animal Sources								
Income Elasticity	.64	.27	.52	.26	.37	.50	.63	.73
	(11.41)	(3.58)	(9.38)	(5.31)	(3.30)	(4.52)	(9.56)	(2.95)
Size Elasticity	−.49	.58	−.72	−.10	−.32	−.50	−.63	−.50
	(−3.47)	(3.04)	(−7.44)	(−1.10)	(−1.07)	(−2.29)	(−5.93)	(−.89)
Vegetable Sources								
Income Elasticity	.10	.19	.08	−.23	.07	.44	.08	.19
	(6.47)	(10.83)	(1.50)	(−.91)	(2.11)	(8.55)	(0.79)	(2.51)
Size Elasticity	−.13	−.22	−.16	.43	.14	−.64	−.06	−.31
	(−3.35)	(−4.94)	(−1.59)	(0.92)	(1.57)	(−6.36)	(−.36)	(−1.78)
Protein Intake								
Animal Sources								
Income Elasticity	.60	.36	.53	.29	.40	.50	.52	.56
	(10.47)	(3.44)	(10.29)	(8.10)	(3.38)	(5.00)	(8.27)	(2.78)
Size Elasticity	−.39	.43	−.72	−.19	−.33	−.46	−.45	−.24
	(−2.69)	(1.65)	(−7.65)	(−2.84)	(−1.06)	(−2.33)	(−4.56)	(−.52)

Continued –

Table 4 – *(Continued)*

Vegetable Sources								
Income Elasticity	.05	.15	.01	−.38	.05	.44	−.02	.15
	(2.61)	(10.39)	(0.20)	(−1.22)	(1.35)	(7.89)	(−.18)	(1.90)
Size Elasticity	−.09	−.16	−.01	.67	.16	−.72	.13	−.26
	(−1.87)	(−4.16)	(−.11)	(1.9)	(1.54)	(−6.47)	(0.75)	(−1.41)
Fats Intake								
Animal Sources								
Income Elasticity	.68	.24	.53	.26	.37	.51	.71	.78
	(11.64)	(3.14)	(9.0)	(3.96)	(3.07)	(4.54)	(8.28)	(3.16)
Size Elasticity	−.55	.65	−.72	−.07	.28	.50	−.74	−.55
	(−3.67)	(3.29)	(−6.67)	(−.62)	(−.92)	(−2.25)	(−5.50)	(−.97)
Vegetable Sources								
Income Elasticity	.20	.26	.27	.05	.21	.36	.17	.23
	(4.95)	(6.08)	(2.39)	(.44)	(3.08)	(8.81)	(1.53)	(1.82)
Size Elasticity	−.15	−.66	−.54	−.04	−.08	−.36	−.34	−.50
	(−1.19)	(−6.05)	(−2.57)	(−.23)	(−.44)	(−4.51)	(−1.94)	(−1.74)
Carbo-hyderates								
Animal Sources								
Income Elasticity	.49	.23	.45	.19	.37	.40	.56	.86
	(8.19)	(3.43)	(10.04)	(7.59)	(4.61)	(2.74)	(4.70)	(1.54)
Size Elasticity	−.36	.43	−.69	−.10	−.49	−.50	−.43	−.85
	(−2.40)	(2.58)	(−8.45)	(−2.29)	(−2.30)	(−1.74)	(−2.31)	(−.66)

Continued –

Table 4 – *(Continued)*

	Punjab		Sind		NWFP		Baluchistan	
	Urban	Rural	Urban	Rural	Rural	Urban	Rural	Urban
Vegetable Sources								
Income Elasticity	.09	.19	.03	−.29	.04	.45	07	.19
	(6.42)	(10.22)	(.69)	(−1.05)	(1.04)	(8.04)	(.63)	(2.40)
Size Elasticity	−.13	−.19	−.06	.54	.19	−.67	.003	−.28
	(−3.90)	(−3.94)	(−.71)	(1.05)	(2.07)	(−6.17)	(.02)	(−1.56)
Calcium								
Income Elasticity	.33	.24	.27	.11	.24	.41	.25	.40
	(3.68)	(8.35)	(7.20)	(1.55)	(4.91)	(4.65)	(2.72)	(2.00)
Size Elasticity	−.31	.05	−.41	−.02	−.25	−.58	− 17	−.47
	(−9.88)	(.66)	(−5.98)	(−.19)	(−1.92)	(−3.37)	(1.19)	(1.02)
Phosphorous								
Income Elasticity	.15	.22	.10	−.13	.09	.44	.09	.19
	(10.54)	(9.85)	(2.45)	(−.64)	(2.65)	(7.89)	(0.51)	(2.55)
Size Elasticity	−.18	−.13	−.13	.32	.11	−.66	.08	−.24
	(−5.21)	(−2.38)	(−1.77)	(−.83)	(1.22)	(−6.08)	(0.54)	(−1.41)
Iron								
Income Elasticity	.16	.21	.08	−.07	.10	.42	.08	.24
	((8.25)	(11.86)	(.200)	(−.38)	(2.87)	(8.28)	(0.80)	(2.43)
Size Elasticity	−.19	−.12	−.13	−.23	.06	−.62	.01	−.36
	(−3.84)	(−2.70)	(−1.50)	(−.70)	(.65)	(−6.27)	(.04)	(−1.59)

Continued –

Table 4 – *(Continued)*

Thiamine								
Income Elasticity	.09	.17	.04	−.31	.06	.43	−.004	.16
	(5.84)	(11.16)	(0.92)	(−1.07)	(1.61)	(7.70)	(−.04)	(1.96)
Size Elasticity	−.14	−.16	−.04	.59	.16	−.68	.15	−.19
	(−3.58)	(−3.96)	(−.47)	(1.12)	(1.67)	(−6.10)	(1.03)	(−1.04)
Riboflavin								
Income Elasticity	.26	.25	.22	.026	.19	.44	.20	.31
	(11.28)	(10.87)	(6.34)	(.51)	(3.7)	(7.91)	(2.21)	(2.7)
Size Elasticity	−.26	−.10	−.31	.06	−.09	−.64	− 12	−.38
	(−4.45)	(−1.65)	(−4.72)	(.28)	(−.65)	(−5.84)	(−.86)	(1.46)
Niacin								
Income Elasticity	.15	.24	.12	−.15	.11	.45	.08	.24
	(11.54)	(9.49)	(2.64)	(−.65)	(2.63)	(7.48)	(.78)	(2.99)
Size Elasticity	−.18	−.14	−.16	.32	.09	−.66	−.03	−.29
	(−5.39)	(−2.17)	(−1.94)	(.76)	(.82)	(−5.62)	(.16)	(−1.59)
B-Carotene								
Income Elasticity	.41	.34	.34	.07	.35	.44	.13	.44
	(6.12)	(5.92)	(4.16)	(.44)	(3.73)	(3.22)	(.65)	(.93)
Size Elasticity	−.42	−.30	−.40	.17	−.45	−.59	.06	−.21
	(−2.45)	(−2.07)	(−2.63)	(.59)	(−1.81)	(−2.20)	(.19)	(−.20)
Vitamin C								
Income Elasticity	.25	.28	.36	.15	.35	.37	.04	.74
	(2.07)	(3.94)	(7.65)	(1.42)	(3.35)	(3.24)	(.17)	(3.67)
Size Elasticity	−.29	−.30	−.52	−.21	−.58	−.58	.12	−.95
	(−.94)	(−1.86)	(−5.98)	(−1.08)	(−2.03)	(−2.46)	(.32)	(−2.87)

provinces. There are three bases of our analysis: (1) To check the level of nutrient intake in each income group. (2) To check whether a rise in household income or size shows a positive or negative effect on nutrient intake. (3) To make a comparison of nutrient intake across regions at each income group level.

According to Tables 1 and 2 most regions in the country are self-sufficient in Thiamin, Niacin, Iron, Calcium and Ascorbic Acid. But the people living in rural areas of Baluchistan are deficient in Ascorbic Acid, Niacin and Calcium. Their deficiency in Ascorbic Acid and Calcium is serious because on average the recommended allowance for these vitamins and minerals is 27.22 mg, 470 mg and –570 mg respectively while their intake is 18.51 mg and 340.34 mg. They are slightly deficient in Niacin. In this region, the adverse effect of household size is relatively greater than the positive effect of household income on nutrient intake. The major reason for deficiency of Ascorbic Acid and Calcium seems to be either non-availability of food items which contain higher amounts of Ascorbic Acid and Calcium or that these people do not prefer such food items. This conclusion is drawn because we have observed that even people lying in the higher income groups are deficient in Ascorbic Acid and Calcium intake. Price cannot be the cause of these deficiencies in the higher income groups. Another reason may be the ignorance of people about their nutritional requirements. Urban areas of Sind and Baluchistan are also deficient in Calcium intake whereas rural areas of Sind are self-sufficient. In urban areas of Sind and Baluchistan income elasticity is observed to be .27 and .25 respectively. Both elasticities are significant but their magnitudes are relatively low as compared to the magnitude of income elasticity observed for other regions of Pakistan. In Baluchistan, income groups in the Rs 3001 to Rs 3500 range are deficient in Calcium but in the case of Sind higher income groups are taking Calcium in excess of the recommended allowance. The causes of Calcium deficiency in urban areas of Sind and Baluchistan are different. In the case of Sind, low purchasing power and adverse household size are the main causes of deficiency in Calcium intake whereas in Baluchistan non-availability of food items containing sufficient amount of Calcium or ignorance of the people about their nutritional requirements may be the main cause of this deficiency.

Riboflavin is another important vitamin and its deficiency, along with deficiency of energy, brings about diseases like masmaras and kwashiakor. In Pakistan the rich and the poor are deficient in this vitamin which clearly shows that Riboflavin intake is much lower than the recommended allowance. Whole cereals and pulses are the main sources of this vitamin. Polishing of rice and grinding of cereals wastes Riboflavin and this seems to be the main cause of deficiency of this vitamin, at least in the poorer classes.

Vitamin A is derived from two sources i.e. B-Carotene and Retinal. Retinal source of Vitamin A is rare and mostly found in animal foods whereas B-Carotene is

freely available in daily diet and easily accessable. However, the amount of B-Carotene required is twice that of Retinal(Food and Agriculture Organization 1974).

CONCLUSIONS AND POLICY RECOMMENDATIONS

Severe limitations on the purchasing power of the poor is the main cause of malnutrition. Our lower income groups are deficient in energy, Calcium, Vitamin A and Riboflavin. But in rural Punjab, however, the poor are self sufficient in these nutrients.

From the foregoing analysis one can conclude that with improvement in the economic status of the poor, adequate emphasis should be placed on their food consumption patterns. In Baluchistan even the rich are deficient in important nutrients due to their traditional food consumption patterns.

The present study shows that the high rate of population growth in Sind with limited capabilities results in reduced available per capita food demand culminating in various degrees of malnutrition. Briefly, in Pakistan for some nutrients in which all income groups are self-sufficient (protein, thiamin and iron) where there is a wish among high income groups to meet the nutritional requirements by consuming high status food, there is a way for the poor to attain the recommended level through staple food items.

Several measures can be taken to improve the food intake of lower income groups:

1. There is need for family planning to keep the rate of population growth within reasonable limits.
2. Government should take into account a range of foods rather than cash crops only, along with other high nutrient items. Special emphasis should be given to food crops etc.
3. Agricultural prices should be stabilized and nutritious food should be made available in the markets.
4. There is need for an optimal trade-off between cash crops and food crops.
5. Losses due to inefficient handling, transportation and milling should be minimized.
6. It is necessary that basic nutritional educational information should be provided at all levels.
7. Government should introduce minimum wage legislation.

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Comments on "Food and Nutrition in Pakistan (A Cross-regional Study)"

First of all I would like to thank the authors for an interesting and enlightening paper on "Food and Nutrition in Pakistan (A Cross-regional Study)". This paper attempts not only to assess the size of the problem, but also to identify the causes and consequences of inadequate nutrition intake.

I am, however, not a food and nutrition expert and my only "competence in the field", as Dr Chaudhry so kindly put it, is in using the 1979 HIES in our paper to be presented tomorrow. It would have been useful, therefore, for laymen such as myself, if some of the theory behind the work had been given. Obviously because of size limitations, this is difficult.

One of my concerns with the paper is the effect that multicollinearity may have on the equations, as the household size and income variables are likely to be collinear. Investigation into this should be carried out as it could have important effects upon the results. In fact, Sohail Malik *et al.* (1987) in their paper presented at this conference, found the family size variable to be strongly correlated with household income in all years, which led to severe multicollinearity problems. They overcame these by dividing through by family size and conducting their analysis on a per capita basis.

Turning to the tables, the number of people in the various provinces and the R^2 statistic should possibly have been produced, and while it is presumed that the figures in brackets on Table 4 are T-statistics it would be nice to have this confirmed. A more detailed analysis of the allocation of food *amongst* family members would also have been interesting. My particular concern is with women being treated as equal adult members in nutritional consumption. Some of the work carried out by Amartya Sen (amongst others) may be relevant here as he appears to have found that adults in a household may have more nutritional requirements. The female members of the family, however, will need less *vis-a-vis* the male members. (1) The composition of food across regions and provinces, is it the same in terms of minerals, vitamins, energy and protein, and if not, has this been accounted for? Further, the question of quality should be remembered. (2) Is it important to know how family size changes? For instance will there be a different requirement in nutritional terms if the family size is increased through marriage rather than through birth?

I would be interested to see a further piece of work that should be quite easy to achieve and potentially very rewarding. This is, to break down the 1979 HIES into suitable income groups and find if the nutritional level varies as one would expect that it does. I would hypothesize that the more well off are generally above the minimum nutritional level. It would also be interesting to find out what income group had the "best" diet, for example, the very wealthy may not have a nutritionally balanced diet due to their consumption of excess fats/junk food.

Turning to the conclusions, most of the steps to improve the diet of the low income group appear to be perfectly reasonable. If people grow more crops, even highly nutritious ones, they may not consume more as they may still be sold. Solving the nutrition problem by cutting down on exports may not be acceptable, as the foreign exchange earnings could perhaps be used where it would be more socially profitable.

Finally, the work is an interesting starting point for an analysis of nutrition in Pakistan. More experimentation and research in this area must be useful.

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Instability of Federal Government Revenues and Expenditures in Pakistan

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INTRODUCTION

As in many other countries, in Pakistan too, the government provides a number of social goods and services. For this purpose, the government has to spend huge amounts of money every year. Federal government expenditures in real terms have grown at an annual average rate of 8.84 percent during the past fifteen years. Also, the share of the federal government expenditures in GNP has increased from 20.93 percent in 1971-72 to 25.19 percent in 1985-86. The main component of the federal government expenditures is of the recurrent type and is devoted to defence, civil administration, debt servicing, health, education, roads, and other such services. At present, the level of social goods and services provided by the government is not considered satisfactory. Moreover, public demand for them is on the increase due to an increasing population growth rate and rising standards of living in the country.

The government needs resources to meet the public demands for its goods and services and to fulfill the development requirements of the country. For this purpose, the government generates revenue through various taxes and tapping other revenue sources. It is important that these taxes and other revenue sources yield a stable revenue over time. If there are large year to year fluctuations in revenue, it becomes very difficult for the government to meet its inflexible obligations and to implement development plans. Stability of revenues, therefore, becomes very important for fiscal management and development planning.

The objective of this study is to provide empirical estimates reflecting the level of instability of federal government revenues and expenditures. There are a number of studies [Idachaba (1975); Lim (1983); Schroeder and Dallon (1986); White (1983; Williams and Anderson (1973)], for countries other than Pakistan in which instablity of government revenues and expenditures has been estimated. In Pakistan, this

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issue has not yet received any attention. The focus of studies on Pakistan [Chaudhry (1962); Gillani (1986); Azad (1978); Khan (1973)] has been on another important aspect i.e., the estimation of buoyancy and elasticity of different taxes with respect to national income. These studies, no doubt, provide useful information on the relationship between tax revenues and national income. However, they do not cover the aspect of stability of the government revenue for different sources over time. An attempt will be made in this study to fill this gap.

MEASURES OF INSTABILITY

While defining instability, it is important to keep in mind the purpose it has to serve. As stated earlier, federal government expenditures on major items exhibit a steady upward trend. To meet these growing expenditures, the government revenues must also grow. A revenue source which grows smoothly over time, therefore, can be considered as stable. In the empirical literature on the instability of government revenues and expenditures [Idachaba (1975); Lim (1983); White (1983); Williams and Anderson (1973)], two alternative indices of instability have been employed to measure the level of instability. Both the measures are based on the notion that yield from a stable revenue source must grow over time and follow a systematic path. The revenue from a perfectly stable revenue source in one case must increase each year by the same constant amount, while in the other case, the revenue must grow each year at a constant rate. The instability indices I and Z in this study are based on these concepts respectively.

To estimate the instability index I, a linear regression of the concerned revenue or expenditure on time will be performed. The standard error of the estimate of the linear trend equation divided by the average value of the dependent variable over the relevant period gives the estimated value of the index I. The index I is similar to the familiar descriptive statistic of dispersion known as coefficient of variation. If the revenue grows each year by the same constant amount, then all its values will lie on the estimated trend line and the index I will assume a zero value. Any deviations of the actual revenue from the estimated line will produce a positive value for I. Thus larger deviations will yield larger values of I.

The instability index Z is estimated after regressing the log of the relevant variable on time. The index Z is defined as the standard error of the estimate of the regression. If the revenue grows each year at a constant rate, then all the values of the revenue will be on the same growth path and the value of Z will be zero. Any deviation from the estimated growth path will yield a positive value of the index.

In our study, we use both the instability indices to evaluate the performance of the various types of the federal government revenues and expenditures.

INSTABILITY OF GOVERNMENT REVENUES

Before discussing the instability results, it will be useful to have a brief look at the revenue structure of the federal government. The revenue of the federal government consists of tax and non-tax revenues. Although there have been fluctuations in the relative shares of tax revenue and non-tax revenue over time, but taxes have always been a major source of government revenue. The share of non-tax revenue in total revenue was 24.92 percent in 1959-60 which declined to 19.04 percent in 1979-80 and then again rose to 28.09 percent in 1985-86. 'The major sources of non-tax revenues are profits of commercial departments of the government (like post offices, telephones and telegraphs, railways, road transport), interest on loans advanced by the government and fees (Pakistan Economic Survey 1986, p. 35).

Taxes can be divided into two major categories: direct and indirect. Indirect taxes not only dominate in total tax revenue, but their relative share has also increased over time. In 1959-60, the relative share of indirect taxes was 75.16 percent which rose to 85.34 percent in 1985-86. The main components of direct taxes are income and corporate taxes. On the indirect taxes side, the major subcategories include custom duties, excise duties, sales taxes and 'other indirect taxes'. Their relative shares in total tax revenue in 1985-86 were 40.94 percent, 23.30 percent, 7.47 percent, and 13.63 percent respectively. The subcategory of 'other indirect taxes' consists of different types of surcharges and its relative share has increased significantly during the recent years.

The instability indices I and Z have been estimated for total federal government revenue and its various subcategories. The time period chosen for the analysis is divided into two sub-periods: from 1959-60 to 1970-71 and from 1971-72 to 1985-86. These two periods correspond to pre- and post-separation of East Pakistan. The data for period 1959-60 to 1970-71, however, pertains to the then West Pakistan only. The separation of East Pakistan had a serious impact on the economy of the remaining part of the country. Therefore, we decided to conduct our analysis for the two periods separately. In this Way, we can also examine the changes that have taken place over the two periods. the data for the 1959-60 to 1970-71 period are taken from Fatima (1983) and for the 1971-72 to 1985-86 period, they are taken from the annual budget statements and Pakistan Economic Survey. The data on all variables are in nominal terms.

To estimate the instability indices I and Z, linear and semi-log linear regressions of the concerned variables on time were performed respectively. In most cases, the regression coefficients were statistically highly significant and R^2 were also quite high. The computed values of I and Z have been multiplied by 100 and hence reported as percentages in Table 1. The various revenue sources have been ranked according to their level of instability. The most unstable revenue source is assigned rank 1,

the next most unstable rank 2 and so on. First, we look at the result for the period from 1959-60 to 1970-71. If we compare tax and non-tax revenues, the tax revenue turns out to be relatively more stable according to both I and Z indices. The result is not surprising because non-tax revenue mainly consists of profits of commercial departments of the government and year to year large fluctuations in them are quite likely. When tax revenue is divided between revenues from direct and indirect taxes, we find that both the indices I and Z rank total direct taxes more unstable than total indirect taxes. A very high proportion of tax revenue comes from indirect taxes and the fact that these taxes as a whole are more stable than direct taxes gives a feeling of relief. Different subgroups of direct and indirect taxes are analysed next. Direct taxes have two main subcategories: income and corporate taxes, and 'other direct taxes', The share of 'other direct taxes' in total direct taxes is very small but revenue from them is much more unstable than that from the income and corporate taxes. Indirect taxes are subdivided into custom duties, excise duties, sales taxes and 'other indirect taxes'. According to both the instability indices, the category of 'other indirect taxes' is most unstable and excise duties are the least unstable. Custom duties follow excise duties in terms of their stability ranking. Sales taxes turn out to be relatively unstable and they are ranked as the most unstable after the 'other indirect taxes'. The estimated values of I and Z for the total revenue (not reported in Table 1) are 9.07 and 5.43 respectively. These values are lower than their corresponding values of many subcategories of total revenue. This is due to the offsetting or compensating fluctuations in revenue from different subcategories.

The results for the 1971-72 – 1985-86 period are also given in Table 1. According to the index I, tax revenue is more stable than non-tax revenue but this conclusion is completely reversed when the index Z is considered. During the period under analysis, especially in the latter years, non-tax revenue grew quite fast and its relative share in total revenue increased significantly. Consequently, the index Z has characterized non-tax revenue as more stable than tax revenue. The instability ranking of subcategories of tax revenue remains the same as in the previous period except in the case of indirect taxes where customs duties and sales taxes have swapped their positions with each other. The values of the instability indices I and Z for total revenue are 18.09 and 8.46 respectively.

A comparison of the results of the two periods yields some interesting findings. The instability of total revenue has increased over time according to both the indices. Total indirect taxes were more unstable than total indirect taxes in both the periods. However, the level of instability of total indirect taxes has decreased and that of total indirect taxes increased over time. In both the priods 'other direct taxes' were more unstable than income and corporate taxes. In different subcategories of indirect taxes, excise duties were most stable and 'other indirect taxes' least stable.

Table 1

Estimates of Instability Indices for Different Federal Revenues

Type of Revenue	Period: 1959-60 to 1970-71				Period: 1971-72 to 1985-86			
	Value of Instability Index		Instability Ranking (1 for Most Unstable)		Value of Instability Index		Instability Ranking (1 for Most Unstable)	
	I	Z	I	Z	I	Z	I	Z
Tax Revenues	8.35	6.31	2	2	14.62	9.97	2	1
Non-tax Revenue	23.53	24.33	1	1	31.95	7.37	1	2
Total Direct Taxes	26.53	25.32	1	1	18.87	19.16	1	1
Total Indirect Taxes	9.70	5.40	2	2	15.87	11.06	2	2
Direct Taxes								
Income and Corporate Taxes	26.88	25.19	2	2	19.01	19.69	2	2
Other Direct Taxes	63.29	86.21	1	1	22.37	20.37	1	1
Indirect Taxes								
Custom Duties	22.42	12.89	3	3	14.68	20.58	2	2
Excise Duties	18.12	10.03	4	4	11.30	12.25	4	4
Sales Taxes	33.00	40.16	2	2	14.06	14.16	3	3
Other Indirect Taxes	45.45	105.26	1	1	73.52	35.09	1	1

INSTABILITY OF GOVERNMENT EXPENDITURES

The expenditures of the federal government have grown over the years in response to growing demand by the public for its social goods and services. In this study, we restrict our analysis only to total federal government expenditures and its two main sub-groups: development and non-development expenditures. The availability of the data makes it possible to carry out the analysis only for the period from 1971-72 to 1985-86.

The estimated values of the instability indices I and Z for the government expenditures are given in Table 2. As expected, the development expenditures turn out to be much more unstable than the non-development expenditures. The values of both the instability indices for the development expenditures are more than four times the values of the indices for the non-development expenditures. Most of the non-development expenditures are of recurrent nature and there is not much possibility of large fluctuations in them. Development expenditures, however, depend on the availability of funds, both from internal and external sources and there is no guarantee of smooth flow of such funds.

Table 2

Estimates of Instability Indices for Federal Government Expenditures for the 1971-72 to 1985-86 Period

Nature of Expenditures	Instability Index I	Instability Index Z
Total Expenditure	17.80	11.73
Non-development Expenditures	27.78	8.95
Development Expenditures	114.13	34.29

COMPARISON OF INSTABILITY OF FEDERAL GOVERNMENT TOTAL REVENUES AND EXPENDITURES

In case, the government has to depend entirely on its revenue to incur expenditures, then instability in revenue will lead to instability in expenditures. However, the government can borrow from within and outside the country to finance its expenditures. Therefore, it is not necessary that instability in revenue will lead to instability in expenditures. It is quite possible, on the other hand, that the expenditures may exhibit greater instability than the revenue in case, there are large fluctuations in the borrowings from internal and external sources. The result for the

instability in the total government revenues and expenditures for the period from 1971-72 to 1985-86 are presented in Table 3. According to the instability index I, the level of the instability of both the revenues and the expenditures is more or less the same. But the results based on the instability index Z show that the expenditures are more unstable than the revenues. Instability in the total expenditures is largely due to instability in the development expenditures.

Table 3

Estimates of Instability Indices for Federal Government Total Revenue and Expenditures for the 1971-72 to 1985-86 Period

	Instability Index I	Instability Index Z
Total Revenue	18.09	8.46
Total Expenditures	17.80	11.73

SUMMARY AND CONCLUSIONS

In this study, we have tried to estimate the level of instability of the federal government revenues, expenditures and their subcategories. Two alternative measures of instability, I and Z, have been used for this purpose. For a perfectly stable revenue source, the index I requires that revenue from the source must increase each year by exactly the same amount and the index Z requires that it must grow each year at a constant rate.

The instability of the revenues have been estimated for two periods, i.e., 1959-60 to 1970-71 and 1971-72 to 1985-86. The results show that the level of instability of total revenues has increased over time according to both the instability indices. For the period from 1959-60 to 1970-71, the two instability indices describe non-tax revenue much more unstable than tax revenue. However, for the latter period the two indices yield conflicting results. Total direct taxes were more unstable than total indirect taxes in both the periods. However, the level of instability of total direct taxes decreased and that of total indirect taxes increased over time. In both the periods 'other direct taxes' were more unstable than income and corporate taxes, and in different subcategories of indirect taxes, excise duties were most stable and other 'other indirect taxes' least stable.

On the expenditure side, the analysis was carried out only for the 1971-72 to 1985-86 period due to data constraints. Predictably, the development expenditures turn out to be much more unstable than non-development expenditures.

When the instability level of total government revenues and expenditures are compared, the level of instability of the two is not much different from each other according to the instability index I, while expenditures are more unstable than the revenues when the index Z is used.

The stability of revenue is necessary for smooth fiscal and development planning. However, the fact is that the government revenues are not perfectly stable. Therefore, the government should take into account the level of instability of its different revenue sources when preparing budgets and development plans. In case, this is not done, the government can end up with financial problems which may force it to resort to deficit financing or borrowings from the non-banking sector. All this can have undesirable effects on the economy.

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Comments on "Instability of Federal Government Revenues and Expenditures in Pakistan"

This is an interesting topic. However, the paper fails to do full justice to it. My comments relate to (a) conceptualization of the problem; (b) specification of the estimating method, (c) interpretation of results; and (d) possible directions for further work.

(a) The paper fails to develop a conceptual framework within which the instabilty of expenditures and revenues could be analysed. No cause and effect relationship has been developed from which a reduced form could be derived and tested. In the process, the paper has limited the analysis of instability to a mechanical format in which, it is assumed, that instability is a function of time. This methodology is fine for a cross-section analysis and a comparison of countries but is not suitable for an in-depth analysis of a single country. Thus, the paper is not "explanatory", it is only descriptive of a situation. Surely, important factors such as the structural shifts in the economy and inadequacies in expenditure control and revenue collection lie behind the instability phenomenon. The paper would have benefited from an assessment of these factors.

(b) The eclectic approach followed by the paper has limited usefulness for understanding the form and causes of instability. In particular, equal treatment of instability in expenditure and revenues is misleading. Surely, factors underlying expenditures instability are different from those underlying revenues. Moreover, it is not clear why and how the two estimators were selected? It would have been far better if, as stated earlier, indicators had been endogenously determined. As they stand, they provide (at least) a spurious correlation between time and instability rather than a functional cause-and-effect relationship. Furthermore, the two indicators used in the paper are presented as equally useful and as complements to each other. In the context, they are expected to reinforce each other. While both have their limitations, clearly the so-called Z indicator is far better than the so-called I indicator for a longer period analysis and would provide a more stable estimate then the I indicator.

(c) The results derived by the paper are predictable and not surprising. However, it would have been better to abstract from evaluating instability of expenditures which has, in any case, been handled in a rather cursory and casual fashion. This section does not add anything to the paper. Perhaps, it should be dropped and the paper focus only on revenues with greater disaggregated analysis of revenue items. Some of the results derived, have not been adequately pursued. For example, the reduced instability of direct tax revenue during 1971-72 – 1985-86 period has been associated with a reduction in the share of such revenues in total revenue. Is there a causal relationship underlying this phenomenon? A fully conceptualized behavioral hypothesis would have allowed the paper to do so.

(d) The final test of any paper is its ability to provide directions for change in policy. In this respect, the paper is, at best, ambivalent. The paper concludes that there is greater instability of direct tax revenues. Does this mean that the government should move towards more indirect tax. Surely that could not be the author's intent. The casual empiricism underlying this paper's eclectic approach to such an important subject does not provide guidance to policy-makers.

I would suggest a less grandiose approach. Instability should be evaluated for each revenue item by formulating "explanatory" hypothesis rather than defined upon eclecticism. Instability should then be viewed as a function of variables such as income changes in the structure of the economy, external environments, and exogenous factors such as related government policy changes rather than of time. In this respect, it should be recognized that the stability of, say, excise duty relates to the fact that it applies to capacity to produce while instability in corporate tax relates, at least to some extent, to the overall economic conditions and profitability.

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A Rational Expectations Macro-econometric Model of Pakistan's Monetary Policy since 1970s

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I. INTRODUCTION

Since April 1985 the operations of the entire financial sector in Pakistan have been transformed into a system which is expected to conform to the laws of Islamic society. Under this system all banks and other financial institutions are supposed to conduct their borrowing and lending according to an interest-free Islamic financial system, except for past commitments which may have been carried over in accordance with original commitments.[1] With this rapid transition towards the interest-free banking system in Pakistan, the present decade has witnessed the emergence of the State Bank of Pakistan as a key participant in the area of policy formation. Indeed, the greater participation of the governor and the bank has given rise to a considerable amount of discussion and debate over Pakistan's monetary policy among the academics and politicians at home and abroad. To a large extent, this discussion and analysis has been essentially descriptive, being based upon casual observations rather than tightly formulated econometric models. From the viewpoint of understanding Pakistan's economy over the 1970s and 1980s within the framework of a complete macro model, there is a growing need to empirically establish the mechanisms of monetary policy in Pakistan and to determine its impact on such macro-economic variables as real output and employment.

The purpose of this paper is to specify and estimate a simple open economy rational expectations model of Pakistan's monetary policy over the Seventies and Eighties. To this end, we investigate the channels and timing of Pakistan's monetary

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[1] The recent national desire for the elimination of interest from the Pakistani economy was indicated as early as 1977 when the President of Pakistan asked the Council of Islamic Ideology to prepare a blueprint for the establishment of an interest-free economic system consistent with the Islamic laws. Consequently, by January 1981, the operations of the banks were partially brought under the new interest-free banking system by opening profit-loss-sharing (PLS) deposits [for more discussion on the Islamization of the banking sector in Pakistan, readers can refer to Government of Pakistan (1985)].

policy over the past two decades in a simultaneous system of equations. The model, which comprises of five interdependent equations, determines (a) the nominal money supply (M_1), (b) deviations of real output from trend, (c) the nominal opportunity cost of money balances, (d) the inflation rate, and (e) the spot exchange rate. Agents, in this model, are assumed to be rational in the sense that they take into account the behaviour of the State Bank and form expectations over nominal and real opportunity costs of money balances. The system of equations is efficiently estimated by a full information maximum likelihood generalized Errors-in-Variables (FGEV) method e.g., Wickens (1983) and Hasan (1987a) and a single equation Two-Step-Two-Stage Least Squares (2S2SLS) method e.g., Cumby *et al.* (1983) and Hasan (1987a) proposed for rational expectations macro-economic models. The quarterly data for this study covers the period 1972–1 to 1985–4. Careful consideration will be given in the estimation and testing of the dynamic structure of the model, which will ensure, among other things, that the impact delays of monetary policy are correctly measured.

The paper is divided into four sections. In Section 2 an outline of the basic framework of the model is given. Section 3 focuses on the estimation procedure and the interpretation of the results. Section 4 presents the conclusions from the study.

2. THE MODEL

In this paper, we use a small, five equation, linear dynamic open economy macro model to describe Pakistan's monetary policy over the 1970s and 1980s. Our choice of a small system of equations model stems from the fact that, over the last decade, the emphasis in macro-econometric modelling in both developed and developing countries has switched away from the large-scale models towards small, possibly non-linear ones.[2] An advantage of a small system of equations model is that it enables the researcher to analytically solve the expectations variables. Thus, the reduced form of the model can be estimated by incorporating the cross-equation rational expectations restrictions.

The five equation structural model describing the monetary policy of Pakistan is given below:

Money Demand

$$m_t - p_t = \alpha_0 + \alpha_1(y_t + \bar{Y}_t) + \alpha_2 E(i_t \mid \Phi_{t-i}) + \alpha_3(m_{t-1} - p_{t-1}) + \mu_{1t} \quad \ldots (1)$$

[2] One can provide many reasons for this movement. However, one important consideration is the consistency that arises when an econometrician is required to model in a systematic and coherent manner the interlinks of the various stipulated functional relations. Small systems force the researcher to focus upon those interlinks that are believed to the crucial to the particular problem at hand. [For a detailed discussion and applications of some of the small system of equations model for U.S. and Canada readers can refer to Raynauld (1981); McCallum (1976); Leiderman (1979); and Sargent (1976).]

Real Output

$$y_t = \beta_0 + \sum_{i=1} \beta_{1t} y_{t-i} + \sum_{i=0} \beta_{2i} (m_{t-i} - p_{t-i}) + \beta_3 [E(i_t|\Phi_{t-i}) -$$

$$E(\pi_t|\Phi_{t-1})] + \sum_{i=0} \beta_{4i} (p_{t-1} - f_{t-i} - p^*_{t-i}) + \sum_{i=1} \beta_{5i} y^*_{t-i} + \mu_{2t} \quad (2)$$

Interest Rate

$$i_t = \gamma_0 + \sum_{i=1} \gamma_{1i} i_{t-i} + \sum_{i=0} \gamma_{2i} (i^*_{t-1} - i_{t-1-i}) + \sum_{i=1} \gamma_{3i} y_{t-i}$$

$$+ \sum_{i=1} \gamma_{4i} \pi_{t-i} + \sum_{i=1} \gamma_{5i} f_{t-i} + \mu_{3t} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

Inflation Rate

$$\pi_t = \lambda_0 + \sum_{i=1} \lambda_{1i} \pi_{t-i} + \mu_{4t} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (4)$$

Exchange Rate

$$f_t = \delta_0 + \sum_{i=1} \delta_{1i} f_{t-i} + \mu_{5t} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (5)$$

where y_t is the logarithmic (log) deviation of the real output (Y_t) from its trend value ($\bar{Y}_t$), p_t is the log of the price level, p^*_t is the log of the U.S. price level, π_t is the inflation rate ($p_t - p_{t-1}$), m_t is the log of nominal money stock (M_1) i_t is the nominal rate of interest, i^*_t is the U.S. nominal rate of interest, f_t is the log of spot exchange rate, $E(i_t|\Phi_{t-i})$ is the expected value of i at time t based on the information set Φ at $t-1$, $E(\pi_t|\Phi_{t-1})$ is the expected value of π at time t based on Φ at $t-1$. μ_{1t}, μ_{2t}, μ_{3t}, μ_{4t}, μ_{5t}, ν_{1t} and ν_{2t} are the random shocks and they are assumed to be serially uncorrelated with zero mean, constant variance and are also assumed to be contemporaneously uncorrelated with each other.

Equation (1) is the money demand equation and is based upon the conventional real-partial adjustment specification. A similar kind of money demand (assuming with and without rational expectations hypothesis) has served as a basis for much of the applied research in Pakistan e.g., Mangla (1979); Khan (1980, 1982); and Hasan (1987b). Under a free competitive financial market system one would expect the increase in real income and the expected interest rate to cause real money balances to increase and decrease, respectively. Moreover, the speed of adjustment coefficient ($1 - \alpha_3$) is to be positive and less than unity. However, on the other hand, in the case of developing economies where the forces of free markets are less prevalent than those of government controls, one could in that situation obtain results that are different from the conventional ones.

Equation (2) represents the demand for real output of the economy, which can be viewed as a reduced form of the conventional IS curve. The distributed lag output variable in the equation is introduced to capture any multiplier-accelerator effect and any other sources of persistence. Wealth effects on expenditures which are expected to respond positively to the aggregate demand are captured through the current and lag values of real balances. Expected real rate of interest should cause the real output to decrease through the consumption and investment demand functions. Expectations are, of course, assumed to be formed rationally based upon the useful information set available to the agents at time $t-1$.

As for the terms of trade variable $(p_t - f_t - p_t^*)$ we have allowed an unrestricted distributed lag structure. According to economic theory, one should expect a negative effect of the terms of trade variable on the real output variable. In other words, a currency depreciation that lowers the terms of trade (i.e., raising import prices relative to export and domestic prices), shifts both domestic and foreign demand from the foreign to the domestic good, consequently raising real output. Finally, in order to take into account the openness of Pakistan's economy, we incorporate U.S. real output as a proxy for the foreign aggregate demand. One would expect a positive relationship between domestic and foreign real output through higher net export demand. The real output equation described above is similar to the closed economy aggregate demand equation.

In Equation (3), we have attempted to specify the behaviour of the State Bank in setting interest rates in the 1970s and early 1980s by a reaction function. We recognize that it is very difficult to model a reaction function that should take into account all aspects of the bank in establishing interest rates. In our specification, we have taken a more intuitive and simple approach in setting up a bank's reaction function. The distributed lag values on the interest rate in Equation (3) are intended to pick up any costs of adjustments from large changes in the foreign interest rates (i.e., the U.S. rates). The difference between the current foreign (U.S.) and lag domestic interest rates and the lag exchange rate variables are used to pick up any current exchange rate considerations used by the bank in fixing the interest rates. One should expect no deviation between domestic and foreign interest rates if the capital were perfectly mobile and consequently γ_{20} would be unity and other γ_{2i}s to be zero. However, if the capital were imperfectly mobile, then the degree to which the bank takes into account exchange movements in the foreign interest rates may be measured by the values of γ_{2i}s. The presence of the lag real output and the inflation rate is intended to capture the aggregate demand conditions of the economy and the coefficients of these two variables are expected to be positive.

We have chosen to model inflation and exchange rate movements by univariate autoregressive (AR) processes. The use of pure time-series techniques is primarily

due to the absence of adequate econometric specifications of these variables for Pakistan.[3]

3. ESTIMATION METHODS AND RESULTS

In this section, we discuss the derivation of the rational expectations solution of the model, the estimation strategy and the results.

Rational Expectations Solution

The rational expectations estimation of a system of equations model can be carried out consistently at both *reduced* and *structural* form levels. The estimation technique at the reduced form level is known as the Full System Substitution (FSS) Method. The two structural form estimation methods are: (a) Two-Step Two-Stage Least Squares (2S2SLS) Method proposed by Cumby *et al.* (1983) and (b) Full Information Maximum Likelihood Generalized Errors-in-Variables (FGEV) Method proposed by Wickens (1983).[4] The implementation of these estimation techniques for rational expectations models are briefly given below.

In order to estimate the model at the reduced form level using the FSS method we first need to eliminate the unobservable expected variables from the structural model. We will assume that agents are rational and that in their forecasting processes, they have knowledge of the structure of the model and that all exogenous and lagged endogenous variables are contained in the agent's information set Φ at time $t-1$. The rational expectations solution of the model requires that we take expectations of Equations (3) and (4) conditional upon Φ_{t-1}, that is;

$$E(i_t \mid \Phi_{t-1}) = \gamma_0 + \sum_{i=1} \gamma_{1i} i_{t-i} + \sum_{i=0} \gamma_{2i} (i^*_{t-1} - i_{t-1-i}) + \sum_{i=1} \gamma_{3i} y_{t-i}$$

$$+ \sum_{1=1} \gamma_{4i} \pi_{t-i} + \sum_{i=1} \gamma_{5i} f_{t-i} \qquad \ldots \qquad \ldots \qquad \ldots \qquad (6)$$

$$E(\pi_t \mid \Phi_{t-1}) = \lambda_0 + \Sigma \lambda_{1i} \pi_{t-i} \qquad \ldots \qquad \ldots \qquad \ldots \qquad (7)$$

and then substitute the resulting equations into Equations (1) and (2). This will give us two nonlinear equations with no unobservable variables:

[3] The use of pure time series representations to describe the processes generating is quite common [see, e.g., Hansen and Sargent (1982), Vandaele (1983)].

[4] A detailed discussion on these methods can be found in Cumby *et al.* (1983; 2S2SLS) and Wickens (1983; FGEV). A summary and the relative small sample efficiency for all these techniques is given in Hasan (1987a).

$$m - p = \alpha + \alpha (y + \bar{Y}) + \alpha_2 \left\{ \gamma_0 + \sum_{i=1} \gamma_{1i} i_{t-i} + \sum_{i=1} \gamma_{2i} \right.$$

$$(i^* - i_{t-1-i}) + \sum_{i=1} \gamma_{3i} y_{t-i} + \sum_{i=1} \gamma_{4i} \pi_{t-i} + \sum_{i=1} \gamma_{5i} f_{t-i} \Big\} +$$

$$\alpha_3 (m_{t-1} - p_{t-1}) + \mu_{2t} \quad \ldots \quad \ldots \quad \ldots \quad \ldots \quad (8)$$

$$y_t = \beta_0 + \sum_{i=1} \beta_{1i} y_{t-i} + \sum_{i=0} \beta_{2i} (m_{t-i} - p_{t-i}) + \beta_3 \left\{ \gamma_0 + \sum_{i=1} \gamma_{1i} i_{t-i} \right.$$

$$+ \sum_{i=0} \gamma_{2i} (i^*_{t-1} - i_{t-1-i}) + \sum_{i=1} \gamma_{3i} y_{t-i} + \sum_{i=1} \gamma_{4i} \pi_{t-i} + \sum_{i=1} \gamma_{5i} f_{t-i}$$

$$\left. + \lambda_0 + \sum_{i=1} \lambda_{1i} \pi_{t-i} \right\} + \sum_{i=0} \beta_{4i} (p_{t-i} - f_{t-i} - p^*_{t-i}) + \sum_{i=1} \beta_{5i} y_{t-i} + \quad (9)$$

The above system of Equations [(8) and (9)] along with Equations (3), (4), (5), and (6) can be efficiently estimated by a Zellner's Seemingly Unrelated Regression method.

The 2S2SLS method is a single equation technique which estimates the parameters of the structural equations one at a time. With this method the unobserved rational expectations variables in the structural model are replaced by their actual value, thereby creating an errors-in-variables problem. The equation is then estimated by an instrumental variables method.

On the other hand, FGEV is a full information method which, though obviously more complex, is conceptually simple. It is easier to describe the FGEV method as a generalized 'instrumental variable" method. Like 2S2SLS, the FGEV method is also a structural form estimation method. The unobserved expectations variables in this method are replaced by the actual observed variables in the system, thereby creating errors in the variables.

Estimation Strategy

As we can see, the rational expectations hypothesis imposes complicated cross-equation nonlinear restrictions on the reduced form model. The above FSS method is feasible in estimating the reduced form model but it is computationally much more difficult and costly to implement than the other two methods. Hence, for this study we will use the two structural forms of the rational expectations methods discussed earlier.

The specific lag structure of each equation comprising the system was determined on the basis of the ordinary least squares (OLS) method. In particular, we set the lag length at four (since we have quarterly data) and then, on the basis of a t-test, the actual lag was established.

Results

Utilizing the methods described above, the model was estimated for Pakistan's economy using seasonally adjusted quarterly data over the period 1972-1 to 1984-4.[5] All data were collected from the various issues of the *International Financial Statistics* published by the International Monetary Fund.

Table 1 presents the 2S2SLS estimates for the model. For each equation, a set of four period lag exogenous and endogenous variables were used as an instrument set for the right-hand-side endogenous variable. The insignificant lags are not reported in the table. The 2S2SLS results can be summarized as follows:

(a) The estimated parameters of all the coefficients in the money demand equation have the expected sign. However, the coefficient of the expected interest rate variable is insignificant. A similar type of result was also found by Hasan (1987b) in an earlier study. One of the economic reasons given for the justification of this kind of result is that there is a lack of broader and competitive financial markets in the country. One other reason that could also be given for getting such an insignificant interest rate coefficient may relate to the behaviour and the constraints of the economic agents within which they operate in the economy. From the religious and social point of view, the interest rate is considered to be an undesirable thing by a good majority of people in the country.

(b) It is also interesting to note that although the coefficient of the expected real rate of interest in the real output equation has the right negative sign, the variable itself is statistically insignificant. These results may suggest that not only the interest rate is unimportant for the holders of financial assets (as found in the money demand equation) but it is also equally unimportant for the investors of goods and services. The demand for real output depended significantly on the positive lagged values of real output and money supply and on the negative values of terms of trade variable. However, the increase in the foreign (U.S.) demand for real output did not significantly increase the real output for Pakistan. Such a result can be justified on the basis of the import quotas and trade restrictions imposed by the government on various occasions in the past.

(c) The lagged domestic exchange rates, interest rates and the lagged U.S./Pakistan interest rate differentials were important in setting the domestic interest rates. This evidence may suggest that the open economy considerations were important factors in designing the domestic interest rates.

(d) Finally, the exchange rate movements were captured by a second order AR process while the inflation rate followed an AR (1) process.

[5] The model was estimated using econometric package programmes called TSP, RATS and another written by Cumby and Huizinga (1984). TSP was used to implement the FGEV method, while the Cumby and Huizinga programme handled the 2S2SLS method. The ARIMA model and the forecasts were made by using RATS.

Table 1

Two-Step Two Stage Least Squares (2S2SLS) Estimates of the System

Money Demand: $m_t - p_t = 0.6082 + 0.1792(y_t + \bar{Y}_t) - 0.01233\,E(i_t|\Phi_{t-1}) + 0.6639(m_{t-1} - p_{t-1})$
(2.05) (5.56) (0.71) (14.14)
$R^2 = 0.958$

Real Output: $y_t = -1.7181 + 0.3464y_{t-1} + 0.7401(m_t - p_t) - 0.01563[E(i_t|\Phi_{t-1}) - E(\pi_t|\Phi_{t-1})]$
(2.65) (2.45) (3.49) (0.84)

$-0.8276(p_t - f_t - p_t^*) + 0.2876y^*_{t-1}$ $R^2 = 0.786$
(4.71) (1.21)

Interest Rate: $i_t = 0.3246 - 0.3301i_{t-2} + 0.1754(i_t^* - i_{t-1}) + 2.9788y_{t-1} + 10.7539\pi_{t-2}$
(1.97) (2.46) (2.51) (2.48) (1.89)

$-5.5568f_{t-2}$ $R^2 = 0.556$
(2.34)

Inflation Rate : $\pi_t = 0.01992 + 0.2849\pi_{t-1}$ $R^2 = 0.080$
(3.55) (2.03)

Exchange Rate : $f_t = -0.1031 + 0.2282f_{t-1} - 0.2743f_{t-2}$ $R^2 = 0.950$
(1.95) (5.55) (2.10)

Notes: The notations and explanation of different variables are presented in the text. Figures in parentheses are absolute *t*-values.

Table 2

Full Information Maximum Likelihood Errors in Variables (FGEV) Estimates of the System

Money Demand : $m_t - p_t = \underset{(2.38)}{0.5023} + \underset{(5.56)}{0.2931}(y_t + \bar{y}_t) - \underset{(0.48)}{0.0112}E(i_t|\Phi_{t-1}) + \underset{(2.88)}{0.941865}(m_{t-1} - p_{t-1})$

Real Output : $y_t = \underset{(3.07)}{-1.1655} + \underset{(2.45)}{0.55201}y_{t-1} + \underset{(3.49)}{0.3265}(m_t - p_t) - \underset{(0.61)}{0.0796}[E(i_t|\Phi_{t-1}) - E(\pi_t|\Phi_{t-1})]$

$\underset{(2.61)}{-0.1402}(p_t - f_t - p_t^*) + \underset{(1.62)}{0.5409}y^*_{t-1}$

Interest Rate : $i_t = \underset{(1.89)}{0.3246} - \underset{(3.15)}{0.3301}i_{t-2} + \underset{(2.35)}{0.1754}(i^*_t - i_{t-1} + \underset{(3.75)}{2.9788}y_{t-1} + \underset{(2.17)}{10.7539}\pi_{t-2}$

$\underset{(2.42)}{-5.5568}f_{t-2}$

Inflation Rate : $\pi_t = \underset{(3.72)}{0.01992} + \underset{(1.98)}{0.2849}\pi_{t-1}$

Exchange Rate: $f_t = \underset{(2.36)}{-0.1031} + \underset{(4.34)}{0.2282}f_{t-1} - \underset{(2.31)}{0.2743}f_{t-2}$

Notes : The notations and explanation of different variables are presented in the text. Figures in parentheses are absolute *t*-values.

After estimating the model by 2S2SLS we then simultaneously estimated the complete model at the structural level by the FGEV method. The results of FGEV are reported in Table 2. The results of FGEV are qualitatively similar to that of the 2S2SLS method.

4. CONCLUSIONS

The conclusions of this paper are summarized in this section. In this paper we specified and estimated a small system of an open economy rational expectations model for Pakistan's monetary policy during the period covering the 1970s and early Eighties. Although it is very difficult to capture all aspects of the behaviour of the State Bank, a simple but intuitive interest rate setting equation was modelled in this paper. The proposed model does appear to fit well Pakistan's economy and the 2S2SLS method, in general, performed better than the FGEV method.

The results of this paper may have important implications in formulating Pakistan's monetary policy in the light of the present transition towards an interest-free banking system in the country. Our results suggest that, in the past, economic agents (both investors and the holders of financial assets) paid little or no attention to the government controlled interest rates. Consequently, a PLS type of banking system, as adopted by the banking sector recently could be a more viable alternative than the earlier system in promoting a healthy and strong economy in the long run.

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Comments on "A Rational Expectations Macro-econometric Model of Pakistan's Monetary Policy Since 1970s"

This paper by Dr Hasan is a good example of competent and useful applied macro-economic analysis on Pakistan. The paper does two things. First, it provides a quantitative examination of Pakistani monetary policy since the 1970s. Aside from some studies on money demand, there has been surprisingly little effort made to test basic monetary hypotheses on data for Pakistan. Second, it formulates a small aggregate model that utilizes a rational-expectations framework. Model builders in Pakistan have been enamoured with large-scale econometric models that often only they understand. Such large-scale models have fallen into some disrepute, and there is an increasing trend in economics towards constructing small models that have a clear theoretical foundation. Dr Hasan's model is fairly transparent and thus easy to understand, and it explicitly incorporates rational expectations, which have been one of the major theoretical and empirical advances that have taken place in the last decade or so. The rational expectations "revolution" has now been imported into Pakistan by Dr Hasan's capable efforts.

I commend the author for his attempt in both putting rigor where once only descriptive analysis – of the type produced regularly in the Pakistan Economic Survey – ruled, as well as in using state-of-the-art technology. However, I am certain that Dr Hasan would acknowledge that what he has done is at best only a first step. Being that, there are weaknesses and problems in the paper that I would like to bring out and discuss. The remainder of my Comment will deal first with the specification of the model, and then turn to the empirical analysis.

Specification of the Model

Before getting into a discussion of the individual equations in the model, I have a general point to make on Pakistani monetary policy that is not captured by the model developed in this paper. While the interest rate (specifically the discount rate of the State Bank) is a policy instrument, it is not the principal one. In Pakistan, monetary policy is conducted within the framework of a credit plan. In this credit plan, ceilings are set on the expansion of overall bank credit, and selective credit policies are used to allocate credit towards the desired sectors. The relevant model is, therefore, neither one in which interest rates are controlled and credit (money

supply) is endogenous, nor one in which credit is controlled and interest rates are free. What we are really looking at is a credit-rationing world in which the State Bank is attempting to fix both the price and quantity of credit. If one wants to accurately represent the financial system of Pakistan, my own preference would be to go the credit-rationing route rather than trying to apply classical models that have worked well for developed economies.

Coming now to the five equations in the model, I have the following points:

(a) In the money demand equation it would seem that the expected rate of inflation, π^e, should also be included. In developing countries, such as Pakistan, substitution can and does take place between money and real assets as well as between money and financial assets. As π^e rises one would expect that the demand for real money balances would decline and the demand for real assets, such as jewellery, real estate, consumer durables, etc., would increase.

(b) I was surprised to find no role for government expenditures in the *real output equation.* I think the author is being too ultra-classical here. One does not have to be a Keynesian to acknowledge that government spending has a direct effect on consumption and investment. In fact, I would go further and argue that government capital expenditures have done quite a lot to stimulate both short-term and long-term growth in Pakistan. A second point relating to output determination is the effect of the variable $(p_{t-i} - f_{t-i} - p^*_{t-i})$. It is argued in this paper that this picks up the terms of trade effect. But this variable is more properly defined as the real exchange rate, and if one takes the expected signs at face value one would argue that a real appreciation raises output. There is, however, considerable controversy in the literature as to whether a devaluation raises or lowers output, and as the issue is essentially an empirical one I would leave the sign ambiguous.[1]

(c) The modelling of a government reaction function is always a difficult task, because one is really trying to get into the minds of the government authorities. Furthermore, as the authorities change the variables they look at, and alter the weights they assign to the variables, the reaction functions are also likely to change. These problems are well known, but no reference is made to them. I still believe that a credit reaction function would have been more appropriate for Pakistan than the *interest rate equation,* but let me make a few observations on the latter. The State Bank's discount rate policy has been guided by several factors that are not present in the specification. First, it can be argued that the State Bank has kept the interest rate low to keep the borrowing costs of the Government of Pakistan on the sale of its bonds down. Second, many observers feel that in recent years there has been a deliberate attempt to keep the spread between rates on savings deposits and PLS accounts fairly wide to facilitate the use of the latter. Finally, and perhaps more

[1] This point will be taken up again in the discussion of the empirical results.

importantly, the level of foreign reserves has guided the actions of the State Bank. Looking at the history of macro-economic policy-making in Pakistan if there is one thing that stands out it is the government's preoccupation with external imbalances and its stock of international reserves. Surely interest rate policy would be geared to the difference between desired and actual stocks of foreign reserves.

(d) While it is simple and customary to model the *inflation rate* as an AR process, it obviously begs a lot of economic questions. In Pakistan foreign inflation has had a significant effect on domestic inflation – the bursts of inflation in 1974–76 and 1979–81 were associated with the dramatic increases in international oil prices. This autoregressive (AR) model also implies that inflation is independent of domestic real and monetary shocks. I doubt whether anyone would seriously argue that factors such as crop failures or deficit-financing by the government have no inflationary impact on the economy.

(e) The *exchange rate equation* is also specified as an AR process. Here again I would argue that variables such as foreign interest rates, exchange rates of competitor countries, the inflow of remittances, etc., have an important effect on exchange rate policy in Pakistan. There is also an inconsistency here – how can interest rates be endogenous to foreign variables while the exchange rate is exogenous? Surely the State Bank uses both instruments in response to external shocks. Finally, since the exchange rate was fixed between 1974 and 1981, and it was only after the delinking in January 1982 that it started to move against the U.S. dollar, the parameters of the AR model are an average of the two sub-periods. In the first sub-period the AR1 parameter was obviously unity and it seems pointless to estimate it. At least one could use intervention analysis to pick up that break in the process if one did not want to estimate the equation only from the first quarter of 1982.

Results

While the empirical findings are generally sensible and indicate that rational expectations models have a place in Pakistan, I still have certain reservations about a few particular results that are obtained.

(a) The average lags in adjustment of real money balances seem excessively long For example, the mean time lag calculated from the results reported in Table 2 is about five years! My guess is that the equation is misspecified and that the lagged dependent variable is picking up the effect of a missing variable (perhaps).

(b) It would have been useful to present Q-statistics in the results. As it stands we have no idea whether there is any serial correlation in the errors of the estimated equations.

(c) In the real output equation results the partial derivatives of output (y) with respect to the exchange rate (f) and the stock of real money balances (m-p) seem very large. If these estimates are to be believed then a devaluation of 10 percent would

cause output to rise by over 8 percent in the same quarter (remember that prices are unaffected). I am not sure the Pakistani authorities are that optimistic about the expansionary effects of devaluation. In fact, there is a fear that devaluation would be contractionary, at least in the short run.

(d) Given that the financial system has changed in recent years with the move towards Islamization, I wonder if the same model is applicable now as it was in the 1970s. Since we know of the change in regime, it would be only natural to test for stability of the regression equations. One could then proceed to adjust for shifts in the equations if needed.

(e) It is interesting to note that the 4th order lag coefficients are statistically significant in the ARIMA models for both real output and real money balances (Appendix). This may be because seasonally adjusted data is being used. In other words, if the data are smoothed by some filter to eliminate seasonality, and then an ARIMA model is fitted this model will capture the parameters of the original filter. The more normal procedure is to use raw data, ensure stationarity, and then estimate the ARIMA model. This way you simultaneously get the estimates of the lag parameters and seasonal factors.

Conclusions

It may appear that this Comment is simply a litany of the errors and problems I found in Dr Hasan's paper. This impression, however, has to be set against the fact that Dr Hasan has taken on a difficult task that has befuddled many economists, careful modelling of developing countries is not child's play and for the amateur. My own feeling is that such modelling has to proceed in stages, building gradually to a more accurate representation of the economy. Dr Hasan's paper is the first stage and my suggestions are directed more at future efforts, including I hope those of Dr Hasan, in this very fruitful area.

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Monetary Anticipations and the Demand for Money: An Application for the South Asian Region

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1. INTRODUCTION

While there are a number of issues in economics which are frequently scrutinized, the most important of them probably is the determination of a stable money demand function. Other issues in this regard relate to the choice between (i) broad vs narrow definition of money; (ii) measured vs.permanent income; (iii) short-term vs. long-term interest rate; and (iv) inclusion of a variable for inflation or expected inflation.

Quite recently, a new dimension has been added to the demand for money function. It is now argued that unanticipatory changes in the nominal money supply also affect the real demand for money. Darby (1972) has proposed that unanticipatory nominal money supply behaves as a shock-absorber in the money demand function. Initially, Laidler (1980) and then Carr and Darby (1981) formulated a shock-absorber model in which they have shown empirically that unanticipatory shocks in money supply positively affect the demand for money. Inclusion of this shock variable was justified by Darby (1972) on the ground that money balances serve as a buffer stock or shock-absorber which temporarily absorbs unexpected variations in income, especially the transitory income, until an adjustment is reached in adjusting the portfolio of securities and in consumer durable goods. The shock-absorber model of Carr and Darby is based on the following two hypotheses:

(i) Changes in money supply which are fully anticipated will be reflected in price level expectations and, therefore, in nominal demand; and

(ii) Changes in money supply which are unanticipated will temporarily be stored in bank accounts. The adjustment in interest rates and the price level will not be so quick, so that money demand equals money supply.

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Therefore, these unexpected changes in money supply will affect real money balances with positive sign.

The second hypothesis was tested by Carr and Darby (1981) for eight industrial countries. Their results show that unanticipated money supply changes always positively affect the real demand for money. Furthermore, this particular result is insensitive to the estimation techniques.

Mackinnon and Milbourne (1984), while commenting on the Carr and Darby paper have shown that the econometric technique used by them yield severely biased estimates. Mackinnon and Milbourne (1984) arrived at this result after making a number of algebraic manipulations to the original model. However, in a later article Carr, Darby and Thornton (1985) refuted the comments of Mackinnon and Milbourne on the grounds that the economics used by the later to clarify their position was wrong. In the process, Carr, Darby and Thornton (1985) not only proved their second hypothesis as correct, they also proved that their first hypothesis was also correct. An attempt similar to the above was also made by Khan (1980). In this article a monetary anticipation model was estimated for a developing economy.

The present exercise is taken up with a view to put the hypotheses of the Carr-Darby Model to further empirical testing for developing countries of the South Asian region. For this purpose, time-series data have been collected for the relevant variables for Pakistan, India, Sri Lanka and Bangladesh.[1]

The plan of the paper is as follows. The paper is divided into four parts. After the introduction and a brief review of literature, the second part outlines the proposed model. The third part reports the methodological issues and the results of estimation, while the last part concludes this study.

II. THE PROPOSED MODEL

The conventional real money demand function as given by Cagan (1956) is usually expressed as a Cobb-Douglas type function of a scale variable (usually current or permanent income) and one or more interest rate variables. The general form of the equation where all the variables are real and are expressed in logarithmic form is given as follows:

$$m_t^d = \alpha_0 + \alpha_1 y_t + \alpha_2 r_t \quad \ldots \quad \ldots \quad \ldots \quad (1)$$

[1] Data in this study covers a period from 1960 to 1982. The authors are thankful to Mr Muslehuddin, Staff Economist, PIDE for providing the necessary data for this study.

where

$m_t^d = M_t - P_t$ = logarithm of real money demand;

$y_t = Y_t - P_t$ = logarithm of real income;

r_t = logarithm of interest rate;

P_t = logarithm of price level; and

M_t = logarithm of nominal money demand.

We assume that there is a tendency of partial adjustment of actual to the desired level of money stock. The partial adjustment model as proposed by Chow (1966) is

$$m_t - m_{t-1} = \lambda(m_t^d - m_{t-1}) \quad \ldots \quad \ldots \quad \ldots \quad (2)$$

Combining Equation (2) with Equation (1), we get the usual real money demand equation where there is a lagged dependent variable along with other exogenous variables. The new equation, after substitution, is the following:

$$m_t = \beta_0 + \beta_1 y_t + \beta_2 r_t - \beta_3 m_{t-1} \quad \ldots \quad \ldots \quad \ldots \quad (3)$$

As stated by Darby and Carr (1981), the Chow model is also consistent with contemporaneous changes in expected nominal money supply and price level, but it does not work so well when there are nominal money shocks. To incorporate this type of expression, they have developed the following relationship. Assume that M_t^s is the logarithm of nominal money supply and M_t^a is the anticipatory value of M_t^s. The hypothesis states that real money holding is not simply related to real money demand as in Equation (3) but it also includes a term for unanticipated value of money as in the extended Equation (4), i.e.,

$$m_t = \beta_0 + \beta_1 y_t + \beta_2 r_t + \beta_3 m_{t-1} + \alpha(M_t^s - M_t^a) \quad \ldots \quad \ldots \quad (4)$$

The second type of modification in the original model as proposed by Carr and Darby is the addition of a term for transitory income. The reason for the inclusion of this variable as suggested by Darby (1972) is that all unexpected variations of

income, especially the transitory income, are absorbed by money balances until there is final adjustment in the portfolio of securities.

Finally, the new proposed model can be differentiated from Equation (3) by making a choice for permanent income in place of current income. Therefore, after introducing the two changes, i.e. the choice of permanent income in place of measured income and by adding the transitory income in Equation (4), we get the following expression;

$$m_t = \gamma_0 + \gamma_1 y_t^p + \gamma_2 y_t^T + \gamma_3 r_t + \gamma_4 m_{t-1} + \alpha (M_t^s - M_t^a) \quad (5)$$

where

$y_t \simeq y_t^p + y_t^T$

y_t^p = logarithm of permanent income; and

y_t^T = logarithm of transitory income.

III. METHODOLOGICAL ISSUES

Before we could proceed with the ultimate results of Equation (5), it may be important to clarify some of the steps that we have undertaken while estimating the model. The first step was the estimation of an unanticipated money supply variable. To calculate this variable, the first requirement was to estimate some kind of money demand function. In Carr and Darby (1981) a univariate ARIMA process was used. However, Mackinnon and Milbourne (1984) used only the lagged values of M_t to find out the value of anticipatory money supply. They later on showed that the empirical results of these two estimation techniques did not change the conclusions to be drawn therefrom.

In the present study, the extrapolative predictors were obtained by regressing the actual money demand on its own past values. The number of lags were different for every country. We continued to add lags until the explanatory power of the equation ($\bar{R}^2$) declined. This kind of prediction is regarded as 'partly rational' a term introduced by Sargent (1973). After adopting the above procedure, we first calculated the anticipatory values of money supply, i.e., M_t^a, and, in the second step, the unanticipatory money supply value was calculated by the relationship $M_t = M_t^s - M_t^a$.

i.e. this is the residual in the above equations, which will now be used as a proxy for the shock variable in Equation (5).[2]

The second problem related to the estimation of permanent income. For this Purpose we used the methodology which was suggested by Rausser and Laumas (1976) and later on was used by Mangla (1979). Here the permanent income was defined as the weighted average of current and past income,[3] i.e.,

$$Y_t^p = 0.4\ Y_t + 0.3\ Y_{t-1} + 0.2\ Y_{t-2} + 0.1\ Y_{t-3}$$

The transitory income can now be calculated from the relationship given below:

$$Y_t^T = Y_t - Y_t^p$$

where

Y_t^T is logarithmic transitory income;

Y_t is logarithmic current income; and

Y_t^p is logarithmic permanent income.

The final problem relates to the estimation of Equation (5) itself. We have initially estimated this equation by the Ordinary Least Squares (OLS) technique. Since many variables like (M_t, Y_t^p and Y_t^T are all simultaneously determined, there is a possibility that the estimated results of OLS have a simultaniety bias. To overcome the problem of simultaniety, we used the instrumental variable estimation technique.[4]

IV. ESTIMATION RESULTS OF THE MODEL

Although there are a number of studies especially for Pakistan, India and Sri Lanka where the conventional money demand function is empirically tested, however, the focus of attention in almost all of these studies has revolved around testing alternative specifications.[5]

[2] Alternative specifications using dummy and fiscal variables were also tried, but unfortunately, neither of these worked well.

[3] Permanent income can also be measured by alternative methodology which can be found in the studies of Friedman (1959); Goldfeld (1973) and Laidler (1977). The choice between these alternatives is purely arbitrary.

[4] The choice of instruments in this study differs not only from Carr and Darby (1981), it also slightly differs from Mackinnon and Milbourne (1984). Here we have used the procedure which is quite close to that of McCallum (1975).

[5] See for example Abe *et al.* (1975); Akhtar (1974); Mangla (1979); Khan (1982); Gujrati (1968); Gupta (1970) and Singh (1970) for India, Wong (1977) and Khan (1982) for Sri Lanka and Naqvi *et al.* (1984) for all the four countries.

The results of the proposed shock-absorber model in Table 1 show that the money shock variable has a positive sign in all the equations. The OLS estimates for this variable are significant at the 95 percent level for Pakistan, India and Bangladesh. For Sri Lanka, the coefficient of the money shock variable is significant at the 90 percent level. The instrumental variable estimates show that once again this variable enters positively in all the equations. However, now it is significant only for Pakistan and India.[6]

Table 1 also shows that the coefficient of transitory income has also appeared with the correct positive sign for all the countries except for Bangladesh. This is true both for the OLS and instrumental variable estimates. The variable of transitory income is significant at the 95 percent level for India and it is significant at the 90 percent level for Sri Lanka. Finally, the coefficient of the lagged dependent variable is also significant and its size is less than unity in all the four cases. This result is consistent in the presence of the partial adjustment model.

In the same table, alternative specifications for the four countries are also reported. Instead of making any distinction between permanent income and transitory income, we have used measured income as a scale variable.[7] The results of the equations have not changed the complexion of the earlier story as the money shock variable has not only appeared with a positive sign, it is significant as well. All other variables also have the correct sign. However, the explanatory power of the alternative equations is slightly less.

As far as fully anticipated changes in money supply are concerned, according to Carr and Darby (1981) these will be reflected in the price level expectations and, therefore, in nominal money demand. This hypothesis could not be verified in the present study. It may be important to note that the empirical verification of this hypothesis was not even reported by Carr and Darby (1981) in their original work. However, in their rejoinder to Mackinnon and Milbourne (1984) they have successfully attempted this.

V. CONCLUSIONS

In this paper an attempt has been made to empirically test the hypothesis that changes in money supply which are not fully anticipated affect the real money balances with a positive sign. Although this hypothesis was verified for eight industrial countries by Carr and Darby (1981), nevertheless, it required further empirical tests especially for the economies of developing countries. Here we have shown that in a shock-absorber model for countries of the South Asian region, the shock

[6] The equations estimated by OLS and also by instrumental variable technique are corrected for serial correlation by applying Cochrane-Orcutt technique, if and when it was present.

[7] In order to save ourselves from any problem that may arise out of the use of the simultaneous Y_t^T and M_t^u, we have also tried alternative specification for every country.

Table 1

OLS and Instrumental Variable Estimate of Demand for Money

Country	Techniques of Estimation	Coefficients of									
		Constant	y_t^p	y_t^T	y_t	r_t	m_{t-1}	M_t^u	$\bar{R}^2$	*SER*	*D.W.*
1. Pakistan	OLS	–0.62	0.23	0.14	–	–0.15	0.83	0.85	0.90	0.041	1.61
		(–0.44)	(0.93)	(0.24)	–	(–1.24)	(2.97)	(2.61)			
	INST	–0.42	0.22	0.14	–	–0.12	0.83	0.89	0.89	0.041	1.57
		(–0.39)	(0.61)	(0.18)	–	(–0.83)	(2.33)	(1.76)			
	OLS	–1.07	–	–	0.19	–0.16	0.93	0.95	0.98	0.044	0.96
		(–1.71)	–	–	(1.68)	(–3.13)	(8.57)	(9.64)			
	INST	–1.25	–	–	0.33	–0.18	0.79	0.50	0.97	0.051	1.02
		(–1.72)	–	–	(1.92)	(–2.99)	(4.86)	(1.09)			
2. India	OLS	–2.48	0.56	1.33	–	–0.02	0.77	0.83	0.99	0.036	1.91
		(–2.57)	(2.36)	(3.15)	–	(–0.71)	(6.74)	(2.47)			
	INST	–1.30	0.26	1.80	–	–0.01	0.92	1.38	0.99	0.041	2.37
		(–1.01)	(0.79)	(3.17)	–	(–0.30)	(5.83)	(2.30)			
	OLS	–5.85	–	–	0.72	–0.07	0.52	0.81	0.96	0.48	1.80
		(–1.86)	–	–	(1.83)	(–1.34)	(1.77)	(1.93)			
	INST	–2.29	–	–	0.56	0.01	0.73	1.08	0.98	0.062	2.13
		(–1.89)	–	–	(1.93)	(0.19)	(5.06)	(2.05)			
3. Bangladesh	OLS	–12.86	1.55	–0.99	–	–0.52	0.57	0.73	0.81	0.108	2.34
		(–3.01)	(4.07)	(–1.83)	–	(2.69)	(3.79)	(2.01)			
	INST	–12.87	1.46	–1.08	–	–0.52	0.68	0.64	0.80	0.112	2.75
		(–2.79)	(3.59)	(–1.62)	–	(–2.50)	(3.90)	(1.08)			
	OLS	–5.02	–	–	0.66	–0.21	0.76	1.01	0.65	0.146	1.79
		(–1.01)	–	–	(1.68)	(–0.91)	(4.10)	(2.12)			
	INST	–6.83	–	–	0.82	–0.28	0.77	1.62	0.61	0.154	1.49
		(–1.05)	–	–	(1.58)	(–0.94)	(2.95)	(1.51)			
4. Sri Lanka	OLS	–1.02	0.20	2.71	–	0.07	0.86	0.51	0.96	0.109	1.49
		(–0.36)	(0.47)	(1.51)	–	(0.33)	(3.59)	(1.70)			
	INST	–2.06	0.36	3.16	–	0.50	0.79	0.33	0.96	0.111	1.49
		(–0.57)	(0.64)	(1.54)	–	(0.22)	(2.60)	(0.66)			
	OLS	–7.55	–	–	1.23	–0.03	0.42	0.44	0.86	0.104	1.65
		(–1.39)	–	–	(1.63)	(0.13)	(1.28)	(1.82)			
	INST	–0.40	–	–	0.11	0.14	0.86	0.65	0.96	0.113	1.66
		(–0.007)	–	–	(0.12)	(0.59)	(1.80)	(0.81)			

Notes: (1) The figures given in the parentheses are *t*-values.

(2) The variables are defined as follows:

y_t^p = Logarithm of permanent income; r_t = logarithm of interest rate;

y_t^T = Logarithm of transitory income; M_t^u = unanticipated money demand variable

Y_t = Logarithm of current income;

Last two equations of each country is the alternative specification.

variable enters in all the equations with a positive sign. Furthermore, the coefficient of the transitory income is also positive and greater than zero for all except one case. This confirms that all unexpected variations of income, especially the transitory income, are absorbed by money balances until there is a final adjustment in the portfolio of securities. Towards the end it may be noted that the hypothesis that fully anticipated changes in money supply affect nominal money supply could not be verified in the present exercise.

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Comments on "Monetary Anticipation and the Demand for Money: An Application for the South Asian Region"

The paper is a successful attempt to apply the Carr-Darby model to some of the Asian countries. Three major comments on the paper concerning its theoretical basis, specification of the model and the empirical estimates are in order:

1. The hypothesis, that unanticipated changes in money supply affect real money balances rather than the interest rate and price level, was tested by Carr-Darby for eight *industrial* countries. To put this hypothesis to further empirical testing for *developing* countries, the authors needed to establish the relevance for doing so by convincing the readers about the following queries:

(i) Are there really some changes in money supply which remain unanticipated in the developing countries?

(ii) If yes, how large is the size of such changes, i.e., are these changes significant enough to be considered separately in the demand for money?

(iii) Do the capital markets in the developing countries really provide a portfolio adjustment mechanism in the same fashion as they do in the case of industrial countries?

(iv) Do the communities in developing countries really have a feel for distinction between anticipated and unanticipated parts of money supply changes?

2. The unanticipated changes in money supply have been approximated in the paper by the residual of the equation regressing money supply on its past values alone. Estimates of this equation for all the four countries considered in the study turn out to be unstable as the coefficients of M_{t-1} exceed unity. Moreover, the residual thus derived would be biased if there had been large money creation for budgetary support purposes mainly because a part of such money creation is anticipated. In view of this, it would be desirable to include in the equation, some measure of money creation required for federal financing needs. Barro (1977) used for this purpose, actual federal expenditure in excess of normal federal expenditure. As an alternative, actual budgetary support in excess of some average of the sample period may be used.

3. In specifying the demand for money equation, the authors, simply follow the Carr and Darby specification and without realizing the difference of the money markets between the developed and developing countries, have used, *inter alia,* interest rate, transitory income, and unanticipated money supply. In developing countries, interest rates are often fixed by the monetary authorities and remain fixed over a fairly long period. In these circumstances it is not correct to use the interest rate as the market price of holding money. Secondly, if there is any such thing as unanticipated money supply at all, it would be highly correlated with the transitory income and, thus, the use of both the variables as regressors simultaneously, as has been done by the authors, seems highly unwarranted. The mis-specification of the model is manifested in the insignificant coefficients of both the interest rate and transitory income in most of the equations; transitory income is insignificant for all the countries except India and, similarly, the interest rate is insignificant for all the countries except Bangladesh.

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Some Econometric Evidence on the Relative Importance of Monetary and Fiscal Policy in Pakistan

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I. INTRODUCTION

Economists agree that both monetary and fiscal policies can influence the pace of aggregate economic activity. However, their relative importance still remains a widely debated and complicated issue. Given the mushroom growth of different types of economic models, it seems almost impossible to decide their relative importance, at a purely theoretical level. So in this paper, we have tried to deal with this issue empirically in the context of Pakistan.

In surveying the literature, we can find a number of empirical studies on this issue, but most of them are for the developed countries. Similar studies for the developing countries are rare. We have been able to find only two such studies for Pakistan, one by Hussain (1982) and the other by Masood and Ahmad (1980).

The study by Hussain (1982) covers the period from 1949-50 to 1970-71, and the data used in this study pertain to united (East and West) Pakistan. So the results of his study can hardly be of much relevance to present Pakistan. Masood and Ahmad (1980) use data for present Pakistan from 1959-60 to 1976-77 in their study. They regress induced expenditures on autonomous expenditures and money supply and assess the relative importance of the two exogeneous variables, on the basis of t-values and beta-coefficients. Their definition of induced and autonomous expenditures seems to be a little arbitrary. Agricultural income, an independent variable in their regressions, turns out to be a dominant variable in a number of equations. The negative sign of the autonomous expenditures in some regressions is difficult to justify. Their efforts, to determine the lag structure, have also been unsuccessful. Although their data are from many individual sources, they have not applied any formal tests to check the consistency of the data and the possible structural change that might have taken place due to the separation of East Pakistan.

In the present study, we intend to improve on the previous work on several accounts. First, we shall update the previous studies up to 1984-85. Second, at PIDE,

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some studies [Fatima (1983); Kemal, Bilquees and Khan (1980)] have been undertaken to provide consistent data for present Pakistan. We plan to make use of these data in our study. Since these data, up to 1970-71, are calculated on the basis of some assumptions and there is also some possibility of structural change in the economy after 1970-71, due to the separation of East Pakistan, slope and intercept dummies will also be used to see whether these influences were statistically significant. The role of fiscal policy will be explored in greater detail and the issue of the length of lags associated with the two policies will also be probed more thoroughly.

II. METHODOLOGY

In order to evaluate the relative importance of monetary and fiscal policies, we can start with a reduced form Anderson-Jordan type equation (Anderson and Jordan 1968) which relates monetary and fiscal policy actions to aggregate economic activity. Our dependent variable is GDP, while total government expenditures and, alternatively, narrow and broad definitions of money supply are taken as independent variables. To see whether monetary or fiscal policy alone is sufficient to explain changes in GDP simple regressions employing either monetary or fiscal variables will also be estimated. We shall compare beta-coefficients[1] and t-values associated with the two types of policy variables. A higher value of the beta-coefficient for a variable will imply its stronger effect on GDP, while dependability or predictability of a variable will be judged by the value of the t-statistic associated with it.

In the mixed economies of the developing countries, government expenditures are not used merely as a tool of stabilization policy. They are planned to achieve many other objectives relating to economic development. It is not only the aggregate level of government expenditures that matters but also their composition. To take care of this aspect of government expenditures, we have deviated a little from the standard Anderson-Jordan type methodology by replacing a single variable of total government expenditures with its components, namely current consumption expenditures, investment and subsidies.

The relative speed of the monetary and fiscal policies depends upon the length of lag associated with the variables representing these policies. However, the choice of appropriate lag length is a complicated matter and no simple formal statistical procedure is available for this purpose. We plan to estimate regressions with different lengths of lags and then try to choose a regression with the lowest estimated standard error, as suggested by Theil (1961). Clearly, this criterion does not guarantee the choice of a regression which makes sense in terms of the signs and the magnitudes of

[1] For definition see Maddala (1977).

the coefficients and the length of lag. However, for the want of any better criterion, we have to rely on it. We shall also postulate that lag effects of the two policies continue indefinitely but dampen geometrically in successive periods. A Koyck-type distributed-lag equation will be estimated to test this hypothesis, assigning some geometrically declining weights to monetary and fiscal policy variables. The Ordinary Least Squares (OLS) estimation technique will be employed throughout this study.

III. DATA

The data used in this study cover the period from 1959-60 to 1984-85. The sources of data, for the two concepts of money supply, are Kemal *et al.* (1980) and various issues of the *Bulletin,* State Bank of Pakistan. The GDP deflators are used to convert these data to real magnitudes. The data on GDP and the various components of government expenditures at current and constant prices are taken from the Pakistan Economic Survey 1985-86.

IV. RESULTS

Table 1 presents estimates of the various versions of the Anderson-Jordan type equation in nominal terms.[2] A comparison of simple and multiple regressions reveals that the addition of one more policy variable to a regression results in a visible reduction in the value of the estimated coefficients and the estimated standard error of the regression. This shows that both monetary and fiscal policies are effective in influencing the level of aggregate economic activity. In all regressions, both the beta-coefficients and the *t*-values, associated with the money supply variables, have larger values as compared to those of government expenditure. This leads us to conclude that the impact of monetary policy on GDP is stronger, as well as, more predictable than that of fiscal policy, though both the policies, significantly, influence the level of GDP. The regressions, estimated with all variables in real terms, give similar results which are not reported here.

The regressions with money supply and various components of government expenditures as independent variables are reported in Tables 2 and 3 in nominal and real terms respectively. Money supply is again highly significant in all these regressions. A glance at these regression results also shows that government current consumption expenditures are significant both in real and nominal terms. On the other hand, government investment outlays are significant only in the regressions

[2] All these equations were also estimated with slope and intercept dummies to see whether the data for pre- and post-1971 are consistent and whether structural change in the economy, due to the separation of East Pakistan, is statistically significant. These dummies turned out to be insignificant and were dropped in later analysis.

Table I

Regressions of GDP on Government Expenditures and Money Supply at Current Prices

S. No.	Constant	G	M_1	M_2	$\bar{R}^2$	S.E.	D.W.
1.	6479.69	3.7484			0.9959	7802.68	0.85
		0.9980					
	(3.0662)	(77.6331)					
2.	1191.19		3.5542		0.9969	6743.61	1.20
			0.9985				
	(1.1786)		(89.8704)				
3.	5798.42			2.2718	0.9970	6659.49	1.45
				0.9986			
	(3.2065)			(91.0090)			
4.	3817.50	1.5810	2.0607		0.9980	5424.15	1.29
		0.4209	0.5789				
	(2.4520)	(3.7545)	(5.1637)				
5.	5906.97	1.5559		1.3322	0.9980	5384.38	1.51
		0.4143		0.5856			
	(4.0392)	(3.7031)		(5.2345)			

Notes: 1. The figures in parentheses are t-values. Beta-coefficients are reported just above them. The values at the top are the estimated coefficients of regression.

2. The symbols used in the Table are defined as follows:
   G = Total government expenditures.
   M_1 = Narrow money supply (currency + demand deposits).
   M_2 = Broad money supply (M_1 + time deposits).
3. All variables are measured in millions of current rupees.

Table 2

Regressions of GDP on Components of Government Expenditures and Money Supply at Current Prices

S. No.	Constant	*GC*	*GI*	*GS*	M_1	M_2	$\bar{R}^2$	*S.E.*	*D.W.*
1.	4052.84	2.3957	1.0284	0.7483	1.9638		0.9984	4911.65	1.49
		0.3198	0.1122	0.0197	0.5517				
		(2.8102)	(4.8871)	(0.7026)	(5.3223)				
2.	5843.35	1.9553	1.6102	1.0084		1.2295	0.9989	5550.46	1.45
		0.2610	0.1757	0.0265		0.5404			
		(3.7360)	(2.7966)	(0.8419)		(4.1984)			

Notes: 1. The figures in parentheses are t-values. Beta-coefficients are reported just above them. The values at the top are the estimated coefficients of regression.

2. The symbols used in the Table are defined as follows:
   G_C = government current consumption expenditures.
   G_I = government investment.
   G_S = government subsidies.
   M_1 = Narrow money supply (currency + demand deposits).
   M_2 = Broad money supply (M_1 + time deposits).
3. All variables are measured in millions of current rupees.

Table 3

Regressions of GDP on Components of Government Expenditures and Money Supply at Constant Prices of 1959-60

S. No.	Constant	*GE*	*GI*	*GS*	M_1	M_2	$\bar{R}^2$	*S.E.*	*D.W.*
1.	6234.14	3.4184	−0.3126	3.5005	1.3972		0.9864	1838.41	1.45
		0.5051	−0.0291	0.1271	0.4170				
	(5.4499)	(4.0777)	(−0.3769)	(2.7026)	(3.6665)				
2.	7306.37	2.6649	−0.0028	3.4913		1.0366	0.9884	1701.31	1.55
		0.3938	−0.0003	0.1267		0.5012			
	(7.7501)	(3.0652)	(−0.0036)	(2.9588)		(4.3839)			

Notes: 1. The figures in parentheses are *t*-values. Beta-coefficients are reported just above them. The values at the top are the estimated coefficients of regression.

2. The symbols used in the Table are defined as follows:
   G_E = government current consumption expenditures.
   G_I = government investment.
   G_S = government subsidies.
   M_1 = Narrow money supply (currency + demand deposits).
   M_2 = Broad money supply (M_1 + time deposits).
3. All variables are measured in millions of 1959-60 rupees.

estimated with all variables in nominal terms. A possible explanation of this phenomenon would be that the supply of consumption goods is relatively flexible and government demand for goods and services does not compete with that of the private sector. On the other hand, the supply of capital goods is not so flexible and any increase in government demand for capital goods crowds out private investment. Hence, the effect of increase in government investment is reflected only in increased prices. The supply-side effects of government investment are also dubious. In previous years, the government has spent a considerable amount of its investment outlays for providing infrastructure and other facilities to stimulate private investment. But, unfortunately, owing to a number of economic and non-economic factors, these effects have not been very fruitful.

These results also provide some insight into the role of subsidies. They are insignificant when regressions are estimated in nominal terms but become significant in regressions with real magnitudes. This shows that subsidies do exert a significant positive influence on real GDP. A large proportion of government subsidies is spent on essential food items, agricultural inputs and exports.[3] As a result, the prices of these commodities for the consumers are reduced and, hence, their demand increases at a given price level. This explains why the coefficient of government subsidies is insignificant when the regressions are estimated in nominal terms.

To estimate the length of lag in the effect of the two policies, we started by, first, keeping government expenditures at current period and increasing the length of lags in money supply from one to five years in successive regressions. Then, the same procedure was repeated with the lags of government expenditures, keeping money supply at current period. The standard errors of both the sets of regressions, resulting from this exercise, were examined but no overall pattern seemed to emerge. After the failure of this procedure, all possible combinations of the lags of the two types of policy variables, up to five years, were tried but no sensible results could be obtained. Even, the regressions based on the Koyck-type, distributed-lag pattern, did not make much sense. Hence, our efforts to estimate the log structure associated with the two policies remained unsuccessful.

V. SUMMARY AND CONCLUSIONS

In this paper, we have tried to find out, which one of the monetary and fiscal policies is more vigorous, more dependable and takes a shorter time in exerting its influence on GDP. We have updated and improved previous work by using a better data base, studying the role of the various components of government expenditures

[3] In 1984-85, the distribution of total government subsidies was 58 percent on wheat, sugar and edible oil, 22 percent on agricultural inputs, 15 percent on exports and 5 percent on other items. (Source: *Pakistan Economic Survey 1985-86*).

in influencing GDP and probing thoroughly the length of lag in the effect of monetary and fiscal policies. Not surprisingly, our results are different from those of the two previous studies.

The main finding of this study is that monetary impulses have greater leverage and are more dependable. However, these results may, by no means, be taken to imply that fiscal policy should be discarded altogether in favour of monetary policy. Our regression results show that fiscal policy can still be used as a second tool of stabilization policy along with monetary action.

A close look at the role of different components of government expenditures, by regressing them on GDP along with money supply, has uncovered some interesting aspects of fiscal policy. While current consumption expenditures are very effective in influencing GDP both in real and nominal terms, the effect of government investment is mainly felt on prices. This highlights the need for restructuring the government's investment policy. On one hand, resources should be diverted towards the capital goods industry in order to make the supply of capital goods more flexible and thus curb the crowding-out effects of government investment, while, on the other hand, steps should be taken at the political, social and economic levels to induce private investors to utilize the infrastructure and other facilities provided through government investment. This will enhance the supply-side effects of government investment.

The role of government subsidies also deserves attention. Most of the government subsidies are given on essential food items, agricultural inputs and exports. This increases demand for these items at a given price. As subsidies result in an increase in real GDP, without pushing up prices, so they can be used as an anti-inflationary expansionary policy tool.

As regards the shape of the lag structure of the fiscal and the monetary policy variables, our results indicate that there is no systematic pattern of lags associated with the two types of variables. It is likely that quarterly data could help in resolving this issue, but for most of the variables used in this study, such data are not available.

In conclusion, this study shows that monetary policy is more effective and more dependable, compared to fiscal policy, as a tool of influencing GDP, though fiscal policy is important in its own right. It has also shed light on some interesting policy implications of the composition of government expenditures. The choice of an optimal combination of the two policies is, of course, left to the policy-makers.

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Comments on "Some Econometric Evidence on the Relative Importance of Monetary and Fiscal Policy in Pakistan"

Not being an econometrician, I have to confine my comments to the problems of general macro-economic policy questions, which are raised by the authors, sometimes *inter alia,* sometimes explicitly.

(1) One can only agree with the authors' view, that the question of the relative importance of monetary and fiscal policy, on the pace and level of general economic activity of a country can only be decided by empirical research. No doubt, the well known "golden rules" (formulated, for instance, by Howard S. Ellis in 1951) on the relative importance of the two groups of policy tools must always be interpreted according to the macro, micro and (last, but not the least) the institutional conditions of the country we are dealing with.

(2) The present study is a good first step in elucidating this problem in the light of Pakistani conditions: First, a comprehensive set of statistical data on the relevant macro-economic variables has been prepared. And second, certain instrument variables have been specified. But it seems that the authors have not gone far enough in this respect. For instance, one could question, if under the conditions of the Pakistani monetary system, one can really rely on the definition of textbook variables such as M_1 or M_2 and government expenditure in toto as independent instruments. On the contrary, under the special circumstances prevailing in this country (i.e. with weak connection between the Government and the Monetary Authorities), the interdependence of the two policy instruments may be a substantial one. In this case, several of the authors' findings must be read with caution.

(3) The results presented in this paper raise several questions:

- Could it be that the stronger impact of monetary policy, which the authors have detected, is only a superficial impression, because the value of the fiscal deficit is implicit in the development of the monetary variables?

– Could it be that the authors' contention, that global government investment has a very small impact on general economic activity derives from the fact that the authors did not disaggregate this variable far enough?
For, we know, that the multiplier of infrastructural investment is very low and implies long lags, whereas the multiplier of government investment, in directly productive activities, is comparatively high and works in short periods. Could it be proven that most government investment in Pakistan consists of infrastructural activities. The authors' crowding-out argument (which in the case of Pakistan is not very convincing) appears to be superfluous.

(4) Finally, the question may be asked, if the authors' correlation study could not be read the other way round. For, if we assume that the Government, with its policy instruments, is reacting to the development of GNP over time – be it in an automatic or in a discretionary manner – the policy variables are the dependent ones. Whether this problem is relevant or not can only be decided on the basis of better knowledge about the institutional background of Pakistan's economic policy system. Therefore, it would be very expedient, if the authors could widen the scope of their study by adding a discussion on the institutional background of monetary and fiscal policy in Pakistan.

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