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The Effect of Education, Experience and Occupation on Earnings: Evidence from Pakistan

Hina Nazli[*]

I. Introduction

The theory of human capital posits a significant and positive relationship between earnings and work experience. This theory assumes a continuous increase in wages with employment experience at different levels of schooling. Several studies have established that earnings rise rapidly as the level of educational attainment improves. Similarly increase in work experience adds to skills, makes an individual more productive and hence leads to higher earnings. Education provides not only an initial labour market advantage, but also cumulative benefits over the working life. Therefore, it is misleading to assume a uniform rate of return to experience at different levels of education.

In order to examine the impact of education and experience on earnings, Mincer (1974) in his seminal article introduced an interaction term of education and experience as an explanatory variable in the earning function to account for the cumulative effect of both these variables. He found a negative and significant coefficient in estimates based on US data and concluded that more educated workers attain peak earnings with less experience. However, the opposite impact is generally estimated and is extensively documented in the literature[1]. There are however, some exceptions; for example, using data for Morocco, Psacharopoulos (1981) did not observe any significant impact of this interaction on earnings. For British data, Psacharopoulos and Layard (1979) found that the value of the interactions terms increases with either increase in education or experience for different levels of both these variables. More recently, Connolly and Gottschalk (2003) have found that the returns to tenure increase with education, but that returns to experience decrease with educational attainment in the US. This indicates that the less educated have higher returns to education. In examining the role of ICT technology in the

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[1] See Blaug (1976) for Thailand, Anderson (1980) for El Salvador, Knight and Sabot (1981) for Tanzania, Layard and Psacharopoulos (1974) for United States, Mazumdar (1981) for Malaysia, Byron and Takahashi (1989) for Indonesia, Byron and Manaloto (1990) for China, Knight and Sabot (1990) for Kenya and Tanzania; and Brunello and Comi (2000) for eleven European countries.

UK, Kirby and Riley (2004) found that the return to an extra year of schooling is greater relative to an extra year of job-specific experience. The overall conclusion of the international studies examining the returns to education[2] is that higher levels of education lead to higher earnings as the employment experience lengthens.

While studies examining the effect of education on earnings are manifold for Pakistan, no study has used the education-experience interaction variable. This study seeks to fill the gap.

Acquired skills through education and training play an important role in the choice of occupation that in turn affects individual earning as different occupations require different characteristics of workers. In order to get a suitable reward, educated individuals look for such jobs that match with their education. On the other hand, the uneducated want to enter jobs that match with their skills and where rewards are higher. By using an "occupation production function", Knight (1979) demonstrated that certain levels of education are 'necessary', 'appropriate' or 'excessive' for a particular job. In other words, a worker with a certain level of education may be more productive in one occupation than the other and would thus receive higher wages. For Tanzania and Kenya, Beyer and Knight (1989) and Knight and Sabot (1990) found a positive relationship between human capital variables and the level of skills an individual has. They concluded that by introducing occupation in the earning function, one can better understand the mechanism by which the returns to education fall; and, more generally the way in which the labour market operates. Using data on U.S. engineers and the position of engineering jobs within firms, Ferrall (1997) observed that most of the returns to experience and to assignment to higher hierarchy levels within firms are caused by skill accumulation and self-selection rather than technological differences across hierarchy levels.

The role of occupation in determining earnings has been highlighted by several studies[3]. For Pakistan various studies have observed that workers belonging to different occupations receive significantly different returns[4]. Khan and Irfan (1985) found differences in earnings based on interregional as well as occupational differences. The expected average earnings for urban areas were found to be 18 percent higher than those for rural areas whereas clerical, sales and service workers were expected to earn 6 percent lower than the blue-collar

[2] for details see Nasir and Nazli (2000)

[3] For example see Knight (1989) for a detailed review.

[4] See, Haque (1977); Khan and Irfan (1985); Ahmad, *et al* (1991);Ashraf and Ashraf (1993); Shabbir (1994); Nasir (1998); Fafchamps and Quisumbing (1998); Nasir and Nazli (2000); and Malik and Nazli (2003).

and agricultural workers. Another important factor that the authors captured in explaining the earning function of the earner was the effect of the income of the first earner (usually father) on the second earner (off spring). Their results indicated that the income of the second earner was positively related with that of the first earner and that the effect was strongest for the administrative and professional group of workers. Hence the income of the first earner affected that of the second earner through occupational status. Fafchamps and Quisumbing (1998) using data from the International Food Policy Research Institute report that increase in earnings associated with an increase in human capital are partly due to the increase in productivity and partly to the reallocation of labour from farm to non-farm activity. Hence increase in education induces households to shift labour away from low productivity farm activities to high productivity non-farm activities; which results in a greater increase in earnings. Malik and Nazli (2003) found a significant poverty reduction effect of skilled occupations both in urban as well as rural areas.

This paper attempts to explain the effect of education, experience and occupation on individual earnings in Pakistan. The exploration of this interlinked connection is of considerable importance at the academic as well as policy levels. From the academic point of view, it highlights the importance of the collection of data on years of schooling and past and present employment history of work experience. These data are sadly lacking in most of the household surveys. At the policy level, it highlights the importance of education and training expansion, and brings to light the very important issue of uneven employment opportunities in different regions of Pakistan.

The education system in Pakistan is still under-developed. Extremely low levels of adult literacy, low enrolment and high drop out rates at the primary level, high student-teacher ratios, wide gender and regional disparities, and low levels of public investment are both symptoms and indicators of the very dismal performance of the education sector[5]. The literacy rate for the population 10 years and above was 45 per cent in 2001-02; 58 percent for males and 32 percent for females. Despite many efforts and various government programmes, no change in the literacy rate has been found between 1998-99 and 2001-02 [for details see PIHS (2001-02)][6]. This not only indicates that a large proportion of the population is still illiterate but also highlights the significant differences between genders. This situation is far worse if regional disparities are taken into account as gender differential is more pronounced in

[5] Data in this section except where otherwise indicated are from the *Pakistan Economic Survey* (2002-03).

[6] Official estimates however claim that the literacy rate has increased to 51.6 percent in 2003 [*Pakistan Economic Survey* (2002-03)].

rural areas [see Arif, Nazli, and Haq (2000)]. The gross enrolment rate showed a remarkable improvement during 1951-1991. This rate increased to 98 percent by 1998-99. It has sadly declined to 91 percent in 2001-02. Rising trends in poverty during the 1990s may be the one major cause for this decline since for several parents, especially in rural areas, it has now become more difficult to send children to school. In addition, high drop out rates also indicate the poor quality of education. PIHS (2001-02) indicates that 13 percent of children of ages 15-19 years who have enrolled in primary school, drop out before completing primary (class 5). However, the largest drop out rate is at the end of the primary level, with 28 percent dropping out before reaching the end of class six.

Due to the poor performance of the education sector, Pakistan's labour market has remained dominated by less educated and unskilled manpower. In this situation, it becomes important to examine the role of education, experience and occupation on earnings. Because of the non-availability of data on the years of work experience, there is no literature available in Pakistan that examines the returns to experience. The recently conducted nation-wide survey, Pakistan Socio Economic Survey (PSES) has information on various economic and socio-economic variables including the years of employment experience. This information permits an examination of the effect of education, experience and choice of occupation on individual earnings.

The rest of the paper is organised as follows: section 2 presents an outline of the methodology used in the empirical estimation and section 3 describes the data and variables in the model. Results are presented in section 4. Conclusions and policy implications are presented in the last section.

II. Methodology

The simple human capital model developed originally by Becker (1964) and used by Mincer (1974) can be written as:

$$\ln Y = f(S, E, E^2) \qquad (1)$$

Where lnY stands for natural logarithm of monthly earnings, S represents completed years of schooling, and E is the labour market experience of the ith individual. The experience-earning profile indicates that earnings rise rapidly in the first years of work life, reaches a peak, and then tends to fall after the mid-career; implying that the increase in earnings in the early years of work life is due to the increase in productivity that is gained through the level of education, technical training and experience of work. The age at which earnings are maximum depends on the level of schooling. If we say that

education plays an important role in enhancing productivity and efficiency of individuals then the more educated should have a steeper age-earning profile than the uneducated. Therefore, as already mentioned, in order to examine the joint effect of education and experience, it is important to incorporate the effect of education in the age-earning profile by specifying the interaction term between schooling and experience. In order to test the interaction effect we will estimate the following equations:

$$\ln Y = f(S, E, E^2, \sum Z_k) \quad (2)$$

$$\ln Y = f(S, E, E^2, S.E, \sum Z_k) \quad (3)$$

$$\ln Y = f(\sum S_i, \sum E_j, \sum Z_k) \quad (4)$$

$$\ln Y = f(\sum S_i, \sum E_j, \sum S_i E_j, \sum Z_k) \quad (5)$$

Where S_i and E_j are is the sets of four dummy variables indicating different levels of education and experience respectively. These levels are:

S_1 = No education.

S_2 = Primary education (1–5 years).

S_3 = Middle education (6–8 years).

S_4 = Matric and above.

E_1 = Employment experience 1–4 years.

E_2 = Employment Experience 4–8 years.

E_3 = Employment experience 8-12 years.

E_4 = Employment experience 12 years or more.

Z_k = Vector of other explanatory variables. In our model, this vector includes dummies for technical training, sex, and provinces.

Equation 3 examines the joint effect of education and experience. A positive coefficient of interaction term implies that the joint effect of these two variables is stronger than their individual effects at given values. Equation 4 explains what the returns to education are and experience at different levels of

these two variables. Equation 5 introduces the interaction terms of different levels of education and experience and examines the effect of different levels of experience (education), keeping education (experience) constant. Another way of looking at the joint effect of education and experience on earning is to examine the coefficient of education in the earning equation that is stratified by the length of experience or to examine the coefficients of experience and its squared term in the earning equation that is stratified by the levels of education.

III. Data

In order to examine the impact of structural adjustment policies on income distribution, poverty alleviation, and social welfare, the Pakistan Institute of Development Economics (PIDE), launched a project entitled "Micro Impact of Macroeconomic and Adjustment Policies" funded by the International Development Research Center (IDRC), Canada. To achieve the goals of this project, a household survey in the rural and urban areas of all provinces of Pakistan was conducted during 1998-99[7]. This survey was called the "Pakistan Socio-Economic Survey (PSES) 1998-99" [for details see Arif, *et al* (1999)]. For this survey, a two stage stratified random sampling design was adopted so as to select a sample of 3564 households. FATA, FANA, and Military restricted areas were excluded from the universe. The urban/rural distribution of the sample was 1296 and 2268 households respectively.

In addition to education, experience and occupation, the effect of technical training on earning is also examined in this study. This effect has been found positive and substantial in many developing countries[8]. The PSES has information on the years of technical training that permits this estimation. We use a dummy variable that takes the value '1' if an individual received technical training and '0' otherwise. In addition, the regional, provincial and gender imbalances in the provision of the limited available social services are quite pronounced in Pakistan[9]. These effects are controlled for by introducing dummy variables for region, provinces and gender.

For the purpose of analysis we have restricted our sample to wage earners and salaried persons. Our sample has 1271 individuals; 1151 males and 120 females. Table 1 presents descriptive statistics on key variables. According

[7] In order to make this data set a panel, a second round of survey on the same household has recently been completed. However, the results of the present study are based on the data collected in 1998-99.

[8] Jimenez and Kugler (1987); van der Gaag and Vijverberg (1989); Khandker (1990); Nasir (1999); and Nasir and Nazli (2000).

[9] Nasir and Nazli (2000) cited various studies that examined these differentials in detail.

to the statistics in Table 1, the average age of the individuals included in the sample is 35 years. The mean years of schooling are 7.67 years and 25 percent individuals have no formal education. Almost 25 percent individuals have education below *matric*[10] and 50 percent are above *matric*. Mean experience is observed 11 years. Nearly 59 percent wage earners and salaried persons live in urban areas. On average an individual earns Rs. 3495 per month. In our sample, there are only 11 percent individuals who received technical training. A majority of wage earners belong to the Punjab, followed by Sindh and NWFP.

Table1: Mean, Standard Deviation and Brief Definitions of Important Variables

Variables	Mean	SD	Variables Definitions
Y	3494.65	2591.08	Individual's monthly earnings in rupees consist of wages and salaries.
Age	34.89	12.01	Age of an individual in years.
S	7.67	5.42	Completed years of schooling.
E	11.08	8.72	Total Years of labour market experience.
MALE	0.90	0.29	Dichotomous variable equal to 1 if individual is male.
Urban	0.59	0.49	Dichotomous variable equal to 1 if individual belongs to urban area.
Training	0.11	0.32	Dichotomous variable equal to 1 if individual received any technical training.
Prof	0.13	0.33	Dichotomous variable equal to 1 if individual belongs to "Professional" category of occupation.
Tech	0.25	0.43	Dichotomous variable equal to 1 if individual belongs to "Technician/Clerk" worker category of occupation.
Service	0.56	0.49	Dichotomous variable equal to 1 if individual belongs to "Service" category of occupation.
Labour	0.05	0.22	Dichotomous variable equal to 1 if individual belongs to "Labour" category of occupation.
Punjab	0.46	0.49	Dichotomous variable equal to 1 if individual belongs to Punjab
Sindh	0.33	0.47	Dichotomous variable equal to 1 if individual belongs to Sindh
NWFP	0.14	0.34	Dichotomous variable equal to 1 if individual belongs to NWFP
Balochistan	0.06	0.24	Dichotomous variable equal to 1 if individual belongs to Balochistan

[10] Exam taken after ten years of education

IV. Results

In the sample of 1271 individuals, 25 percent were uneducated and 51 percent had more than eight years of education. Among the uneducated, 34 percent belonged to the highest and 21 percent to the lowest experience groups. On the other hand, the concentration of those who belonged to the highest education group was in the lowest experience group (53%). This implies the presence of the trade off between education and years of experience.

Before analysing the results, it is useful to look at the average earnings across each educational and experience category for different age groups. Table 2 presents the mean earnings at different levels of education and experience by 10 age groups. The data in this Table confirm a concave age-earning relationship. There is, among the educated, lower earning differentials across educational levels at younger ages (less than 30 years). This differential reaches a maximum in the group 40-45 years[11]. Looking at educational levels, highest earnings are found associated with highest level of education [see Chart 1]. This chart shows a flatter age-earning profile for the group S_1 as compared to all other groups. This means that the earnings of the uneducated remain substantially lower than those who have some education.

Table 2: Mean Income at Different Levels of Education and Experience by Age Groups

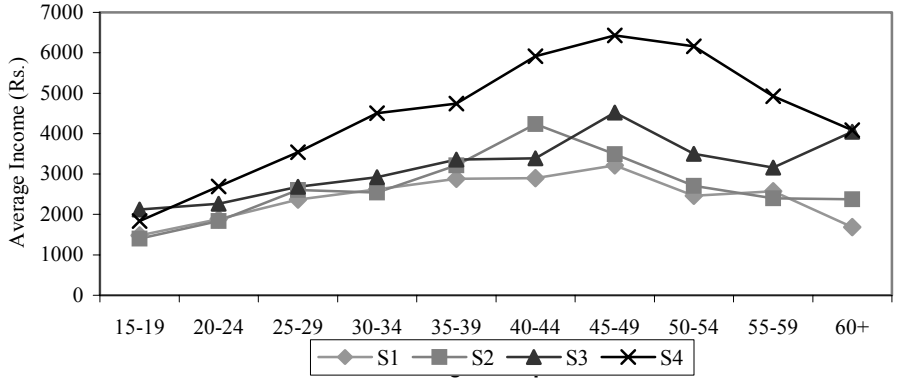
(Rupees)

Age groups	Educational groups				Experience groups				Total
	S1	S2	S3	S4	E1	E2	E3	E4	
15-19	1,482	1,404	2,122	1,838	1,685	2,417	-	-	1,737
20-24	1,881	1,837	2,262	2,690	2,412	1,962	1,675	1,350	2,318
25-29	2,370	2,603	2,683	3,536	3,468	2,764	3,578	2,100	3,168
30-34	2,621	2,539	2,920	4,507	3,752	3,774	4,029	3,293	3,822
35-39	2,883	3,217	3,359	4,740	3,263	4,240	3,752	4,052	3,925
40-44	2,899	4,240	3,391	5,913	5,521	4,358	5,302	4,550	4,729
45-49	3,218	3,496	4,525	6,432	2,801	4,840	4,276	5,496	4,908
50-54	2,466	2,710	3,498	6,162	3,588	2,075	2,680	4,288	4,002
55-59	2,574	2,401	3,159	4,925	3,500	2,798	2,240	3,580	3,403
60+	1,690	2,375	4,050	4,083	1,961	1,167	2,146	2,987	2,642
Total	2,430	2,650	2,906	4,372	2,783	3,381	4,003	4,300	3,495

[11] For the US, Ehrenberg and Smith (1997) found a smaller wage differential among young workers (below 27) with and without a university degree. This difference reaches its maximum between the ages 40 and 50 years. Earnings reached a maximum in the age group 45-49 years and show a declining trend afterwards.

Table 2 shows a positive relationship between experience and earnings. An interesting finding is that at early ages, smaller earnings are associated with higher experience. After the age of 35 years, this situation becomes reverse. For example in the age group 20-24, individuals belonging to lowest experience category, earn 78 percent more than those in highest experience category. This may be due to the fact that the individuals with less experience have higher levels of education that leads to higher earnings.

Chart 1: Age-Earnings Profile at Different Levels of Education



Gender Differentials in Age-Earning Profile

The existence of a wide gender gap in human capital accumulation is evidenced by various studies in Pakistan[12]. The PSES (1998-99) reports vast gender disparities in literacy and enrolment rates. The literacy rate among females is half that of males' literacy rate for the whole of Pakistan. This difference is much higher in rural areas. In our sample there are only 120 females; among them 28 fall in the first education group S_1, that is 'no education'; only 6 in the second group S_2; no one in the third group S_3; and 86 belong to the fourth education group S_4. This means that participation of women in the wage market is higher for those who are either uneducated or have education more than 8 years. In this sample 69 percent women are found in urban areas. Table 3 presents the age-earning profiles across gender. This Table shows wide gender disparity in the mean earnings. It is interesting

[12] Sabot (1992); and Alderman, Behrman, Ross and Sabot (1996b); Sawada (1997); Shabbir (1993); Ashraf and Ashraf (1993a, 1993b, and 1996); and Nasir (1999).

to note that mean earnings of females for the age group 30-39 are higher than that of males. After this age group, the gap becomes wider in favour of males. Looking across the educational groups, one can note that this differential is more pronounced for the uneducated group [see Appendix Chart 1]. In this group female earnings exhibit a fluctuating pattern. Maximum earnings are found for the age group 35-39, whereas males attain peak earnings in the age group 45-49. Surprisingly, in this age group, female earnings were found lowest. In the education group S_2 no women of the ages between 25-44 years were found working for wages. This reflects the general pattern of a typical Pakistani woman, who due to her household and child responsibilities in the early years of married life cannot participate in productive economic activities[13]. The highest educational group portrays a very interesting picture for the age group 35-49 years, female earnings are found higher than that of males[14]. The age-earning profile of this educational group is presented in the Appendix Chart 2. This chart shows a considerable difference in the earnings of males and females for the age group 45-49 years in favour of females. In this educational group, both males and females attain peak earnings in the age group 45-49 years.

Table 3: Age-Earning Profile by Gender

(Rupees)

Age groups	S1		S2		S3		S4		Total	
	Male	Female	Male	Female	Male	Female	Male	Female	Male	Female
15-19	1,472	300	1,373	1,800	2,122	-	1,863	1,680	1,756	1,428
20-24	1,843	500	1,837	1,800	2,262	-	2,859	1,922	2,370	2,370
25-29	2,568	1,105	2,603	-	2,683	-	3,642	3,021	3,242	2,679
30-34	2,680	500	2,539	-	2,920	-	4,577	4,123	3,809	3,932
35-39	2,951	1,750	3,217	-	3,359	-	4,677	5,144	3,866	4,578
40-44	3,050	1,233	4,240	-	3,391	-	5,900	6,050	4,749	4,444
45-49	3,466	350	3,614	2,200	4,525	-	6,401	8,000	5,018	2,620
50-54	2,768	957	2,883	1,500	3,498	-	6,374	4,800	4,239	2,476
55-59	2,814	733	2,444	2,100	3,159	-	5,086	3,400	3,560	1,850
60+	1,831	884	2,375	-	4,050	-	4,083	-	2,792	884
Total	2,576	939	2,678	1,933	2,907	-	4,491	3,603	3,557	2,898

[13] In our sample, 55 percent women are currently married. Among them 65 percent belong to the age group 25-44 years.

[14] In this age group a larger proportion of females (35%) have education equal to or more than 14 years.

Regional Differentials in Age-Earning Profile

The regional imbalances in the provision of limited available social services are more pronounced in Pakistan. Rural areas are not only underdeveloped in terms of physical infrastructure but also neglected in gaining basic amenities. According to the PIHS (2001-02), the literacy rate in urban areas is 64 percent and in rural areas it is 36 percent. The gross enrolment rate was 94 percent in urban areas and 68 percent in rural areas. Because of these differences low returns to education are observed in rural areas [Shabbir (1993 and 1994); Nasir (1999); and Nasir and Nazli (2000)]. In our sample of 1271 individuals, 756 belong to urban areas and 515 are from rural areas. In this sample the urban literacy rate is found to be 63 percent and in rural areas it is 47 percent. Similar differences can be seen in the occupational distribution. For example, 70 percent of the professionals are from urban areas.

Results of Estimated Equations:

The results based on the estimated equations (2, 3, 4, and 5) are presented below. The estimates are reported in Table 4. According to equation 2, the rates of returns to education are 5 percent and returns to experience are 7 percent. An individual attains peak earnings with an experience of 21 years. Evaluating at mean experience, we find that an individual with 11.08 years experience earns 54 percent higher than the non-experienced individual. There are also significant gender, regional and provincial differences. The coefficients of occupation dummies indicate that choice of occupation is an important determinant of individual earnings. Higher earnings are associated with better paying occupations (Professionals). This equation shows that returns to technical training are nearly 9 percent.

Table 4: Estimated Equations with and without Education-Experience Interaction Terms

	Equation 2		Equation 3		Equation 4		Equation 5	
	β	t-value	β	t-value	β	t-value	β	t-value
Const	6.26	(65.68)	6.35	(61.10)	6.46	(66.12)	6.55	(59.90)
S	0.048*	(14.45)	0.040*	(8.19)				
E	0.067*	(12.41)	0.060*	(9.71)				
E^2	-0.0016*	(-9.69)	-0.0015*	(-9.19)				
S.E			0.0007**	(2.19)				
S_2					0.175*	(3.22)	0.098	(1.08)
S_3					0.247*	(4.45)	0.147	(0.15)
S_4					0.494*	(11.52)	0.419*	(6.07)
E_2					0.229*	(5.71)	0.216*	(2.56)
E_3					0.342*	(6.89)	0.275*	(2.74)
E_4					0.434*	(10.64)	0.278*	(3.60)
$S_2.E_2$							0.090	(0.65)
$S_2.E_3$							0.032	(0.17)
$S_2.E_4$							0.135	(0.09)
$S_3.E_2$							0.056	(0.39)
$S_3.E_3$							0.180	(1.05)
$S_3.E_4$							0.230	(1.55)
$S_4.E_2$							0.016	(0.15)
$S_4.E_3$							0.072	(0.59)
$S_4.E_4$							0.241**	(2.50)
Train	0.094*	(1.99)	0.090*	(1.92)	0.119*	(2.43)	0.112**	(2.28)
Prof	0.502*	(6.10)	0.489*	(8.28)	0.591*	(6.96)	0.577*	(6.76)
Tech	0.315*	(4.17)	0.308*	(5.94)	0.367*	(4.66)	0.356*	(4.49)
Service	0.258*	(3.82)	0.250*	(4.08)	0.246*	(3.49)	0.239*	(3.37)
Male	0.449*	(8.54)	0.437*	(8.28)	0.471*	(8.54)	0.434*	(8.17)
Urban	0.150*	(4.81)	0.118*	(3.73)	0.153*	(4.61)	0.150*	(4.50)
Punjab	0.041	(0.91)	0.034	(0.77)	0.053	(1.13)	0.047	(1.01)
Sind	0.189*	(3.97)	0.190*	(4.01)	0.236*	(4.76)	0.239*	(4.82)
Baloch	0.380*	(5.37)	0.357*	(5.34)	0.404*	(5.47)	0.414*	(5.59)
Adj R^2	0.40		040		0.34		0.34	

* indicates that coefficient is significant at 1 percent level.
** indicates that coefficient is significant at 5 percent level.
*** indicates that coefficient is significant at 10 percent level.

Equation 3 included the interaction term. The inclusion of this variable reduced the coefficient of education from 0.048 to 0.040. The coefficient of experience is also reduced from 0.067 to 0.060. Evaluating at mean value of

education (7.58), we find that earnings rise by 30 percent. Similarly earnings increase by 26 percent if experience is 11.08 years (mean value). An individual with education 7.58 years and experience of 11.08 years earns 6 percent more than an uneducated one having experience less than 5 years. These results imply that uneducated workers attain peak earnings after having an experience of 20 years. However, the maximum earnings at completed school years 5, 8, 10, 12, 14 and 16 years are achieved at experience of 21.16, 21.86, 22.33, 22.80, 23.26 and 23.73 years[15].

In order to test the significance of the interaction term, we have applied the F-test that rejected the null hypothesis that education-experience interaction is not significant.

In equation 4, instead of using S, E and E^2, we introduced 4 dummies for education and four dummies for employment experience (S_1 and E_1 being the excluded categories). These estimates indicate the returns to education increase with increase in education. Similar trends are observed for employment experience.

In equation 5 we included nine dummies to capture the interaction between education and employment at different levels. The introduction of these interaction terms reduces the value of the coefficients of education dummies and the only significant dummy in the estimates is S_4. Similarly, the coefficients of employment experience dummies are also reduced at each level but remain statistically significant. On the other hand, only one interaction term S_4E_4 is found to be significantly different from zero. The significant coefficient of S_4E_4 implies that the workers with education *matric* and above with employment experience more than 15 years earn 27 percent more than those who have no education and employment experience less than 5 years. The F-test to examine the significance of these interaction terms indicates that the interaction terms are not significant. This means that there is no significant impact of education-experience interaction at different levels of education and experience, except the highest one.

These findings are further strengthened by examining the level of income at different levels of education (experience) holding experience (education) constant. Such statistics are presented in Table 5 where mean income is calculated for each education and experience category.

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[15] For Tanzania, Knight and Sabot (1981) observe a similar trend. Mincer (1974) however found that individuals with higher levels of education achieve peak earning with shorter length of experience in the United States.

Table 5: Mean Income at Different Levels of Education and Experience

(Rupees)

	E1	E2	E3	E4	Total
S1	1,973	2,512	2,629	2,677	2,430
S2	2,015	2,953	2,930	3,230	2,650
S3	2,423	2,679	3,570	3,639	2,907
S4	3,386	4,069	4,989	5,857	4,372
Total	2,783	3,381	4,003	4,300	3,495

One can observe an increase in mean income as the educational level increases holding experience constant or increasing experience holding educational level constant. A considerable difference in the earnings of uneducated and educated at each level of experience can be noted from this Table. For example, one can see a negligible increase in income of the uneducated individuals belonging to experience group 3 and 4, whereas this differential is considerable as education increases in the same experience groups. This shows that the experience-earning profile is steeper for the educated [see Appendix chart 3].

One of the striking features of Table 4 is the high and significant dummies of occupation in all four equations. Higher earnings are associated with better paying occupation[16]. According to equation 2, professionals earn 50 percent, technical professionals 32 percent and service workers earn 25 percent higher than the labourers. Dropping these dummies from the regressions we found a decline in explained variation in all the equations[17]. In addition, a substantial rise in the coefficients of education and training has been observed (from 0.048 to 0.056 and from 0.094 to 0.115 respectively). In equation 4 when education is replaced by a set of dummy variables, we found expected magnitudes and signs of these dummies. This equation also showed higher coefficients of education at all levels. In equation 5, significant coefficients of S_4, interaction dummy S_4E_4, and technical training indicate the importance of education and training in determining earnings. The role of these two variables is also very significant in the choice of occupation. For example, using the data of Israel, Neuman and Ziderman (1991) observed that the individuals with vocational school

[16] The occupations are classified according to the level of skills that workers have. The category 'Professionals' includes managers and other professionals; Technicians and other semi-professionals fall in the category 'Technicians'; the group 'Service' includes all skilled and semi-skilled workers; and general labour are combined in the category 'labour'.

[17] This set of estimated equations is not reported here.

training working in their course-related discipline earn more (by up to 10 percent annually) than their counterparts who attended general secondary schools or work in noncourse-related occupations but are graduates of vocational schools.

Effect of education, experience and occupation on earnings

Another way of looking at the joint effect of education and experience on individual earnings is to stratify the sample according to the levels of employment experience (educational levels) and examine the coefficient of schooling (experience). Besides, in order to examine the effect of occupation on earnings we will stratify our sample according to occupations and examine the coefficients of education, experience and the education-experience interaction term.

Effect of education on earnings at different levels of experience

First we divide our sample into four experience groups, mentioned in the section of methodology and examine the returns to education at these levels of experience. The estimated earning functions for different levels of employment experience are reported in Table 6. This table shows that higher earnings are associated with higher experience. Looking at the regression estimates, one can note that as experience increases from 4 years to 14 years, the coefficient of education drops from 5 percent to 3.5 percent. This table shows that although the mean earnings at the lowest level of experience are lowest, the coefficient of education is considerably high. At this level of experience one additional year of education adds 5 percent more to earnings. This means that at early stages of employment, an individual needs to demonstrate his productivity. In this regard, both education and technical training play an important role. A decline in the coefficients of technical training and education with increase in experience indicates the productivity enhancing learning process that the individual acquires through experience. In other words, the effect of education reduces as experience increases. This table shows that in the highest experience group, returns to education are also highest. At this level of experience, the only significant occupation dummy is for the professionals. By dropping the occupational dummies from the regression we not only found a considerable decline in the explained variation but also a decline in the coefficient of education from 0.061 to 0.048. This means that at higher levels of experience, occupation has a direct as well as indirect effect through education on individual earnings.

Table 6: Earning Function Estimates at Different Levels of Experience

	E1		E2		E3		E4	
	β	t-value	β	t-value	β	t-value	β	t-value
Const	6.45	(34.76)	6.98	(38.24)	6.66	(22.66)	6.71	(37.95)
S	0.050*	(8.08)	0.038*	(5.72)	0.035*	(3.67)	0.061*	(9.87)
Train	0.208*	(2.34)	0.06	(0.69)	0.038	(0.03)	0.083	(0.89)
Prof	0.45*1	(2.91)	0.541*	(3.32)	0.675*	(2.67)	0.362*	(2.36)
Tech	0.321**	(2.29)	0.343**	(2.38)	0.445**	(2.00)	0.159	(1.12)
Service	0.240***	(1.91)	0.268**	(2.12)	0.283	(1.42)	0.184	(1.44)
Male	0.549*	(6.12)	0.287*	(2.98)	0.555*	(3.01)	0.530*	(4.65)
Urban	0.007	(0.13)	0.161*	(2.64)	0.049	(0.51)	0.276*	(4.48)
Punjab	-0.009	(0.12)	-0.064	(-0.67)	0.177	(1.26)	0.094	(1.19)
Sind	0.670**	(1.96)	0.116	(1.20)	0.368*	(2.59)	0.227*	(2.54)
Baloch	0.404*	(2.75)	0.054	(0.35)	0.582*	(3.23)	0.510*	(4.35)
Adj R^2	0.28		0.27		0.29		0.46	
N	442		326		171		328	

* indicates that coefficient is significant at 1 percent level.
** indicates that coefficient is significant at 5 percent level.
*** indicates that coefficient is significant at 10 percent level.

Effect of experience on earnings at different levels of education

The results of estimated earning function to examine the coefficient of experience at different levels of education are reported in Table 7. These results show that returns to experience are increasing as education increases. Highest returns are associated with highest level of education. These results indicate that at lower levels of education, experience and training play an important role in raising income. The significant coefficient of training for primary and below indicates the importance of technical education especially for those who have some know-how. Looking at the occupation dummies, this table reveals that for the uneducated, the coefficient of "Services" and for the highest education category, the coefficient of "Professionals" is highest not only in size but also in the level of significance. The inclusion of E^2 in the regression equations produces higher returns to experience for the uneducated than those who are primary or middle graduates. However, evaluating at mean years of experience (11.08 years) implies that uneducated and primary educated individuals with experience 11.08 years earn 47 percent and 41 percent more than the non-experienced workers. The differential in the earnings of experienced and non-experienced becomes wide as educational level improves to middle and high (55% and 56%).

Table 7: Earning Function Estimates at Different Levels of Education

	S1		S2		S3		S4	
	β	t-value	β	t-value	β	t-value	β	t-value
Const	6.03	(32.76)	7.23	(25.97)	7.39	(39.08)	6.89	(32.33)
E	0.006	(1.70)	0.016	(3.17)	0.026	(5.86)	0.029	(8.43)
Train	0.003	(0.02)	0.333	(2.65)	-0.102	(-0.79)	0.085	(1.38)
Prof	0.297	(1.62)	-0.324	(1.12)	0.182	(0.86)	0.716	(3.51)
Tech	0.309	(2.18)	0.108	(0.51)	0.185	(0.88)	0.453	(2.26)
Service	0.345	(3.38)	0.183	(1.29)	0.167	(0.98)	0.296	(1.48)
Male	1.070	(9.50)	0.205	(0.95)	-	-	0.298	(4.33)
Urban	0.138	(1.67)	0.172	(2.00)	-0.087	(1.12)	0.218	(4.59)
Punjab	-0.035	(-0.17)	-0.284	(-2.20)	0.041	(0.36)	0.160	(2.43)
Sind	0.191	(2.38)	0.009	(0.072)	0.268	(2.38)	0.279	(4.06)
Baloch	0.491	(3.95)	0.498	(1.98)	0.420	(2.01)	0.341	(3.09)
Adj R^2	0.32		0.22		0.20		0.25	
N	315		155		146		642	

* indicates that coefficient is significant at 1 percent level.
** indicates that coefficient is significant at 5 percent level.
*** indicates that coefficient is significant at 10 percent level.

Effect of occupation on earnings

It has been found that mean earnings differ substantially across occupations for the same level of education and experience. Table 8 shows that variation in earnings within an occupation across different levels of education is less than the variation within an educational or experience group across different occupations. For example, highly educated labourers earn 10 percent higher than uneducated labour whereas workers in the "Professional" category having education more than 8 years earn 66 percent more than the workers in the "Labour" category with the same level of education. Appendix chart 4 shows the variation in earnings within one occupation for different levels of education. The responsiveness in earnings to education is negligible for the labourer class. On the other hand, earnings are found highly sensitive for professionals. Appendix Chart 5 indicates similar trends for the experience groups that the differences in earnings across different experience levels for professionals are more pronounced than those of labourers.

Table 8: Mean Earnings in Different Occupations for each Educational and Experience Group

	S1	S2	S3	S4	E1	E2	E3	E4
Labour	1,824	1,799	2,429	2,025	1,603	1,834	2,133	2,208
Service	2,501	2,664	2,904	3,726	2,534	2,973	3,530	3,488
Tech	2,523	3,612	2,914	4,164	3,077	3,864	4,633	4,546
Prof	2,789	2,025	3,232	6,025	4,148	4,853	5,489	7,221

The picture becomes clearer when we examine the coefficients of education, experience and education-experience interaction in the earning functions that are stratified according to occupations[18]. These results are presented in Table 9. One can note from the estimated equations that the coefficient of experience rises as the occupational category improves. This indicates that the individuals in better occupational categories learn more with experience. A similar trend can be seen in the returns to education with the exception of the "Labour" category, where returns to education are higher than the "Service workers". One year increase in the *education* of "Professionals" increases their earnings by 9 percent whereas this increase is only 5 percent for the labourers. Similarly, one year increase in *experience* brings about an increase of 9 percent in the earnings of "Professional" workers, while this increase is only 4 percent for the labourers. The professionals, technical workers and service workers attain peak earnings after experience of 21, 21 and 22 years whereas Labourers need an experience of 33 years to attain peak earnings. This implies that an individual in a better occupation attains peak earnings at lesser experience.

[18] The education-experience interaction terms was found insignificant. Therefore we have dropped this variable and re-estimated the earning functions for each occupational category.

Table 9: Earning Function for Different Occupations

	Labour		Service		Tech		Prof	
	β	t-value	β	t-value	β	t-value	β	t-value
Const	5.12	(11.32)	6.14	(52.06)	6.74	(50.04)	6.26	(31.58)
S	0.051*	(3.76)	0.035*	(8.26)	0.053*	(7.58)	0.086*	(7.95)
E	0.039**	(2.15)	0.066*	(9.07)	0.067*	(6.69)	0.085*	(5.36)
E^2	-0.0006	(-1.23)	-0.0015*	(-6.95)	-0.001*6	(-5.39)	-0.0019*	(-4.27)
Train	0.163	(0.57)	0.006	(0.93)	0.005	(0.05)	0.107	(0.99)
Male	0.982*	(2.48)	0.970*	(9.96)	0.235*	(3.06)	0.256*	(2.25)
Urban	0.269***	(1.80)	0.089**	(2.16)	0.156*	(2.67)	0.272*	(2.76)
Punjab	0.703*	(2.98)	0.016	(0.26)	0.041	(0.53)	0.061*	(5.25)
Sind	1.050*	(4.61)	0.168*	(2.58)	0.040	(0.47)	0.204***	(1.67)
Baloch	1.049*	(3.53)	0.419*	(4.33)	0.200	(1.61)	0.692*	(3.49)
Adj R^2	0.42		0.33		0.30		0.48	
N	70		713		320		164	

* indicates that coefficient is significant at 1 percent level.
** indicates that coefficient is significant at 5 percent level.
*** indicates that coefficient is significant at 10 percent level.

It is interesting to note that the coefficient of the education-experience interaction was significant in the full sample regressions presented in Table 4, but it is found insignificant when we divide workers according to their occupations (Table 9)[19]. It implies that education and experience affect earnings differently in different occupations. This is because some occupations require high skilled workers. And the individuals with better level of education can learn those skills more quickly with their experience. Therefore both the returns to experience and returns to education are higher for those who choose a better occupation.

To further explore the effect of occupational choice, we examined the pattern of earnings not only across occupation for the same level of education but also across different levels of education for the same occupation[20]. The results are reported in Table 10. This Table shows an obvious earning differential across occupations for the same level of education and experience as compared to that noted within an occupation for different levels of experience holding education constant. This table

[19] For Tanzania, Knight and Sabot (1981) also observed significant interaction term in the full sample and insignificant in the stratified sample.

[20] In order to examine the effect of occupation for the same level of education, we chose only those individuals who have education of more than five years. And the effect of education for the same occupation has been explored by restricting the sample only to service workers.

illustrates the variables that have a stronger effect on earnings: from amongst occupation, education or experience.

Table 10: Earnings Differentials Across Occupations and Educational Levels for Different Levels of Experience

	S≥5				Occupation=Service			
	Prof	Tech	Service	Labour	S1	S2	S3	S4
E1	4,927	3,137	2,747	1,809	2,019	2,094	2,398	3,179
E2	4,942	3,801	3,236	2,205	2,572	2,923	2,705	3,555
E3	5,692	4,784	3,996	2,750	2,703	2,834	3,637	4,626
E4	7,787	4,905	4,117	3,150	2,813	3,368	3,698	3,726

To illustrate this we choose one occupation 'Service', and one experience level E3 (8-12 years) and examine variation within and across occupation, education and experience. We note that the differential in the earnings of professionals and labourers with the same education (S≥5) and same experience level (E3) is 52 percent. This difference between uneducated and highly educated within the same occupation (Service) and same experience level (E3) is 42 percent. And the difference in the earnings of least experienced workers and those having experience of 8-12 years within the same occupation (Service) and same educational level (S≥5) is 31 percent. This indicates that the effect of choice of occupation is stronger than the effect of education and the effect of education is stronger than the effect of experience. We can conclude from the above discussion that in Pakistan's labour market, occupational choice is more important than education and education is more important than experience for higher earnings. However, a positive association between high mean years of education and better occupation indicates that in addition to employment opportunities, education plays an important role in choosing an occupation. There is a need to explore this causal relationship.

Conclusions

This paper examines the effects of education, experience and occupation on individual earnings in Pakistan for wage earners and salaried persons. The results of this paper indicate that the education-experience interaction has a positive and significant impact on earnings. However, when the earning functions are stratified according to experience groups, the returns to education are found to be declining as experience lengthens. On

the other hand, the stratification according to educational groups indicates that the returns to experience rise as educational level improves. In addition to these, this analysis also finds that the rise in earnings with experience at the highest educational level is much greater than that at lower educational levels. This implies that education plays a crucial role not only when an individual enters the job market but also in enhancing the post school human capital formation, gained through experience. Technical training was found to have a large and significant impact on those who have experience either less than 5 years or have education of at least primary.

Another important finding is that there exist significant differences in earnings across occupations. The effect of occupational choice is found to be stronger than the effect of education and the effect of education is observed to be stronger than the effect of experience. For example: the differential in the earnings of professionals and labourers with the same education (S≥5) and same experience level (E3) is 52 percent. This difference between uneducated and highly educated within the same occupation (service) and same experience level (E3) is 42 percent. And the difference in the earnings of least experienced workers and those having experience of 8-12 years within the same occupation (service) and same educational level (S≥5) is 31 percent. This indicates that the effect of choice of occupation is stronger than the effect of education and the effect of education is stronger than the effect of experience. A positive association between high mean years of education and better occupation highlights the importance of education in choosing a better occupation. This paper found significant earning differentials across gender, region and provinces, especially when the earning functions are stratified by occupation groups.

Policy Implications and Recommendations:

The findings discussed above have six main policy implications.

1. A stronger effect of education than experience suggests the need for expansions and improvements in the education sector. Therefore attention should be given to improve the quality of education in addition to increasing the educational infrastructure.

2. A positive and significant impact of technical training for those who have primary or below level of education points to the need of such institutions that can provide training, especially to those who are less educated. In Pakistan, the existing number of formal technical and vocational training institutes is not sufficient to cater to the demand for technical education. Moreover, due to the lack of communication between these

institutions and the industrial establishment, the labour absorption rate of these graduates is low [see Butt (1993)]. Therefore, there is a need not only to increase the number of such institutions but also to increase their coverage to all areas. Coordination between these institutions and the industrial establishment would certainly play a positive role not only in obtaining employment but also in choosing an occupation that is found to be a very important determinant of earnings in the present study.

3. The importance of the choice of occupation brings to light the very important issue of available employment opportunities in Pakistan's labour market. Significant earning differentials across gender, region and provinces reflect uneven distribution of employment opportunities for males and females; rural and urban areas; and in four provinces of Pakistan. Therefore urgent measures are needed to create equity by eliminating these differences. There is a need to promote girls education, to develop the rural economy and to ensure even distribution of all social services and employment opportunities across provinces and regions.

4. A positive association between education and better occupation indicates that in addition to employment opportunities, education plays an important role in choosing an occupation. Unfortunately, on the one hand, due to high rate of illiteracy and low educational attainments, Pakistan's labour market is dominated by uneducated or less educated persons and on the other hand, a large number of educated persons are unemployed[21]. The lack of job opportunities is a significant reason of the high rate of brain drain from the country. There is an urgent need to pay attention to this very important issue and design such policies that help in the optimal utilisation of skilled human resources of the country.

5. There is a great need to collect detailed information on work experience, i.e., past and present employment history that is presently lacking in most of the household surveys in order to further investigate the effects of human capital accumulation.

6. A positive association between high mean years of education and better occupation highlights the importance of education in choosing a better occupation. This analysis, however, does not explore the causal

[21] The *Labour Force Survey* (2001-02) reports that 3.57 million persons were unemployed in Pakistan in 2001-02; 45 percent were illiterate and 55 percent were literate. Among literate unemployed, 5.9 percent held higher and professional degrees.

relationship between education and occupation. Such exploration would provide useful insights into human capital formation and utilisation.

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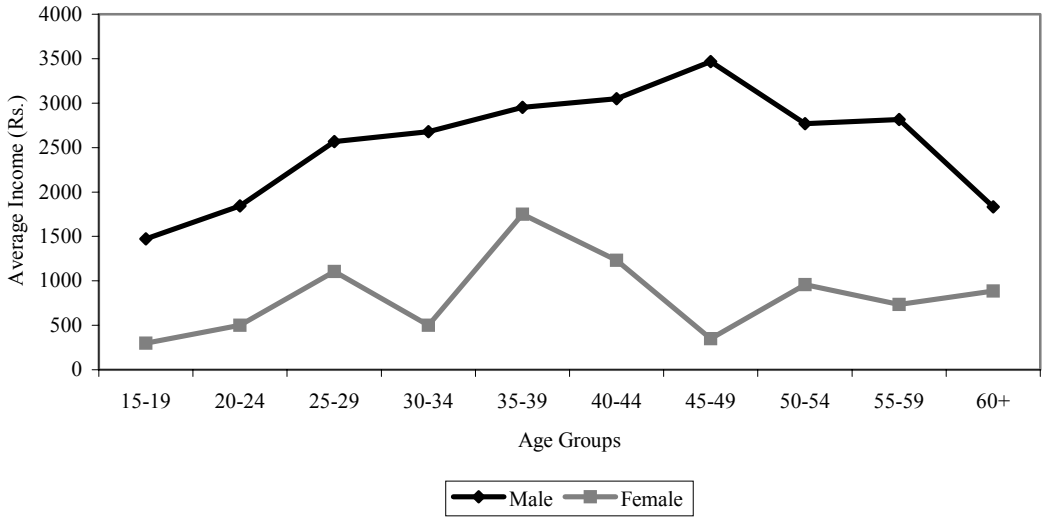
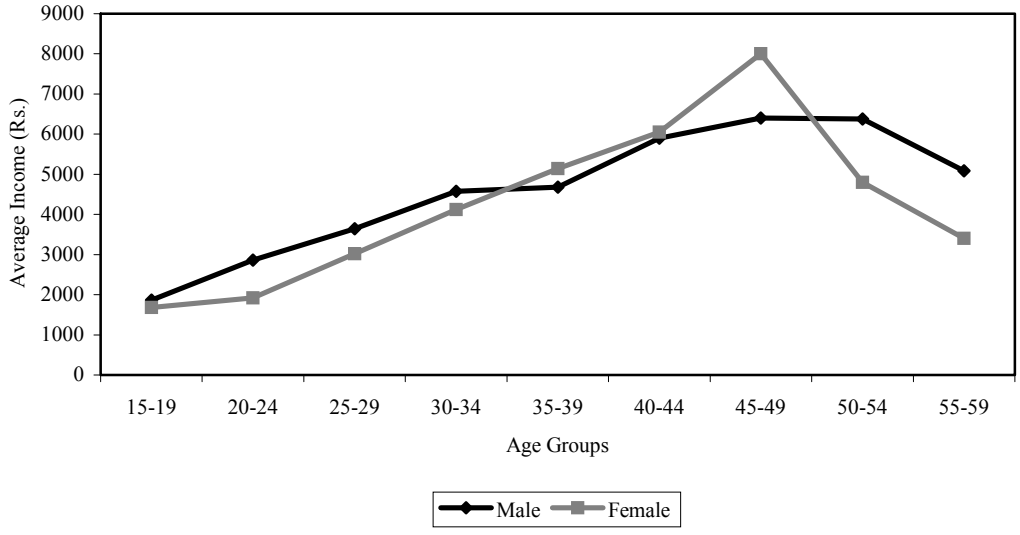
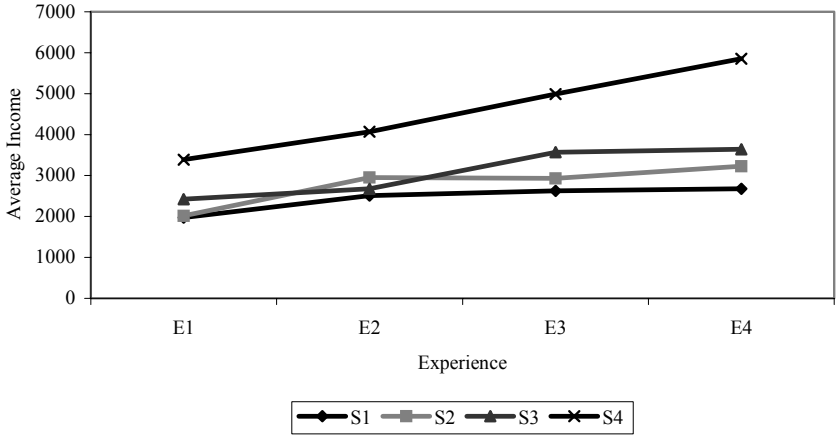
Appendix Chart 1: Gender Differentials in Age-Earning Profile at S1



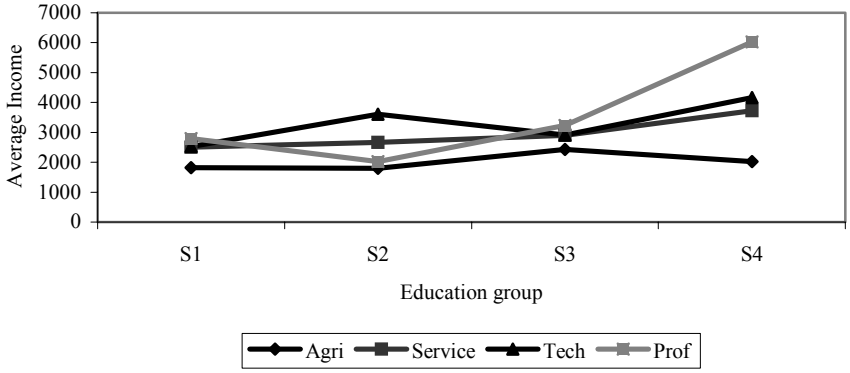
Appendix Chart 2: Gender Differential in Age-Earning Profile at S4



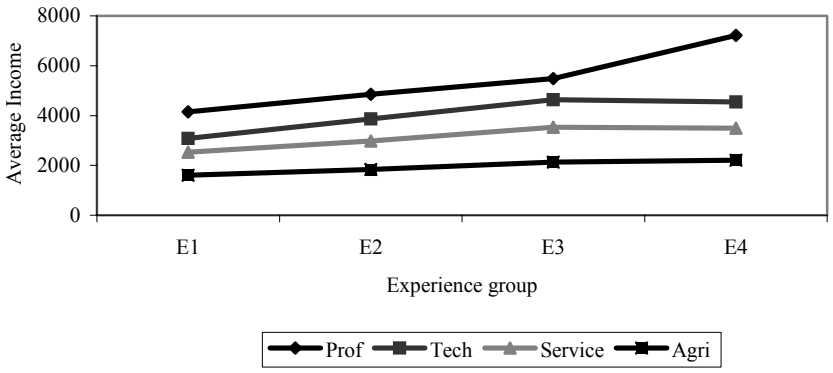
Appendix Chart 3: Earnings at Different Levels of Education and Experience



Appendix Chart 4: Occupational Earning Differentals within Each Educational Group



Appendix Chart 5: Occupational Earning Differentials within Each Experience Group



Determinants of the Argentine Financial Crisis: Can We Predict Future Crises?

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Abstract

This article aims at identifying the macroeconomic indicators that account for the Argentine financial crisis. For this purpose, an early warning system (EWS) is built based on a probit model that incorporates six monthly variables spanning the time period between February 1991 and February 2000. The results indicate that the significant indicators are the consumer price index and the ratio of the value of exports to the value of imports. Results further indicate that the predictive power of the model is quite reasonable with a correct prediction probability of 67 percent at 15 percent cutoff level.

I. Introduction

In the late 1990s, economic and financial crises raged through emerging market economies such as Asia, Mexico, Russia and, more recently, Turkey and Argentina, with devastating economic and social consequences. In today's increasingly interdependent world, finding ways to reduce the risk of future crises has become an international policy challenge of enormous importance. In this respect, a reliable Early Warning System (EWS) is needed to predict financial crises so that policy makers can take pre-emptive measures to mitigate or even prevent them (Wyplosz, 1998).

The objective of this study is to model an early warning system that predicts the likelihood of future currency crises based on a multinomial probit model using monthly Argentine data spanning the time period between February 1991 and February 2000. This paper is structured as follows. Section II reviews the EWS literature. Section III provides background information on the Argentine economy. Section IV presents the data and introduces the methodology used. The last section points out the conclusions that emerge from the study.

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II. Literature Review

Literature on financial crises is categorised into three mainstream models, namely first-generation models, second-generation models, and third-generation models. In the "first-generation" models (Krugman 1979; Flood and Garber 1984), a government with persistent money-financed budget deficits is assumed to use a limited stock of reserves to peg its exchange rate and the attempts of investors to anticipate the inevitable collapse generates a speculative attack on the currency when reserves fall to some critical level.

In "second-generation" models (Obstfeld 1994, 1996, Ozkan and Sutherland 1995, Radelet and Sachs 1998, and Wyplosz 1998) policy is less mechanical: a government chooses whether or not to defend a pegged exchange rate by making a tradeoff between short-run macroeconomic flexibility and longer-term credibility. The crisis then arises from the fact that defending parity is more expensive as it requires higher interest rates. Should the market believe that defense will ultimately fail, a speculative attack on a currency develops either as a result of a predicted future deterioration in macro fundamentals, or purely through self-fulfilling prediction (Vlaar, 2000).

The need for third generation models became apparent in the 1990s with the Mexican Tequila crisis of 1994 and the Asian crises of 1997. A number of new approaches have emerged to explain how these crises evolved and how they spread from country to country. Third-generation models (Dooley 1997, Krugman 1998, Radelet and Sachs 1998) are categorised into three different groups such as herd-behaviour, contagion, and moral hazard.

There have been numerous studies in the literature on the determinants of financial crises. Empirical literature on financial crises can be categorised into two separate groups. The first group consists of studies based on a model known as “Signals Approach” which involves observing the behaviour of a number of indicators as they issue signals when they exceed certain threshold values. The second approach is based on a logit or probit model and uses lagged values of early warning indicators as well as a dummy variable to predict crises.

Signals approach was developed by Kaminsky *et al.* (1998) and consists of a bilateral model where a set of high frequency economic variables during a specified period is compared, one at a time, with a crisis index so that when one of these variables deviates from its normal level

beyond a specific threshold value prior to a crisis, it issues binary signals for a possible currency crisis. Signals model devised by Kaminsky *et al.* (1998) consists of 15 variables with optimal thresholds estimated for each country in relation to percentiles of the distribution of observations of the indicator maximising the correct signals and minimising the false. Their signal horizon is set at 24 months and a currency crisis is defined as a sharp depreciation of the currency or a large decline in international reserves. Crisis index was formed using a weighted average of monthly percentage changes in the exchange rates and reserves with positive and negative weights attached, respectively, in such a way that the two components of the index have equal conditional volatilities. Periods when the index is above its mean by more than three standard deviations are defined as crisis periods. The percentage of correct signals to the percentage of false signals would give an indication of the accuracy of each indicator. Kaminsky *et al.* (1998) used monthly data of 15 developing and 5 industrial countries from 1970 to 1995 and detected an average of 61 crises during this period. Their findings show that the best indicators are at least twice as persistent as others in crisis periods relative to tranquil periods and that all indicators send the first signal between one year and one year and a half before a crisis starts. Their best indicators, based on noise-to-signal ratio, are the real exchange rate, banking crises dummy, exports, stock prices, and M2/international reserves. Their study also showed that the real interest differential, imports, bank deposits, lending rate/deposit rate have noise-to-signal ratio smaller than 1.

This model was later improved by Kaminsky and Reinhart (1999), who used the same sample as in Kaminsky *et al.* (1998). They found that before a crisis episode, several of the indicators began to send stress signals and that the earliest signals sent by the best predictors were between 6 to 18 months before a crisis starts. Their model identified a total of 26 banking and 76 currency crises, 18 of which were twin crises. They found that the occurrence of both types of crises has increased sharply since the early 1980s with only one twin crisis taking place before 1980. In their study Kaminsky and Reinhart (1999) also found that banking and currency crises had common causes with the former usually preceding the latter and following a particular pattern where the peaks of banking crises follows the currency crises.

The signals approach uses information from crisis and non-crisis times and takes the timing of crises explicitly into account. This method makes it possible to evaluate the predictive powers of individual indicators facilitating the establishment of indicator rankings. Therefore, it is well suited for finding vulnerabilities in an economy as it immediately reveals the

variable that causes the weakness. This enables policy makers to develop prompt policy responses in order to prevent crises. These models work well with small samples and impose no restriction on the number of explanatory variables.

Despite these advantages, in the signals approach, information from each indicator is treated in an inefficient way since all are transformed into dummies. This implies that signals are equally strong regardless of whether an indicator just passes the threshold or exceeds it by a wide margin. This approach is bivariate, in that each indicator is analysed, and optimal thresholds calculated, separately. Due to this nature of the approach, correlations among the explanatory variables are not taken into account, which can affect the optimal thresholds in a negative way when constructing a composite leading indicator. In addition, these models do not allow the application of some standard statistical evaluation methods, such as the significance tests, as they are nonparametric.

Probit and logit models, pioneered by Frankel and Rose (1996), use limited dependent variable models known as probit or logit regressions to identify the causes of crises. In these models, the currency crisis indicator is also modeled as a zero-one variable, as in the signals approach. However, the explanatory variables do not take the form of a dummy variable, but enter the model in a linear fashion. This approach defines a crisis indicator equal to one or zero depending on whether a currency crisis does or does not occur within the specified time period. Frankel and Rose (1996) attempted to find out how international debt structure and external factors affected the probability of currency crises. They used a number of external, internal and foreign macroeconomic variables in a multivariate probit model specified for 105 developing countries, covering annual data from 1971 to 1992. They defined a crisis as at least 25% depreciation of the nominal exchange rate that also exceeds the previous year's depreciation level by at least 10% and constructed a dummy crisis variable according to that rule. Results of their model indicate that the overall explanatory power of the model is quite low with a pseudo R2 measure of around 20% for all specifications. According to the same results, current account and budget deficits are insignificant as well as most of debt composition variables, except for foreign direct investment. A fall in this variable by one percent of the debt is associated with a 3% increase in the probability of a crash. Results of their model suggest that the probability of a crisis increases when output growth and reserves are low, and domestic credit growth, external debt and foreign interest rates are high. They also found that the probability of a crash is higher during recessions and when the ratio of foreign direct investment to total debt is low.

Sachs, Tornell and Velasco (1996) also used a probit model to analyse currency crises, particularly the Mexican Tequila Crisis of 1995, using a sample of 20 emerging countries that were vulnerable to the contagion effect after the 1994 Mexican crisis. They tried to answer the question as to which countries are most likely to suffer serious attacks in the event of a change in the global environment rather than identifying the timing of crises. They used the weighted sum of the percent decrease in reserves and the percent depreciation of the exchange rate from November 1994 to April 1995 as their crisis index. They found that crises happened only in the countries with weak fundamentals such as low reserves, fragile banking systems and overvalued exchange rate. They found that short-term capital inflows do not matter when reserves and fundamentals are strong whilst government consumption and current account deficits matter only in the countries with weak fundamentals and weak reserves.

Berg and Pattillo (1999) tested models offered by Kaminsky, Lizondo and Reinhart (1998), Frankel and Rose (1996) and Sachs, Tornell, Velasco (1996) to see if these models could predict the Asian crisis using information available at the end of 1996. They found that the models offered by Sachs, Tornell, Velasco (1996) and Frankel and Rose (1996) were ineffective in forecasting the Asian crisis. The Kaminsky, Lizondo and Reinhart (1998) model, on the other hand, proved to be successful. Crisis probabilities generated by this model for the period between May 1995 and December 1996 were statistically significant predictors of actual crisis occurrence over the following 24 months. Besides, the forecasted cross-country ranking of crisis severity provided by this model is a significant predictor of the actual ranking. Berg and Pattillo (1999) also found out that in all three approaches, the probability of a currency crisis increases when domestic credit growth is high, the real exchange rate is overvalued relative to trend, and the ratio of M2 to reserves is high.

In a recent study, Komulainen and Lukkarila (2003) examined the causes of financial crises in 31 emerging market countries during 1980-2001 using a probit model based on 23 variables. Their findings show that financial crises occur together with banking crises and an increase in private sector liabilities, public debt, foreign liabilities of banks, unemployment, inflation, and US interest rates raises the probability of a crisis. Table 1 summarises the empirical literature on early warning systems.

Table-1: Literature Review on Early Warning Systems

Study	Kaminsky, Lizondo, Reinhart (1998)	Sachs. Tornell, Velasco (1996)	Kaminsky, Reinhart (1999)	Berg, Patillo (1999)	Frankel, Rose (1996)	Komulainen and Lukkarila (2003)
Approach	Signals approach	Probit model	Signals approach	Both approaches	Probit Model	Probit Model
Data	1970-1975 monthly data from 15 developing and 5 industrial countries	Monthly data from 20 emerging markets.	Same sample as Kaminsky, Lizondo, Reinhart (1998)	Same variables as Kaminsky, Lizondo, Reinhart (1998) plus M2/reserves and CA/GDP	1971-1992 annual data from 105 developing countries	1980-2001 monthly data from 31 emerging and developing countries
Crisis Index	Weighted average of exchange rate and reserve changes with a threshold of mean +3 standard deviation.	Weighted sum of percent decrease in reserves and the percent depreciation of the exchange rates	Weighted average of exchange rate changes and reserves	Same as Kaminsky, Lizondo, Reinhart (1998)	Exchange rate change over 25%, at least 10% higher than previous year	Equally weighted exchange rate depreciation and loss of reserves with a threshold of +2 standard deviations
Results	Significant variables include real exchange rate, exports, banking crises dummy, stock prices, M2/international reserves	Crises happen in countries with weak fundamental, low reserves, fragile banking systems, overvalued exchange rate	Detected 76 currency, 26 banking, and 18 twin crises. Found that banking and currency crises have common causes	Significant explanatory variables include real exchange rate, current account, reserve, export, and M2/reserves	Significant variables include real exchange rate, output, domestic credit, foreign interest rates	Significant variables include private sector liabilities, public debt, foreign liabilities of banks, unemployment, inflation, and US interest rates

III. Background of the Argentine Economy

In the 1980s, following the IMF's guidance, Argentina cut tariffs on imports, privatised its state enterprises, reduced social service expenditure, and welcomed multinational corporations. Problems began in the 1990s when policy makers decided to implement a fixed exchange rate linking its peso to the dollar at a rate of one to one (Yildizcan 2001). As a result, when the US dollar became overvalued, the peso became overvalued as well, making exports expensive and imports cheap. This, in turn, increased Argentina's trade deficit, interest rates, level of unemployment and diminished its national production. Hence, Argentina wound up with no choice but to borrow more and more from the IMF in order to maintain a large reserve of dollars to sustain an overvalued currency (Yildizcan 2001).

A thorough analysis of the Argentine economy prior to the recent financial crisis by Eichengreen (2002) reveals that Argentina had suffered extended periods of economic stagnation and high levels of inflation prior to its financial crisis episodes. Then, it pegged their exchange rates as an attempt to stabilise its ailing economy and to bring down inflation. Argentine policy makers chose to implement an inflexible peg by adopting a dollar-based currency board. Further analysis by Eichengreen (2002) reveals that following extended periods of economic instability, Argentina managed to bring inflation down in the context of the exchange rate based stabilisation policy. Then, it experienced a post-stabilisation boom as the reduction in the interest rates toward global levels stimulated the domestic demand, especially for durable and semi-durable consumption goods and private investment. In addition, the volume of exports increased as the economy reached stable levels. However, export growth reached was highly insufficient to finance the buoyant import demands. This rendered the country dependent on capital inflows. As a result, the country made intensive efforts to balance the public-sector accounts and pursued ambitious programmes to privatise the public enterprises. Furthermore, it took steps to strengthen the banking system. However, when crisis hit the country in 2001, the fiscal consolidation movement was incomplete and as Eichengreen (2002) points out, the political support for cuts in public spending was highly fragile and fragmented. In Argentina, political disturbance jeopardised the fiscal and economic adjustment attempts and the trigger of the crisis was the breakdown of support for the fiscal cuts demanded by the Economy Minister Jose Luis Machinea and his political successor, Roberto Lopez-Murphy. The crisis required the immediate assistance of the IMF, which initially rejected a $1.3 billion-credit demand by Argentina and allowed its financial crisis to deepen. The IMF finally provided credit to Argentina only after it became completely unable to maintain its peg to the dollar due to the devaluation of the Brazilian Real.

4. Data and Methodology

4.1 Crisis Definition

Building an EWS model depends primarily on how we define a crisis. The objective of a crisis definition is to describe large, extraordinary changes in economic variables such as exchange rates, interest rates, or foreign exchange reserves. The literature on predicting currency crises has used the term crisis synonymously with speculative attacks or extreme pressure on the exchange rate. As a result, crisis indices have often been based on identifying sharp changes either in the exchange rate alone, as done by Frankel and Rose (1996), or in the weighted averages of exchange rates and reserves as done by Kaminsky *et al* (1998).

Essentially, classifying each sample period as being in crisis or not depends on whether or not an index of vulnerability exceeds an arbitrarily chosen threshold. In this study, a crisis episode is considered to occur in a particular month if the month-over-month percentage change in the bilateral exchange rate[1] is at least 10%. For the purposes of improving the statistical properties of our model, we use a three-month window, i.e. we consider that each crisis episode spans a time period of three months following the month in which the crisis emerged. This practice, from the statistical point of view, strongly increases the number of ones in the sample thereby improving the statistical properties of our probit regressions. In addition, because a large movement in an exchange rate is often followed closely by another or several large movements, some of which may still be part of the crisis associated with the first instance of depreciation (Dowling and Zhuang 2000), we consider only a depreciation episode that takes place 6 months or more after the previous one as a separate crisis. Using this definition and a 10% month-to-month exchange rate threshold, we identify four separate crises in Argentina during the time period between February 1991 and February 2000 as shown in Table 2 below.

Table-2: Beginning of Crisis Episodes

May 1991
July 1993
January 2000
October 2002

[1] Argentine Peso/US dollar

4.2 Explanatory Variables

The present study employs six monthly (end-of-month) macroeconomic indicators from Argentina spanning the time period between February 1991 and February 2000. All data are obtained from DataStream and are transformed into natural logarithms to achieve mean-reverting relationships and to make statistical testing procedures valid. We follow a methodology where we use the first three crisis episodes in Argentina to build a probit model that predicts future crises while we use the last crisis to test our model out-of-sample.

Probit models can accommodate only a limited number of explanatory variables. For our probit model, we have chosen a set of six variables as shown in Table 3. We use the bilateral exchange rate between the domestic currency and US dollar as it is an indicator of competitiveness loss or gain for the countries prior to crisis episodes and, to our knowledge, is used in all EWS models including probit models of Frankel and Rose (1996) and Sachs, Tornell and Velasco (1996) both of which found this variable to be a significant crisis indicator for a number of emerging economies. A monetary policy indicator that is used frequently in the literature and we include in this study is domestic credit. This explanatory variable is used as an indicator of the banking sector as well as a monetary policy indicator. As Kaminsky and Reinhart (1998) point out, very high growth rates of domestic credit may serve as a simple indicator of the fragility of the banking system and the higher the domestic credit, the more dependent the real economic activity on the health of the banking system, and the worse the effects of a crisis on the economy.

A pair of explanatory variables used quite frequently in the EWS literature is the level of exports and imports. These variables are used as an indicator of the current account of the countries. Jotzo (1999) points out that declining volume of exports can be considered as an indication of competitiveness loss of a country, possibly caused by an overvalued domestic currency. Frankel and Rose (1996) used import and export growth rates separately in their probit model. In this study, we use the ratio of export values to the import values instead for the purposes of keeping the number of explanatory variables in our model at a minimum thereby diminishing the risk of multicollinearity. Another important indicator used in our model is the money supply M1. As Eichengreen *et al* (1995) point out, M1 is a measure of liquidity, and its growth indicates excess liquidity, which may invoke speculative attacks on the currency thus leading to a currency crisis. This suggestion is also supported by Dowling and Zhuang (2000) who affirm that rapid growth in credit induced by excessive monetary expansion have historically been associated with currency and banking crises in many countries.

Literature on EWS also uses market index frequently as an indicator of the market sentiment prior to crises. Frankel and Rose (1996) used index of equity prices as a real sector indicator in their probit model. Following this reasoning, we include Argentine stock market indices in our model. The last indicator that we employ is the consumer price index, which is a common inflation measure that has not been used widely in the literature.

Table-3: Explanatory Variables and Definitions

Variable	Symbol	Explanation
Stock Market Index	M	Argentine monthly stock market indices. Used as a real sector indicator showing the reaction of the market prior to crises.
Exchange Rate	X	Bilateral monthly US dollar exchange rates for the Argentine Peso. (AP/USD, so that an increase denotes depreciation of the domestic currency) Used as an indicator of competitiveness loss or gain of the country prior to crises.
Exports/ Imports	EXIM	Monthly export values divided by the log returns of monthly import values. Used as an indicator of the current account of the country.
Money Supply	M1	Monthly Argentine money supply M1. Used as an indicator of monetary policy and liquidity.
Domestic Credit	DC	Monthly Argentine domestic credit as a percentage of GDP. Used as an indicator of the banking sector as well as a monetary policy indicator.
Consumer Price Index	CPI	Monthly Argentine consumer price index. Used as an indicator of inflation.

For individual variables, a positive coefficient means that an increase in this explanatory variable will cause an increase in dependent variable, that is, dummy dependent variable close to 1. A negative coefficient, on the other hand, would mean that a decrease in this variable would cause a decrease in the likelihood of a crisis with the dummy dependent variable close to 0. Table 4 summarises the expected signs of the variables as well as the economic rationales behind these expectations.

Table-4: Expected Signs of the Coefficients

Variable	Sign	Explanation
CPI	+	It is common sense that increased inflation would make a country more vulnerable to financial crises.
X	-	Berg *et al* (1999) point out that currency overvaluation could lead to deteriorations in the current account and have historically been associated with currency crises.
EXIM	-	According to Dowling and Zhuang (2000), weak exports and excessive imports usually lead to deteriorations in the current account and have often been associated with currency crises.
M1	+	According to Eichengreen *et al* (1995) growth of M1 indicates excess liquidity, which may invoke speculative attacks on the currency thus leading to a currency crisis. Besides, Dowling and Zhuang (2000) point out that crises historically have been linked to rapid growth in credit induced by excessive monetary expansion in many countries.
DC	+	Kaminsky and Reinhart (1998) point out that high levels of domestic credit indicate the fragility of a banking system, thus leading to banking and financial crises.
M	-	According to Kaminsky and Reinhart (1998) recessions and a bust in asset price bubbles often precede banking and currency crises

4.3 Probit Model

A probit model is set up using lags of the explanatory variables. In this study, one-, two-, and three-month lagged values are initially used in the same regression to identify significant and insignificant variables, and in case of significant variables, to distinguish the most significant lags, i.e. the lags with the highest Z-statistic or lowest p-value. These variables are then used as early warning indicators in the final probit model after removing the insignificant ones. This is done using a backward stepwise[2] regression, which starts with including all variables and their three lags, in our model (including their three

[2] This method assumes that some input variables in the regression do not have an important explanatory effect on the outcome. Hence, it is a convenient simplification to keep only the statistically significant terms in the model.

lags). Next, we drop the insignificant variables until we end up with only significant ones. Then, we identify the most significant lag for each variable, and use it in the final probit regression. The probit model is set up as follows:

$$y_t^* = X_{t-i}\,\beta + \varepsilon_t \qquad \varepsilon_t \sim N(0,\sigma^2) \qquad \ldots\ldots (1)$$

$$CRISIS_t = X_{t-i}\,\beta + \varepsilon_t \qquad \varepsilon_t \sim N(0,\sigma^2) \qquad \ldots\ldots (2)$$

where $CRISIS_t$ is assumed to be an observable process for each country and its position in time t depends on information available at time t-1 and the random error term ε. We observe y in such a way that:

$$y = 1 \quad \text{if } CRISIS_t > 0 \qquad \ldots\ldots (3)$$

$$y = 0 \quad \text{if } CRISIS_t < 0 \qquad \ldots\ldots (4)$$

Therefore, the probability that y = 1 is the probability that:

$$CRISIS_t > 0, \text{ or,} \qquad \ldots\ldots (5)$$

$$P(CRISIS_t > 0) = P(X\beta+\varepsilon>0) = P(\varepsilon > -X\beta) \qquad \ldots\ldots (6)$$

$$\text{where } X = \begin{pmatrix} CPI_i \\ DC_i \\ X_i \\ EXIM \\ M1_i \\ M_i \end{pmatrix} \quad \text{and } i = 1,2,3$$

As shown in equations (3) and (4), a binary dummy crisis variable is constructed for the financial crises. This dummy variable takes the value of one or zero depending on whether a currency crisis does or does not occur. If the crisis takes place, the dependent variable takes the value of 1. Otherwise it remains 0. The dependent variable is then regressed on lagged values of the explanatory variables.

4.4 Properties of Data

Table 5 below shows the major descriptive statistics for the Argentine explanatory variables[3].

Table-5: Descriptive Statistics

	CPI	DC	EXIM	M1	M	X
Mean	0.002	0.006	0.561	0.007	1.092	0.014
Median	0.000	0.010	0.194	0.002	0.387	0.002
Maximum	0.153	0.085	55.989	0.126	63.827	0.701
Minimum	-0.249	-0.416	-26.460	-0.122	-30.165	-0.281
Std. Dev.	0.027	0.041	6.663	0.045	7.712	0.129
Skewness	-4.729	-8.087	3.566	0.327	4.506	1.617
Kurtosis	66.758	83.706	41.000	3.371	44.038	9.791
Autocorrelation Coefficient[4]	-0.267	0.074	0.038	0.197	0.170	-0.092
Jarque-Bera	23022.850	37544.670	8284.244	3.128	8017.479	313.509
Probability	0.000	0.000	0.000	0.209	0.000	0.000

As can be seen, CPI has the smallest standard deviation and M has the largest spread. The only variable that has skewness and kurtosis around 0 and 3, respectively, is M1. When we check the autocorrelations of these three variables we see that all have low autocorrelations. The next step is to check the multicollinearity among these variables.

Table-6: Correlation Matrix

	CPI	DC	EXIM	M1	X	M
CPI	1	-0.0507	-0.0172	0.0905	0.0773	0.0223
DC		1	0.0355	0.0326	-0.1726	-0.0818
EXIM			1	0.1285	0.0130	-0.6112
M1				1	0.2890	-0.0607
X					1	-0.0634
M						1

[3] One-month lags
[4] Autocorrelation coefficient of the first lag

As can be seen from Table 6, the stock market index and exports/imports are correlated. Therefore we leave the stock market index out because the latter is a relatively more important indicator showing the competitiveness of a country.

4.5 Empirical Results

We first build our model for Argentina using a crisis index, as explained before, based on the crisis periods shown in Table 2. As mentioned before, in this section we follow a stepwise regression. This process consists of three steps. Firstly, we use one-, two- and three-month lagged values in the same regression to identify the significant lags. Secondly, we remove the insignificant variables. Finally, we use the most significant lags of the remaining variables to run our concluding regression.

The criteria followed for eliminating insignificant variables is 10%, i.e. variables with p-values higher than 10% are dropped. In addition, if the probability of each variable is less than 10%, 5%, and 1%, we conclude that this variable is significant in explaining financial crises at 10%, 5%, and 1% confidence intervals respectively, meaning that these particular variables play an important role in determining financial crises and can be used in our final probit model. Equation (7) below shows the variables used in the first pass regression.

$$CRISIS_t = b_0 + b_1CPI_{t-1} + b_2CPI_{t-2} + b_3CPI_{t-3} + b_4M1_{t-1} + b_5M1_{t-2} + b_6M1_{t-3} + b_7X_{t-1} + b_8X_{t-2} + b_9X_{t-3} + b_{10}EXIM_{t-1} + b_{11}EXIM_t + b_{12}EXIM_{t-3} + b_{13}DC_{t-1} + b_{14}DC_{t-2} + b_{15}DC_{t-3} + \varepsilon \quad \text{.....(7)}$$

	1st pass regression			2nd pass regression			3rd pass regression	
	Coefficient	Z - Statistic		Coefficient	Z - Statistic		Coefficient	Z - Statistic
CPI_{t-1}	61.69972	1.713380*	CPI_{t-1}	95.23992	3.327183***	CPI_{t-1}	84.55441	3.230583***
CPI_{t-2}	89.82605	1.679904*	X_{t-2}	-1.969538	-1.030647	$EXIM_{t-1}$	0.058443	1.990007**
CPI_{t-3}	-7.351847	-0.096324	$EXIM_{t-1}$	0.060232	2.087160**	C	-1.795917	-7.266789
$M1_{t-1}$	-2.262915	-0.306142	C	-1.842863	-7.014730			
$M1_{t-2}$	7.212541	0.986752						
$M1_{t-3}$	12.42318	1.259787						
X_{t-1}	-2.077949	-0.973176						
X_{t-2}	-7.421373	-1.712542*						
X_{t-3}	2.512407	1.159673						
$EXIM_{t-1}$	0.090650	2.465508**						
$EXIM_{t-2}$	0.056672	1.752002*						
$EXIM_{t-3}$	0.042091	1.650247						
DC_{t-1}	26.23504	1.120348						
DC_{t-2}	36.46514	1.335374						
DC_{t-3}	46.60143	1.513563						
C	-4.661995	-3.295582						

* Significant at the 10% level.
** Significant at the 5% level.
*** Significant at the 1% level.
C is the intercept term

As can be seen in Table 7, DC and M1 are not significant. Therefore, we run a second regression without these variables. We note that X is not significant at the end of the second regression. Therefore, we run a third regression excluding this variable. As the table indicates, both variables are significant in the final regression. Therefore, we conclude that the only significant variables in explaining the Argentine financial crisis within the time period specified are CPI (one-month lag) and EXIM (one-month lag). As can be seen in Table 7, the sign of CPI is in line with our expectations. However, EXIM, surprisingly, has a positive coefficient. As we have already explained, declining volume of exports is considered an indication of competitiveness loss of a country. Therefore, the sign of EXIM is not in line with our expectations. Table 8 enables us to evaluate the predictive power of this model. We use arbitrary cutoff levels of 30% and 15% to see how well it is able to predict the occurrence of financial crises.

Table 8: Prediction Evaluation

	Success cutoff=0.30	Success cutoff=0.15
Percent Correct	50.00	66.67
Percent Incorrect	50.00	33.33

As Table 8 points out, for this probit model there is 66.67% and 50% correct prediction rate at 15% and 30% cutoff levels respectively. Out-of-sample test also affirms this conclusion. Equation (8) below shows an out-of-sample test for the October 2002 crisis in Argentina by using data beyond our sample.

$$CRISIS_t = b_0 + b_1 CPI_{t-1} + b_2 EXIM_{t-1} + \varepsilon \quad \text{.....(8)}$$

$$= -1.796 + 84.554(0.0296) + 0.058(0.0483) = 0.56981$$

where $_t$ denotes October 2002, $_{t-1}$ denotes September 2002 and, $_{t-2}$ denotes August 2002. As can be seen the result of our model using the above values gives us 0.55981 which is rather away from the dummy variable 1, thereby failing to indicate a crisis. Consequently, we can conclude that an EWS based on a probit model using the aforementioned variables within the time period specified is only moderately successful in predicting future financial crises.

6. Conclusion

In this study a probit model is built based on monthly data from Argentina. Evidence emerges that the only significant variables are the consumer price index and the ratio of the volume of exports to volume of imports. The positive sign of CPI is in line with our expectations whereas that of export/import ratio is not. The model as a whole is fairly successful in predicting financial crises; at 15% prediction cutoff, it is able to predict crises correctly with a probability of 67%. However, an out-of-sample test conducted over the 2001 financial crisis of the model also fails to predict the crisis at a reliable level.

Changing the crisis definition according to what is to be warned against and adjusting the sensitivity of the crisis measure according to the needs, preferences, and degrees of risk-aversion of policy makers may improve or worsen the performance of the model. This study constitutes a first step in the construction of an extensive early warning system. The probit model built in this study employs only macroeconomic variables. In order to devise a comprehensive model, qualitative data such as banking crises, contagion, political disturbances, moral hazard, and herding behaviour should also be included in an EWS.

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Does Stability Preclude Contractionary Devaluation?

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Abstract

In this paper we attempt to assess the relevance of correspondence principle in determining the possible effects of currency devaluation on balance of payments and employment. We developed a model in line with Buffie (1986) who derived a very strong result that if the model is locally stable and if labour and imported inputs are gross substitutes then devaluation will certainly improve labour employment and balance of payments at the same time. For the general production function the Buffie model predicts that devaluation cannot contract both employment and balance of payments at the same time since either of them is incompatible with the stability of the model. Buffie results by and large depend upon stability conditions of the model and what we have demonstrated that stability analysis of the model unfortunately is not free of error. In the corrected model we observe that the results derived by Buffie do not hold in general.

1. Introduction

Devaluation is deemed to be a major policy to rectify balance of payments problems as it restricts imports and boosts exports. For some time, however, the use of exchange rate as a policy instrument gets set back as the experience of many less developed countries are quite contrary to what was expected. In spite of mixed results, devaluation is still considered a prescription for the speedy recovery of an ill economy. For decades it remains a challenge for economists to explore reasons for mixed results as experienced by many less developed countries. Economists such as Salop (1974), Turnovsky (1981), and Lai and Chang (1989) have developed models encompassing the supply side effects of the exchange rate, to assess the main conclusion derived by Harberger (1950), Laursen and Metzler (1950), and many others that if devaluation is demand expansionary then it both increases gross-output and improves the payments balance. After incorporating the supply-side effects of the exchange rate in the model Salop has derived the result that if the monetary authority fixes the money supply then devaluation certainly reduces output and improves the payments

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balance at the same time. Lai and Chang on the other hand pointed out the importance of the degree of money illusion and of the nature of the tax system (progressive vs. proportional) in determining the impact effect of devaluation upon gross output. Turnovsky assesses the role of expectations regarding changes in the exchange rate and foreign prices on output. As expected Turnovsky's model predicts that devaluation will do the job so long as agents under predict the possible change in the real exchange rate.

The quest for developing a more realistic macro model led the economists to a point where no conclusive results are predicted. In the recent past Larrian and Sachs (1987), Buffie (1986), and Calvo (1983) and some others have made use of the Samuelson's (1947) correspondence principle to establish the relationship between the stability of the system and the effects of devaluations. Calvo and Larrian and Sachs have derived the result that devaluation will contract output if and only if the system is locally unstable. Buffie, on the other hand, concluded that for general technology, there exists no definite correspondence between stability and the impact effects of devaluation upon employment and balance of payments. However, in his model devaluation cannot both contract employment and reduce the payments balance. This is because either contraction in the employment or reduction in payments balance is incompatible with stability. Furthermore, if the production function is separable between primary factors and the imported input then stability guarantees that devaluation both increases employment and improves the balance of payments. Does stability preclude contractionary devaluation? The investigation of Calvo (1983), Lai and Chang (1989), Buffie (1986) and some others reveal that the correspondence between stability and the effects of devaluation very much depends upon the specification of the model. This is the same conclusion that is reached by Lizondo and Monteil (1989) in a comprehensive survey of the devaluation literature, "the relevance of the principle is inescapably model specific. A presumption of stability does not in general rule out the possibility that devaluation could be contractionary on impact".

2. Scope of the Study

In this paper we attempt to improve the Buffie (1986) model to confirm his very strong result that if the model is locally stable and if labour and imported inputs are gross substitutes then devaluation will certainly improve labour employment and payments balance. In addition, Buffie has derived an interesting result by assuming the separability of the production function between primary factors and the imported input. In this special case, he found that stability guarantees that devaluation will both increase

labour employment and improve payments balance. For general technology, however, he found that devaluation cannot both contract employment and make the balance of payments deteriorate at the same time, since this joint outcome is incompatible with the local stability of the system. Although Buffie's model is very interesting and it is one of the few studies, (along with Calvo (1983) and Larrian and Sachs (1986)) that relates the stability of the model to the impact effects of devaluation, there exist some inconsistencies in his model. Throughout the comparative static analysis Buffie assumed that the nominal wage is fixed in the short-run, while the price of the domestic good adjusts continuously to clear the goods market. These assumptions imply that the real wage must also be adjusting continuously. But, Buffie's dynamic analysis assumes that real the wage is adjusting sluggishly, over a period of time as the rate of unemployment exceeds or falls short of the natural rate of unemployment. That is, at a point in time the real wage is predetermined. The comparative static and dynamic stability sections of Buffie's analysis are inconsistent. Since Buffie has attempted to establish a correspondence between the stability conditions and the impact effects of devaluation, this internal inconsistency is central.

There is another inconsistency in the Buffie analysis. In order to derive the stability conditions, Buffie solved the two differential equations of the model simultaneously. This is the correct way of deriving the stability conditions in his model. But, a problem emerges when he justifies the sign of a particular expression by referring to the "Walrasian Stability" condition. According to this condition the equilibrium should be stable if the demand for goods is negatively sloped in the price/output plane. If, on the other hand, the demand and supply functions are both positively sloped, then equilibrium will be stable if the slope of the demand function is steeper than the slope of the supply function. In the present context, this appeal to Walrasian stability is unsatisfactory for the following reason.

In the Buffie model the dynamics of the system are explained through the wage adjustment and balance of payments equations (as we explain more fully below). Thus, the time paths of variables must be determined by involving these equations. This requires that any conditions regarding the slope of aggregate demand and the aggregate supply function of a good must derive from these dynamic equations and should not be justified making use of some other notion of stability which is not a part of the model. The equation of Walrasian stability condition cannot also be part of the model. Furthermore, the Walrasian stability condition is based on the assumption that the goods price adjusts sluggishly to restore equilibrium in

the goods market. This, in fact, contradicts Buffie's assumption that the goods price adjusts continuously to clear the market[1].

There are however, at least two ways of solving the Buffie model correctly. They both involve using the Phillips curve:

$$\dot{w} = \beta[u - \bar{u}] + \dot{p}, \quad \beta < 0$$

where

w = nominal wage rate

$\dot{w}$ = rate of change of nominal wage

p = price of the domestically produced good

$\dot{p}$ = time derivative of price level

u = actual rate of unemployment

$\bar{u}$ = natural rate of unemployment

β = speed of adjustment of nominal wage rate

but they differ according to what specification they make concerning money wages. In the first specification it is the level of the nominal wage that is fixed at each point in time. p can be calculated by taking the time derivative of the variables in the goods market equilibrium condition (as we explain more fully below). This assumption involves agents having perfect foresight. We can call this special case as: "Sluggish Money Wages with Perfect Foresight". An alternative is to assume that agents have static expectations; this would involve simply dropping the p term. We can call this special case "Sluggish Money Wages with Static Expectations".

The second method of achieving internal consistency is to assume that it is the real wage, z = w/p, that is predetermined at a point in time. This involves the assumption that w always makes a discrete jump in response to any jump in p, and that the real wage only adjusts through time

[1] See Buffie (1986) page 126.

according to the following Phillips curve, which can be written by assuming w = p = 1 initially as,

$$\dot{z} = \dot{w} - \dot{p} = \beta[u - \bar{u}], \quad \beta < 0$$

and we may call this special case: "A Sluggish Real Wage Phillips curve".

Our objective in this paper is to identify Buffie's mistakes and to explain the role of stability conditions to determine the effects of devaluation on key economic variables. To stay as close as possible to the original Buffie model we report our results for the first case that is "Sluggish Money Wages with Perfect Foresight".

After this long critical introduction we now move to the introduction of the corrected Buffie model.

Model

The model we will use in this paper is that of Buffie (1986) and specified as follows:

Aggregate Supply

The model assumes that the country in question is producing a single good, Q, with a general production function involving domestic labour, N, imported input, IN, and some fixed factor say capital, K. The supply side of the economy is explained by the following equations which are derived by making use of the Hotelling lemma and by assuming that capital, K, and its price, r, are fixed.

$$Q = \pi_p(w, p, e) \tag{1}$$

$$N = -\pi_w(w, p, e) \tag{2}$$

$$IN = -\pi_e(w, p, e) \tag{3}$$

The variables w, p, and e measure the wage rate, price of good, Q, and the exchange rate respectively. Equation (1) represents the aggregate supply function and equation (2) and (3) represents the demand functions for labour and the imported input. $\pi(w, p, e)$ is the indirect variable profit function which is homogeneous of degree zero in nominal wages, w, good

price, p and the nominal exchange rate, e. $\pi_i(w,p,e)$ is the partial derivative of the indirect variable profit function with respect to the argument w, p, and e respectively.

Assuming e=p=w=1 initially, the following local partial elasticities are defined.

$$\begin{array}{lll} \delta_e = -\pi_{ee}/\pi & \delta_w = \pi_{ew}/\pi_e & \delta_p = \pi_{ep}/\pi_e \\ \phi_p = \pi_{pp}/\pi_p & \phi_e = \pi_{pe}/\pi_p & \phi_w = \pi_{pw}/\pi_e \\ \varepsilon_w = -\pi_{ww}/\pi_w & \varepsilon_e = \pi_{we}/\pi_w & \varepsilon_p = \pi_{wp}/\pi_w \end{array} \quad (4)$$

Throughout the analysis, we are assuming that all factors of production are normal. The own price elasticities are negative, and δ_w and ε_e have the same sign. If the imported input and domestic labour are gross substitutes then δ_w and ε_e are positive. On the other hand, if they are gross complements, then δ_w and ε_e are negative. These assumptions imply that $\delta_p\delta_e\varepsilon_w\phi_p > 0$ $\phi_e\phi_w < 0$ $\delta_w \gtrless \phi_e$ 0

In order to make the expression used later simpler the following relationships between the local partial elasticities are used:

$$\delta_e = \delta_w + \delta_p \qquad \varepsilon_w = \varepsilon_e + \varepsilon_p \qquad \phi_e + \phi_w = -\phi_p \quad (5)$$

$$\phi_p = \theta_L\varepsilon_p + \theta_I\delta_p \quad \phi_w = \theta_I\delta_w - \theta_L\varepsilon_w \quad \phi_e = \theta_L\varepsilon_e - \theta_I\delta_e \quad (6)$$

θ_j, j=I, L represent the share of the variable inputs i.e., imported input and of labour in the total cost of production respectively. Relationships in (5) are obtained by exploiting the homogeneous of degree zero property of the indirect variable profit function in w, p, e while the relationships in (6) are obtained by differentiation of the production function.

Aggregate Demand

Throughout our analysis we assume that domestic consumers purchase only one good which is domestically produced. Part of the production of this good is exported to the rest of the world. For simplicity, it is assumed that no government exists. To explicitly study the effects of devaluation which stem from the supply-side effects of the exchange rate it

is assumed that the devaluating country imports only intermediate inputs, IN.

The market clearing condition for the home good is defined as:

$$Q = C + X(ep^x / p) \tag{7}$$

C is the total domestic consumption of good Q. p^x is the export price and $X(ep^x/p)$ is the total exports of the domestic good. As usual, it is assumed that exports of the domestic good depend upon relative prices, ep^x/p. For simplicity, we assumed the export price exogenous and equal to unity. Following the monetarist approach to the balance of payments, domestic consumption is defined as the difference between the disposable income Q^d, and the real hoarding of money, H/p;

$$C = Q^d - H / p \tag{8}$$

The disposable income is defined as the difference between the home good and the total payments to foreigners for intermediary inputs:

$$Q^d = Q - ep^m IN / p \tag{9}$$

p^m is the foreign price of the imported inputs. For simplicity, we assumed that this price is exogenous and equal to unity.

Using the above equations the equation (8) can further be written as:

$$Q = \pi_p(w, p, e) + (e / p)\pi_e(w, p, e) - H / p \tag{10}$$

Real hoarding is defined as a proportion of the difference between the actual real money balances. M/p, and their desired level, M^d/p:

$$H / p = \psi[M^d / p - M / p], \quad \psi > 0 \tag{11}$$

The demand for real money is defined as the linear function of value added:

$$M^d / p = k[\pi_p(w, p, e) + e / p\pi_e(w, p, e)] \tag{12}$$

By substituting (12) into (11) and then (11) into (10) the reader can readily derive the following reduced form of the aggregate demand function for good Q:

$$sQ = (1-s)(e/p)\pi_e(w,p,e) + \psi M/p + X(e/p) \qquad (13)$$

Where $s = k\psi$ is the short-run marginal propensity to save.

Dynamics

Besides the above seven equations (1), (2), (3), (7), (10), (11), and (12) the model also has two differential equations, which define the dynamics of the model. One equation is the accumulation identity for the balance of payments, while the second is the Phillips curve. The balance of payment identity explains the net flow of money over a period of time as:

$$\dot{M} = B = pX(e/p) - eIN \qquad (14)$$

a dot over a variable indicates the time derivative of the variable. Substituting equation (9) into (8) and then (8) into (7) gives:

$$H = pX(e/p) + e\pi_e(w,p,e) \qquad (15)$$

Finally, by substituting equations (12) into (11) and then (11) into (15) the following reduced form of the first differential equation of the model can easily be obtained:

$$\dot{M} = B = p\psi\,[k(\pi_p(w,p,e) + (e/p)\pi_e(w,p,e)) - M/p] \qquad (16)$$

The second differential equation of the model is the equation of the Phillips curve which explains the adjustment in wages over time. As explained above we assume that the nominal wage is adjusting over a period of time according to the following Phillips curve:

$$\dot{w} = \beta\,[1 + \pi_w(w,p,e) - \bar{u}] + \dot{p} \qquad (17)$$

$\bar{u}$ indicates the natural rate of unemployment, and β is less than zero. For simplicity, we are assuming that the size of the labour force in the country is equal to unity. Therefore, $-\pi_w$, can be thought of as the fraction of the labour force demanded. The above Phillips curve explains the

adjustment in the nominal wage through time, as it adjusts towards full equilibrium. Wages decrease (increase) when the actual rate of unemployment $1+\pi_w(w,p,e)$ (=1-N) exceeds (falls short) of the natural rate of unemployment u or as good prices, p, decrease (increase) over a period of time. The rate of change of the nominal wage depends not only on the parameter β but it also depends upon the parameter which appears in the above Phillips curve when the term p is calculated by taking the time derivative of the variables in the goods market equilibrium condition. As explained above we may call this special case: "Sluggish Money Wages with Perfect Foresight". This completes the basic structure of the model. In the short-run there are ten endogenous variables $Q, Q^d, p, C, M^d, H, N, IN, \dot{w}$, and M which can be given values by solving the equations (1),(2),(3),(7),(8),(9),(11),(12),(16), and (17)) simultaneously. In the long-run however, if the system is stable then w and M will converge to zero and the levels of both w and M are endogenous.

3. Stability Analysis

To asses the short-run and the long-run effects of devaluation on output and balance of payments position we first derive the stability condition of the model. Solving the aggregate demand (13) and supply (1) equations for the model we get:

$$s\pi_p(w,p,e) = (1-s)(e/p)\pi_e(w,p,e) + \psi M/p + X(e/p) \qquad (18)$$

Assuming e=p=w=1, X=IM, and hoarding H=0 initially[2], the total differentiation of (18) coupled with the use (4) and some manipulations gives:

$$dp = A_1 dw + A_2 dM \qquad (19)$$

where

$$A_1 = \frac{-s\phi_w\theta_I^{-1} - (1-s)\delta_w}{\Delta}, \quad A_2 = \frac{\psi}{\Delta X}$$

$$\Delta = \pi_x + s\theta_I^{-1} + (1-s)\delta_p - 1 + s\phi_p\theta_I^{-1} \gtrless 0$$

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[2] We assume hoarding is zero initially then it implies that $M^d/p = M/p = k(\pi_p + (e/p)\pi_e)$ which in turn implies that $\psi M/\pi_e = s(1-\theta_I^{-1})$

From (19) we can get:

$$\dot{p} = A_1 \dot{w} + A_2 \dot{M} \qquad (20)$$

Substituting (16) into (20) and then (20) into (17) and by collecting terms we get:

$$\dot{w} = \frac{\beta[1 + \pi_w(w,p,e) - \bar{u}] + [A_2 \psi p[k\pi_p(w,p,e) + e/p\pi_e(w,p,e)] - M/p}{1 - A_1} \qquad (21)$$

Holding the exchange rate, e, constant, the total differentiation of (21) (coupled with the use of (4) and that at initial equilibrium w=p=e=1, X=IM and both $\dot{w}$ and $\dot{M}$ are equal to zero) yields:

$$d\dot{w} = \frac{\beta\pi_w(-\varepsilon_w dw + \varepsilon_p dp) + A_2\pi_p(s\phi_w - s\theta_I\delta_w)dw}{1 - A_1} +$$

$$\frac{A_2\pi_p(s\phi_p - s\theta_I\delta_p + s\theta_I + \psi M/p)dp - A_2\psi dM}{1 - A_1} \qquad (22)$$

Substituting the expression of dp from (19) back into (22) and by collecting terms we get:

$$d\dot{w} = adw + bdM \qquad (23)$$

where

$$a = \frac{h_1 + A_2 h_3}{1 - A_1}, \qquad b = \frac{h_2 + A_2 h_4}{1 - A_1}, \qquad h_1 = \beta\pi_w[-\varepsilon_w + \varepsilon_p A_1],$$

$$h_2 = \beta\pi_w\varepsilon_p A_2 \qquad h_3 = \pi_p[z_1 + z_2 A_1],$$

$$h_4 = \pi_p[z_3 + z_2 A_2],$$

$$z_1 = s\phi_w - s\theta_I\delta_w \qquad z_2 = s\phi_p - s\theta_I\delta_p + s\theta_I\delta_p + s\theta_I + \frac{s\psi M}{\pi_p},$$

$$z_3 = -\frac{\psi}{\pi_p}$$

Similarly, holding the exchange rate, e, constant and using the assumption that at initial equilibrium w=p=e=1, X=IM, and M = 0, the total differentiation of (17) coupled with the use of (6) above yields:

$$\dot{dM} = \pi_p\left[(s\phi_w - s\theta_I\delta_w)dw + (s\phi_p - s\theta_I\delta_p + s\theta_I + \frac{\psi M}{\pi_p})dp - \frac{\pi_p\psi dM}{\pi_p}\right] \qquad (24)$$

By substituting the equation (19) into (24) and collecting terms we get:

$$\dot{dM} = h_3 dw + h_4 dM \qquad (25)$$

For convenience, we rewrite equation (23) and (25) into matrix form, we have the model in its compact form, which is useful for identifying the stability conditions:

$$\begin{pmatrix} \dot{dw} \\ \dot{dM} \end{pmatrix} = \begin{pmatrix} a & b \\ h_3 & h_4 \end{pmatrix} \begin{pmatrix} dw \\ dM \end{pmatrix} \qquad (26)$$

In a system where the dynamics involve adjustment in two variables that are predetermined at each point in time, stability requires that there should exist two stable roots. In this case, stability of the system requires that the determinant and the trace of the matrix of coefficients a, b, h_3, and h_4 must take a positive and negative value respectively:

$$\det = ah_4 - bh_3 > 0 \qquad (27)$$

$$\text{Trace} = a + h_4 < 0 \qquad (28)$$

Substituting the values of a, b, h_3, and h_4 into (27) and (28) and after doing a series of manipulations we can show that the system will be stable if and only if:

$$\pi_x + \delta_e - 1 - \varepsilon_e \delta_w / \varepsilon_w > 0 \qquad \text{and}$$

$$R = \pi_x + \delta_e - 1 + s\theta_I^{-1} - s\theta_I^{-1}\theta_L \varepsilon_e > 0 \tag{29}$$

or

$$\pi_x + \delta_e - 1 - \varepsilon_e \delta_w / \varepsilon_w < 0, \quad \text{and}$$

$$R = \pi_x + \delta_e - 1 + s\theta_I^{-1} - s\theta_I^{-1}\theta_L \varepsilon_e < 0. \quad \text{and}$$

$$-\beta\pi_w \varepsilon_w [\pi_x + \delta_e - 1 - \varepsilon_e \delta_w / \varepsilon_w] - \psi [\pi_x + \delta_e - 1] > 0 \tag{30}$$

4. Comparative Static Results

Assuming that the nominal wage and the money stock are predetermined at a point in time, that both net exports and hoarding are equal to zero initially, and that e = p = w = 1 initially, in this section we study the effects of devaluation upon employment and the balance of payments of the country.

Treating w and M as predetermined at a point in time the total differentiation of (18) coupled with the use of (4) gives:

$$\frac{dp}{de} = \frac{\pi_x + (1-s)(\delta_e - 1) - s\phi_e \theta_I^{-1}}{\Delta} \gtrless 0 \tag{31}$$

where

$$\Delta = \pi_x + (1-s)(\delta_p - 1) + s\theta_I^{-1} + s\phi_p \theta_I^{-1} \gtrless 0$$

Proposition 1 Devaluation may or may not necessarily improve the level of employment.

Proof:-

Differentiating equation (2) and using the expression for dp/de above and after some manipulation we get:

$$\frac{dN/N}{de} = \frac{\varepsilon_w}{\Delta}[\pi_x + \delta_e - 1 - \frac{\varepsilon_e \delta_w}{\varepsilon_w} + s(1 + \frac{\varepsilon_e}{\varepsilon_w v_x})] \qquad (32)$$

where

$$\Delta = \pi_x + (1-s)(\delta_p - 1) + s\theta_I^{-1} + s\phi_p\theta_I^{-1} \gtrless 0$$

$$v_x = X/Q$$

From (32) it is evident that due to ambiguity in the sign of the expression in the square brackets, and of Δ, the employment effect of devaluation cannot be determined conclusively.

If the system is stable under condition (29), we know that $\pi_x + \delta_e - 1 > \varepsilon_e \delta_w / \varepsilon_w$. However, since ε_e can take both signs and we are not sure about the sign of Δ, the employment effect of devaluation cannot be determined conclusively. However, if we assume that labour and the imported input are gross substitutes $\varepsilon_e > 0$, then under condition (29) employment will increase (decrease) with devaluation if $\Delta > 0 (\Delta < 0)$. The reader can easily confirm that for $\Delta > 0$ a share of the imported input in the total cost, θ_I, increases the likelihood of employment increasing following devaluation.

If, on the other hand, the stability condition (30) is satisfied then even if in addition Δ and ε_e take a definite sign the employment effect of devaluation cannot be determined conclusively.

The above outcome contradicts the findings of Buffie. Buffie has derived the result that if labour and imported inputs are gross substitutes then devaluation necessarily increases labour employment.

Proposition 2 Devaluation may or may not necessarily improve the balance of payments.

Proof:-

Taking w and M as predetermined at a point in time the total differentiation of (16) coupled with the use of (4) we get:

$$\frac{dB}{de} = \frac{\overline{IM}s(v_x^{-1} + \theta_L\theta_I^{-1}\varepsilon_w)}{\Delta}\left[\pi_x + \delta_e - 1 - \frac{\varepsilon_e\delta_w}{\varepsilon_w}\right] +$$

$$\frac{\varepsilon_e\delta_w}{\Delta\varepsilon_w}\left[\frac{(1-\theta_I)\theta_L^{-1}\varepsilon_w^{-1} + \theta_I\theta_L^{-1}\varepsilon_e^{-1}}{1+(1-\theta_I)\theta_L^{-1}\varepsilon_w^{-1}}\right] \gtrless 0 \qquad (33)$$

where

$$\Delta = \pi_x + (1-s)(\delta_p - 1) + s\theta_I^{-1} + s\phi_p\theta_I^{-1} \gtrless 0$$

From (33) it is evident that dB/de > 0 as

$$\pi_x + \delta_e - 1 > \frac{\varepsilon_e\delta_w(1-\theta_I\theta_L^{-1}\varepsilon_w^{-1})}{\varepsilon_w(1+(1-\theta_I)\theta_L^{-1}\varepsilon_w^{-1}} \quad \text{if} \quad \Delta > 0 \qquad (34)$$

$$\pi_x + \delta_e - 1 < \frac{\varepsilon_e\delta_w(1-\theta_I\theta_L^{-1}\varepsilon_w^{-1})}{\varepsilon_w(1+(1-\theta_I)\theta_L^{-1}\varepsilon_w^{-1}} \quad \text{if} \quad \Delta < 0 \qquad (35)$$

If stability condition (29) along with $\Delta > 0$ is satisfied then the impact effect of devaluation on payments balance is not certain. However, the reader can readily confirm that if labour and imported inputs are gross substitutes then the payments balance certainly improves upon devaluation[3]. But, if the stability (29) along with $\Delta < 0$ is satisfied then condition (35) may or may not be satisfied. However, if we assume that $\varepsilon_e > 0$ then the stability condition (29) along with $\Delta < 0$ ensures that the condition (35) must not be satisfied. The conclusion then is that in this special case,

[3] If labour and the imported input are gross substitutes $\varepsilon_e > 0$ then the necessary and sufficient condition under which dB/de<0 is $-\varepsilon_w\theta_I > (1-\theta_I)\varepsilon_e$. This is not possible as long as $\varepsilon_e > 0$. It is important to note if labour and the imported input are weak gross substitutes $0 < \varepsilon_e < \theta_I\theta^{-1}$ then satisfaction of the Marshall-Lerner condition becomes sufficient for the payments balance to improve upon devaluation.

devaluation must worsen the payments balance. On the other hand, if stability condition (30) is satisfied, then regardless of the sign of Δ, conditions (34) and (35) may or may not be satisfied. This implies that the payments balance may or may not improve upon devaluation, even if the system is locally stable.

Can devaluation both contract employment and worsen the balance of payments?

Buffie has derived the result that if the system is locally stable then for the general production function, devaluation cannot both contract employment and worsen the payments balance. In addition, he also proved in his model that if labour and imported inputs are gross substitutes then devaluation simultaneously improves the payments balance and employment.

With the help of multipliers (32) and (33) above we can check the validity of these strong results.

If Stability Condition (29) is Satisfied

Under stability condition (29) and with $\Delta > 0$ the necessary condition which makes dN/de < 0 is:

$$\varepsilon_e < -\varepsilon_w v_x \qquad (36)$$

Since both ε_w and v_x are positive, from (36) it is clear that the imported input and domestic labour have to be gross complements to make dN/de < 0. Similarly, under stability condition (29) and with $\Delta > 0$ the necessary condition which makes dB/de < 0 is to be given as:

$$\varepsilon_e > -\varepsilon_w v_x \qquad (37)$$

From (36) and (37) it is evident that if the stability condition (29) along with $\Delta > 0$ is satisfied then devaluation cannot both worsen the balance of payments and reduce employment. On the other hand, if the stability condition (29) along with $\Delta < 0$ is satisfied then the reader can confirm that if labour and imported inputs are gross substitutes then devaluation both contracts employment and worsens the payments balance.

If Stability Condition (30) is Satisfied

If the system is stable under condition (30) and if $\Delta > 0$[4] then the necessary and sufficient conditions under which devaluation reduces employment and worsens the payments balance are:

$$\frac{dN/N}{de} < 0 \quad \text{if and only if}$$

$$\pi_x + \delta_e - 1 < \frac{\varepsilon_e \delta_w}{\varepsilon_w}\left[1 - \frac{s\varepsilon_w}{\varepsilon_e \delta_w} - \frac{sv_x^{-1}}{\delta_w}\right] \tag{38}$$

dB/de < 0 if and only if

$$\pi_x + \delta_e - 1 < \frac{\varepsilon_e \delta_w}{\varepsilon_w}\left[\frac{1 - \theta_I \theta_L \varepsilon_e^{-1}}{1 + (1-\theta_I)\theta_L^{-1}\varepsilon_w^{-1}}\right] \tag{39}$$

From (38) and (39) it is evident that if the MLC is violated then the sufficient condition under which devaluation contracts employment is

$$\frac{\varepsilon_e \delta_w}{\varepsilon_w} > s(1 + \varepsilon_e \varepsilon_w^{-1} v_x^{-1}) \tag{40}$$

and the sufficient condition under which devaluation worsens the balance of payments is

$$1 - \theta_I \theta_L^{-1} \varepsilon_e^{-1} > 0 \tag{41}$$

From (40) and (41) it is evident that if labour and the imported inputs are gross complements $\varepsilon_e < 0$ and if $\varepsilon_w v_x < -\varepsilon_x$, then devaluation both contracts employment and worsens the payments balance.

The reader can easily confirm that if the stability condition (30) along with $\Delta > 0$ is satisfied and even if the MLC is satisfied then devaluation could both contract employment and worsen the payments balance. For example, let us assume that the condition (38) is satisfied even

[4] It will happen if and only if $\delta_w < s\theta_I \theta_L^{-1} \varepsilon_w$ and $\left|\delta_w - s\theta_I \theta_I^{-1}\right| > |R|$.

if $\varepsilon_w v_x + \varepsilon_x > 0$. Under these circumstances the sufficient condition under which devaluation also worsens the payments balance is:

$$\delta_w \theta_L^{-1} \theta_I - s[\varepsilon_w + (1-\theta_I)\theta_L^{-1}] < 0 \qquad (42)$$

A careful reader could note here that if labour and imported inputs are gross complements $(\delta_w < 0)$ then condition (42) is necessarily satisfied. This implies that if the MLC is satisfied and if $\varepsilon_w v_x + \varepsilon_e > 0$, $\delta_w < 0$, and if devaluation contracts employment, then the payments balance must deteriorate at the same time.

By following the above procedure the reader can prove another interesting result. If the stability condition (30) along with $\Delta > 0$ is satisfied and if labour and the imported input are gross complements then devaluation cannot both improve payments balance and increase employment. This is because either the increase in labour employment or the improvement in the balance of payments is incompatible with stability of the model.

If stability condition (30) along with $\Delta < 0$ is satisfied then the necessary condition which makes dN/de < 0 is:

$$-\varepsilon_w^{-1} v_x^{-1} \varepsilon_e < 1 \qquad (43)$$

and necessary condition which makes dB/de<0 is:

$$-\varepsilon_w v_x \varepsilon_e^{-1} < 1 \qquad (44)$$

From (43) and (44) it is evident that if labour and the imported input are gross substitutes than devaluation could both contract employment and worsen the balance of payments. On the other hand, if labour and the imported input are gross complements then the condition (43) reduces to:

$$\varepsilon_e > -v_x \varepsilon_w \qquad (45)$$

and the condition (46) reduces to:

$$\varepsilon_e < -v_x \varepsilon_w \qquad (46)$$

From (45) and (46) it is evident that if labour and the imported input are gross complements then devaluation cannot both contract employment and worsen the payments balance.

Contrary to Buffie, the above analysis reveals that for a general specification of technology, stability of the model does not preclude the possibility that devaluation can both contract employment and worsen the payments balance.

Implications of the Plausible Parameter Values and the Slope Conditions

We can show that in an economy in which the nominal wage is predetermined at a point in time and the aggregate demand function for goods is negatively sloped, then Δ must have a positive value. On the other hand, in an economy in which the real wage is sticky at each point in time and the aggregate demand function for goods is negatively sloped, then R must have a positive value. It is of interest to assume that for all kinds of economies, the aggregate demand function for goods is negatively sloped in the price/output plane. We notice that if R has a positive value then the system will be stable under condition (29) only. Furthermore, if the system is stable under condition (29) and also if Δ has a positive value then Buffie's results hold true.

5. Some other Limitations of the Buffie Model

Buffie conceived a model that highlights the importance of imported inputs in the context of currency devaluation. However, surprisingly enough it is assumed throughout that labour and imported inputs are substitutes for each other. As a matter of fact at present most of the LDCs imports intermediary inputs that they cannot produce locally owing to capital constraint and technical know-how. It is too restrictive to assume that imported inputs, which are normally in the form of plants (such as sugar plants, cement plants, car assembly plants etc), machines, and oil etc, can be substituted out with labour. Whereas capital, which is deemed to be a close substitute of imported inputs was held fixed both in the short-run and the long run. In the context of currency devaluation omissions such as that imported inputs and labour cannot be substitutes for each other is important as noted by Ali (2004). Another deficiency in the Buffie model is that it does not take into account the possibility of improved efficiency, which may result in less dependency on imported inputs through time. Furthermore, the model does not include the government budget constraint that plays an important role in determining the efficacy of fiscal and monetary policies. Presently, most LDCs face a large budget deficit and

import invariably a fixed amount of defence equipment each year. To finance the budget deficit, as already constrained by too little tax collection, these countries resorted to printing money, issuing bonds, and borrowing from international agencies and friendly countries. Government borrowing and printing money results in inflation and in this situation nominal devaluation hardly has any effect on real variables, as the real exchange rate is almost not affected.

We can improve Buffie's model by taking into account the above limitations. However, in this paper we concentrated merely on mistakes committed by Buffie to justify the sign of certain expressions appearing in the comparative static analysis. The interested reader, however, may read Ali (2004) for a model addressing most of the issues mentioned above.

6. Currency devaluation and less developed countries

Like the Mercantilists, LDCs are always in pursuit of promoting their exports while blocking imports at the same time. For this reason these countries embraced the Keynesian policy of currency devaluation, which is deemed to promote exports and reduce imports at the same time. Keynes himself was quite critical about the over valued currency. His anguish was deeply reflected in his work, "The Economic Consequences of Mr. Churchill," which he wrote when Churchill decided to turn Britain to the gold standard with an overvalued pound. Keynes advises were fully backed by agencies such as the International Monetary Fund (IMF). IMF assumes that devaluation will increase competitiveness by affecting the real exchange rate. However, as time evolved economists started realising the basic weakness inherent in Keynesian policy. Keynesian theory, which is based on a strong presumption of a demand driven economy, undermines the supply side of the economy. At the same time new realities pertinent to LDCs opened up new research challenges for economists and like-minded scholars. In the last fifteen years or so the trade complexion of the world has changed dramatically. The frequency with which big multinationals have started moving from more developed countries to less developed countries increased significantly.

Contrary to their traditions most LDCs are now actively producing many import competing finished goods such as TVs, Fridges, Automobiles, etc. Presently, most of the Christmas goods sold in America are in fact manufactured in China. Silicon Valley companies engineer their software in India. The Mexican border hosts 3,500 ***maquiladora*** assembly plants from dozens of countries around the world. McDonald's sells Big Macs at 28,000 restaurants in more than 120 countries outside the USA. For this very

reason in Doha two developing countries, India and Brazil have forged a common front to seek access to the markets of industrial countries for agricultural and manufacturing exports of developing nations. Last but not least, the accession of China and Taiwan to the WTO led economists to re-evaluate the future trade pattern of the world.

For most of the LDCs the share of finished goods imports has gone down as low as ten percent of their total imports. However, to produce import competing finished goods these countries are heavily relying on the imports of intermediary goods. In the present scenario blocking imports in all forms and currency devaluation seems detrimental.

Concluding Remarks

The above investigation supports the Lizondo and Monteil (1989) finding that devaluation is not necessarily expansionary, even if the system is locally stable. It is seen that in general, there does not exist a definite correspondence between the stability of the model and the effects of devaluation on labour employment and payments balance. However, with certain additional assumptions it is observed that stability of the model managed to resolve the sign ambiguity of devaluation multipliers. It is seen that the stability conditions discussed by Buffie represent only one of two possible sets of assumptions which can generate stability. The upshot of the analysis is that Buffie's claim that if labour and imported inputs are gross substitutes, the orthodox conclusion that devaluation will be expansionary and improve the payments balance remains valid, does not hold in general. We observed a number of cases in which for the general specification of technology, devaluation simultaneously contracts employment and worsens the payments balance. This in fact contradicts Buffie's strong result that (p. 135) ***"If the initial equilibrium is locally stable, devaluation cannot both contract employment and worsen the payment balance."***

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Estimation of Saving Behaviour in Pakistan Using Micro Data

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Abstract

The role of savings in investment and therefore in the development of a country cannot be exaggerated. In poor countries like ours most of the savings is done by households. In this paper the saving behaviour of Pakistan households, broken down to rural-urban, is examined. Using HIES 1998/99 and utilising OLS, it has been shown that saving behaviour in Pakistan is influenced by various factors including wealth, employment status, education, age and dependency ratio. But the most import role in influencing saving behaviour is played by household income.

Introduction

Saving is an important variable in the theory of economic growth. Several studies have been conducted to estimate saving behaviour. These studies differ from each other in terms of both the method of estimation and the set of data used. Some studies have used cross-country data, some have utilised single country time series data and still some others have used micro data obtained from household income and expenditure surveys.

These studies include Bergen (1967), Kelley *et al.* (1968), Gupta (1970), Qureshi (1981), Giovanni (1983), Ali (1985), Akhtar (1986), Khan (1988), Deaton (1989), Haque and Saleem (1991), Burney and Khan (1992), Sidiqui (1993), Kazmi (1993), Khan and Rahim (1993), Iqbal (1993), Sadf (1994), Azhar (1995), Hussein (1996), Kochar (1996), Kennickell and Meclure (1997), Kim and Zang (1997), Qureshi (1997), Khan and Nasir (1998), Khan and Nasir (1999), Hamilton and Clemens (1999), Loayza and Sharkar (2000), Loayza, Habbel and Serven (2000), and Ayub (2000). Most of these studies have analysed saving behaviour in overall Pakistan and then broken it down to the rural/urban level. They have tried to examine the effects of income, real and nominal rate of interest, rate of inflation, rate of growth of income, output rate, lagged output per capita, lagged population growth rate, foreign and domestic saving ratio, degeneracy ratio, age, education, employment

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status, earning status, occupation, purchase of jewelry, assets, imports, exports, foreign aid, bank credit, prime interest rate, workers' remittances, private capital outflows, expected inflation rate, development of financial institutions, residence location, secondary earner, sex, consumption pattern etc. Some studies have tested the Absolute Income and Permanent Income Hypothesis. The majority of the studies have used Ordinary Least Squares (OLS) to estimate the effects of various variables. Few studies have even gone for non-linear models to estimate their functions.

This study also analyses the household saving behaviour in Pakistan. Beside investigation of the nature of the income saving relationship, the study also examines the impact of various socio-economic and demographic factors on household saving. In particular, the effects of income, dependency ratio, wealth, education, employment status, age and sex. In order to highlight the differences in saving behaviour of rural and urban households, separate estimates are obtained for each type of household and for overall Pakistan.

The main difference between our study and the previous studies is that we have utilised the latest micro data available on tapes, that is HIES 1998/99. Moreover, we have selected some different independent variables which we believe are also important in determining saving behaviour in Pakistan.

Importance of Savings

Saving is that amount of current income which is not spent on consumption. Saving is important to help maintain a higher level of investment, which is a key determinant of economic growth. Higher investment rates, mainly financed by domestic savings are necessary to guarantee the sustained rates of economic growth required for the alleviation of widespread poverty in developing countries. Low rates of savings are associated with increased vulnerability to macro-economic crises. Over the last three decades, saving rates have fallen sharply in many countries contributing to the emergence of large current account imbalances in these countries.

In Pakistan, due to deficiency in savings, Gross Total Investment (GTI) declined from 17.7% of GDP in 1996-96 to 14.7% in 2000-01. Similarly Gross Fixed Investment (GFI) declined from 16.2% to 13% during the same time period (see Table 1). In the past external resource inflow used to be the major source of funds to finance local investments. But now the situation has changed over the past few decades. Net External Resource Inflow (NERI) has fallen from 6.1% of GDP in 1996-97 to only 2.94% in

2001-2002. The National Savings as percentage of GDP, however, have gone up from 11.2% in 1996-97 to 12.2% in 2000-01. Within national savings, private and household saving has gone up from 9.3% and 8.2% of GNP in 1996-97 to 15.1% and 13.9% in 2000-01 respectively (see Table 2).

Table-1: Structure of Saving and Investment in Pakistan (Percentage of GDP)

Description	1996-97	1997-98	1998-99	1999-2000	2000-01
Gross total investment	17.7	17.3	15.6	15.6	14.7
Changes in stock	1.6	2.6	1.6	1.6	1.6
Gross Fixed Investment	16.2	14.7	13.9	14.0	13.0

Table-2: Saving Trends in Pakistan (Percentage of GNP)

Year	National Savings	Foreign Savings	Public Savings	Private Savings	House-hold Savings	Corporate Savings	GNP at Market Price (Billion Rs.)
1995-96	11.6	7.17	1.5	10.1	8.9	1.2	2158
1996-97	11.2	6.10	1.0	9.3	8.2	1.1	2385.5
1997-98	14.6	3.03	1.0	13.6	12.0	1.6	2744.4
1998-99	11.10	3.82	1.0	13.98	12.34	1.5	2913.5
1999-00	12.20	2.62	1.91	14.00	13.51	1.8	3173.7
2000-01	12.20	2.94	1.62	15.1	13.9	1.2	3466.4

To sustain a higher level of investment and growth Pakistan needs to increase its national savings. The most promising way to boost national savings is through increasing public savings because the government has been a major dis-saver for quite some time. This requires strong improvement in the fiscal balance, particularly the revenue balance. Another promising way to increase national savings is to concentrate on household savings, which accounts for roughly three-fourths of national savings. These include pension schemes, life insurance and mutual funds. This is consistent with the fact that household savings are usually the largest component of private/domestic savings in developing countries, especially in the lower-income predominantly agricultural developing countries [Ayub (2001)].

The household saving rate has risen considerably in recent years (see Table 2). An important policy question concerns the identification of the factors responsible for this trend. Is the rise in household saving due to changes in saving patterns of rural or urban households? How has it responded to the performance of the agricultural sector, in view of the

apparently close association between growth in agriculture and the overall saving rate? To answer these questions, the proposed work will go beyond the use of aggregate data and will employ information from household surveys, which are readily available in Pakistan. The Federal Bureau of Statistics conducts periodically (lately on annual basis) nation-wide Household Income and Expenditure Surveys (HIES). In addition, Pakistan Integrated Household Surveys (PIES), which include information on items such as borrowing and lending by households, have been conducted in recent years with World Bank support. Surveys of rural saving have also been carried out in recent years.

Background of Study

Various consumption/saving hypotheses have been developed ever since the Absolute Income Hypothesis (AIH) was postulated by Keynes in economic theory. Income has been regarded as the chief determinant of the saving function. The saving function represents the difference between income and consumption expenditure. Different forms of the functional relationship between saving and income have been tested. Some studies found a statistically significant effect of income on saving, and other studies found non-significant effects of income. Some studies analysed the saving functions by including different socio-economic factors, while some others estimated kinds of savings such as savings in the form of assets, etc. However, no study has estimated the household saving function by using the latest available micro-level data HIES 1998-99. Our objective here is not to test these contending consumption/saving hypotheses with household data. But we wish to find out a saving function which is simple, and at the same time, has been widely used in analysing household saving behaviour.

Estimation Technique and Model Specification

The estimation of the household saving function for this study is obtained by using the Ordinary Least Squares (OLS) method. The package used for estimation is SPSS. The objective of the study is to analyse household savings with respect to the characteristics of the households. The study analyses the household saving function by using the dummy variable approach.

The difference between the household income and expenditure is taken as household saving. Symbolically the household saving may be expressed as below:

$$S = Y - C \qquad (1)$$

where,

S = Household saving

Y = Total income

C = Total household consumption expenditure

We begin our analysis with the Absolute Income Hypotheses which relates household saving behaviour with household income and other socio-economic variables.

$$S = a_0 + a_1Y + Z + E \qquad (2)$$

where

S = Saving

Y = Income

Z = Other socio-economic variables

E = Error term

In assessing the relative significance of various socio-economic and demographic factors on household saving behaviour, the above model has been estimated by using a randomly selected sample of households. The description of the profiles has been restricted to the estimates based on the variables including total income, wealth, dependency ratio, educational level, age, employment status and sex. The sample included households for rural and urban areas of Pakistan. The household saving behaviour has also been estimated for Pakistan as a whole. By including the socio-economic variables in the equation (2) we get

For Pakistan:

Sp = a + ß1Y + ß2Dw + ß3Ddep + ß4Demp + ß5Ded + ß6Dage + ß7Dage-s + ß8Dsex + e ..... (i)

For Urban:

Su = a + ß1Y + ß2Dw + ß3Ddep + ß4Demp + ß5Ded + ß6Dage + ß7Dage-s+ ß8Dsex + e ..... (ii)

For Rural:

Sr = a + ß1Y + ß2Dw + ß3Ddep + ß4Demp + ß5Ded + ß6Dage + ß7Dage-s + ß8Dsex + e ..... (iii)

where

A, ß1, ..., ß8 are co-efficients to be estimated

E = error term

Sp = savings in overall Pakistan

Sr = savings for rural households

Su = savings for urban households

Variable included in the above equations are

Y = Income

Dw = Dummy for wealth (since we cannot measure wealth easily so we are using house-ownership as a proxy for wealth)

Dw assumes the value of 1 if household is an owner of a house

0 otherwise

Ddep = Dependency ratio

where the dependency ration is measured as

Ddep = HS – NE / HS

where

HS = Household size

NE = Number of earners

Demp = Dummy for employment status. It assumes the value of

1 if the household head is employed

0 otherwise

Ded = Dummy for educational years of the household head.

Ded-1 = Dummy for middle level. It assumes the value of

1 if the individual is middle pass

0 otherwise

Ded-2 = Dummy for intermediate level. It assumes the value of

1 if the individual is intermediate level pass

0 otherwise

Ded-3 = Dummy for graduate level. It assumes the value of

1 if the individual is a graduate

0 otherwise

Ded-4 = Dummy for above graduate. It assumes the value of

1 if the individual is above graduate

0 otherwise

Ded-5 = Dummy for middle level in rural areas. It assumes the value of

1 if the individual is middle pass in rural areas

0 otherwise

Ded-6 = Dummy for above middle level in rural areas. It assumes the value of

1 if the individual is above middle level pass in rural areas

0 otherwise

Dage = Age of the household head

Dage-s = Age square. It is used to check the rate of change of saving with respect to increasing age of the household head.

Dsex = Dummy for the household sex. It assumes the value of

1 if the head of household is a male

0 otherwise

Data Description

The Pakistan Integrated Household Survey 1998-99 has the sample size of 14307 households. Of this total, rural households are 8933 and urban sample included 5374 households. To estimate the econometric model, data is obtained from the Federal Bureau of Statistics (FBS) Islamabad. It is based on micro-level data of the Pakistan Integrated Household Survey, PIHS 1998-99.

Variables and Theoretical Expectations

The objective of this study is to analyse the household saving behaviour given the effects of various socio-economics and demographic factors along with income on household savings. The factors, whose impact on saving will be examined in this study, are income, wealth, dependency ratio, employment status, education level, age and sex.

Income:

Income has been considered the most important factor in the determination of the saving behaviour of an individual. More income means, normally, more saving and vice versa.

Wealth of Household:

Apart from income, wealth has been taken as another determinant of saving behaviour. Since it was difficult to get data on wealth, ownership of house was taken as a proxy for wealth. If a household head owns a house then the dummy takes a value equal to 1 and if the household head does not have his own house, the dummy variable takes the value equal to 0. Here wealth is taken as an explanatory variable because wealth plays an important role in influencing saving behaviour of people.

Dependency Ratio:

The dependency ratio is defined in the literature as the percentage of the population aged 14 and below plus the percentage of the population aged 65 and above. On the basis of cross-country evidence Leff (1969) is the first to have obtained an inverse relationship between the dependency ratio and household saving. Leff's paper generated considerable interest and since then several studies have been undertaken to violate or contradict his findings.

It is argued that the inconclusiveness that prevails in the literature regarding the direction and magnitude of the relationship between the dependency ratio and household savings is due to the way that the dependency ratio is defined. In defining dependency ratio it has been implicitly assumed that the population aged 14 and below plus 65 and above adds to household consumption and contributes nothing towards production. In developing counties, where 70 percent of the population lives in the rural areas and where children are considered an asset because of their contribution to household activities, the above assumption appears to be rather strong. The impact of the dependency ratio on household savings can be more meaningfully examined if, instead of putting a restriction on the age of the household member, their earning status is explicitly taken into account. Following Burney and Khan (1992) we define dependency ratio as:

$$DR = (HS - NE) / HS$$

Where DR is the dependency ratio, HS is the household size and NE is the number of earners in a household. Using HISE 1984-85, Burney and Khan

(1992) found a strong negative relationship between household savings and dependency ratio. The impact was relatively stronger for the rural households.

Employment Status:

The employment status of the household head has received considerable attention as a source of differences in saving across households in developing countries. Ramanathan (1969) and Kelly and Williamson (1968) respectively have found that self employed person save the most in India and Indonesia. Snyder (1974) on the other hand does not find support for his results in the case of West Africa. In our study, the impact of employment status on household savings is analysed by considering whether a person is employed or not. If a person is doing some kind of job the dummy variable assumes the value of 1, otherwise it is zero.

Education:

Kelley (1980) and Akhtar (1987) have examined the impact of the level of education on household savings. According to Burney and Khan (1992) their findings are ambiguous. The ambiguity stems from the fact that, on the one hand, for various reasons, educated households have relatively higher consumption expenditure; while, on the other hand, educated people are likely to earn more. Further more, while household consumption is influenced by the tastes and preferences of all the household members, it is difficult to define a composite index of household education level. Since the head of the household generally takes the decision of how much to save, the level of education of the household head appears to be the relevant variable. Moreover, education level of head of the household not only determines the level of education but also the amount and pattern of expenditure which in turn determine savings. In our study, the level of education of the head of the household is described by the five categories i.e. primary and below, middle pass, intermediate pass, graduate, and above graduate. These categories are represented in the regression by the set of four dummy variables taking vales (0,1).

Age of the Household Head:

The life-cycle models suggest that there exists a relationship between age and saving rates. In this study, the age of the household head and its square is included to establish the relationship. Burney and Khan found that savings increase with the age crossing a certain limit.

Sex:

Sex of household head is also considered as an important variable to determine the saving behaviour of a household. If the head of household is male, dummy assumes the value of 1, otherwise 0.

Table 3: Ordinary least Square Estimates of the Saving Equations for Overall Pakistan

Variable	Coefficients
Income	*.886*
	*(169.919)**
Wealth	*-.021*
	*(-4.270)**
Dependency ratio	*-.036*
	*(-7.121)**
Employment status	*.035*
	*(5.789)**
Ded –1	*-.013*
	*(-2.642)**
Ded –2	*-.069*
	*(-14.192)**
Ded –3	*-.085*
	*(-17.564)**
Ded –4	*-.168*
	*(-32.738)**
Age	*-.133*
	(-4.995)
Age-square	*.109*
	(3.999)
Sex	*.010*
	*(1.861)**
Constant	*1392.044*
	*(5.087)**

Note: t-statistics are given in parentheses
*indicates significance at 5 percent level.

N= 14307

R^2 *= .682*

F = 2784.784

D.W = 1.761

Results:

Table-3 shows overall (Pakistan) household saving behaviour with different socio-economic variables. It can be seen that household saving is affected by income. The coefficient of income is positive and thus compatible with prior theoretical expectations that there is a positive and causal relationship between saving and income. It is statistically significant at the 5 percent level of significance, suggesting that household saving is significantly affected by the income of the household. This shows that large and rapid increase in income tends to raise the rate of household saving because households' capacity to save increases with household income.

Using cross-sectional data, Leff (1969) was first to detect the existence of an inverse relationship between the dependency ratio and household savings. In this study, the dependency ratio is found to have a strong negative influence on household savings for overall Pakistan. The coefficient of dependency ratio is statistically significant at the 5 percent level of significance. The results suggest that as the number of the dependent population increases, household saving tends to decline because the expenditure on them increases accordingly. The dependency ratio is of two kinds, young-age-dependency, and old-age-dependency. As the birth rates decline (from 3.1 to 2.9 in 2001), and life expectancy at birth increases, the main source of dependency burden moves form young to old dependents. In this way, the overall negative influence of dependency ratio on household income and then on household savings remains. The negative effects of the dependency ratio on household savings in Pakistan are in line with the findings of Leff (1969), and Burney and Khan (1992). Further, Siddique (1993) has also found a similar relationship between dependency ratio and household savings from time-series data analysis.

The coefficient of employment status is found to be positive and statistically significant at the 5 percent level, for overall Pakistan. This suggests that the heads of household who were employed have positive saving in the case of overall Pakistan. This is understandable as one can only save if he/she has some income. Normally one earns income if he/she has some kind of job. Similarly, the unemployed are not expected to save unless they have some other source(s) of income.

Education attainment seems to exercise a negative influence on household saving behaviour. The negative influence of education on household savings has been found significant at the 5 percent level of significance for overall Pakistan. The Table shows that the negative influence of education increases as the household moves from lower level of education

to higher level of education. This trend is reversed at graduate plus education of the head of the household. Our results confirm the earlier results found by various studies including Burney and Irfan (1991) and Burney and Khan (1992). This negative relationship between savings and education level of the head of household could be due to the fact, as explained by Burney and Irfan (1991), that educated heads like to educate their children more and more to make sure that they follow their parents in their future career. As a result saving is expected to decline as more and more money is spent on educating the future generation of educated parents.

The coefficients of Age and Age Square of the household head are, as expected with negative and positive signs, respectively. The coefficient of age is near the significance level of 5 percent but that of the age square is insignificant. This shows that age of the household head has little impact on household savings. The results suggest that savings decrease with age, but at a decreasing rate and tend to increase as the age crosses a certain limit.

Sex of the head of household also affects the saving behaviour of households. Male headed households have a coefficient with the positive sign and its size is reasonable for overall Pakistan. It is significant at the 5 percent level of significance. This shows that male headed households save more than female headed households. Generally, it is considered that female headed households save more. But this is not confirmed by our results as female heads seem to spend their money on the purchase of jewelry, clothes, and crockery etc., or their income is so small that they have nothing to save. The earnings of such households are no more than what is needed for survival.

The value of the constant is 1392.044. This means that when income is zero with all other variables stated above, households have this amount of savings. The value of R2 is 0.682 which even though not very high is quite reasonable given the fact that the data used is cross-sectional and not the time series one.

The value of F shows the overall significance of the relationship between the dependent and independent variables. It represents the relationship between explained variations and unexplained variations in the dependent variable. Large F-value means that unexplained variation is small. From that point of view large F-value is a positive sign for our estimated regression. The Durban-Watson (D.W) test is used to detect the serial correlation in the estimated regression function. The results of this study suggest that the Durban –Watson value is in acceptable limits and that there is no serial correlation.

Table-4: Ordinary Least Squares Estimates of the Saving Equation for Urban Households in Pakistan

Variables	Coefficients
Income	.794
	(76.102)*
Wealth	-.011
	(-1.191)*
Dependency ratio	-.037
	(-3.729)*
Employment status	.053
	(4.517)*
Education	
Ded –1	-.012
	(-1.187)*
Ded –2	-.046
	(-4.460)*
Ded –3	-.068
	(-6.854)*
Ded –4	-.135
	(-12.470)*
Age	-.140
	(-2.603)*
Age square	.130
	(2.365)
Sex	.019
	(1.836)*
Constant	1550.059
	(2.720)*

Note: t- statistics are given in parentheses.

* indicates significant at the 5 percent level

N = 5374

R^2 = 0.551

F = 598.543

DW = 1.761

The results corresponding to the urban and rural households are documented in Tables 4 and 5. Here again saving is regressed on household income, wealth, dependency ratio, employment status, education, age and sex variables.

The coefficients of income for urban households, though a little smaller than those for overall Pakistan, has a positive sign and is statistically significant at the 5 percent level. Whereas the income coefficient for rural households (Table 5) is bigger than overall Pakistan but much bigger than urban households indicating income as a very important and perhaps only determinant of saving in rural areas. However, in both cases there is a direct positive relationship between household income and savings. This result is consistent with the overall saving behaviour of Pakistan.

The coefficient of wealth for urban households is negative and statistically significant at the 5 percent level of significance. The coefficient being not very big shows that it has a low negative effect on household savings for urban households. In the case of rural households (Table 5), the coefficient is still negative and significant at the 5 percent level of significance, though bigger than that for urban households, and this indicates negative influence of ownership of house on saving behaviour. These results confirm the overall Pakistan results.

The coefficient of dependency ratio for urban households in Table 4 is negative and statistically significant at the 5 percent level. The coefficient is quite big indicating a strong negative effect on household savings. As the number of dependent population increases the amount of consumption expenditure on them also increases and hence, the rate of saving decreases. The same is true for rural households (Table 5). In fact here a negative coefficient is bigger than that of urban households. The results for urban and rural households confirm the overall Pakistan results in Table 3.

For urban households too the coefficient of employment status is positive and significant at the 5 percent level of significance. The coefficient of employment status for urban households is bigger than for overall Pakistan. This indicates that saving by urban households heavily depends on their employment status i.e. whether they are employed or not. The coefficient of employment status for rural households is also positive and significant at the 5 percent level of significance. But the coefficient is much smaller than those of overall Pakistan and urban Pakistan. This indicates that rural households savings are less dependent on employment.

Various categories of education are found to have a significant negative influence on households savings for urban households (see Table 4). The important point to note here is that like in the case of overall Pakistan, the size of the parameters of various categories of education increase with the level of education. In other words, the more educated the head of the household, the more he spends on education and therefore, the less he saves. In the case of rural households (see Table 5) it is not the same. Here education has a positive effect on saving behaviour. The values of positive coefficient increase as one moves into higher and higher levels of education. In other words, in rural areas the more educated household head will save more compared with the less educated household head.

In the case of urban households, the coefficients of age of the household head and its square appear again, with negative and positive signs respectively. The coefficient of age of household is statistically significant at the 5 percent level of significance. Whereas in the case of rural households the coefficients of household age and its square are statistically significant, with negative and positive signs respectively (see Table 5). The signs of coefficients for urban and rural households confirms those of the overall Pakistan.

In the urban areas the coefficient of sex variable representing the male head of household is positive and statistically significant at the 5 percent level of significance (see Table 4). The coefficient is bigger than for overall Pakistan indicating that, in the urban areas male headed households are more important in influencing saving behaviour than in overall Pakistan. In the case of rural areas, the coefficient is negative but very small suggesting that in the rural areas the male head of household has a negative impact on saving behaviour even though this negative impact is very small.

The values of constants represent the same thing as for all Pakistan. In this case the value of constant is 1650.059 i.e. savings is 1650.059 when the values of all independent variables, including income, is zero. The value of R^2 is .551 for urban households. This seems all right. The calculated F-value is much higher than F-tabulated which suggests that this model is overall significant (see Table 4). The value of Durban-Watson i.e. 1.761 is satisfactory and suggests that there is no serial correlation in this model. For rural areas, the value of the constant is 679.501. The value of R^2 = .861 is quite high. This shows goodness of fit. The calculated F-value is much higher than the table value. This confirms overall significance of our model (see Table 5). The value of Durban Watson 1.766 is quite reasonable indicating non-existence of serial correlation among variables.

Table-5: Ordinary Least Square Estimates of the Saving Equation for Rural Households of Pakistan

Variables	Coefficients
Income	.940
	(232.452)*
Wealth	-.018
	(4.580)*
Dependency ratio	-.045
	(-10.343)*
Employment status	.016
	(3.017)*
Education	
Ded –5	.06
	(3.491)*
Ded –6	.051
	(10.675)*
Age	-.133
	(-6.071)*
Age-square	.095
	(4.235)*
Sex	-.004
	(-.759)*
Constant	679.501
	(3.057)*

Note: t - statistics are given in parentheses.

* indicates significance at the 5 percent level.

N = 8933

R^2 = .861

F = 6148.608

DW = 1.766

Conclusion

Domestic savings play a dominant role in the economic growth and stability of any country. Economic growth requires investment and it can be financed through domestic savings or from abroad through foreign capital inflows. However, in the long run a nation has to rely on domestic savings. Economic revival primarily depends on investment through both domestic savings and capital accumulation. In the process of economic revival, domestic savings are crucial. Our study shows that the saving scenario in Pakistan is not ideal indeed.

Having estimated three models of saving behaviour in Pakistan, we found the following:

i. Income is the most important variable which has a positive effect on household saving behaviour in Pakistan (including rural and urban).

ii. Wealth (ownership of house) has a negative impact on saving behaviour of Pakistan (including rural-urban) households as house owners are less inclined to save.

iii. The dependency ratio caused by the rapid increase in population has been the most important factor causing the saving rate to remain depressed. It has a strong negative influence on household savings in Pakistan (including rural-urban).

iv. In case of employment status only employed persons have positive savings.

v. Various categories of education have been found to have a negative influence on household saving behaviour for overall Pakistan as well as for urban Pakistan. In the case of rural areas, opposite behaviour has been observed as people save more with more education

vi. In case of age and age square negative and positive signs respectively indicate that saving decreases with age and that it decreases at a decreasing rate.

vii. The coefficients of variable representing male headed households have been found positive for urban and for overall Pakistan but negative for rural households. This shows that the male headed households are more likely to save in overall and in urban Pakistan but not in rural Pakistan.

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Measuring the Underground Economy and its Impact on the Economy of Pakistan

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Abstract

This study focuses on the measurement of the underground economy (UGE) through tax evasion in Pakistan over the time period 1974-2002. The monetary approach is applied in order to estimate the underground economy. First, the currency demand equation is estimated and then an attempt is made to deduce the size of the underground economy and tax evasion. Finally, an Ordinary Least Square (OLS) Model is applied in order to estimate the impact of the underground economy on Gross Domestic Product of Pakistan for a selected time period. The results demonstrated that the underground economy has increased enormously from Rs. 12 billion in 1974 to Rs. 1085 billion in 2002. The findings suggest that the existence of such a large UGE can decrease tax revenues, depress GDP, and raise socio-economic problems. Frequent tax audits and heavier penalties for tax evasion may minimise the size of the underground economy with its ill effects.

Introduction

The Under Ground Economy (UGE) and tax evasion has remained a hotly debated issue in Pakistan. The underground economy has been variously defined as irregular, black, parallel, unofficial, hidden, secondary, subterranean, submerged, and shadow economy in the literature. In this study UGE is used to define only those economic activities that generate income, concealed from tax authorities in order to evade various taxes and remains unrecorded in official statistics. This excludes the illegal economy and the informal economy. The illegal economy consists of income produced by unlawful activities such as smuggling, gambling, prostitution, drug trafficking and so on whereas the informal economy includes those activities that entail a cost but which are excluded from the rights and benefits of the

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formal economy.[1] UGE has an extremely negative impact on economic, social and cultural development of any society. It hampers equitable and efficient resource allocation among different sectors of the economy that leads to increase in tax burden of the members of the formal economy.

The underground economy and tax evasion has been a focus of research in Pakistan for many years. The researchers have made a variety of efforts to quantify the underground economy through tax evasion. The growing interest in this area is due to the continuous suffering of the country from low tax revenue collection and increasing budget deficit. The major contribution at the national level is by Ahmed and Qazi (1995), Azar (1996), Iqbal and Qureshi (1998), and Aslam (1998). These studies demonstrate that the underground economy has been growing rapidly for a long time and has reached an alarming rate in Pakistan. A large underground economy reflects a direct loss in public tax revenues and depresses the growth of Gross Domestic Product. Moreover, a growing underground economy may provide strong incentives for domestic and foreign workers to move away from the official economy. It is also pointed out that, "the effect of UGE is much more destructive in a country such as Pakistan – whose subsistence and economic development are already precarious".

The income tax evaded during 1957-58 amounted to Rs. 147 million and increased enormously to Rs. 18.5 billion in 1984-85 and then to Rs. 152 billion in 1996. The underground economy grew about Rs15 billion in 1973 to Rs. 1,115 billion in 1996 and this depicts increasing trends both in the growth rate of UGE and tax evasion.[2] Reducing the underground economy can increase tax revenues, stimulate public spending and hence can enhance overall economic growth.

At the international level, in a study conducted by Johnson & Kaufmann (1998) it was found that the countries with relatively low tax rates, higher income level and a well established rule of law tend to have a smaller underground economy. Another study by Freidrich & Enste (2002) proved that the underground economy depresses the growth of Gross Domestic Product.

[1] Here we are measuring the underground economy indirectly through tax evasion that cannot capture the illegal and informal economy. Lack of information available for these two lead to its exclusion from measurement of UGE.
[2] c.f. Iqbal, 1998

This paper is an attempt to estimate the size of the underground economy in Pakistan through income tax evasion capturing information for an extended time period of 1974-2002 along with its impact on the economy of Pakistan. So, it is expected to present a recent picture of the phenomena.

The rest of the paper is organised as follows. Section 2 provides data description and methodology. Section 3 discusses the empirical results. Section 4 concludes the paper.

Data and Methodology

The measurement of the underground economy has been the subject of intense debate in the literature. Some authors have used the direct method to assess the underground economy while some others have attempted an indirect method, known as the non-monetary approach and monetary approach, respectively.[3] This study follows the monetary approach based on a monetary indicator and in particular the amount of currency in circulation. This approach basically originates from the model of Tanzi (1983).

The approach is applied with three main assumptions. First, the underground economy is generated through tax evasion. Second, currency alone is used as a medium to carry out transactions in the underground economy. Third, velocity of illegal money is same as that of legal money.

In the estimation procedure, first the currency demand equation is estimated with the justification that most of the transactions are carried out in the form of cash in the underground economy in order to reduce the chances of detection. The demand for currency is measured by the ratio of currency in circulation (CC) to M_2 definition of money supply. The following is the model applied to estimate the currency demand equation.

$$(CC/M_2)_t = \beta_1 + \beta_2 (T/Y)_{t-1} + \beta_3 (BS) + \beta_4 (INT)_{t-1} + \beta_5 (Y_g) + \beta_6 (CC/M_2)_{t-1} + \in \quad \ldots \text{I}$$

Table 1 provides the details about the variables, definition and its resources, used in equation I.

[3] Monetary approach refers to the currency ratio, the modified currency ratio, transaction method and big bill phenomenon while non-monetary approach depends on labour market studies, difference between income and expenditure and the soft modeling approach.

Table-1: Definition of Variables

Variables	Definitions	Sources
CC	Currency in circulation equals currency issued, currency held by the State Bank of Pakistan and currency in tills of scheduled banks measured in million rupees.	Pakistan, State Bank of (2002).
M_2	Money supply is measured as currency in circulation, banks demand deposits, scheduled banks time deposits & other deposits with State Bank of Pakistan measured in million rupees.	Pakistan, State Bank of (2002).
T	Total taxes is measured by adding up the direct taxes that includes taxes on income, wealth tax, workers welfare tax and indirect tax that includes custom duties, federal excise duties and sales tax, measured in million rupees.	Pakistan, Government of (2002).
INT	Interest rate on time deposits taken as weighted average rates pertain to other than PLS deposits.	Pakistan, State Bank of (2002).
	These rates are percentage per annum.	
Y	Gross Domestic Product is defined as the value of all goods and services produced in the economy, measured in million rupees.	Pakistan, Government of (2002).
BS	Banking services defined as ratio of bank deposits to total number of bank accounts measured in million rupees.	Pakistan, State Bank of (2002).
Y_g	Growth rates in real per capita GDP measured in million rupees.	Pakistan, Government of (2002).

The data used for estimating the underground economy covers the period 1974-2002. The justification of variables along with their expected signs in the currency demand equation is given below.

Regarding the sign of the tax variable it is hypothesised that as the level of taxation rises people engage more and more in tax evading activities

that are facilitated by the use of currency. Hence, the ratio of currency holding to money CC/M_2 is expected to rise. The relationship between the interest rate on time deposits and currency ratio is expected to be negative as a high interest rate on time deposits may serve as an incentive for investment and people prefer to purchase time deposits rather than holding their money in cash. The hypothesised sign for the growth rate in real per capita GDP is expected to be negative as the fall is expected to occur in CC/M_2 with the expansion of the economy through rapid economic growth. The lagged currency money ratio $(CC/M_2)_{t-1}$ is included to capture the lag effect that shows the sluggishness of the money market. The sign of the lagged currency money ratio is expected to be positive. Moreover, improvement in banking services lowers the demand for currency holding. Thus, the sign of banking services is expected to be negative in the currency demand equation.

After estimating the currency demand equation, the size of the UGE through tax evasion is gauged. The procedure for estimating the size is as follows;

Illegal Money $(IM) = [(CC/M_2)_t - (CC/M_2)_{wt}] * M_2$

Legal money $(LM) = M_1 - IM$

Velocity of money $(IV) = GDP/LM$

Underground Economy (UGE) = $IM * IV$

Tax evasion $(TE) = UGE * (T/GDP)$

First, the values of the currency ratio for each year with and without tax variables are predicted by using the preceding regression equation. The difference between the two is multiplied by the total value of M_2 for the respective years in order to find out the level of illegal money as given in the above notations. Following Tanzi (1983), the difference between total money supply (M_2) and the estimated illegal money gives legal money (LM). Dividing the Gross Domestic National Product (GDP) by legal money gives an estimate of the income velocity of legal money. Further, illegal money is multiplied with velocity of money to get an estimate of the underground economy. Finally, the level of tax evasion is calculated by multiplying estimates of the underground economy with the ratio of overall taxes to *GDP.*

After measuring the size of the underground economy and tax evasion, an Ordinary Least Square model is applied to find out the impact of UGE and TE on GDP. Following are the equations used for estimation.

$$GDP_t = \alpha_0 + \alpha_1\ TE_t + \alpha_2\ GDP_{t-1} + \varepsilon \qquad \ldots \text{ II}$$

$$GDP_t = \alpha_3 + \alpha_4\ UGE_t + \alpha_5\ GDP_{t-1} + \varepsilon \qquad \ldots \text{ III}$$

Where, *GDP* stands for real gross domestic product, *TE* for tax evasion, *UGE* for underground economy and GDP_{t-1} for one year lagged *GDP*, all measured in million rupees.[4]

Empirical Results and Interpretation

Table 2 provides the results of estimated currency demand equation.

Table-2: Estimates of OLS Model (Currency Demand Equation)

Variables	Coefficients	t-values
C	0.151	(2.78)*
$(T/Y)_{t-1}$	0.848	(3.04)*
(BS)	-2.166	(-3.32)*
$(INT)_{t-1}$	-0.006	(-1.47)*
Y_g	-0.094	(-1.01)
$(CC/M_2)_{t-1}$	0.401	(2.44)*
R-Square	0.82	
Adjusted R^2	0.78	
F-Statistic	21.9	
Durbin-h	0.34	

Note: The * indicates that parameters are statistically significant at least at the 10 % level of significance.

The results are overall satisfactory as the coefficients of all variables except per capita real GDP growth rate, are statistically significant and the signs are as expected. The R^2 is reasonably high i.e. 0.78, indicating that

[4] Since tax evasion is measured from the underground economy, both yield similar results.

most of the variation in the demand for currency is explained by the estimated equation. Moreover, the value for the Durbin-h test indicates that no autocorrelation exists in the model.

The coefficient of lagged total taxes $(T/Y)_{t-1}$ is statistically positively significant as expected. This finding confirms the hypothesis that as the level of taxation rises, people are motivated to indulge in tax evading activities and the demand for currency holding increases. The result is in line with that of Ahmed (1995), Aslam (1998), and Iqbal (1998).

The coefficient of banking services (BS) has a negative sign as expected and is statistically significant. It shows that an improvement in banking services lowers the demand for currency for transaction purposes because with credit cards, demand deposits, and travellers cheques for transactions becoming available, people prefer not to hold money in cash form. The coefficient of interest rate on time deposits $(INT)_{t-1}$ has a negative sign as expected, and it implies that higher interest rate increases the opportunity cost for holding money. So people prefer to purchase time deposits rather than holding money in cash to gain from the high interest rate.

Finally, the lagged currency money ratio possesses the expected positive sign and is statistically significant, indicating the strong relation of current demand for holding currency with its previous year's demand.

After estimating the currency demand equation for each year, the predicted level of the currency ratio with tax variables $(CC/M_2)_t$ and with out tax variables $(CC/M_2)_{wt}$ are calculated by using the preceding regression equation. The difference between $(CC/M_2)_t$ and $(CC/M_2)_{wt}$ multiplied by the total value of M_2 for the respective years shows how much taxes cause people to hold currency that gives the estimates of illegal money.

Table 3 shows the estimates of the underground economy and tax evasion for the years 1974-2002. The estimates confirm the presence of a large underground economy and tax evasion in Pakistan.

Table-3: Estimates of Underground Economy in Pakistan (Million Rupees)

Years	Illegal Money	Legal Money	Velocity of money	Under-ground Economy (UGE)	Tax Evasion (TE)	Growth rate of GDP %[5]	Growth rate of UGE %	Growth rate of TE %
1974	2978	19663	4.1	12276	1562	-	-	-
1975	3598	20918	5.0	18196	2093	4.6	48.2	33.9
1976	4112	25752	4.8	19868	2296	3.7	9.18	9.69
1977	5205	30048	4.6	24455	2859	8.0	23.0	24.5
1978	6572	35519	4.7	31331	3766	4.7	28.1	31.7
1979	8491	43278	4.4	37930	4697	8.7	21.1	24.7
1980	10550	49721	4.6	49221	6633	6.8	29.8	41.2
1981	13182	60377	4.5	59793	8220	6.8	21.5	23.9
1982	14264	66661	4.7	68062	8794	6.7	13.8	6.98
1983	17576	78965	4.6	81866	10371	5.0	20.3	17.9
1984	19797	83647	4.9	97973	13183	7.5	19.7	27.1
1985	23326	95641	4.8	113017	14198	5.5	15.3	7.69
1986	24541	110289	4.6	112969	15425	6.4	-0.04	8.64
1987	30287	129337	4.2	129219	20831	7.6	14.4	35.0
1988	39457	145512	4.3	170866	28612	4.9	32.2	37.3
1989	41969	162563	4.3	183599	30404	4.4	7.45	6.26
1990	49934	190222	4.1	207802	29926	5.4	13.2	-1.57
1991	51022	214118	4.3	222155	29622	7.8	6.91	-1.01
1992	65697	237211	4.5	302015	43372	1.8	35.9	46.4
1993	73431	254390	4.7	349298	49353	4.0	15.6	13.8
1994	83849	274918	5.1	430913	60716	5.3	23.4	23.0
1995	99124	324014	5.2	520738	75627	5.1	20.8	24.5
1996	116678	331330	5.8	684734	103149	1.1	31.5	36.4
1997	134182	309368	7.2	969949	134207	1.2	41.6	30.1
1998	140463	339867	7.4	1039626	141973	3.6	7.18	5.78
1999	146995	497939	5.4	800127	112525	4.2	-23.0	-20.7
2000	165636	573396	5.0	831101	117230	2.5	3.87	4.18
2001	179904	581527	5.3	962463	137605	2.7	15.8	17.4
2002	209185	665791	5.1	1085286	152728	5.9	12.7	10.9

[5] The growth rate of GDP is calculated by the authors using data on real GDP measured in million rupees, taken from the *Economic Survey* (2002).

Table 3 shows that from 1974-2002 the underground economy has increased from Rs. 12 billion in 1974 to Rs. 1085 billion in 2002 and tax evasion has also increased from Rs. 1562 million to Rs. 152 billion. This shows that since 1974 there has been a remarkable upward trend in the underground economy as well as in tax evasion that further proves the linkage between the two.

The estimates show that the underground economy has enormously increased in the 90s. This can be attributed to high taxes and regulation imposed by the government. The estimates of illegal money show an upward trend from 1974 to 2002. While legal money has also increased with the passage of time except for the year 1997. The rate of growth of the underground economy and growth rate of GDP suggests that the rate of growth of the underground economy has been higher than the growth rate of the formal economy.

Table 4 finally provides the estimates based on equations II and III.

Table-4: Estimates of OLS Model (Impact of UGE & TE on GDP)

Variables	**Equation I**	**Equation II**
C	-44.65 (-0.35	-47.55 (-0.401)
TE	-0.005 (-3.39)*	_
UGE	_	-0.0007 (-3.373)*
GDP_{t-1}	1.078 (50.86)*	1.079 (55.12)*
Adjusted R^2	0.99	0.99
F-Statistic	8782	9384
Durbin-h	-1.07	-1.235

Note: The * indicates that parameters are statistically significant at the 1 % level of significance.

The results of the OLS model are quite satisfactory for both equation one, with TE as independent and the other one with UGE. All the variables bear the expected signs. The value of adjusted R^2 is 0.99 indicating 99 % of variation being explained by selected variables. The Durbin-h test

shows no sign of autocorrelation in the model. Tax evasion and the underground economy both have a significantly negative effect on GDP. As tax evasion increases by 1%, this decreases the tax revenue, GDP tends to fall by 0.005 % that depends on tax revenue. The same is the case with UGE that puts a negatively significant effect on GDP. The lagged value of GDP has a positive effect on current values for GDP showing a significant role of the multiplier.

Conclusion

This study confirms the existence of a large underground economy and tax evasion in Pakistan over the period 1974-2002. The results are closer to the ones found by Iqbal and Qureshi (1998). However, this study provides up-to-date information on the size of the UGE and tax evasion. The size of the underground economy has been growing at a rapid pace and is faster than the growth of the formal economy. This expansion of the underground economy may be due to changes in the economic and political scenario of the country.

The existence of the underground economy is a matter of serious concern for the government and policy makers. The presence of such a large underground economy is itself an indicator of the prevailing corruption on the part of the public in Pakistan. This not only causes large fiscal losses to the economy but also causes inefficiencies in public administration. Tax evasion has a negative impact on Pakistan's fiscal and monetary sectors. In order to compensate for this loss, the government imposes more taxes and that further raises the problem of tax evasion. Some of the suggestions arising from the results are given below.

- The government should improve the ways of detecting tax evasion.
- The Income tax department must be well equipped with efficient staff required for proper documentation.
- Tax collection system should be simple and comprehensive for the masses.
- Reducing the size of the underground economy can enhance the economic growth of Pakistan through increased tax revenues.

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On the Causal Relationship between Government Expenditure and Tax Revenue in Pakistan

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Abstract

This paper applies the technique of Granger Causality to determine the relationship between total government expenditures and total tax revenue using annual revised estimates. The analysis discovers a firm unidirectional effect from expenditure to revenue suggesting the preference of controlling the spending decisions to reduce the tax revenue-expenditure deficit.

Introduction

There has always been a debate among economists about the intertemporal association between taxation and government expenditure. This discussion is vital since it corroborates the size of government, budget deficit and the structure of taxation and expenditure themselves. In studying the causal relationship between taxation and expenditure, three possibilities may arise: Expenditure may change (1) simultaneously with tax revenues (2) after the commencement of revenue streams, or (3) before revenues. The first situation is a case where voters of a society take a joint decision vis-à-vis the desired level of taxes and spending together and thereby weigh the costs and benefits of any change in the balanced budget. This case of fiscal synchronisation is observed to the extent where expenditure changes are balanced by contemporaneous taxation. Situation (2) is the case where revenues lead and control the spending decisions. In this case, the ways and means of collecting taxes are driven mainly by political and/or institutional jurisdictions and thereby preferred over economic efficiency, the decision of expenditures is a case followed by the revenue decision. Argument (3) can be thought of as a pro-Keynesian case where deficit budgeting is advocated to boost employment, consumption, saving and production and then the revenue inflows are determined through increased tax revenues[1]. Nonetheless, a possible cause of the failure of this theory in most of the developing countries would be a heavy reliance on consumption expenditures rather than investment expenditures. Furthermore,

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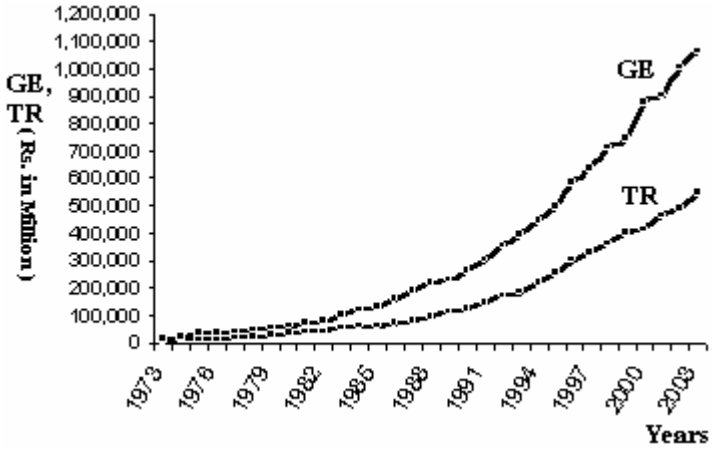
[1] This analysis is that of Frusternberg *et. al.* (1986)

this argument can be supported by another empirical matter; spending decisions are also based on political will. It is argued that if the political majority can deliver expenditure alterations, it will be reflected on the tax side as an aftermath.

The Government of Pakistan collects the major portion of revenue through taxes and surcharges which constitute 65% to 70% of overall revenue collection. The rising gap between total expenditure and total tax revenue has always been a concern of many economists and policymakers. This gap was Rs. 150 million in 1991 when the Resource Mobilisation & Tax Reform Commission was established. In 2003, this gap widened to Rs. 515 million which can be seen from Figure-1. Moreover, it is an empirical fact that most of the tax revenue was deposited to consumption expenditures rather than investment expenditures and this could be a primary cause of this continuously sprouting tax-expenditure gap.

Figure-1: Government Expenditure and Tax Revenue



In this paper, an attempt is made to gauge the primary reasoning of the budget deficit we have been facing. This has been done by estimating the causal relationship between Total Expenditure and Tax Revenue.

The structure of the paper is as follows: Section (I) is dedicated to the literature review, Section (II) illustrates the methodology and data, Section (III) explains the empirical results and major findings and finally Section (IV) concludes the study and presents some policy implications.

I. Review of Selected Literature

The hypotheses of "tax then spend", "spend then tax" and "tax or spend and spend or tax" are all supported by the economic studies regarding different economies. Thus we can classify these studies with respect to the first, second and third hypothesis. Furthermore, a careful examination of these studies reveals that the development stages of a country is nothing or very little to do with the direction of causality as noted by Cheng (1999).

For instance, Friedman (1972, 1978) supports the view that increasing taxes means that one would have just as large a deficit but at a higher level of government expenditures. To him, the direction of causality is from tax revenues to government spending. Buchanan and Wagner (1977) also substantiate this result. In their view, the budget deficit is a primary cause of increased government expenditures. If the government is to finance this deficit entirely through direct taxes, demand for restraining the expenditures would be called for by the society. Blackley (1986) also showed that increasing revenue leads to increased expenditures thus the smaller deficit is ruled out. Manage and Marlow (1986) find the unidirectional causality running from federal receipts to expenditures. However, they criticised the Reagan administration's deficit reduction packages which emphasised the tax increase over deficit reduction pointing out that these packages were designed to reallocate the combination of various revenue sources without concentrating on aggregate spending levels. Marlow and Manage (1987) studied this relationship in state and local government finances of the United States. The Granger test detects that tax receipts cause expenditure for state governments. However, there is no significant relationship found between these two variables in local governments. Owoye (1995) conducted a study of G7 countries and finds that the direction of causality runs from tax revenues to government expenditures in the case of Japan and Italy. Cheng (1999) in a study of eight Latin American countries detects a similar direction for Columbia, the Dominican Republic, Honduras and Paraguay.

On the contrary, Barro (1974), Peacock and Wiseman (1979) support the other view that increased taxes and borrowings are due to increased government expenditures. In their view, it is the political system of a country which decides how much to spend and then finds the resources to finance this spending. Developing countries such as Pakistan apparently face this situation. Moreover, continuous need for social sector reforms also requires increased development expenditures. This result is further supported by Anderson, *et. al.* (1986) who test this hypothesis in the context of the U.S. economy, 1946-1983 using multivariate analysis.

Furstenberg *et. al.* (1986) examined the intertemporal relationship using the VAR model. Their analysis revealed that tax revenues are followed by the decisions of spending: a support for "spend now and tax later" hypothesis.

Furthermore, Manage and Marlow (1986) find the presence of bidirectional causality between U.S. federal revenues and expenditures for 1929-82. This bidirectional causality is found in more than half the states. Joulfaian and Mookerjee (1990) also support both tax-and-spend & spend-and-tax hypotheses. Owoye (1995) confirms this result in G7 countries excluding Japan and Italy. Cheng (1999) also identifies this feedback mechanism in Chile, Panama, Brazil, and Peru. This bidirectional causality is also prominent in the case of Indian states, as Bhat, K. Sham *et. al.* (1993) revealed.

II. Methodology and Data

In this paper we use the Granger test of causality (1969) to study the causal relationship between Government Spending and Tax Revenues. It states that a variable *TR* Granger-cause *GE* if the prediction of *GE* is improved solely by the past values of *TR* and not by other series included in the analysis. Vice versa is true for *GE* Granger-causing *TR*. In this connection, it is necessary to estimate these two regressions:

$$GE_t = a_0 + \sum_{i=1}^{n} \alpha_i TR_{t-i} + \sum_{i=1}^{n} \beta_i GE_{t-j} + u_{1t} \qquad (1)$$

$$TR_t = a_1 + \sum_{i=1}^{n} \lambda_i TR_{t-i} + \sum_{i=1}^{n} \delta_i GE_{t-j} + u_{2t} \qquad (2)$$

Where GE is Total Government Expenditures, TR is Tax Revenue and u_1 and u_2 are white-noise residuals. We will test the hypotheses H_o: $\sum\alpha_i = 0$ and H_o: $\sum \delta_i = 0$ respectively for both the equations. If both the hypotheses are subject to rejection, then we can conclude the presence of feedback effect between *GE* and *TR*. And if only one of the hypotheses is subject to rejection, we can construe the unidirectional causality from that variable to the independent variable of the equation. Furthermore, we also anticipate that $\sum\alpha_i<1$, $\sum \beta_i<1$, $\sum\lambda_i<1$ and $\sum \delta_i<1$.

In addition, the Granger Causality test is very sensitive to the selection of lags of independent and dependent variables. Some previous studies like Anderson *et. al.*, (1986); Manage and Marlow (1986); Joulfaian and Mookerjee (1990); Baghestani and McNown (1994) arbitrarily choose the lag lengths. This arbitrary choice can not be justified *a priori* and could

generate biased results. As Lee (1997) points out the practice of choosing similar lag length could be a potential model misspecification. One may argue that the political and economic history of a country would appropriately elucidate at what year one variable is causing the other. However, to keep oneself from model misspecification in a situation where one is not sure as to what lag to use, some alternative measures would have to be acquired. Therefore, a more proper technique of best-lag selection is adopted using the ***modus operandi*** defined here: In our approach, we use the Akaike Information Criterion (1969) and Schwarz Criterion (1978) to determine the appropriate lag lengths for *GE* and *TR*. Both these tests suggest that a model with the least value of AIC and/or SC should be chosen. This selection process follows this way: first we regress GE on the lags of GE excluding *TR* from where the best lag(s) is determined. Second, using these lags for *GE*, we start including lags of *TR* in the regression so that the suitable lag(s) for TR would be determined. It is the procedure for selecting appropriate lag lengths for both variables in equation (1) and the same methodology is adopted for equation (2). We use Normal, First-differenced and Log series for our analysis and the results of AIC and SC for these three series are reported in Tables 2a, 3a and 4a respectively. First-differenced series is a good instrument to get rid of any nonstationarity problem and Log series is used to minimise the variance. It is also worthwhile notifying that Schwarz Criterion is a better measure of choosing lag lengths since it imposes a harsher penalty of adding more restrictions; {see Gujarati (2003) for details}. In our analysis, both AIC and SC depict the same conclusion for most of the cases. Otherwise we use SC for the reason defined above. Similarly, Tables 2b, 3b and 4b show the results of Granger Test respectively for three series.

We use the data for these two variables in real terms (we use GDP deflator as the general price level) from 1973 to 2003. These are revised estimates taken from various issues of Federal Budgets in the Briefs. Total Government Expenditures constitute Federal Current Expenditures, Provincial Current Expenditures and Annual Development Programme. Similarly, Total Tax Revenue constitutes Federal Direct & Indirect Taxes and Total Provincial Taxes.

III. Empirical Results

Table-1 sums up the results of the Granger test for all three series. It can be seen that we essentially face unidirectional causality running from Government Expenditure to Tax Revenues. Moreover, Tax Revenue responds quickly to the changes in Government Expenditure. This would fundamentally be the case where government expenditures are determined

through political manipulation and then the financial sources are searched to finance these expenditures. In the Pakistani context, Total (federal, provincial combined) Current Expenditures were Rs.700 billion during 2002, rose up to Rs. 792 billion last year showing an increase of 13%. On the other hand, Development Expenditures were Rs.126 billion in 2002, increased up to Rs. 130 billion portraying a jump of only 3%. It clearly shows the government preferences and points out the areas where current expenditures need to be heavily shrunk. These include defense expenditures, debt servicing and general administration. The demand for defense expenditure is quite high for whatever reason. Furthermore, this spending has, explicitly or implicitly, been one of the main preferences for any regime, whether military or democratic. Similarly, spending on general administration is predominantly the expenses on bureaucracy and include extensive compensations which tends to increase the size of the government while it is an empirical fact that little government is always good government. Debt servicing is another major part of our total expenditure outlays. All these expenditures have been priority spending over the years in Pakistan and, despite attempts to be contained now, still compose the major part of total spending. It can be argued that the heavy reliance on these expenditures is not only certainly against pro-Keynesian theory but also imperative to increase the budget deficit.

Table-1: Summary of Results for Granger Causality Test

Normal Series	First-differenced Series	Log Series
TR does Not Cause *GE*	*TR* does Not Cause *GE*	*TR* does Not Cause *GE*
GE cause *TR* at 1st Lag	*GE* cause *TR* at 3rd Lag	*GE* cause *TR* at 1st Lag

Furthermore, it has been argued several times that we have had very compact allocations for development expenditures. In times of political mayhem and military tensions, the axe always hits development outlays to fill the gaps in current expenditures. The main channels to sponsor these expenditures are the introduction of fresh taxes, raising the existing tax rates and borrowings. Governments tended to be involved in these practices without precisely considering the affiliated costs, not by monetary means but by welfare aspects. Secondly, due to the narrow tax base, evasion and inefficient implementation, collection never occurred as expected and needed. Thirdly, as stated herein above, the revenues raised through taxes mostly went to finance consumption expenditures.

Nonetheless, looking at the causality results, we have two simultaneous solutions. First, increasing the tax base and making sure of proper tax collection avoiding misuse and leakages. Second, now that the governments start focusing on these issues, besides finding new sources to finance these expenditures, there is a need for a gradual shifting from excess current expenditures towards development overheads.

Moreover, since in this study *GE* is causing *TR*, it can be claimed that decreasing expenditure can also decrease revenues. Nevertheless, it may be argued that since not all (rather, few) expenditures are investment spending, if we decrease the consumption expenditures together with the increase in revenue collection which can be justified on economic grounds, the result will certainly be against this claim.

The reader may also presume that since in this study *GE* is not found to be dependent on *TR*, only increasing the tax revenues may tend to reduce the budget deficit. This is rather a difficult question to answer as well as a very strong assumption that could not be suggested only considering the causal relationship between these two variables, which is the basic element of this study. What we need is the 'effect' analysis of all the expenditures and revenues separately and in aggregate. Precisely, we need proper cost-benefit analyses of any changes in taxation and expenditures if we are to address the problem of the federal deficit.

IV. Conclusion and Policy Implications

In this study, the causal relationship between Total Expenditures and Tax Revenue has been analysed. In general, our results support the Barro hypothesis that government expenditure causes revenues. The result that *TR* does not cause *GE* can best and only be explained by the political economy of Pakistan where the main expenditures are the outlays chiefly determined politically by bureaucratic and military influence (defense, debt servicing, general administration). Most of these consumption expenditures pose self and/or group interests rather than overall welfare. Although debt servicing is a liability transfer from previous periods, it is included here too because the debts taken have not been reflected in increased development and other investment expenditure over the years and have arguably been used for self interests rather than communal welfare by politicians. For that matter, a major portion of development expenditure in Pakistan is the residual amount left over from different consumption expenditure heads in provincial accounts (Net Capital Receipts, Net Public Account Receipts, for instance). Whenever the political need (or greed) of consumption

expenditure is higher, there is little left as residual to self-finance the development expenditure by provinces.

Furthermore, seeing that our tests can not guarantee the final benchmark resolution of the issue of reducing the deficit, we can obviously not support increasing tax revenues over decreasing expenditure. Only reducing the expenditures can not solely be acclaimed; rather, what we need primarily is (i) reduction in the size of large consumption outlays and their shifting towards development and other investment expenditures, thereby moving towards Pareto optimal solutions. In addition, the presence of and dependence on the political factors in determining the preferences for expenditures can interrupt any economic step taken to correct for the revenue-expenditure gap. Therefore, (ii) in determining the new outlays, economic efficiency should be preferred over political determination.

In addition, as is the focal point of this paper, results suggest that besides the Tax & Tariff Reform programme of the government which emerged and was enhanced during the 90s, ***we strongly need an expenditure reform curriculum*** in which comprehensive cost-benefit analyses should be conducted for government expenditures together with the analyses of adopting optimal approach for gradual shifting and reformation. This whole scenario should be scrutinised in a general equilibrium framework so that the effect and distributional consequences of any expenditure could be spread over the entire economy. Besides considering only the revenue generation from Tax and Tariff reforms, expenditure reforms analysis should be considered as the task that will determine the direction and deployment of revenue raised from Tax and Tariff Reforms. Once the optimal expenditures are identified, it will be 'economically efficient' to set targets for tax collections and revenue utilistion.

APPENDIX:

TABLE – 2a: Tests for Lag Selection using AIC & SC
Normal Series

$$\left(\frac{GE}{P}\right), \left(\frac{TR}{P}\right)$$

Dependent Variable	Lag of GE	Lag of TR	AIC	SC
GE	1	-	11.53	11.63
	2	***-***	*11.47*	***11.61***
	3	-	11.48	11.67
	4	-	11.54	11.78
	2	***1***	*11.52*	***11.71***
	2	2	11.59	11.82
	2	3	11.70	11.99
	2	4	11.67	12.01
TR	***-***	***1***	*9.47*	***9.56***
	-	2	9.43	9.57
	-	3	9.50	9.69
	-	4	9.58	9.82
	1	***1***	*9.36*	***9.50***
	2	1	9.41	9.60
	3	1	9.50	9.74
	4	1	9.58	9.87

Table – 2b: Granger Causality Test Results between Total Expenditures (GE) and Tax Revenues (TR) using Table-2a

Dependent Variable	Lag of GE	Lag of TR	TR ===> GE		GE ===> TR		Final Inference
			F-Stats	Sig. Level	F-Stats	Sig. Level	
GE	2	1	0.53	0.47	-	-	Unidirectional Causality from GE to TR
TR	1	1	-	-	5.27	0.029	

Table – 3a: Tests for Lag Selection using AIC & SC
First Differenced Series

$$\Delta\left(\frac{GE}{P}\right),\ \Delta\left(\frac{TR}{P}\right)$$

Dependent Variable	Lag of GE	Lag of TR	AIC	SC
GE	***1***	**-**	***11.40***	***11.49***
	2	**-**	11.41	11.55
	3	-	11.46	11.66
	4	-	11.41	11.66
	1	***1***	***11.47***	***11.61***
	1	2	11.58	11.77
	1	3	11.53	11.77
	1	4	11.40	11.69
TR	**-**	***1***	9.39	***9.48***
	-	2	9.44	9.58
	-	3	9.51	9.70
	-	4	9.56	9.81
	1	1	9.45	9.59
	2	1	9.50	9.69
	3	***1***	9.32	***9.56***
	4	1	9.36	9.65

Table – 3b: Granger Causality Test Results between Total Expenditures (GE) and Tax Revenues (TR) using Table-3a

Dependent Variable	Lag of GE	Lag of TR	TR ===> GE		GE ===> TR		Final Inference
			F-Stats	Sig. Level	F-Stats	Sig. Level	
GE	1	1	0.00	0.99	-	-	Unidirectional Causality from GEs to TR
TR	3	1	-	-	3.7225	0.024	

Table – 4a: Tests for Lag Selection using AIC & SC
Log Series

$$LOG\left(\frac{GE}{P}\right),\ LOG\left(\frac{TR}{P}\right)$$

Dependent Variable	Lag of GE	Lag of TR	AIC	SC
GE	***1***	**-**	*-2.89*	***-2.79***
	2	**-**	*-2.80*	-2.66
	3	-	*-2.82*	-2.63
	4	-	*-2.77*	-2.53
	1	***1***	*-2.89*	***-2.75***
	1	2	*-2.83*	-2.64
	1	3	*-2.83*	-2.59
	1	4	*-2.75*	-2.46
TR	**-**	***1***	*-3.28*	***-3.18***
	-	2	*-3.21*	-3.07
	-	3	*-3.21*	-3.02
	-	4	*-3.14*	-2.90
	1	***1***	*-3.32*	***-3.18***
	2	1	*-3.24*	-3.05
	3	1	*-3.21*	-2.97
	4	1	*-3.13*	-2.84

Table – 4b: Granger Causality Test Results between Total Expenditures (GE) and Tax Revenues (TR) using Table-4a

Dependent Variable	Lag of GE	Lag of TR	TR ===> GE		GE ===> TR		Final Inference
			F-Stats	Sig. Level	F-Stats	Sig. Level	
GE	1	1	1.998	0.16	-	-	Unidirectional Causality from GEs to TR
TR	1	1	-	-	3.303	0.08	

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Determinants of Youth Development in Pakistan

Azeema Faizunnisa[*] and Atif Ikram[**]

Abstract

Pakistan's youth[1] consists one-fifth (25 million) of its population and is one of the most valuable resources for its national growth and prosperity. An educated, skilled, and healthy youth, in other words a developed youth, would most certainly put Pakistan in the course of social and economic enrichment. Hence, it is imperative to determine where Pakistan's youth stands in terms of development characteristics and indicators.

The present study is based on a national survey "Pakistan's Youth: Transition to Adulthood: Education, Work and Marriage" undertaken in all four provinces by the Population Council in 2001-02, with a sample size of 8,074 youth and 6,812 households in 252 communities. The survey used three comprehensive questionnaires with various modules covering education, work, marriage, fertility, and living conditions of youth, their households and their communities. The survey also covered gender attitudes, norms, mobility, and safe places.

The present paper has used the data from the above-mentioned study to work out "Youth Development Index" (YDI). The YDI is a simple summary measurement, as other development indexes, of four dimensions of the youth development concept: educational attainment, employment, recreation and health seeking behaviour. The index has been analysed with other independent variables to ascertain the links of various agents and determinants affecting the development of youth in Pakistan. Then a regression model has been used to finally ascertain the factors that are most significant in a young person's life.

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Introduction

Pakistan has a youthful population as more than half of its population is below the age of 20 years. Three out of four households have one or more young people (age 10 to 24 years). Furthermore, one out of every five persons in Pakistan is in the age group of 15 to 24 years (PCO, 2003). This huge young population enumerated 25 million in 1998 census, is one of the most valuable resources for Pakistan's social and economic growth and prosperity.

On the other hand, Pakistan apparently has to face dire consequences if this resource is not capitalised and allowed to remain uneducated, unhealthy and unskilled. The latest Census of 1998 reported that one-third of the boys and over half of the girls in the age group of 15-24 years are illiterate. Among those who are literate, 33% of the boys and 37% of the girls have only attained education levels of either primary or below primary. In the age group of 15-19 years, only 37% of the boys and 24% of the girls are currently attending any educational institution. About a third of young people have never attended school in Pakistan. Rural girls are most deprived in this regard, as 60% of them have never been enrolled in school. Of those young people who have ever attended school, on average they have attained about 8 years of schooling. The situation is grimmer in the rural population in almost all aspects as compared to the overall educational statistics (PCO 2003).

While Pakistan is striving to achieve universal primary education by the year 2015, there are still huge differences in educational attainment between urban and rural areas and the provinces and between boys and girls (MoE, 2003).

If we look at the labour market statistics, 41% and 42% of the total male and female labour force respectively consist of youth (15-24 years age). And 70% and 15% of total male and female population respectively in the age group of 15-24 years is part of the labour force. Overall 43% of young people (15-24 year olds) are part of the labour force of Pakistan. Among young boys, a less than two thirds of 15-19 years olds are involved in the labour force, whereas in the later years (20-24), most (87%) become economically active. For girls, the trend is not as dramatic. About 14% of all girls aged 15-19 are part of the Labour Force, which progress to 16% in the later years. The lower participation of females in the Labour Force is due to the fact that a vast majority of them spends as much as 8 hours per day on household work. Obviously these figures reveal the significance of the young population in our labour force strength. Unfortunately, a large proportion of

this young labour force is involved in unskilled or semiskilled activities (FBS, 2004).

These few national level statistics are the proverbial tip of the iceberg of the actual problem that persists among Pakistani youth. Therefore, it is absolutely imperative; first, to determine the current state of our youth in terms of development characteristics, mainly, of health, education and skill. Secondly, ascertain the determinants influencing or likely to influence youth development in Pakistan. Policies and plans concerning youth development can only be made afterwards, whether at the community, regional, district or national levels.

Hereafter, the paper is divided into five sections. The next section "Background" gives brief information about the data and the sources from where the data has been taken in this report for analysis. The section on "Methodology" describes the index and its usage. After limitations, the section on "Research Findings" discusses the analysis. On the basis of the analysis, in the last section of the report the authors conclude the paper.

Background

There has been virtually no national level survey conducted in Pakistan on youth, however, various small-scale regional studies have been carried out focusing on particular issues concerning the youth of Pakistan (Khan, 2000). Available information at the national-scale about Pakistani youth is limited and in most cases can only be found in the shape of main indicators in censuses or national surveys such as *Labour Force Survey* or *Pakistan Integrated Household Survey*. All these studies are carried out by either the Federal Bureau of Statistics or the Pakistan Census Organisation, both of the institutions which have been severely criticised for mis/underreporting of the data, especially in the case of women respondents (Shaheed and Mumtaz, 1990; MoL M&OP, 1989; Mumtaz and Shaheed, 1987).

This dearth of information about Pakistani youth has always demanded a comprehensive national scale survey to be carried out keeping in mind various cultural constraints prevalent in Pakistan. Recently, the Population Council conducted a national representative survey on youth in Pakistan in the year 2001-2002 and published its findings in 2003 (Population Council, 2003). This national survey has enabled researchers to carry out in-depth analysis on the data made available by this study.

In the initial phases of the Youth Survey, the Population Council and the Federal Bureau of Statistics jointly determined the sample design based on a sampling frame of the 1998 Census. It used the two-step stratified sampling technique to identify 254 primary sampling units. A total of 6,812 households were contacted in all the four provinces of Pakistan distributed in rural and urban localities. The survey used three different questionnaires for households, adolescents and youth and for the community profile. Data collection has covered a wide range of topics covering education, work, marriage, fertility, and living conditions of youth as well as characteristics concerning their households and their communities. The survey also covered attitudes, norms, and mobility pertaining to gender roles and status and responsibilities. One of the main characteristics of the survey was the usage of trained female surveyors for female respondents, which has enhanced the credibility and the reliability of the data gathered during the fieldwork.

Methodology

The present paper has worked out a "Youth Development Index" (YDI) by using the data from the above-mentioned study. The YDI is a simple summary measurement, typically used by other development indexes pertaining to various dimensions of youth development. For this index, we have intentionally selected educational attainment, employment, recreation and health seeking behaviour of youth. The index has been analysed with other independent variables to ascertain the linkages of various agents and determinants affecting the development of youth in Pakistan. A regression model was later employed to finally determine the most critical factors in a young person's life and achievements. The selected explanatory variables include demographic and socio-economic characteristics of youth such as residence, age, sex, socio-economic class, parental education, etc.

The index, as explained above, has used selected variables to determine the values of YDI. For example, a person with "no education" is assigned value '0' or if he/she had 8 years or more of schooling, the value '3' is assigned, the maximum value to be assigned for education. In health, we used two indicators for health seeking behaviour. First, does a person consult a doctor for general health problems and secondly does a person consult a doctor for sensitive health issues? In both cases, we assigned value '1' to a person who consults the doctor and '0' who does not. Similarly, having any kind of recreational activity (such as reading, watching television, sports etc.) as an indicator of development in a young person's life, we assigned a value '1' to a person who reported at least one type of leisure activity. The last indicator of work had to be inter-linked with education. Because if a person is not currently working and is in school, he/she must be given the maximum value because of a trade-off between work and

education in which education is always preferable for youth. However, we assigned the maximum value to a person who had 10 years and more schooling and has worked (refer to Table 1 for detailed description of assigned values).

By summing up the values derived from these four indicators, we calculated YDI for each individual. Individuals falling in the range of 0 to 3 YDI score are refereed as least developed. Whereas if it falls in the range of 4 to 6, he/she is called moderately developed and finally a person falling in the range of 7 to 9 value is called developed.

Before moving further into research findings, it is necessary that we list some of the limitations of the methodology.

Limitations

Indicators such as of education, or health used to derive the values of YDI are given equal or more weightage from one and to the other, while *a priori* it is extremely difficult to justify that any set of weights to a particular variable is appropriate in relation to another or other variable(s) in the index (Kelly, 1991).

The YDI has used health-seeking behaviour of an individual as variables for health in the index. This is primarily a limitation of a research study because health indicators such as Body Mass Index or health history of an individual have not been asked in the survey and this would have given more significance to overall YDI.

Since the data is taken from a household survey, the age distribution of the respondents varies slightly by sex and region. For example, female and male respondents in the age group of 20-24 years in the urban areas are respectively 3.2% and 2% more in the overall sample than in the rural areas. Established in research findings, as persons belonging to a higher age group would yield higher YDI, this might have slightly influenced the overall value of YDI by region or sex.

Research Findings[2]

The average age of 8,074 respondents interviewed was found to be 18.9 years and the mode value was 15 years. On average, the young persons

[2] The section on "Research Findings" is based on analysis of an age group of 15 to 24 years of males and females living in the urban and rural areas of Pakistan. Therefore the words "male" and "female" have been used synonymously to male youth and female youth of 15 to 24 years of age group or otherwise defined.

who have ever enrolled in school have mean educational attainment of 7.2 years while the maximum years of schooling is 16. The average age at the time of first work and marriage was found to be 14.2 and 17 years respectively. The average YDI score is 3.46, less than half of the total YDI value of 9 for Pakistani youth (refer to Table 2).

Table 3 presents the construct variables for Youth Development Index by value and its percentage distribution. In education more than one-third of the youth has no schooling and assigned a value of '0'. Also almost one-third of the youth has 8 or more years of schooling and assigned value '3', whereas the rest of the youth falling between these two groups has been assigned either value '1' or 2'. More than three-fourths of the youth surveyed do not consult a doctor either for sensitive or general health issues and have been given '0' value. However, an encouraging proportion is involved in recreational activities and four out of five persons interviewed have responded as being involved in at least one of the recreational activities probed during the interview. In work, a very small proportion (6.56%) of youth has 10 years or more schooling and has also "ever worked". About one-fifth of the youth has neither any schooling nor have they worked and are given '0' value.

Figures 1 and 2 present YDI score by region and sex respectively. It is evident from Figure 1 that the rural areas have scored less than the urban areas in respect of YDI value. If we move from the scale of 0 to 9 on figure 1, the urban region has a rising trend towards higher values and the rural areas have shown a declining trend. A similar pattern can also be observed in Figure 2 representing comparison of male and female with male having a rising trend towards higher YDI values. It is interesting to note that males living in the urban areas have an average YDI value of 21% higher than males living in rural areas and 136% higher than female, living in the rural areas. Whereas urban females have an average YDI value almost similar to rural male, however, 91% higher to rural female. The difference between the average YDI value of urban male and urban female is little less than 20%. These findings clearly illustrate that the youth living in urban areas is far more developed than those who are living in rural areas and male are more developed than their female counterparts. Moreover, the urban females are twice as developed as female living in rural areas and almost equally developed as male living in the rural areas.

Table 4 presents YDI score by development categories of "Least Developed", "Moderately Developed" and "Developed" by region and sex. Almost half the youth surveyed falls in the category of "least developed" and only 10% youth can be called "developed". In case of females, especially

those living in rural areas, almost three fourths are in the category of "least developed." Male who are living in rural areas or urban areas have shown far better results then female. Both in rural and urban areas, more than half the male surveyed fall in the category of moderately developed. Also 14% and 20% male can be referred to as developed youth in the rural and the urban areas respectively.

Comparison of YDI by different socio-economic and demographic characteristics of youth has revealed some interesting findings presented here in Table 5. The province of Punjab has the highest mean score of 3.64 YDI as compared to other provinces of Pakistan. The Sindh province has closely fallen behind Punjab. Balochistan province has attained the least value. The urban region has a value of 4.5 YDI as compared to a value of 3.06 in the rural areas. Similar results were obtained when comparison was made between male and female. The age and YDI had a positive relationship and as the age of the respondent increases the YDI also increases. While comparing the socio-economic status, those who belong to a high socio-economic status have an average YDI of 4.77, maximum value attained while comparing any of the socio-economic or demographic characteristics of the respondents and more than twice as high as the value of youth belonging to low socio-economic status. Interestingly, respondents who are not yet married have a high YDI value as compared to those who are ever married. Furthermore, among married youth, those who are married before the age of 20 years have YDI value of just a little over half the value of those who are married in the age category of 20 or more. Exposure of visiting another city, going to school alone, and participation in decision making about own work or education have all shown a positive influence on YDI.

Table 6 shows results from the linear regression analysis. Model 1 is based on all young people surveyed, whereas the second model is for only rural areas and the third is for female youth only.

In the first model, the results show that young people who express their views regarding their education and are accepted by parents/guardians, have a greater score (0.798) than those who do not take part in the decision making. Moreover, as expected, being a male, urbanite, belonging to the highest socio-economic class, having been to another city etc., being able to go to school alone and having literate parents are all positively associated with higher YDI score. Among the provinces only Punjab was statistically significant and shows 0.219 higher score than Balochistan.

The second model shows a very strong association with ability to go to school alone and take part in educational decisions. Those young people have a 1.377 and 1.066 more score. Mother's education also has a positive impact on youth development, and those young people whose mothers are literate have 0.86 points added to their score. The trends are similar for the variables in the previous model. However, all provinces turned out to be non-significant in this model.

In the third model, only female young people were considered. Here, mother's literacy came out to be most directly affecting the female YDI score. Females having literate mothers have 0.916 more YDI score than those whose mothers are illiterate. Among other variables, being able to go to school alone and taking part in educational decisions make a significant positive difference in the score (0.654 and 0.915 higher).

For all three models the adjusted R-squares are quite strong and about 40% of the variation in the YDI can be explained through the variables used in our model.

Conclusion

The results show a positive overall picture as half the young people have more than 4 score in the YDI (ranging from 0 to 9). However, there are stark differences among young people of Pakistan across the provinces, sex and urban rural areas. Females are more likely to get a lower score than boys as their chances of getting education and taking part in the labour force are much lower than that of boys, especially in the rural areas. Hence, the scores for girls especially those residing in rural areas, belonging to lower socio-economic class and more restrictive home environment are much lower.

Table-1: The Construct Variables for Youth Development Index (YDI)

	Assigned Value
Education	
No schooling	0
Less than 5 years	1
5-7 years schooling	2
8 or more years of schooling	3
Talk to Doctor for General Health	
No	0
Yes	1
Talk to Doctor for Sensitive Health	
No	0
Yes	1
Recreation	
No	0
Yes	1
Work	
No schooling and no work	0
No schooling but ever worked	0.5
>5 years schooling and ever worked	1
5-9 years schooling and ever worked	2
10+ schooling and ever worked	3
Range	0 — 9

Table 2: Descriptive Statistics of Respondents

	Age of Respondents	Education Class completed	Age at first work	Age at marriage	YDI score
Mean	18.87	7.21	14.16	17	3.46
Median	19	8	14	17	4
Mode	15	5	15	16	5
Minimum	15	0	1	6	0
Maximum	24	16	24	24	9
N	8,074	5,176	3,803	2,338	8,073

Table-3: The Construct Variables for Youth Development Index (YDI) by % Value

	Value	%	N
Education			
No schooling	0	38.16	3,080
Less than 5 years	1	10.69	863
5-7 years schooling	2	17.73	1,431
8 or more years of schooling	3	33.43	2,698
Talk to Doctor for General Health			
No	0	78.83	6,293
Yes	1	21.17	1,690
Talk to Doctor for Sensitive Health			
No	0	78.86	6,278
Yes	1	21.14	1,683
Recreation			
No	0	20.34	1,622
Yes	1	79.66	6,354
Work			
No schooling and no work	0	21.01	1,429
No schooling but ever worked	0.5	21.11	1,436
Some schooling and ever worked	1	38.09	2,591
5-9 years schooling and ever worked	2	13.24	900
10+ schooling and ever worked	3	6.56	446
Range	0 — 9		

Table-4: YDI Score by Development Groups, Sex and Region

	Male	Female	Total	N
YDI Score Rural				
0-3	30.3	73.9	56.7	3,269
4-6	55.8	23.9	36.5	2,106
7-9	14.0	2.2	6.8	394
Total N	2,279	3,491	5,769	
YDI Score Urban				
0-3	18.1	33.1	26.7	614
4-6	61.9	53.1	56.9	1,310
7-9	20.0	13.8	16.5	380
Total N	987	1,317	2,304	
YDI Score Overall				
0-3	26.6	62.7	48.1	3,884
4-6	57.6	31.9	42.3	3,416
7-9	15.8	5.4	9.6	774
Total N	3,266	4,807	8,073	

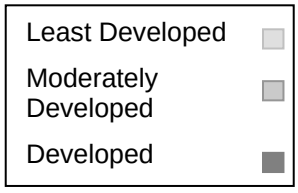


Table-5: Mean YDI Score for Various Socio-economic and Demographic Characteristics

Characteristics	Mean
Province	
Punjab	3.64
Sindh	3.52
NWFP	2.99
Balochistan	2.55
Residence	
Rural	3.06
Urban	4.50
Gender	
Male	4.52
Female	2.75
Age-group	
15-17 years	3.21
18-20 years	3.59
21-24 years	3.64
Socio-economic status	
Low	2.21
Low-mid	2.81
High-mid	3.73
High	4.77
Ever Married	
No	3.92
Yes	2.38
Married before 20	
No	3.50
Yes	2.11
Exposure of visiting some other city etc.	
No	2.90
Yes	4.03
Can go to school alone	
No	2.44
Yes	4.30
Participated in decision about own work*	
No	3.18
Yes	3.77
Participated in decision about own education*	
No	2.72
Yes	4.64

*Those who gave an opinion and it was approved

Table-6: Linear Regression Models Predicting the Youth Development Index by various Explanatory Variables

	Model 1: All Young People		**Model 2: Rural Young People**		**Model 3: Females Only**	
Predictors	**Un-standardised Coefficients (B)**	**Sig.**	**Un-standardised Coefficients (B)**	**Sig.**	**Un-standardised Coefficients (B)**	**Sig.**
(Constant)	3.893	0.000	2.232	0.000	2.639	0.000
Urban	0.145	0.013	N/A		0.330	0.000
Female	-0.840	0.000	N/A		N/A	
Province (Balochistan = reference)						
PUNJAB	0.219	0.023	0.090	0.392	0.368	0.002
SINDH	0.163	0.103	0.152	0.169	0.103	0.414
NWFP	-0.104	0.346	-0.170	0.156	-0.289	0.034
SES (High Socio-economic Status = reference)						
Low-SES	-1.556	0.000	-1.609	0.000	-1.933	0.000
Low Mid SES	-1.098	0.000	-1.098	0.000	-1.473	0.000
High Mid SES	-0.501	0.000	-0.432	0.000	-0.748	0.000
Exposure to other city etc.	0.411	0.000	0.652	0.000	0.286	0.000
Can go to school alone	0.761	0.000	1.377	0.000	0.654	0.000
Part in education decision	0.798	0.000	1.066	0.000	0.915	0.000
Part in work decision	0.266	0.000	0.250	0.000	0.212	0.000
Father is literate	0.594	0.000	N/A		N/A	0.000
Mother is literate	0.485	0.000	0.860	0.000	0.916	
Adjusted R^2	0.43		0.389		0.418	

Figure 1: Percentage Distribution of YDI Score by Region, Pakistan

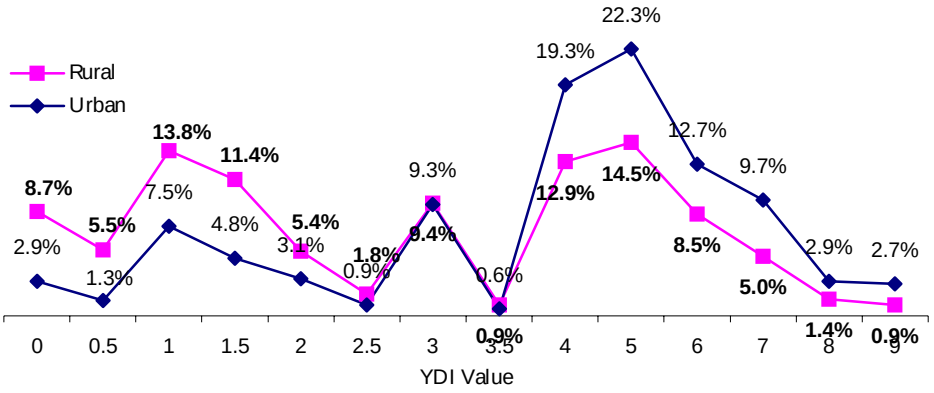
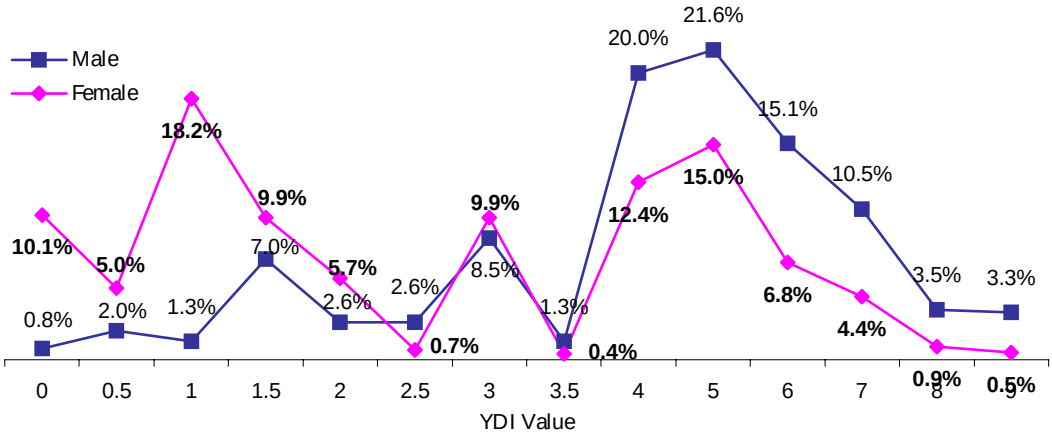


Figure 2: Percentage Distribution of YDI Score by Sex, Pakistan



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The Standard of Living in Pakistan --- Better or Worse?

Salman Ahmad*

In a democracy there is scarcely any public question of greater importance than the standard of living of the common people. It is essential to know the actual level of this standard of living, and whether it is improving or deteriorating. There can be two types of standards of living. One is the standard of living of the society as a whole, and the other is the standard of a group within the society. It is perfectly possible for the standard of the society as a whole to be improving, while that of one or more groups within the society is declining. Moreover, if the distribution of economic power in the society is very unequal, it may happen that the group, the standard of which is declining may constitute a very large proportion, even a majority, of the total population.

Our aim is to explore that standard of living of the average household (the wage earner), taking into account the following factors. First, indices of price levels are almost always based on the prices of articles most of which do not enter directly into the budget of the wage-earner's family. The increase in prices in recent years has affected different classes of commodities very differently, and that the commodities, the prices of which have fallen rapidly are those which belong to the category of luxuries, while those articles, the prices of which have risen at a rate greater than the average, are the necessities of life, which constitute the major part of the workingman's expenditure. Second, an index of wage levels is likely to be meaningless because of the extreme difficulty in arriving at anything like an average of wages.

Uncertainty as to the course of the standard of living of the wage-earner's family has been due to the lack of a basis of measurement, of a "yardstick", which would represent in actual commodities, the elements in the workingman's standard, and which could be applied, in connection with the prices of those commodities at different times and places, to test the relative level of the standard of living of different groups.

There are two elements in every standard of living—income and expenditure. As for income, in the case of the wage earner's family it consists primarily of wages. For practical purposes, the fluctuations in the

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wages of any class of workers represent the fluctuations in the income of the families in that class. The problem of expenditure is not so simple. The items included are numerous and varied, and not the same for any two families in any two years. Yet the yardstick demands that there be a definite list of commodities which enter into the budget of the average family, and constitute the major portion of its expenditure. The first step in this is to make such a list of commodities. This list will be divided into two main categories, necessities, and luxuries. The items included in the first category—food, clothing, shelter, heat and light—are fairly uniform for all families in a given working class. The task is to make a budget of necessities which will come as near as possible to representing the actual expenditure of the ordinary family. This is the standard budget. The next step is to determine the cost of this standard budget at two different times; then to deduct this cost from the total income of the family at each date. Finally, a comparison of the proportion of total income which remains to be expended for luxuries will indicate the relative levels of the two periods.

For the data, we have used the *Household Integrated Economic Survey* (1996-97) published in Sept. 1999. According to the Survey, the average monthly income per household totals Rs. 5770. The survey results indicate the percentage of consumption expenditure on necessities and luxuries. Table I shows the percentage and the costs involved.

Table -I:

Commodity Groups	Percentage	Total Cost
I. Necessities		
Food	49.31	2845.2
House Rent	13.07	754.1
Clothing	8.11	467.9
Fuel & Lighting	6.88	397.0
Total	77.37	4464.2
II. Luxuries	22.63	1305.8
Grand Total	100	5770.0

We have done another exercise to make a general estimate of the cost of specific items included in each of the four categories of necessities at 1996-97 prices. Table II shows the "standard" monthly budget of a "standard" family in the case of food.

Table-II: Monthly Household Expenditure and per Capita Consumption of Food Items

Commodity	Per Capita Monthly Consumption (kg)	Per cent	Cost (Rs.)
Wheat Flour	10.19	20.95	460
Rice	1.16	4.78	105
Pulses	0.73	3.69	81
Milk	7.32 litres	25.36	557
Butter	45.44 grams	1.64	36
Vegetable Ghee	1.29	10.43	229
Mutton	0.15	2.78	61
Beef	0.38	5.33	117
Chicken	0.16	1.91	42
Vegetables	5.33	12.66	278
Sugar	1.02	7.01	154
Tea	66.32 grams	3.46	76
TOTAL		100	2196

Since few unskilled wage-earners are home owners, the item of shelter for families of this class reduces to a question of rent. It is taken for granted that apartments will be weather proof, and sanitary according to prevailing standards. According to the survey, the average monthly expenditure per household in Pakistan is estimated at Rs. 677.

The clothing budget is even more difficult to prepare. It is impossible to see how any family can clothe itself in the amount allotted for that purpose. According to the Survey[1], the average monthly expenditure on Apparel, Textile and Footwear per household comes to Rs. 420. The distribution is as follows:

[1] p.346

Table-III:

	Items	%	Rs.
1.	Clothing and its accessories 227.39	54.14	227.39
2.	Readymade and second hand garments (durable) 55.99	13.33	55.99
3.	Tailoring services, etc 53.93	12.84	53.93
4.	Footwear (durable) 76.69	18.26	76.69
5.	Shoe repair services, etc. 6.0	01.43	6.0

There remains the matter of fuel and light. There are thirteen items. According to the Survey, average monthly expenditures per household are Rs. 356[2]. The distribution is given in Table IV. Firewood and electricity are the two most important items. Gas comes next, used for cooking.

Table-IV:

Sr. No.	Item	Percentage	Rs.
1	Firewood	30	106.89
2	Kerosene oil	5.7	20.30
3	Charcoal	.03	.09
4	Coal	.07	.25
5	Dung-cakes	5.46	19.47
6	Gas(Pipe)	7.86	28.01
7	Gas(Cylinder)	2.69	9.58
8	Electricity	35.92	127.99
9	Match Box	1.8	6.43
10	Candles	0.14	.50
11	Bagasse	0.34	1.14
12	Agri Waste	7.51	26.77
13	Electrical Items	2.48	8.83
	Total	100	356.28

[2] p. 351 & 366

The above discussion shows a standard budget of the necessities of life, as used by a workman's family with an income of Rs. 5770. The family could have bought the commodities listed, at the prices current at the stores with Rs.3649, and have 37% or Rs. 2121 left over for luxuries.

The next step is to see what exactly these same commodities would have cost under like conditions in 1993-94. The method employed in comparing prices between 1996-97 and 1993-94 is as follows: The cost in 1996-97 is divided by the index for 1996-97, giving the cost at the basic figure 100. This is then multiplied by the index for 1993-94, which gives the cost in 1993-94.

The Economic Survey shows combined consumer price index for 1996-97 at 189.18 and for 1993-94 at 135.14 with base 1990-91= 100. This shows that consumer prices increased by about 40 %. So the cost of these items in terms of 1993-94 prices comes to 2607. As regards the monthly income of a standard household, according to the *Household Integrated Economic Survey* was Rs. 3915 in 1993-94. In order to arrive at the final comparison of the standard of 1993-94 and 1996-96, it is necessary to subtract from the total income Rs.3915 the sum of Rs.2607, which covers the expenditures of the family in 1993-94. There remains a balance of Rs.1308 or 33% to be spent on luxuries.

It is evident, then, that on the basis of the test adopted at the outset—the relative proportion of total income leftover for luxuries, the working families of 1993-94 enjoyed a lower standard of living than those of 1996-97. It might perhaps seem, at first sight, in the light of what was said about the relatively larger increase in the prices of luxuries than of necessities, that the family in 1996-97 could purchase less in satisfaction of luxuries than the family in 1993-94 with its 33%. This may be true as the items of expense which are included under luxuries include outgo for doctors, medicine, dentistry, religion, education, saving, recreation, insurance, etc., items that are regarded as mere necessities by more well-to-do families, and with reference to which there is the probability that the cost has increased faster than average prices.

The writer is well aware that the foregoing data does not prove that the labourers's family was better off in 1996-96 than in 1993-94. Nothing statistical is proved if there is a single estimate, a single approximation, a single gap in the demonstration, a single chance of error. But he does believe that they furnish very strong evidence in support of the proposition.

It is probable that a more exhaustible study of prices actually current in 1993-94 might necessitate some minor modifications in various items of the budget. It does not seem possible that it would materially affect the general conclusions.

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Factors Influencing Girls' Primary Enrolment in Pakistan

Imran Ashraf Toor and Rizwana Parveen*

The target set in the National Policy on Education (1998-2010) for primary level enrolment is 90% of the children of age group of 5-9. This again was an achievable target, provided the available resources were efficiently used and programme interventions were made in a timely fashion. But during the last five years, it has not been implemented effectively and efficiently due to rapid population growth, insufficient political will, a period of undemocratic governance, and poor management of scarce resources. Women and girls have been most affected by these negative factors. The national literacy rate for females is only 35%, compared to 59% for males, and in certain status the female literacy, enrolment and achievement rates are much lower. There are many issues related to low enrolment of females such as poverty and economic issues, inadequate school infrastructure, gender bias in content and teaching and learning processes and poorly qualified teachers. The analysis of the study indicates that the age of the child, parents' schooling particularly the mother, income per capita of the household head and distance to school are relevant variables in explaining the probability of female enrolment at the primary school level.

JEL Classification: 122. 128 and 138

I. Introduction

Education is an essential tool for Human Resource Development and a necessary ingredient for sustainable socio-economic growth. The challenges of the 21st Century could be faced through identifying issues, developing strategies and operational programmes in the education sector. Education, especially female primary education helps reduce poverty by increasing the productivity of the poor, by reducing fertility and improving health, and by equipping people with the skills they need to participate fully in society.

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There are several reasons for the low levels of female enrolment in Pakistan, not the least of which is the high level of poverty. Over one-third of the population is estimated to be living below the poverty line (PIHS-2001-02)[1]. According to the new official poverty line, it is inferred that the incidence of poverty is higher in rural areas as compared to urban areas which are 38.7 and 22.4 respectively[2]. Although school attendance is subsidised, the costs of books, uniforms, and transportation to school can be too much to bear for poor families. Poor families are also more likely to keep girls at home to care for younger siblings or to work in family enterprises. If a family has to choose between educating a son or a daughter, because of financial restrictions, typically the son will be chosen. Negative parental attitudes toward educating daughters can also be a barrier to a girl's education. Many parents view educating sons as an investment because the sons will be responsible for caring for aging parents. On the other hand, parents may see the education of daughters as a waste of money because daughters will eventually live with their husbands' families, and the parents will not benefit directly from their education. Also, daughters with higher levels of education will in all likelihood have higher dowry expenses, as they will want a comparably educated husband. However, education sometimes lowers the dowry for a girl because it is viewed as an asset by the husband's family.

Another barrier to female education in Pakistan is the lack of adequate school facilities (PIHS 2000-01). Many rural areas simply do not have classrooms to accommodate all the school-age children. Furthermore, the classrooms that are available often lack basic necessities such as sanitary facilities or water. Lack of latrines can be particularly detrimental to girls' school attendance. Lack of female teachers is another potential barrier to girls' education. Girls are more likely to attend school and have higher academic achievement if they are taught by female teachers. Again there are differences among the provinces; the provinces with the highest literacy rates are also the provinces with the highest proportion of female teachers. Many parents, especially in large families with limited resources enroll boys in school instead of or before girls. According to the PIHS 2001-02, 17 percent of girls left school owing to lack of permission from their parents. Some parents also keep their daughters out of school due misinterpretation of the tenets of Islam. Sometimes, students are not motivated to become educated due to the lack of awareness about education (PIHS 2001-02).

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[1] *Pakistan Integrated Household Survey* (2001-02).
[2] *Economic Survey 2002-03*, Finance Division, Government of Pakistan.

II. Government Priorities for Gender Education

Gender disparity in primary and secondary education exists in Pakistan. Eliminating gender gaps in basic education/literacy is the cornerstone of the Government of Pakistan policy for social development in general and education in particular. The Ministry of Education has a policy framework in place to advance gender equality in its Education Sector Reforms (ESR) and Education For All (EFA) Programmes. Diverse programmes and strategies have been developed, ranging from compensatory programmes such as stipends at the middle and secondary levels, free textbooks and school nutrition support to girls' schools. Initiatives in Public Private Partnerships such as the school up-gradation programme in the afternoons has resulted in a higher coverage for girls at middle, secondary and higher secondary levels. Of the 6240 schools upgraded in the Punjab province and NWFP province, 3787 or 60.8% are girls schools, and 18% are mixed schools.[3] The programme is an outstanding example of addressing gender equity in Pakistan for non-elite groups. In the NWFP province, of the total 93 upgraded institutions, 80% are girls and mixed schools. Furthermore all 50% development allocations are being provided to girls schools. It is estimated that during 2002-03 female gross participation rate at the Primary level will increase from 72% to 76%.

The rest of the paper is organised as follows: Section III presents the literature review. Section IV illustrates the specifications of a model of child schooling and Section V discusses data sources. Section VI is devoted to a discussion of the results. The final section provides the principal findings and policy recommendations.

III. Literature Review

There is a vast literature on primary education in LDCs which seeks to find the importance of primary education and the importance of primary schooling as an input to the social and economic progress of poor countries.[4] The relative importance of school supply versus household demand factors remains controversial, with serious implications for education policy [Simmons and Alexander (1978)]. There have been several papers which look at the household demand for schooling (Deolalikar, 1993; Tansel, 1993: Sather and Lloyd, 1993; Singh, 1992), due in part to the increasing number of household surveys available in developing countries.

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[3] *Economic Survey 2002-03*, Finance Division, Government of Pakistan

[4] Within the overall policy goal of raising primary school enrolment, raising girls' enrolment has received special attention, due to the large positive externalities of female education on children and adult health, fertility and infant mortality.

Many studies of the determinants of school enrolment exist for Pakistan, but they are hardly comparable because of wide differences in data and methodology. Some authors are content with cross-tabulation while others use more sophisticated probit or logit models. Chishti and Lodhi (1988) reveal that the decision to attend school depends on the gender of the potential student, household income, parents' education, and ethnic background. Hamid (1993) uses cross-tabulation to study the distribution of households sending their children to school from various variables of interest such as household income, household heads' profession, education, and gender. Sathar and Lloyd (1994) find that children with educated parents and higher household consumption level attend primary school, though their chances in rural areas are improved with availability of girls-only public schools within a distance of one kilometer.

Burney and Irfan (1991, 1995) included a community variable which is a salient feature of their studies as compared to other studies which are conducted in this area. They found a positive and significant relationship between village literacy level and school enrolment. Alderman *et al.* (1996) present some probit estimates for school attendance in Pakistan. They find that travel to school and book costs are important influences on the decision to start schooling. Other variables that figure in their school attendance of middle school, a quadratic in age, and square of a measure of preschool ability.

The present study is focused only on female primary school enrolment in Pakistan. It provides inter-region and inter-provincial analysis. Two main questions are addressed in this study: (1) what is the role of family background variables such as income and parental education in the demand for female education? (2) Are household factors affecting education different for region and province for females? These questions are motivated by the particular social and economic environment in the country. This persistent inequality in the face of the historic commitment to public education raises the important question of the impact of education in enhancing social mobility in Pakistan. Moreover, the provincial governments have recently introduced 'cost-sharing' in its primary education policy which has aimed to target the poor and deprived areas. There is a gap between male and female enrolment in Pakistan, which increases by age group. It is therefore of special interest to separately investigate and compare the determinants of schooling demand for girls.

IV. Model And Empirical Approach

A. Theoretical Model

Parents' decision to educate their children, or invest in human capital formation, has often been analysed in a Chicago-Columbia framework.[5] Therefore, the demand for children's education can be derived from a Becker-Lewis model of household production where it is assumed that parents or elders make decisions regarding child schooling. A simple version of the household's problem is to maximise

$$U(X,Z) \qquad (1)$$

Subject to

$$P_x \cdot X + W \cdot L = W \cdot T + Y \qquad (2)$$

and

$$Z = Z(X, t; \Omega) \qquad (3)$$

In this framework household utility (1) is maximised over market (X) and non-market (Z) goods, subject to a full income constraint (2) and a household production function for non-market goods (3). Inputs to the production function are time (t) and market goods, as well as an efficiency parameter (Ω) which depends on factors such as the ability or experience of household workers, access to complementary public inputs and so on. Market goods are purchased at price P_x household time endowment is T, unearned income is Y, the wage rate is W and leisure consumption L.

The outcomes measured in this study are Z-goods, and solving the household problem yields demand functions that relate the optimal level of their consumption to the exogenous variables: prices, unearned income, household efficiency (Ω) and preferences. We use this framework to guide the choice of explanatory variables - thus the demand for schooling will be an increasing function of the perceived benefits of schooling, and a decreasing function of its costs (both direct and opportunity costs). Household characteristics that increase the costs (or decrease the benefits) of educating a child will lower the household demand for education.

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[5] For details, the readers are referred to Becker and Lewis (1973); Becker and Tomes (1976) and DeTary (1973).

In this framework, parents' education and socio-economic status are considered to have a significant impact on child schooling. For example, in many empirical studies, the mother's schooling is found to be positively associated with child schooling in the market and household activities.[6] Within the Chicago-Columbia framework, much of the work on child schooling has been done in the context of fertility behaviour. A few researchers, however, have also attempted to analyse child schooling per se. The studies by King and Lillard (9183) and DeTary and Rindfuss (1983) are some of the examples.

B. Empirical Approach

The outcome representing the demand for education is considered in this study. We analyse the probability of currently enrolled females in primary school. The dependent variable is dichotomous, so the logistic function is used to fit the data.

There are two categories of independent variables - individual specific and household specific. The former include age and its square. The age variable reports the age of the girl which is 5-10 years. The other variables are parent's education, while the latter are gender of household head, number of residents 0-5 years age in the house, number of resident 5-10 years age in the house, two regional dummies (region and province), distance to school which represents the time cost of school attendance, and (log of) total per capita household expenditure, persons per room and electricity in the house. All regressions are estimated separately for females by region and province wise.

V. Data Description

The data used in the estimation come from the fourth round of the *Pakistan Integrated Household Survey* 2001-02 (PIHS). The PIHS survey consists of about 16,182 households. This survey is stratified by province (Punjab, Sindh, NWFP and Balochistan) and by region urban/rural area. Households residing in different parts of the country have been selected for the PIHS survey using the stratified sampling technique. In order to derive representative statistics for each of the provinces, as well as for the country as a whole, raising factors are applied. These raising factors take into account the sampling strategy adopted in the survey and weigh each household by a factor that is inversely proportional to its probability of selection. There is detailed information on the educational status of

[6] In the alternative 'Pennsylvanian' model, this is interpreted to reflect an inter-generational effect rather than the productivty effect of educated parents. This implies that the parents' schooling in the Pennsylvanian model does not have as large a productivity effect as in the Chicago-Columbia framework.

each household member over five years old, which is merged with the household roster, consumption, and community modules to get the necessary information for the analysis. Variable means for the sample are reported in Table 1.

Table-1: Mean and Standard Deviation of the Variables

Variables	Mean	Std.
Current enrolment	0.445	0.497
Female share in population	0.491	0.500
Age in years	7.450	1.700
Age squared	58.448	25.740
Father's education	3.562	4.774
Mother's education	2.394	6.687
Female Headed Household	0.064	0.245
No. of residents 0-5 year olds	1.970	1.660
No. of residents 5-10 years olds	2.75	1.390
Distance to school (km)	1.305	0.685
Log per capita expenditure	8.820	0.555
Persons per room	4.457	2.402
Electricity in the house	0.643	0.479

Source: *Pakistan Integrated Household Survey 2001-02.*

VI. Regression Results

The regression results consisted of two parts. In the first part, we discussed the inter-regional analysis of girls' enrolment in Pakistan. The last part is based on inter-provincial analysis.

A. Regional Impact on Female Enrolment

Does the impact of family background represent largely unobserved regional level heterogeneity? Table-2 presents the logistic estimation results of enrolment for females. Households in the urban areas are more flexible in choosing government or private schools for girls' schooling as compared to the households that are in rural areas. When we analysed girls' enrolment in urban and rural areas, we observed that the mother's education was more important as compared to the father's education in both areas. Children whose mothers had more years of schooling had more enrolment than children whose mothers were less educated. Children of educated mothers were more likely to be continuing their education. The results also reflect that mother's education is more important for girls' primary enrolment in rural areas as compared to urban areas. This confirmed the previous study conducted by Handa (1996).

Per capita expenditure has a positive and significant coefficient. This trend shows that a positive correlation exited between girls' enrolment and per capita expenditure. Arif *et al.* (1999) also proofed this relationship using the *Pakistan Socio Economic Survey* (PSES) data set.

To see how girls' enrolment is affected by the household demographic composition, we add two variables to the model: the number of children five years old or younger, and the number of children aged 5-10 year residing in the household. The coefficient on the latter will tell us to what degree households make a 'quality-quantity' trade-off in the schooling decision. Naturally both these variables are endogenous,[7] so their coefficient estimates should be interpreted as strict partial correlation coefficients without any implication of causality. Numbers of children aged 0-5 and the number of children aged 5-10 have higher elasticities in urban areas as compared to rural areas.

The variable 'persons per room' describes the conjunction in the house and it is related to poverty. Poor families have more conjunction in the house as compared to rich families. This conjunction can add immeasurably to the discomfort and inconvenience in the house. So hypothetically it has a negative relationship with female enrolment. It has a significant sign in this study according to the hypothesis in both areas. The rate of incidence of poverty is higher in rural areas as compared to the urban areas;[8] so housing infrastructure is poor in rural areas which is reflected in this study. Electricity in the house has a positive relationship with enrolment in both time periods. It has a higher magnitude in the rural areas, which shows that in areas where electricity is available there is more enrolment as compared to those areas where electricity does not yet exist. Electricity in the house provides a comfortable environment for education. Students can use better lighting for study and can use a fan in the summer season to lengthen their study hours.

[7] We do not have any instruments to try and correct for this problem.
[8] *Economic Survey 2002-03*, Finance Division, Government of Pakistan

Table-2: Logistic Coefficient for Female Enrolment By Region

	Urban Area			Rural Area		
Variables	**Coefficient**	**t-test**	**Elasticities**	**Coefficient**	**t-test**	**Elasticities**
Constant	-18.738	13.89	-	-12.543	13.69	
Age in years	3.532	12.47*	0.843	2.626	12.23*	0.596
Age squared	-0.202	11.08*	-0.048	-0.150	10.89*	-0.034
Father's education	0.086	8.76*	0.021	0.108	13.71*	0.024
Mother's education	0.085	6.36*	0.020	0.139	6.82*	0.032
Female Head Household	0.356	1.43	0.085	0.888	4.38*	0.201
No. of residents 0-5 year olds	0.067	1.49	0.016	0.013	0.43	0.003
No. of residents 5-10 years olds	-0.118	2.55**	-0.028	-0.039	1.05	-0.009
Distance to school (km)	-0.344	5.46*	-0.082	-0.515	9.58*	-0.117
Log per capita expenditure	0.420	4.97*	0.100	0.093	2.15**	0.021
Persons per room	-0.045	2.27**	-0.011	-0.054	3.95*	-0.012
Electricity in the house	0.820	5.63*	0.196	1.016	14.64*	0.230
Total Observations	2992			5872		
LR-Test	3083.43			6265.40		
R^2	0.26			0.21		

*Note: t-test. (*1% and **5 % significance)*

Another important variable is distance to school which has a negative relationship with enrolment in both areas, it has a higher coefficient in rural areas. Children travel to and from their primary schools, even in rural areas, most travel less than 2 km and very few travel more than 5 km. Girls have to travel long distances to school particularly in the Balochistan and Sindh provinces, where the distances involved would be expected to represent a substantial barrier to access.[9] This exhibits that school facilities are very poor and out of the access of poor people in rural areas. This is very obvious when the question of rural urban disparity arises. In Pakistan, it is frequently found that school facilities are mostly urban based, particularly in the private sector and rural areas are often taken for granted with respect to the government schools and hence are deprived of their basic rights.

B. Inter-Provincial Differences in Female Enrolment

Inter-provincial differences in enrolment are displayed in Table-3. Inter-provincial analysis has importance for girls' enrolment because the analysis provides us the provincial differences in female primary education. According to estimates, father and mother's education is an important factor in all provinces. The father's education is more important in the Punjab province because the elasticity of this variable is higher in this province as compared to the other provinces. Mother's education has higher elasticity in the NWFP province and the least elasticity in Sindh province.

Table-3: Inter-Provincial Elasticities •

Variables	Punjab	Sindh	NWFP	Balochistan
Constant	-	-	-	-
Age in years	0.819	0.520	0.863	0.456
Age squared	-0.047	-0.030	-0.049	-0.026
Father's education	0.027	0.020	0.025	0.019
Mother's education	0.023	0.016	0.028	0.024
Female Headed Households	0.187	0.271	0.077	0.155
No. of residents 0-5 year olds	0.011	0.011	0.007	0.005
No. of residents 5-10 years olds	-0.016	-0.002	-0.018	0.004
Distance to school (km)	-0.141	-0.246	-0.043	-0.114
Log per capita expenditure	0.092	0.101	0.064	0.003
Persons per room	-0.018	-0.010	-0.008	-0.003
Electricity in the house	0.261	0.180	0.194	0.180

Source: Appendix Table A-1 to A-4 • See Appendix-B

[9] *Pakistan Integrated Household Survey 2001-02.*

The distance to school is significant in all provinces. The elasticity of this variable is higher in the Sindh Province and the lowest in Balochistan Province. This shows that in the Sindh province school facilities are not near to the residence of the people. Similarly, per capita expenditure has higher elasticity in the Sindh province as compared to the other provinces. This trend shows that poverty and enrolment has a positive relationship in this province as compared to the other provinces.

Another important variable 'female headed household' has the highest elasticity in Sindh province which illustrates that a woman who is a head of a household has more influence in the Sindh province for girls' enrolment. The variables persons per room and electricity in the house have higher elasticities in Punjab province as compared to other provinces. This shows that population conjunction has effectiveness in this province. Likewise electricity also has importance due to the provision of better environment in the house for education.

There are also other multiple factors that may cause changes in female enrolment. However, it is plausible to argue that demand side factors, in the case of Pakistan, are mainly responsible for these changes during the last decade. The following hypotheses or suppositions may illustrate the increasing enrolment of girls. Household's human and physical assets and changes in its income significantly affect children's education patterns. Serious supply-side constraints on village girls' primary education suggest the importance of supply-side policy interventions in Pakistan's rural primary education—for example, providing more girls' primary schools close to villages and employing more female teachers. Advocacy for recruitment of a quota of female teachers in rural areas. Social mobilisation campaigns for girls' education in rural areas through television and radio, *Imam* (religious leader) and interpersonal communication. Technical support of the Ministry of Education and the Textbook Printing Press to review the storage and distribution system, and to suggest improvements.

VII. Conclusions And Policy Implications

Education has a positive impact on individual earnings and also yields substantial externalities: parents' education and mother's literacy and education are associated with low infant mortality rates, higher enrolment and achievement rates of children and less gender differences in enrolment of children. There are also significant differences across provinces with decline in enrolment in Sindh and Balochistan in public sector education. To increase girls' primary school enrolment is a major development imperative, although the interventions that can best raise enrolment are not always straightforward.

This paper evaluates the relative importance of supply and demand side factors in determining girls' primary school enrolment.

Socioeconomic background is an important determinant of the demand for primary schooling in Pakistan, and an even more important determinant of enrolment in primary school for girls. School supply also plays a role in influencing enrolment- girls from rural regions or those who live farther away from school are less likely to be enrolled. There are important differences in the demand for schooling by gender. School availability also has a significant impact on enrolment rates. Reducing the travel distance to the nearest school will increase the enrolment rate. Construction of a village will increase enrolment more among poorer households. For enrolment, mother's and father's education is also important for females. Similarly, household income has a much bigger effect on the probability of enrolment.

Despite this awareness, major challenges remain to increase access to education, to improve quality, and to commit resources for the education system to keep pace with the economic structure will most likely hinder Pakistan's economic prosperity. Conversely, timely reforms can pay off in terms of economic growth and poverty reduction, as is evident from the experience of East Asian countries which have generally invested heavily in basic human capital, both male and female.

Having taken steps to ensure that all children can go to school, the government, with help from donor agencies such as UNESCO and UNICEF, must devote equal attention to ensuring that all children can learn. Trained, well-paid teachers, reasonable class sizes, adequate hours of instruction, supplies of books and materials, a child-friendly learning environment and strong mechanisms for community oversight of local schools: these are not just optional add-ons, they are the fundamental ingredients of the process known as "education". Running a school without these essentials is like trying to run a hospital without medicines or doctors. Yet many cash-strapped districts are trying to do exactly that; so it is hardly surprising that they suffer from high drop-out and repetition rates, which eat further into their budgets. National education plans must therefore include priority action to improve and monitor the quality of teaching and learning, especially in the most disadvantaged communities and worst-performing schools, which have often suffered decades of neglect and underinvestment. Special priority must at least triple, and aid to basic education in Pakistan must increase manifold, in order to achieve this goal.

Appendix-A:

Table-A-1: Logistic Coefficient for Female Enrolment (Punjab Province)

Variables	Coefficient	t-test	Elasticities
Constant	-17.257	14.39	
Age in years	3.332	11.96*	0.819
Age squared	-0.191	10.62*	-0.047
Father's education	0.110	9.79*	0.027
Mother's education	0.092	5.49*	0.023
Female Headed Household	0.759	3.39*	0.187
No. of residents 0-5 year olds	0.046	1.00	0.011
No. of residents 5-10 years olds	-0.067	1.37	-0.016
Distance to school (km)	-0.573	8.85*	-0.141
Log per capita expenditure	0.375	6.07*	0.092
Persons per room	-0.073	3.79*	-0.018
Electricity in the house	1.063	10.38*	0.261
Total Observations	3292		
LR-Test	3438.90		
R^2	0.30		

*Note: t-test. (*1% and **5 % significance)*

Table-A-2: Logistic Coefficient for Female Enrolment (Sindh Province)

Variables	Coefficient	t-test	Elasticities
Constant	-15.037	9.61	-
Age in years	2.577	7.96*	0.520
Age squared	-0.149	7.07*	-0.030
Father's education	0.098	8.60*	0.020
Mother's education	0.077	4.21*	0.016
Female Headed Household	1.341	3.02*	0.271
No. of residents 0-5 year olds	0.056	1.08	0.011
No. of residents 5-10 years olds	-0.008	0.14	-0.002
Distance to school (km)	-1.218	8.97*	-0.246
Log per capita expenditure	0.500	5.03*	0.101
Persons per room	-0.051	2.58*	-0.010
Electricity in the house	0.890	7.84*	0.180
Total Observations	2472		
LR-Test	3090.58		
R^2	0.27		

*Note: t-test. (*1% and **5 % significance)*

Table-A-4: Logistic Coefficient for Female Enrolment (NWFP)

Variables	Coefficient	t-test	Elasticities
Constant	-19.376	10.42	-
Age in years	3.816	8.77*	0.863
Age squared	-0.218	7.91*	-0.049
Father's education	0.110	7.52*	0.025
Mother's education	0.123	3.50*	0.028
Female Headed Household	0.339	1.07	0.077
No. of residents 0-5 year olds	0.030	0.55	0.007
No. of residents 5-10 years olds	-0.081	1.36	-0.018
Distance to school (km)	-0.190	3.15*	-0.043
Log per capita expenditure	0.282	3.45*	0.064
Persons per room	-0.037	1.24	-0.008
Electricity in the house	0.857	5.35*	0.194
Total Observations	1641		
LR-Test	1809.44		
R^2	0.25		

*Note: t-test. (*1% and **5 % significance)*

Table-A-4: Logistic Coefficient for Female Enrolment (Balochistan Province)

Variables	Coefficient	t-test	Elasticities
Constant	-11.871	6.02	-
Age in years	2.449	5.44*	0.456
Age squared	-0.138	4.79*	-0.026
Father's education	0.104	7.61*	0.019
Mother's education	0.127	3.82*	0.024
Female Headed Household	0.832	1.18	0.155
No. of residents 0-5 year olds	0.026	0.37	0.005
No. of residents 5-10 years olds	0.020	0.28	0.004
Distance to school (km)	-0.611	3.84	-0.114
Log per capita expenditure	0.017	0.17	0.003
Persons per room	-0.014	0.39	-0.003
Electricity in the house	0.969	6.33*	0.180
Total Observations	1459		
LR-Test	1544.81		
R^2	0.20		

*Note: t-test. (*1% and **5 % significance)*

Appendix-B:

The derivation of the elasticities used in Table-2 and Table-3.

$$L = \ln(\frac{Pi}{1- Pi}) = \hat{\beta_0} + \hat{\beta_1} X$$

$$\hat{\beta_1} = \frac{dL}{dX}$$

$$\hat{\beta_1} = \frac{d}{dX}[\ln(\frac{Pi}{1- Pi})]$$

$$\hat{\beta_1} = \frac{1}{[\frac{Pi}{(1- Pi)}]}[\frac{\frac{dPi}{dX}(1- Pi) - Pi(\frac{-dPi}{dX})}{(1- Pi)^2}]$$

$$\hat{\beta_1} = \frac{1}{Pi(1- Pi)}.(\frac{dP}{dX}.\{1- Pi + Pi\})$$

$$\hat{\beta_1} = \frac{1}{Pi(1- Pi)}.(\frac{dP}{dX})$$

$$\frac{dP}{dX} = \hat{\beta_1} Pi(1- Pi)$$

$$Elasticity = \frac{dP}{dX}.\frac{X}{P}$$

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Book Review

Pro-Poor Growth and Governance in South Asia: Decentralization and Participatory Development, Edited by Poona Wignaraja and Susil Sirivardana, Published by SAGE Publications, New Delhi/ Thousand Oaks/ London, 2004; ISBN: 81-7829-257-0 (India – Hb) pps 459.

In the Forward of this book, Gowher Rizvi states that the present volume makes its particular contribution in recognising that the governance agenda, with an emphasis on participatory development, can be combined with systematic decentralisation of power and resources to the grassroots in order to lay the basis for sustained poverty reduction. The key to this process is community mobilisation through social movements and non-governmental development organisations that can catalyse changes in the conditions of the poor. He goes on to say, "Decentralization without social mobilization creates scope for vested local interests to monopolize power and resources to their advantage". Also, Rizvi underlines the fact that social movements and organisations representing the poor can challenge the monopolisation of power and resources by officials and politically dominant groups and affect lasting social change and devolution of resources in a manner that is both democratic and reduces poverty.

This book probes some of the positive elements on which a manageable national and regional social transition in South Asia can be built, and identifies ways in which people and states are attempting to re-connect with South Asia's 'civilisational rhymes', using those positive elements. The book builds on three positive core elements that have emerged so far. They are:

i. The efficiency of the poor, whose creativity can contribute directly to pro-poor growth, through an accumulation process where the pattern of growth, human development and equity are not trade-offs. The strategic option is based on a different pattern of growth, and not on re-distributive justice, which starts with the poor as subjects, not merely labourers or objects.

ii. The attempt at re-orientating decentralisation reforms, in relation to participatory development and democracy. What is called for is devolution not merely decentralisation.

iii. The holistic approach and paradigm shift involved in cost effectively eradicating the worst forms of poverty, which can be a catalyst for good governance and help mediate the antagonistic contradictions, through this holistic strategic approach, in a given time frame.

The analysis and conclusions in this book are completely different from conventional thinking and action on development and democracy and can help close major gaps in the intellectual discourse, as well as give greater coherence to micro-macro policy and practice. This kind of interdisciplinary macro-micro analysis does not currently exist.

Part I of the book has a brief introduction and conceptual framework. Part II consists of six case studies selected from locations in India (Kerala and Gujarat), Pakistan, Sri Lanka, Bangladesh and Nepal, that demonstrate different models but with commonalities and differences of the link between pro-poor growth, decentralisation reforms and poverty eradication, which can lead to good governance process and practices. These cases cover both rural and urban experiences. All the essays show a movement towards the participatory paradigm and the establishment of innovative partnerships among political and development actors. Part III draws some critical lessons from these illustrative cases for value driven macro-micro policy, which can support and re-enforce the processes and practices, both short-term and long-term, which are being rooted on the ground. In the concluding part of this book, the key lessons for macro and micro policy have been "unambiguously" drawn. It is to enhance the understanding of some of these critical elements in the alternative paradigm of good governance and pro-poor growth-oriented poverty eradication that the authors have probed the link between decentralisation reforms and pro-poor growth in six socio-political locations in five South Asian countries. In the case studies an attempt has been made to go beyond decentralisation as such, and look at attempts at real devolution and empowerment of the poor and to go beyond welfare, delivery and redistributive justice to a more sustainable transitional pro-poor growth strategy and also see the linkages between the two. These core macro-micro policy options articulate the paradigm shift and a new South Asian school of thought.

Among the lessons for macro policy are:

1. A paradigm shift to participatory development and democracy is possible;

2. Integrating pro-poor growth and decentralisation reforms are important - decentralisation by itself is not sufficient;

3. It is important to build new partnerships and to carve a new social contract - a partnership for self reliance;

Among the micro policy lessons are:

4. It is important to build sustainable organisations of the poor as a core methodology of rigorous social mobilisation;

5. It is important to have pro-poor growth and a new accumulation process at the local level and welfare alone is not sufficient - this should include efficiency of the poor as a basis for pro-poor growth and should include a new accumulation process which is aimed at the poor;

6. It is important to strategise in order to meet the challenge of transforming the base from dependence to self-reliance - notably, women led pro-poor growth is more self-reliant.

The editors sum up the conclusion with, "The conclusion is inescapable that these lessons for policy in strategising to meet the challenge of eradication of the worst forms of poverty transforming the base of society are compelling. The experimental and material basis for it is in place". They go on to state, "The process can be further deepened by continuously probing the reality, raising the consciousness of the poor, putting in place supportive macro framework conditions, and identifying further feasible macro-micro policy choices".

The book makes interesting and intensive reading. The case studies are an insight to how pro-poor empowerment works and is sustainable in different communities in different South Asian countries. Apart from being a wonderful attempt in cooperation between South Asian writers, economists and thinkers, it is also a very good and brave attempt to give a new mode of thinking for pro-poor growth that is sustainable. The words "pro-poor growth and no welfare" and "macro-micro policy" are used very efficiently and appropriately in the background of the case studies and give a brave direction on the part of the authors for future development thinkers on how to go about governance, growth and policy which is not only pro-poor but also poor-led and is sustainable in the South Asian context. Much of the book is also material for academic debate and therefore also a step in the right direction.

Government College University, Lahore **Qais Aslam**

Book Review

Nurul Islam, *Exploration in Development Issues, Selected Articles of Nurul Islam*, International Food Policy Research Institute, Washington DC, Ashgate Publishing Limited, Hants, England and Ashgate Publishing Company, Burlington, USA, 2003, ISBN 0 7546 15952, pp 568, Price not mentioned.

This collection of articles by a veritable stalwart in the field of economics, covers almost the entire spectrum of development issues ranging from Food Supply, Agriculture and the State, International Trade, Economic Assistance and Economic Policy. It is a book decidedly not for the uninitiated and to both comprehend and enjoy the work one has to have a certain devotion to the subject and perhaps even a modicum of passion for the same.

The articles span a period of about four decades of the author's chequered and illustrious career. Starting as a professor at Dhaka University, Islam became the pioneer head of the Pakistan Institute of Development Economics in the then East and West Pakistan. Then he went on to head the economic and social policy department of the Food and Agricultural Organization (FAO) of the United Nations. His most recent assignment has been that of adviser at the International Food Policy Research Institute (IFPRI), a period in which he penned most of his articles on food security.

Given that the articles were written over a relatively lengthy period of time, development thinking on various issues has undergone considerable modification and change and this, to an extent is reflected in these writings. In the main the articles are policy-oriented, reflecting the nuances in the debates, thinking and research. The contents themselves are not simply a re-hash of what has been said before, but Islam gives his own astute insights here and there into the various permutations and combinations of theories and concepts.

The section on development policy includes two concepts in development economics, namely surplus labour and balanced growth, concepts that were very much in vogue in the earlier years of development thinking. The author then goes on to discuss long term development plans for individual developing countries, including their implementation. The chapter on plan implementation specifically discusses the medium term plan in Bangladesh in the early 1970s and the

problems and obstacles in implementation that arose therefrom. The author also makes passing historical reference to the days when planning as a policy tool was popular to the era of deregulation and privatisation when planning became the ***bete noire*** of economic policy makers. The last subsection goes beyond considerations of economic growth, delving into the questions of income distribution and poverty. Also discussed are the merits and demerits of open versus closed economy, as well as the pace and sequence of adjustment to and integration with the process of globalisation.

The chapter on inward looking strategies is in essence a detailed historical perspective on the strategy of import substitution, its evolution, causes, consequences and the subsequent modification and rejection of the strategy. While the early stages of industrialisation necessitated the substitution of imports, the idea that the country should focus on sectors and industries where it enjoyed long run comparative advantage gained increasing popularity. With the passage of time, import substitution industries, the author points out, when based on comparative advantage succeeded in entering the export market. Such issues have an added bearing and relevance today when developing countries are actively pursuing policies of structural adjustment, the current buzzword in the lexicon of development.

The chapter on East Asia discusses threadbare the characteristics and causes of the so-called Asian Miracle. Also presented in this chapter are a few lessons for South Asia and it is Islam's contention that developing countries in the present day and age encounter new constraints on their freedom of action, and hence he questions whether it is at all possible for developing countries to replicate those policies in totality even if they so desired.

The author aptly puts it that `The pendulum in development thinking, after swinging from one extreme to the other, tends to settle in the middle, at least for some time'. To substantiate this statement, Islam cites the example of mainstream economists who seem to be adopting a more balanced view of the state and the market, virtually discarding a total dependence and free play of market forces that was ***a la mode*** in the 1980s and 1990s.

Yet another pearl of wisdom that Islam offers the reader and worth quoting is: `The process of development is not always smooth or stable; nor is it necessarily or universally peaceful. There are occasional disruptions and dislocations; the chances are that they are less traumatic and destabilizing in

an open, democratic, pluralistic and decentralized system than in an authoritarian one. Compromises are more likely in a democratic system with a high probability that disruptions are minimized'. (p 9)

The chapter on `Reflections on Development Perspectives since the 1960s' is inherently valuable and relevant in itself. The author examines the interrelationship between growth, equity and poverty, and questions such propositions such as whether growth leads to inequality, whether attempts to redistribute assets or strive for greater equity stifle growth, and more pertinently in the context of today's Pakistan whether the proposition that growth `first' and equity and poverty alleviation `later' are feasible in the real world.

Food security, a concept and concern having considerable importance in development literature right from its inception is discussed next in its broad sense. The author extrapolates food demand into the future, discusses policy reforms in agriculture, the access of households to food and the twin problems of under nourishment and poverty and last but not least, the variability in food supplies and prices, their implications and ways of tackling them.

The issues discussed in the chapter on trade include the rapidly expanding trade in intermediate inputs, the role of strategic trade intervention in seeking a large market share and the impact of multinationals that procure inputs from sources distributed worldwide as well as sell outputs in the world market. Implications for trade policy of such issues is also touched upon. As concerns the chapter on aid, it makes for interesting reading since the current debates surrounding the aid phenomena are presented. For instance whether aid is limited in its effectiveness, the problem of donor fatigue, the inadequate impact of aid on growth, whether like structural adjustment `aid conditionality' is interference by the donors in the domestic economy, and how acceptable or otherwise this is, and the alternative of self-help and policy reforms/improvement in the recipient countries.

Islam talks about the Bangladesh experience in the early 1970s concerning economic policy reform and the IMF and here he gives some precious insights into the overall effects of devaluation being delayed to early 1995 rather than in October 1974, and the negotiations with the IMF and consequences for the economy resulting from this.

The book is undoubtedly a classic in the true sense of the word for those in the economics profession. The style is impeccable and quite

apparently written by a person with profound intellect and a deep grasp of the issues. I, for one cannot fault it on any count.

Lahore School of Economics **Nina Gera**
Lahore

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