Demand for Public Health Care in Pakistan

ATHER H. AKBARI, WIMAL RANKADUWA, and ADIQA K. KIANI

A health care demand model is estimated for each province in Pakistan to explain the outpatient visits to government hospitals over the period 1989–2006. The explanatory variables include the number of government hospitals per capita, doctors' fee per visit at a private clinic, income per capita, the average price of medicine and the number of outpatient visits per capita in the previous period. All variables are significant determinants of the demand for health care in at least one province but their signs, magnitudes and the levels of significance vary. These variations may be attributed to cultural, social and religious factors that vary across provinces. Variations in health care quality offered at public hospitals may also be a factor. These factors and improved accessibility of health care facilities should be the focus of public policy aimed at increasing the usage of public sector health care facilities in Pakistan.

I. INTRODUCTION

Governments in many developed and developing countries intervene in health care markets due to large positive externalities whose presence renders the provision of health care by the private sector insufficient. However, private health care provision has been growing in low and middle income countries [Aljunid (1995); Swan and Zwi (1997)]. Shorter waiting time, better access, greater confidentiality, and greater sensitivity to patients' needs by private providers are among the major reasons cited in literature [Lönnroth, Tran, Thuong, Quy, and Diwan (2001)].

The growing reliance on private sector for health services in developing countries has raised concern among some health policy analysts who view the quality of care offered by many private providers to be poor [Brugha and Zwi (1998)]. Poor people spend a greater proportion of their income on health care than do the rich, often using less qualified or totally untrained private providers. Despite this concern, and the lack of usage of public health care services, very few studies in health economics literature have focused on estimating the effects of economic and non-economic factors on demand for public health care in developing countries. Such an analysis is necessary for an appropriate policy response to rising health care usage in the private sector if the social objectives of health care policy are to be met. Rising income inequality is another reason

Ather H. Akbari <ather.akbari@smu.ca> is Professor of Economics, Saint Mary's University, Halifax, Canada. Wimal Rankaduwa <wrankaduwa@upei.ca> is Professor of Economics, University of Prince Edward Island, Canada. Adiqa K. Kiani <adiqakiani@fuuastisb.edu.pk> is Assistant Professor of Economics, Federal Urdu University of Arts, Science and Technology, Pakistan

for justifying such an analysis. The present paper attempts to fill in the gap in empirical demand analysis of health care in developing countries by estimating a demand function for public health care in Pakistan. The demographic transition of Pakistani population is expected to result in a growing percentage of its elderly population [Durr-e-Nayab (2008)]. Hence, demand for health care is expected to grow in this country in the next few decades which provides further impetus for studying the demand for health care in Pakistan.

Pakistan has a population of about 176 million people who comprise six major ethnic groups including Punjabi 44.68 percent, Pashtun (Pathan) 15.42 percent, Sindhi 14.1 percent, Sariaki 8.38 percent, Muhagirs 7.57 percent, and Balochi 3.57 percent [Central Intelligence Agency (2009)]. Punjabis and Sariakis are mostly found in the Punjab province, Sindhis and Muhajirs in Sindh, Pashtuns in Khyber Pakhtunkhwa (formerly NWFP) and Balochis in Balochistan. In addition, Khyber Pakhtunkhwa has been home to Afghan refugees for the past 30 years and about 1.7 million Afghan refugees were living there in 2009. This ethnic distribution of Pakistani population has contributed to a diverse set of cultural practices which may also reflect in the usage of health care services. Cultural, as well as religious norms, often determine if and when health care is sought by patients.[1] It is difficult to quantify the impact of cultural and religious norms in a health demand estimation. Hence, we estimate the health demand model separately for each province.[2]

The paper is organised as follows. Section II presents a brief overview of the current health care system in Pakistan. Section III presents the health demand model and discusses the data used in its estimation. Section IV presents the econometric analysis while Section V discusses its results. Section VI presents a summary, concludes the study and provides some directions for future research.

II. A BRIEF REVIEW OF PAKISTANI HEALTH CARE SYSTEM

Health care management in Pakistan is primarily the responsibility of provincial governments, except in case of federally administered territories. However, the federal government is responsible for planning and formulating national health policies. Each provincial government has established a department of health with the mandate to protect the health of its citizens by providing preventive and curative services. The provincial health departments also regulate private health care providers. Large variations are found in public sector spending on health care across provinces. Balochistan and Khyber Pakhtunkhwa spend the least share of their public expenditure on health care and in recent years, this share has declined rapidly in Balochistan [Akram and Khan (2007)]. Health care provision in each province is in a three-tiered system in which public, private and non-governmental sectors participate. Private sector serves nearly 70 percent of the

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[1]Falvo (2004) points out that in some cultures seeking medical help may be considered a sign of weakness. In other cultures, women may take a medical advise from older women in the family rather than seeing a health practitioner. Varley (2002) attributes the failure of biomedical pharmaceuticals and clinical practices in its treatment of women in Northern Pakistan to social and religious norms.

[2]It is understood that due to ethnic diversity within a province, cultural practices within that province may not be homogeneous. For example, as one would expect in the provinces of Punjab and Sindh. However, in each case, there is a dominant ethnic group whose practices may largely dominate the data that we describe in a later section.

population. It is primarily a fee-for-service system and covers a range of health care provision from trained allopathic physicians to faith healers operating in the informal private sector [World Bank (1993)]. Neither private nor the government sector work within a regulatory framework and very little information is available regarding the extent of human, physical and financial resources engaged in these sectors.

According to the Pakistan Social and Living Standards Measurement Survey [PSLM (2004-05)], as many as 67.4 percent households in Pakistan consult health providers in private sector when they have health problems (see Table 1). Majority of both rural and urban households consult private health care providers which mainly include: private clinics/hospitals, chemist/medical stores, and/or pharmaceutical industry. A large number also consults homeopaths and *tabbibs*,[3] the latter being especially popular in rural areas. The highest private consultation is in the province of Sindh and the lowest in Balochistan, especially rural Balochistan.

Table 1

Health Consultations by Type of Health Provider Consulted (Percentage)

Region/ Province	Private/ Dispensary/ Hospitals	Public Dispensary/ Hospitals	RHC/BHU	Hakim/ Herbalist	Homoeopathic	Chemist/ Pharmacy	Saina/ Saini	Other
Urban Areas	**71.5**	**20.47**	**0.52**	**1.76**	**1.54**	**3.1**	**1.01**	**0.11**
Punjab	73.5	15.42	0.26	3.09	2.28	3.91	1.37	0.18
Sindh	78.93	17.79	0.75	0.75	0.96	0.14	0.65	0.03
Khyber Pakhtunkhwa	55.81	31.31	0.39	0.67	1.44	9.13	1.09	0.16
Balochistan	56.47	40.68	1.2	0.99	0.1	0.13	0.43	0
Rural Areas	**64.31**	**20.68**	**3.5**	**2.32**	**0.6**	**6.89**	**1.36**	**0.35**
Punjab	71.08	15.27	1.2	4.74	1.22	3.85	2.28	0.35
Sindh	76.29	18.71	3.23	0.53	0.16	0.28	0.52	0.29
Khyber Pakhtunkhwa	51.73	21.73	3.6	1.15	0.44	19.9	1.13	0.32
Balochistan	47.57	37.51	10.21	2.13	0.17	0.69	1.2	0.51
Overall	**67.4**	**20.59**	**2.22**	**2.08**	**1**	**5.26**	**1.21**	**0.24**
Punjab	72.27	15.34	0.74	3.93	1.74	3.88	1.83	0.27
Sindh	77.6	18.25	2	0.64	0.56	0.21	0.58	0.16
Khyber Pakhtunkhwa	52.92	24.53	2.66	1.01	0.73	16.75	1.12	0.28
Balochistan	50.34	38.5	7.41	1.77	0.15	0.52	0.96	0.35

Source: Federal Bureau of Statistics, PSLM (2004).

In contrast with private health care, public health care is offered at a low cost. Generally, a patient treated at a public hospital's Out Patient Department (OPD) does not pay any consultation fee but has to incur own cost when buying medicines.

Health care facilities under public sector comprise more than 10,000 health facilities ranging from Basic Health Units (BHUs) to tertiary referral centres (Table 2). In the 1990s, a BHU covered around 10,000 people, whereas the larger Rural Health Centres

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[3]*Tabbibs* or *hakims*, are traditional health providers who operate under ancient Greek system of remedy relying mainly on herbal medicine. In 2006, there were about 55,000 *tabbibs* in Pakistan with 31 specialised institutions offering diploma and 3 universities offering degrees (http://www.pakistan.gov.pk/ministries/planninganddevelopment-ministry/mtdf/7-Health/7-Health.pdf).

Table 2

Mean Values and Standard Errors of Variables in the Model (1989-2006)*

Variable	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
VPC	0.62998	0.26145	0.35727	0.27787
	(0.27444)	(0.063070)	(0.21442)	(0.21463)
HOSPC	0.0000582	0.0000363	0.0000728	0.0002012
	(0.0000040)	(0.0000066)	(0.0000070)	(0.0000366)
DOCFE	46.637	110.87	39.785	100.98
	(14.624)	(58.050)	(6.0771)	(19.172)
INCOME	3051.4	4163.9	2945.8	3527.0
	(168.98)	(299.72)	(237.15)	(336.75)
PMED	83.939	86.593	84.462	87.046
	(32.289)	(24.380)	(26.493)	(24.507)

Notes: * Numbers in the parentheses are standard errors. VPC=Visits per capita to Out Patient Department at government hospitals, HOSPC = Number of hospitals per capita, DOCFE = Consultation fee charged by a doctor at a private clinic, INCOME = Income per capita, PMED = Medicine price.

(RHCs) covered around 30,000-45,000 people.[4] The "tehsil" headquarter hospitals cover population at sub-district level whereas the district headquarter hospitals serve an entire district.[5]

The finding that only one out of three patients uses public health care raises an important question for health policy-makers in Pakistan: should public funds not be directed towards subsidising the private sector health care rather than to public sector health care which should focus on serving the poorest of the poor?

To answer this question, it is important to understand the factors that affect demand for public sector health care.

III. ECONOMIC MODEL AND DATA USED FOR PRESENT STUDY

Most health care demand studies in developing countries have analysed the effects of various determinants of health care demand, such as user fee (or consultation fee), income, quality of health care and distance to the health care provider, on the demand for public health care. These studies are based on data obtained through surveys sponsored by international organisations such as the World Bank.[6]

In Pakistan, the PSLM is a comprehensive annual survey of households which provides indicators of health in addition to other social indicators such as education, water supply and sanitation, and household economic situation and satisfaction. Unfortunately no information on the price charged for consultation at health care facilities, which is a major variable of interest to us, is available through this or any other survey. The Federal Bureau of Statistics publishes annual data, for major cities in

[4]BHUs and RHCs comprise Primary Health Care (PHC) units.

[5]Government of Pakistan, Situation Analysis of Health in Pakistan, Ministry of Health, Islamabad, 1995.

[6]For example, Mwabu, Ainsworth, and Nyamete (1993) on rural Kenya; Akin, David, and Hazel (1995) on the Ogun state on Nigeria; Xu, *et al.* (2006) on Uganda; Asfaw, Braun, and Klasen (2004) on Ethiopia; and Ching (1995) on the Phillipines.

Pakistan, on consultation fee charged in a private health care facility that is viewed as a substitute for a public health care facility in health economics literature. Annual data on other determinants of health care demand are also available at provincial levels. So we decided to base our analysis on time series data for each province.

To estimate the demand for public health care in Pakistan, we resort to the standard demand theory. In health economics, the demand function for health care is measured at individual level as well as for the entire market.[7]

Due to data limitations, we focus on market demand for outpatient services in public hospitals. We specify the following demand function:

$$VPC_t = f(\ HOSPC_t, DOCFE_t, INCOME_t, PMED_t, VPC_{t-1}) \qquad \ldots \qquad \ldots \qquad (1)$$

This model postulates that the number of outpatient visits per capita in period (VPC) at government hospitals is a function of the number of government hospitals per capita (HOSPC), doctors' fee per visit at private hospitals (DOCFE), income level per capita (INCOME), price of medicine (PMED), and the number of outpatient visits per capita in the past period (VPC $_{t-1}$). The subscript "t" refers to the time period.

Data on the number of patient visits were obtained from Development Statistics of each province (Various Issues) covering the period 1989-2006. These were divided by the estimated population in each province on which data were obtained from *Agricultural Statistics of Pakistan* (Various Issues). For the province of Sindh, these data were available only until 1998 and had to be extrapolated for the remaining period of our analysis. We based our extrapolation on the average share of outdoor patient visits in total (indoor and outdoor) hospital visits in the late 1990s.[8]

We include the number of hospitals per person as an independent variable as it is an indicator of the accessibility of public health care service to the patient. If a public hospital is far from the patient's place of residence, it may be inconvenient to visit that hospital as the visit may involve incurring extra transportation and time costs. For women, the inconvenience may be even more serious because due to cultural and social reasons, many have to depend on a male member of the household to accompany to the clinic. Hence, if a private clinic is nearby, a patient may decide to visit the same by paying the consultation fee, instead of travelling long distance to the public hospital where consulting a doctor is free. Therefore, we expect the number of hospitals per person to have a positive sign in our model. Data on the number of hospitals in each province were obtained from each province's Development Statistics and were divided by the estimated population in each province.

Our second independent variable is doctors' fee charged for consultation in a private clinic. A private clinic may be viewed as a substitute for the OPD in a public hospital. Hence, we expect the sign of this variable to be positive. Other studies, mentioned earlier, have found a growing use of private health care in developing countries despite the availability of public health care. This raises the issue regarding the substitutability of public and private health care systems in those countries. The sign and magnitude of this variable will help determine the role of prices in patients' choice of a

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[7]In their textbook on health care economics, Folland, Goodman, and Stano (2009) discuss the application of demand theory in economics of health care.

[8]During the period 1989-1998, the share of outdoor patients in total patient visits was fairly stable, varying between 96 and 97 percent.

health care system, keeping other demand determining variables constant. Data on fee charged at private clinics were obtained from the *Statistical Bulletin* published by the Federal Bureau of Statistics (Various Issues) which provides data for major cities. Average fee reported in each province's capital city was considered.

Income also plays an important role in determining whether a patient uses private or public health care system. Due to the public perception of lower quality of care provided in public sector hospitals, and expectations of longer waiting times, one would expect public health care service to be an inferior good. Hence, our dependent variable should have a negative relationship with the income per capita variable. Data on this variable were obtained from *Household Integrated Economic Survey* (Various Issues) and are for average household income.

Another important independent variable in the model is the price of medicine. Patients have to purchase medicine in the market regardless of whether they attend OPD at a public hospital or go to a private clinic for consultation. Hence, medicine price may be viewed as a rationing tool in the use of public health care by patients in Pakistan. In fact, patients' response to changes in this variable may also be viewed as similar to how they would respond if a user fee were introduced for using OPD at the public hospital. We expect this variable to have a negative sign in the model. Data on medicine prices are averages of various major medicines reported in the *Statistical Bulletin* of the Federal Bureau of Statistics (Various Issues) and are for the capital city in each province.

The model also includes the past level of visits per capita representing the past behaviour of patients. This variable captures the effect of habit persistence in the case of patient visits to OPDs in government hospitals.

The demand model (1) is estimated in the following log-linear form:

$$Ln\,(VPC)_t = \alpha_0 + \alpha_1\,Ln\,(HOSPC)_t + \alpha_2\,Ln\,(DOCFE)_t + \alpha_3\,Ln\,(INCOME)_t$$
$$+ \alpha_4\,Ln\,(PMED)_t + \alpha_5\,Ln\,(VPC)_{t-1} + e_t \quad \ldots \qquad \ldots \qquad \ldots \quad (2)$$

The coefficients α_1, α_2, α_3, α_4 and α_5 in this formulation are the elasticities of demand with respect to the respective variables. The term *e* is the stochastic error term.

The model is estimated using the annual time series data from 1989 to 2006 separately for each of the four provinces of Pakistan. An analysis of linear long term trend in each series indicated that VPC had a positive trend in all provinces, except in Sindh for which the series displayed a negative trend. The linear trend in the HOSPC series was negative in all provinces, again with the exception of Sindh, where a positive linear trend was found in this variable. For all provinces, the INCOME and PMED series displayed positive trends while DOCFE displayed a negative trend. The PMED series displayed the strongest trend, among all variables, in all four provinces.

Mean values of the data series and the corresponding standard errors are reported for the four provinces during the period of study in Table 2. Our dependent variable, i.e., patient visits per capita to the OPD in public hospitals is significantly higher in Punjab than in any other province. The second highest value of this variable is in Khyber Pakhtunkhwa, while in the other two provinces this number is roughly the same. Among the determinants of demand, medicine price is the lowest in Punjab followed by Khyber Pakhtunkhwa. On per capita basis, Balochistan—the least populated province in Pakistan—has the highest number of hospitals. Income per capita and doctor's

consultation fee is the second highest, while medicine price is the highest, in Balochistan. Doctor's fee and income per capita are positively related across provinces. Our econometric analysis of the next Section will allow us to assess the sensitivity of the visits per capita in each province with respect to each of the demand determinants, while keeping the effect of others constant.

IV. ECONOMETRIC RESULTS

Recent research in time series analysis emphasises the need for investigating (or testing for) evidence for stationarity and co-integration among time series data prior to estimation of econometric models using them. These tests are necessary to ensure that the model estimation would not yield spurious results. Accordingly, Phillips-Perron unit root tests are applied to all of the data series used in this study. The results are reported in Table 3.

Table 3

Results of Phillips-Perron Unit Root Tests on Variables Used in the Model

Province	Variable	F-test (1) $H_0: \alpha_0 + \alpha_1 + \alpha_2 = 0$	F-test(2) $H_0: \alpha_1 + \alpha_2 = 0$	F-test(3) $H_0: \alpha_0 + \alpha_1 = 0$	t-test(1) $H_0: \alpha_1 = 0$
Punjab	Ln (VPC)	7.4167	6.0146		
	Ln (HOSPC)	4.5993	6.0348		
	Ln (DOCFE)	9.1662	4.9177		
	Ln (INCOME)	4.1485	6.0785		
	Ln (PMED)	4.3206	3.1681		
Sindh	ΔLn (VPC)			5.4312	−3.2553
	ΔLn (HOSPC)			3.7430	−2.7521
	ΔLn (DOCFE)			6.4262	−2.9592
	ΔLn (INCOME)			12.526	−4.8401
	ΔLn (PMED)			4.1253	−2.8062
Khyber Pakhtunkhwa	ΔLn (VPC)	8.0116	12.016		
	ΔLn (HOSPC)	9.8209	14.719		
	ΔLn (DOCFE)	3.8042	5.7057		
	ΔLn (INCOME)	16.922	25.383		
	ΔLn (PMED)	5.0248	7.5277		
Balochistan	ΔLn (VPC)			4.0011	−2.8180
	ΔLn (HOSPC)			4.2927	−2.9236
	ΔLn (DOCFE)			7.4273	−3.8595
	ΔLn (INCOME)			6.2744	−3.5234
	ΔLn (PMED)	5.2658	7.8978		

Notes: For variable legend, please see notes below Table 2. The equation estimated for a given variable *y* for t-test (1) and F-test (3) is given as:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \sum_{j=1}^{p} \gamma \Delta y_{t-j} + e_{t-1}$$

Asymptotic critical values for the t-test and F-test at 10 percent level of significance using the above equation are −2.57 and 3.784, respectively.
The equation estimated for a given variable *y* for the F-test (1) and F-test (2) is:

$$\Delta y_t = \alpha_0 + \alpha_1 y_{t-1} + \alpha_2 t + \sum_{j=1}^{p} \gamma \Delta y_{t-j} + e_{t-1}$$

Asymptotic critical values for the F-test (1) and F-test (2) at 10 percent level of significance using the above equation are 4.03 and 5.34, respectively.

Results reported in Table 3 confirm that all of the data series used for Punjab are integrated of order zero (i.e., I(0)), and hence the estimation of the model given by the Equation (2) would not yield spurious results. Therefore, the model given by the Equation 2 is estimated for Punjab with the addition of the variable *T* that accounts for the time trend. Results of this exercise are reported in Table 4.

Table 4

Model Estimates for Punjab, Sindh, Khyber Pakhtunkhwa and Balochistan

Variable[a]	Model Equation 2	Model Equation 3 Error Correction Model		
	Punjab	Sindh	Khyber Pakhtunkhwa	Balochistan
Ln (HOSPC)	3.1599**	6.6768**	−7.5582*	2.7145**
	(5.028)	(4.754)	(−2.124)	(3.147)
Ln (DOCFE)	0.84649**	1.2633**	−6.2606**	0.40214
	(3.068)	(3.978)	(−4.292)	(0.8543)
Ln(INCOME)	0.58216*	−2.9310**	−1.3687	−0.68622
	(2.076)	−(6.069)	(−0.4610)	(−0.6806)
Ln (PMED)	−0.16337	−1.1600	−5.7969*	−1.0185
	(−1.035)	−(0.9885)	(−2.187)	(−0.8424)
Ln (VPC)$_{t-1}$	0.43679**	−0.87355**	0.61074**	1.3711**
	(2.668)	−(3.450)	(3.104)	(4.498)
e$_{t-1}$		−1.5119**	−1.6605**	−1.2341**
		−(4.454)	(−5.697)	(−3.358)
T	0.13343**			
	(5.704)			
Constant	21.819**	−0.01949	0.03551	0.10105
	(4.000)	(−0.8381)	(0.1541)	(0.9565)
N	17	13	16	16
Df	10	6	9	9
R2	0.99	0.90	0.83	0.67
Adj.R2	0.98	0.81	0.71	0.45
D.W.	2.1570	2.4707	1.9337	2.2351
D.H	−1.4497	−2.6429	2.3446	−1.2402

Notes: [a] The error correction model includes the error correction term e$_{t-1}$ and the first differences of the other variables. Values reported in parentheses are the t-ratios for coefficients.
  * Statistically significant at 10 percent level.
  ** Statistically significant at 5 percent level.
  Variable legend provided under Table 2.

Results of the unit root tests indicate that many of the data series for the other three provinces are not integrated of order zero. However, the first differences of all of those series are found to be stationary (i.e., the data series are integrated of order one, I(1)). The results of the unit root tests that confirm their stationarity are also reported in Table 3. The Phillips tests of cointegration are then applied to verify evidence of a long run equilibrium relationship among these variables in each of the provinces. In the presence

of such evidence, an appropriately specified error correction model, derived from the model Equation (2), is estimated.

The error correction model specified in this study is given by the following equation:

$$\Delta Ln\ (VPC)_t\ =\ \beta_0 + \beta_1\ \Delta Ln\ (HOSPC)_t + \beta_2\ \Delta Ln\ (DOCFE)_t + \beta_3\ \Delta Ln\ (INCOME)_t$$
$$+ \beta_4\ \Delta Ln\ (PMED)_t + \beta_5\ \Delta Ln\ (VPC)_{t-1} + \beta_6\ e_{t-1} + v_t \qquad \ldots \qquad \ldots \qquad \ldots \qquad (3)$$

The evidence for a long run relationship (i.e., cointegration) in terms of Phillips tests is present in the case of Sindh. Accordingly, the error correction formulation is considered the appropriate model to be estimated for that province. However, we estimated the error correction model for all of the three provinces for which all the data series were found to be integrated of order one and have reported those results in Table 4.

V. DISCUSSION OF RESULTS

Based on the results of Phillips Perron unit root tests and Phillips tests of cointegration, we estimated the model given by Equation 2 for Punjab and the model given by Equation 3 for the rest of the provinces. The results of this exercise are summarised in Table 4. The estimated coefficients are the demand elasticities with respect to explanatory variables included in the model. These explanatory variables include the number of government hospitals per capita, doctors' fee per visit at private hospitals, income level per capita, price of medicine, and the number of outpatient visits per capita.

The estimated demand elasticity with respect to the hospitals per capita (HOSPC) are greater than unity in absolute value for all the four provinces. The estimates for Punjab, Sindh and Balochistan are positive and statistically significant at the 5 percent level of significance. The estimate for Khyber Pakhtunkhwa is negative and significant at 10 percent level of significance. The negative sign for Khyber Pakhtunkhwa appears puzzling and may be partly due to a strong aversion to treatment outside of home. Greater availability of health professionals that accompanies a public hospital may create a higher demand for treatment at home, especially in case of women in Khyber Pakhtunkhwa. This interpretation however needs further investigation by a survey of preferences among patients, women in particular. The lowest elasticity value in Balochistan is perhaps also reflecting lower quality of public health care in that province where the share of public health care expenditure has declined in total public expenditures over the period covered in this study.

The estimated elasticity with respect to doctors fee (DOCFE) is statistically significant at 5 percent level of significance for all the provinces but Balochistan. The estimated elasticity value is positive in Punjab and Sindh and negative in Khyber Pakhtunkhwa, indicating that patients in the first two provinces view health services provided at OPDs in public hospitals as substitutes for services provided at private clinics, while patients in Khyber Pakhtunkhwa view them as complementary goods. The Khyber Pakhtunkhwa result could be an indication that patients in that province view public and private health care as a collective good and reduce their demand to all health care provided outside of home when consultation fee at private clinics rises. They may be seeking home care when fee charged at a private clinic increases. This explanation can only be confirmed or rejected by further research. The statistically insignificant effect of

DOCFE in Balochistan is consistent with the lowest availability of hospitals per capita in that province.

Among the four provinces, Sindh is the only province where the estimated income elasticity is found to be significant at 5 percent level of significance. In case of Punjab, the estimated income elasticity is found to be significant only at 10 percent level of significance and is positive only in that province. However, the demand for OPD services is income inelastic, as the income elasticity value is lower than unity. In Khyber Pakhtunkhwa and Balochistan, income has no statistically significant effect on the demand for public health care, i.e., demand is income inelastic in these two provinces as well. The income inelasticity of public health care in most of the provinces of Pakistan indicates that health care is generally viewed as a necessity in that country.[9] The perfect income inelasticity of demand in Khyber Pakhtunkhwa and Balochistan may be due to lower per capita income levels in these two provinces which are also home to a large number of refugees from Afghanistan. Sindh is the only province where public health care is viewed as inferior good which could be due to greater availability of private health care in that province but this needs further investigation.

The estimated elasticities with respect to price of medicine (PMED) are negative in all of the provinces, as expected, but not statistically significant at 5 percent level of significance in any of the provinces. In Khyber Pakhtunkhwa, the estimated elasticity value is the highest in magnitude and is significant at the 10 percent level of significance. Hence, patient visits are inelastic with respect to the price of medicine, particularly in the provinces of Punjab, Sindh and Balochistan.

The estimated coefficient of the lagged visits per capita which captures the effect of past behaviour is significant at 5 percent level of significance in all of the provinces. The estimate is positive for Punjab, Khyber Pakhtunkhwa and Balochistan. In these provinces, the higher the demand in the past, the higher the demand in the present. In contrast, the estimated coefficient for the province of Sindh indicates that the higher the demand in the past the lower the present demand in that province. The positive sign is an indication of repeat patient visits in three provinces, but not in Sindh.

VI. SUMMARY, CONCLUDING REMARKS AND DIRECTIONS FOR FUTURE RESEARCH

The present study provided a model of demand for health services to analyse the demand for outpatient visits to OPDs at government hospitals in the four provinces of Pakistan. The model was estimated using the annual time series data from 1989 to 2006. Based on the results of the unit root tests (Phillips Perron unit root tests) and cointegration tests (Phillips tests) performed on the data, an error correction formulation of the model is estimated for Sindh, Khyber Pakhtunkhwa and Balochistan.   The explanatory variables included the number of government hospitals per capita, doctors' fee per visit at a private clinic, income per capita, the price of medicine and the number of outpatient visits per capita in the previous period.

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[9]The PSLM survey of 2007-08 indicated that the percentage of respondents in Punjab who indicated their reason for not using a public hospital to be its distance from their place of residence is the highest, about 26 percent, among all four provinces [Pakistan (2009)]. If public hospitals are not evenly distributed in the province, then the positive income elasticity can be justified as poor are unable to travel long distance to a public hospital. This aspect of our result needs further research.

The estimated coefficients of any explanatory variable do not display uniformity in terms of the sign or the magnitude across the four provinces. However, all the explanatory variables can be identified as empirically significant determinants of the demand for health care at OPDs in government hospitals as the estimate for any given explanatory variable is significant at the 10 percent level of significance at least for one among the four provinces. We believe differences in the estimated elasticities across the provinces could be due to two main reasons: First, they could partly reflect the differences in the dominant culture and customs that influence the choice of patients among home care, private health care and public health care services. Indeed, Ali, Bhatti and Kuroiwa (2008) have found that cultural norms dictate women's utilisation of maternal health care facilities in the provinces of Khyber Pakhtunkhwa and Punjab. Second, these results could also be a reflection of differential quality of health care offered at public hospitals in Pakistan in different provinces. For example, the declining share of health care spending in total public spending in Balochistan could have resulted in lower quality of health care in that province than in others and is probably reflected in lower coefficient of the hospital per capita variable in that province. Available data do not allow us to identify the extent to which cultural norms and quality of health care delivery result in differential utilisation of public services across the four provinces. However, to gain more insights into the above results, one can classify the data into urban and rural regions, because rural population is usually more reliant on traditional and religious values. To assess the effects of quality differences in health care, one may construct the appropriate provincial health quality measures.

In most provinces, the demand for health care is positively related to the availability of health services, the doctors' fees at private clinics, and the past level of demand. The demand is negatively related with the price of medicine in majority of provinces. The elasticity of demand with respect to the number of hospitals per capita is the highest of all estimated elasticities. As such, the availability of services is perhaps the most significant determinant of the demand for health care in Pakistan. The negative value of this elasticity in Khyber Pakhtunkhwa is an indicator of general aversion to out-of-home care which is substituted for home care with greater availability of health professionals accompanying government hospitals. The results confirm the fact that services provided at OPDs in public hospitals and in private clinics are substitutes in most parts of Pakistan and, based on the test of significance, are viewed as inferior goods only in the province of Sindh. Income does not have an effect on public health care demand in the Khyber Pakhtunkhwa and Balochistan provinces, while it does have a positive effect in Punjab.

There are two main policy implications of this study: First, public policy should be sensitive to different economic, cultural and religious practices in each province that play their role in health care demand.[10] Second, accessibility of health care providers is an important determinant of health care demand. Hence, the lack of demand for public health care services should not be viewed as indicating patients' preference for private health care services rather the lack of availability of health care services in the public sector. According to the PSLM (2007-08), about 46 percent of patients do not use a public sector hospital in Pakistan either because it is too far away from their home or

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[10]We suggest a future research should investigate the impacts of cultural and social factors in determining the demand for health care in Pakistan more directly.

because there is none available in their region. Health policy may consider opening smaller and cost-effective health care units on a larger scale in the country. By doing so, the current regressive nature of public health care expenditures in Pakistan as indicated by Akram and Khan (2007) can also be addressed.

The markets for health care in many developing countries undergo significant transformations as a result of such factors as the increase in the participation of both the public and private sectors and the improvements in the level of health education among the general public. Higher level of understanding of both demand and supply sides of these markets is essential for effective policy-making in health related sectors in these countries. The level of interest found in the empirical research on demand side studies of health markets does not match the interest in supply side studies of these markets, in developing countries in particular. The difficulties of finding quality data may have been partly responsible for the low level of interest in empirical investigations of health markets in developing countries. Pakistan is no exception in this regard. For example, focusing specifically on United Nation's Emergency Obstetric Care (UN EmOC) indicators of maternal morbidity and mortality, Ali and Kuroiwa (2007) found poor record keeping practices in the health care facilities of the Khyber Pakhtunkhwa and Punjab. Yet, the present study focuses on the demand side of the health care market using the best available data obtainable from the domestic data sources in Pakistan. To the best of our knowledge, this is the first attempt to empirically estimate demand functions for health care for four provinces of Pakistan. Our economic model is based on sound economic theory and a strong econometric analysis. In our view, the quality of data used in this study cannot be significantly different from those used in any other empirical study in Pakistan based on time series data. It is also not known to us as to what extent the quality of our data have differentially affected our results across the four provinces. A curious researcher may corroborate our results with future survey data that focus on economic determinants of health care demand in Pakistan.

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