Asian Journal of Agricultural Sciences 3(4): 342-351, 2011
ISSN: 2041-3890

Received: May 14, 2011 Accepted: June 28, 2011 Published: July 20, 2011

Evaluation of the Effects of Factors Affecting Women Representation Using Ordinary Least Square (OLS) Regression

[1,2]Najeebullah Khan, [1]Adnan Hussein and [3]Muhamma Zahid Awan
[1]School of Communication, University Sains Malaysia, 11800 USM, Pulau Pinang, Malaysia
[2]Department of Public Administration,
[3]Department of Business Administration, Gomal Universitiy, Dera Ismail Khan,
Khyber Pukhtunkhwa, Pakistan

Abstract: In this study we tested the impact of seven explanatory variables such as political rights, civil liberty, election system type, quota, female's enrolment at college, female's labor force participation rate, female's life expectancy at birth in (years) and real GDP per capita in US dollars at current price on women representation using Ordinary Least Square (OLS) regression. Thirty years annual time series data were collected from different sources including Inter Parliamentary Union PARLINE data base, 2010; Freedom House, 2010; World Development Indicators, 2010; Penn World Table 6.3 and various economic surveys of Pakistan. Using SPSS version 12.00, we examine the determinants of women representation in Pakistan. The results confirm that the model is perfectly fit for explaining variation in women representation. Quota, female's Life expectancy at birth and GDP per capita are the three significant predictors, which explain 84% variation in women representation.

Key words: Ordinary Least Square (OLS) regression, Pakistan, women representation

INTRODUCTION

Under representation of women in legislative bodies has become a global issue articulated by international agencies and others. One of eight Millennium Development Goals (MDGs) set by the United Nation in 2000 is the gender equality and women empowerment. Despite such international commitments and efforts women are under-represented in every walk of life and everywhere in the world. Scholars around the world are of the view that despite constituting half of the world population, the representation of women in the national legislature is only 18% and may be regarded as marginal (Krook, 2010; Wolbrecht and Campbell, 2007).

Even in advance societies the representation of women has increased only marginally from 9% in 1995 to 16% in 2004 which is much lower than the critical mass of 30% envisaged at Beijing (Paxton *et al*., 2010; Devlin and Elgie, 2008). However, recently it reached to 45% in Nordic countries, 19.9% in Organization for Security and Cooperation in Europe (OSCE) member countries (excluding Nordic countries) and 22.2% in American societies in 2010. The representation of women in most of the developing countries is much below than those of the advanced countries and is about 10.1% in Arabs, 13.2% in Pacific, 18.4% in Sub Saharan Africa and 18.7% in Asian countries (Inter Parliamentary Union, 2010). Eminent scholars explained such variations by variety of factors including institutional such as nature of government, electoral system, party system and quota (Stokemer, 2008); socio-economic like class-distinction, illiteracy, per capita income, poverty (Jabeen and Jadoon, 2009) and cultural such as customs, traditions and religion (Bano, 2009). The factors responsible for women's overall under-representation is largely common across nations while the degree of under-representation varies from nation to nation (Norris, 2006). Therefore, common measures and techniques cannot bring similar outcome for all the nations, rather customized strategies are mandatory to overcome the problems of women's under representation (Halder, 2004). Although considerable work has been done on women's representation around the world as cross sectional (Lovenduski and Norris, 2003) or cross countries analyses (Paxton, 1997) but none of the researcher measured the impact of factors on women representation in Pakistani perspective. Most of the previous studies are of descriptive nature. This paper will fill this gap in the literature by empirically developing and testing a model relating to women representation in Pakistan.

The main objective of this research is to:

- Evaluate trends of women representation in legislature of Pakistan using ordinary least square (OLS) regressions
- Model relationship between dependent and independent variables and to predict variation in women representation

Corresponding Author: Najeebullah Khan, School of Communication, University Sains Malaysia, 11800 USM, Pulau Pinang, Malaysia. Tel: (0092) 0966-714277

- Find the best fit model for explaining women representation in Pakistan. This paper is organized as follows:
  Section 2: It describes theoretical framework.
  Section 3: The data and methodology of this study are discussed in this section.
  Section 4: The empirical results are presented in this section.
  Section 5: It contains concluding remarks and summary.

LITERATURE REVIEW

Women and politics in Pakistan: Pakistan got independence on 14th August 1947. It originally had two wings, West Pakistan and East Pakistan but the latter got separated in 1971 and became Bangladesh. Pakistan now consists of five provinces (Sind, Punjab,Balochistan, Khyber Pukhtunkhwa[1] and Gilgit Baltistan[2]); two federally administered areas (Federally Administered Northern Areas (FANA) and the Federally Administered Tribal Areas (FATA)); Azad Jammu and Kashmir (AJK); and the Federal Capital Area (FCA) of Islamabad (Stone *et al*., 2006). Pakistan being a federal state is governed by the constitution of Pakistan 1973. The constitution allocates functions and demarcates powers between federation and federating units. The constitution empowered the federal government to legislate on matters presented in the Federal Legislative List while the residuary powers vested to the province[3]. Pakistan has bicameral legislature comprising on National Assembly (the lower house) and the Senate (the upper house) with 342 and 100 members, respectively. The President is the titular head of the state while the Prime Minister is the head of the government. The population of Pakistan is 163.76 million out of which 84.98 million are male and 78.78 million are female. About 20% of the population lives below the international poverty line of US$ 1.25 a day (Pakistan Statistical Year Book, 2009; Coleman, 2004). Pakistan has a multi-cultural and multi-ethnic society. Pakistan is a multilingual country with more than sixty languages is being spoken. English is the official language of Pakistan while Urdu is the national language. Other major languages include Punjabi, Pashto, Sandi, Balochi, Saraiki and Kashmiri.

Under the provision of Article 25 of the constitution of Pakistan 1973 both men and women enjoy equal rights of voting and contesting. The constitution under Article 27 not only guarantees equal fundamental rights to every one and prohibit discrimination on the basis of gender rather bound the government to provide spaces for all marginalized groups including women in the government machinery. It is also provided in Article 34 of the constitution that the state shall make endeavor to ensure full participation of women in all government sphere of national life (Jabeen and Jadoon, 2009). The parliamentary system of Pakistan provide equal right of voting to every citizen of the state if he/she is over the age of 18 and a right of contesting if he/she have a Bachelor degree (14 years of schooling) and a 24 years of age for National Assembly and 30 years of age for Senate (Constitution, 1973). National Assembly comprises of 342 (282 directly and 60 proportionally) elected members for the period of five years unless sooner dissolved. The Senate comprises of 100 indirectly elected members (Provincial Assemblies) for a period of fixed six years having representation on the principle of provincial parity, however, one-half of its members retire after every three years (Yazdani, 2003).

The political status of women in Pakistan varies considerably across regions, classes and locations due to demographic differences, socio-economic characteristics and because of the impacts of religion and feudal/tribal nature of society (Bano, 2009). Predominant male society restricts women only to household activities and does not allow them to interact with the men. The political participation of women remained at low priority except in the days of independence when they were involved on equal footing (Saiyid, 2001). The role of political parties in the mobilization of women in political environment is negligible one. The political parties and masses used women for voting in elections. Their role within the party was limited to the organization of women wing, mobilization of women in favour of party and motivating other women for agitation and rallies (Saiyid, 2001). The role of women in decision making is not only limited rather negligible (Jabeen and Jadoon, 2009). Soon after independence the newly born state guaranteed the suffrage to women in 1947 and right of vote in 1956 (Bano, 2009). All the three constitutions of Pakistan (1956, 1962 and 1973) provided for the reservation of seats for women in legislature (Yazdani, 2003). The democratic regime of Zulfiqar Ali Bhutto (1970-1977) opened the gate of all services to women and reserved 15% seats in National Assembly and 5% seats in Provincial Assemblies (Bano, 2009). After imposing Martial law in 1977, the then Chief Martial Law administrator General Zia-ul-Haq took many steps to empower women such as the establishment of women division, commission on women and the inclusion of chapter on women in the sixth plan (Yazdani, 2003). However, the promulgation of Hadood ordinance[4] banned women participation as spectators in sports, imposed purda, suspended fundamental rights including the right to be free of discrimination on the basis of sex (Zaidi, 2005).

In 1988 so on after becoming the first female Prime Minister of Pakistan Benazir Bhutto took many steps for the wellbeing of women like the establishment of women

ministry, women studies centre at five major universities, women police stations, and first women bank but did not reserve women seats in national legislature (Coleman, 2004; Kamal, 2000)After becoming Prime Minister of Pakistan Nawaz Sharif enacted the Qisas and Diyat ordinance[5], which was strongly opposed by the opposite political parties, human rights activists and women organizations. He also failed to reserve seats for women in the national legislature (Zaidi, 1999).

In 1999, the then chief Martial law administrator, General Parvez Musharraf, removed the democratic government of Nawaz Nashrif and imposed Martial Law in the country. He took mega steps to improve the status of women in Pakistan such as (a) the then Parliament passed women protection bill and removed some articles of Hadood Ordinance, (b) reserved 10% quota for women in Central Superior Services and across the board departments and (c) reserved 60 seats for women in National Assembly (Yazdani, 2003). The detail about the share of women in National Assembly of Pakistan since its independence is given in Table 1. Although the reservation of 60% seats for women was against the natural distribution of male and female in the country and may hamper an expected uplift of women due to decreased competition but it provided considerable opportunities to women to enter in to the political arena of a country.

Factors effecting women representation: Previous studies have identified number of factors affecting women's representation in the parliament. These have been divided in to four broad categories such as political and institutional, historic, socioeconomic and cultural factors. Although culture has strong affects on women representation in Pakistan, however, non-availability of annual time series data was the main reason of its exclusion from the analysis. The review of the available literature on socio-economic and political factors affecting women representation is as under.

Table 1: Women representation in lower house of Parliament of Pakistan since independence

Pakistan				
Year	Total seats	Women elected on direct seats	Women elected on reserved seats	%
1947	30	-	2	6.7
195	580	-	-	0
1962	156	6	-	3.8.
1965	156	6	-	3.8
1972	144	6	-	4.2
1977	210	1	10	5.2
1985	217	1	21	10.1
1988	217	4	20	11.1
1990	217	2	-	0.9
1993	217	4	-	1.8
1997	217	6	-	2.8
2002	342	13	61	21.64
2008till date	342	17	60	22.22

Inter-Parliamentary Union (Accessed 11 May, 2010) and Bano

Socio-economic factors: There is a well established and growing literature on the impact of socio-economic factors on the representation of women in national legislative bodies. It is generally assumed that education of women is one of the leading factors that have both direct and indirect effects on women representation in the parliament. It is well documented that highly educated citizens participate more intensively in politics than those with fewer educational credentials (Marien *et al*., 2010). Similarly it is argued "that with education, women become more politically aware, and more assertive and active in political discussion and participation (Wade and Soe, 1996)". Likewise Paxton *et al*. (2010) argues "that if women have less access to education and professional opportunities, they will also have less access to politics". Furthermore, Rosenstone and Hansen (1993) are of the view that apparently political participation is much more common among people with higher levels of education and income. Similarly Verba *et al*. (2005) suggested that money, time and education associated with higher socioeconomic status facilitate political participation. Likewise Kenworthy and Malawi (1999) argues that the nations with relatively high level of female education have more spaces for women in the national parliament.

Illiteracy, limited access to education, poverty, economic dependency and mobility constraints are the various socio-economic factors that hinder women from the political process in Pakistan (UNDP, 2000; Kamal, 2000). Nurullah and Naik (1959) assert that "Native custom excludes females from the advantage of education. Schools strictly speaking are confined to the education of boys. Female education was practically non-existent". According to UNDP Report (2005), "in the Human Development Index (HDI), the rank of Pakistan is 135th among 177 countries indicating low life expectancy at birth, low educational attainment and low income. The report also indicates the adult literacy rate of age (15 years and above) of female is 35.2% compared to 61.7% of male. In the same report the Gender related Development Index (GDI) rank of Pakistan is 107th among 177 countries which indicate that how the human development gap has been further aggravated by substantial gender disparities".

In 2004-05 the State Bank of Pakistan announced annual report and discussed the situation of education in detail. This report states that, "unfortunately, Pakistan's track record in literacy and education has not been satisfactory. The education system in the country is characterized by highly illiteracy rate, low gross and net enrolment at all level of education, high dropout rates from schools, a wide disparity at gender and regional level, and a poor quality of education (Annual Report, 2005)". In this connection Economic Survey of Pakistan (2009-10) states that "it is widely acknowledged that education is amongst the single most important factor

contributing to poverty alleviation. Education plays an overarching role and has a cross cutting impact on all aspects of human life. It is a vital investment for human and economic development. However, unfortunately, Pakistan's standing on this front has historically been poor" (Table 2).

The Table 2 shows that Pakistan with public spending on education as a percentage of GDP is the lowest in the chosen sample, whereas it is better than Bangladesh in terms of literacy rate. The literacy rate in Pakistan has improved gradually over a period of time. The indicators of Pakistan in this front are at the bottom of global rankings. Within the region, only Bangladesh has a worse outcome on both the indicators such as spending by the public sector as well as literacy rate. All other countries have been spending substantial amount of their budget on education, consequently have higher literacy rate.

Table 2: Comparison of Public Sector Spending on Education

Country	Public sector spending (As % GDP)	Literacy rate in (%)
Bangladesh	2.6	55.0
China	-	93.7
India	3.3	-
Indonesia	3.5	-
Iran	5.2	-
Malaysia	4.7	92.1
Nepal	3.2	57.9
Pakistan	2.1	57.0
Sri Lanka	--	90.6
Thailand	4.5	-
Vietnam	5.3	92.5

Economic Survey 2009-10 Pakistan

H1: Higher the level of women education, higher will be their representation in parliament

The second factor that influences female political representation is the labor force participation. Yoon (2004) argues that women who find themselves in the formal labor force structure are more likely to enjoy political representation. Similarly Matland (1993) find that the shift of women from household activities to paid labor force is raising the women political representation in industrialized societies. Likewise Halder (2004) asserts that greater share of women in professional occupation ensures larger chance of women in national politics. In contrast predominantly male societies in developing countries don't allow women to work outside the boundaries of house. Consequently, women have little opportunities to develop their skills in public domain (Ariffin, 1999).

According to Annual Report (2007) of the State Bank of Pakistan "urban labor force participation rate (in percent terms) has declined while overall and rural labor force participation rates have raised in Fiscal Year 2008 (FY08) as compared to FY07. Rural labor force participation has climbed up to the highest in FY08. This has occurred due to dependency of most of the rural population on agriculture as the main source of employment over the discussed period; however, the decline in urban labor force participation can be linked to slowdown in urban economic activity due to economic downturn in recent years and low growth in services and manufacturing sector. Concentration of employment in agriculture sector can lead to saturation and underemployment in this sector. Holistic efforts are required in order to ensure that the urban economy gets back on track so that the urban labor force participation remains in consonance with the trend in overall labor participation rate". Similarly the statistics of Economic Survey of Pakistan (2009-10) given in Table 3 suggests fractional improvement in the participation rate across gender. However, improvement is more in females rather than in males

Table 3: Refined Activity Participation rate (%) Pakistan

Indicators	2007-08	2008-09
Male	96.5	69.3
Female	19.6	20.7
Total	45.2	45.7

H2: Increase of women participation in labor force activities increases their political representation.

The impacts of development on women representation are well reported. Most of the previous studies used Gross Domestic Product (GDP) per capita as a proxy for country's development. For example, Stokemer (2008) found positive relationship between development of a country and increased women representation in parliament. Likewise Matland (1993) asserts that increase in material wealth of a country leads to weakening traditional values, decreased fertility rates, increased urbanization, greater educational and labor force participation and attitudinal changes in the perception of appropriate roles for women. Similarly Pasha *et al*. (1999) argues that growth in per capita income enables households among other things to invest in devices which imply time and labor saving for women in the performance of domestic functions.

H3: Higher the GDP Per capita of a country, higher will be the women representation in a country.

Several previous studies have found positive links between female life expectancy and women representation in national Parliament. For example Nobles *et al*. (2010) using a rigorous and conservative approach to the analysis of time series data and found a strong, significant temporal correlation between the event of emancipation and female length of life. Similarly, Miller (2008) found that women's suffrage in the U.S. was linked with legislative changes that favored increased public health spending and a concomitant decrease in

child mortality due to infectious disease; benefits from these legislative changes could be observed in the exact year associated with female suffrage in each state. Likewise, Kawachi *et al*. (1999) found women's legal rights and political participation to be associated with both male and female longevity across U.S. states. Additionally Chattopadhyay and Duflo (2004) found experimental evidence from India that after the mandatory imposition of reserved local council seats for women female involvement in political decision making increases spending on and availability of public goods salutary to health.

H4: Higher the life expectancy of women at birth, higher the women political representation.

Political factors: The bulk of studies conducted in different part of the world have identified the impact of political factors on women representation in the national legislatures. It is well reported that the structure of electoral system has profound affects on the percentage of women representation (Krook, 2010; Devlin and Elgie, 2008; Wolbrecht and Campbell, 2007). Women representation is more in societies where the electoral system allows the voters to choose candidates from party lists in multi-member districts rather than the individual candidates in single-member districts. Parties are more likely to nominate women if women represent only a part of a larger group of candidates and voters are also more likely to vote for them. The evidence from studies strongly suggests that the structure of the electoral system matters (Rule, 1994; Norris, 1999). For instance, most previous studies suggest that women representation is higher under proportional representation method than any other method (Krook, 2010; Paxton *et al*., 2009; Stokemer, 2008).

A study conducted by Norris (2006) in Netherland confirms that "substantially more women are usually elected in systems using party list proportional representation, especially those such as the Netherlands which have a large district magnitude, compared with majoritarian electoral systems using single member districts. Any reform that moves away from nationwide proportional representation in the Netherlands will therefore probably reduce the proportion of women in parliament unless other compensatory actions are taken". Similarly a recent study conducted by Paxton *et al*. (2010) tested the impact of electoral system on women's political representation over time and found significant positive impacts of electoral system on women representation. They further suggest that the size of the effect of electoral system has remained consistent over time. This finding stands in contrast to reasonable theory suggesting that the effect of proportional representation should grow over time.

H5: Women's representation will be higher under proportional electoral system than under any other formula.

A second political factor that may affect women political representation is the form of government in the country. Most of the past studies strongly suggest that political democracy through political rights and civil liberty provides more chances to women to enter in political arena of a country. It is argued that both high early levels of democracy and overtime democratic growth increases women's political representation (Krook, 2010). Jabeen and Jadoon (2009) are of the view that the freedom of thought and expression not only provides women with immediate experience in the political dimensions, but offers enduring effects that continue over many years by setting women on to a path of higher growth in representation. Similarly Paxton *et al*. (2010) argues that country's openness to democratic processes may strengthen women's position in the political sphere over time. Khan and Bahadar (2008) assert that Pakistan has a poor track record of democracy as for more than half of its years of existence after independence; it has been ruled by the military. While the military governments always found faults with the politicians, it was always them who created the local government systems.

In Pakistan, always a limited local democracy had been introduced in order to convey some kind of democratic legitimacy to an authoritarian regime. Sivaramakishnan noted this phenomenon for Pakistan. "Local government fared much better during eras of authoritarian rule than in times of democratic rule".

H6: Higher the political right and civil liberty of citizens in a country, higher the women's political representation.

A third political factor that has significant impact on the women political representation is the quota system or reservation of seats. Around the world, quotas have become a part of the electoral landscape. In the decade prior to 1985, 4 countries introduced quotas. Between 1985 and 1994, 21 countries adopted quotas, whereas the former eastern bloc countries dropped those (25 countries in all). In the following decade between 1995 and 2005, more than 55 countries adopted quotas. As of 2006, more than 84 countries have some form of quota to improve the selection of female candidates running for office. Many other countries have discussions under way over whether to implement quotas. It is widely believed that quota is the most efficient method of increasing women representation (Stokemer, 2008). Murry (2010) argues that women representation is higher in countries where provisions of some kind of quota/ reservation of seats are available.

Similarly Paxton *et al*. (2010) is of the view that stronger the gender electoral quota system the greater will be the percentage of women in political office.

Stokemer (2008) argues that in Europe and Americas all countries with high female representation in parliament have some kind of quota provision. Furthermore the study conducted by Trip and Kong (2008) shows that the introduction of quotas has helped overcoming constraints on women's political representation posed by economic underdevelopment, cultural influences, and even electoral systems. This study also demonstrates that the introduction of quotas offers the most explanatory power for women's representation today, together with electoral systems that allow for greater candidate turnover (i.e., party-list proportional representation systems).

In Pakistan a certain quota of seats was especially reserved for women in Parliament since the election of 1946. This tradition of reservation of seats for women remained continues in the 1956, 1962 and 1973 constitutions. Although the constitution of Pakistan 1973 provided reservation of seats for two general elections or for ten years period, which created vacuum when this provision expired before the election of 1990 and has not been revived until 2000 (Bano, 2009). Despite commitments by both the major political parties, the women's reserved seats have not been restored (Dushka, 2001) The then government of Pervez Musharaf has the credit of increasing women's reserved seats to sixty.

H7: Countries that have legally imposed quotas are likely to have more female representation.

METHODOLOGY

Data: There is a considerable body of research on measuring the impact of factors affecting the growth of women representation in the Parliament. Both cross country analyses (Paxton *et al*., 2010) and individual country case studies (Jabeen and Jadoon, 2009) have been done throughout the world in the past, however, little work has been available in Pakistani context. Furthermore, most of the available studies in Pakistan are of descriptive nature. However, this study tested the relationship between socio-economic political factors and the growth of women representation in Pakistan empirically. We used annual time series data of 1972 to 2010 with the exclusion of the periods of Martial Laws when National Assembly was dissolved by the Military dictators (1978-1984 and 2000-2001) from our analysis. We used Ordinary Least Square (OLS) regression for an estimation of the impact of factors affecting women representation using SPSS version 12.0. Percentage of women representation in the lower house (the National Assembly) of the Parliament of Pakistan is the dependent variable of the study. Data were obtained from Inter-Parliamentary Union PARLINE data base supplemented by additional information from the website of election commission Pakistan and the work of Bano (2009).

As predictor we included political rights, civil liberty, election system type, quota, female's enrolment at college level, female's labor force participation rate, female's life expectancy at birth in (Years) and real GDP per capita at current price. For the first two independent variables - political rights and civil liberty - we retrieved yearly data from the Freedom House, 2010; World Development Indicator 2010. Freedom House (2010) provides detail report of annual rating of the entire world from 2002 to 2010 while data for the remaining period was obtained from the World Development Indicators 2010. It is considered authentic and widely used by the researchers of both developed and developing countries (Paxton *et al*., 2010; Stokemer, 2008; Halder, 2004). Freedom House further breaks rating on the basis of political rights and civil liberty which helps the researchers to see the impacts of democracy on women representation.

For an electoral system type we used three categories which exist in Europe such as (proportional, semi proportional and plurality). For regression analysis we created dummy variables and coded one for plurality and zero for proportional and semi-proportional as in Pakistan majority system is working. Data were obtained from the Inter- Parliamentary PARLINE data base and from the database of Electoral System Design provided by the International Institute for Democracy and Electoral Assistance (IDEA), 2010. For an explanatory variable Quota/seat reservation, the overtime reservation of seats of Pakistani government was obtained from the study of Bano supplemented by the websites of Election Commission, Pakistan. We used enrollment rate at college level, female's labor force participation rate, female's life expectancy at birth and Real GDP per capita at current price to measure the impact of socio-economic factors on the growth of women representation in Pakistan. Data about all these predictors were gathered from World Development Indicator 2010, Penn World Table 6.3, various economic surveys of Pakistan, and Human Development Index, established by the United Nations Development Program.

Model: We used parsimonious models for our regression modeling. A parsimonious model is widely used prediction technique that fit the data adequately without using unnecessary parameters and produces more accurate results. Prior research indicates that model with a few significant predictors forecast the situation more accurately than the models with insignificant predictors (Punkratz, 1993). For finding parsimonious model backward elimination method has been widely used. In the backward regression techniques all the potential variables first included in the initial regression analyses

Table 4: Regression statistics

Model	Independent variables	Adjusted R^2	variables corresponding to the ²coefficient with the highest p- value	p-value of the coefficient
RMI	QUO, PR, CL, EC, LFP, LE, GDP	0.878	PR	0.718
			LFP	0.655
			EC	0.619
			CL	o.415
			GDP	0.326
RM2	QUO, CL, EC, LFP, LE, GDP	0.883	LFP	0.602
			EC	0.567
			CL	0.382
			GDP	0.333
RM3	QUO, CL, EC, LE, GDP	0.886	EC	0.394
			CL	0.305
RM4	QUO, CL, LE, GDP	0.887	CL	0.191

and then irrelevant variables has been removed one by one to find the best fit model. Regression statistics p-value and coefficient of determination (R^2) has been used as parameters for the elimination of insignificant variables (Sonmez, 2004). The p-value shows the significance of the variables while R^2 shows variability explained by the model. Before proposing regression model to test the developed hypotheses, it is mandatory to introduce the general regression model for normal terms in terms of X variables. The general linear regression model with normal error terms in terms of X variables is given in Eq.

$$Y' = \beta_0 + \beta_1 X_1 + \beta_2 X_2 + \ldots + \beta_k X_k + \epsilon_{(1)} \quad (1)$$

where β_0 is the constant, $\beta_{1,\ldots}$ βk are the coefficients of independent variables, $X_{1\ldots}$ X_k are the independent variables and ϵ is the error term.

Proposed model: Based on the general regression model we propose regression model for assessing the impact of factors affecting women representation in lower house of the parliament of Pakistan. Let's statistically denote all the variables used in this study:

POWR = X_1QUO; X2PR; X3EST; X4CL;
X5EC; X6LFP; X7LE; X8GDP

where;

POWR = Percentage of women representation
QUO = Quota
PR = Political rights
EST = Election system type
CL = Civil Liberty
EC = Enrollment at college
LFP = Female's labor force participation
LE = Female's life expectancy at birth in years
GDP = Gross domestic product per capita in US dollars at current price

RESULTS

Findings of the study: Like Kenworthy and Malami (1999) and Stokemer (2008) we used Ordinary Least Square (OLS) regression to examine these determinants of women's political representation in Pakistan. We initially included the entire variables (political rights; civil liberty; election system type; quota; female's enrolment at college level; Female's labor force participation rate; Female's life expectancy at birth in (years) and real GDP per capita at current price in our regression model. One of them (election process type) was dummy variables. By using backward methodology we got the first workable regression model with seven predictors such as quota, Political rights, civil liberty, female's enrolment at college, female's labor force participation rate, female's life expectancy at birth and GDP per capita. The obtained regression model is given in Eq.

$$PWR = \beta_0 + \beta_{1QUO+} \beta_{2PR+} \beta_{3CL+} \beta_{4EC++} \beta_{5LFP+} \beta_{6LE+} \beta_{7GDP+} \epsilon \quad (2)$$

where;

PWR is the percentage of women representation
QUO is the quota reserved for women
PR is for political rights
CL stands for civil liberty
EC denotes enrolment at college
LFP is the participation rate of women in the labor force
LE is the life expectancy of women at birth
DGP is the real GDP per-capita
$\beta_{0\ldots\ldots}$ β_7 are the regression coefficients and ϵ is the error term

Using backward regression technique we eliminated all the insignificant variables one by one to find the best fit model for explaining women representation in Pakistan. The detail of stepwise backward elimination process of insignificant variables with generated regression models are presented in Eq.

$$PWR = \beta_0 + \beta_{1QUO+} \beta_{3CL+} \beta_{4EC+} \beta_{5LFP+} \beta_{6LE+} \beta_{7GDP+} \epsilon \quad (3)$$

$$PWR = \beta 0 + \beta_{1QUO+} \beta_{3CL+} \beta_{4EC+} \beta_{6LE+} \beta_{7GDP+} \epsilon \quad (4)$$

$$PWR = \beta 0 + \beta_{1QUO+} \beta_{6LE+} \beta_{7GDP+} \epsilon \quad (5)$$

Table 5: Regression statistics

	B	SE	p-value
QUO	0.791	0.084	0.000
LE	- 1.118	0.315	0.001
GDP	5.885	0.001	0.000
Constant 59.077	16.674	0.000	

$R^2 = 0.896$; Adjusted $R^2 = 0.884$; n = 30

The p-value and coefficient of determination R^2 were used as parameters for the elimination of insignificant variables. The regression statistics for model 1 to 4 (RM 1 to MR4) are given in Table 4 with adjusted R^2 and the variable corresponding to the coefficient with high p-values.After eliminating entire insignificant variables through backward regression techniques we got the fifth and the final regression model consisting of three predictors such as quota; female's life expectancy at birth and GDP per capita at current price. The results of the model are given in Eq.

$$PWR = \beta 0 + \beta_{1QUO+} \beta_{6LE +} \beta_{7GDP+} \epsilon \qquad (6)$$

where;

PWR is the percentage of women representation;
QUO is the quota reserved for women,
LE is the life expectancy of women in years and
GDP is the gross domestic production per capita in US dollars at current price;
$\beta_0, \beta_1, \beta_6 \beta_7$ are the regression coefficients and ϵ is the error term.

The regression statistics for model 5 (RM 5) are given in Table 5 with adjusted R^2 and the variables with their corresponding p-values.

DISCUSSION

A galaxy of researchers has unearthed striking results from similar studies and reached similar as well as different findings. For instance the political factors (election system type, quota system and women political rights) socioeconomic factors (education, labor force participation, GDP per capita) and cultural (religion) factors have been reported over and over as the significant predictors of women representation (Paxton *et al*., 2010; Stokemer, 2008). The proportional system is more conducive to increasing the role of women in parliamentary affairs (Krook, 2010). Similarly, where there is predefined quota for women, their representation is higher as compared to where there is no predetermined quota for women (Murry, 2010). Likewise, if constitution provides well-defined political rights for every group of citizens there are more chances of increase in women representation (Jabeen and Jadoon, 2009). Similarly highly educated citizens participate more in politics than less educated class (Marien *et al*., 2010).

In Pakistan, however, the electoral system is based on plurality principle which definitely hinders in increasing women' role but due to quota system introduced in 2002, the women representation has potentially increased (Jabeen and Jadoon, 2009). We have tested and proved the same in the above given models and found significant positive impacts of quota on women representation while electoral system has no impact whatsoever on the growth of women representation in Pakistan. These results are supporting the results of previous studies that quota and Proportional election system compared to other election systems has more positive impact on the growth of women representation (Norris, 2006).

It is well reported that high political rights and civil liberty are conducive for the growth of women representation. We estimated the impact of both in our study and found no impact whatsoever of political right and civil liberty on women representation in Pakistan, which indicates that the plea of previous studies that more democratic government, are more prone to the growth of women representation has not been substantiated in this study (Paxton *et al*., 2010; Stokemer, 2008). Similarly the influence of high labor force participation on the growth of women representation found by Norris and Inglehart (2001) has not been substantiated in this study. Pasha *et al*. (1999) found strong correlation between the level of GDP per capita and the equalization of economic opportunity between men and women, which has been proved by this study. Findings of the study are not supporting the impacts of education on women representation in Pakistan as reported by Marien *et al*. (2010). Several previous studies have found positive links between female life expectancy and women representation in the national Parliament which is proved by the study at hand (Miller, 2008).

CONCLUSION

Given the above literature and analysis, it can be concluded that women representation is dependent on multiple factors, which increase or decrease the role of women in political matters of a country however, their significance and prediction power varies from situation to situation. The reason to fact is that every state provides different social, political, economic and governmental role to different sectors of society. In developing countries like Pakistan the women are still in the backyard and treated as such in almost all aspects of life. If any country is sincere in giving due role to their women in the parliamentary affairs, she must take up the matter on all fronts particularly, proportional electoral system, sufficient quotas, clear cut human rights for women especially the political rights, high GDP growth rate and more opportunities of education and increased labor force participation of women in a country.

ACKNOWLEDGMENT

We are thankful to Higher Education Commission (HEC) Pakistan for funding post doctoral study. For their suggestions, assistance, editing and helpful comments, we would like to thanks the anonymous reviewers, editorial board of Maxwell Scientific Organization, as well as colleagues at Gomal University, Dera Ismail Khan, Khyber Pakhtunkhaw, Pakistan.

REFERENCES

Annual Report, 2005. State Bank of Pakistan. Retrieved from: http://www.sbp.org.pk/reports/annual/arfy05/Chp-8.pdf.

Annual Report, 2007. State Bank of Pakistan. Retrieved from: http://www.sbp.org.pk/reports/annual/arfy07/qtr-index-eng.htm.

Ariffin, R., 1999. feminism in malaysia: A historical and present perspectives of women struggles in Malaysia. Women Stud. Int. Forum, 22(4): 417,427.

Bano, S., 2009. Women in parliament in Pakistan: Problems and potential solutions. Women Stud. J., 23(1): 19-35.

Chattopadhyay, R. and E. Dufflo, 2004. Woman as policy makers: Evidence from a randomized policy experiment in India. Econometrica, 72(5): 1409-1443.

Coleman, I., 2004. Gender Disparities, Economic Growth and Islamization in Pakistan, Woodrow Wilson Centre for Scholars, Washington D.C.

Devlin, C. and R. Elgie, 2008. The effects of increased women's representation in parliament: The case of Rwanda. Parliament. Aff., 61(2): 237-254.

Dushka, S., 2001. Women in politics-problems of participation: A case study of Pakistan. ISSI J., 21(2).

Economic Survey of Pakistan, 2009-10. Education and Educational Facilities, Economic Advisors Wing Finance Division Govt. of Pakistan Islamabad.

Freedom House, 2010. Freedom in the World, New York: Freedom House. Retrieved from: http://www.freedomhouse.org/template.cfm?page=15.

Halder, N., 2004. Female Representation in Parliament: A Case Study from Bangladesh. New Zealand J. Asian Stud., 6(1): 27-63.

Inter Parliamentary Union (IPU), 2010. PARLINE database on Nat6ional Parliament. Retrieved from: http://www.ipu.org/parline-2/parlinesearch.asp.

Jabeen, N. and M.Z.I. Jadoon, 2009. Gender and local governance in Pakistan: Representation vs. participation. Int. NGO J., 4(5): 264-276.

Kamal, S., 2000. The Democracy-Poverty Nexus: Summary on Issues of Participation Stockholm: International Institute for Democracy and Electoral Assistance (IDEA).

Kawachi, B.P., B.P. Kennedy, V. Gupta and D. Prothrow-Stith, 1999. Women's status and the health of women and men: A view from the states. Soc. Sci. Med.,48(1): 21-32.

Kenworthy, L. and M. Malami, 1999. Gender inequality in political representation: A worldwide comparative analysis. Soc. Forces, 78(1): 235-269.

Khan, N. and B. Shah, 2008. The historical perspectives of local government in Pakistan: Learning from the past. Gomal Univ. J. Res., 23(1): 68-76.

Krook, M.L., 2010. Women representation in parliament: A quality comparative quality. Polit. Stud., 58(5): 886-908.

Lovenduski, J. and P. Norris, 2003. Westminster women: The politics of presence. Polit. Stud., 51(1): 84-102.

Marien, S., M. Hooghe and E. Quintelier, 2010. Inequalities of non-institutionalized forms of political participation: A multi level analysis of 25 Countries. Polit. Stud., 58(1): 187-213.

Matland, R., 1993. Institutional variables affecting women representation in national legislature: The case of Norway. J. Polit., 55: 733-755.

Miller, G., 2008. Women's suffrage, political responsiveness, and child survival in American history. Q. J. Econ., 123(3): 1287-1327.

Nobles, J., R. Brown and R. Catalano, 2010. National independence, women political participation and life expectancy in Norway. Soc. Sci. Med., 70(9): 1350-1357.

Norris, P. and R. Inglehart, 2001. Women and democracy: A cultural obstacles to equal representation. J. Democr., 12: 26-140

Norris, P., 1997. Choosing electoral system: Proportional, majoritarian and mixed system. Int. Polit. Sci. Rev.,18(3): 297-312.

Norris, P., 2006. The impacts of electoral reform on Women's representation. Acta Politica, 41(2): 197-213.

Nurullah, S. and J.P. Naik, 1959. Commission on National Education, Govt. of Pakistan. Pakistan Statistical Year Book, 2009. Federal Bureau of Statistics. Retrieved from: http://www.statpak.gov.pk/fbs/content/pakistan-statistical-year-book-2009.

Pasha, A.G., H.A. Pasha and A. Nasir, 1999. Gender Inequalities in Developing Countries: A Case Study of Pakistan. Retrieved from: http://www.spdc.pubs/rr/rr39.pdf.

Paxton, P., 1997. Women in national Legislature: A cross national analysis. Soc. Sci. Res., 26(4): 442-464.

Paxton, P., Hughes, M.M. and M.A. Painter, 2009. Growth in women's political representation: A longitudinal exploration of democracy, electoral system and Quota. Eur. J. Polit. Res., 49(1): 25-52.

Paxton, P., M.M. Hughes and M.A. Painter, 2010. Growth in women's political representation:A longitudinal exploration ofdemocracy,electoral system and quota. Eur. J. Polit. Res., 49(1): 2010, 25-52.

Punkratz, A., 1983. Forcasting with Univariate Box-Jenkins models. John Willy & Sons, New York.

Rosenstone, S.J. and J.M. Hansen, 1993. Mobilization, Participation and Democracy in America. Mac Million, New York.

Rule, W., 1994. Women's underrepresentation and electoral system. Polit. Sci. Polit., 27(4): 689-692.

Stokemer, D., 2008. Women's representation: A comparison between Europe and Americas. Politics, 28(2): 65-73.

Stone, R.N., R. Ebel,S.Ignatova and R. Kalid, 2006. Assessment Report Pakistan Devolution Support Program. Retrieved from: http://urbaninstitute.org/ Uploaded, (Accessed on: January 01, 2007).

Trip, A.M. and A. Kong, 2008. The global impact of quotas on the fast track to increased female legislative representation. Comp. Polit. Stud., 41(3): 338-361.

UNDP, 2000. Human Development Report. Oxford University Press, New York.

UNDP Report, 2005. International Cooperation at a Crossroads: Aid, Trade and Security in an Unequal World. Retrieved from: http://hdr.undp.org/en/ reports/global/hdr2005/.

Verba, S., L.K.L. Schlozman and H.E. Brady, 2005. Voice and Equality: Civic Voluntarism in American Politics. Harvard University Press, Cambridge, MA.

Saiyid, D., 2001. Women in politics-problems of participation: A case study of Pakistan. ISSI J., 21(2).

Sonmez, R., 2004. Conceptual cost estimation of building project with regression analysis and neural network. Can. J. Civil Eng., 31(4): 677-683.

Wade, L.L. and J.W. Soe, 1996. Women education and political violations in the South Korean mass. Comp. Polit. Stud., 29(1): 27-51.

Wolbrecht, C. and D.E. Campbell, 2007. Leading by example: Female members of parliament as political role model. Am. J. Polit. Sci., 51(4): 921-942.

Yazdani, F., 2003. Women representation in local government in Pakistan, impact analysis and future policy implication. Centre for Policies Studies, Central European University.

Yoon, M.Y., 2004. Explaining women political representation in sub-saharan Africa. Legis. Stud. Quart., 29(3): 447-468.

Zaidi, S.A., 2005. The Political Economy of Decentralization in Pakistan: Transversal Theme "Decentralization and Social Movement" Working Papers no 1. Retrieved from: http://www.nccr-pakistan.org/publications_pdf/Forests, (Accessed on: August 01, 2006).

Zaidi, S.A., 1999. Issues in Pakistan's Economy. Oxford University Press, Karachi.

Note:

1 Law makers approve the name in 18th amendment of the constitution passed on April 8, 2010.

2 On 29 August 2009, the Gilgit-Baltistan Empowerment and Self-Governance Order 2009, was passed by the Pakistani cabinet and later signed by the country's President.

3 18th amendment enhances provincial autonomy by abolishing concurrent list where both federation and federating units could legislate

4 Under Offenses against Property (Enforcement of Hadood Ordinance 1979), the punishment of imprisonment or fine, or both, as provided in the existing Pakistan Penal Code for theft, was substituted by the amputation of the right hand of the offender from the joint of the wrist by a surgeon.

5 Qisas and Diyat Ordinance was passed in 1990 and revised in 2006. With the passing of Qisas and Diyat Ordinance in 1990, the victim (or heir of the victim) now has the rights to inflict injuries on the offender identical to the ones sustained by the victim. The law also allow offender to absolve themselves of the crime by paying compensation to the victim or their heir if, or only if, the family of the victim willing to accept.