Economic Welfare and Education: Attain Education, Gain Voice
The Contribution of Educated Single Females In The Society For Economic Welfare Improvement

Ms. Humaira Kamal Pasha

PhD Candidate (CERDI-CNRS)

Universite Clermont Auvergne

26 Avenue Léon Blum, 63000 Clermont-Ferrand

Clermont-Ferrand, France.

Email: Humaira_Kamal.PASHA@etu.uca.fr

Abstract:

This study focuses on the single females who have primary, secondary or higher levels of education living in female-headed households for their economic welfare contribution by using microdata of Pakistan Living Standards Measurements Survey from 2005 to 2016 with multilevel model regression. The economic welfare is estimated by per capita consumption expenditures and other socio-economic characteristics on two levels, individuals and households at lower and Primary Sample Units (PSUs) at upper level. The estimates are explained at two levels simultaneously on unconditional and conditional random intercept and random intercept-slope models. The strong correlation explains the strength of the covariates. The fixed part illustrates single females being positively significant on the economic welfare. The estimated coefficients of education levels for the single females are statistically significant. The effect of female head on the household's welfare is inverse. The result coefficients are strongly in favor that single females are quite productive for educated generations, mobilizing resources and stabilizing the household's financial constraints by their income share, intellectual and working skills at secondary and higher levels of education. The results indicate family patterns and the possessions of the physical assets for the single females are likely to affect welfare. The analysis also describe that PSU variations are significant for the same households as they contribute same characteristics for the households but considering different PSUs the welfare changes drastically. Conditional on the fixed part, ICC is slightly correlated within the same PSUs but highly correlated within the same households and PSUs. The study reports robust evidence of the educated single females for welfare from rural-urban distributions.

Key words: Human resources, economic welfare, gender, multilevel model, education.

JEL Codes: O12, O15, D6

1. **Introduction**

Females whether being single mothers, unmarried or living alone, are channels to establish household's social and economic welfare (World Bank Report 2018)[1]. Their Intellectual capacity, organizational skills, assertive thinking, decisions making, and management capabilities are substantial mechanisms to reduce fertility rate, poverty, gender gap, unemployment by ameliorating life quality, budget constraints, capital formation and financial independence (Thomas 1995; Behrman 1997, 2010; King 2004; Strauss 2008; Pigou 2017). One of the predominant benefits of investment in education foresees the economic stability and welfare improvement by mobilizing human capital and gender equality in a society (Schultz 1961 ; Psacharopoulos et al., 1994, 2004; Aslam 2008; Colclough et al., 2009). A strong empirical relationship between educated females and welfare has been analyzed in developing countries. The contribution of single females in different sectors and high salaried professions are direct reflection of modernized and well-acquainted societies with advance technology.

Pakistan as world's sixth largest population is facing more crucial challenges than other developing countries in south Asia from its inception (Malik et al., 2016). A country with only 5.7 percent growth rate, 116th ranked in corruption and having 39 percent multidimensional poverty with 60 percent literacy rate mainly in urban areas suffer from terrorism[2], hyper-inflation, regional disputes and lower living standards (World Bank 2017)[3]. 4 out of 10 people in Pakistan are living under multidimensional poverty (UNDP Report 2016)[4]. Although, there are many impressive indicators for socio-economic standards and welfare improvement, yet education perpetrates outclass for financial returns, gender unbiasedness and efficient resource mobility for the country by implementing better policies (Kimenyi 2006; Nguyen et al., 2007; Bianchi 1999).

Majority of people in the country believe that female education should not considered as essential human resource investment. The practical perception of the people in the society holds that females are only responsible for continuation of generation and chores of the households (Cocharen 1990). These rampant beliefs become hazardous for females' survival when they face financial difficulties by losing their husbands or guardians in calamities, diseases, terrorism or in natural deaths and the worst situation occurs when they are compelled to take care of any handicapped family member who could be only male earner. Things are always complexed in a society where females become victims of social incision if their parents are unable to afford expensive or heavy dowry to get them married. It directly disconnects them from the research boundaries and innovative market to perform well as productive labor or entrepreneurs (Just et al., 2008).

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[1] World Development Report 2018- Learning to realize education promise
[2] The country estimates $68 billion economic costs from 2000-2010 in this war (The New York review of Books, Mohsin Hamid 2011) and nearly killing 65,000 people in Pakistan (Brown University's Cost of War Project since 2001, Dawn 2019).
[3] Pakistan development update, November 2017: Managing risks for sustained growth.
[4] United Nations Development Program in Pakistan (Annual Report 2016). Volunteerism with the welfare departments by the youth groups for the development particularly in KPK and Balochistan which are disputed areas.

The interest of the study is to investigate the contribution of the single females for the economic welfare in Pakistan by using micro data from 2005 to 2016 collected under the Integrated Households Survey (PSLM). The paper empathizes on the determinants of the economic welfare those are associated with the income pattern and households' characteristics particularly for females at macro and micro levels. The study has pointed out the importance of the single females who are forced to remain isolate or society does not accept and encourage them for their economic activities. The single females at each education level specifically secondary and higher, are analyzed for their income share and welfare improvement in female headed households by participating in labor market. The female headed households suffer more than male headed households in terms of gender and education inequality and therefore the head of the household most of the times undergoes with the minimum years of schooling (Appleton 1996; Ferreira et al., 2008).

This study also highlights the impact of the female heads in urban areas and associated female literacy rate in the country for the welfare achievement and it also explains the technology influence under their headship. One of the major objectives of this study to observe the impact of spoken languages and female literacy rate that if they cast any effect on the welfare achievement and economic stability in Pakistan. It is also worth observing that not only gender, but the demographic and regional variations can bring welfare achievement in South Asia (Slack et al., 1999). The study analyze the education investment and welfare achievement simultaneously for the females of the household to encourage public policies for gender equity and engaging funds for the betterment of the people to raise their living standards.

Education and welfare situation in Pakistan: Pakistan has been experiencing hindrances in welfare achievement, instability in economic expansion and possible cardinal factors behind are low saving rates, high inflation, institutional conflicts, corruption, terrorism and gender inequality (Abbasi 1999). It is evident that aggregate income and its equal distribution are detachable indicators of the welfare (Chaudhary 1982). But the recession in 1990s has proved that failure of fair resource distribution implemented worst growth rate that tends to decline by 4.2 percent. It has widened the proportion of the population who forced to live under poverty line around 18 percent in 2003 followed by 40 percent foreign debts in 2000[5]. The economy of the country has gone bad to worst earlier this year where growth rate plunged from 6.2 to 5.7 percent (Pakistan Financial Ministry 2018). Undoubtedly the public and private measures on education has gone widespread across Pakistan in recent decades yet its dynamic role has not succeeded to raise the female literacy rate. The barriers for advance technology and optimum utilization of human resources are playing strong role to discourage females in the country due to gender stereotypes in prevailing races and outdated customs.

By examining educational portfolio of the country that constitutes Educational Conference (1947), Education Commission (1959), National Education Policies (1972-1980, 1978,1992), ten-year educational

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[5] Pakistan Economic Survey pursue sound policies for the public interest by managing financial matters in the Federal Government

strategy (2001-2011) and amendments in Education Policy (1998-2010)[6] give strategic demonstration of the government to increase literacy rate but consumption patterns have been remained unimproved (Richard et al., 2008). The new elected Prime Minister of Pakistan has urged to consider Pakistan as Scandinavian style Islamic welfare state providing feasible health care, free education at all levels and number of social and economic interventions for the citizens like Denmark who spends 29 percent on the welfare excluding educational expenditure[7]. This requires tax revenues and redistribution of the public services by hiring more people and ignoring their gender[8].

Overall the males are far head than females for the transferring from one level to the higher level. Some initiative programs such as National Endowment Scholarships, Prime Minister Laptop Schemes, Ministry of Social Welfare and Special Education Islamabad, Green Pakistan for the patients' education and health supports, Under ILO Workers' Welfare Fund and USIP grants for the free educational assistance and scholarships for encouraging female participation but they are unable to fulfill the demand of increasing population. Couple of welfare organization to raise the education level for the adults such as Kohsar, Fazaia, Baithak, Alfalah are working at small grounds with limited resources to eradicate illiteracy and gender discrimination in different provinces and their active roles are seen mostly in Punjab (Rosenthal 1996). New Girls' Network program has given confidence female legislators to pass reforms on acid attacks victims for their legal and economic assistance[9].

Gender-specific education completion ratios are shocking when females are segregated within married and single groups. Table 2 demonstrates the education by age that has better percentage before 30 years for single females. The ratio of single females for the secondary level is remarkably better than married females. The figures surprisingly support unmarried graduates. Similar attributes are for the higher secondary females who are better in learning performance and education completion than married ones. Females between 26 to 35 are more inclined towards graduation and higher education and after 36 years of age, their proportion declines immediately. This highlights the need of education for mature females who are in unit digits to acquire higher secondary and graduate degrees. Besides facing discriminations, prejudice, pressure and inequalities, the unmarried females seem determined to secure reasonable places in job markets to boost up economic growth. Contrary to this, the number of female professionals and business women in the labor market is unluckily low which reduces their chances to get higher positions and salaries in their respective industries. Moreover, the disciplines are taught in the higher institutions are widely gender specific. Females, in research fields like astronomy

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[6] Federal Ministry of Education with the contribution of provincial governments afterlooks the curriculum development and financing the research programs. Article 25-A emphasizes the quality education freely to every citizen from age 5 to 18. Education system of Pakistan consists of primary (Grades 1 to 5), Secondary (Grades 6 to 8), higher secondary (Grades 9 to 12) and University programs leading Graduation or tertiary level of education.
[7] Social spending stays at historically high levels in many OECD countries (OECD Expenditure Report 2016).
[8] Prime Minister Imran Khan's very first address to the nation on 28th August 2018 on tax reforms and welfare state implications.
[9] UN contribution in Women's Parliamentary Caucus in Pakistan in 2008 legislation for acid attack, workplace harassment, domestic violence and female prisoners.

and biotechnology are less likely to be adopted due to gender specific courses and high cost associated with these degree programs.

The study is designed into the following chapters. The current chapter describes introduction, second consists of previous literature and third covers the data and methodology. Fourth chapter explains results and last one concludes and recommends policies and limitations. This study tries to investigate some of the core objectives in which the impact of single females and their education particularly at higher level on economic welfare of the household. It also draws special attention on the female headed household contribution in the welfare stream. The additional areas are also pinnacle for the effect of demographic status, labor contribution, educated members and socio-economic characteristics of the household in the reference of single females for economic welfare improvement in the country.

Contribution of the study: This study contributes in the empirical literature by four major aspects. Firstly, the objective of the study is contemporary and strong. As most of the previous studies have ignored the educated single females' contribution for welfare and sustainable growth. This study has focused very first time on the widowed and divorced females who remained unmarried due to insufficient resources to get married in Pakistan. Secondly, the dataset is quite rich and covers on average 40,000 households for recent years 2005 to 2016 at micro level. The study examines pooled dataset for prevailing socio-economic issues at multiple levels. Thirdly, the welfare remains macro level issue associated with income or poverty, but the objective of this paper has been investigated on two approaches, Multilevel Model Regressions that capture the significant effects of welfare at individuals, households and PSUs levels. Fourthly, the paper examines the social, economic and intrahousehold factors behind the gender specific education on welfare and determine the impact of the economic stability by females' participation at each level of the education with income particularly at higher level economic.

In sum up this study has quite different concept. It adds up in the literature that foresees the impact of education particularly at higher levels on economic welfare in the society that ignores single females who are suffering from isolation and facing boycotts, pressures, difficulties and discriminations. Their determination and hard work for maintaining their households and livelihoods have never been acknowledged as the main earners and source of capital formation in the job market. This study has multidimensional addition in the literature which forecasts suitable professions for the single females, highlights the spoken languages that have potential to raise the living standards and manifests the female literacy contribution side by side males' education in the economic stream for financial stability in the households.

2. Literature Review

Previous studies have observed the predominant impact of economic growth that can be determined by welfare achievement which is defined as feasible living standards, quality life and financial stability among individuals, whether males or females in the households (Barr 2012). The welfare seems to reflect human productive and intellectual capabilities that positively target socio-economic parameters such as, employment status, improved health care services and equal income distribution, but none of them can be achieved without education attainment (Gottfredson et al., 2004; Armor 2003). Economic growth and human resource investment stay significant and effective which not only tweak the quality

of work but also cognitive skills with research programs (Ram 2007; Jones et al., 2006; McDaniel 2006; Hanushek et al., 2000). Education being social stimulus who enforces the barriers to fall and boost up human potentials for maximum utility (Oyelere 2011; Sackey 2008; Patrinos 2002, 2004; Schultz 2004; Aromolaran 2004; Bernhardt et al., 2002; Bennel 1996; Becker 1993).

Jacob (2002) illustrates education being prerequisite solution for the gender biasedness, income gap between different social groups by implementing scientific and advance skills for technology. This situation has raised the question at micro level for the households in making investment decisions for welfare achievement by saving patterns and expanding income resources without gender discrimination among children (Schultz et al., 1982). Welfare is also defined as the better condition of the child in the household (Handa 1996, 2004). Moreover, attributes associated with the economic welfare and quality of life emphasize on the consumption and income patterns where female contribution is equal (Hoddinott 1995). Mansour (2012) analyzed for 2008 and 2010 for population disparities and household consumption level in Jordan. In empirical literature the welfare is measured with two different methodologies namely, calories intake (Aromolaran 2004) and consumption expenditure patterns (Hoddinott 1995). The other aspect of welfare deals with the inclusion of the education investment overall in the household (Shilpi et al., 2014) and particularly for the females (Sorensen 2013).

Glewwe (1990) has measured the quality of life with the production endowments where household members characteristics including age, household size, education and household conditions are monitored. It defines utility with household expenditure level that is used as proxy for the welfare. the study reveals that the welfare level grows significantly where the production of the coffee land is relatively high. Interestingly the estimates favor age-earning high profile for the females at 44 and male 57 years of age with their higher level of education. The analysis with the most educated male and female above 18 years, gender and other variables which are assumed exogenous in the household for determination of welfare. It explains the earnings of the educated females are stabilizers for the budget constraints, but in rural areas the production of the coffee differs with the certain level of education that eventually effects on economic welfare. Although people with some level of education tends to make assets and business interested as compared to the self-employed cultivators. Yet, the household composition differences for consumption accounted by taking per capita expenditure which solely depends on the household's members.

The consumption patterns are investigated with the help of Nepalese dataset of 2001 population census by describing household welfare with number of indicators such as parental education, child welfare and fertility. Female education, mother tongue and other socio-economic factors are estimated for the school attendance, years of schooling and working of the mother that show positive inclination towards life improvement (Shilpi et al., 2014; Behrman 2010; Schultz 1982). One cannot ignore the relationship between education of mothers and child's welfare that advocates healthier and educated household and empirical literature has explored it in many countries (Behraman 1997,2010; Thomas 1995, 1998; Orazem et al., 2008). Family welfare and economic development are enveloped by the female education and improved human capital. (World Bank 2012b). The positive effect of the mother's education and child health and learning capabilities expand the level of household income (Behrman 2010; Caldwell 1979). The child mortality rates decline with the economic and health conditions as the better education levels endorse more stable living standards and reduce fertility rate (Schultz 2004; Hirschman 2002).

The situation becomes consequential when the household depends only on female earnings. With the lack of education, limited mobility and rigid traditional norms prohibit females to earn handsomely if they get divorce, never married or become widowed (Krysik et al., 1997; Roach 1997). These single females become financially unstable and compelled to acquire small jobs like being household maids, packaging or stitching garments in small factories where welfare no longer remain even at low level (Cancian et al., 2001; Menon et al., 2000). Women having enough education, or at least higher or post-secondary education tends to become financially better than those who are completely illiterate (Mauldin et al., 1990; Bae et al., 2000; Smock 1993, 1994).

By improving the perspective for household composition and consumptions patterns, change female preferences whether they behave as single, married persons or mothers to encourage welfare through education. It is noticeable that the mating choices according to the value of time and the decisions to get married could be flexible with higher level of education to improve the household welfare (Schultz et al., 1982). Divorced or separated females having education receive more financial resources from those women who are less educated (Mauldin 1990; Mincer 1964). The capital theory also supports those females who have training or in-job experience for earning (Mincer 1962). Single females with higher intellectual skills, professional degrees (Bianchi et al., 1999; Dixon et al., 1994) have significant results for the economic welfare and social well-being (Sen 2017). Female education is a dynamic device for building nation and boosting up its revenues (Bernhardt et al., 2002).

The female education and the welfare of the households although have strong positive effects yet they are negligible in practice in developing countries (Ahmed 2010). Several studies focus on the female education for the long-term relationship and human capital growth. This pattern remains feeble in the developing countries where educating to females is not usual practicing due to many social and economic reasons. Female education put direct effect on the raising living standards, reduce mortality rate, declined fertility, improves labor participation and total factor productivity (Psacharapoulos 1994; King et al., 1998, Barro 1996; Klasen 2002, Sala-i-Martin 2003; Bloom et al., 2006; Lowson 2008; Wilde et al., 2013).

Other studies analyzed about the single mothers' work experience to find better job and higher salaries (Bianchi et al., 2000) but others show opposite results (Dixon et al., 1994) to maintain their economic life. It is evident that the quality of education reflects the level of income and the household with lower standards of living suffer with poor and inadequate education. Low life standards are determined not only with the low education level but also least work experience (Malik 1996; Cheema et al., 2012; Datt et al., 2005; Sekhampu 2013). The inverse seems to raise the level of the welfare particularly in the education levels (Mukherjee et al., 2003; Gounder 2012). The age shows positive and significant effect on welfare (Sorensen 2013; Litchfield et al., 2008).

Employment survey and expenditure unit record data for the female headed households show more poverty and poor economic welfare (Ray 2000). Using survey data of Botswana for two rounds in 2003 and 2010 (Khaufelo et al.,2016) determine the welfare which is negatively associated with the poverty in which the education of the head of the household and employment status of the household members

play important roles. The male head of the household with the marital status like divorced, widow and never married have negatively significant impact on the household such as 0.22 percent which is second after the separated ones using logit estimations. Dependency ratio shows 0.7 percent decrease in the household per capita consumption expenditure.

Interesting findings on the female headship and the economic welfare of the households point that mostly studies compare them with in the married families in terms of earnings and poverty alleviation with the household characteristics (Richard et al., 1993; Ogundari 2014). The household characteristics in which its size tends to lower the welfare level and the dependency ratio hits the poverty line which shows negative impact on the overall social and economic life of the residents (Baulch et al., 1998; Benson et al., 2003; Akerele 2011). Hassan (2009) found the ownership of the livestock lead to amplify the welfare and this also contributes as economic means of the households. Female head of the households seem influence with the poor condition and low welfare as compared to the male head of households (Geda et al., 2005; Litchfield et al., 2011).

Charette (2014) analyze the impact of the probability of the welfare participation by using female headed household data in Canada with the help of budget constraints variables. The study investigated welfare participation accompanied with wage rate and education levels from primary to university level by using probit level. Different spoken languages and job tenure also contributed in different provinces of Canada to account welfare in the country. The estimation results showed that the children have strong impact for the welfare participation and government support job training programs also contribute on unemployed population (Van de Walle 1998). The education plays significantly reverse results for this participation. Language diversity also plays influential role on economic growth (barro 1996). Although multilingualism is prone to internal conflict, domestic and regional disputes and sometimes severe regional disparities and trust deadlocks for the equal distribution of resources and employment opportunities (Alesina 2005).

Multilevel Model Regression: The share of learning and knowledge in economic growth and poverty alleviation has central place for bringing independent decisions and problem handling at micro and macro levels (Lynn et al., 2006; Mulatu et al., 1999; Weber 1988). Previous studies have investigated consumption expenditure as proxy of welfare in two ways. Most likely method is Ordinary Least Square (OLS) and the other is Quantile Regression (QR) methodology (Akter 2014; Hoddinott 1995). Himaz (2011) used the both methods OLS and Quantile regression for the data from household expenditure survey from 1985 to 2007 of Sri Lanka to observe the relationship between welfare and education. The study shows incremental trend with the upgradation in the education levels with the male earning distributions as the data spreads insufficient for the females. Education returns are higher for higher quantiles (Ogundari 2012). The same results are investigated on the dataset of Cote d'Ivoire where female income share influence on the household expenditure (Hoddinott 1995; Schultz et al., 1982). The results are significant by the proportional share of the income of the spouse of the male head of the household on the welfare.

Recent studies are tending towards more effective methodologies where the effects can be determined at the basic and higher levels as well such as multilevel model regression. This study also uses the same technique for the variation of the welfare within the households. The choice of the multilevel model has strong reasons as the welfare of the individuals vary within and between the households ranging till the provinces and giving hierarchical levels to observe these effects (Hox 1995). Because of the multilevel structure, single level model will not be enough which tends to remove some in groups' effects (Russo 2008) who also share some certain common values (Arzensek et al., 2014).

Oppositely, data structure also supports the use of multilevel regression model. The two stage consists of PSUs and the then secondary units contain individuals in the households. The other major factor which can be important in using multilevel model to acquire different slopes which cannot be possible with simple fixed effects (MacKinnon et al., 2004). The model became highly recommended in the social sciences, bio sciences and management areas to explain population variations among different firms or individuals in the household (Woldesenbet et al., 2017).

Within and between school effects are investigated for the learning achievement at the students-level (Gamoran 1987) but the difficulties accompanied with the estimation (Burstein et al., 1981) dealt with the development of the hierarchical or multilevel modeling (Raudenbush et al., 1986). This method mobilizes the maximum likelihood estimation with the EM logarithm (Dempster et al., 1977; Rice 1997). Even the school sectors variability explains its role in determining the education attainment among students. Bremberg et al., (2006) emphasize on school environment for the child education attainment using multilevel model techniques. Among other determinants the school and socio-economic status and good climate with the urban location count the welfare and the education attainment for the students (Singh et al., 2011; Hirschman 1983).

Sorensen (2013) has observed the welfare spending with the improvement of the public education services for the longitudinal data for 22 countries. Period and cohort effects imply different with the aging effects as the elder people desire more pension, less education expenditure but more health care and social security. The interest becomes long standing for the individual and the household characteristics. Younger people are interested in the scholarship programs and social security increment for education attainment while it is discouraged among older ones. It has observed geographical and high-level contextual effects being crucial determinants in social sciences. Looking into the positive way, using logistic regression for generalized multilevel model Slack (1999) also analyzed the school performance by the learning capabilities in improving languages and arts tests.

3. Data and Methodology

3.1 Data and Variables

The micro data which is used in this study is taken from the Pakistan Social and Living Standards Measurements (PSLM) survey conducted by the Pakistan Bureau of Statistics (PBS), Government of Pakistan, from 2005 to 2016. It is designed to provide social and economic indicators at provincial and district level which has been started from 2004 and is continued till 2016. The objective of PSLM is to establish the distributional impact of the development programs with higher government expenditure

budget and welfare of people accordingly. The data calculated from these surveys is used for the monitoring and assessing the Millennium Development Goals (MDGs) indicators and assisting the government to formulate and design policies and strategies for poverty reduction, employment opportunities, reduction in education disparities and economic development.

The sample size of PSLM surveys at district level has approximately 80000 and for provincial level 26000 households. The reasons to use PSLM data conducted by PBS are following; Firstly, PBS takes special measures for the quality and reliability of the data by monitored team with supervisors for the field wok. Entire data is taken from all the regions of Pakistan to the Islamabad Headquarters for further processing. Secondly, the survey covers wide range of topics such as; education, health, occupation, services etc. Thirdly the survey is the main mechanism for monitoring Millennium Development Goals (MDGs) indicators in Pakistan.

The contribution associated with the education attainment are:
a. Individual characteristics
b. Household characteristics
c. Provincial characteristics[10]

Dependent Variable: The first dependent variable used in the study is per capita consumption expenditure as proxy for the economic welfare of the household. The consumption expenditures are reported annually in Pakistani currency for food and non-durable goods. This study uses the per capita consumption expenditure in logarithm.

Individual characteristics: The interested variable consists of the single females in the households which are aged from 15 to 65 years and their marital status are unmarried, never married, widowed and divorced. The dataset holds on average 10 percent presence of these females in the household. The variable single female is composed of dummy variable where 1 is the female is single and 0 means there is no single female in the household but married ones. The education of the single females are also very important, and it has been covered in three dummy variables for each level of education. The very first education level is primary which shows that single females have obtained at least less than primary education. The second level of education comprises of at least graduation grade for the single females and the last level is composed of higher education or graduation studies.

The gender of the head of the household is a dummy variable which is coded as 1 when the single female is the head of the household and 0 if not the head of the household. The very next variable describes as that if single female has income share in the household or not. It is a dummy variable which takes 1 if the single female has any monthly income in the household or 0 if she doesn't have any contribution. Apart from their contribution, if females hold any physical capital it may have strong aspect in the household's welfare. The variable describes as the single female has possession such as her own dwelling, so it may hold 1 otherwise 0 for this dummy variable (Ali et al., 2008; Benerjee et al., 2002).

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[10] Appendix B.1 Variables description and data resources.

The other explanatory individual variables are household size and age of the members of the household. The square of the age of the members of the households to check about the linearity among these two variables. Whereas household size count the sum of the persons residing in the household (McGaranahan 1978). The education of the father and the mother is estimated in complete years of education. The share of the older people in the household is the ratio between the number of the older person above age 65 with the size of the household. One of the interesting variables is the introduction of the adult male who if gets high amount of the salary in the household and his education levels. The dummy variable for the male adult presence in the household who has maximum salary among the residents. The adult male if he acquires primary level of education then dummy takes values 1 and 0 if he doesn't. Next dummy variables for the male adults are having higher secondary and higher graduation levels. The household adults who are having professional degree jobs, technicians and clerks are consisted of in three dummies. The adults between aged 15 to 65 in these professions are taken as the labor force of the households.

Household characteristics: The household holding any internet connection, mobile phone or telephone represents proxy for the awareness of technology an advancement in the modern era. It also proposes the awareness between the individuals and particularly empowering the females for their research work and professional career (Nelson 1966). This variable is also a dummy variable. Similarly, the availability of the electricity in the household makes dummy variable. The location of the household if it is in urban area then the dummy has value of 1 or if in rural then 0.

Provincial characteristics: The female literacy rate is based on four provinces such as Punjab, Sindh, KPK and Balochistan. The other variable of languages is the spoken local languages in the country. These are dummy variable who take the value 1 if the resident speaks Urdu which is national language of Pakistan, similar for Sindhi, Punjabi, Pushto, Balochi and 0 for other languages spoken in the different regions[11].

Multilevel approach characteristics: There are two levels in the Multilevel approach which are estimated in the current study. The higher level consists of PSU (Primary Sampling Units) which are 5468 in the dataset and the lower level is composed of 77582 households (Mackinnon et al., 2004). The lower level basically comprises of number of individuals reside in the household and this dataset holds 633650 individual observations and the households. The per capita expenditure is taken in logarithm which is regressed on the individual, household and PSUs levels characteristics[12].

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[11] The provincial characteristics are taken by the 33rd issue of the Labor Force Survey in Pakistan (LFS) which consists of literacy rate province and gender wise. This survey is conducted by the Pakistan Bureau of Statistics which begins in 1963. Each year the questionnaires and methodologies have been improvised under the forum of "Panel of Labor Statistics". The survey along with quantification of major variables also calculates other economic variables such as literacy, migration and professional security. On average the sample size of the survey comprises of more than 42 thousand households. The revised survey from 1990 with adoption of marginal economic activities likely to be carried out further for employed persons. The unit of the sample survey data is household and it is estimated for four distinct nationally representative samples those are enumerated in a given quarter.

[12] Firstly, the regression is applied by using Ordinary Least Square method and performed certain tests including Wald Test, Likelihood Ratio Test and residuals are also examined graphically. The test tables and graphs can be presented on demand. Secondly the VCE(Robust) standards are obtained in OLS for both dependent variables; per capita consumption expenditure and additional variable adult equivalent consumption. Wald test has specified

3.2 Methodology

Why to use Multilevel Model Regression: There are three main reasons for choosing multilevel technique in this study. Economic welfare is determined by the different levels which has variation among individuals in a country. A single level approach may be not quite suitable if the problem arises between different variables as hierarchical manner (Hox 1995). It also captures group levels variation which are not covered in single level approach (Russo 2008). The individuals in the country share similar attributes but also contribute differently according to locations and availability of the resources (Trunk et al., 2014). The next important reason among them is the structure of the data. The data is conducted by the stratified two-stage sampling in which the primary stage composed of units these are called PSUs and the secondary stage consists of households and households contains individuals. This structure supports Multilevel model approach. Moreover, this approach is getting popularity in the recent studies such as medicines, sociology and management (Nikulina 2014). This approach has been discussed in previous literature like trade, industry development and energy but little attention has been put forward for the education of the females (Ang et al., 2015; Thieme et al., 2013; Corden 1997; Suzumura 1987). So, the individuals, households and higher levels characteristics are better investigated in the Multilevel approach.

Multilevel Models: Hierarchical linear modeling also refers as Multilevel Modeling and captures under the analyses of the "mixed effect modeling". The data has multiple levels or nested structure. The common examples occur when individuals are in the households and they in different PSUs or provinces. Traditional multiple linear regression analysis assumes that all cases are independent of each other but when data has multiple levels than multilevel model regression is more suitable than multiple linear regression (Hoox 2010; Gelman at el., 2006).

Using this methodology puts identifying variation in the outcome on two or three levels depending on the stages of the hypothesis (Nigelrice et al., 1997). The response variable consists of continuous or binary data so either linear or logistic multilevel model can be determined. The use of multilevel modeling techniques is based on the data which is structured hierarchically (Gamoran 1987; Lee et al., 1988; Woldesenbet et al., 2017). Fitting a multilevel model, one assumes that there is grand mean as well as many means because there are many clusters for each stratum (Sellström 2006).

The errors which are basically differences between the expected and predicted observations are relative to the mean corresponding to that cluster. The random effects are corresponded as the differences between clusters' means and over all grand mean for each stratum. By including these random effects variance of each level is obtained and its interpretation is better explained by calculating inter-class correlation (ICCs) that describe how much proportion of the unexplained variance is attributed to each included level. The model tends to be complexed by adding random slopes as effects vary within each cluster (Raudenbush et al., 2004; Singer 2003). Linear or logistic multilevel models can be achieved according to the category of the response variable and curtail identifying variation on the basis of the

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strong evidence for the inclusion of parameters which are presented in the model. Similar tests are performed for the Multilevel Regression method.

certain levels. In exhibiting case, the outcome variable is continuous, and the random intercept model can be explained as,

$$Y_{ij} = \beta_{0j} + \beta_{1j}X_{ij} + \varepsilon_{ij} \qquad \text{(with j =1,2, ... J and i =1,2, ... N)} \qquad (1)$$

The Y_{ij} is the value of the response of the ith household (Level 1) in the jth PSU (Level 2); β_{0j} is the overall constant or intercept of the model and rests of the term are the effects of the X variables on the outcome. Whereas ε_{ij} is the variability in the outcome.

$$\beta_{oj} = \gamma_{00} + \gamma_{01}Z_j + \mu_{0j} \qquad \text{(with j =1,2, ... N)} \qquad (2)$$

$$\beta_{ij} = \gamma_{10} + \gamma_{11}Z_j + \mu_{1j} \qquad \text{(with j =1,2, ... N)} \qquad (3)$$

$$Y_{ij} = \gamma_{00} + \gamma_{01}Z_j + \gamma_{10}X_{ij} + \gamma_{11}X_{ij}Z_j + \mu_{0j} + \varepsilon_{ij} \qquad (4)$$

Where γ_{00} is the intercept, μ_{01} and μ_{10} are the effects of level 2 variable Z_j on level 1 X_{ij}. Whereas for the interaction models μ_{11} is the cross-level interaction between level 1 and level 2 variables.

If there are L variables X at level 1 and M variable Z at level 2, then the equation can be presented like;

$$Y_{ij} = \beta_{oj} + \sum_{l-1}^{L}\beta_{lj} X_{ij}^l + \varepsilon_{ij} \qquad (5)$$

$$\beta_{oj} = \gamma_{00} + \sum_{m-1}^{M}\gamma_{0m} Z_j^m + \mu_{0j} \qquad (6)$$

$$\beta_{pj} = \gamma_{p0} + \sum_{m-1}^{M}\gamma_{pq} Z_j^m + \mu_{pj} \qquad (7)$$

Then,

$$Y_{ij} = \gamma_{00} + \sum_{l-1}^{L}\gamma_{l0} X_{ij}^l + \sum_{m-1}^{M}\gamma_{0m} Z_j^m + \sum_{l-1}^{L}\sum_{m-1}^{M}\gamma_{lm} Z_j^m X_{ij}^l + \sum_{l-1}^{L}\beta_{lj} X_{ij}^l + \mu_{0j} + \varepsilon_{ij}$$
$$(8)$$

So, γ are the regression coefficients (fixed part of the model) ,μ are the group level residuals, and ε are the individual levels' residual. Last two are random part of the model. The degree of coincidence between two individuals belong to the same households can be estimated by the inter-class correlation which can be calculated by the following formula,

$$\rho = \frac{\sigma_\mu^2}{\sigma_\mu^2 + \sigma_\varepsilon^2} \times 100 \qquad (9)$$

σ_μ^2 represents PSU level variance and σ_ε^2 individual or household level in the linear model. The fixed part of the model demonstrates overall mean relationship between response and explanatory variables such as relationship implies in the average PSU. While the random part of the model shows household and PSU specific characteristics relationships differ from the overall mean relationship because

coefficients are based on the changes in households and PSU an individual is identified. A maximum likelihood estimator is used (Dempster et al., 1977). Multilevel method allows data combination at different levels to see their relationships and avoid pitfalls for traditional methods and interactive approaches (Steenbergen et al., 2002).

Model specification*:* The econometric model that is applied in this study consider three determinants of the economic welfare; individuals, households at level 1 and PSUs characteristics at level 2. The analysis are based on the per capita consumption expenditure at level 1 to focus on the participation of the single females and their education levels,

$$Economic\ Welfare = f(single\ females, individuals, households, PSUs)$$

Quantile Regression (QR): The other approach associated in this study is the quantile regression for the welfare indication as the two household with low and higher consumption expenditure respond differently according to the household's characteristics (Glewwe 1991, Himaz et al., 2011). The effect by OLS regression estimation sought to be same over entire distribution of the household but Quantile Regression (QR) relaxes this assumption and permits different determinants to influence on different parts of the distribution (Naiman 2007). Quantile regression method provides mechanism on series of quantiles along the conditional distribution for estimating welfare relationships. For the economic welfare of the household the model is written as (Koenker and Bassett, 1978):

$$Y_i = X_i\beta_\theta + \mu_{i,\theta}\ with\ Quant_\theta\ (Y_i|X_i) = \ X_i\beta_\theta \tag{10}$$

The QR specification examines the β_θ as the parameter to be estimated for different quantile of the entire distribution and $\mu_{i,\theta}$ is the error term. Whereas X_i is a vector of exogenous variables. $Quant_\theta\ (Y_i|X_i)$ shows the θth regression quantile of response variable Y_i given X_i. It also defines robust regression to add up in the current study.

4. Results and Analysis

4.1 Multilevel Random Intercept Models

Table 1 Multilevel Random Intercept Models
Dependent Variable: Per capita consumption expenditure

Variables	(1)	(2)	(3)	(4)	(5)	(6)
Single female		0.0268***	0.0381***	0.0375***	0.0140***	0.0140***
		(0.00189)	(0.00271)	(0.00262)	(0.00258)	(0.00364)
Single education P			-0.000190	-0.00491	-0.00290	-0.00290
			(0.00740)	(0.00714)	(0.00704)	(0.00797)
Single education S			0.290***	0.242***	0.230***	0.230***
			(0.00936)	(0.00902)	(0.00890)	(0.0135)
Single education H			0.100***	0.0794***	0.0691***	0.0691***
			(0.00377)	(0.00363)	(0.00358)	(0.00521)
Female head			-0.461***	-0.426***	-0.424***	-0.424***
			(0.00696)	(0.00671)	(0.00662)	(0.0216)
Female share			0.00863**	0.0135***	0.00932**	0.00932**
			(0.00430)	(0.00415)	(0.00409)	(0.00475)

	(1)	(2)	(3)	(4)	(5)	(6)
Possess dwelling			0.133*** (0.00171)	0.120*** (0.00165)	0.00435** (0.00187)	0.00435 (0.00446)
HH size			-0.015*** (0.000150)	-0.018*** (0.000146)	-0.0182*** (0.000144)	-0.0182*** (0.000686)
Age			0.0028*** (9.56e-05)	0.0025*** (9.22e-05)	0.00248*** (9.09e-05)	0.00248*** (0.000108)
Square of age			-3.85e-1*** (1.42e-06)	-3.52e-1*** (1.37e-06)	-3.43e-05*** (1.35e-06)	-3.43e-05*** (1.74e-06)
Father's education			0.0378*** (0.00537)	0.0328*** (0.00518)	0.0405*** (0.00511)	0.0405*** (0.00538)
Mother's education			0.0388*** (0.00305)	0.0333*** (0.00295)	0.0272*** (0.00290)	0.0272*** (0.00365)
Dependents			-0.341*** (0.00702)	-0.326*** (0.00677)	-0.322*** (0.00668)	-0.322*** (0.0256)
Male share			0.158*** (0.00167)	0.151*** (0.00161)	0.358*** (0.00229)	0.358*** (0.00765)
Male education P			0.0822*** (0.00221)	0.0616*** (0.00213)	0.0781*** (0.00211)	0.0781*** (0.00291)
Male education s			0.110*** (0.00444)	0.0976*** (0.00428)	0.0928*** (0.00422)	0.0928*** (0.00529)
Male education H			0.297*** (0.00410)	0.256*** (0.00396)	0.263*** (0.00390)	0.263*** (0.00621)
Professional			0.178*** (0.00664)	0.165*** (0.00640)	0.164*** (0.00631)	0.164*** (0.00929)
Technician			0.102*** (0.00972)	0.0958*** (0.00937)	0.0958*** (0.00924)	0.0958*** (0.0153)
Clerk			0.0606*** (0.0109)	0.0569*** (0.0105)	0.0538*** (0.0104)	0.0538*** (0.0130)
Technology in HH				0.285*** (0.00191)	0.282*** (0.00189)	0.282*** (0.00726)
Electricity in HH				0.237*** (0.00181)	0.235*** (0.00179)	0.235*** (0.00720)
Urban				0.623*** (0.00958)	0.568*** (0.00938)	0.568*** (0.0425)
Female literacy					0.00732*** (5.83e-05)	0.00732*** (0.000164)
Urdu					0.134*** (0.00337)	0.134*** (0.0167)
Punjabi					0.0479*** (0.00380)	0.0479** (0.0199)
Sindhi					0.153*** (0.00553)	0.153*** (0.0283)
Pushto					0.166*** (0.00468)	0.166*** (0.0271)
Balochi					0.110*** (0.00813)	0.110*** (0.0354)
Constant	10.19*** (0.00874)	10.18*** (0.00874)	10.16*** (0.00831)	9.537*** (0.00871)	9.241*** (0.00912)	9.241*** (0.0289)
Observations	633,650	633,650	633,650	633,650	633,650	633,650
Number of groups	5,468	5,468	5,468	5,468	5,468	5,468
Random part	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)
PSU (Level 2)						
Var (constant)	0.4159031 0.0079906	0.4155173 0.0079833	0.3501075 0.0067417	0.2458628 0.0048631	0.230106 0.0045309	0.230106 0.0045183
Var (Residual)	0.2021686 0.0003607	0.2021057 0.0003606	0.1888108 0.0003369	0.175605 0.0003134	0.1706894 0.0003046	0.1706894 0.0021616

ICC						
	0.6729043	0.6727685	0.6496486	0.5833489	0.5741235	-
	0.0042472	0.0042481	0.0044019	0.0048295	0.0048362	-
Other Information						
Akaike	814814	814615.5	770974.7	723509.1	705325	705325
Bayesian	814848.1	814660.9	771236	723804.4	705688.5	705688.5

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1. Model 1 is unconditional random intercept model, 2 with only single variable. Model 3 and 4 with the single female and individuals of the HH characteristics. Model 5 consists of provincial characteristics and Model 6 consists of same covariates but with robust standard errors.

Table 1 consists of 6 random intercept models which are estimated for two levels, including households and PSUs variables. The model 1 is regressed on the log of per capita expenditure which is the proxy for the economic welfare (Handa 2004) with only intercept and no covariates. The intercept is significant positively at 99 percent confidence intervals. In the random part of the model the variance constant of PSU and individuals are listed (Arzensek et al., 2014). The interclass correlation coefficient describes that 67 percent of the variation covers dependent variable without any explanatory variables. The variance component part of this model describes the variance between the PSU that is 41 percent and for individuals it is 20 percent that hold variabilities between and within individuals. Simultaneously adding one dummy variable of single females in Model 2, the model fit criteria AIC and BIC show slight difference with the 2.68 percent increment in the welfare of the household. The ICCs has significant variation which shows that living in the same PSU the individuals are having correlation of 67 percent.

 In very next model with the individual characteristics of single females are added where single females are positively significant by raising the welfare 3.8 percent, for secondary and higher secondary levels of education 29 and 10 percent respectively (Wilde et al., 2013). The share of the income of the single females and their own possession of the dwelling give positive and significant estimates at 99 percent confidence intervals (Alesina et al., 2001). The income share of the male adults in the households have strongly positive impact on welfare with 15.8 percent which is higher than females and their highest level of education makes increases welfare by 30 percent as compared to secondary education which is 11 percent in Model 3. Education of the mother contributes significant impact on the welfare as compared to the father which is 3.8 percent (Behrman 2011; Caldwell 1979). Addition of the high scale jobs , technicians and clerks have significant effect on the household welfare.

In Model 4, household characteristics are included, in which the single females, by keeping other variables constant, they increase the welfare by 4 percent which is better than the previous models. Although the use of technology, electricity and urbanization are strongly significant by expanding welfare 28, 23, 62 percent respectively. Model 5 is the full model that has all estimated variables with languages and literacy rate. Amazingly Pushto and Sindhi speakers' dummy variables constitute significant part as compared to Punjabi. Urdu which is national language of the country and speakers of this language increase the welfare by 13. 4 percent. The last model is estimated with the robust standard errors. Moving towards the random part of the table, Model 5 covers the variation in the dependent variable by 57 percent and there is the sharp decrease in the variance associated with the PSU level that is 23 percent compare to the Model 2 having 41 approximately. The level 1 residuals also decline from 20 percent in the Model 1 to 17 percent in Model 6. The Model fit criteria explains well

about the suitability, even though in the first three models the decline seems not bigger, but AIC and BIC have smaller value for model 5 making it the suitable model among others.

4.2 Multilevel Random Intercept-Slope Model

Table 2 Multilevel Random Intercept – Slope Models
Dependent Variable: Per capita consumption expenditure

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Single female	0.0130***	0.0138***	0.0130***	0.0141***	0.0140***	0.0130***	0.0141***
	(0.00252)	(0.00255)	(0.00257)	(0.00257)	(0.00258)	(0.00258)	(0.00259)
Single education P	-0.00245	-0.00416	-0.00336	-0.00296	-0.00342	-0.00236	-0.00297
	(0.00686)	(0.00694)	(0.00701)	(0.00699)	(0.00703)	(0.00702)	(0.00708)
Single education S	0.218***	0.223***	0.231***	0.227***	0.230***	0.230***	0.229***
	(0.00869)	(0.00877)	(0.00886)	(0.00884)	(0.00889)	(0.00888)	(0.00897)
Single education H	0.0658***	0.0671***	0.0692***	0.0676***	0.0690***	0.0780***	0.0692***
	(0.00349)	(0.00353)	(0.00357)	(0.00356)	(0.00358)	(0.00435)	(0.00361)
Female head	-0.419***	-0.424***	-0.423***	-0.421***	-0.425***	-0.421***	-0.426***
	(0.00647)	(0.00653)	(0.00659)	(0.00657)	(0.00661)	(0.00671)	(0.00665)
Female share	0.0106***	0.0113***	0.0102**	0.00914**	0.00943**	0.0113***	0.0131***
	(0.00399)	(0.00403)	(0.00407)	(0.00406)	(0.00409)	(0.00414)	(0.00449)
Possess dwelling	0.00579***	0.00475**	0.00483***	0.00488***	0.00489***	0.00450**	0.00435**
	(0.00184)	(0.00185)	(0.00187)	(0.00186)	(0.00187)	(0.00188)	(0.00188)
HH size	-0.0183***	-0.0184***	-0.0183***	-0.0183***	-0.0183***	-0.0182***	-0.0182***
	(0.000142)	(0.000142)	(0.000143)	(0.000144)	(0.000143)	(0.000143)	(0.000143)
Age	0.00239***	0.00243***	0.00247***	0.00246***	0.00248***	0.00248***	0.00248***
	(8.86e-05)	(8.95e-05)	(9.05e-05)	(9.02e-05)	(9.08e-05)	(9.07e-05)	(9.09e-05)
Square of age	-3.34e-05***	-3.38e-05***	-3.43e-05***	-3.41e-05***	-3.43e-05***	-3.42e-05***	-3.43e-05***
	(1.32e-06)	(1.33e-06)	(1.35e-06)	(1.34e-06)	(1.35e-06)	(1.35e-06)	(1.35e-06)
Father's education	0.0409***	0.0408***	0.0405***	0.0403***	0.0402***	0.0405***	0.0405***
	(0.00498)	(0.00503)	(0.00509)	(0.00507)	(0.00510)	(0.00510)	(0.00510)
Mother's education	0.0260***	0.0270***	0.0274***	0.0264***	0.0271***	0.0279***	0.0274***
	(0.00283)	(0.00286)	(0.00289)	(0.00288)	(0.00290)	(0.00294)	(0.00291)
Dependents	-0.321***	-0.315***	-0.323***	-0.321***	-0.321***	-0.322***	-0.322***
	(0.00657)	(0.00663)	(0.00665)	(0.00663)	(0.00667)	(0.00667)	(0.00667)
Male share	0.325***	0.344***	0.348***	0.344***	0.356***	0.360***	0.359***
	(0.00225)	(0.00227)	(0.00229)	(0.00228)	(0.00229)	(0.00229)	(0.00229)
Male education P	0.0753***	0.0753***	0.0780***	0.0780***	0.0778***	0.0782***	0.0781***
	(0.00206)	(0.00208)	(0.00210)	(0.00209)	(0.00211)	(0.00210)	(0.00211)
Male education s	0.0872***	0.0907***	0.0917***	0.0922***	0.0927***	0.0928***	0.0929***
	(0.00412)	(0.00416)	(0.00421)	(0.00419)	(0.00422)	(0.00421)	(0.00422)
Male education H	0.250***	0.256***	0.261***	0.262***	0.263***	0.263***	0.263***
	(0.00381)	(0.00385)	(0.00389)	(0.00387)	(0.00390)	(0.00389)	(0.00390)
Professional	0.159***	0.162***	0.164***	0.162***	0.164***	0.164***	0.163***
	(0.00617)	(0.00623)	(0.00629)	(0.00627)	(0.00630)	(0.00631)	(0.00632)
Technician	0.0871***	0.0911***	0.0950***	0.0948***	0.0958***	0.0975***	0.0949***
	(0.00903)	(0.00911)	(0.00920)	(0.00917)	(0.00923)	(0.00925)	(0.00925)
Clerk	0.0532***	0.0558***	0.0528***	0.0540***	0.0535***	0.0543***	0.0525***
	(0.0101)	(0.0102)	(0.0103)	(0.0103)	(0.0103)	(0.0104)	(0.0104)
Technology in HH	0.288***	0.286***	0.283***	0.285***	0.283***	0.281***	0.282***
	(0.00188)	(0.00189)	(0.00189)	(0.00188)	(0.00189)	(0.00189)	(0.00189)
Electricity in HH	0.235***	0.233***	0.236***	0.235***	0.235***	0.235***	0.235***
	(0.00178)	(0.00178)	(0.00180)	(0.00179)	(0.00179)	(0.00179)	(0.00179)
Urban	0.552***	0.540***	0.544***	0.521***	0.568***	0.571***	0.568***
	(0.00975)	(0.0103)	(0.0107)	(0.0104)	(0.00937)	(0.00938)	(0.00937)

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
Female literacy	0.00664***	0.00701***	0.00711***	0.00705***	0.00728***	0.00736***	0.00734***
	(5.73e-05)	(5.76e-05)	(5.82e-05)	(5.81e-05)	(5.83e-05)	(5.84e-05)	(5.83e-05)
Urdu	0.168***	0.120***	0.135***	0.150***	0.136***	0.133***	0.134***
	(0.00774)	(0.00359)	(0.00337)	(0.00345)	(0.00338)	(0.00337)	(0.00337)
Punjabi	0.0838***	0.0139	0.0451***	0.0605***	0.0500***	0.0476***	0.0480***
	(0.00505)	(0.00860)	(0.00380)	(0.00385)	(0.00380)	(0.00379)	(0.00380)
Sindhi	0.119***	0.151***	0.0876***	0.162***	0.154***	0.152***	0.153***
	(0.00871)	(0.00579)	(0.0120)	(0.00561)	(0.00555)	(0.00552)	(0.00553)
Pushto	0.0863***	0.158***	0.170***	0.162***	0.167***	0.166***	0.166***
	(0.00642)	(0.00481)	(0.00470)	(0.0124)	(0.00470)	(0.00468)	(0.00468)
Balochi	-0.00483	0.0994***	0.123***	0.127***	0.102***	0.110***	0.110***
	(0.0104)	(0.00809)	(0.00818)	(0.00826)	(0.0237)	(0.00812)	(0.00812)
Constant	9.275***	9.284***	9.272***	9.268***	9.240***	9.238***	9.240***
	(0.00965)	(0.00979)	(0.00991)	(0.00975)	(0.00912)	(0.00912)	(0.00912)
Observations	633,650	633,650	633,650	633,650	633,650	633,650	633,650
Number of groups	5,468	5,468	5,468	5,468	5,468	5,468	5,468
Random part	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)
PSU (Level 2)							
Var (Urdu)	0.1213936						
	0.0036776						
COV (Urdu ,constant)	-0.0280755						
	0.0030896						
Var (Punjabi)		0.1205414					
		0.0044164					
COV (Punjabi ,constant)		-0.0711065					
		0.0039289					
Var (Sindhi)			0.1030647				
			0.0070752				
COV (Sindhi ,constant)			-0.0787102				
			0.005903				
Var (Pushto)				0.1207718			
				0.0077422			
COV(Pushto, constant)				-0.0665981			
				0.0057675			
Var (Balochi)					0.074813		
					0.0099471		
COV (Balochi, constant)					0.0073055		
					0.011024		
Var (Single education H)						0.023414	
						0.0012261	
COV (Single H, constant)						0.0089534	
						0.0017767	
Var (Female Share)							0.0120009
							0.0013667
COV (Female share, constant)							0.0044506
							0.0019019
Var (constant)	0.2272139	0.2520509	0.2408028	0.2338109	0.2298689	0.2296086	0.2298833
	0.004808	0.0050815	0.0049403	0.0048137	0.0045272	0.0045241	0.0045273
Var (Residual)	0.1613842	0.1651095	0.1691037	0.16808	0.1702862	0.1698568	0.1704461
	0.0002887	0.0002951	0.0003019	0.0003001	0.0003039	0.0003041	0.000305
ICC							
PSU	0.5847016	0.6042062	0.5874579	0.5817771	0.5744495	0.5747896	0.5742354
	0.00516	0.0048422	0.0049931	0.0050299	0.0048363	0.0048376	0.0048369
Other Information							

AIC	676890.4	688733.8	700434.6	697004.9	704164.2	704434	705210.2
BIC	677276.6	689120	700820.8	697391.1	704550.4	704820.2	705596.5

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

Table 2 presents the estimates for the Random intercept and slope models. Results explain random slopes and the intercept correlations are negative except those who speaks Balochi language that improves the average gain in the welfare. The correlation explained by the ICCs among these models, observes 60 percent higher variability between PSUs in Model 2. The likelihood ratio test comparing the current model with the single level model without any effect is provided with the p-value that is effectively zero by concluding that variance in the outcome variable at PSU level is highly significant and multilevel approach is favored over linear regression. Although the AIC and BIC criteria favors the Model 1 with Random slope by including speakers of Urdu language. This is noticeable that the correlation between the Urdu and the random intercept in this model tends to decrease the average welfare gain that is smaller than the rest of the four languages. Model 6 consists of the Random intercept and slope model that explains the positive slope for the single female higher education. ICC explains by this model is 57 percent and the correlation between the random intercept and slope has positive effect 0.9 percent across the PSUs. So, the PSUs with higher level of education on average show higher gain in the education for single females.

The last column of this table explains the random intercept and slope model for the female income share with variance 0.012 and standard error 0.0013. The random intercept and slope of female share has positive correlation and in PSUs with the higher level of female income share contribute better for the economic welfare as compared to those PSUs who have smaller share of the income by the females. The intra-class correlation expresses the 57 percent correlation in welfare between two households in the same PSU.

4.2.3. Multilevel Random Intercept Model with Interactions

In Table (Appendix B.3) the estimations on the random intercept models are calculated with the addition of the interaction terms. The Model 1 explains the results with the interaction of single female and the higher salaried occupation, further with being technician in Model 2, and after that the use of technology in Model 3. Even the gender of the head being female, and the single are also interacted with the urbanization and female literacy rate in Model 4 and 5. Model 1 describes the positive but insignificant interaction between single female and higher salaried occupation. The fixed coefficients of this model show positive and significant effects for the single females at secondary and higher education. Even though, the income share of the female has positive effect, but the physical property possession becomes insignificant. The dependents have decreasing effect by 32 percent on welfare. Other coefficients are similar as in the earlier intercept models. Model 2 explores the interactive estimation with single female and the technician profession which comes positive but insignificant. On the other side the single females show positive and effective influence when interacting with technology by improving economic welfare by 4 percent. Model 3 also describes the significant influence of secondary and higher education levels for welfare of single females and male members of the

households. It also improves welfare if the electricity is available in the house by 23 percent. There is interesting interaction between the female head and the urbanization, and it also shows positively significant effect for the welfare by 7.2 percent. The other models with technological skills and female literacy rate interacted by female head are also significant and positive. According to AIC and BIC information Model 3 selects better effects on the welfare as compared to the other models.

1.3 Quantile Regression

Quantile regression models fit quantiles of conditional distribution as linear functions of the independent variables. It allows for the effects of independent variables to differ over the quantiles (Chamberlain 1994). The Table (Appendix B.3) exhibits the quantile regressions estimates and other tests for the robustness check also demonstrated in Appendix B.4[13]. First three models of the table show significant and positive effect of the single female for the welfare addition and higher quartile performs better than the lowers. Lower quartile affects positively for the single females and amazingly their education levels from primary to higher are positively significant for the welfare achievement. The female head on the other side, decreases the welfare that is similar with the household size. The age has positive effect on higher quartile. Father's education has significant effect at lower quartile by interestingly the welfare improves with the support of the educated mother at higher quartile. Looking further with the individual characteristics, the educated male in the household has comparatively significant and strong effects than their parents and the median effect on the welfare by the higher level of education of male member. At lower quartiles, occupations like high salaried and technicians perform better for welfare improvement. On the other hand, similar results are observed for the clerks. Models show that other household characteristics, in which the technology contributes better at lower quartile. Although across the models, it has significant and positive effect. While the female literacy has significant effect on the welfare at 0.75^{th} quartile as compared to the median regression model

4.4 Results Discussion

The coefficients estimates favor that cultural barriers, lack of research, education deprivation for single females and out dated school syllabus have ramparted the human capabilities to acquire job opportunities and better standards of living. Single females are quite effective for producing educated generations, mobilizing resources and stabilizing the household's financial constraints by their intellectual and working skills. The study reports the same result as education is an important vehicle for the welfare and economic growth of the country (Glewwe 1994). The need of educational spread with

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[13] The robustness check has been conducted on different tests, explanatory variables and subsamples. The robustness check has been performed on Multilevel intercept and OLS models with multiple tests and variations. The Table B.5 (Appendix) represents 6 models among most suitable ones. The Model 1 describes the education completion rate in the government institution that increases the welfare for the single female by 5.2 percent. For private institutes by 4.7 percent in the Model 2 and insignificant decrease in the welfare when females are studied in the long distance and non-formal institutes in the Model 3. The other two consecutive models are estimated for the urban and rural areas separately. Urban and rural areas are significantly improving the welfare with the presence of the single females but their gain in different levels of education vary in both regions. The inclusion of other explanatory variables are also found the estimates mostly robust.

modernize curriculum system and technology skills are based on the high intellectual resources in which equal share of the women cannot be denied for welfare growth. This paper has consistent results for the secondary and higher secondary educational levels for the single females and the share of the income has wider scope on the household's welfare. The women feel confident and more secure with holding better education and income independence that can help them to survive under the gender disparities in this modern world of technology.

The results indicate family patterns and the possessions of the physical assets for the single females are likely to effect welfare. Larger families with lower level of income are in trouble to meet their basic needs and the same occurs when the females with no possession in their hands are having trouble to sustain their lives. Gender of the head of the household show significant and negative impact on expenditure. Precise and organized distribution of the resources are possibly occurred if the parents are well informed and educated. The household suffers from the poverty if the head has minimum education. The equal amount of contribution from man and woman of the household experience better family resource mobilization, decision making relating education, health and assets investment.

The results explains about larger families who are deprived with the basic living standards and remain in the vicious circle of poverty that assure no improvement in welfare. On the other side education of the parents holds strong effect on the economic welfare of the household by the estimated results (Litchfield 2008). Dependency ratio has remained the negative element for the welfare determination as the more family members join in the income generation, the better can be the standards of living and resource distribution. Although the female employment rate affects positively for the welfare in the country, but it is quite low and that is why dependency ratio in female headed households are alarming. The estimates present the education of adult males also contributes strongly on the household's economic welfare. The magnifique positive impact is possible if the male adult is highly educated (Mukherjee 2003).The results are calculated for high salaries earners such as doctor, engineers and professional workers can boost up the quality of education whereas the low salaried jobs are difficult to maintain subsequent living(Dixon 1994; Armor 2003). The results supports the higher salaried occupation with the higher level of education. It relatively observed that adult education influence on the female contribution for the financial needs.

Undoubtedly other factors are also notable such as the urbanization and level of burden shared among the individuals of the households. With the lower income level and poverty generating effects the household welfare declines that raise unemployment and social unrest. The situation is complicated when the females are single and only earners of the households to fee their family members. Although the household characteristics play important role in the betterment of the living standard, yet they are quite associated with the people who have sufficient resources. The consumption behavior and the level of expenditure vary from one household to another and it is examined that the lower level of education has lower contribution in the household welfare.

The analysis also describe that on higher level such as at PSU variations are significant for the same households as they contribute same characteristics for the households. But considering different PSUs the welfare changes drastically. This also depends on the availability of the technology and electricity

resources and regional disparities and spoken languages. The use of multilevel regressions motivate the estimates to investigates the variation between different levels of PSUs and households (Jacob 2002).

The estimates explains that positive dispersion in the spoken languages and female literacy have potential for the welfare gain. The positive correlation between the higher level of education of the single female and the intercept explains that with different PSUs the welfare improves but living within same PSUs this rise is noticeable. That is also accounted by the intra-class correlation where the variability is higher between PSUs. The results show decrease in the welfare when the head is female but if she resides in the urban area then the welfare tends to improve (Singh et al., 2011). The similar experience is investigated when the female head is provided with the technology (Nguyen et al., 2015). On the other side the female literacy rate tends to increase for female headed households. Regional languages also improves the welfare in the household, although not at the same ratio. Like for Balochi and Pushto as compared to Urdu, Sindhi and Punjabi have fewer gain in the economic welfare achievement. The differences are mostly that the Punjab and Singh provinces are over-crowded with the population. Political influence, number of parliament seats and the active working labor force are mostly adjusted in Punjab and Sindh and these facts are second by the results (De Grauwe 2006).

Moving towards the welfare achievement at different percentiles, the primary education of the single female performs well in the higher quartiles. This study also explains that the higher welfare is associated with the higher level of the education of the single females at the higher quartile. The results are interesting for the educated parents who improves the welfare at lower quartiles. Although the urban areas are better in the welfare production at higher quartile, but this is opposite for the household characteristics. Thus, economic development can be antecedent in the current case and other macroeconomic issues like corruption, law and order, health and employment specifically poverty are also influenced by the education attainment. The estimates represents positive and significant impact of education for the welfare improvement. Results showed that education of the single females are beneficial for the household' economic stability. The female head of the households if single represents significant effect on the welfare and the income share contributes positively.

5. Conclusion

This paper aims to explore the role of the gender in maintaining economic welfare of the households which is deliberately ignored in the literature for the females who are single. Single females are increasing in their number and face similar difficulties if educated or not. But they can have better access to sustain their lives if they get education. Females are less likely to choose their spouses which refer their weak empowerment level and relevant decisions that are influenced by the other members of the households. Females are victims by the domestic violence, low empowerment, extreme hunger and illiteracy can manage to up bring their lives with financial stability if they are provided with the formal and technical education. Political unrest, regional disputes and war on terrorism have turned many females widows or orphans by losing their single male earners. Moreover, unmarried females who are left behind in the households, it is quite hard to get them employed due to lack of education. These families face dual hardships, firstly, by losing earner means financial distress and severe poverty,

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secondly the responsibility for their daughter's dowry to get them married become hard nut to crack. The price to get married of daughter in Pakistani society is becoming higher and out of affordability (Sen 2017). Social funds and rehabilitation programs are not sufficient to endorse their needs. The estimates of this study account for the household's economic welfare with the influence of income share and education of the single females in the household's expenditure in Pakistan and laid stress to play their role wisely for economic growth. Although fair income distribution and gender equality in the society is harder for poverty decline and reducing wage gap in highly populated country (Leibbrandt et al., 2014) like Pakistan.

The study also emphasizes on the household decision making regarding educating daughters for the uncertain future and ownership of the physical assets in any shape such as house, shop, land or animals so it might be other vague evidence of the economic stability of the single women and specially mothers. Different methodologies have been developed for the consumption patterns of the households but using the multilevel regression model has provided in depth and extensive investigation (Bandyopadhyay 2010).

Regional disparities are also observed between the households although different employment sectors are involving in upbringing the standard lifestyle. The literature based on unemployment and economic welfare show mixed results and this study holds that impact of the adult employment in different sectors is positive and significant. Another explanation directs that the people who are associated with the low level of income or low category jobs contribute in lower economic welfare as compared to high paid jobs which are basically located in the urban areas and metropolitan cities.

Despite some limitation the estimates can be used to arrive at the tentative evaluations of the benefits to acquire education for that part of the households which remain creature for only child bearing and domestics chores. The following concluding results are demonstrated under specific limitations. Firstly, the impact of the education is strong on the welfare of the households. This effect is clear and justified for the single females.

The influence of the educated single females provides better welfare in the urban areas and the supporting male head of the household. But the point cannot be ignored when looking at the larger family size and structure. The share of the income of educated single females deepens the understanding of the household welfare but the participation of the educated head is also noticeable. The advancement of the technology and ownership of the dwelling widen the concept of independency among single females which are captured by the results. Second, technology and better facilities motivate women to start their business and independency. Urbanization is the main location for improvement in the welfare as it gives accessibility to female to move. Urbanization give freedom of mobility and job opportunities and there are less restrictions for the females. Thirdly, educated parents are conscious for the future consequences so they invest on their daughters wisely.

An educated mother has more concerns how to deal with the major socio and economic problems with the education or vocational skills. Fourthly, vast areas of Pakistan deprived from the better job opportunities which restrict the women to come out and excel in their own cognitive areas (Schultz

1984). This widens the earning differences where high level income families provide better education to the females but lower income level cadres like clerk and technicians are hardly maintaining their life styles. The obtained results on the expenditure per capita and single females for welfare are robust. Estimations based on PSLM dataset from the time period 2005 to 2016 with different explanatory variables show positive and significant results (Handa 2004). It is also seen that the productivity and learning capacity have been flourishing single females who are residing in same areas and PSU which highlights the importance of the regional boundaries and mobility of labor who perform well in their own regions.

5.1 Policy implication

The misconceptions behind those females who are not married, divorced or widowed have created narrow lifestyle and strong barriers for them to flourish. The out dated society in Pakistan does not seem to adjust the role of single female in economic and social race of life. Unfortunately, many public sectors do not capture proper number of seats or quota system for the widowed women. There is no rule or criteria fitted for divorced female who has children and she is the only one to maintain the livelihood of the household. The quota system for these kinds of female is quietly ignored in private sectors. Small number of pension funds and the right to give employment opportunities of the deceased's children, are most of the time swallowed by the nepotism and favor by that relative sector.

Female adult education without fee or minimum admission cost are hard nuts to crack. The criteria to get admission, age restrictions and female mobilization to get the job are the main hazards. Ground realities are also not acceptable where the end of husband life means end of the widow's life as well. Government should need to redesign the economic welfare pattern for the development policies where the large number of the female can contribute in the society if they are secure to get education, do work and make handsome amount of the earnings. The media needs to show its part in old and out dated customs and cultural barriers in which it is difficult for a single female to survive. Welfare is described as the government support to the citizen with the aid of social security, subsidized goods and services such as education health and vocational skills, usually providing minimum level of well-being and basic human needs. Social welfare department failed to address the increasing number of road beggars who are mostly children under 10 years of age. Impaired individuals, child abuse, helpless women, beggars and elderly people who are rightful to receive welfare services based on community development projects including urban and rural areas are still face complex system of generating funds (Sen 2017). Meanwhile other points are also negotiable such as;

a. Local higher and secondary higher education programs should link up with the welfare agencies.
b. Legal land rights should be revised, and transfer of rights must be at immediate steps as the land holding supports single females and their families.
c. The online systems of the female complaints and environment protection in the complaint offices victimized by the male staff members. As higher the sufferings reduce the women participation in the income generation.

d. Development of effective measurements for poverty reduction and poor families which has only widow earners, fair policy options for the single mothers, conducting research and efficient participation of female workers should be implemented in the upcoming industrial programs.

e. To mobilize and facilitate female labor and job market in significant way by equal wages and motivating female entrepreneurs.

f. Worker welfare fund, inland revenue welfare, deceased employees fund, welfare schemes for federal government, and others are covered under the Ministry of Finance and Revenue in Pakistan, but their implementation are needed to be revised and upgraded.

g. Immense need of adult female education research centers where capable staff should be hired.

h. Mental rehabilitation centers for females who are suffering from terrorism , regionally displaced issues, depression, domestic violence like acid attacks, marriages at early age and handicapped females who has desire for education should be considered in the public literacy programs.

5.2 Limitations

The research findings determine some extended points for the economic welfare. Such as, the model can be investigated with multiple random slopes for multiple levels. It can also examine the nature of the single male who are responsible of the large household sizes. The model can be tested with other aspects of the welfare determinants which are not covered in this study. Lastly, this study opens new directions to observe for the empowering single females in the society for other professional and technological expertise where the main goal exists for gender equity and human resource development (Duflo 2012). Welfare department budget and support act programs for the females are very limited whereas effective role of educating women is inevitable. Number of recipients from the welfare fund are quite small which are mostly short term. Job training programs and vocational training from the public assistance and supervision can be fruitful for lower level jobs and this can be seen also significant in current study. We are strongly convinced that the findings of this research deserve to be examined extensively by understanding the aspects of the welfare of the people, so the resource allocation tends to be more effective.

References

Ahmed, S., Creanga, A. A., Gillespie, D. G., & Tsui, A. O. (2010). Economic status, education and empowerment: implications for maternal health service utilization in developing countries. *PloS one*, *5*(6), e11190.

Akerele, D., & Adewuyi, S. A. (2011). Analysis of poverty profiles and socioeconomic determinants of welfare among urban households of Ekiti State, Nigeria. *Current Research Journal of Social Sciences*, *3*(1), 1-7.

Akter, S., & Basher, S. A. (2014). The impacts of food price and income shocks on household food security and economic well-being: Evidence from rural Bangladesh. *Global Environmental Change*, *25*, 150-162.

Alderman, H., & King, E. M. (1998). Gender differences in parental investment in education. *Structural Change and Economic Dynamics*, *9*(4), 453-468.

Alesina, A., & Ferrara, E. L. (2005). Ethnic diversity and economic performance. *Journal of economic literature*, *43*(3), 762-800.

Alesina, A., Glaeser, E., & Sacerdote, B. (2001). *Why doesn't the US have a European-style welfare system?* (No. w8524). National bureau of economic research.

Anderson, J. E., & Van Wincoop, E. (2001). *Borders, trade and welfare* (No. w8515). National Bureau of Economic Research.

Ang, B. W., & Wang, H. (2015). Index decomposition analysis with multidimensional and multilevel energy data. *Energy Economics*, *51*, 67-76.

Appleton, S., & Balihuta, A. (1996). Education and agricultural productivity: evidence from Uganda. *Journal of International Development*, *8*(3), 415-444.

Aromolaran, A. B. (2004). Household income, women's income share and food calorie intake in South Western Nigeria. *Food Policy*, *29*(5), 507-530.

Arrow, K. J. (1972). Economic welfare and the allocation of resources for invention. In *Readings in Industrial Economics* (pp. 219-236). Palgrave, London.

Artadi, E. V., & Sala-i-Martin, X. (2003). *The economic tragedy of the XXth century: growth in Africa* (No. w9865). National Bureau of Economic Research.

Arzenšek, A., Košmrlj, K., & Širca, N. T. (2014). Slovenian young researchers' motivation for knowledge transfer. *Higher education*, *68*(2), 185-206.

Aseron, J., Wilde, S., Miller, A., & Kelly, S. (2013). Indigenous Student Participation in Higher Education: Emergent Themes and Linkages. *Contemporary Issues in Education Research*, *6*(4), 417-424.

Bandyopadhyay, S., & Tembo, G. (2010). Household consumption and natural resource management around national parks in Zambia. *Journal of Natural Resources Policy Research*, *2*(1), 39-55.

Barr, N. (2012). *Economics of the welfare state*. Oxford University Press.

Barro, R. J. (1996). *Determinants of economic growth: a cross-country empirical study* (No. w5698). National Bureau of Economic Research.

Baulch, B., & McCulloch, N. (1998). Being poor and becoming poor: poverty status and poverty transitions in rural Pakistan.

Becker, G. S. (1964). 1993. Human capital. *A Theoretical and Empirical Analysis with Special Reference*.

Behrman, J. R. (1997). Intrahousehold distribution and the family. *Handbook of population and family economics*, *1*, 125-187.

Behrman, J. R. (2010). Investment in education—Inputs and Incentives. In *Handbook of development economics*(Vol. 5, pp. 4883-4975). Elsevier.

Benson, T., Chamberlin, J., & Rhinehart, I. (2005). An investigation of the spatial determinants of the local prevalence of poverty in rural Malawi. *Food Policy*, *30*(5-6), 532-550.

Bernhardt, J. M., Lariscy, R. A. W., Parrott, R. L., Silk, K. J., & Felter, E. M. (2002). Perceived barriers to Internet-based health communication on human genetics. *Journal of health communication*, *7*(4), 325-340.

Bianchi, S. M. (2000). Maternal employment and time with children: Dramatic change or surprising continuity? *Demography*, *37*(4), 401-414.

Bianchi, S. M., Subaiya, L., & Kahn, J. R. (1999). The gender gap in the economic well-being of nonresident fathers and custodial mothers. *Demography*, *36*(2), 195-203.

Blau, D. M. (1998). Labor force dynamics of older married couples. *Journal of Labor Economics*, *16*(3), 595-629.

Bowles, S., & Gintis, H. (2001). The inheritance of economic status: Education, class and genetics. *International encyclopedia of the social and behavioral sciences: Genetics, behavior and society*, *6*, 4132-141.

Caldwell, J. C. (1979). Education as a factor in mortality decline an examination of Nigerian data. *Population studies*, 395-413.

Cancian, M., & Reed, D. (2001). Changes in family structure: Implications for poverty and related policy. *Understanding poverty*, 69-96.

Charette, M., & Meng, R. (1994). The determinants of welfare participation of female heads of household in Canada. *Canadian Journal of Economics*, 290-306.

Chaudhary, S. A. PARTICIPATION OF RURAL WOMEN IN DECISION MAKING.

Colclough, C., Kingdon, G., & Patrinos, H. (2009). The pattern of returns to education and its implications.

Corden, W. M. (1997). Trade policy and economic welfare. *OUP Catalogue*.

Datt, G., & Jolliffe, D. (2005). Poverty in Egypt: Modeling and policy simulations. *Economic Development and Cultural Change*, *53*(2), 327-346.

De Grauwe, P. (2006). Language diversity and economic development. *Manuscript, Katholieke Universiteit Leuven*.

Dempster, A. P., Laird, N. M., & Rubin, D. B. (1977). Maximum likelihood from incomplete data via the EM algorithm. *Journal of the royal statistical society. Series B (methodological)*, 1-38.

Dixon, J., & Kouzmin, A. (1994). The commercialization of the Australian public sector: competence, elitism or default in management education? *International Journal of Public Sector Management*, *7*(6), 52-73.

Duflo, E. (2012). Women empowerment and economic development. *Journal of Economic Literature*, *50*(4), 1051-79.

Fafchamps, M., & Shilpi, F. (2005). Cities and specialisation: evidence from South Asia. *The Economic Journal*, *115*(503), 477-504.

Fang, Y. (2011). Economic welfare impacts from renewable energy consumption: The China experience. *Renewable and Sustainable Energy Reviews*, *15*(9), 5120-5128.

Ferreira, F. H., Leite, P. G., & Litchfield, J. A. (2008). The rise and fall of Brazilian inequality: 1981–2004. *Macroeconomic Dynamics*, *12*(S2), 199-230.

Gamoran, A., & Berends, M. (1987). The effects of stratification in secondary schools: Synthesis of survey and ethnographic research. *Review of educational research*, *57*(4), 415-435.

Geda, A., de Jong, N., Kimenyi, M. S., & Mwabu, G. (2005). Determinants of poverty in Kenya: a household level analysis.

Gelman, A., & Hill, J. (2006). *Data analysis using regression and multilevel/hierarchical models*. Cambridge university press.

Gertler, P., & Glewwe, P. (1990). The willingness to pay for education in developing countries: Evidence from rural Peru. *Journal of public Economics*, *42*(3), 251-275.

Glewwe, P. W., Hanushek, E. A., Humpage, S. D., & Ravina, R. (2011). *School resources and educational outcomes in developing countries: A review of the literature from 1990 to 2010* (No. w17554). National Bureau of Economic Research.

Glewwe, P., & Hall, G. (1994). Poverty, inequality, and living standards during unorthodox adjustment: The case of Perú, 1985-1990. *Economic Development and Cultural Change*, *42*(4), 689-717.

Gottfredson, L. S. (2004). Intelligence: is it the epidemiologists' elusive" fundamental cause" of social class inequalities in health? *Journal of personality and social psychology*, *86*(1), 174.

Gounder, N. (2012). The determinants of household consumption and poverty in Fiji. *Discussion Papers Economics. Griffith University*.

Gounder, R., & Xing, Z. (2012). Impact of education and health on poverty reduction: Monetary and non-monetary evidence from Fiji. *Economic Modelling*, *29*(3), 787-794.

Gradstein, M., & Justman, M. (2002). Education, social cohesion, and economic growth. *American Economic Review*, *92*(4), 1192-1204.

Grootaert, C. (1997). The Determinants of Poverty in Cote d'Ivoire in the 1980s. *Journal of African Economies*, *6*(2), 169-196.

Grosh, M. E., & Glewwe, P. (1998). Data watch: The World Bank's living standards measurement study household surveys. *Journal of Economic Perspectives*, *12*(1), 187-196.

Handa, S. (1996). Expenditure behavior and children's welfare: An analysis of female headed households in Jamaica. *Journal of development Economics*, *50*(1), 165-187.

Handa, S., Simler, K., & Harrower, S. (2004). *Human capital, household welfare, and children's schooling in Mozambique* (Vol. 134). Intl Food Policy Res Inst.

Hanushek, E. A., & Kimko, D. D. (2000). Schooling, labor-force quality, and the growth of nations. *American economic review*, *90*(5), 1184-1208.

Himaz, R., & Aturupane, H. (2011). *Education and household welfare in Sri Lanka from 1985 to 2006*. Department of Economics, University of Oxford.

Hirschman, A. O. (2002). *Shifting involvements: Private interest and public action*. Princeton University Press.

Hirschman, E. C. (1983). Consumer intelligence, creativity, and consciousness: Implications for consumer protection and education. *Journal of Public Policy & Marketing*, 153-170.

Hoddinott, J., & Haddad, L. (1995). Does female income share influence household expenditures? Evidence from Côte d'Ivoire. *oxford Bulletin of Economics and Statistics*, *57*(1), 77-96.

Hox, J. J., Maas, C. J., & Brinkhuis, M. J. (2010). The effect of estimation method and sample size in multilevel structural equation modeling. *Statistica Neerlandica*, *64*(2), 157-170.

Jacob, B. A. (2002). Where the boys aren't: Non-cognitive skills, returns to school and the gender gap in higher education. *Economics of Education review*, *21*(6), 589-598.

Just, Richard, Darell L. Hueth, and Andrew Schmitz. *Applied welfare economics*. Edward Elgar Publishing, 2008.

Kimenyi, M. S. (2006). Ethnicity, governance and the provision of public goods. *Journal of African Economies*, *15*(suppl_1), 62-99.

King, L. A., & Raspin, C. (2004). Lost and found possible selves, subjective well-being, and ego development in divorced women. *Journal of personality*, *72*(3), 603-632.

Klasen, S. (2002). Low schooling for girls, slower growth for all? Cross-country evidence on the effect of gender inequality in education on economic development. *The World Bank Economic Review*, *16*(3), 345-373.

Kosec, K., Haider, H., Spielman, D. J., & Zaidi, F. (2018). Political competition and rural welfare: evidence from Pakistan. *Oxford Economic Papers*, *70*(4), 1036-1061.

Kudi, T. M., Odugbo, S. B., Banta, A. L., & Hassan, M. B. (2009). Impact of UNDP microfinance programme on poverty alleviation among farmers in selected local government areas of Kaduna State, Nigeria. *International Journal of Sociology and Anthropology*, *1*(6), 099-105.

Kurz, D. (2013). *For richer, for poorer: Mothers confront divorce*. Routledge.

Lee, V. E., & Bryk, A. S. (1989). A multilevel model of the social distribution of high school achievement. *Sociology of education*, 172-192.

Leibbrandt, M., & Levinsohn, J. (2014). Fifteen years on: Household incomes in South Africa. In *African Successes, Volume I: Government and Institutions* (pp. 333-355). University of Chicago Press.

Lowson, E., & Arber, S. (2014). Preparing, working, recovering: Gendered experiences of night work among women and their families. *Gender, Work & Organization*, *21*(3), 231-243.

MacKinnon, D. P., Lockwood, C. M., & Williams, J. (2004). Confidence limits for the indirect effect: Distribution of the product and resampling methods. *Multivariate behavioral research*, *39*(1), 99-128.

Mahmood, H., Suleman, Y., Hazir, T., Akram, D. S., Uddin, S., Dibley, M. J., ... & Thow, A. M. (2017). Overview of the infant and young child feeding policy environment in Pakistan: Federal, Sindh and Punjab context. *BMC public health*, *17*(2), 474.

Malik, F. J. (1996). *The teaching of English in Pakistan: A study in teacher education*. Vanguard.

Masters, W. A., & McMillan, M. S. (2001). Climate and scale in economic growth. *Journal of Economic Growth*, *6*(3), 167-186.

Mauldin, T. A. (1990). Women who remain above the poverty level in divorce: Implications for family policy. *Family Relations*, 141-146.

McDaniel, M., Paxson, C., & Waldfogel, J. (2006). Racial disparities in childhood asthma in the United States: evidence from the National Health Interview Survey, 1997 to 2003. *Pediatrics*, *117*(5), e868-e877.

Mincer, J. (1984). Human capital and economic growth. *Economics of Education Review*, *3*(3), 195-205.

Mukherjee, S., & Benson, T. (2003). The determinants of poverty in Malawi, 1998. *World Development*, *31*(2), 339-358.

Muralidharan, K. (2013, April). Priorities for primary education policy in India's 12th five-year plan. In *India Policy Forum* (Vol. 9, No. 1, pp. 1-61). National Council of Applied Economic Research.

Nelson, R. R., & Phelps, E. S. (1966). Investment in humans, technological diffusion, and economic growth. *The American economic review*, *56*(1/2), 69-75.

Nguyen, L., Barton, S. M., & Nguyen, L. T. (2015). iPads in higher education—Hype and hope. *British Journal of Educational Technology*, *46*(1), 190-203.

Nguyen, P. M., Elliott, J. G., Terlouw, C., & Pilot, A. (2009). Neocolonialism in education: Cooperative learning in an Asian context. *Comparative education*, *45*(1), 109-130.

Nikulina, V., & Widom, C. S. (2014). Do race, neglect, and childhood poverty predict physical health in adulthood? A multilevel prospective analysis. *Child abuse & neglect*, *38*(3), 414-424.

Oesterdiekhoff, G. W. (2012). Was pre-modern man a child? The quintessence of the psychometric and developmental approaches. *Intelligence*, *40*(5), 470-478.

Ogundari, K. (2012). Returns to Education Revisited and Effects of Education on Household Welfare in Nigeria. *Department of Food Economics and Consumption Studies, University of Kie*.

Ogundari, K., & Aromolaran, A. B. (2014). Impact of education on household welfare in Nigeria. *International Economic Journal*, *28*(2), 345-364.

Pigou, A. (2017). *The economics of welfare*. Routledge.

Psacharopoulos, G. (1994). Returns to investment in education: A global update. *World development*, *22*(9), 1325-1343.

Psacharopoulos, G., & Patrinos*, H. A. (2004). Returns to investment in education: a further update. *Education economics*, *12*(2), 111-134.

Raudenbush, S. W. (2004). *HLM 6: Hierarchical linear and nonlinear modeling*. Scientific Software International.

Raudenbush, S., & Bryk, A. S. (1986). A hierarchical model for studying school effects. *Sociology of education*, 1-17.

Rice, N., & Jones, A. (1997). Multilevel models and health economics. *Health economics*, *6*(6), 561-575.

Riches, G. (Ed.). (2016). *First world hunger: Food security and welfare politics*. Springer.

Rosenthal, J. A., Groze, V., & Morgan, J. (1996). Services for families adopting children via public child welfare agencies: Use, helpfulness, and need. *Children and Youth Services Review*, *18*(1-2), 163-182.

Sala-i-Martin, X., & V Artadi, E. (2003). Economic growth and investment in the Arab world.

Schultz, T. P. (2004). School subsidies for the poor: evaluating the Mexican Progresa poverty program. *Journal of development Economics*, *74*(1), 199-250.

Schultz, T. W. (1961). Investment in human capital. *The American economic review*, *51*(1), 1-17.

Schultz, T. W., & Schultz, T. W. (1982). *Investing in people: The economics of population quality*. Univ of California Press.

Sekhampu, T. J. (2013). Determinants of poverty in a South African township. *Journal of Social Sciences*, *34*(2), 145-153.

Sellström, E., & Bremberg, S. (2006). Is there a "school effect" on pupil outcomes? A review of multilevel studies. *Journal of Epidemiology & Community Health*, *60*(2), 149-155.

Shephard, K. (2008). Higher education for sustainability: seeking affective learning outcomes. *International Journal of Sustainability in Higher Education*, *9*(1), 87-98.

Shoaib, M., Saeed, Y., & Cheema, S. N. (2012). Education and Women's Empowerment at Household Level: A Case Study of Women in Rural Chiniot, Pakistan. *Academic Research International*, *2*(1), 519.

Singer, J. D., Willett, J. B., & Willett, J. B. (2003). *Applied longitudinal data analysis: Modeling change and event occurrence*. Oxford university press.

Singh, N. P., Singh, R. P., Kumar, R., Padaria, R. N., Singh, A., & Varghese, N. (2011). Labour migration in Indo-Gangetic plains: Determinants and impacts on socio-economic welfare. *Agricultural Economics Research*, *24*, 449-458.

Slack, P. (1999). *From reformation to improvement: public welfare in early modern England*. Oxford University Press on Demand.

Smock, P. J. (1993). The economic costs of marital disruption for young women over the past two decades. *Demography*, *30*(3), 353-371.

Smock, P. J. (1994). Gender and the short-run economic consequences of marital disruption. *Social forces*, *73*(1), 243-262.

Sørensen, K., Van den Broucke, S., Pelikan, J. M., Fullam, J., Doyle, G., Slonska, Z., ... & Brand, H. (2013). Measuring health literacy in populations: illuminating the design and development process of the European Health Literacy Survey Questionnaire (HLS-EU-Q). *BMC public health*, *13*(1), 948.

Sørensen, Marie Louise Stig. *Gender archaeology*. John Wiley & Sons, 2013.

Steenbergen, M. R., & Jones, B. S. (2002). Modeling multilevel data structures. *american Journal of political Science*, 218-237.

Strauss, J., & Thomas, D. (1995). Human resources: Empirical modeling of household and family decisions. *Handbook of development economics*, *3*, 1883-2023.

Suzumura, K., & Kiyono, K. (1987). Entry barriers and economic welfare. *The Review of Economic Studies*, *54*(1), 157-167.

Thieme, C., Prior, D., & Tortosa-Ausina, E. (2013). A multilevel decomposition of school performance using robust nonparametric frontier techniques. *Economics of Education Review*, *32*, 104-121.

Thomas, S. L. (1998). Race, gender, and welfare reform: The antinatalist response. *Journal of Black Studies*, *28*(4), 419-446.

Thompson, J. J. (1993). Women, welfare, and college: The impact of higher education on economic well-being. *Affilia*, *8*(4), 425-441.

Van de Walle, D. (1998). Assessing the welfare impacts of public spending. *World development*, *26*(3), 365-379.

Wilde, J. L., & Doherty, W. J. (2013). Outcomes of an intensive couple relationship education program with fragile families. *Family process*, *52*(3), 455-464.

Wodon, Quentin T. *Growth, poverty, and inequality: a regional panel*. The World Bank, 1999.

Zafar, A., Aslam, N., Nasir, N., Meraj, R., & Mehraj, V. (2008). Knowledge, attitudes and practices of health care workers regarding needle stick injuries at a tertiary care hospital in Pakistan. *Journal of the Pakistan Medical Association*, *58*(2), 57.

Appendix A. Graphs

A.1 Welfare distribution in the provinces of Pakistan
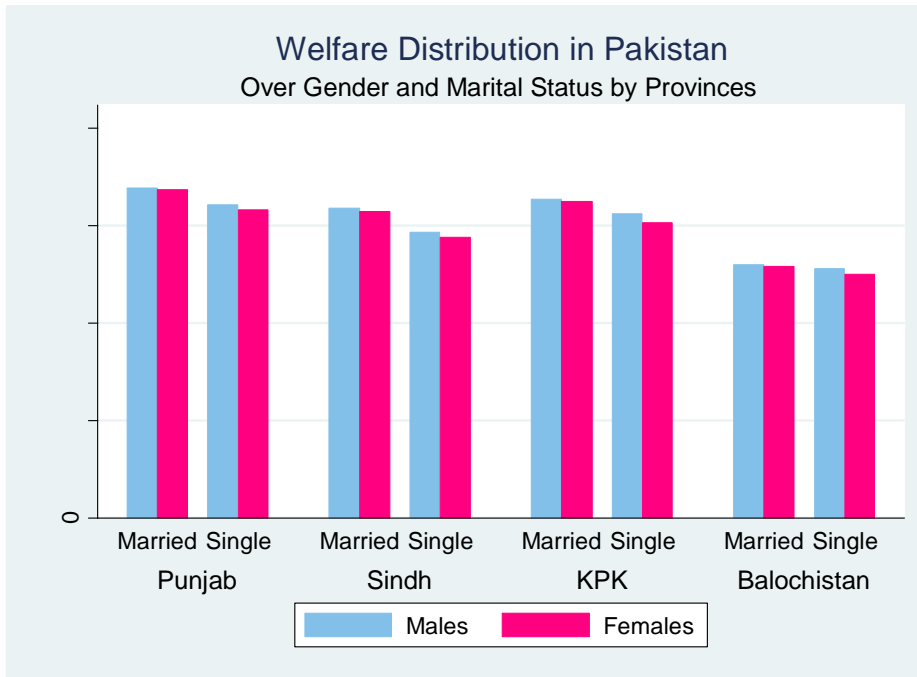
A.2 Female Education by Age
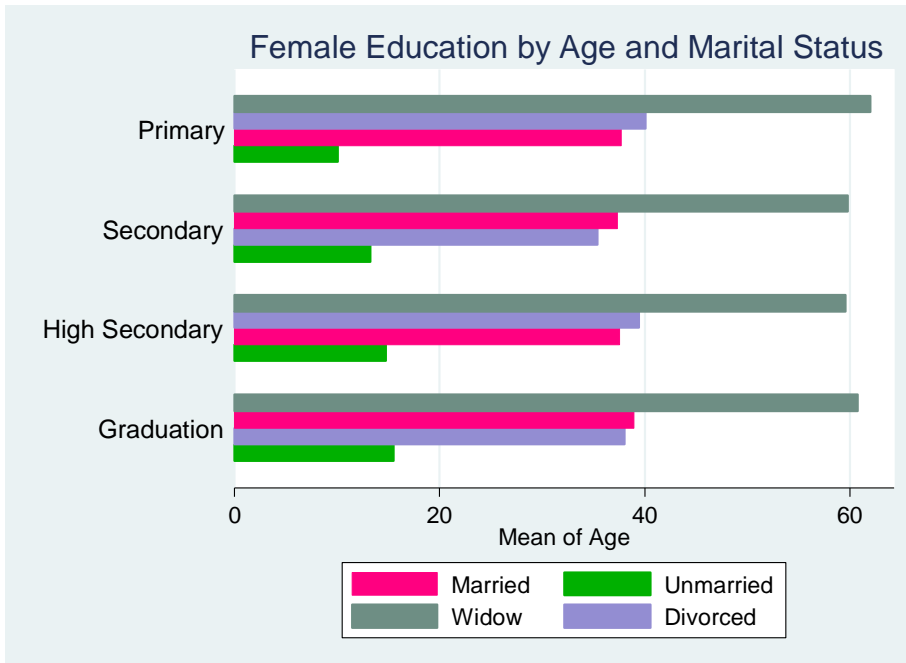
Appendix B. Tables

B.1 Table with description and source

Table B.1 Descriptive table of variables with sources

Variables	Description	Sources
Dependent variables		
Per capita expenditure	It is continuous variable ant taken as the dependent variable for the proxy of the welfare.	PSLM
Independent variables		
Single female	=1 if the female is single (divorced, unmarried and widow) =0 if the female is married	PSLM
Single education P	=1 if the single female has at least primary level of education =0 no level of education	PSLM
Single education S	=1 if the single female has at least secondary level of education =0 no level of education	PSLM
Single education H	=1 if the single female has at least higher secondary or graduation level of education =0 no level of education	PSLM
Female head	= 1 if the single female is the head of the household =0 male head	PSLM
Single income share	=1 if single female contributes something in the household's monthly income =0 no share of income	PSLM
Possesses dwelling	=1 if single female holds any physical asset possession such as property =0 no possession	PSLM
HH size	Size of the household which is continuous variable	PSLM
Age	Age of the members of the household	PSLM
Square age	Square of the age of the members of the household	PSLM
Father's education	Fathers education in years	PSLM
Mother's education	Mother's education in years	PSLM
Dependents	Ratio of the older people 65 years and above to the total number of the households' members	PSLM

Male income share	=1 if adult male (18 and 65 years) has maximum share of the income in HH =0 otherwise	PSLM
Male education P	=1 if the adult male has at least primary level of education =0 no level of education	PSLM
Male education S	=1 if the adult male has at least secondary level of education =0 no level of education	PSLM
Male education H	=1 if the adult male has at least higher secondary or graduation level of education =0 no level of education	PSLM
Technology	=1 if the household contains any connection such as telephone (mobile or landline) and internet =0 otherwise	PSLM
Electricity	=1 if household has electricity =0 otherwise	PSLM
Urban	= 1 for the household in urban area =0 for the rural areas	PSLM
Professional worker	=1 if household member is working with professional education and degree or diploma holder =0 otherwise	PSLM
Technician	=1 if household member is technician =0 otherwise	PSLM
Clerk	=1 if household member is clerk =0 otherwise	PSLM
Female literacy	Literacy rate of the four provinces	Labor Force Survey (LSF)
Urdu	=1 if person speaks Urdu =0 otherwise	PSLM
Punjabi	=1 if person speaks Punjabi =0 otherwise	PSLM
Sindhi	=1 if person speaks Sindhi =0 otherwise	PSLM
Balochi	=1 if person speaks Balochi =0 otherwise	PSLM
Pushto	=1 if person speaks Pushto =0 otherwise	PSLM

B.2 Descriptive Statistics

Table B.2: Summary Statistics

Variables	Observations	Mean	S.D	Min	Max
Per capita expenditure	633650	30777.23	32776.77	0	3001683
Single female	634631	0.1015598	0.3020688	0	1
Single education P	634631	0.0061579	0.0782304	0	1
Single education S	634631	0.0037707	0.0612902	0	1
Single education H	634631	0.0370845	0.1889691	0	1
Female head	634631	0.0069521	0.0830888	0	1
Single income share	634631	0.0204891	0.1416662	0	1
Possesses dwelling	634631	0.3474476	0.4761598	0	1
HH size	634631	10.30461	5.580266	4	67
Age	634631	24.36549	19.09718	0	99
Square age	634631	958.3789	1320.866	0	9801
Father's education	634631	0.0187763	0.4274072	0	23
Mother's education	634631	0.0617871	0.7883154	0	23
Dependents	634631	0.0325717	0.0875556	0	1
Male income share	634631	0.4393892	0.4963131	0	1
Male education P	634631	0.1013597	0.3018046	0	1
Male education S	634631	0.019011	0.1365637	0	1
Male education H	634631	0.0206577	0.1422356	0	1
Technology	634631	0.4611672	0.4984901	0	1
Electricity	634631	0.7925235	0.4055	0	1
Urban	634631	0.4537818	0.4978597	0	1
Professional worker	634631	0.0072751	0.0849834	0	1
Technician	634631	0.0032854	0.057224	0	1
Clerk	634631	0.0026062	0.0509848	0	1
Female literacy	634631	21.23932	22.40444	0	54
Urdu	634631	0.3022575	0.4592366	0	1
Punjabi	634631	0.2276851	0.4193386	0	1

Sindhi	634631	0.1840629	0.3875358	0	1
Pushto	634631	0.1885741	0.3911703	0	1
Balochi	634631	0.0086082	0.09238	0	1

B.3 Multilevel Random Intercept Model with Interactions

Table B.3 Multilevel Random Intercept Models with Interactions
Dependent Variable: Per capita consumption expenditure

Variables	(1)	(2)	(3)	(4)	(5)
Single education P	-0.00281	-0.00289	-0.0138	-0.00351	-0.00315
	(0.00797)	(0.00704)	(0.00712)	(0.00704)	(0.00704)
Single education S	0.229***	0.230***	0.216***	0.228***	0.229***
	(0.0137)	(0.00890)	(0.00899)	(0.00890)	(0.00890)
Single education H	0.0691***	0.0690***	0.0602***	0.0679***	0.0684***
	(0.00521)	(0.00358)	(0.00369)	(0.00359)	(0.00358)
Female head	-0.425***	-0.424***	-0.423***	-0.466***	-0.630***
	(0.0216)	(0.00662)	(0.00662)	(0.00990)	(0.0377)
Female share	0.00917*	0.00928**	0.0101**	0.00894**	0.00921**
	(0.00474)	(0.00409)	(0.00409)	(0.00409)	(0.00409)
Possess dwelling	0.00433	0.00435**	0.00559***	0.00438**	0.00452**
	(0.00446)	(0.00187)	(0.00188)	(0.00187)	(0.00187)
HH size	-0.0182***	-0.0182***	-0.0182***	-0.0183***	-0.0183***
	(0.000686)	(0.000144)	(0.000144)	(0.000144)	(0.000144)
Age	0.00248***	0.00248***	0.00248***	0.00248***	0.00248***
	(0.000108)	(9.09e-05)	(9.09e-05)	(9.09e-05)	(9.09e-05)
Square of age	-3.43e-05***	-3.43e-05***	-3.43e-05***	-3.43e-05***	-3.43e-05***
	(1.74e-06)	(1.35e-06)	(1.35e-06)	(1.35e-06)	(1.35e-06)
Father's education	0.0405***	0.0405***	0.0405***	0.0406***	0.0405***
	(0.00538)	(0.00511)	(0.00511)	(0.00511)	(0.00511)
Mother's education	0.0272***	0.0272***	0.0276***	0.0274***	0.0273***
	(0.00365)	(0.00290)	(0.00290)	(0.00290)	(0.00290)
Dependents	-0.322***	-0.322***	-0.322***	-0.322***	-0.322***
	(0.0256)	(0.00668)	(0.00667)	(0.00668)	(0.00668)
Male share	0.358***	0.358***	0.359***	0.358***	0.358***
	(0.00765)	(0.00229)	(0.00229)	(0.00229)	(0.00229)
Male education P	0.0781***	0.0781***	0.0788***	0.0781***	0.0781***
	(0.00291)	(0.00211)	(0.00211)	(0.00211)	(0.00211)
Male education s	0.0929***	0.0928***	0.0931***	0.0929***	0.0928***
	(0.00529)	(0.00422)	(0.00422)	(0.00422)	(0.00422)
Male education H	0.263***	0.263***	0.264***	0.263***	0.263***
	(0.00621)	(0.00390)	(0.00390)	(0.00390)	(0.00390)
Professional	0.161***	0.164***	0.163***	0.163***	0.164***
	(0.0104)	(0.00631)	(0.00631)	(0.00631)	(0.00631)
Technician	0.0958***	0.0947***	0.0953***	0.0958***	0.0959***
	(0.0153)	(0.0101)	(0.00924)	(0.00924)	(0.00924)
Clerk	0.0538***	0.0538***	0.0535***	0.0537***	0.0539***
	(0.0130)	(0.0104)	(0.0104)	(0.0104)	(0.0104)
Technology in HH	0.282***	0.282***	0.278***	0.282***	0.282***
	(0.00726)	(0.00189)	(0.00193)	(0.00189)	(0.00189)
Electricity in HH	0.235***	0.235***	0.235***	0.235***	0.235***
	(0.00720)	(0.00179)	(0.00179)	(0.00179)	(0.00179)
Urban	0.568***	0.568***	0.568***	0.568***	0.568***
	(0.0425)	(0.00938)	(0.00938)	(0.00938)	(0.00938)
Female literacy	0.00732***	0.00732***	0.00732***	0.00732***	0.00731***

	(0.000164)	(5.83e-05)	(5.83e-05)	(5.83e-05)	(5.83e-05)
Urdu	0.134***	0.134***	0.134***	0.134***	0.134***
	(0.0167)	(0.00337)	(0.00337)	(0.00337)	(0.00337)
Punjabi	0.0479**	0.0479***	0.0479***	0.0479***	0.0479***
	(0.0199)	(0.00380)	(0.00379)	(0.00379)	(0.00379)
Sindhi	0.153***	0.153***	0.153***	0.153***	0.153***
	(0.0283)	(0.00553)	(0.00553)	(0.00553)	(0.00553)
Pushto	0.166***	0.166***	0.166***	0.166***	0.166***
	(0.0271)	(0.00468)	(0.00468)	(0.00468)	(0.00468)
Balochi	0.110***	0.110***	0.110***	0.110***	0.110***
	(0.0354)	(0.00813)	(0.00813)	(0.00813)	(0.00813)
Single female	0.0139***	0.0140***	-5.10e-05	0.0146***	0.0143***
	(0.00365)	(0.00259)	(0.00293)	(0.00259)	(0.00259)
Single female # professional	0.0145				
	(0.0205)				
Single female # technician		0.00650			
		(0.0244)			
Female Head # Technology in HH			0.0369***		
			(0.00363)		
Female Head # Urban				0.0722***	
				(0.0128)	
Female Head # Female Literacy					0.00451***
					(0.000815)
constant	9.241***	9.241***	9.241***	9.241***	9.241***
	(0.0289)	(0.00912)	(0.00912)	(0.00912)	(0.00912)
Observations	633,650	633,650	633,650	633,650	633,650
Number of groups	5,468	5,468	5,468	5,468	5,468
Random Part	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)
PSU					
Var (constant)	0.2301055	0.230106	0.2300651	0.2301149	0.230107
	0.0045182	0.0045309	0.0045303	0.0045312	0.004531
Var(Residuals)	0.1706891	0.1706893	0.1706616	0.1706807	0.170681
	0.0021616	0.0003046	0.0003046	0.0003046	0.0003046
ICC					
	0.5741232	0.5741235	0.5741198	0.5741452	0.5741364
	0.0048362	0.0048362	0.0048364	0.0048363	0.0048363
Other Information					
AIC	705326.1	705326.9	705223.7	705295.4	705296.4
BIC	705701	705701.8	705598.6	705670.2	705671.3

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

B.4 Quantile Regression

Table B.4 Quantile Regression
Dependent Variable: Per capita consumption expenditure

Quantiles Variables	(0.25) (1)	(0.50) (2)	(0.75) (3)	(0.25) (4)	(0.50) (5)	(0.75) (6)
Single female	0.0812*** (0.00501)	0.105*** (0.0026)	0.121*** (0.0033)	0.0143** (0.0055)	0.0199*** (0.0053)	0.0123*** (0.0037)
Single education P				0.119*** (0.0116)	0.0708*** (0.00965)	0.0342** (0.0145)
Single education S				0.200*** (0.0150)	0.253*** (0.0156)	0.361*** (0.0152)
Single education H				0.0808*** (0.00778)	0.0730*** (0.00742)	0.0790*** (0.0072)
Female head				-0.548*** (0.0106)	-0.395*** (0.0131)	-0.284*** (0.0141)
Female share				0.0201*** (0.00660)	0.00174 (0.00433)	-0.0106 (0.00750)
HH size				-0.0718*** (0.000262)	-0.0622*** (0.000236)	-0.0515*** (0.000243)
Age				0.00106*** (0.000198)	0.00121*** (0.000130)	0.00180*** (0.000133)
Square of age				-3.56e-05*** (3.01e-06)	-2.41e-05*** (1.79e-06)	-2.10e-05*** (1.84e-06)
Father's education				0.0552*** (0.00927)	0.0299*** (0.00869)	0.00403 (0.00731)
Mother's education				0.0735*** (0.00552)	0.0683*** (0.00511)	0.0533*** (0.00564)
Male education s				0.202*** (0.00329)	0.194*** (0.00307)	0.188*** (0.00337)
Male education H				0.472*** (0.00768)	0.511*** (0.00667)	0.566*** (0.00633)
Professional				0.568*** (0.0109)	0.521*** (0.0107)	0.477*** (0.0159)
Technician				0.503*** (0.0207)	0.457*** (0.0125)	0.413*** (0.0170)
Clerk				0.520*** (0.0172)	0.428*** (0.0127)	0.326*** (0.0147)
Technology HH				0.439*** (0.00254)	0.363*** (0.00230)	0.342*** (0.00165)
Electricity HH				0.210*** (0.00281)	0.243*** (0.00245)	0.303*** (0.00282)
Urban				0.279*** (0.00226)	0.310*** (0.00166)	0.324*** (0.00202)
Female literacy				0.00034*** (5.15e-05)	0.00050*** (4.67e-05)	0.00092*** (5.72e-05)
Constant	9.487*** (0.00186)	10.04*** (0.00133)	10.52*** (0.00151)	9.805*** (0.00541)	10.09*** (0.00296)	10.31*** (0.00304)
Pseudo R^2	0.0004	0.0008	0.0012	0.2815	0.2516	0.2406
Observations	633,650	633,650	633,650	633,650	633,650	633,650

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1

B.5 Robustness Check

Table B.5 Robustness Check: Random Intercept Models

Variables	Education Institutions			Regions	
	(1)	(2)	(3)	(4)	(5)
	Govt	Private	Long Distance	Rural	Urban
Single female	0.0523***	0.0474***	-0.00367	0.00379	0.0227***
	(0.00585)	(0.00898)	(0.00299)	(0.00404)	(0.00335)
Single education P	-0.0340	-0.0264	-0.0112	-0.00743	0.00218
	(0.0133)	(0.0169)	(0.00946)	(0.00992)	(0.0101)
Single education S	0.398***	0.336***	0.265***	0.198***	0.348***
	(0.0333)	(0.0641)	(0.00936)	(0.0103)	(0.0204)
Single education H	0.136***	0.143***	0.0793***	0.0511***	0.0953***
	(0.00895)	(0.0140)	(0.00407)	(0.00503)	(0.00532)
Female head	-0.322***	-0.309***	-0.426***	-0.392***	-0.469***
	(0.0201)	(0.0263)	(0.00724)	(0.00904)	(0.00981)
Female share	0.0334***	0.000350	0.0145***	0.0149***	0.00377
	(0.00979)	(0.0157)	(0.00461)	(0.00551)	(0.00620)
Possess dwelling	0.0103**	0.00570	-0.00127	-0.00475*	0.0196***
	(0.00437)	(0.00582)	(0.00218)	(0.00263)	(0.00271)
HH size	-0.0240***	-0.0268***	-0.0170***	-0.0216***	-0.0157***
	(0.000331)	(0.000478)	(0.000166)	(0.000226)	(0.000184)
Age	0.0040***	0.00287***	0.0024***	0.00261***	0.00233***
	(0.000239)	(0.000313)	(0.000103)	(0.000142)	(0.000118)
Square of age	-3.88e-05***	-2.49e-05***	-3.31e-05***	-3.53e-05***	-3.30e-05***
	(3.68e-06)	(4.90e-06)	(1.51e-06)	(2.13e-06)	(1.74e-06)
Father's education	-0.0279	0.0136	0.0462***	0.0383***	0.0428***
	(0.0241)	(0.0299)	(0.00528)	(0.00697)	(0.00757)
Mother's education	0.0226*	0.00668	0.0346***	0.0236***	0.0307***
	(0.0117)	(0.0156)	(0.00305)	(0.00378)	(0.00465)
Dependents	-0.0298	0.0588*	-0.331***	-0.356***	-0.293***
	(0.0240)	(0.0311)	(0.00717)	(0.0103)	(0.00873)
Male share	0.342***	0.343***	0.345***	0.350***	0.358***
	(0.00496)	(0.00805)	(0.00266)	(0.00365)	(0.00292)
Male education P	0.0730***	0.128***	0.106***	0.0683***	0.0944***
	(0.00535)	(0.00817)	(0.00241)	(0.00291)	(0.00314)
Male education s	0.219***	0.165***	0.0887***	0.0902***	0.106***
	(0.0122)	(0.0219)	(0.00458)	(0.00521)	(0.00751)
Male education H	0.466***	0.282***	0.308***	0.243***	0.334***
	(0.0204)	(0.0318)	(0.00409)	(0.00464)	(0.00794)
Professional	0.250***	0.167***	0.169***	0.146***	0.212***
	(0.0235)	(0.0221)	(0.00685)	(0.00741)	(0.0127)
Technician	0.102***	0.151***	0.110***	0.0859***	0.120***
	(0.0375)	(0.0399)	(0.00979)	(0.0109)	(0.0184)
Clerk	0.105**	0.0252	0.0714***	0.0314***	0.127***
	(0.0411)	(0.0444)	(0.0110)	(0.0120)	(0.0219)
Technology in HH	0.253***	0.313***	0.276***	0.317***	0.244***
	(0.00428)	(0.00597)	(0.00219)	(0.00282)	(0.00254)
Electricity in HH	0.207***	0.190***	0.230***	0.253***	0.228***
	(0.00416)	(0.00876)	(0.00202)	(0.00355)	(0.00204)
Urban	0.400***	0.368***	0.524***		
	(0.0119)	(0.0151)	(0.0101)		
Female literacy	0.0064***	0.00665***	0.00752***	0.00758***	0.00686***
	(0.000132)	(0.000189)	(6.78e-05)	(8.71e-05)	(7.98e-05)
Urdu	0.121***	0.144***	0.124***	0.197***	0.0844***

	(0.00764)	(0.0114)	(0.00390)	(0.00541)	(0.00439)
Punjabi	0.0479***	0.0345***	0.0446***	0.102***	0.0279***
	(0.00861)	(0.0126)	(0.00439)	(0.00614)	(0.00489)
Sindhi	0.121***	0.0912***	0.148***	0.196***	0.123***
	(0.0116)	(0.0184)	(0.00633)	(0.00826)	(0.00787)
Pushto	0.166***	0.123***	0.166***	0.179***	0.165***
	(0.0101)	(0.0156)	(0.00539)	(0.00742)	(0.00618)
Balochi	0.0551***	0.108**	0.108***	0.102***	0.0967***
	(0.0171)	(0.0544)	(0.00922)	(0.0149)	(0.00963)
Female math skills					
Constant	9.392***	9.650***	9.244***	9.668***	9.354***
	(0.0130)	(0.0197)	(0.00960)	(0.0119)	(0.0101)
Observations	104,470	59,387	469,793	287,621	346,029
Number of groups	5,387	4,561	5,468	2,887	2,596
Random Part	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)	Parameter (S.E)
PSU					
Var (constant)	0.2063435	0.2425574	0.2266829	0.248208	0.188525
	0.0043279	0.0055815	0.0044682	0.0066129	0.0052811
Var(Residuals)	0.1379423	0.1541899	0.1694949	0.1795605	0.1622105
	0.0006206	0.0009315	0.0003519	0.0004759	0.0003915
ICC					
PSU	0.5993379	0.611365	0.5721746	0.5802391	0.5375133
	0.005177	0.0056896	0.0048546	0.0065222	0.0069902
Other Information					
AIC	106610	70340.79	524953	336455.6	365628.1
BIC	106915.8	70628.53	525306.9	336783.2	365961.5

Standard errors in parentheses *** p<0.01, ** p<0.05, * p<0.1