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Does Women Well-being Matter for Demand and Development of Children?

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Abstract

Women well-being has number of socioeconomic and developmental implications. Early child development is directly linked with well-being of mothers and educated women demand lower children. However, the existing literature hardly focused this area, therefore, the current study has investigated the impact of women wellbeing on fertility and early child development. For this purpose, this study constructed women well-being index to measure the well-being of the women by using four dimensions, economic well-being of women, social well-being of women, political awareness of women and satisfaction of women in different aspects of life. Moreover, early child development index has considered as proxy for child development which covers four dimensions of early child development, literacy-numeracy of children, physical growth of children, learning of children and socio-emotional development of children. In this connection, the data was collected from thirty-six districts across the Punjab province, Pakistan. By applying descriptive and regression analysis, the study found that women well-being has positive association with all domains of early child development. However, women well-being and its dimensions have negative relationship with fertility. Therefore, improvement in well-being of women may a suitable strategy especially for developing economies to enhance early child development and to reduce demand of children.

Keywords
Women Well-Being • Early Child Development • Demand of Children

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Introduction

Wellbeing of women has become an important strategy not only to improve living standard and welfare of a household as well as of the economy. As a Sustainable Development Goal (SDG), women wellbeing has number of socioeconomic implications and consequences. Women have significant contribution in economic growth and development of a society (Da Rocha & Fuster, 2006; Fernandez et al, 2014; Ozerkek, 2013; Trommlerova et al., 2015; WHO, 2005). Moreover, improving the status and ability of women is not only useful for economic development, it is also crucial for early child development and human development (Duflo, 2012). Therefore, it is believed that special focus is needed to improving women life and that wellbeing of women have spillover effects.

Women wellbeing is critical to ensuring healthy children, prosperous families, healthy communities and developed nations. Lower women wellbeing and depressed women have adverse consequences for children (Salt et al., 1988; Patel & Prince, 2006; Falceto et al., 2004; Galler et al., 2004; Minkovitz et al., 2005; Galler et al., 2006; Black et al., 2007; Grote et al., 2010; Surkan et al., 2011; Bohren et al., 2015). Furthermore, the children who grow up in families with less wellbeing have lower early child development (Hair, Hanson, Wolfe, & Pollak, 2015). Early child development has direct association with economic, social and emotional wellbeing of the families. Early development of children is directly associated with maternal health (Benner & Kim, 2010) and mother's education and health have positive relationship with child survival. While there is need to understand that female education has no pre-assumed more effect on child survival as compared to male education. According to Ashraf, Abrar-ul-Haq and Ashraf, (2017) educated women are more careful regarding their children's welfare as well as they also demanded fewer children than uneducated women. Similarly, the households where income is in the hands of women have less malnutrition and more children's welfare as compared to the households where income is in the hands of men (Abrar ul Haq, Jali, & Islam, 2016). Likewise, malnutrition in early child development stage limits mental and physical development, educational achievement and economic productivity later in life, powering intergenerational cycles of poverty and undernutrition and lower well-being of women has been identified as one of the key responsible factors of undernutrition (Hoddinott et al., 2013).

Some studies indicate that emotional wellbeing of women enhances physical health of children and it has been the main concern of different researchers (Berghet al., 2008; Weinstock, 2008; DiPietro et al., 2008; O'Donnel et al., 2009; Glover, 2011; Lange & Randler, 2011). Moreover, it is also evident that the emotional stresses of women reduce physical growth of children (Rondó et al., 2003). In this regard, the maternal stress, maternal education, mother's socioeconomic status, smoking, consumption of alcohol has been explored key determinants of physical health of

children (Gennaro, 2005; Aliyu et al., 2010; Keegan et al., 2010; Wadhwa et al., 2001). Furthermore, the early child development is predicted by family wellbeing and parental quality (Roggman, Boyce, & Innocenti, 2008; Rafferty, Griffin, & Robokos, 2010; Newland et al., 2014). Similarly, the early child development suffers when their families are struggling (Newland, 2015).

Moreover, the Parents with low income and low education levels also tend to lower health outcomes, which further lead to lesser children health (Topal, Ozkul, & Dagli, 2017; Case & Paxson, 2002). Parents' health, education and economic support are crucial to enhancing early child development. This postulates that early child development may directly affected from women wellbeing, which is relating to economic, social, emotional and physical wellbeing of women as well as life satisfaction of women. It improves child quality, which is helpful to make quality citizen in future (Vandell, Belsky, Burchinal, Steinberg, & Vandergrift, 2010). Early childhood development is defined as an orderly, predictable process along a continuous path, in which a child learns to handle more complicated levels of moving, thinking, speaking, feeling and relating to others. Furthermore, the physical growth, literacy and numeracy skills, socio-emotional development and readiness to learn are vital aspects of a child's overall development, which is a basis for overall human development (Shieh, Chou, & Ersozlu, 2018)

On the other hand, gender inequality and less wellbeing of women are not only a primary cause of their poverty, but it also argued that it is the most important cause of rapid population growth (Cornwall, 2015). The societies where women are less educated, unhealthy and have little access to productive resources, little income, little decision-making power have large number of children (Brinda, Rajkumar, & Enemark, 2015), Ashraf et al., 2017, Cain, 1984; Dyson & Moore, 1983; & Jacobson, 1992). In family planning, wellbeing and empowerment of women has attained central importance to reduce fertility (Ulbrich, Health, & 2002; Petchesky & Weiner, 1990; Germain & Ordway, 1989). They argue that without education of women, health facilities, freely access to markets, independent decision making in household, political independence, religious independence the policy of direct family planning cannot be helpful to reduce fertility (Ulbrich, Health, & 2002). The importance of gender-based empowerment and equality dynamics have been increased in demographic literature (Bick, 2016; Blanc, 2001; Mason & Smith, 2000; McDonald, 2000; Sen & Batliwala, 2000). Specifically, it has been suggested that economic, social, emotional and political well-being of women wellbeing are important factors as strategy to reduce fertility especially in developing economies of the world. However, it can be achieved by providing basic facilities of education and health to women as well as by providing self-esteem and dignity to women, as women wellbeing may a worthwhile strategy to enhance early child development and to reduce fertility of a society. Therefore, the key objective of the current study is to investigate the impact of women wellbeing on

fertility as well as on early child development to find the answer of question 'Does women wellbeing matter for demand and development of children?'

Literature Review

Women and child development have been the great concern of the researchers. Different researchers studied various implications of women and human well-being (Chandra et al., 2009; Blanchflower & Oswald, 2008; D'Acci, 2011; Davidson et al., 2011; Trzcinski & Holst, 2012; Doepke & Tertilt, 2014; Stillman et al., 2015;). Moreover, in existing literature most of the researchers studied the contribution of women in economic growth and economic development (Such as, Sharma, 2008; Lincove, 2008; Fatima & Sultana, 2009; Klasen & Lamanna, 2009; De la Croix & Donckt, 2010; Fatima, 2011; Chaudhary et al., 2012; Rodenberg & Pahle, 2012; Duflo, 2012; Rees & Riezman, 2012; Tsani et al., 2012; Ekesionye & Okolo, 2012; Mujahid & Zafar, 2012; Mukherjee & Mukhopadhyay, 2013; Fernandez, 2014; Doepke & Tertlt, 2014; Xu, 2015; Khayria & Feki, 2015). However, on the other hand, few researchers have observed the impact of mothers' wellbeing on wellbeing of their children at micro level. They have investigated the impact of various aspects of women wellbeing on early child welfare by using microanalysis. Most of these studies are about parenting, family wellbeing and children wellbeing.

Early child development is directly and indirectly based on family wellbeing especially well-being of mothers. Numerous studies have found that early child development is predicted by parenting wellbeing and quality (McKeown, Pratschke, & Haase, 2003; Newland et al., 2014; Rafferty, Griffin, & Robokos, 2010; Roggman, Boyce & Innocenti, 2008; Ummanel, Şahin Kıralp, & Yiğit, 2017) and also early child development suffers due to lower well-being of parents (Newland, 2014). Frequent literature identified important parenting and family factors to determine child wellbeing (Belsky & Pluess, 2009; Pluess & Belsky, 2013). The parents who have poor wellbeing, it affects the children development as well as to entire system of family (Newland, Coyl & Freeman, 2008; MacKenzie, Nicklas, Brooks-Gunn, & Waldfogel, 2011). Moreover, parental physical and emotional wellbeing is equally important for whole family and children (Case & Paxson, 2002). Similarly, parents' physical health and behaviour are directly related to family functioning which further impact child outcomes (Giallo et al., 2013; Hogg, Ritchie, de Kok, Wood, & Huby, 2013; Pancer et al., 2013; Newland, 2014). According to Gase & Passon (2002), parents are a primary source of inspiration and guideline for their children to improve health, learning, physical growth, social and emotional development. Therefore, the quality of parenting is important for quality development of the children (Newland et al., 2013, 2014). As high quality of parenting is developmentally suitable, steadily meets the child's wants and is used as those needs change in order to adoptive children's well-being (Cabrera et al., 2008; Roggman et al., 2008; Newland et al., 2008, 2013).

Moreover, there are some studies which have concluded direct connections from family wellbeing to child well-being outcomes (Newland et al., 2013). Likewise, the relationship among parenting, maternal health and outcomes of child wellbeing like physical growth, learning of children, social and emotional development of children is being studied consistently from last two decades. In those works, the wellbeing of the women is linked with children qualities such as their health, education and improvement in physical growth (Coyl et al., 2002; Farver et al., 2005). In this regard, many dimensions of family well-being are important for early child wellbeing like child health outcomes, including birth weight, sudden infant death syndrome, childhood injuries and health-risk behaviours (Case & Paxson, 2002). Many studies have found that wellbeing of children is indirectly connected with family well-being through parents' child interaction (Coyl et al., 2002; McLoyd, 1998; Freeman et al., 2010; Rafferty et al., 2010; Ziegert, 2011). Furthermore, maternal employment has also significant association with child nutrition, child education, learning and improvement in early skills of children (Ruhm, 2004; Love et al., 2003; Vogl, 2015). Thus, the review of above literature shows that wellbeing of family and parents are significantly useful to improve early outcomes of children at household level. Women wellbeing may have significant association with early child development at macro as well as across the regions of a country. Moreover, the empirical literature regarding the relationship of women wellbeing with different aspects of early child development among the regions of a country is not found commonly. Therefore, the present study has investigated the impact of different dimensions of women wellbeing on various aspects of early child development across the regions of Punjab, Pakistan. Thus, this study contributes significantly in existing literature related to wellbeing of women and early child development.

While women wellbeing is not only important for early child development, its demographic implications also have been studied by different social scientists as well. There is an inverse association between women wellbeing and fertility (Hindin, 2000; Peddie, Menon, 2013; Teijlingen, & Bhattacharya, 2004). Moreover, there is enough evidence that empowering women through education, health, political awareness and decision-making power reduces their fertility (Kull, 2002; Kritz, 2000; Moursund & Kravdal, 2003; Kohler, Behrman & Skytthe, 2005; Woldemicael, 2009; Upadhyay & Karasek, 2012). Educated women have small family size as compared to uneducated women (El-Zeini, 2008; Monte & Illis, 2009; Woldemicael, 2009; Khan et al., 2009; Upadhyay & Karasek, 2012). Various studies have shown the importance of socioeconomic factors including women status to reduce their fertility (Hirschman, 2001; Rindfuss, Bumpass & John, 1980).

Furthermore, employment opportunities of women have significant contribution to decline their fertility (Wanamaker, 2012). In this connection, the empirical literature shows that fertility is negatively associated with female education and labor force

participation (Mason, 1987). It is also observed that female educational attainment and labor force participation has contributed to fertility decline in developing countries (Jejeebhoy, 1995; Lam & Duryea, 1999). Moreover, Rocha & Fuster (2006) studied the relationship between female employment and fertility in organization economic co-operation and development (O.E.C.D) countries. By applying household's data and General Least Square (GLS) they found positive relationship between female employment and fertility (Fuchs, 2017; Rocha & Fuster, 2006). Furthermore, Sharma (2008) discussed that women education is the key factor to change the social and economic status of a society. Thus, universal primary education of both gender is important for reducing poverty, achieving high growth rate and socio-economic development and higher cost of children reduces the fertility which may cause to increase their per capita savings (Becker, Murphy & Tamura 2007; Fuchs, 2017). Theoretically, fertility affect growth positively as well as negatively. High fertility reduces economic growth by increasing dependency ratio, reducing women labour force participation (Bloom & Williamson, 1998; Klasen, 2000). However, improvement in the status of women through education and labour force participation reduces fertility and enhances economic development (Coleman, 2004). Moreover, female autonomy also decreases fertility rate and increase the expenditure on child well-being (Dyson & Moore, 1983; Abadian, 1996; Gage, 1995; Jejeebhoy, 1995).

Date and Methodology

Data of all variables of women wellbeing such as proportion of women who have job, percentage of women who have personal income, percentage of women have pre-natal and post-natal health facility, proportion of literate women, percentage of women who are used computer and internet, proportion of women having mass media exposure and percentage of women who are satisfied from life, health, living environment, friends and relatives, as well as constructed data related to early child development index (ECDI) and its four dimensions, total fertility and other control variables vitamin, under-five mortality rate, unemployment rate, per capita income of all districts, material for playing of children, percentage of children having books, immunization rate and gender parity index for secondary education (GPS) has been collected from Multiple Indicator Cluster Survey, (2014). Multiple Indicator Cluster Survey (MICS, 2014) was conducted by Punjab Bureau of Statistics (PBS) with the collaboration of United Nations International Children's Emergency Fund (UNICEF). MICS (2014) collected data using questioners related to women, children and other characteristics of household at the regional stage, 9-divisions, 36-districts, and urban and rural areas of province Punjab, Pakistan. The total sample size was 41,000 households, located in 2050 sample clusters. More than half of the population of Pakistan resides in Punjab. This survey covers all districts of Punjab with appropriate sample from each district. MICS has calculated separate information about child development and women wellbeing through distinct questioners.

Furthermore, in the light of above raised question, the following econometric models have been estimated. First five equations are related to the association of women wellbeing with early child development and its dimensions. Other five equations are explained the connections of women wellbeing and its dimensions with demand for children.

$$ECDI_i = a + b_1VA_i + b_2WWI_i + b_3LMP_i + b_4UER_i + e_i \tag{1}$$

$$LNC_i = a + b_1WWI_i + b_2LMP_i + b_3UER_i + b_4LMB_i + e_i \tag{2}$$

$$LOC_i = a + b_1WWI_i + b_2LMP_i + b_3UER_i + b_4LMB_i + b_5VA_i + e_i \tag{3}$$

$$PGC_i = a + b_1WWI_i + b_2LMP_i + b_3UER_i + b_4LMB_i + e_i \tag{4}$$

$$SEDC_i = a + b_1WWI_i + b_2LMP_i + b_3UER_i + b_4LMB_i + e_i \tag{5}$$

$$TF_i = a + b_1WWI_i + b_2PCI_i + b_3GPS_i + u_i \tag{6}$$

$$TF_i = a + b_1EWW_i + b_2PCI_i + b_3GPS_i + u_i \tag{7}$$

$$TF_i = a + b_1SWW_i + b_2PCI_i + b_3GPS_i + u_i \tag{8}$$

$$TF_i = a + b_1PAW_i + b_2PCI_i + b_3GPS_i + u_i \tag{9}$$

$$TF_i = a + b_1SOW_i + b_2PCI_i + b_3GPS_i + u_i \tag{10}$$

Where,

ECDI = Early Child Development Index
LNC = Literacy and Numeracy of Children
LOC = Learning of Children
PGC = Physical Growth of Children
SEDC = Socio-emotional Development of Children
WWI = Women Wellbeing Index
VA = Vitamin A
LMP = Material for Playing of Children
UER = Unemployment Rate
LMB = Percentage of Children Having Books
TF = Total Fertility Rate
EWW = Economic Wellbeing of Women
SWW = Social Wellbeing of Women
PAW = Political Awareness of Women
PCI = Per Capita Income
GPS = Gender Parity Index
SOW = Life Satisfaction of Women
e, u = Error Terms
(i) = Subscript used for Cross Section (District)

In this connection, the demand of children has measured by total fertility rate of specific district. To quantify women wellbeing, this study has calculated a composite index by using four dimensions, economic well-being of women, social well-being of women, and political awareness of women and satisfaction of women in various aspects of life. Moreover, the early child development index (ECDI) has considered as proxy for early child development which had calculated by Punjab Bureau of Statistics with the collaboration of United Nations International Children's Emergency Fund (UNICEF) in Multiple Indicator Cluster Survey MICS (2014). ECDI is a composite measure of four dimensions, literacy and numeracy of children, physical growth of children, learning of children and socio-emotional development of children. Thirty-six districts of Punjab province are considered as study area. The measurement and description of variables are given below;

a) Women Wellbeing Index (WWI)

Women Wellbeing Index has calculated by using four dimensions, economic well-being of women, social wellbeing of women, satisfaction of women in different aspects of life as well as political awareness of women. Economic wellbeing of women has estimated by considering the percentage of women in a district (region) who have jab and income. Social wellbeing of women has quantified by using three dimensions education of women, health of women and women efficacy in information technology. Education of women is measured by considering the percentage of literate women from age twenty-four to onward. Proportion of women who have pre-natal and post-natal health facility in specific region has used as proxy for women health. However, third variable women efficacy in information technology is measured by calculating the percentage of women who are frequently used computer and internet. Women exposure to mass media is used as proxy for political awareness. It is assumed that women who are used mass media like newspaper, television and radio have more political awareness as compared to others. Last dimension, satisfaction of women is measured by using five aspects of satisfaction, life satisfaction, satisfaction about health, satisfaction about living environment, satisfaction about friends and relatives. To construct composite index of women wellbeing with mentioned four dimensions Principal Component Analysis (PCA) method has applied.

b) Early Child Development Index (ECDI)

Early Child Development Index (ECDI) has used as proxy for child development. ECDI is a composite measure of four dimensions such as physical growth of children, socio-emotional development of children, literacy and numeracy of children and learning ability of children. ECDI indicates the proportion of children in a specific district who are on track of early child development in mentioned four dimensions. Literacy and numeracy of children means children are identified as

being developmentally on track based on whether they can identify/name at least ten letters of the alphabet, whether they can read at least four simple, popular words and whether know the name and recognize the symbols of all numbers from 1 to 10. If at least two of these are true, then the child is considered developmentally on track.

Similarly, physical growth of children means that, if the child can pick up a small object with two fingers, like a stick or a rock from the ground and/or the mother/caretaker does not indicate that the child is sometimes too sick to play, then the child is regarded as being developmentally on track in the physical domain. Social and emotional development of children indicates that children are considered to be developmentally on track if two of the following are true: If the child gets along well with other children, if the child does not kick, bite or hit other children and if the child does not get distracted easily. Learning ability of children means that, if the child follows simple directions on how to do something correctly and/or when given something to do, is able to do it independently, then the child is considered to be developmentally on track in this domain. Punjab Bureau of Statistics PBS calculated ECDI in its report of MICS (2014 with four mentioned domains with the collaboration of UNICEF. This study used ECDI and its four dimensions as proxy for early child development.

Data Analysis

Various techniques have applied for empirical estimation of data. In this regard, both descriptive and inferential statistics have been applied. Women wellbeing index has been constructed by applying Principal Component Analysis (PCA) method. PCA is a multivariate statistical technique that can be used to reduce the number of variables in a dataset by converting them into a smaller number of components; each component being a linear weighted combination of the initial variables (Vyas & Kumaranayka, 2006). The first component, which explains the largest part of the variation in the data, is chosen as the women wellbeing index. Moreover, to investigate the degree of relationship and correlation among various dimensions of women wellbeing, total fertility and different domains early child development scatter graphs, the Ordinary Least Square (OLS), different diagnostic tests like coefficient stability test (CUSUM and CUSUM SQUARE), serial correlation test, heteroscedasticity test, multicollinearity test and partial correlation coefficient have been applied.

Empirical Findings

Degree of relationship and correlation among different dimensions of women wellbeing, total fertility and various domains of early child development has estimated by applying descriptive statistics, regression analysis, diagnostic tests and correlation matrix. Main empirical findings are divided in three parts, first related

to PCA results about women wellbeing index and its dimensional indices, second relevant to the degree of relationship and correlation among women wellbeing, fertility and early child development and third about diagnostic tests as discussed in following subsections.

PCA Weights for Women Wellbeing

PCA computes four eigenvalues, reports 1 average value about economic wellbeing of women, social wellbeing of women, political awareness of women and satisfaction of women in various aspects of life. Four components are extracted from four possible components. The values of 4 components are 2.0230, 1.1804, 0.7126 and 0.0839 respectively, which indicates that principal component 1 has higher value as compared to others. Proportions of 4 components are 0.5058, 0.2951, 0.1782 and 0.0210 respectively. Principal component (PC) 1 has higher proportion with value 2.0230 from 4. First two components have 0.8009 cumulative proportion. We have selected PC 1 in which economic wellbeing of women explains -0.0991 variation, 0.3159 by satisfaction of women, 0.6636 by political awareness and 0.6707 by social wellbeing of women.

Social Wellbeing of Women

Social wellbeing of women reports values 2.3588, 0.4341 and 0.2070 for 3 principal components respectively. PC 1 indicates higher value 2.3588 from 3 with 0.7863 proportion. Selected PC 1 assigns 0.5425 weight of variation by women health, 0.5971 by women efficacy in information technology and 0.5907 by women education.

Satisfaction of Women in Various Aspects of Life

Furthermore, the PCA reports eigenvalues of 5 components of satisfaction of women in five aspects, life satisfaction, and satisfaction about health, satisfaction about living environment, satisfaction about friends and relatives. PC 1 comprises 3.2183 value from 5 with higher proportion 0.6437. Women satisfaction about living environment shows 0.5003 variation in PC 1, 0.4275 by women satisfaction about friends, 0.2968 by women satisfaction about health, 0.4817 by women satisfaction about life and 0.4966 by women satisfaction about other relatives.

Political Awareness of Women

Similarly, the eigenvalues of 3 components indicate higher value 2.3090 of PC 1 with higher proportion 0.7697. PC 1 reports 0.5275 weight of women listening radio on the basis of variation. O.6205 attains women reading newspaper and women watch television achieve 0.5802 weight.

Economic Wellbeing of Women

Women have jobs attains 0.7071 contribution in PC 1 variation and same achieve by women have income. On the other hand, eigenvalue of PC 1 is 1.8554 from 2 with proportion of 0.9272, PC 2 shows only 0.0728 proportion with 0.1456 eigenvalue which is very low as compared to PC 1. PC 1 is adopted for economic wellbeing calculation. Degree of relationship and correlation of women wellbeing with early child development and fertility has reported in next section 4.2.

Degree of Relationship and Correlation among Women Wellbeing, Fertility and Early Child Development

Moreover, this study estimated the degree of relationship and correlation of women wellbeing with early child development as well as with its four domains, literacy and numeracy of children, physical growth and learning of children and socio-emotional development of children. Similarly, degree of association and correlation of women wellbeing and its four dimensions, economic well-being of women, social wellbeing of women, political awareness of women and satisfaction of women in different aspects of life with demand of children (total fertility) has been investigated and the main empirical findings are reported in following sub-section 4.2.1 and 4.2.2.

Women Wellbeing and Early Child Development

In this connection, the Figure 1, 2, 3, 4 and 5 respectively show that women wellbeing has positive association with early child development and its four domains, literacy and numeracy, learning of children, physical growth of children and socio-emotional development of children. Figure 1 describes the relationship between women wellbeing and early child development. Women wellbeing has quantified
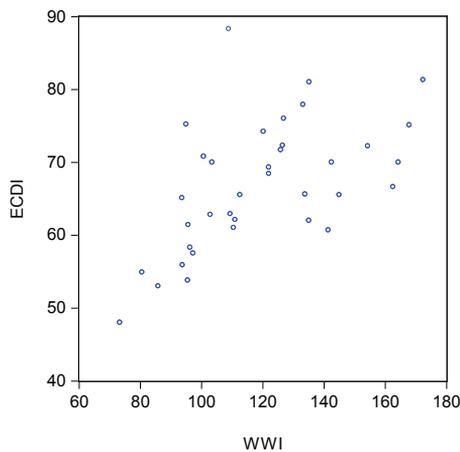

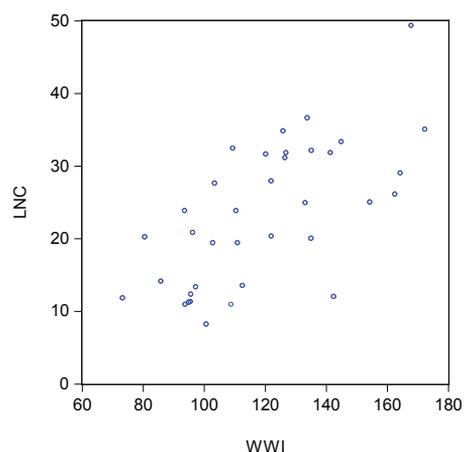*Figure 1. Association between Women Wellbeing Index (WWI) and Early Child Development Index (ECDI)*

Figure 2. Association between Women Wellbeing Index (WWI) and Literacy and Numeracy of Children (LNC)
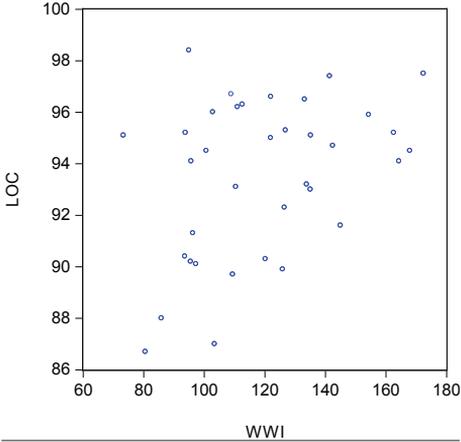
Figure 3. Association between Women Wellbeing Index (WWI) and Learning of Children (LOC)
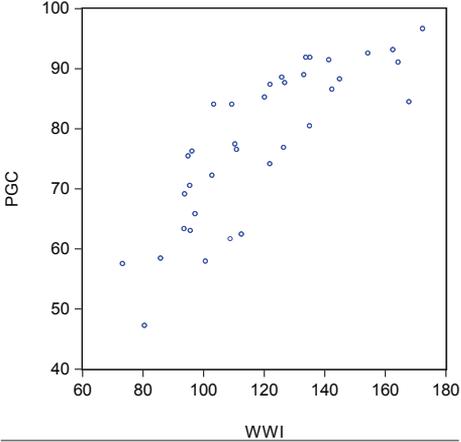

Figure 4. Association between Women Wellbeing Index (WWI) and Physical Growth of Children (PGC)
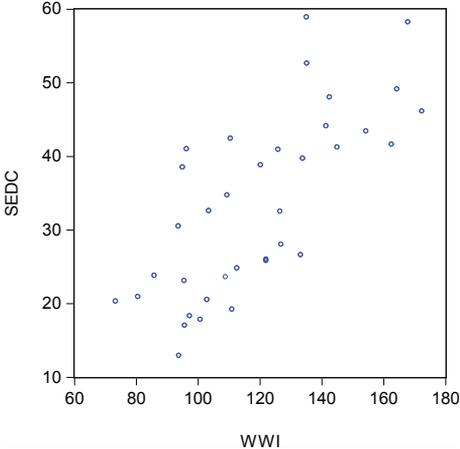

Figure 5. Association between Women Wellbeing Index (WWI) and Socio-emotional Development of Children (SEDC)

by calculating a composite index (women wellbeing index) with four dimensions, economic well-being of women, political awareness of women, social well-being of women and satisfaction of women in different aspects of life. Moreover, the Figure 2 depicts the relationship between women wellbeing and literacy-numeracy of children. Similarly, the Figure 3 shows the association of women wellbeing with learning of children. Likewise, the relationship of women wellbeing with physical growth of children has indicated in figure 4. Lastly, the Figure 5 postulates the connection between women wellbeing and socio-emotional development of children.

Furthermore, the regression estimates of five econometric equations in table-1 depict that women wellbeing index (WWI) has positive relationship with early child development index (ECDI) and its four domains, literacy and numeracy of children

(LNC), learning of children (LOC), physical growth of children (PGC) and socio-emotional development of children (SEDC). Women wellbeing has positive and significant association with early child development at 1 percent level of significance with probability value of 0.0018. Coefficient value 0.1673 shows that 1 unit increase in women wellbeing improves 0.1673 unit early child development. From other control variables, vitamin (VA) has positive and significant relationship with early child development. However, material for playing (LMP) and unemployment rate (UER) are associated insignificantly with early child development. Explanatory power of first equation is 0.4293 with acceptable F-statistic 5.8320. Moreover, the results of second estimated econometric equation indicate that women wellbeing has positive and significant connection with literacy-numeracy of children with coefficient 0.1434 at 10 percent level of significance with probability value 0.0764. Furthermore, from remaining three estimated econometric equations, it is also concluded that women wellbeing has positive and significant effect on learning of children, physical growth of children and socio-emotional development of children with coefficient 0.1345, 0.3828 and 0.2731 respectively. Moreover, regarding significance level, women wellbeing and learning of children are significant at 5 percent, and with other two domains women wellbeing is significant at 1 percent level of significance. Other three econometric models have explanatory power 0.8423, 0.7250 and 0.6885 with acceptable F-statistics 32.0639, 20.4410 and 17.1365 respectively.

Table 1
Women Wellbeing and Early Child Development

Dependent Variable	Independent Variables						R2	F-statistic
	WWI	LMP	VA	UER	LMB	C		
ECDI	0.1673*	0.1148	0.1411***	-0.7784	-	103.2197	0.4293	5.8320
LNC	0.1434***	0.0426	-	0.0686	0.5178***	-6.1736	0.4930	7.5360
LOC	0.1345**	0.2339*	0.0658	-0.1357	1.0208*	-2.2124	0.8423	32.0639
PGC	0.3828*	0.2125***	-	0.6100	0.1482	-37.0722	0.7250	20.4410
SEDC	0.2731*	0.3402**	-	-1.4332***	0.4238	-10.4870	0.6885	17.1365

Source: Author's Calculation
Note: (*) (**) (***) indicate significant at (1) (5) (10) % level of significance

Correlation matrix in table-2 postulates that women wellbeing index (WWI) has higher degree correlation with early child development index (ECDI), literacy-numeracy of children (LNC), learning of children (LOC), physical growth of children (PGC) and socio-emotional development of children (SEDC). However, with learning of children degree of correlation is lower as compared to other domains. Women wellbeing has 0.5596, 0.6649, 0.3789, 0.8238 and 0.7319 degree of coefficient with early child development and above mentioned four domains respectively.

Table 2
Correlation Matrix of Women Wellbeing and Early Child Development

	ECDI	LOC	LNC	PGC	SEDC	WWI
ECDI	1.000000	0.407163	0.378926	0.480403	0.371747	0.559685
LRN	0.407163	1.000000	-0.080053	0.283323	0.079657	0.378924
LTN	0.378926	-0.080053	1.000000	0.681912	0.624891	0.664966
PHS	0.480403	0.283323	0.681912	1.000000	0.694885	0.823897
SFL	0.371747	0.079657	0.624891	0.694885	1.000000	0.731988
WWI	0.559685	0.378924	0.664966	0.823897	0.731988	1.000000

Source: Author's Calculation

Women Wellbeing and Fertility

In addition, the present study has also investigated the relationship of women wellbeing and its four dimensions, economic wellbeing, social wellbeing, political awareness of women and satisfaction of women in various aspects of life with fertility. By reporting five scatter Figure 6, 7, 8, 9 and 10, this study have found that women wellbeing and its mentioned four dimensions have negative relationship with fertility.

Regression estimates in Table-3 show that women wellbeing index (WWI) and its three dimensions, economic wellbeing of women (EWW), social wellbeing of women (SWW) and satisfaction of women (SOW) in different aspects of life have negative and significant connection with total fertility (TF) rate. However, political awareness of women (PAW) has negative and insignificant relationship with fertility. The coefficients of women wellbeing and its three dimensions, economic well-being of women, social well-being of women, and
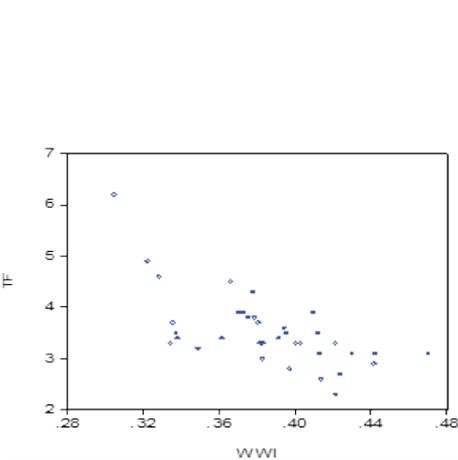

Figure 6. Relationship between Women Wellbeing Index (WWI) and Total Fertility (TF)
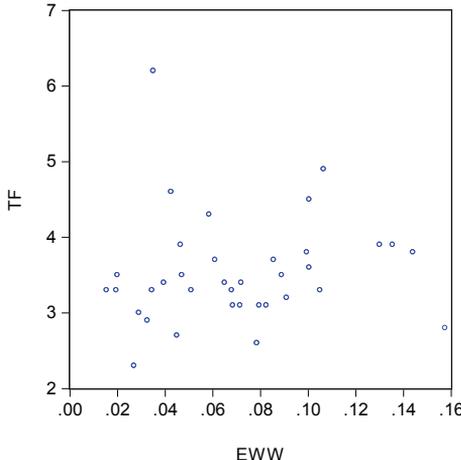

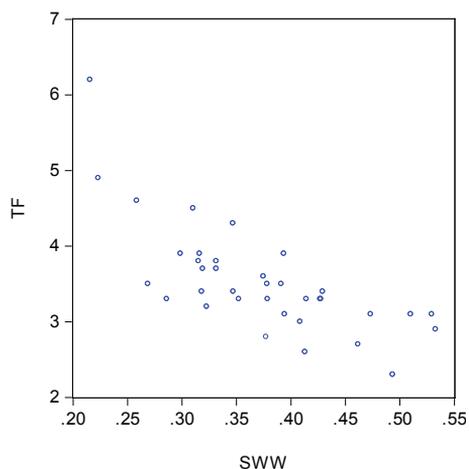Figure 7. Relationship between Economic Wellbeing of Women (EWW) and Total Fertility (TF)

Figure 8. Relationship between Social Wellbeing
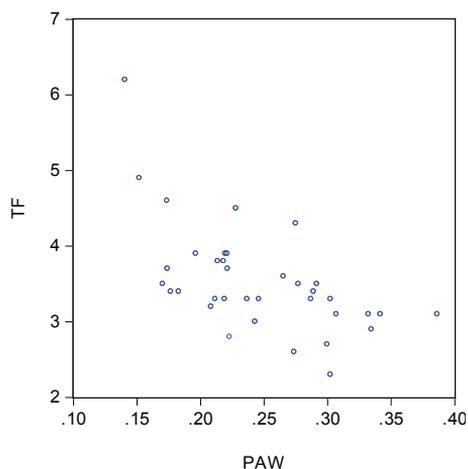of Women (SWW) and Total Fertility (TF)

Figure 9. Relationship between Political Aware-
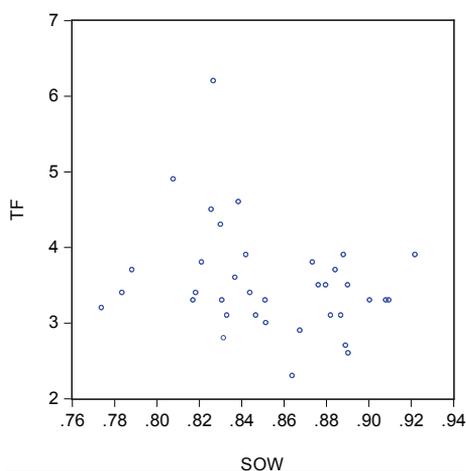ness of Women (PAW) and Total Fertility (TF)

Figure 10. Relationship between Satisfaction of
Women (SOW) in various aspects of life and Total
Fertility (TF)

satisfaction of women in different aspects of life are -9.2109, -0.0858, -5.6417, and -4.9743 with respective probability 0.0259, 0.0879, 0.0025 and 0.0603. Political awareness of women negatively but insignificantly associated with fertility with probability value of 0.2402. Explanatory power of mentioned five models are 0.4849, 0.4511, 0.5492, 0.4609, and 0.4229 respectively. From other control variables, per capita income (PCI) has been identified as useful factor to reduce fertility because it has negative connection with fertility in all econometric models. Gender parity index (GPS) has insignificant relationship with fertility. GPS is calculated MICS (2014) showing female to male ratio of secondary school enrollment.

Table 3
Women Wellbeing and Fertility

DV	Independent Variables								R2	F-Statistic
	WWI	EWW	SWW	PAW	SOW	PCI	GPS	C		
TF	-9.21**	-	-	-	-	-7.94***	0.29	10.7492	0.49	10.05
TF	-	-0.09***	-	-	-	-3.56*	-0.19	3.1061	0.45	8.80
TF	-	-	-5.64*	-	-	-4.59	0.23	7.6855	0.55	12.99
TF	-	-	-	-3.30	-	-9.88***	-0.15	9.3914	0.42	7.81
TF	-	-	-	-	-4.97***	-15.00*	-0.22	15.4294	0.46	9.12

Source: Author's Calculation

Note: (*) (**) (***) indicate significant at (1) (5) (10) % level of significance

Correlation matrix in Table-4 indicates negative correlation coefficient of women wellbeing index (WWI), economic well-being of women (EWW), social well-being of women (SWW) and political awareness of women (PAW) and satisfaction of women (SOW) in different aspects of life with total fertility (TF) rate. The values are -0.6610, -0.0902, -0.7311, -0.5963 and -0.2569.

Table 4
Correlation Matrix of Women Wellbeing and Fertility

	EWW	TF	WWI	SOW	PAW	SWW	PCI	GPS
EWW	1.000000	-0.090235	-0.165990	0.241544	-0.007561	0.038580	-0.113604	-0.249101
TF	-0.090235	1.000000	-0.661095	-0.256923	-0.596345	-0.731102	-0.621387	-0.436606
WWI	-0.165990	-0.661095	1.000000	0.415637	0.924429	0.938275	0.716159	0.686766
SOW	0.241544	-0.256923	0.415637	1.000000	0.221339	0.267706	-0.020535	0.172379
PAW	-0.007561	-0.596345	0.924429	0.221339	1.000000	0.903074	0.762293	0.649025
SWW	0.038580	-0.731102	0.938275	0.267706	0.903074	1.000000	0.748533	0.624569
PCI	-0.113604	-0.621387	0.716159	-0.020535	0.762293	0.748533	1.000000	0.563477
GPS	-0.249101	-0.436606	0.686766	0.172379	0.649025	0.624569	0.563477	1.000000

Source: Author's Calculation

Diagnostic Tests

Breush-Godfrey Serial Correlation LM test, ARCH Heteroscedasticity test and Variance of Inflation Factor (VIF) depict that there is no problem of serial correlation, heteroscedasticity and multicollinearity in all estimated econometric models. CUSUM and CUSUM SQUARE show that coefficients all econometric models are stable at 5 percent level of significance.

Women Wellbeing and Early Child Development
Results of all Diagnostic Tests

Diagnostic Test	F-St	Prob.	F-St	Prob.	F-St	Prob.	F-St	Prob.	F-St	Prob.
ARCH Heteroskedasticity Test	0.41	0.22	0.99	0.42	0.96	0.45	0.00	0.95	0.01	0.91
B-Godfrey Serial Correlation LM Test	0.05	0.94	1.81	0.18	0.37	0.68	1.10	0.34	2.11	0.13
Mean Variance Inflation Factor	1.41		1.38		1.47		1.51		1.44	

Source: Author's Calculation
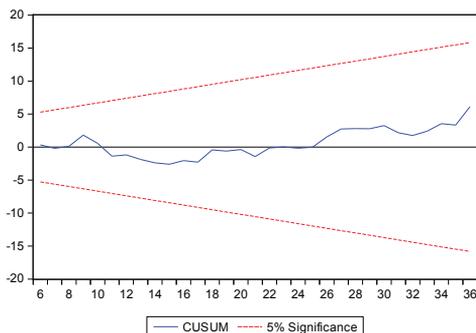
Figure 11. Women Wellbeing and Early Child Development (Coefficients Stability of First Regression Equation through CUSUM Estimates)
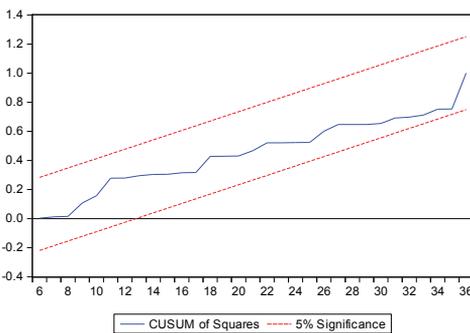
Figure 12. Women Wellbeing and Early Child Development (Coefficients Stability of First Regression Equation through CUSUM of Squares Estimates)
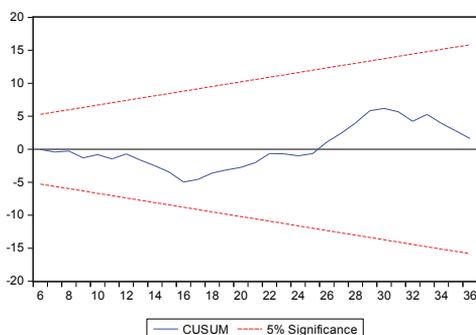
Figure 13. Women Wellbeing and Early Child Development (Coefficients Stability of Second Regression Equation through CUSUM Estimates)
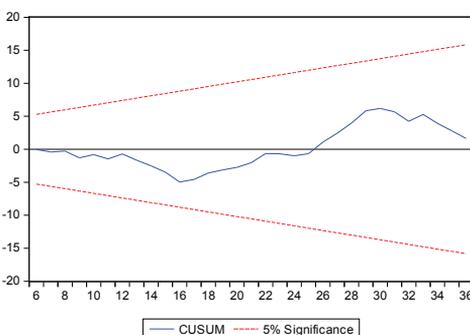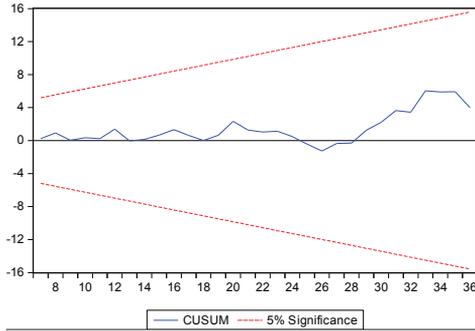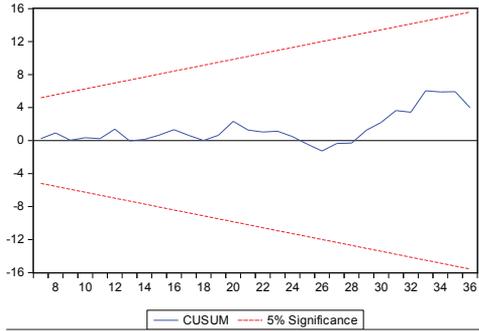

Figure 14. Women Wellbeing and Early Child Development (Coefficients Stability of Second Regression Equation through CUSUM of Squares Estimates)
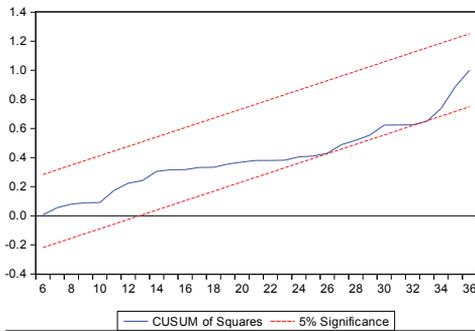
Figure 15. Women Wellbeing and Early Child Development (Coefficients Stability of Third Regression Equation through CUSUM Estimates)

Figure 16. Women Wellbeing and Early Child Development (Coefficients Stability of Third Regression Equation through CUSUM of Squares Estimates)

Figure 17. Women Wellbeing and Early Child Development (Coefficients Stability of Fourth Regression Equation through CUSUM Estimates)
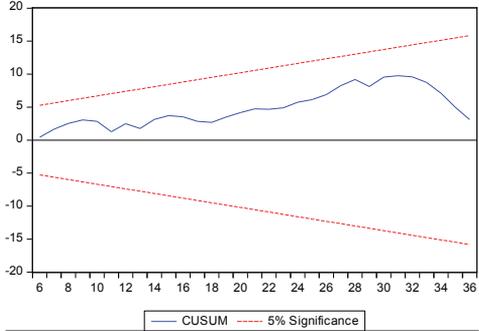

Figure 18. Women Wellbeing and Early Child Development (Coefficients Stability of Fourth Regression Equation through CUSUM of Squares Estimates)
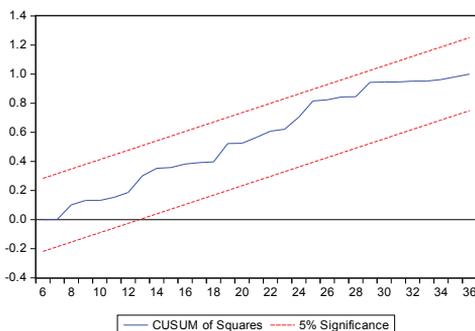

Figure 19. Women Wellbeing and Early Child Development (Coefficients Stability of Fifth Regression Equation through CUSUM Estimates)
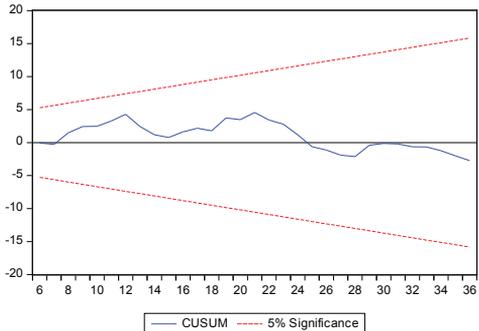

Figure 20. Women Wellbeing and Early Child Development (Coefficients Stability of Fifth Regression Equation through CUSUM of Squares Estimates)

Women Wellbeing and Fertility
Results of all Diagnostic Tests

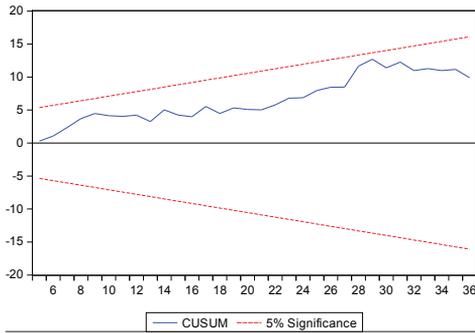| Diagnostic Test	F-St	Prob.	F-St	Prob.	F-St	Prob.	F-St	Prob.	F-St	Prob.
ARCH Heteroskedasticity Test	0.00	0.93	0.04	0.82	0.02	0.87	0.02	0.87	0.08	0.77
B-Godfrey Serial Correlation LM Test	0.47	0.62	0.01	0.98	0.41	0.66	1.11	0.89	0.31	0.73
Mean Variance Inflation Factor	1.61		1.35		2.12		2.21		1.71	

Source: Author's Calculation

Figure 21. Women Wellbeing and Fertility (Co-efficients Stability of First Regression Equation through CUSUM Estimates)
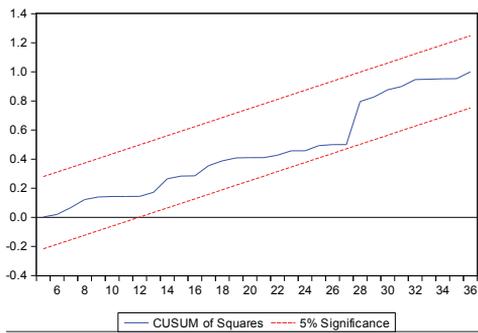

Figure 22. Women Wellbeing and Fertility (Co-efficients Stability of First Regression Equation through CUSUM of Squares Estimates)

Figure 23. Women Wellbeing and Fertility (Coef-ficients Stability of Second Regression Equation through CUSUM Estimates)

Figure 24. Women Wellbeing and Fertility (Coef-ficients Stability of Second Regression Equation through CUSUM of Squares Estimates)

Figure 25. Women Wellbeing and Fertility (Coefficients Stability of Third Regression Equation through CUSUM Estimates)

Figure 26. Women Wellbeing and Fertility (Coefficients Stability of Third Regression Equation through CUSUM of Squares Estimates)
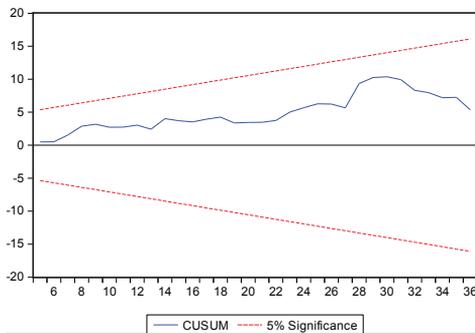
Figure 27. Women Wellbeing and Fertility (Coefficients Stability of Fourth Regression Equation through CUSUM Estimates)

Figure 28. Women Wellbeing and Fertility (Coefficients Stability of Fourth Regression Equation through CUSUM of Squares Estimates)

Figure 29. Women Wellbeing and Fertility (Coefficients Stability of Fifth Regression Equation through CUSUM Estimates)
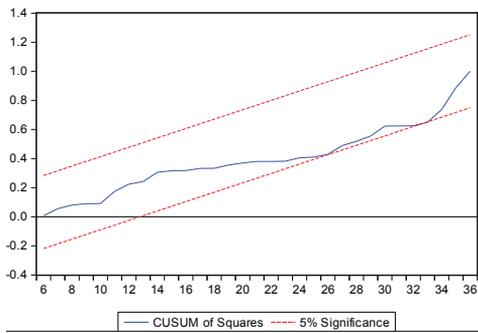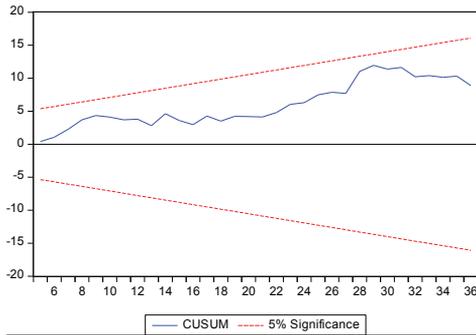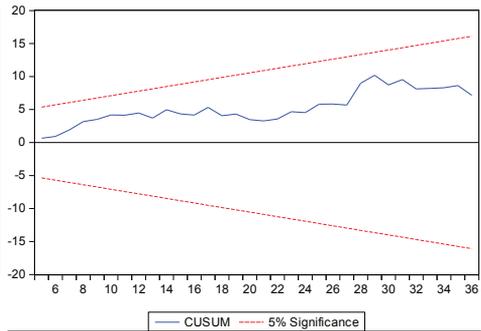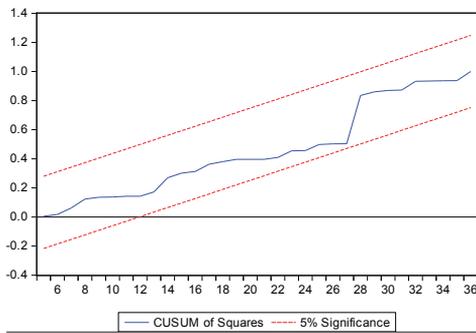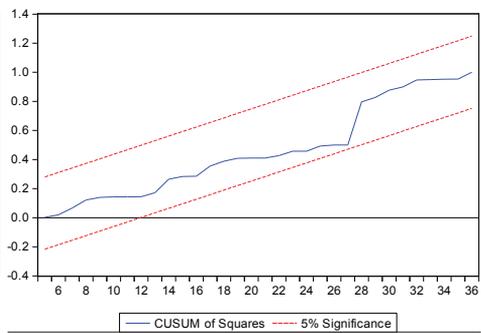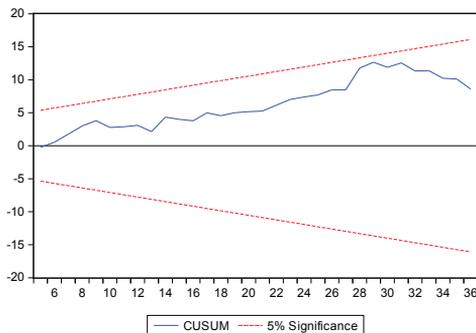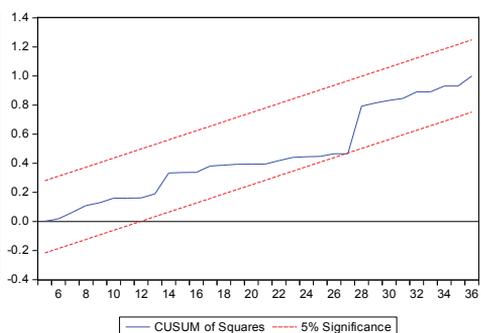
Figure 30. Women Wellbeing and Fertility (Coefficients Stability of Fifth Regression Equation through CUSUM of Squares Estimates)

Conclusion and Recommendation

Present study has been estimated the impact of women wellbeing on demand and development of children across the districts of Punjab, Pakistan. Women wellbeing were quantified by constructing a composite index using four dimensions, economic well-being of women, social wellbeing of women, political awareness of women and satisfaction of women in various aspects of life. Principal Components Analysis (PCA) was applied to assigning weight in the construction of index. Total fertility rate was considered a proxy for demand of children. Early child development was measured by using early child development index with four domains, literacy-numeracy of children, learning of children, physical growth of children and socio-emotional development of children. By applying descriptive and regression analysis, this study found positive association of women wellbeing with early child development and its domains. While fertility was negatively correlated with women wellbeing and its dimensions. These empirical findings can be justified with existing literature related to the significance of women in the improvement of children and reduction of fertility. Promoting early child development is a targeted goal at national level as well as at global level. United Nations (UN) included early child development as sustainable goal and target for 2030 in all over the world. Almost, 250 million children, (43%) proportion of under five-year age in developing economies are at risk of not attaining early child development properly (Black et al, 2016). This gap in human capital potential is partly because of many factors including lack of nurturing care of children. Nurturing care of children is directly linked with nutritional needs, protection from threats, opportunities of early learning and emotionally support from family especially from parents for health care, feeding care and behavioural care (Britto et al., 2017). Mothers' wellbeing has significant impacts on all mentioned components of children nurturing as concluded by Coyl et al. (2002), Farver et al. (2005), Newland et al. (2014), Rafferty, Griffin, & Robokos (2010), Roggman, Boyce & Innocenti (2008). The ability of a mother to support the health and development of her children is critically dependent on her own health and wellbeing (Wang & Eccles, 2012). Lower well-being of women is associated with low birth weight, stunting, childbirth complications, and less survival of children (Walker et al, 2015). Social, economic, emotional and political wellbeing of women is helpful to enhance child development as supported the current findings of this study. Learning, physical growth, nutritional improvement and emotional wellbeing of children are directly connected with women wellbeing. Women enhance their family income and improve child nutrition and health through labour force participation (Atkin, 2009) which dually effect to reduce poverty and on family standard of living (Augustine & Papanyan, 2016). Female spend more as compared to men on family well-being (Hoddinott & Haddad, 1995). Female have more saving behaviour and use credit more efficiently (Klasen & Lammana, 2009; Goetz & Gupta, 1996). The provision of credit or support through microcredit from NGO, s and financial institutes to

female, it will enhance societal development (Ekesionye & Okolo, 2012; Grasmuck & Espinal, 2000; Schuler & Hashemi, 1994). Female autonomy will decrease fertility rate and increase expenditure on child well-being (Abrar et al, 2017). Wellbeing of women increases opportunity cost of children, increase in cost of children reduces fertility which may increase saving per capita (Abrar et al, 2017). Empirical findings of this study support the theory of women wellbeing, demand and development of children, it affects positively to all dimensions of early child development. While fertility is affected negatively from all domains of women wellbeing.

In the light of empirical findings, improvement in all dimensions (economic wellbeing of women, social wellbeing of women, political awareness of women and satisfaction of women) of women wellbeing is suggested as useful strategy to enhance all domains (literacy-numeracy of children, learning of children, physical growth of children and socio-emotional development of children) of children and to reduce fertility. Developing economies have higher fertility and lower development of children as compared to developed economies. Lower child survival, malnutrition and lower immunization are clearly observable in developing countries. Lower well-being of women is one of the responsible factors of higher fertility and lower child development. Increasing education of women, provision of health facilities to women, creating job opportunities for women and increasing living standard of women is a significant and optimal strategy to reduce fertility and to enhance child development especially in developing economies.

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