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Time Allocation Pattern Across Region and Gender: A Case Study of Pakistan

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***Abstract*:** Allocation of time for various activities is determined by economic and non economic factors such as gender; particularly the gender division of household work is a useful indicator for assessing social norms and customs. The major objective of the present study is to assess the allocation of time for market, expenditure saving market and non-market activities by gender, age groups (10-14, 15-25, 26-45 and 46-60), across region and province. The study is unique because paid market hours, expenditure saving market hours and household hours are analyzed separately for individuals residing in Pakistan. Data is gathered from Labour Force Survey (LFS) of Pakistan for the year 2017-18. Both descriptive statistics and empirical assessment is employed for the assessement purpose. The study indicates that average hours of female household work are higher than male, especially in urban and rural Punjab. Findings also indicate that female average household hours are higher for the age group 26-45. As in this age group they have relatively higher responsibilities of child bearing and rearing and are involved in other domestic chores. Average paid market hours of male work are higher than female, as he is considered the bread earner of a family. In spite of the fact that in recent decades a growing number of women are entering the labour force,her time allocation for household work has not changed significantly. This study suggests that awareness about a fair distribution of responsibilities between men and women should be created in order to reduce the significant gender gap in labour force participation in Pakistan which will help to achieve set target 8.8 of SDG.

Key Words: Time Allocation, Household work, Paid Market Hours, Unpaid Market Hours, and OLS.

1. Introduction

The locus of most economic decision-making are households that play its role as producers, investors, and consumers. Different types of resources available are allocated among various production and consumption activities by the households. Of the resources available to the household, a crucial role is played by time in determining the well being of individual members. Time is a scarce resource. Allocation of time to various activities is persuaded by economic and non-economic factors that vary by gender, particularly the gender division of household work/chores, which is a useful indicator to assess social norms. Time is usually divided into three main activities (1) labour market time (2) household production time and (3) Consumption time – include leisure time as well.

According to the Labour Force Survey of Pakistan 2017-18, 63% of males while only 17% of females allocate their time to the labour market – employed population. In urban areas, paid market hours of males and females are 52 hours/week and 37 hours/week respectively; whereas in rural areas paid market hours of males and females are 49 hours/week and 34 hours/week. In urban areas expenditure saving market hours of males and females are 7 and 6 hours/week respectively; whereas in rural areas expenditure saving market hours of males and females are 8

hours/week and 9 hours/week. Household hours of females in rural and urban areas are 40 and 43 hours/week respectively, whereas male household hours are 8 and 6 hours/week in rural and urban region. Most of the household chores are done by females in our society; therefore their participation in labour market is less compared to males. In Pakistan, women are double burdened if working in the labour market as they also have to perform household tasks. Household responsibilities have negatively impacted women's participation in the labour market, as a result, they remain deprived of economic and employment opportunities. Further, usually in rural areas, females besides fulfilling household duties are also engaged in agriculture work, livestock care and food processing, marketing of agricultural products, handicraft, and other small scale non-farm work.

Studies focusing on gender inequalities and addressing allocation of time are limited in number in the case of Pakistan, research is almost negligible. Duernecker and Herrendorf (2017) found for 12 OECD countries, from 1970 to 2010 that increase in labour income taxes induce people to substitute household production activities for market work. Moreover, people also substituted leisure for market work. Rathnayaka and Weerahewa (2015) found for males, in farm owned families in the district of Udukumbura that they allocate more hours for compensated as well as voluntary work and fewer hours for care work. Dong and An (2012) employed "Chinese Time use Survey" (TUS) conducted in 2008 to evaluate the allocation of time by activity (paid work, unpaid work and non-work activity which include self-care and leisure) and gender. Like other countries, it was found that paid hours of work for men are greater than women; while time spent by women in unpaid work is more than men. Seemingly unrelated regression (SUR) technique was applied to estimate the trade-off between paid work, unpaid work and non-work activity. The estimates showed the consistency that almost all the changes associated with life events and economic situations are considered to contribute a widening of the male- female difference in total work time and reduction in the time for self-care and leisure that is available to women relative to men. This research suggests that in Chinese society women's propensity to trade-off paid work for unpaid work is smaller than men. Saqib and Arif (2012) found from time use survey of Pakistan conducted in 2007, that whether women are employed or not they are more time-poor than men. If they are employed, they have to deal with a major trade-off between time poverty and monetary poverty. Quentin et al (2010) accomplished in their study of Sierra Leone and found ample facts that women allocate their substantial time to domestic chores and this stress bound their economic opportunities**.** The time spent on household chores usually performed by women has restricted her chance to engage in productive activities. Their earnings and decision power within the household may be restricted. Women have limited opportunities to foster their education along with training due to scarcity of time. Many empirical consequences obtained in the study authenticate conventional perception that women are found to work more than men on domestic chores and child-rearing. It was also found that women who are engaged in the labour market also spend time on household work.

Brynin and Ermisch (2009) found that due to increasing education and earning of women, the return to market work exceeds the marginal value of home production which makes it inappropriate for a household to withdraw females from the labour market. Therefore the comparative advantage of men in the labour market and allocation of time for domestic work must be negotiated rather than assigned on the basis of gender.

Amin and Suran (2008) accomplished their study on "*Terms of Marriage and Time-Use Patterns of Young Wives*" in rural Bangladesh and found that on average women spend 29% of the day in domestic chores. Further, it was found that the amount of domestic work increases with the number of offspring. Chris, Bernard and Henriette (2006) used KPM methodology for the collective household model to see the difference among Turkish (immigrant) and Dutch (native) households. They found that due to the increase in income effect of either male or female, the household ends up forwarding the labour supply curve. Backward bending occurs due to their partner's wage only. Increase in working hours enforces both males and females to enter into the labour market. The presence of young children in a household causes the disappearance of female from the labour market, thus more male partners will enter into the market. It is found by the research conducted in the US that the domestic workload of men has increased over time which suggests that overall workloads have become equal (Sayer 2005).

Time use data for Sub-Saharan African countires revealed that women squander more time than men at work, particularly in household production and child care (Mason and Ritchie, 2004). In the household, children particularly girls, have domestic responsibilities. At every age, the burden of work of young women is more than young men. Domestic work, food preparation, child care, nursing of elderly household members are termed as reproductive tasks which are essential to sustain families. Baxter (2002) reported that women had reduced their domestic working hours over time. While, little evidence of a noticeable change in men's involvement in domestic work was found. Evers and Walters (2001) found for women in rural farm families that they provide the majority of

the labour for food production, processing, and household responsibilities including care work with minimal support, while farm work and spare time is allocated between men and women. Ilahi (2000) discussed the time tasks of male-female and reveald that the working hours of women are more than men in almost all states.

Emmanuel (1994) used probit estimation for evaluating time allocation patterns by employing household survey data of six villages in rural India. Pool data was used to check the differences in time use and leisure activities among girls concerning working and non-working activities in the labour market. Findings of the study reveal that the allocation of time for boys and girls regarding adult and child wage rate play a significant role in time allocation. Girl's participation rate is accounted more in the labour market and domestic activities as compared to boys who are indulged in school activities. Sultana and Nazli (1994) found for the districts of Dir, Badin, Attock and Faisalabad, that time allocated on household chores by employed women is more than unemployed women. If a woman is employed then her time allocation for household chores depends on her age, education and predicted wages of male in a household. Opportunities for females in rural areas should be expanded so more educated females can participate in labour market. Labour supply decision and jointly determined earnings of both male and female of the household were determined by Kousar et al (2017) by using cross-sectional data of 341 rural households from six districts of Punjab. To correct selection bias for wage and labor supply equations Heckman's two step method was used. Results of the study reveal that education, experience, adult household size and physical infrastructure have positive and significant influence on the probability of participation of both male and female in non-farm work. On the other hand, participation of both male and female decreases in non-farm work due to lack of access to physical assets, non-labor income and the presence of children in household.

The division of labour into paid and unpaid market work for men and women respectively is a rational choice based on sound economic principles as argued by Becker (1981). Becker further argues that due to high levels of human capital, men have comparative advantage in labour market; while the comparative advantage of women is in domestic chores. Further, Becker (1965) stated that "*Members who are relatively more efficient at market activities would use less of their time at household activities than would other members*". Hence, the labour division by gender is considered as an efficient way to utilize the resources available. Gronau (1977) investigated three types of time allocations, work in the market, household labour and leisure. Data was collected from the 1964 Productive American study and a survey conducted by the Israel Institute of Applied Social Research. The effect of an increase in the wage rate on the time allocation of the husbands and wives depends upon the employment status of the individual. No change in allocation occurs for the unemployed person. If a person's wage increases then the domestic work is reduced by hiring domestic labour to take care of daily home chores. It is also possible to purchase household chores from market such as ready-made food items, laundry, etc. Allocation of women's time and the role of education was examined by Leibowitz (1975). Primary findings of the study is concerned with women's allocation of time for market work and domestic work. By using census data, results show that highly educated women spend more time in the market work over their life span as compared to less educated one. Blood and Wolfe (1960) argue that time spent on non-market work is inversely related to time spent on market work while the spouse who spend least time in market work, their major time is spent on household chores.

Arising from the foregoing findings, the objectives of this study are set: to assess the allocation of time for different activities (paid work, expenditure saving work and non-market work), across different age groups, region and province. In all ages' paid market hours, expenditure saving market hours and household hours differ; therefore it is estimated separately for different ages. Household hours of females are higher for all ages; especially the hours allocated to cooking and child care. As women have taken most of the household responsibilities, majority of their time is allocated for care of sick/elder people and upbringing of children. Hence, time allocated to non-market work across activities for all age groups and by region and province is analyzed separately. As stated above, paid market hours of male and female work differ, therefore allocation of time by gender is also analyzed separately. In order to assess the determinants of allocation of time by activities the socio-economic determinant of allocation of time is focused which includes; marital status, household head's education attainment, household size, wages, etc. No national study has analyzed paid market hours, expenditure saving market hours and household hours separately and it is the main contribution of this study. Further, expenditure saving market hours and household hours are analyzed separately across activities which is not addressed in any of the national study. This paper is organized as follow: Section II discusses theoretical foundation, Section III provides model specification and data sources, Section IV consists of descriptive and empirical results. Last section contains conclusion and discusses some policy implications.

2. Theoretical Foundation

The theoretical foundation of this article is based on the Becker (1965) article "*Theory of allocation of Time*". Becker started with the simple Household's utility function

$$U = U(y_1, y_2, y_3, \ldots\ldots y_n)$$

And a Resource Constraint

$$\sum p_i y_i = I = W + V$$

Where, y_i are goods purchased and their market prices are p_i. I is the money income, W is the earning and V is other income. Becker modified this simple utility function by stating that households combine time and market goods to produce commodities that directly enter utility function. These commodities here are represented as function of Z_i

$$Z_i = f_i(x_i T_i)$$

x_i is a vector of market goods and T_i is a vector of time input used in producing commodities. T_i is a vector of time because there are types of time as well. For example day time is different than night time, while time at weekend is different from time at weekdays. However, the partial derivatives of Z_i with respect to both x_i and T_i is non-negative that gives positive utility.

Households combine time and market goods via the production function to produce the commodities (Zi) in a way that maximize their utility.

$$U = U(Z_1, \ldots\ldots Z_m) = U(f_1, \ldots. f_m) = U(x_1, \ldots. x_m;\ T_1 \ldots. T_m)$$

The utility function is assumed to be maximizing on two different constraints. The goods constraint is given below.

$$\sum_1^m p_i\, x_i = I = V + T_w \bar{W}$$

Where T_w is the vector giving the working hours and $\bar{W}$ is a vector giving the earnings per unit of T_w.

The time constraint is written below.

$$\sum_1^m T_i = T_c = T - T_w$$

Where Tc is a vector of total time spent on consumption and T is the total time available. Solving the above for T_w:

$$T - \sum_1^m T_i = T_w$$

Production function can be split as well

$$T_i = t_i Z_i \quad \text{(Time used for } Z_i\text{)}$$
$$x_i = b_i Z_i \quad \text{(Input used in } Z_i\text{)}$$

t_i is the vector of input of time used for per unit of Z_i, while b_i is the vector of input of goods used for per unit of Z_i. Substituting T_w in goods constraint

$$\sum p_i x_i = V + \left(T_i + \sum T_i\right)\bar{W}$$
$$\sum p_i x_i - \sum T_i\, \bar{W} = V + T\bar{W}$$

Substituting xi and Ti to get full budget constraint

$$\sum (p_i\, b_i + t_i\, \bar{W}) Z_i = V + T\bar{W}$$

The full price of consumption is the sum of direct and indirect prices. Z_i (π_i) are the prices of goods and the time used per unit of Zi.

$$\pi_i = (p_i b_i + t_i \bar{W})$$

A compensated rise in earnings would lead to a shift away from earning intensive commodities to goods intensive commodities. This is because earning and time intensive commodities are positively correlated, consumption would be shifted from time intensive commodities. While the uncompensated increase in earnings on hours of work would depend on the relative strength of the substitution and income effect. The substitution effect increases hours of

work, whereas the income effect reduces the hours of work.
Based on the argument raised six decades earlier by Becker, this paper documents trends in the allocation of time in Pakistan particularly focusing on time allocated to work (paid and expenditure saving market work) and non-working hours (time devoted to household work).

3. Model Specification and Data Sources

For the assessment of the objective i.e. exploring the factors influencing time allocation are modeled as:

$$Time\_alloc_g = \alpha_0 + \alpha_1 PC + \alpha_2 SE + \alpha_3 LE + \varepsilon_i \quad \text{_____(1)}$$

Where

- $Time\_alloc$ are the weekly hours devoted to paid market work, g represents gender.
- PC represents personal characteristics. Such as Age, marital status and education attainment,etc.
- SE presents socio-economic determinants such as number of children, household income, region,etc.
- LE presents labour market indicators such as wages, occupation of individuals, etc.

Specifically, the factors influencing time allocated to expenditure saving and household work is specified as

$$Time\_alloc_i = \beta_0 + \beta_1 PC + \beta_2 SE + \beta_3 LE + \mu_i \quad \text{_____(2)}$$

Where *Time_alloc* represents the weekly hours and subscript i represents the time devoted to expenditure saving market work and household work. Time_alloc is used as dependent variable. It is the time allocated to market (paid and expenditure saving market), and non-market hours of work (household hours). It is measured as hours per week. As far as explanatory variables are concerned; age and age square is used to show the impact of age and its non linear term on hours of work with an assumption that age impact hours of work substantially. As age increases working and non-working hours including household work decreases because of the increment in hours of leisure or shifting of responsibilities. It may also decline due to the increase in earning members of the family. In sum, time allocated to paid, expenditure saving market and household work hours decreases as the responsibilities are reallocated to young generation. Marital status here represents unmarried, married and widowed/divorced individuals. Unmarried is taken as a reference category. Relationship of being male in any type of marital status is hypothesized to be positive with paid market hours as they have to support their families. Contrary to this, its relationship may be negative as financial burden might be shared by their spouse or some males having seasonal income or depend on other sources of income. Relationship of being married and female may also be positive with paid market hours due to economic reasons. Contrary to this, its relation may be negative due to domestic responsibilities. Being Widow/divorced and female may also have a positive relationship with paid market hours as they also have to support their families, therefore their paid hours increases. Contrary to this, its effect may be negative due to the presence of other earning members in the household. Relationship of being married and widow/divorced female with household hours is positive as in our society they are held responsible to perform their household duties in every age. Relationship of being married and widow/divorced males with household hours may be negative as they are the main economic providers. Married and widow/divorced individuals may have positive relation with expenditure saving market hours so the labour cost could be saved. Contrary to this, its relation may be negative due to inflation and depending on the socio-economic condition of the household as individuals may participate in paid market work.
Education is represented here by the years of education. As the years of education increases paid market hours for both gender is expected to increase, as returns to education increase probabilities for being in employment increases. Years of education may have a negative effect on expenditure saving market hours as educated person more often prefer regular paid employment. Female years of education may increase or decrease non-market hours, depending on the level of education achieved and their domestic responsibilities.Whereas, years of education may decline male household hours as they have more employment opportunities than her female counterparts and can also migrate/emigrate for paid market work. Household size may increase or decrease paid market hours. As household size increases, paid market hours may reduce as the financial burden may be shared by other family members. Contrary to this, paid market hours may increase due to increase in the number of dependents in the

household. It may have negative effect on expenditure saving market hours as household size increases people will switch from expenditure saving market work to paid market work in order to support their families, therefore their work hours will reduce.

If the number of children under 6 years, children of age 6-10 and 11-14 years increases female household hours may increase as they are held responsible for performing household chores and taking care of their children. Male household hours may decline due to increase in the number of dependents as their participation in paid market work might increase. If the individual is household head then his/her relation with paid market hours may be positive as they are major economic contributors of the household, hence their participation in labour market is higher. Contrary to this, its relation may be negative if socio-economic condition of household may get better. Relationship of wages with paid market hours is positive, as wages increases individuals will increase their paid market hours and reduce their leisure hours/domestic responsibilities – opportunity cost of time increases. Firstly substitution effect dominates but as the income increases, further an individuals may reduce their working hours and increase their leisure hours -at this stage income effect dominates.

Relationship of household income with expenditure saving market hours may be positive if there are more earning members. Contrary to this, it may be negative if there are few earning members or higher number of dependents, then individuals may switch from expenditure saving market work to paid market work. Relationship of household income with household hours of female may be negative if the wages of other household members increase, thus household hours of females will reduce. Since they can afford domestic servant or will move towards good intensive commodities. Whereas, relationship of household income with household hours of male may be negative as their participation in paid work will increase or household income will be used for investment in male education.

Across region, rural region is taken as a reference category. People residing in urban region may have positive or negative relation to paid market and non-market hours as compared to rural region. In rural areas, agriculture sector is the main source of income as compared to other sectors, while in urban areas diversified opportunities are available to earn better livelihood. Contrary to this, its negative relation with paid market hours maybe due to the deteriorating law and order condition in urban areas. As compared to urban areas, expenditure saving market hours may be higher in rural areas as family members are employed to save labour cost. In rural areas, household hours may also be higher than urban areas depending on household size, number of dependents, wages of other household members and customs and traditions existing in the region.

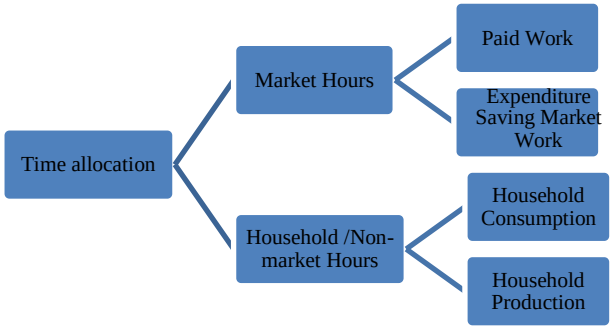
Across provinces, KPK is taken as a reference category. People residing in Punjab, Sindh, and Balochistan may have positive or negative relation to paid market and non-market hours as compared to KPK depending on the custom, tradition and opportunities available in the province. Finally, this study analyzes the allocation of time for market activities by segregating paid market hours/week, expenditure saving market hours/week and household hours/week by gender, region and province as well as across different age groups, while household hours/week are also analyzed separately across different age groups, region and province and for different activities by using descriptive statistics. Further, determinants of the above said activities are analyzed by using OLS. The data used in this study is taken from the Labour Force Survey (LFS) of Pakistan for the year 2017-18, conducted by Pakistan Bureau of Statistics (PBS). In this study the time allocated to paid market and non-market activities by age group, gender, region and province is examined in detail. On average paid working hours of males are 50 hours/week and females are 35 hours/week While household hours are more for females (41 hours/week) given their responsibilities of household chores, child bearing and rearing.

4. Results and Disscussions

Result section is further divided into two parts. First part is based on the assessment of time allocated to different activities across region, province, various age-groups, across occupation, different expenditure saving market activities and household activities for both gender. In second part, empirical assessment for paid market hours, expenditure saving market hours and household hours is performed.

4.1 Descriptive Statistics

This section first discusses the allocation of time (average time allocated) to paid market and expenditure saving market hours/week by region, province, gender and for different age groups. Household hours/week are analyzed by region, province and across different age groups for different activities for both gender. On the basis of the argument given by Becker time allocation is also seggregated as:



Source: Authors' illustration based on Becker (1965)

Flow Chart: Time Allocation in Pakistan

Table1: Average Market and Non-market Hours (Hours/week) by Age Group

Paid Working Hours	**10-14**	**15-25**	**26-45**	**46-60**
Male	40 (1,716)	50 (16,935)	52 (29,191)	50 (11,589)
Female	31 (876)	34 (4,426)	35 (7,589)	35 (2,578)
ExpenditureSaving Working Hours	**10-14**	**15-25**	**26-45**	**46-60**
Male	9 (35)	9 (72)	6 (52)	7 (14)
Female	7 (1,004)	8 (7,534)	8 (12,668)	9 (3,366)
Household Hours	**10-14**	**15-25**	**26-45**	**46-60**
Female	25 (2,275)	39 (16,191)	47 (25,128)	36 (8,375)
Male	8 (64)	7 (99)	6 (77)	7 (56)

Source: Author's own estimation from LFS 2017-18
Values in parentheses shows the number of observations

Table 1 shows that average paid market hours/week for males are higher for age group 26-45 i.e. 52 hours/week. This may be because mostly individuals complete their studies around 24 or 25 years of age and start their career around this age, since in our society male is considered as main economic provider, hence his paid market hours are higher than his female counterparts. Whereas, average paid market hours for females are less than male in all ages. The highest paid market hours recorded for females are for age-groups 26-45 and 46-60 i.e. 35 hours/week. Due to high inflation and socio-economic condition of households they support their families.

Further, on average expenditure saving market hours are higher for male in the age group 15-25 i.e. 9 hours/week but as the age increases their work hours decline. Since their participation in paid market work increases or their work is reallocated to younger generation. Further, as the age of female increases their average expenditure saving market hours also increases. Average hours of females increases after the age of 45. From the number of observations it is evident that as compared to females; male participation in expenditure saving work is minor.

Moreover, average hours/week devoted to household work is higher for females especially in age group 26-45 i.e. 47 hours/week. As in this age group female have higher family and domestic responsibilities as said earlier. Whereas, male household hours decreases after the age of 15 as they are responsible for supporting their families.

In Table 2, 2 (a) and 2 (b), average market (paid market and expenditure saving market hours) and non-market hours are discussed by region, province and gender. Average paid market hours/week for male is higher in both regions of Punjab i.e. 51 hours/week in rural region and 54 hours/week in urban region. While, for female it is higher in both regions of Sindh i.e. 38 hours/week in rural region and 41 hours/week in urban region. Average expenditure saving market hours/week are higher in rural Balochistan for both gender i.e. 10 hours/week, while in urban region it is 12 hours/week for males of Sindh and 9 hours/week for females of Balochistan. Average

hours/week devoted to household work is highest for females in both regions of Punjab i.e.45 hours/week in rural region and 47 hours/week in urban region, whereas average hours/week for males is higher in rural KPK and Balochistan i.e. 9 hours/week and in urban KPK it is 7 hours/week.

Table 2: Average Paid Working Hours (Hours/week) by Region and Province

Region	Province	Male Paid Working Hours	Female Paid Working Hours
Rural	KPK	47 (6,284)	30 (1,437)
	Punjab	51 (18,124)	34 (8,846)
	Sindh	49 (11,447)	38 (2,234)
	Balochistan	48 (4,725)	34 (398)
Urban	KPK	50 (4,190)	35 (487)
	Punjab	54 (11,044)	37 (1,989)
	Sindh	52 (3,482)	41 (291)
	Balochistan	50 (2,867)	38 (190)

Table2 (a): Average Expenditure Saving Working Hours (Hours/week) by Region and Province

Region	Province	Male Expenditure Saving Working Hours	Female Expenditure Saving Working Hours
Rural	KPK	7 (33)	8 (4,689)
	Punjab	8 (31)	8 (3,769)
	Sindh	9 (50)	9 (6,515)
	Balochistan	10 (22)	10 (3,591)
Urban	KPK	5 (6)	5 (1,397)
	Punjab	4 (11)	5 (1,897)
	Sindh	12 (9)	5 (1,132)
	Balochistan	7 (16)	9 (1,992)

Table 2(b): Average Household Hours (Hours/week) by Region and Province

Region	Province	Male household hours	Female household hours
Rural	KPK	9 (52)	38 (7,713)
	Punjab	5 (65)	45 (12,101)
	Sindh	8 (61)	36 (9,408)
	Balochistan	9 (19)	42 (4,090)
Urban	KPK	7 (37)	40 (4,724)
	Punjab	6 (58)	47 (9,645)
	Sindh	6 (13)	38 (3,105)
	Balochistan	4 (7)	41 (2,677)

Source: Author's own estimation from LFS 2017-18
Values in parentheses shows the number of observations

Average paid market hours varies across different age-groups and gender by occupation and are discussed in table 3 and 3 (a). Occupation groups are classified as given by ISCO. Average paid market hours/week are higher for semi-skill male employees as compared to other occupations. Paid market hours increases for professional male employees after the age of 25 and it is higher for the age-group 26-45 i.e. 47 hours/week. Average paid market hours of technician-male are higher for age-group 26-45 i.e. 51 hours/week. For semi-skill and unskill male employees, average paid market hours are higher for age group 26-45 i.e. 53 hours/week and 52 hours/week

respectively. Average paid market hours are higher for technician-femlae for age group 15-25 i.e. 45 hours/week. Paid market hours increases for professional female employees after the age of 25 and it is higher for the age-group 46-60 i.e. 39 hours/week. Average paid market hours of semi skill and unskill female employees are higher for the age-groups 26-45 and 15-25 i.e. 34 hours/week and 43 hours/week respectively.

Table 3: Average Paid Working Hours (Hours/week) of Male by Occupation

Male	Skill Level 4 Professional	Skill Level 3 Technician	Skill Level 2 Semi Skill	Skill Level 1 Unskill
10-14	21 (2)	32 (4)	48 (38)	37 (1327)
15-25	44 (465)	50 (466)	50 (12,114)	50 (3,890)
26-45	47 (2,306)	51 (1,597)	53 (19,920)	52 (5,368)
46-60	46 (1,082)	49 (615)	50 (8,186)	52 (1,706)

Source: Author's own estimation from LFS 2017-18
Values in parenthese represents number of observations

Table 3 (a): Average Paid Working Hours (Hours/week) of Female by Occupation

Female	Skill Level 4 Professional	Skill Level 3 Technician	Skill Level 2 Semi Skill	Skill Level 1 Unskill
10-14	0 (0)	0 (0)	34 (77)	30 (799)
15-25	37 (480)	45 (45)	32 (3,350)	43 (551)
26-45	38 (709)	43 (142)	34 (5,773)	42 (965)
46-60	39 (142)	41 (26)	33 (2,075)	42 (335)

Source: Author's own estimation from LFS 2017-18
Values in parenthese represents number of observations

Average expenditure saving market hours/week differ by activity and are discussed in table 4 and 4 (a) for both gender and across different age-groups. For males it is higher for agriculture and livestock operation in the age-group 46-60 i.e.12 hours/week. Average expenditure saving market hours/week for females are higher for agriculture operation in the age-group 26-45 i.e. 8 hours/week and for livestock operation it is higher in the age-group of 46-60 i.e. 8 hours/week. As compared to other activities, time allocated to agriculture operation and livestock operation are higher. Since these activities are time consuming and the products obtained from it are used for household counsumption and production.

Table 4: Average Expenditure Saving Working Hours (Hours/week) of Male by Activity

Male	Agriculture	Food Processing	Livestock	Poultry Raising	Sewing
10 -14	10 (4)	0 (0)	9 (28)	0 (0)	4 (6)
15-25	8 (6)	7 (8)	9 (36)	5 (1)	6 (37)
26-45	2 (2)	3 (2)	7 (13)	6 (2)	5 (41)
46-60	12 (1)	6 (2)	12 (4)	5 (1)	4 (8)

Source: Author's own estimation from LFS 2017-18
Values in parentheses shows the number of observations

Table 4 (a): Average Expenditure Saving Working Hours of Female (Hours/week) by Activity

Female	Agriculture	Food Processing	Livestock	Poultry Raising	Sewing
10 -14	6 (57)	4 (24)	5 (626)	4 (70)	6 (438)
15-25	7 (235)	6 (268)	7 (3,474)	4 (430)	6 (5,014)

26-45	8 (527)	6 (566)	7 (5,116)	4 (929)	6 (9,388)
46-60	6 (166)	6 (266)	8 (1,784)	4 (284)	5 (1,918)

Source: Author's own estimation from LFS 2017-18
Values in parentheses shows the number of observations

Figure 1 shows the comparison of average household hours/week for both gender by various activities across region and province. Average household hours/week spent on child care and cooking are higher in both regions and provinces as compared to other activities. It is higher for females residing in both regions of Punjab. It is higher for child care i.e. 15 hours/week and for cooking it is 17 hours/week and 18 hours/week in rural and urban region. Average household hours/week spent on sewing are higher in rural and urban Balochistan as compared to other provinces i.e. 7 and 8 hours/week in rural and urban region respectively. Average household hours/week for males are higher for shopping and marketing and firewood collection. It is higher for males for shopping and marketing in both regions of KPK i.e. 7 hours/week and for firewood collection it is higher in rural KPK i.e. 8 hours/week and in urban KPK and Balochistan i.e. 7 hours/week. Male household hours are higher for outdoor activities in those provinces in which womens' mobility is hindered due to partiarchal system and veiling factors. Figure 2 shows the comparision of average household hours/week across various age groups for both gender. Average hours of household work are higher for femlaes of age groups 15-25 and 26-45. Average hours spent on child care are higher for the age-group of 15-25 i.e. 13 hours/week and for cooking it is higher for the age-group of 26-45 i.e.17 hours/week respectively. As in these age-groups females have higher responsiblities of child/elder care and other domestic tasks. Average hours/week of males are higher for firewood collection in the age-group of 46-60 i.e. 7 hours/week. (Figure 1 and 2)

4.2 Empirical Results

The determinants of time allocation across different activities given in equation (1) is presented in Table 5. Table 5 presents the determinants of time allocated to paid market hours for male and female. This table shows that as age increases paid market hours increases for both male and female. However, age square exploring the non linearity shows that paid market hours reduces when age doubles, this may be because by time new generation is there to share the financial burden. Being male and married increases paid market hours by 1.27 hours/week. Being female and widowed/divorced reduces the paid market hours by 0.922 hours/week, while being female and married declines the paid market hours to 0.85 hours/week. Negative relation shows that besides household responsibilities there are labour market and socio-economic factors which declines their participation in paid market work. Male is held responsible for fulfilling family expenditures and after marriage his responsibilities increases which leads to increase his paid market hours.

Positive and significant relation between paid market hours and years of education shows that as the level of education increases probabilities for being in employment increases. Years of education of male and female have a significant and positive effect on the paid market hours. Further, household size decreases paid market hours of both gender this may be because financial burden may be shared by other household members – i.e. number of earners increases. Individual being household head has a positive and significant effect on paid market hours. Though being male/female and also head, they are often considered responsible for the provision of economic need of the family than other members, hence their paid market hours increases by 0.39 hours/week for male and 2.57 hours/week for female.

As compared to unskill occupation, semi-skill occupation has a positive and significant effect on male paid market hours, whereas technician-male and professional-male has a negative and significant effect on their paid market hours. As far as females are concerned, semi-skill and professional occupation has a negative and significant effect on their paid market hours. Being semi-skill employed female, paid market hours reduces by 5.87 hours/week. Being professional, paid market hours of male and female reduces by 5.64 and 5.75 hours/week respectively. Paid market hours of male has a negative and significant relationship with wages showing that income effect is more dominant then the substitution effect. While for females positive and significant relationship exist between paid market hours and wages. However, wages have a negligible impact on paid market hours of both gender. Paid market hours of residents of urban areas are higher than resident of rural areas. In urban region, paid market hours of male and female increases by 2.79 and 1.29 hours/week. As compared to KPK, the coefficient of other provinces is positive and significant for both gender. Male and female paid market hours increases in Punjab by 3.85 and 2.74

hours/week, it increases in Sindh by 1.65 and 7.18 hours/week for both male and female, while in Balochistan it increases by 3.62 hours/week for females.

Table 5: Results of OLS estimation for Paid Market Hours/Week

Dependent Variable: Paid Market Hours/Week	Male Coefficient	Female Coefficient
Age	0.666***	0.555***
	(0.0240)	(0.0392)
Age^2	-0.00879***	-0.00657***
	(0.000274)	(0.000491)
Marital Status Dummy		
Married	1.272***	-0.853***
	(0.181)	(0.293)
Widow and Divorced	-0.258	-0.922*
	(0.427)	(0.517)
Education		
Education Years	0.0411***	0.129***
	(0.00929)	(0.0222)
Household Characteristics		
Household size	-0.0692***	-0.205***
	(0.0157)	(0.0269)
Household Head	0.387**	2.569***
	(0.166)	(0.417)
Occupation Dummy		
Semi Skill	0.533***	-5.874***
	(0.133)	(0.248)
Technician	-1.677***	0.0917
	(0.273)	(0.810)
Professional	-5.636***	-5.753***
	(0.248)	(0.476)
Wages of Paid Workers		
Wages in Rs.	-4.68e-05***	0.000384***
	(1.38e-05)	(3.39e-05)
Region Dummy		
Urban	2.791***	1.292***
	(0.111)	(0.249)
Province Dummy		
Punjab	3.854***	2.744***
	(0.147)	(0.271)
Sindh	1.653***	7.179***
	(0.165)	(0.333)
Balochistan	-0.0370	3.623***
	(0.191)	(0.508)
Constant	35.60***	26.95***
	(0.416)	(0.672)
No. of Observations	62,163	15,872
R^2	0.072	0.121
F- statistics	320.13*	145.39*
	(0.0000)	(0.0000)

Note: *,**,*** represents the level of significance at 1%, 5% and 10% respectively. Values in parentheses represent the probabilities.

Table 6 presents the results for expenditure saving market hours[1]. Male is taken as reference category. With increase in female population expenditure saving market hours decreases by 1.85 hours/week, as they participate in paid market work due to change in socio-economic conditions. With the increase in age increases expenditure saving market hours. However, age square exploring the non linearity which shows that as age doubles, expenditure saving market hours decreases as an individual may move towards the paid market work as their experience increases or their work is shared by new generation. Relationship between individual being widow/divorced and expenditure saving market hours is negative and significant. In order to support their families an individual will quit from unpaid labour and will search for paid work or will become part of the labour force. Moreover, in lower income families most of the males have seasonal income or are unemployed and rely on the income of female households. Relationship between individual being married and expenditure saving market hours is positive as they may assist in family farm and business to save the labour cost. Being married increases expenditure work hours by 0.58 hours/week and being widow/divorced reduces expenditure saving market hours by 1.28 hours per week. Further, as the years of education increases expenditure saving working hours of an individual declines. After acquiring higher education individuals do not prefer unpaid/unskill work rather they search for paid regular employment to improve their standard of living. Further, increase in the household income reduces expenditure saving market hours of an individual. Individuals involved in expenditure saving work either also look for better opportunities or may quit from unpaid labour due to sufficient household income. Household income has a negligible impact on expenditure saving work hours. Being female household head and educated have a negative and significant effect on expenditure saving market hours. Females are held responsible for educating their children and if she is educated then she will educate her children or other children of household which will decline their expenditure saving market hours. Expenditure saving market hours of individuals residing in urban areas are less than those in rural areas. Since, in urban areas there are diversified employment opportunities for individuals to earn their livelihood. Being resident of urban region expenditure saving market hours decreases by 1.94 hours/week. As compared to KPK, the coefficient of other provinces is positive and significant depending on the customs and traditons of the province. Expenditure saving market hours in Punjab, Sindh and Balochistan increases by 1.46, 0.69 and 1.08 hours/week.

Table 6: Results of OLS estimation for Expenditure Saving Market Hours/Week

Dependent Variable: Expenditure Saving Market Hours/Week	**Coefficient**
Dummy for Gender	
Female	-1.847***
	(0.591)
Age	
Age	0.178***
	(0.0261)
Age^2	-0.00197***
	(0.000335)
Marital Status Dummy	
Married	0.575***
	(0.198)
Widow and Divorced	-1.280***
	(0.405)
Education	
Education in Years	-0.112***
	(0.0153)
Household Characteristics	

[1] Unpaid and household hours/week are not taken for both genders as the number of observations for male were too low. Due to which overall model became insignificant. Therefore, we have used dummy for gender

Dependent Variable: Expenditure Saving Market Hours/Week	Coefficient
Household size	-0.0399***
	(0.0146)
Household income (in Rs/Week)	-9.00e-05***
	(1.29e-05)
Average years of Male household head education	-0.417
	(0.433)
Average years of Female household head education	-0.360**
	(0.150)
Dummy for Region	
Urban	-1.937***
	(0.198)
Dummy for Province	
Punjab	1.461***
	(0.178)
Sindh	0.689***
	(0.144)
Balochistan	1.077***
	(0.177)
Constant	8.865***
	(0.693)
Number of Observations	15,403
F(14, 15388)	45.61*
	(0.0000)
R-squared	0.040

Note: *,**,*** represents the level of significance at 1%, 5% and 10% respectively. Values in parentheses represent the probabilities.

Table 7 presents the results of non-market hours – household work. With the increase in age female household hours increases. However, age square exploring the non linearity shows that as age doubles, female household hours declines as their work is shared by younger generation. Whether the female is married or widow/divorced her household hours are higher. Since, in traditional society, it is the prime responsibility of females to fulfill the household chores whatever her martial status is. Being female and married her household hours increases by 11.19 hours/week and being female and widow/divorced increases her household hours by 6.55 hours/week. As the years of education increases, household hours of females also increase as they have taken most of the household responsibilities compared to their male counter-parts. As the number of children increases, female household hours also increases especially the household activities such as child bearing and rearing and cooking. Since it is the prime responsibility of females to look after her children and perform other domestic chores, even if a maid is hired then child/elder care, child education and cooking activities are performed by them. Increase in household income declines male and female household hours as maids may be hired or some household activities may be outsourced or some goods and services may be purchased from market. Male household hours declines in urban region by 1.06 hours/week and it increases in said region for females by 0.8 hours/week. As compared to KPK, the coefficient of other provinces except Sindh has a positive and significant effect on female household hours. Female household hours increases for the residents of Punjab by 7.62 hours/week and in Balochistan by 1.96 hours/week, while for inhabitants of Sindh it declines by 0.87 hours/week. As compared to KPK, the coefficient of Punjab has negative and significant effect on male household hours and it decreases by 2.69 hours/wek. It depends on cultural norms and traditions of province that household hours has positive/negative effect on their inhbitants.

Table 7: Results of OLS estimation for Household Hours/Week

Dependent Variable: Household Hours/Week	Male Coefficient	Female Coefficient
Constant	6.815***	10.80***
	(1.653)	(0.476)
Age		
Age	0.157	1.145***
	(0.103)	(0.0304)
Age^2	-0.00157	-0.0178***
	(0.00120)	(0.000382)
Marital Status Dummy		
Married	-1.414	11.19***
	(0.989)	(0.234)
Widow and Divorced	-2.623	6.546***
	(1.598)	(0.410)
Education		
Education in Years	-0.0252	0.170***
	(0.0516)	(0.0129)
Socio Demographic Characteristics		
Number of children under 6 years	0.129	1.012***
	(0.194)	(0.0501)
Number of children 6-10 years	0.00853	0.718***
	(0.235)	(0.0619)
Number of children 11-14 years	0.0753	0.195**
	(0.345)	(0.0814)
Household Income (in PKR/Week)	-5.99e-05*	-1.51e-05
	(3.35e-05)	(1.09e-05)
Dummy for Region		
Urban	-1.062*	0.802***
	(0.595)	(0.144)
Dummy for Province		
Punjab	-2.686*** (0.735)	7.622***
		(0.178)
Sindh	-0.969	-0.871***
	(0.804)	(0.195)
Balochistan	-0.449	1.957***
	(1.131)	(0.230)
Number of Observations	312	53,463
R-squared	0.104	0.237
F statistics	2.67**	1274.94*
	(0.0015)	(0.0000)

Note: *,**,*** represents the level of significance at 1%, 5% and 10% respectively. Values in parentheses represent the probabilities.

5. Conclusions and Policy Implications

In this study time allocation pattern across region, province, gender and various age groups for different type of activities are discussed. Average paid market hours of males are higher in the age group 26-45 and for females in the age group 26-45 and 46-60. Male is the main economic provider and has to support his family, therefore his paid market hours are higher, whereas due to increase in inflation and changing socio-economic conditions of the household female paid market hours also increases. As the years of education increases, paid market hours of both males and females increases as good remuneration is offered to them and diversified employment opportunities increases for them in different sectors.

Average expenditure saving market hours of male are higher for the age group 10-14 and 15-25, whereas for female it is higher for the age-group 46-60. With the increase in the age of male their expenditure saving market hours reduces as they search for employment opportunities in paid market work to earn a better livelihood. Average expenditure saving work hours of male and female are higher for agriculture operation and livestock operation as compared to other activities as dairy products and meat is obtained from livestock, while products obtained from agriculture are used for household consumption as well as for production purpose. Average household hours of female are higher in the age group of 26-45 as they have higher family responsibilities including child rearing, child bearing and other domestic duties, whereas houseold hours of male is higher for the age-group 10-14. Average household hours of female are higher in both regions of Punjab due to its cultural norms and traditions, whereas for males it is higher in rural KPK and Balochistan and urban KPK. Males are only responsible for those household activities which are necessary for household consumption and are outdoor activities, hence their household hours are higher in those regions where womens' mobility is still hindered due to partiarchal system of the society.

Since the working patterns have changed, most of the women are participating in labour force but the allocation of household work has not changed significantly. It is the prime responsibility of women to fulfill their household chores. This study suggests that awareness about fair distribution of responsibilities between men and women should be created. If this can be done, a significant portion of the gender gap in labour force participation is likely to be eliminated. By offering flexible working hours, telecommuting, and job sharing, employers can better attract and hold onto employees with household responsibilities that interfere with work. For example, work from home and alternative work schedules allow workers especially females to perform household tasks without sacrificing investments in their work life balance. Finally, employers can expand services such as in-house dry cleaning, personal shopping and the preparation of take-home evening meals to help diminish the conflict between family and work.

The fundamental purpose of economic development is to improve the welfare of people. Individuals are the target of any development policy initiated for welfare of household and community. Successful policy will improve the human welfare. Individuals involved in expenditure saving market work and household work will get benefit from such policies and the desired results without any unforeseen negative side effects will be achieved on other groups. In order to design programs it is necessary to understand the current pattern of allocation of time and the issues which determine them effectively, as new policies/projects may alter these issues and change the patterns of time allocation. Moreover, if household work and expenditure saving market work is recognized through the provision of public services, infrastructure and social protection policies then it will help in reaching gender equality and decent working hours for both gender which will help in achieving set target 5.4 and 8.8 of SDG. This policy has been adopted by Governement of Pakistan in 2016, given by United Nation at its 2015 General Assembly as part of the 2030 Agenda for Sustainable Development.

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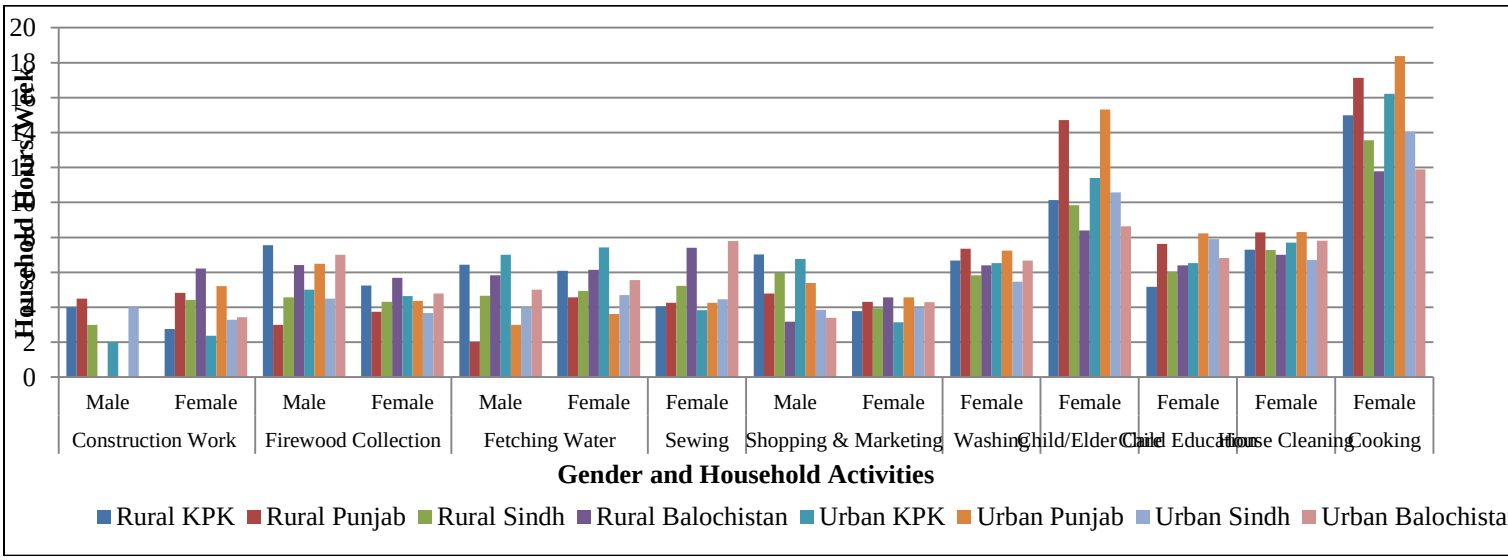
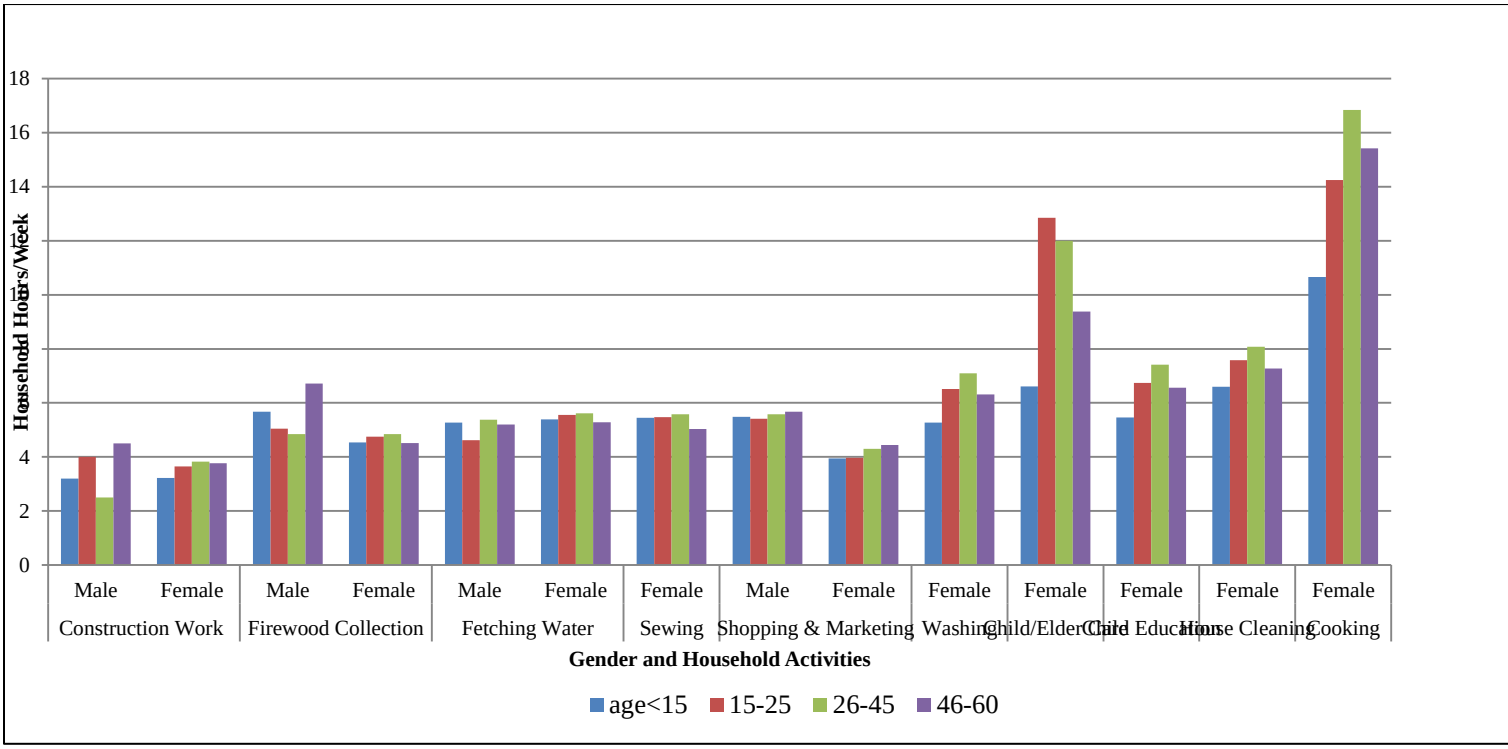


Source: Author's own estimation based on LFS 2017-18

Figure 1: Average Household Hours/Week by Region and Province



Source: Author's own estimation based on LFS 2017-18

Figure 2: Average Household Hours/Week by Age-Group