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The Myth of Missing Women: A Case Study of Pakistan

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Abstract

In the contemporary era, women's empowerment promises enormous gains ensuring a vigorous socio-economic boost for the economy. Further, the persistently changing world demands equity for both men and women as restrictions to women's rights and opportunities cost an economy in terms of income losses. Hence, overcoming gender discrimination and inequality remains a challenge for developing economies. The idea of "missing women" is linked to the appalling absence of women in substantial parts of an economy. The prime objective of the study is to evaluate the myth of missing women for the economy of Pakistan. The study investigates whether the missing women problem exists in the economy or not. For this purpose, a multidimensional approach would be utilized to figure out various gender inequalities considered in the missing women paradigm. Given the available data and statistics opacity, the study would employ both time series (tentatively for the era of 1990-2020) and cross-sectional data of the Pakistan Social and Living Standards Measurement (PSLM) survey of 2019-20. The former would be collected from the websites of World Bank indicators while the latter would be gathered from the Pakistan Bureau of Statistics. Using a mixed approach, the study qualitatively investigates the aggregate indicators associated with the concept of missing women including the sex ratio, fertility rate, and population dividend of Pakistan with a comprehensive regional comparison. Whereas a quantitative analysis would be performed to examine different gender inequalities through the novel context of missing women. The authorities of Pakistan have made strides in reducing the gender gap through better educational enrolment rates and access to health care services. However, these improvements have not been well transmuted into an enhancement of equity and quality of women's life. There is a dire need to broaden the horizon of gender equality and hence this study views gender inequality with the dimension of "missing women".

Key Words: Missing Women, Inequality, Women Empowerment, Gender Inequalities

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1. INTRODUCTION

1.1. Background

The idea of "missing women" revolves around identifying the difference between the women who ought to be living and women who are living. The paradigm of missing women had been pioneered by Sen (1992) who considered sex ratio to cater to gender disparities in Indian society. For this purpose, he presumed that millions of women who should be in the labour force were not part of Asian economies. Based on this assumption, he estimated a 6 to 11 percent of women deficiency in the total women population which he later termed a "Terrible story of Inequality and Neglect". He concluded that persistent gender inequalities society account for these missing women.

Principally, there exist two techniques to examine the problem of missing women. The first method allows comparing the real mortality rates (based on age and sex) with the expected rates alleviating all genders as equal. If the actual rate exceeds the expected estimates for females, it would be an indication of excess female mortality. Turning to the academic background, this technique has been adopted for microdata analysis to determine the extent of gender bias including the work of Klasen and Lamanna (2003), Murthi et al. (1995), and D'Souza and Chen (1980). The second method proposed by Sen in 1990, is to evaluate the actual and ''expected'' sex ratios[4] of the total population because of equal treatment for all genders. If the difference between the actual and estimated sex ratios persists, then it would indicate "missing women." This strand of literature includes studies by Saikia et al. (2021), Jayachandran (2017), Klasen and Wink (2002, 2003), and Retherford and Roy (2003). This technique is more reliable as it is contingent on demographic figures allowing the cumulative impact of gender inequalities that are more frequent in developing economies. It is worth mentioning here that the method is equally applicable for female fatalities caused by gender-based abortions among the missing women. Both techniques are complementary yet crucial to comprehensively analysing the missing women phenomenon.

1.2. The Demographic Transition

The myth of missing women has been widely followed by the demographic transition that appeared since the end of the 19th century. Later in

[4] Male to female ratio.

the century, the exceptional increase in the population had been reversed bringing about pivotal reductions in fertility and population growth rates in divergent regions of the world (Galor, 2012). This global demographic change has induced economies to enjoy the gains from technological progress and factor accumulation enhancing labour productivity and growth activities. This, in turn, accelerated the significant channels of resource per capita, fertility rates, and age distribution that led to high fractions of the working-age population and high productivity per capita. Here a question arises whether this transition has always been seen through the lens of positive gain or not. The answer to the question is yet ambiguous as decreasing fertility rates have also triggered the problems of gender-based abortions surging female fatalities in certain settings, and single-child strategies. Hence, to trace the problem of missing women, it is first essential to look at the demographic structure of the economy.

Looking at the demographic profile of Pakistan, the recent population census in 2017 revealed that the population is endowed with 207.6 million individuals out of which 106.3 million were men and 101.3 million were women. According to the Pakistan Bureau of Statistics (PBS), the population experienced a growth rate of 2.4 percent per year from 1998 to 2017. Out of the total population, 63.6 percent live in rural areas while the rest cluster in urban regions. Further, the sex ratio was found to be 104.9 males to 100 females, and it is higher in urban regions (107.2) as compared to rural regions (103.6). The economic characteristics of the population showed that 447.9 percent of 15-64 who were economically active with the proportion of working population comprised of 56.4 percent men, 6.1 percent women, and 35.3 percent transgender. The rest of the economically inactive population was dominated by women engaged in domestic work making up 72.3 percent of the women population. Hence, this brief review of the demographic factors points out the striking features of the economy endeavouring to cope with the increasing gender disparities.

1.3. Problem Statement

Given the luminous literature and extensive debate on gender inequality and women's empowerment, the academic domain of gender economics in Pakistan still has not addressed the missing women problem. Intuitively, this could be attributed to scant datasets and government negligence to develop policies for missing women. Additionally, it is also a matter of disagreement regarding whether identification and estimation of missing women are possible or not. Therefore, this study is an endeavour to figure out

the problem of missing women in the economy of Pakistan through a meticulous research approach. This design allows broadening the research horizon of gender economics by employing divergent socio-economic factors with an innovative perspective on missing women.

1.4. Research Objectives

The prime objective of the study is to evaluate the myth of missing women for the economy of Pakistan. For this purpose, three research objectives have been developed. The first objective of the study is to figure out the demographic indicators of Pakistan taking into account the regional divergences. The second objective encompasses the quantitative measurement of sex ratio at the household level with a set of socio-economic aspects. Third, to determine the fact that whether the missing women problem is a myth or a serious economic issue by employing mixed-method approach.

1.5. Research Questions

Based on the stated research objectives, the following research questions, have been developed.

- Question I: How the demographic indicators of Pakistan have been changed over time?
- Question II: How the sex ratio at the household level is affected by a set of gender inequalities?
- Question III: Are the missing women issue a myth or reality given the variety of gender inequalities in the economy of Pakistan?

2. METHODS

To analyse the stated research questions, the paper follows the mixed-method approach. The approach is employed to integrate the qualitative and quantitative data which permits a researcher to perform a synergistic data analysis (Wisdom & Creswell, 2013). For the qualitative analysis, the trend analysis of the selected demographic indicators has been performed whereas the cross-sectional data have been employed to perform a quantitative exercise.

2.1. Sampling Procedure

The study utilizes the published data resources to perform the analysis.

2.2. Sample Size

Given the opacity of the available data and statistics, the study employs both time series (maximum available years) and cross-sectional data of the Pakistan Social and Living Standards Measurement (PSLM) survey for the year 2019-20. The former would be collected from the website of World Bank indicators while the latter would be gathered from the Pakistan Bureau of Statistics.

2.3. Data Analysis

As it is mentioned earlier that the qualitative insight would be discussed through the time series data and trend analysis of mortality rate, survival rate, fertility rate, and regional comparison given the available data. A detailed description of the indicators has been provided in the appendix. Whereas the cross-sectional data has been processed through the technique of Ordinary Least Square (OLS). The standard OLS model for the cross-section data is a linear model with a dependent variable (scalar) and several regressors given N observations. According to Cameron & Trivedi (2005), this data are defined as (y,X), where y denotes the dependent variable and X represents a matrix of explanatory variables. The regression model with errors (vector representation) is created as;

$$Y = E[y|X] + u \qquad \ldots (1)$$

where E[y|X] is the conditional expectation of y given X (vector of random and unobserved errors (u). The expression E [y|X] produces the average value of the conditional estimated function. Consequently, a linear model is obtained when E [y|X] is specified with the condition of X to also be a linear function.

The following equation denotes the vector notation of i^{th} observation.

$$y_i = x_i'\beta + u_i \qquad \ldots (2)$$

where x_i' is a K $\times$ 1 regressor vector and β is a K $\times$ 1 is the parameter vector. In the matrix form, the *N* observations are arranged by row to generate equation 3.

$$y = X\beta + u \qquad \ldots (3)$$

where y is a vector of regress ($\boldsymbol{N} \times \mathbf{1}$) and X is a regressor matrix ($\boldsymbol{N} \times \boldsymbol{K}.$). u is an error vector ($N \times 1$). The linear model can be uniformly articulated by equations 2 and 3 and could be utilized respectively while the latter delivers an appropriate description as it is more abridged.

The OLS assessment provides estimators that exhibit the least error values or least residual sum of squares.

$$\sum_{i}^{N} u_i^2 = u'u = (y - X\beta)'(y - X\beta) \quad \ldots (4)$$

In this respect, the partial derivative of equation 4 provides the projected value of beta.

$$\beta_{OLS} = (X'X)^{-1} X' y \quad \ldots (5)$$

The model for sex ratio in this study is estimated by the following OLS model;

$$\mathrm{y} = X^f \beta + \mathrm{u} \quad \ldots (6)$$

Here, y is the household sex ratio (hhsr) and $\mathbf{X^f}$ is a vector of independent explanatory applied in the model.

3. RESULTS AND DISCUSSION

Initiating with the trend assessment of the aggregate data, it is evident from figure 1 that Pakistan has experienced a subsequent decline in the overall infant mortality rates (IMRT) since 1960. This could be attributed to divergent indicators including improvement in childbearing and child practices and better health care interventions such as immunization. Referring segregated rates for females and males (IMRF and IMRM), the respective rates were also declining. Consequently, the survival rates[5] for both females and males (SRF and SRM) in figure 2 also increased over the years for both genders.

[5] Find the population size and death toll reported for the given time. Subtract the total death rate from the total population. Pick the exponent n. To obtain the result per 10n individuals, multiply the outcome by 10^n.

Figure 1. Overall Infant Mortality Rates (IMRT), Infant Mortality Rate for Females (IMRF) and for Males (IMRT)

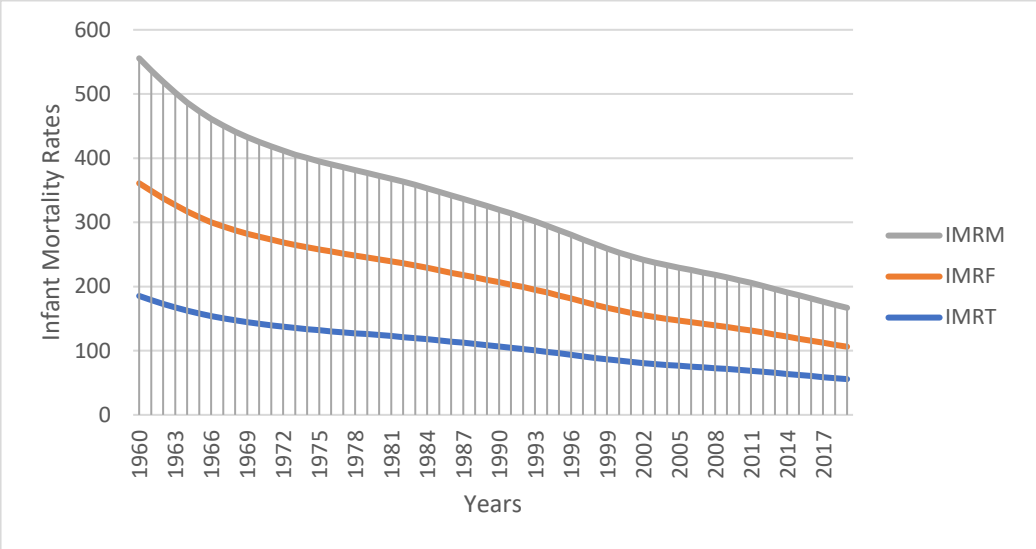


Figure 2. Survival Rate of Males (SRM) and Females (SRF), Pakistan

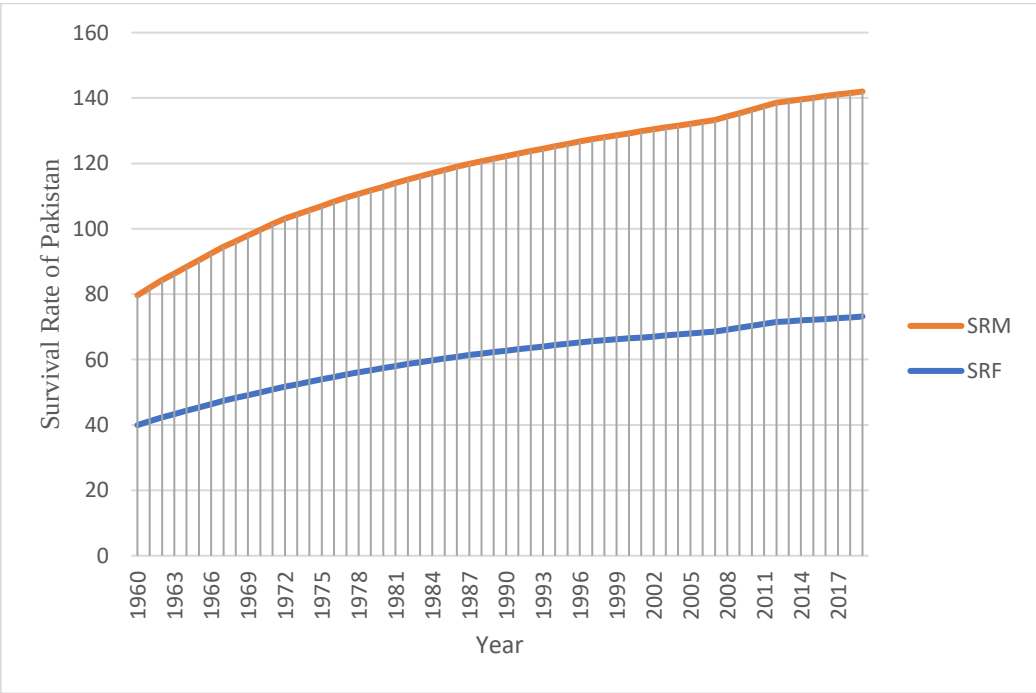
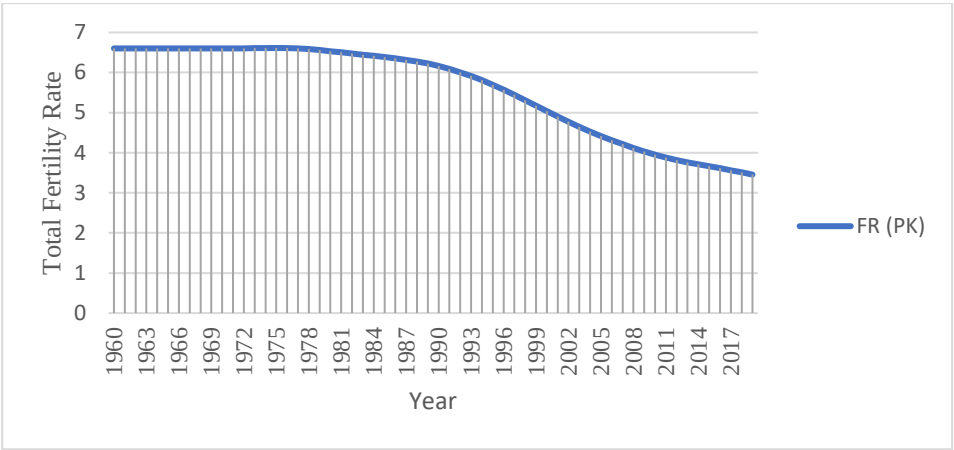


Figure 3. Total Fertility Rate of Pakistan



Pakistan also experienced a comparatively consistent high fertility rate over the years from 1960 to 1990 whereas the rate has been declining since 1990. Nargund (2009) argued that declining birth rates are a matter of concern for both developed and developing economies.

Turning to the regional context, the sex ratio of Pakistan had increased from 1.06 to 1.08 from 1962 to 2019. The ratio for India was initially 1.05 in 1962 however, for the year 2019, it increased to 1.1. Additionally, the population of China leads in terms of sex ratio inequality as it was the highest from the two neighbouring countries. The economy experienced a hike from 1.07 to 1.12 for the same period under consideration. Given the fact that Pakistan exhibits the highest fertility rate (3.45), the other two economies have relatively low fertility rates i.e., 2.2 for India and 1.69 children per woman for China. This situation could be attributed to the fact that both India and China may have the issues of self-selective abortions and son preference (Saikia et al., 2021; Hesketh and Xing, 2011).

The regional disparities and ambiguity in the available statistics indicate a state of a quandary regarding the issue of missing women. Further, it is worth mentioning here the argument presented by Barro (2005) that the missing women puzzle in Asia would better be explained through biological reasoning. He further elaborated that Sen may have overstated the issue of missing women due to prevailing diseases (hepatitis B virus) rather than due to discrimination.

Thus, the brief discussion on mortality and associated factors points out the fact that the technique of mortality rate would not be appropriate enough to explain the issue of missing women. This technique demands a rigorous

approach to evaluate the problem as the available aggregate information is not sufficiently precise for developing economies.

Turning to the other part of the data analysis, the estimation findings are elucidated in Table 1. The findings reveal that all selected indicators are statistically significant at a 1 percent level except the category of joint ownership of household. Additionally, it is worth mentioning here that for this study the sex ratio is derived by dividing the total by women at the household level.

Table 1: Coefficient Estimates of OLS Regression

	Coefficient	Std. Err.	t-value	P>t	95% Confidence Interval	Std.Err.
hhaa6	0.9009602	1.23E-02	73.34	0.000	8.77E-01	9.25E-01
hhfp7	-21.65307	1.83E+00	-11.85	0.000	-2.52E+01	-1.81E+01
hhfi8	0.0000035	2.85E-07	12.28	0.000	2.94E-06	4.06E-06
hhhf9	-37.3317	0.779617	-47.88	0.000	-38.85973	-35.80367
hhus10	-2.594847	0.396784	-6.54	0.000	-3.372533	-1.81716
hhpr11	-1.218721	0.43482	-2.8	0.005	-2.070957	-0.3664852
hhsr12	14.29809	0.579591	24.67	0.000	13.16211	15.43407
Hhbr13	22.85586	0.77232	29.59	0.000	21.34213	24.36958
Hhos14	-29.93731	1.019398	-29.37	0.000	-31.93531	-27.93932
Hhoj15	-0.8933849	0.836235	-1.07	0.285	-2.532383	0.7456128
Hhon16	3.795076	1.29739	2.93	0.003	1.252227	6.337925
_cons	153.3655	0.295556	518.91	0.000	152.7862	153.9447
Number of Observations: 252862						
F (12,630089)	903.72		R-squared		0.088	
Prob > F	0		Root MSE		86.588	

[6] Average Age of Household Members.
[7] Household Female Participation.
[8] Household Family Income.
[9] Household Head Female.
[10] Household Urbanization Status.
[11] Household Lives in Punjab Region.
[12] Household Sex Ratio.
[13] Household Birth Rate.
[14] Household Ownership.
[15] Joint Ownership of Household.
[16] Household Numbers in Occupation.

The table explains that the household sex ratio (hhsr) is positively associated with the average age of household members (hhaa). Zhang and Li (2020) associated this with demographic consequences of increasing population which may also induce the phenomenon of missing women.

Source: Estimated by Authors

The negative association of household female participation (hhfp) in the labor market can be explained from extensive marriage academic models. These models declare that if married women are less likely to participate in the labour market, then there would be a high sex ratio or scarer women relative to men (Grossbard & Amuedo-Dorantes, 2007). While discussing the household family income (hhfi), it is a well evident fact that this variable is firmly associated with the socio-economic stability of a family. However, Schacht and Kramer (2016) claimed that it is progressively unclear to determine the exact link of sex ratio with the socio-economic stability or with the family income. To incorporate the gender differentials in household structure, the household head female (hhhf) has been included in the hhsr model. The indirect connection between the two indicators reveals the fact that if a household is headed by a female in Pakistan, then she would assure a more balanced gender ratio or a maintained family (Dungomaro, 2008).

This household urbanization status (hhus) has been included in the model as the economic progress of a country has been widely linked with the modernization of society reducing poverty, enhancing urbanization, and improving literacy and medical facilities. The striking negative alliance of hhus with sex ratio implies that rapidly increasing urbanization has assessed to reduce the gender imbalances at the household and in turn in the society. This finding contradicts with the study of Murthi et al. (1995) who found no such evidence in the context of India. The authors stated that the urbanization in India had adversely affected women as it lowered poverty and enhanced male literacy and accessibility to medical services pertaining to more women deficit. The result of regional disparities showed better estimates of sex ratio if the household lives in Punjab region (hhpr). The variable has a negative coefficient with a value of 1.2 as compared to other provinces of Pakistan. The idea of household ownership (hhos) originates from the concept of agency which considers an individuals' ownership and control over her endowments and access to economic opportunities. Hence women's agency at household level provides her the autonomy to participate in the decision-making and family

formation. The coefficient value of 29. 9 with a negative sign endorses the fact households with women ownership reduce the gender imbalances at the household level. Meanwhile, the joint ownership had no significant impact in this respect (ADB, 2016).

Referring the average estimates of the overall sample, it has been found that the average sex ratio for the period of 2019-2020 was 1.53, which is much higher than the aggregated sex ratio (1.08). In the appendix, Table B1 explains the post estimation of the model under consideration to check the problem of multicollinearity whereas table B2 shows the correlation matrix which endorses the section criteria of the opted variables.

4. CONCLUSION

The mixed-method approach used in the study had pointed out that missing women is a prominent phenomenon in the economy of Pakistan which is trending over the years. The inclusion of different datasets in the study has provided support to the argument. Further, another main finding of the study had indicated that at a disaggregate level, the rising sex ratio is a matter of concern for the authorities and patrons supporting women empowerment. In the nutshell, it can be concluded that given the demographic transition and rising sex ratio at both aggregate and household levels, the problem of missing women would severely affect the gender balance in the economy of Pakistan.

The authorities of Pakistan have made strides in reducing the gender gap through better enrolment rates and access to health care services. However, these improvements have not been well transmuted into an enhancement of gender equality. There is a dire need to broaden the horizon of gender quality and hence this study views gender inequality with a different dimension i.e., "missing women." Therefore, it is high time to integrate the domains of economics, health, and family behaviour to broaden the horizon of gender economics.

4.1. Policy Recommendations

- Given the restricted domain of the study, it is suggested that analysis may be extended by incorporating more gender inequalities in the sex ratio model used in this study.
- Though gender sensitized policies in Pakistan have been rigorously discussed, the implication of such policies has been widely considered.

Therefore, consideration of doable policy options would provide better results.

- The academic literature on gender economics clusters around empowering the women in Pakistan, avoiding the factors affecting the sex ratio at the household level. Hence, focusing on the issues of women would surge the process of identifying real problems of women.

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ANNEXURE: A

Table A1. Description of Variables

Variable	Description
Mortality rate, infant (per 1,000 live births)	The infant mortality rate is the number of infants dying before reaching one year of age, per 1,000 live births in a given year.
Mortality rate, female infant (per 1,000 live births)	The infant mortality rate is the number of female infants dying before reaching one year of age, per 1,000 live births in a given year.
Mortality rate, male infant (per 1,000 live births)	The infant mortality rate is the number of male infants dying before reaching one year of age, per 1,000 live births in a given year.
Sex ratio at birth (male births per female births)	Sex ratio at birth refers to male births per female births. The data are 5-year averages.
Fertility rate, total (births per woman)	The total fertility rate represents the number of children that would be born to a woman if she were to live to the end of her childbearing years and bear children by age-specific fertility rates of the specified year.
Survival to age 65, female (% of cohort)	Survival to age 65 refers to the percentage of a cohort of new-born infants that would survive to age 65 if subject to age-specific mortality rates of the specified year.
Survival to age 65, male (% of cohort)	Survival to age 65 refers to the percentage of a cohort of new-born male-female infants that would survive to age 65 if subject to age-specific mortality rates of the specified year.

Source: World Bank Indicators, 2021.

ANNEXURE: B

Table B1. Correlation Matrix of the Selected Variables

	hhsr	*hhaa*	*hhfp*	*hhfi*	*hhhf*	*hhus*	*hhrs*	*hhao*
hhsr	1							
hhaa	0.1174	1						
hhfp	-0.0274	0.0387	1					
hhfi	0.0341	0.0098	-0.0283	1				
hhhf	-0.0925	0.1569	0.1018	-0.0896	1			
hhus	0.0016	0.0103	-0.0508	0.143	-0.027	1		
hhrs	0.0867	0	0.0447	0.0069	-0.0959	0.1581	1	
hhao	-0.0173	0.001	0.0197	0.0001	0.0519	0.0808	0.0069	1

Table B2. Post Estimation test for Multicollinearity

Variable	VIF	1/VIF
hhaa	1.03	0.973502
hhfp	1.03	0.971391
hhfi	1.03	0.968255
hhhf	1.08	0.925406
hhus	1.13	0.882881
hhps		
2	1.77	0.566303
3	1.73	0.578423
4	1.31	0.766209
hhao		
2	1.04	0.961504
3	1.01	0.988648
4	1.01	0.990735
Mean VIF	1.2	