DETERMINANTS OF INTRA-HOUSEHOLD INCOME INEQUALITY: A CASE STUDY FROM RURAL PAKISTAN

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HIGHLIGHTS

- Inequality has emerged at macro level but by finding the solutions of the problem our debates come to the micro level. By exploring the root causes of income inequality at micro level we cannot ignore the role of a household head for effective planning for their children.
- The household members less than the selected age are considered under training to make them responsible person for contribution in total household income.
- This approach to family welfare analysis is a new dimension may become controversial as the hypothesized explanatory variables mostly belongs to household head who has decision making powers, as the determinants of intra-household inequality.
- The significance of most of the variables shows some reality that household head in some way become the reason of intra-household inequality.
- The positive relationship between number of females and within family inequality is a call for sound policies to reduce gender gap and get women into mainstream economy.
- The fall in occupations such as farming and livestock sector and other elementary occupations are also becoming the reason of intra-household inequality which needs policy maker's attention.

ABSTRACT

Inequality has emerged at macro level but by finding the solutions of the problem our debate comes to the micro level. By exploring the root causes of income inequality at micro level we cannot ignore the role of a household head for effective planning for their children. The purpose of this study is to estimate the income inequality of households and to find the impact of the most relevant factors on the income inequality at a household level. The data about 400 household including 2266 individuals is extracted from the Household Integrated Economic Survey (HIES) which is conducted in 2015-16 under special survey namely Household Integrated Income and Consumption Survey. This approach to family welfare analysis is a new dimension may become controversial as the hypothesized explanatory variables mostly belongs to household head who has decision making powers, as the determinants of intra-household inequality. The significance of most of the variables shows some reality that household head in some way become the reason of intra-household inequality. Though some results are not according to expectations such as negative relationship of intra-household inequality and household size but this is trending result as a positive sign towards more sharing and cooperation within a family. The positive relationship between number of females and within family inequality is a call for sound policies to reduce gender gap and get women into mainstream economy. The fall in occupations such as farming and livestock sector and other elementary occupations are also becoming the reason of intra-household inequality which needs policy maker's attention.

Introduction

By the end of 20th century, the research on intra-household inequality begun when attention shifted from inequality at macro level to inequality at micro level intra-household inequality. Before that it was thought as private matter of households and impossible to measure. Then it first started by taking mean of household data to find intra-household inequality (Haddad & Kanbur, 1990). Afterwards the intra-household inequality calculated by taking expenditure data on food and clothing of individuals in the household (Browning et al., 1994; Browning & Chiappori, 1998). The research with labor supply data also conducted by many (Apps & Rees, 1996) to reveal the within household inequality in wage rate, working and leisure time. But intra-household inequality has many other dimensions such as decision making and control on household resources by household head. Intra-household inequality is important in measurement of inequality and poverty. It is inevitable to investigate intra-household inequality for sound economic policy which will lead to the wellbeing of individuals. In existing literature mostly individual welfare is computed by taking average welfare of households. Some have created link between average household inequality and intra-household inequality (Haddad & Kanbur, 1992). The inequality in incomes or

expenditure of individuals of household exists but aggregate data of household conceals deprivation within the household which leads to underestimation of inequality and poverty in society (Lise & Seitz, 2011) and this leads to wrong welfare policies and wrong estimates of income for taxation in any country.

Intra-household inequalities present in both developed (Apps & Savage 1989; Browning & Chiappori, 1998) & developing nations (Haddad & Kanbur 1990; Kumar and Mahadevan, 2011) but more in poor countries. These studies had shown that intra-household inequality is high in underdeveloped nation. Moreover, in resource-constrained households with joint family system where altruism is weak and selfishness exist, the probability of distribution asymmetries remain high that give rise to poor individuals within well settled household. It has strong implications in developing countries where resource-

constrained households and family system are more prevalent than in developed nations. In such developing societies, it is possible that in some cases extreme poverty is hidden. Thus intra-household inequality estimation is crucial. Though, it is not easy to target individuals within household and in some cases may be impossible. But intra-household inequality is helpful for policymakers to make sound policy.

Existing studies on intra-household inequality ignored the influence of decision makers (household head) on household income distribution. The purpose of this research is twofold. First, intra-household inequality at income levels of individuals in the household in both rural and urban society. Second, determinants that affect within household inequality particularly impact of household head characteristics and decision making on intra-household inequality.

Role of decision maker in intra-household inequality

The concept of within household inequality was first developed by Sen (1984). In growing literature, it has been examined that whether resources are equally distributed within household (Thomas 1990; Phipps & Burton 1995; Lise & Seitz, 2011; Kumar & Mahadevan, 2011). These studies have recognized that rise in average welfare of individuals within a household is not necessarily attached by a decline in intra-household inequality in welfare. Thus, by neglecting this dimension, there is lack of policy intervention that target intra-household inequality.

Most of the existing literature has considered unitary household decision making and has used collective models by considering single utility function of household (Bourguignon & Chiappori, 1992; Browning & Chiappori, 1998). Other non-unitary models are based on bargaining rule in decision making of household members related to allocation of resources, i.e. consumption and labor supply decisions. These are based on cooperative decision making (Manser & Brown, 1980; McElroy & Horney, 1981;

Lundberg & Pollak, 1994) and non-cooperative decision making (Chen & Woolley, 2001; Konrad & Lommerud, 2000; Lundberg et al., 1997; Udry, 1996). Another phenomenon is also present as first income goes in control of household head and then it is redistributed by his decision as described by Becker (1974, 1981) in his 'Rotten Kid Theorem' using unified household model.[1] So, the decision of household head affects intra-household inequality among other economic and cultural factors. The reason is social values bondage that the main economic provider control family decision making. Household head control in the family is twofold; control on management of family finances and influence on family decision making. This study which is conducted in Pakistan will explore a new dimension in which household Gini is taken on left-hand side of equation and determinants that affect intra-household inequality on right-hand side.

Methodology

The data used in the study is micro data of Household Income and Expenditure Survey collected by Pakistan Bureau of Statistics in 2015-16. During the current study under hand, total 400 households with 2266 individuals from Punjab are included, among them 200 are rural residents and 200 are urban residents. They are linked mainly to occupations such as administrative services,

professional services, teaching, manufacturing and retail sale business, construction and real estate, elementary occupations, farming and livestock. In rural areas, mostly people are less educated and low skilled engaged in farming and livestock, and some are migrated to cities, for working in industries of garments and construction and others are engaged in elementary occupations.

Intra-household inequality

To find intra-household inequality we have used annual income data of individual's in a household by including individuals above 25 years of age. Like previous studies we have used the method of Gini coefficient to find intra-household inequality (Haddad & Kanbur, 1992; Thomas, 1990).

The formula of Gini coefficient:

Gini-coefficient = Area between Lorenz Curve and Diagonal / Total Area under Diagonal

When G is based on the Lorenz curve of income distribution, it can be interpreted as the expected income

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[1] Becker's "Rotten Kid Theorem" (1974, 1981), this theorem suggests that altruistic parents and their children maximize the same utility function, even if the kids are selfish. If an altruistic parent provides a transfer to his

children, then the children have incentives to behave in such a manner that household income is maximized.

gap between two individuals randomly selected from the population (Sen, 1973)

The classical definition of G appears in the notation of the theory of relative mean difference:

$$G = \frac{\sum_{i=1}^{n}\sum_{j=1}^{n}|x_i - x_j|}{2n^2\bar{x}}$$

Where x is an observed value, n is the number of values observed and x bar is the mean value.

If the x values are first placed in ascending order, such that each x has rank i, the some of the comparisons above can be avoided and computation is quicker:

$$G = \frac{2}{n^2\bar{x}}\sum_{i=1}^{n} i(x_i - \bar{x})$$

$$G = \frac{\sum_{i=1}^{n}(2i - n - 1)x_i}{n\sum_{i=1}^{n}x_i}$$

Where x is an observed value, n is the number of values observed and i is the rank of values in ascending order.

G is a measure of inequality, defined as the mean of absolute differences between all pairs of individuals for some measure. The minimum value is 0 when all measurements are equal and the theoretical maximum is 1 for an infinitely large set of observations where all measurements but one has a value of 0, which is the ultimate inequality (Stuart & Ord, 1994).

The simple linear regression model is used to check the impact of different variables on intra-household inequality. All the variables in the model are shown in table 1 by following the equation as;

The linear regression model is as:

$G_i = \beta_0 + \beta_1 AGE + \beta_2 REG + \beta_3 HHSIZ + \beta_4 NFEM + \beta_5 EDU + \beta_6 OCC1 + \beta_7 OCC2 + \beta_8 OCC3 + \beta_9 OCC4 + \beta_{10} OCC6 + \beta_{11} OCC7 + \beta_{12} JSTAT + \mu$

Table 1: Description of variables

Variables	Description
GINI (G)	Gini coefficient of every household in the data
AGE	Age of household head
REG	Urban = 1; 0 = rural
HHSIZ	Number of individuals in a household
NFEM	Number of females in a household
EDU	Education of household head
Occupation	
OCC1	Dummy variable if professional, technician, then1; 0 otherwise
OCC2	Dummy variable if clerk then 1; 0 otherwise
OCC3	Dummy variable if teacher then 1; 0 otherwise
OCC4	Dummy variable if farming and livestock then 1; 0 otherwise
OCC5	Base category
OCC6	Dummy variable if construction and real estate then 1; 0 otherwise
OCC7	Dummy variable if elementary occupation then 1; 0 otherwise
JSTAT	If paid employee then 1; 0 if self employed

Results and Discussion

All the variables in the model have different expected results. Some variables' results are not according to expectations but this is due to trending dimensions. For example it was expected that by increase in household size, intra-household inequality will also increase but in our study results are different.

Table 2: Sample Statistics

Variables	Mean	Std. Deviation
Gini coefficient of individuals in a household	.449	.1560
Age of household head	49.20	12.942
Urban or rural	.500	.500
Household size	5.66	2.105
No of females in a household	2.90	1.436
Schooling years of household head education	7.33	4.072

Data Source: PBS data 2015-16

Mean values of all variables in table 2, where average Gini coefficient is 0.45 means almost 45% inequality is present between households. Average age of household head is 49 years. The average number of members in a family is 6 and average number of females in a household is 3. The average number of schooling years of household head is 7.

Table 3: Statistics related to occupation and job status

Variables	Frequency	Percentage
Professionals	23	5.8
Clerks	66	16.5
Teachers	13	3.3
Farming and livestock	74	18.5
Manufacturing and retail sale	115	28.3
Construction and real estate	46	11.5
Elementary occupations	63	15.8
Paid employee	228	57

Data Source: PBS data 2015-16

The frequency and percentage of different occupations is shown in table 3 where manufacturing and retail sale business has highest frequency among all other occupations as 28.3% of total households while teachers are only 3.3% of total. Farming and livestock has the second highest frequency as 18.5% people linked with this occupation.

Table 4: Gini coefficient

Income inequality within a household	
(0 means perfect equality and 100 means perfect inequality)	
Lowest Gini index	0.15
Highest Gini index	0.70
Average Gini index	0.45

Source: Calculated by using HIES micro data

The Gini coefficient is shown in table 4, which show the lowest and highest Gini coefficients among all calculated Gini coefficient of every household separately. Among them lowest Gini coefficient is 0.15 and highest Gini coefficient is 0.70. Average Gini coefficient value which is 0.45 shows total inequality between households which is useful for policy makers for making the policies for the welfare of households.
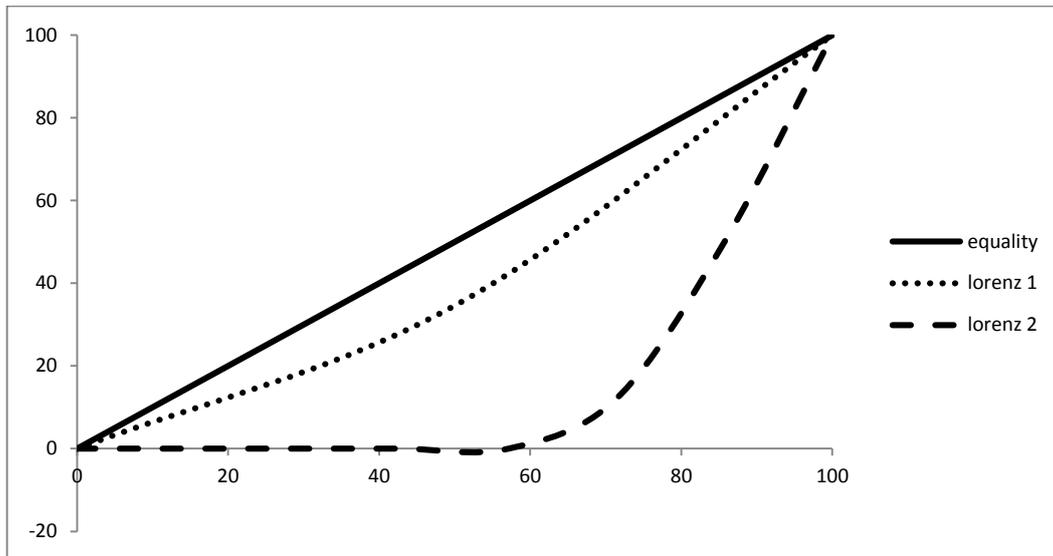
Figure 1: Lorenz curves for lower and upper range of income inequality within households

Equality and inequality lines as 45^0 line shows the perfect equality when Gini coefficient is 0 and Lorenz curve 1 (dotted line) shows 15% inequality within a household while Lorenz curve 2 (dashed line) shows a high level of inequality within a family (say, 70%) as shown in figure 1. These estimates clearly revealing that by taking household as a single entity the estimates of inequality in a society become wrong which further leads towards misperceived policies to increase welfare in the society.

All the above described variables are assumed determinants that cause intra-household inequality when household head has a control over household resources; finances and assets and decision making related to all members of a family. In this case household head characteristics and family background are the main factors that affect intra-household inequality. This is mostly the case of under developed countries where people are still living in large units and joint family system which is in the control of a single person. Moreover, mostly this household head remains a main economic provider for a single large family unit.

There is no multicollinearity between different variables as shown in table 5. For model estimation, from dummy variable occupation one category is considered as base category such as OCC5 (manufacturing and retail sale) which is common category in rural and urban residents, for avoiding dummy variable trap (perfect multicollinearity).

Table 5: Estimation of multicollinearity

Variables	Tolerance	VIF
AGE	.934	1.070
REG	.724	1.381
HHSIZ	.418	2.395
NFEM	.431	2.321
EDU	.865	1.157
OCC1	.832	1.202
OCC2	.585	1.710
OCC3	.826	1.211
OCC4	.535	1.868
OCC6	.652	1.535
OCC7	.693	1.444
JSTAT	.588	1.702

Source: Author's calculations

Model summary is discussed where R square is 0.2 which is low but in line with other studies who find out determinants of intra-household inequality by taking individual expenditure data (Haddad & Kanbur, 1992; Kumar and Mahadevan, 2011). The reason of low coefficient of determination is that intra-household inequality is not only affected by the determinants assumed in this study but also by some other economic and cultural factors. Overall the model is best because F- test is showing significance value as shown in table 6.

Separate effect of each determinant on intra-household inequality is estimated. Among these household

head age has significant negative relationship with intra-household inequality. The region has negative and insignificant relationship with inequality. As existing literature on intra-household inequality shows that within household inequality exists in both developed and developing nations but high in poor nations. Same in the region's case where more developed region (urban) has less intra-household inequality as compare to rural areas where mostly women are not allowed to work due to social taboos. Household size has significant but negative relationship with intra-household inequality. These results are opposite to our expectations but it is possible as number of a family members increases, the number of income earners in family will also increase.

Table 6: Determinants of intra-household income inequality

Variables	B	Std. Error	t	Sig.
(Constant)	.529	.039	13.456	.000
AGE	-.001	.001	-2.287	.023***
REG	-.002	.017	-.112	.911
HHSIZ	-.011	.005	-2.109	.036**
NFEM	.021	.007	2.804	.005***
EDU	.002	.002	.958	.339
OCC1	-.093	.033	-2.813	.005***
OCC2	-.056	.025	-2.261	.024**
OCC3	-.147	.044	-3.375	.001***
OCC4	.056	.025	2.250	.025**
OCC6	-.056	.027	-2.065	.040**
OCC7	.063	.023	2.702	.007***
JSTAT	-.039	.019	-2.099	.036**
R	0.462			
R Square	0.214			
Adjusted R Square	0.189			
F- test	8.759			
Probability	0.000			

*Dependent Variable: Gini coefficient of individuals in a household; ** and *** significance at 5% level and 1% level respectively*

The number of females in a household has positive and significant relationship with inequality. This situation is mostly seen in developing nations where women are less educated and skilled, engaged in household chores. So, they are considered economic burden on household head of a family. Education of household has also positive and insignificant relationship with inequality. Professional workers, clerks, teachers and construction business have significant and negative relationship with intra-household inequality. In Pakistan, these are considered high income earning sectors in which people mostly work as paid employee. Farming, livestock and other elementary occupation have positive and significant effect on intra-household inequality. Farming and livestock sector is neglected sector in Pakistan due to which the families based on agricultural sector face resource-constraints within household. Elementary occupations are less paid works and the household head engaged in these occupations are unable to support their family finances efficiently. In case of job status, as paid employee will increase intra-household inequality will decrease as opposite to self-employment.

Conclusion

This approach to family welfare analysis is a new dimension may become controversial as the hypothesized explanatory variables mostly belongs to household head who has decision making powers, as the determinants of intra-household inequality. But the significance of most of the variables shows some reality that household head in some way become the reason of intra-household inequality. Though some results are not according to expectations such as negative relationship of intra-household inequality and household size but this is trending result as a positive sign towards more sharing and cooperation within a family. The positive relationship between number of females and within family inequality is a call for sound policies to reduce gender gap and get women into mainstream economy. The fall in occupations such as farming and livestock sector and other elementary occupations are also becoming the reason of intra-household inequality which needs policy maker's attention. There is need to be tested this model again with larger sample size to get better results. The primary data may be more appropriate for this study as some important information related to household decision is missing in HIES data. Despite its weaknesses, this research has given way forward for more detailed analysis on individuals' income and expenditure data. Such

researches would lead towards better understanding of distributions of resources within a family. It also helps government to make more competent welfare policies by keeping individual level welfare phenomenon in mind.

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