

Impact of Foreign Remittances on

Inequality: Bangladesh Case

Sheikh Atiya Islam, Graduate Program, University of Dhaka, Bangladesh

Abstract:

Bangladesh is one of the fastest growing economies in the world today. However, this promising picture gets somewhat tainted when we take a closer look at how unevenly this growing income is distributed in the economy. This paper attempts to establish a relationship between remittance inflows and the economic inequality in Bangladesh and empirically analyze how the former impacts the latter. The study is conducted on the rural households of Bangladesh and used Lorenz estimation and Gini decomposition methods to conduct the analysis. The study finds that remittance has a significant impact on the inequality of the expenditure distribution and despite itself being unequally distributed as an income source, with a relatively high source-Gini, it tends to reduce inequality and thereby, creating an equalizing effect, among the low-income households. Thus, the study concludes that proper policies should be drawn to incentivize formal channeling and efficient utilization of remittance inflows, particularly aimed at reducing inequality.

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1. Introduction:

Bangladesh is one of the fastest growing major economies in the world at 7.65% growth rate in FY 2018 (Monetary Policy Statement, July-December, 2018, Bangladesh Bank). A close look at the income distribution between the poorest 10 per cent and the richest 10 per cent depicts that the income share of the poorest 10 per cent is 3.85 per cent compared to 26.92 per cent for the richest 10 per cent in Bangladesh. The GINI index for Bangladesh has fluctuated substantially over the years but it saw a sharp increase of 19.20% from 27.60 to 32.90 between 1991 and 1995. As of 2016, Bangladesh GINI index was at 32.4, which is a 0.93% increase from 2010, carrying the high index value over to recent years (World Bank estimate).

This picture indicates that very little of the benefits of economic growth are trickling down to the very poor, the people who need it the most. Hence, keen interests remain in analyzing the nature of, causes of and remedies for income inequality in terms of contemporary empirical research in development economics.

Stojanov and Strielkowski (2013) maintain efficient remittance transfer as one of the most important methods to facilitate development in less developed countries. Remittance is the funds an expatriate sends to his or her country of origin via wire, mail, or online transfer. These peer-to-peer transfers of funds across borders play a vital role in the economy of Bangladesh as it stands as the 8th highest remittance receiving country in the world. About 12% of the GDP and 66% of total foreign reserve of Bangladesh consists of the money sent by the non-residential Bangladeshis (Migration and Development Brief 2016, World Bank). Inflow of foreign remittance stands at \$14.98 billion in the fiscal year 2017-18 which is about 17% higher than fiscal year 2016-17 (Bangladesh Bank). Even though the portrayed magnitude of remittance inflow is compelling enough, the impact of remittances on our economy is not likely to be entirely captured as, in reality, official estimates of remittances tend to understate actual numbers considerably, as a notable portion of remittance enters the country through unofficial channels (Pradhan, Upadhyay and Upadhyaya, 2008).

The impact of remittances on income inequality constitutes a keenly debated topic in the development literature. We are yet to find a definitive consensus on the issue (Bang, Mitra and Wunnava, 2016). The primary contribution of this paper is two-fold. Firstly, it focuses on the

distribution of household income in Bangladesh, not the level of household income solely. Secondly, existing literature suggests that little to no studies focus on the relationship of growing remittance inflow and household income distribution in Bangladesh. Due to endogeneity and self-selection in the decision of migration, empirical study in this area is significant to form a general consensus on the pattern of migration and its possible impact on inequality in Bangladesh.

This paper proposes to examine if the significant impact of remittance extends to the prevailing income inequality in Bangladesh, and if so, then, whether the impact is improving or worsening the income inequality. The rural Bangladesh case will be considered here as a significant portion of the population reside in the rural areas which implies that the rural income inequalities must constitute an important source of overall income inequality (Stark, Taylor and Yitzhaki, 1986).

The rest of the paper is structured as follows: Section 2 provides a review of the existing literature in the aforementioned area. Section 3 provides an overview of the current trends and patterns of remittance inflow and income inequality in Bangladesh. Section 4 provides an economic background to the empirical study this study deals with. Section 5 provides a detailed statistical summary and description of the data. Section 6 deals with the econometric methodology. Section 7 depicts and analyzes the results. Section 8 draws inference from the results and concludes with relevant policy recommendations.

Objectives of the Study:

The key objectives of the study are as follows:

1. To analyze the prevalent inequality in the household income distribution in Bangladesh.
2. To analyze if foreign remittances have any significant impact on the inequality of the household income distribution in Bangladesh.
3. If yes, to analyze if foreign remittances have a positive or negative impact on the inequality of the household income distribution in Bangladesh.

2. Literature Review:

Extensive empirical works on the relationship between migrant remittances and inequality have been done since the 1980s (Star, Taylor and Yitzhaki, 1986). This study explores the impact of rural-out migration upon the distribution of household income which plays a central relationship between economic growth and equity in the Least Developed Countries. In general, the studies modeling the relationship between remittances and inequality present contrasting results. Barham and Boucher (1998) find that migration and remittances worsen income inequality comparing with a counterfactual for no-migration, for household data in Nicaragua. This hypothesis is further supported by Stark (1986); Acosta (2008). Conversely, Taylor and Wyatt (1996) find that econometric evidence in favor of remittances illustrating a direct equalizing effect on the income distribution, in case of household level data for rural Mexico. Further evidence is presented by Koechlin and Leon (2007) as they argue that migrant remittances tend to improve income inequality as the opportunity cost of migration diminishes with time.

The contrasting results can be due to an endogeneity arising from an inability to compute counterfactual income for the non-remittance recipient population (Ghosh, 2006; Ratha, 2007).

Agwu, Yuni and Anochiwa (2018) argue that remittances must have differential impact on households at different levels on the population income distribution to affect income distribution of the population of a country. This paper examines the effect of remittance on income inequality in case of Senegal using a remittance-dummy model.

Adams and Page (2005) find that the use of instrumental variable quantile regression (IVQR) explicitly shows the differential marginal impact of remittances for households at different levels of the conditional expenditure distribution.

Bang, Mitra and Wunnava (2016) was the first to contribute to the debate about the distributional impact of remittances in sub-Saharan Africa. In case of Kenya, the paper finds that remittances demonstrate a positive impact at all quintiles of household income distribution but the impact is unambiguously greatest for the households on the lower portion of the distribution, in the case of Kenya.

Shifting our focus away from Africa, Lopez, Fajnzylber, Calderon and Acosta (2007) find that in case of Latin American and Caribbean (LAC) countries, remittances lead to an increase in growth

and reduction in inequality and poverty, using household survey data. These results are robust to the use of different instruments that attempt to correct for the potential endogeneity of remittances.

Significant studies done in the Asia and Pacific countries include that of Jongwanich (2007). In case of South Asia, Siddique, Shehzadi, Manzoor and Majeed (2016) find that remittances constitute 4.2% of the total income in this region and it has a significant impact on the alleviation of poverty. Adams and Mahmood (1992) conducted similar analysis in case of Pakistan.

Narrowing our focus to the case of Bangladesh, we find limited studies examining the relationship between remittances and inequality. Mahmud and Osmani (1980) argue that the absolute impact on the income and savings of the remittance-receivers is found to be substantial; but the impact on the relative distribution of income seemed to be disconcerting in Bangladesh. Wadood and Hossain (2015) find significant long run relationship between remittances and economic growth in Bangladesh. Bryan, Chowdhury and Mobarak (2014) explore the causes and consequences of seasonal migration in the Northwestern region of Bangladesh and find migration to be risky, but providing an incentive for temporary out-migration resulted in significant increase in the consumption of the households at origin. But studies on the relationship between remittances and inequality in Bangladesh are still very scant.

As a call for further exploration in the case of Bangladesh, on the face of recent rise in remittances reception, exists, this paper will try to determine if remittances can improve the prevailing income inequality in Bangladesh following inequality measuring techniques e.g. Lorenz Curve, GINI Index and GINI Coefficients Decomposition. Methodologically, this paper will heavily draw from Jann (2016) and López-Feldman (2006). Due to limitations in data availability, this paper will focus on the income distribution of only the rural households in Bangladesh.

3. Overview of the current trends and patterns of remittance inflow and income inequality in Bangladesh:

This section portrays the overall trends and patterns of remittance inflow in Bangladesh and compares it to the global scenario. It also illustrates the trends of inequality in Bangladesh over the years.

Both developed and developing countries all over the world experience varying degrees of income inequality. While some countries manage to maintain a somewhat stable level of inequality, for others it's a challenging task to keep the inequality at a socially and politically stable level.

Looking at the global picture, Europe tends to experience low level of inequality, especially in the Scandinavian region. The picture is significantly worse for African and Latin American countries. Over the years, USA has experienced a sharp rise in income inequality as the GINI coefficient has increased from 38.2 in 1990 to 41.5 in 2016, according to the Federal Reserve Bank economic data. In South Asia, both Bangladesh and India are experiencing significant income inequality which is relatively larger than other Asian countries.

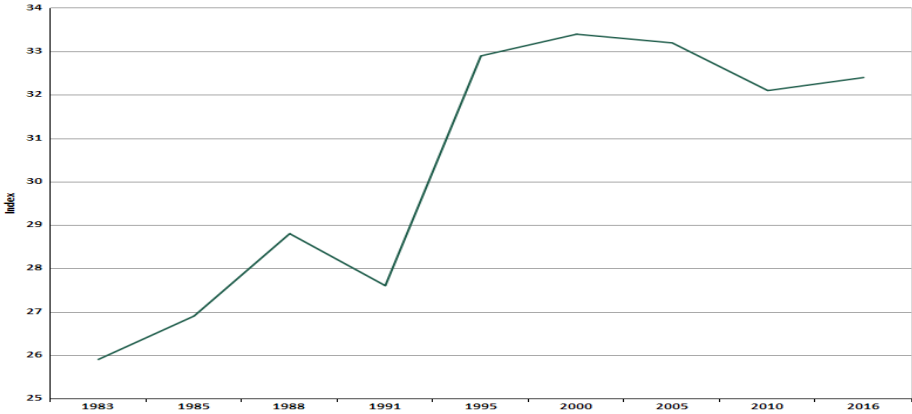


Fig 1: GINI Index for Bangladesh

Source: World Bank

Figure 1 shows the trend of the inequality in Bangladesh, represented by the GINI index, between the year of 1983 and 2016. The figure suggests a steady upward trend in inequality with occasional fluctuations. After the sharp increase of the index between 1991 and 1995, the index retained its value stably around 32-33, with the most recent increase of 0.93% in 2016.

Prevailing inequality in the income distribution can be illustrated by the trend of income concentration at the top 5% households. The share of the income of the top 5% households has

seen substantial increase from 24.61% in 2010 to 27.89% in 2016. On the other hand, the share of income of the bottom 5% households has seen a fall from 0.78% in 2010 to 0.23% in 2016. The overall ratio of the income share of the top 5% and bottom 5% households is alarmingly on the rise from 31.6 in 2010 to 121.3 in 2016,.

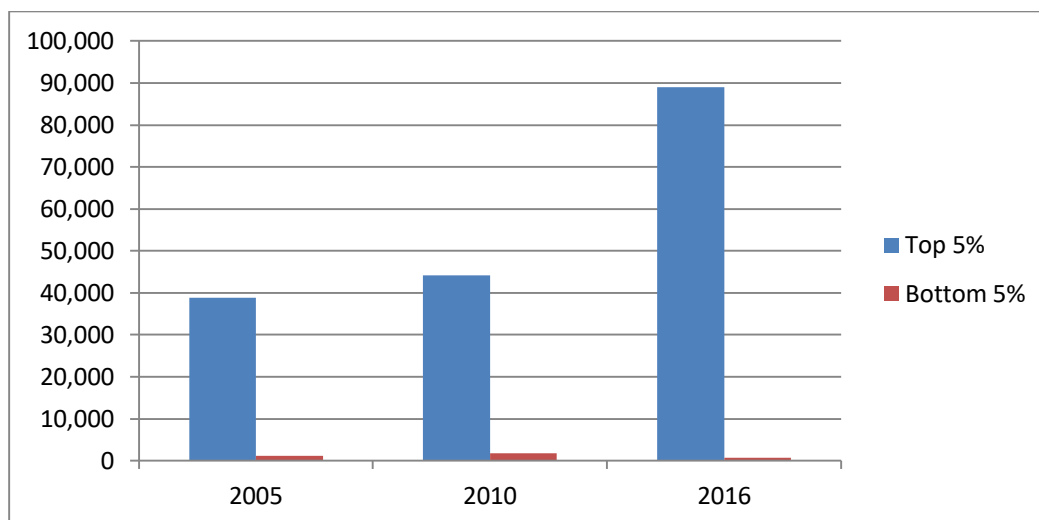


Fig 2: Top and Bottom 5% distribution of Average Monthly Household Income

Source: CPD (2018): State of the Bangladesh Economy in FY2017-18

As figure 2 illustrates, the gap between the average monthly household income of the top and bottom 5% of the households is gradually on the rise providing sufficient evidence for concluding that the rich are becoming richer and the poor are becoming poorer.

However, substantially lower income inequality is exhibited if we shift our focus to the consumption expenditure distribution, instead of income distribution. Income transfers, consumption smoothing, use of credits can explain this difference as they partly insulate the households from the adverse effects of rising income inequality.

According to Bangladesh Bank, in figure 3, Late 2000s and early 2010s saw a significantly high contribution of remittances in the GDP of Bangladesh, the rate of which was around 9.5 percentage point during that period. But very recently the contribution slightly reduced, ending at 5.17% in 2017.

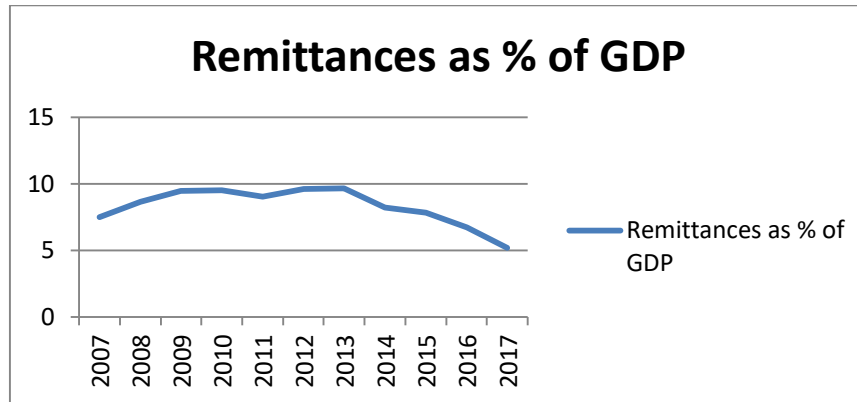


Fig 3: Remittances as % of GDP in Bangladesh

Source: Quarterly report on remittance inflows, July-September, 2017, Bangladesh Bank

But, in figure 4, the amount of remittances inflow shows a consistent upward trend, growing at an average annual rate of 12.49 %, with an almost 100% increase from 2006 to 2010. Inflow of foreign remittance stands at \$14.98 billion in the fiscal year 2017-18 which is about 17% higher than fiscal year 2016-17.

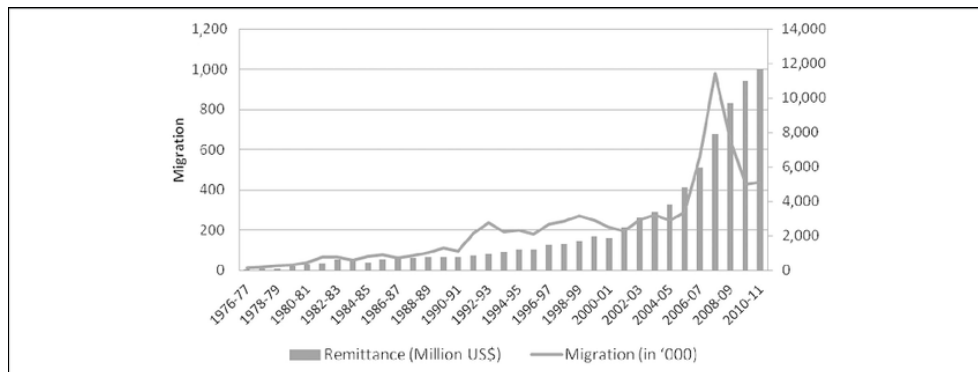


Fig 4: Remittances (Million USD) and Migration Trend in Bangladesh

Source: Migrations From and Remittances in Bangladesh, 1976-2011 Source: Constructed. Data from the Ministry of Finance (2009), Bangladesh Bank (2011).

Globally, as figure 5 illustrates. India receives the largest amount of remittance standing at 69 billion USD. China is just behind at the 2nd position with 64 billion in received remittances. African countries like Nigeria and Egypt are also attracting substantial amount of foreign remittances. Bangladesh stands as the 8th highest remittance receiving country with 15 billion USD in received remittances performing significantly well in the context of Asia.

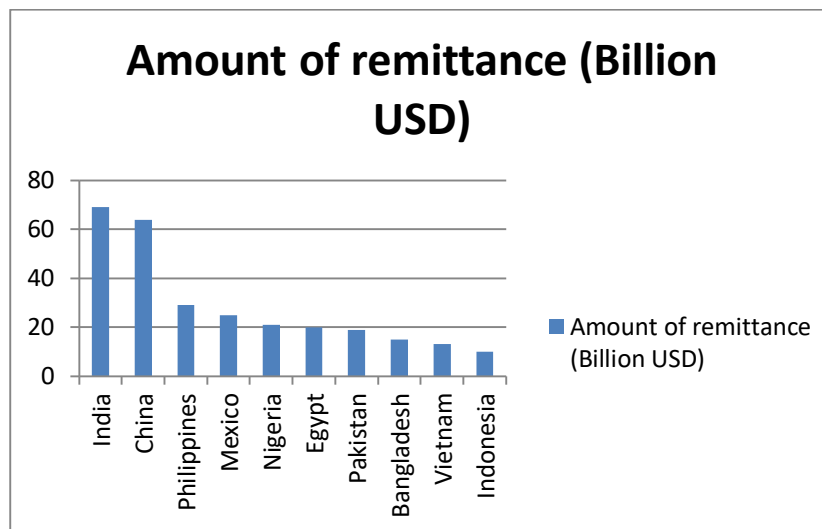


Fig 5: Top 10 countries in the world by Amount of Remittances Received (Billion USD)

Source: Migration and Development Brief, World Bank, April, 2016.

As the trends suggest, the magnitude of the role remittances play in the economy of Bangladesh is telling. Analyzing its impact on inequality is an intriguing topic among development practitioners, especially in the context of developing countries like Bangladesh.

4. Economic Background:

Millions of people move within and across the borders of their country of origin in an attempt to close the gap between their own positions and that of the people of their destination places, thus, proving migration to be a striking symbol of global inequality. In relatively poorer regions of Latin America, Africa, Asia, particularly South Asia, both international and national, permanent, temporary or seasonal, migration represent an opportunity better wage, labor, market condition and lifestyle. But migration, especially international migration, is associated with significant risks and costs. Although migration is, at least partly, associated with income and wealth inequalities between the place of origin and destination, its overall impact on the reduction of this apparent inequality is debatable. Besides the distribution of these costs and benefits being an important factor, selectivity of migration itself is an important factor in the analysis of the aggregate impact

of migration and remittances (Black, Natali, Skinner, 2006). Individuals can self-select themselves for migration based on some specific features which can render migration to be more profitable than others. Among these individual features or characteristics from which self-selection may arise, some are directly observable, such as amount of wealth or level of education, while some are unobservable, such as ambition and ability. As unobservable characters are an important component in terms of self-selection of migration, empirical analysis becomes imperative in analyzing the dimensions of migration and remittances.

According to Borjas' negative selection hypothesis, countries with high inequality are more likely to experience out-migration of its less skilled population to countries with low inequality. In contrast, Chiswick (2000) argued in favor of positive self-selection of migrants, disputing Borja's hypothesis. The two models diverge in their frameworks based on their treatments of migration costs. While Borjas considered migration cost as a constant proportion of foregone earnings, Chiswick also considered direct, out-of-pocket costs, like required migration processing costs, transportation costs etc. Additionally, he assumed that high skilled individuals have relatively higher efficiency in dealing with these out-of-pocket costs.

If most migrants originated from the poorest regions, their achieved net gains from migration would contribute to reduce economic inequality at least, considering all other things equal. But migrants are not always low-skilled and poorest. From the opposing views of the self-selection of migration, we can hypothesize that much depends on the exact economic question being asked, in which context it is being asked, the assumptions about and the treatment of the variables of interest, the econometric or statistical techniques and the macroeconomic condition of the areas or economies of interest.

Therefore, exploration of the relationship between remittance inflow and inequality remains largely dependent on the context being considered and calls for empirical analysis.

5. Data:

5.1 Source:

The data for this analysis is drawn from Bangladesh Integrated Household Survey (BIHS). This survey was carried out between January and June, 2015, by the International Food Policy Research

Institute (IFPRI) supported by United States Agency for International Development (USAID) and Policy Research and Strategy Support Program (PRSSP). The survey was conducted on 6,500 households.

5.2 Summary Statistics:

From the data set used for this analysis, out of the possible 7,316 households, annual food expenditure data could be collected for only 1,098 households, in contrast, 6,437 observations have been reported for annual non-food expenditure. We can see that the average non-food expenditure of the households is 60,433 taka annually whereas the food expenditure is 34,275 taka annually. From the mean of the dummy variable remittance, we can see that annually 31.09% of the households receive remittances and 68.91% households don't receive any remittance.

Variable	Obs	Mean	Std. Dev.	Min	Max
Total Annual Expenditure	7,316	58316	146394.5	0	4637790
Annual Non Food Expenditure	6,437	60433	151786.1	0	4637790
Annual Food Expenditure	1,098	34275	28284.02	0	241124
Household Head's Age	6,321	46.708	13.49736	19	105
Household Head's Secondary Education	6,321	0.0487	0.215313	0	1
Household Head Female	6,321	0.1459	0.352997	0	1
Remittance	6,436	0.3109	0.462901	0	1
Barisal	6,715	0.1066	0.308661	0	1
Chittagong	6,715	0.1474	0.354562	0	1

Dhaka	6,715	0.3019	0.4591	0	1
Khulna	6,715	0.1573	0.364073	0	1
Rajshahi	6,715	0.0901	0.286342	0	1
Rangpur	6,715	0.0852	0.279174	0	1
Sylhet	6,715	0.1115	0.314825	0	1

Table 1: Summary Statistics of the data

6. Methodology:

Given the assumption that the impact of remittances will differ over the conditional distribution of household income, we measure and decompose inequality by subgroups of remittance recipient and non-recipient using Lorenz estimation, GINI coefficient following Jann (2016) and GINI decomposition following López-Feldman (2006). We perform these methods for illustrating inequality in both food expenditure and non-food expenditure in the rural households.

Intuitively, a point on the Lorenz curve quantifies the proportion of total outcome of the poorest $p \cdot 100$ percent of the population. This can easily be seen in the finite population form of $L_X(p)$, which is given as

$$L_X(p) = \frac{\sum_{i=1}^N X_i I\{x_i \leq Q_X^p\}}{\sum_{i=1}^N X_i}$$

where, X is the outcome variable of interest (income), $F_X(x)$ is the cumulative distribution function of X and $Q_X(p)$ is the quantile function (the inverse of the distribution function) with $I\{A\}$ as an indicator function being equal to 1 if A is true and 0 else. Lorenz curves are graphically illustrated typically with p on the horizontal axis and $L_X(p)$ on the vertical axis.

For a sample X_i , where $i=1, \dots, n$ sorted in ascending order, $L_X(p)$ can be estimated as

$$\hat{L}_X(p) = (1 - \gamma)\check{X}_{i_p-1} + \gamma\check{X}_{i_p}$$

where i_p is such that $\hat{p}_{i_p-1} < p \leq \hat{p}_{i_p}$. This approach breaks ties in X proportionally and linear interpolation (corresponding to quantile definition 4 in Hyndman and Fan (1996)) is applied where the distribution function of X is flat.

Lerman and Yitzhaki (1985) maintain that the Gini coefficient for total income inequality, G, can be represented as:

$$G = \sum_{k=1}^K S_k G_k R_k$$

where S_k represents the share of source k in total income, implying how important the income source is with respect to total income, G_k is the source Gini corresponding to the distribution of income from source k, implying how equally or unequally distributed the income source is, and R_k is the Gini correlation of income from source k with the distribution of total income, implying how the income source and the distribution of total income are correlated.

We use Stata14 for all statistical analysis.

6.1 Outcome Variable:

Annual consumption expenditure, both food and non-food expenditure, is used here as a proxy for annual income as expenditure has less variation around its mean and is commonly used in household survey data analysis as income data are much less easily accessible and difficult to capture by a survey enumerator (Khan, 2014). This paper analyzes the impact of remittances on total annual expenditure and its both components, food expenditure and non-food expenditure distributions and illustrates a comparative depiction.

6.2 Remittances and other Household Characteristics Indicators:

Here,

TotalAnnualExp	Annual household expenditure (non-food + food expenditure)
AnnualNonFoodExp	Annual household expenditure (non-food)
AnnualFoodExp	Annual household expenditure (food)
Remittance1	variable =1 if household received positive amount of cash remittance from abroad in the last 12 months, = 0 otherwise
HHage	Household head age in years
HHage ²	The squared age of Household head
HHSecondaryEduc	Indicator of the level of education of household head, = 1 if household head's education is higher than secondary school, = 0 if equal to secondary school or less.
Hhsize	The number of members in a given household including the migrant member.
HHfemale	Indicator for a female headed household.
Region	A group of regional dummies constituting the 7 major divisions in Bangladesh.

7. Empirical Analysis:

7.1 Analyzing the Empirical Results:

Here we perform OLS regression, Lorenz Estimation, Lorenz Estimation by Remittance, Gini Index and GINI Decomposition for the total annual expenditure, annual non-food and annual food expenditure. The results are as follows:

From the simple OLS regression results, as shown in table 2, we can see that all variables have significant impact on the total annual expenditure of the households. All variables except 3 regional dummies, Dhaka, Khulna and Rajshahi, seem to have significant impact on the annual non-food expenditure. Our variable of interest, Remittance dummy, seems to have significant impact on both total annual expenditure and annual non-food expenditure. It is significant for annual food expenditure at 10% level of significance. But a simple OLS regression doesn't show the picture of prevailing inequality in the expenditure distribution.

In order to capture the level on inequality in the expenditure distribution of the households in consideration, we perform Lorenz estimation to draw an empirical Lorenz curve for the total annual expenditure. Then to illustrate how this inequality contrasts in the non-food and food expenditure distribution, we perform separate Lorenz estimation and draw empirical Lorenz Curves for both of these components. The results are illustrated in table 3, 4, 5 and figure 6, 7, 8.

We can see from the results that annual non-food expenditure exhibits a more unequal distribution than food expenditure, which is in line with our expectation.

Now, to evaluate how remittance inflow is impacting on the distributions, we perform Lorenz by subgroup estimation and illustrate the comparison with overlaid Lorenz Curves. The results are illustrated in table 6, 7, 8 and figure 9, 10, 11.

We can see from the results that the Lorenz estimation coefficients are slightly lower for households receiving remittances in case of total annual expenditure and its both components, non-food and food expenditures. The expenditure distribution for remittance receiving households exhibits higher inequality compared to the households which don't receive remittances as their Lorenz curve is farther from the 45° perfect equality line.

To develop a complete picture, we find the GINI indices by remittance as shown in table 9. For remittance receiving households, the GINI indices for total annual expenditure, and its components, non-food expenditure and food-expenditure, are respectively 0.65632, 0.66834 and

0.44485. Compared to the GINI indices of the households which don't receive any remittance, which are 0.56534, 0.57087 and 0.402777, the indices of the remittance receiving households are quite higher. These results depict a picture of higher inequality associated with remittance inflow.

But an interesting picture emerges when we decompose the overall GINI by income sources to determine which income sources are contributing, and to which degree, to this inequality in distribution. As we can see the results from table 10, remittance income is unequally distributed (0.8958) but the GINI correlation between remittance income and total expenditure of a moderate 0.6031 show that a relatively high source Gini does not imply that an income source has an unequalizing effect on total inequality. An income source may be unequally distributed yet favor the poor, as is the case here. The negative percentage change coefficients implies remittances to cause the inequality to go down. A similar impact can be seen in case of both non-food and food expenditures.

7.2 Summarizing the Results:

Remittance, as an income source, is highly unequally distributed as evident from the Lorenz curves and income source GINI indices. But they don't necessarily have an unequalizing effect on inequality. In fact, they tend to reduce inequality significantly as evident from the percentage change coefficients of the GINI decomposition, in case of total expenditure distribution and its both components, non-food and food expenditure.

8. Conclusion:

The magnitude of the prevailing inequality in contrast with the current significant growth of GDP in Bangladesh posits an important question about which factors seem to have significant impact on this inequality and in which direction is the impact operating. As Bangladesh stands as the 8th highest remittance receiving country in the world, probing into the impact of this substantial amount of remittance inflow is economically quite demanding at this point, as we could tap into a potentially useful economic tool for controlling a number of macroeconomic situations which troubled policymakers previously.

In light of this question, this study attempted to link remittance inflow with the economic inequality by empirically analyzing the impact of remittance on the inequality of the household expenditure

distribution in Bangladesh. At first, the study established a statistically significant impact of remittances on the expenditure distribution and then it went on to analyze the direction of the impact. The study found that inequality between two groups can be higher by migration and within group inequality is higher among the remittance receiving households as remittance itself is an unequally distributed income source. But it tends to have an equalizing effect on the expenditure distribution and seems to favor the low-income households, i. e., poor households causing the inequality to go down.

The limitations of the study include inability to capture the nationwide data, as it used the data for only the rural level households, inability to capture the income distribution of the households due to data unavailability; instead the commonly used expenditure distribution was used as a proxy. Further research scopes remain to empirically analyze the relationship between remittances and inequality by overcoming these limitations and utilizing various measures of inequality.

The study concludes that remittance inflow can be used as a useful tool to tackle inequality of the income distribution by employing appropriate policies to explore the prospect of easier foreign migration, obtain more remittances through formal channels and ensure more proficient use of the substantial amount of remittances received each year. Substantial and sustainable investment in economic and social activities, instead of being limited to personal consumption, should understandably be an area of focus for a government interested in reducing inequality (Black, Natali, Skinner, 2006). Therefore, creation of stabilized and investment favorable macroeconomic conditions is decidedly a worthwhile objective.

9. References:

1. Todaro, M. and Smith, S., 2003. Development economics.
2. Stojanov, R. and Strielkowski, W., 2013. The role of remittances as more efficient tool of development aid in developing countries. *Prague economic papers*, 22(4), pp.487-503.

3. Stark, O., Taylor, J.E. and Yitzhaki, S., 1986. Remittances and inequality. *The economic journal*, 96(383), pp.722-740.
4. Pradhan, G., Upadhyay, M. and Upadhyaya, K., 2008. Remittances and economic growth in developing countries. *The European journal of development research*, 20(3), pp.497-506.
5. Bang, J.T., Mitra, A. and Wunnava, P.V., 2016. Do remittances improve income inequality? An instrumental variable quantile analysis of the Kenyan case. *Economic Modelling*, 58, pp.394-402.
6. Jongwanich, J., 2007. *Workers' remittances, economic growth and poverty in developing Asia and the Pacific countries*. United Nations Publications.
7. Adams Jr, R.H. and Page, J., 2005. Do international migration and remittances reduce poverty in developing countries?. *World development*, 33(10), pp.1645-1669.
8. Siddique, H.M.A., Shehzadi, I., Manzoor, M.R. and Majeed, M.T., 2016. Do international migration and remittances reduce poverty in developing countries?.
9. Lopez, H., Fajnzylber, P., Calderon, C. and Acosta, P., 2007. *What is the impact of international remittances on poverty and inequality in Latin America?*. The World Bank.
10. Adams, R.H. and Mahmood, Z., 1992. The Effects of Migration and Remittances on Inequality in Rural Pakistan [with Comments]. *The Pakistan Development Review*, 31(4), pp.1189-1206.
11. Wagstaff, A., 2005. The bounds of the concentration index when the variable of interest is binary, with an application to immunization inequality. *Health economics*, 14(4), pp.429-432.
12. López-Feldman, A., 2006. Decomposing inequality and obtaining marginal effects. *Stata Journal*, 6(1), pp.106-111.
13. Wadood, S.N. and Hossain, M., 2015. Impact of Overseas Remittances on Economic Growth: Evidences from Bangladesh.
14. Black, R., Natali, C. and Skinner, J., 2006. *Migration and inequality*. World Bank.
15. Cattaneo, C., 2007. The Self-Selection in the Migration Process: What Can We Learn?.

16. Jann, B. (2016). Estimating Lorenz and Concentration Curves. *The Stata Journal: Promoting communications on statistics and Stata*, 16(4), pp.837-866.
17. Bryan, G., Chowdhury, S. and Mobarak, A.M., 2014. Underinvestment in a profitable technology: The case of seasonal migration in Bangladesh. *Econometrica*, 82(5), pp.1671-1748.
18. Barham, B. and Boucher, S., 1998. Migration, remittances, and inequality: estimating the net effects of migration on income distribution. *Journal of development economics*, 55(2), pp.307-331.
19. Taylor, J.E. and Wyatt, T.J., 1996. The shadow value of migrant remittances, income and inequality in a household-farm economy. *The Journal of Development Studies*, 32(6), pp.899-912.
20. Koechlin, V. and Leon, G., 2007. International remittances and income inequality: An empirical investigation. *Journal of Economic Policy Reform*, 10(2), pp.123-141.
21. Ghosh, B., 2006. *Migrants' remittances and development: myths, rhetoric and realities*. International Organization for Migration (IOM).
22. Ratha, D. and Mohapatra, S., 2007. Increasing the macroeconomic impact of remittances on development. *World Bank*.
23. Agwu, G.A., Yuni, D.N. and Anochiwa, L., 2018. Do remittances improve income inequality? An instrumental variable quantile analysis of the Senegalese case. *International Migration*, 56(1), pp.146-166.
24. Borjas, G.J., 1991. Immigration and self-selection. In *Immigration, trade, and the labor market* (pp. 29-76). University of Chicago Press.
25. Chiswick, B.R., 2000. Are immigrants favorably self-selected. *Migration theory: Talking across disciplines*, pp.61-76.
26. Hyndman, R.J. and Fan, Y., 1996. Sample quantiles in statistical packages. *The American Statistician*, 50(4), pp.361-365.
27. Lerman, R.I. and Yitzhaki, S., 1985. Income inequality effects by income source: a new approach and applications to the United States. *The review of economics and statistics*, pp.151-156.
28. Ifpri.org. (2018). [online] Available at: <http://www.ifpri.org/> [Accessed 26 Nov. 2018].
29. Data.worldbank.org. (2018). *Indicators / Data*. [online] Available at: <https://data.worldbank.org/indicator> [Accessed 26 Nov. 2018].
30. Bank, B., 2017. Quarterly report on remittance inflows: July-September 2017.

31. Fred.stlouisfed.org. (2018). *Federal Reserve Economic Data / FRED / St. Louis Fed.* [online] Available at: <https://fred.stlouisfed.org/> [Accessed 26 Nov. 2018].

32.Cpd.org.bd. (2018). [online] Available at: https://cpd.org.bd/wp-content/uploads/2018/01/IRBD-FY2018-First-Reading_Paper-Final-13012017.pdf [Accessed 26 Nov. 2018].

33.Pubdocs.worldbank.org. (2018). [online] Available at: <http://pubdocs.worldbank.org/en/661301460400427908/MigrationandDevelopmentBrief26.pdf> [Accessed 26 Nov. 2018].

10. Annex:

	OLS Result						No. of Obs:5,712		
	LnTotalAnnualExp			lnAnnualNonFoodExp			lnAnnualFoodExp		
	Coef.	Std. Err.	p>t	Coef.	Std. Err.	p>t	Coef.	Std. Err.	p>t
Remittance	0.4841453	0.037253	0	0.491157	0.036698	0	0.136563	0.07105	0.1

Household	0.0688962	0.006899	0	0.072384	0.006796	0	-0.01402	0.01392	0.3
Head's Age									
Household	-0.00075	6.84E-05	0	-0.00078	6.74E-05	0	0.000113	0.00014	0.4
Head's Age squared									
Household	0.4402956	0.070487	0	0.431834	0.069437	0	0.272506	0.13069	0
Head's Education									
Household Head Female	-0.577143	0.046629	0	-0.56336	0.045934	0	-0.55207	0.09677	0
Barisal	-0.262767	0.063042	0	-0.1865	0.062103	0	-1.167	0.11106	0
Chittagong	0.3914893	0.059205	0	0.491518	0.058323	0	-0.75947	0.10489	0
Dhaka	-0.149134	0.051419	0	-0.02945	0.050654	0.56	-0.55868	0.1027	0
Khulna	-0.202914	0.056964	0	-0.08677	0.056116	0.12	-1.12425	0.11075	0
Rajshahi	-0.226009	0.065038	0	-0.0799	0.06407	0.21	-1.24611	0.13413	0
Rangpur	-0.511326	0.066923	0	-0.42554	0.065926	0	-0.91936	0.1319	0
_cons	8.989634	0.17157	0	8.693766	0.169015	0	11.26505	0.34423	0

Table 2: OLS regression

		TotalAnnualExp			No. of Obs:7,316
	Coef.	Std. Err.	95% Interval	Conf	
0	0	(omitted)			
5	0	(omitted)			
10	0	(omitted)			
15	0.0010653	0.000259	0.000557	0.001574	
20	0.0061566	0.000528	0.005122	0.007192	
25	0.0139572	0.000768	0.012451	0.015464	
30	0.0241351	0.001049	0.022078	0.026192	
35	0.0365838	0.001378	0.033882	0.039285	
40	0.051458	0.001775	0.047979	0.054937	
45	0.0689326	0.002237	0.064548	0.073318	

50	0.0893045	0.002776	0.083864	0.094745
55	0.1132321	0.003407	0.106553	0.119912
60	0.1410987	0.004124	0.133014	0.149183
65	0.1738655	0.004959	0.164144	0.183587
70	0.2124189	0.005924	0.200807	0.224031
75	0.2587853	0.007052	0.244961	0.27261
80	0.315285	0.008383	0.298851	0.331719
85	0.3853037	0.009964	0.365772	0.404835
90	0.4761549	0.011825	0.452974	0.499336
95	0.6091519	0.014138	0.581437	0.636867
100	1	.	.	.

Table 3: Lorenz Estimation of Total Annual Expenditure

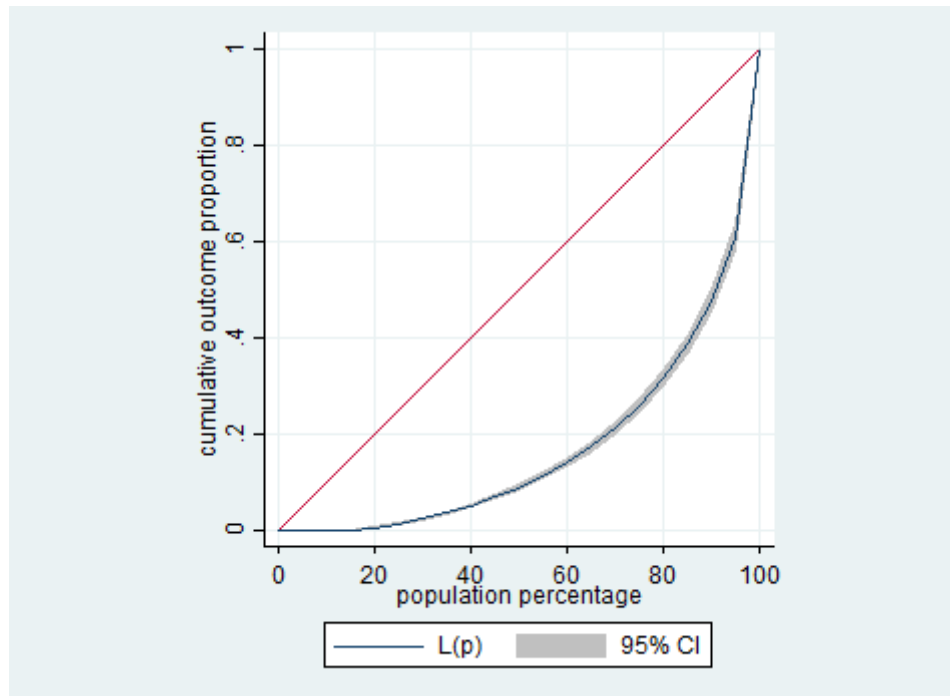


Figure 6: Lorenz Curve of Total Annual Expenditure

AnnualNonFoodExp No. of Obs: 6,437				
Coef.	Std. Err.	95%	Conf	
		Interval		

0	0	(omitted)		
5	0.002228	0.000138	0.001959	0.0025
10	0.007474	0.00032	0.006846	0.0081
15	0.014787	0.000551	0.013708	0.01587
20	0.02394	0.000839	0.022296	0.02558
25	0.034823	0.001171	0.032527	0.03712
30	0.047461	0.001554	0.044414	0.05051
35	0.061985	0.00199	0.058084	0.06589
40	0.078533	0.002483	0.073667	0.0834
45	0.09726	0.003033	0.091314	0.10321
50	0.118629	0.003657	0.11146	0.1258
55	0.142923	0.004356	0.134384	0.15146
60	0.170451	0.005136	0.160382	0.18052
65	0.202057	0.006019	0.190258	0.21386
70	0.238317	0.007009	0.224578	0.25206
75	0.280958	0.008147	0.264988	0.29693
80	0.332074	0.009448	0.313552	0.3506
85	0.396132	0.010996	0.374577	0.41769
90	0.48136	0.012858	0.456154	0.50657
95	0.608869	0.015197	0.579079	0.63866
100	1	.	.	.

Table 4: Lorenz Estimation of Annual Non Food Expenditure

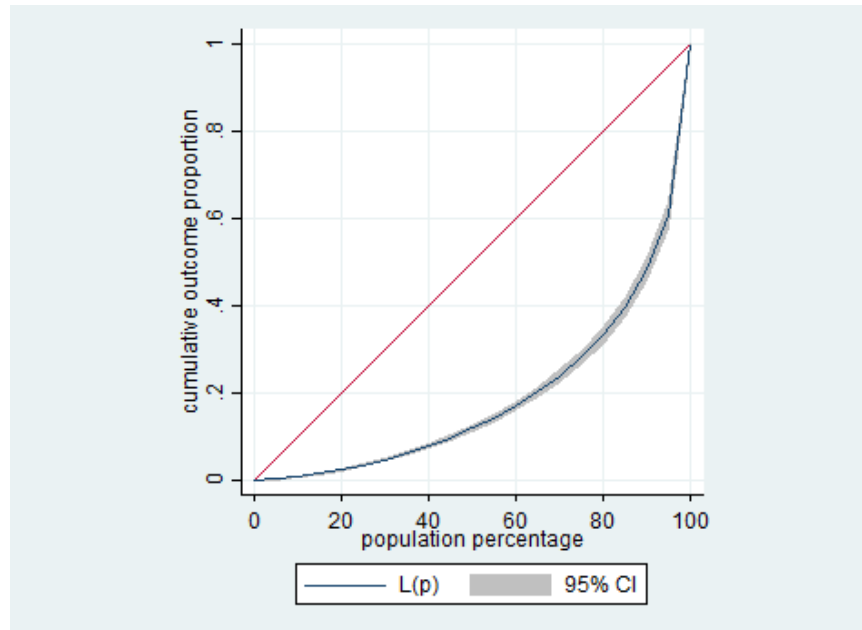


Figure 7: Lorenz Curve of Annual Non Food Expenditure

		AnnualFoodExp			No. of Obs:1,098
	Coef.	Std. Err.	95% Interval	Conf	
0	0	(omitted)			
5	0.0024	0.000329	0.001763	0.003056	
10	0.0091	0.000843	0.007479	0.010786	
15	0.0199	0.001451	0.017078	0.022772	
20	0.0348	0.002136	0.030624	0.039004	
25	0.0537	0.002756	0.048251	0.059067	
30	0.0764	0.003434	0.069645	0.08312	
35	0.1032	0.00407	0.095195	0.111169	
40	0.134	0.004697	0.124734	0.143168	
45	0.1689	0.005291	0.158503	0.179268	
50	0.208	0.005859	0.19652	0.219513	
55	0.2518	0.006404	0.23924	0.264371	
60	0.3004	0.00689	0.286871	0.313909	
65	0.354	0.007337	0.339607	0.368401	

70	0.413	0.007693	0.397901	0.42809
75	0.4774	0.007962	0.461793	0.49304
80	0.5486	0.008161	0.532592	0.564617
85	0.6291	0.008211	0.612992	0.645213
90	0.7223	0.008098	0.70637	0.738148
95	0.8316	0.007671	0.816595	0.846698
100	1	.	.	.

Table 5: Lorenz Estimation of Annual Food Expenditure

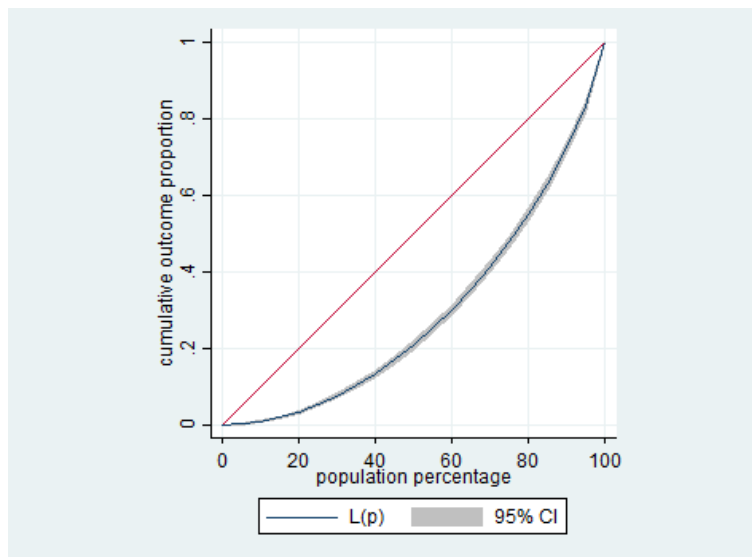


Figure 8: Lorenz Curve of Annual Food Expenditure

	TotalAnnualExp		No. of Obs=6,436	
	Coef.	Std. Err.	[95% Conf.	Interval]
remittance1=0				
0	0	(omitted)		
5	0.0032336	0.000186	0.00287	0.003597
10	0.0098803	0.000413	0.009072	0.010689
15	0.0187226	0.000685	0.017379	0.020066
20	0.0296622	0.001012	0.027678	0.031647

25	0.0425329	0.001389	0.039811	0.045255
30	0.0574005	0.001817	0.053839	0.060962
35	0.0744248	0.002297	0.069922	0.078928
40	0.0938543	0.00284	0.088288	0.099421
45	0.1158183	0.003445	0.109065	0.122571
50	0.1407395	0.00412	0.132664	0.148816
55	0.1691236	0.004874	0.15957	0.178678
60	0.2011508	0.005707	0.189963	0.212339
65	0.2380798	0.006648	0.225047	0.251113
70	0.2809285	0.007708	0.265818	0.296039
75	0.3313391	0.008921	0.313852	0.348826
80	0.3919677	0.010321	0.371735	0.4122
85	0.4650217	0.011933	0.44163	0.488414
90	0.5569939	0.013706	0.530126	0.583862
95	0.684981	0.015925	0.653762	0.7162
100	1	.	.	.

remittance1=1				
0	0	(omitted)		
5	0.0010393	0.00014	0.000764	0.001315
10	0.0041172	0.000353	0.003426	0.004809
15	0.0089832	0.000654	0.007702	0.010265
20	0.0155503	0.001022	0.013547	0.017554
25	0.0238363	0.001467	0.02096	0.026712
30	0.0338458	0.001982	0.02996	0.037732
35	0.0456763	0.002589	0.040601	0.050752
40	0.0598626	0.00332	0.053354	0.066371
45	0.0766026	0.004149	0.068469	0.084737
50	0.0962524	0.005109	0.086238	0.106267
55	0.1187587	0.006166	0.106672	0.130845
60	0.1450265	0.007395	0.130531	0.159523
65	0.1756083	0.008783	0.15839	0.192827
70	0.2115916	0.010375	0.191254	0.231929

75	0.2551017	0.012239	0.231109	0.279095
80	0.3063804	0.014309	0.27833	0.334431
85	0.3730062	0.016796	0.340081	0.405931
90	0.4636722	0.019933	0.424598	0.502747
95	0.5996613	0.023331	0.553924	0.645398
100	1	.	.	.

Table 6: Lorenz Estimation of Total Annual Expenditure by Remittance

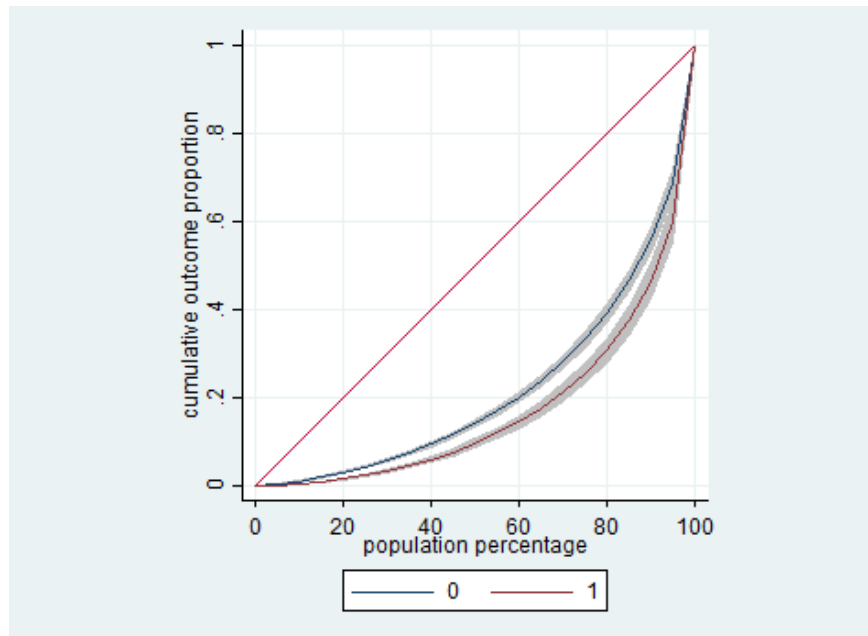


Figure 9: Lorenz Curve Overlay of Total Annual Expenditure by Remittance

	AnnualNonFoodExp		No. of Obs: 6,436	
	Coef.	Std. Err.	[95% Interval]	Conf.
Remittance=0				
0	0	(omitted)		
5	0.003323	0.000209	0.00291	0.0037
10	0.010311	0.000462	0.0094	0.0112
15	0.019675	0.000761	0.01818	0.0212
20	0.031107	0.001136	0.02888	0.0333

25	0.044509	0.00156	0.04145	0.0476
30	0.05992	0.002038	0.05593	0.0639
35	0.077382	0.002578	0.07233	0.0824
40	0.097053	0.003182	0.09082	0.1033
45	0.119188	0.003848	0.11164	0.1267
50	0.144009	0.004591	0.13501	0.153
55	0.171982	0.005416	0.16137	0.1826
60	0.203425	0.006327	0.19102	0.2158
65	0.238842	0.007334	0.22446	0.2532
70	0.279269	0.008462	0.26268	0.2959
75	0.325708	0.009709	0.30668	0.3447
80	0.38083	0.011151	0.35897	0.4027
85	0.448914	0.0128	0.42382	0.474
90	0.536747	0.014784	0.50776	0.5657
95	0.664195	0.017181	0.63051	0.6979
100	1	.	.	.

Remittance=1

0	0	(omitted)		
5	0.00107	0.000147	0.00078	0.0014
10	0.004202	0.000357	0.0035	0.0049
15	0.009027	0.000673	0.00771	0.0103
20	0.015562	0.001052	0.0135	0.0176
25	0.023648	0.001498	0.02071	0.0266
30	0.033505	0.002051	0.02948	0.0375
35	0.045099	0.00267	0.03987	0.0503
40	0.058711	0.003409	0.05203	0.0654
45	0.074797	0.004261	0.06644	0.0831
50	0.093437	0.005226	0.08319	0.1037
55	0.115175	0.006334	0.10276	0.1276
60	0.140138	0.007574	0.12529	0.155
65	0.169015	0.008985	0.1514	0.1866
70	0.20245	0.010577	0.18172	0.2232

75	0.242595	0.012419	0.21825	0.2669
80	0.291965	0.01461	0.26332	0.3206
85	0.355836	0.017166	0.32219	0.3895
90	0.44415	0.020482	0.404	0.4843
95	0.58008	0.024218	0.5326	0.6276
100	1	.	.	.

Table 7: Lorenz Estimation of Annual Non Food Expenditure by Remittance

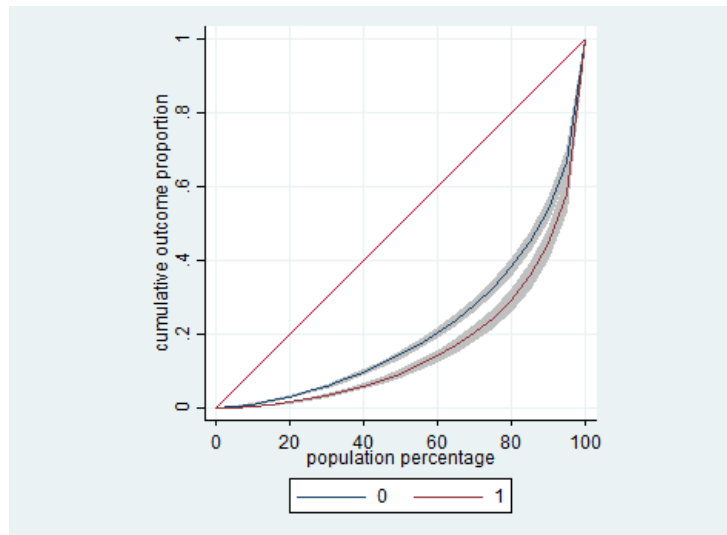


Figure 10: Lorenz Curve Overlay of Annual Non Food Expenditure by Remittance

AnnualFoodExp No. of Obs:1,098				
	Coef.	Std. Err.	[95% Interval]	Conf.
Remittance=0				
0	0	(omitted)		
5	0.002435	0.000405	0.001641	0.003228
10	0.009342	0.00112	0.007144	0.01154
15	0.02069	0.001875	0.017012	0.024368
20	0.036401	0.002803	0.030901	0.041901
25	0.056687	0.003695	0.049437	0.063936
30	0.080659	0.004313	0.072197	0.089121

35	0.108709	0.005156	0.098593	0.118824
40	0.140915	0.005946	0.12925	0.152581
45	0.177307	0.006581	0.164394	0.190219
50	0.21747	0.007073	0.203591	0.231349
55	0.26188	0.007655	0.24686	0.276899
60	0.311131	0.008132	0.295176	0.327086
65	0.365703	0.008652	0.348726	0.38268
70	0.42567	0.008962	0.408087	0.443254
75	0.49072	0.009154	0.472759	0.508681
80	0.562767	0.009263	0.544592	0.580942
85	0.643557	0.009155	0.625594	0.66152
90	0.736936	0.008927	0.71942	0.754451
95	0.84427	0.008421	0.827746	0.860794
100	1	.	.	.

Remittance=1

2	0	(omitted)		
5	0.002369	0.000549	0.001293	0.003446
10	0.00882	0.001301	0.006268	0.011372
15	0.018617	0.002218	0.014265	0.022968
20	0.032278	0.003213	0.025973	0.038583
25	0.049199	0.004176	0.041005	0.057393
30	0.068865	0.005054	0.058948	0.078783
35	0.093534	0.006464	0.080851	0.106217
40	0.121773	0.007598	0.106864	0.136681
45	0.153817	0.008617	0.13691	0.170725
50	0.190518	0.010117	0.170668	0.210368
55	0.233154	0.011304	0.210975	0.255333
60	0.280548	0.012362	0.256293	0.304803
65	0.33235	0.013171	0.306506	0.358193
70	0.389538	0.014003	0.362063	0.417013
75	0.452788	0.014722	0.423902	0.481675
80	0.522524	0.015233	0.492635	0.552414

85	0.602456	0.015566	0.571913	0.632998
90	0.696166	0.015222	0.666298	0.726034
95	0.812701	0.013589	0.786037	0.839365
100	1	.	.	.

Table 8: Lorenz Estimation of Annual Food Expenditure by Remittance

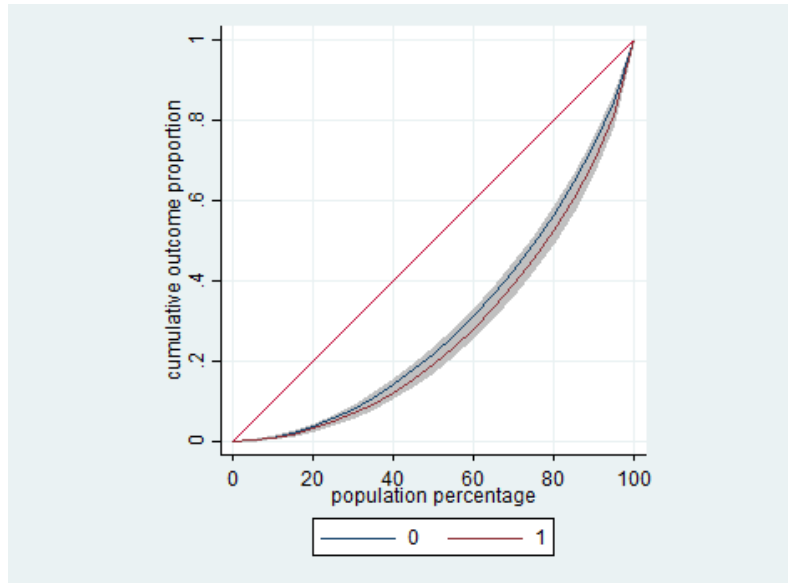


Figure 11: Lorenz Curve Overlay of Annual Food Expenditure by Remittance

Gini Index by Remittance			
	TotalAnnualExp	AnnualNonFoodExp	AnnualFoodExp
	Gini	Gini	Gini
Remittance=0	0.56534	0.57087	0.40277
Remittance=1	0.65632	0.66834	0.44485

Table 9: Gini Index by Remittance

GINI Decomposition by Income Groups	
Total Annual Expenditure	Annual Non Food Expenditure

Source	S_k	G_k	R_k	Share	%change	S_k	G_k	R_k	Share	%Change
Remittances	0.3911	0.8958	0.6031	0.3197	-0.0714	0.4289	0.8815	0.5510	0.3335	-0.0954
Daily Wage	0.2914	0.8267	-	-0.00	-0.2926	0.3196	0.8030	-0.1848	-	-0.3955
			0.0032						0.0759	
Salary Income	0.1290	0.9463	0.4440	0.0820	-0.0470	0.1414	0.9389	0.3510	0.0746	-0.0668
Self-Employed	1.0374	0.6756	0.4677	0.4960	-0.5413	1.1377	0.6314	0.3555	0.4088	-0.7289
Total		0.6609					0.6247			

Annual Food Expenditure						
Source	S_k	G_k	R_k	Share	%change	
Remittances	0.9886	0.8614	0.2055	0.4183	-0.5703	
Daily Wage	0.5146	0.8420	-	-0.0127	-0.5273	
			0.0122			
Salary Income	0.3674	0.9261	0.2316	0.1883	-0.1790	
Self-Employed	2.4406	0.6126	0.2945	1.0522	-1.3883	
Total		0.4184				

Table 10: Gini Decomposition by remittance