Research Works:-

The three chapters of my PhD dissertation are broadly in the area of Applied Welfare Economics. The first chapter/paper is a theoretical analysis on the aggregation of individual welfare. In this paper, I investigate the impact of within group heterogeneity on aggregate/group welfare. The second paper is an econometric evaluation of spatial impacts on prices and on wages, of India's trade liberalization in edible oils that began in the early 1990s. This paper focuses on the regional variation of the change in welfare due to trade induced price change. This is also my job market paper. The final chapter/paper of my thesis is in the area of happiness and we collect data on life satisfaction from the slums of Delhi. The objective is to investigate the response of the poor people on their self-reported life evaluation. This paper also investigates the variation across gender of the relative importance of the factors that are correlated to the self reported measures of well being. I summarize each of these three papers below.

"Does Heterogeneity Affect the Group Cost of Living Index?"

Summary:- Although the theory of cost of living indices has been developed for individual welfare, policy interest and practical questions have invariably been concerned with group cost of living indices as a measure of changes in the welfare of that group. A group cost of living index can be constructed in several ways. In literature, a natural and a widely used definition is to consider the aggregate/group cost of living index as an average of individual indices (Prais (1959), Muelbauer (1974), Nicholson (1975), Pollak (1980), Schultz et. al (2002), Fisher and Grilliches, (1995)).

We consider exact cost of living indices that are functions of budget shares and the change in prices. Even if we assume consumers face same prices, consumers may have different spending pattern leading to different budget shares. Can such heterogeneity in budget shares matter to the group cost of living index? Specifically, can the aggregate index be different for two populations that face the same prices (over two periods) but differ in the extent of heterogeneity in budget shares. This is the question that this paper seeks to address.

The same question can be posed in a slightly different way. Assume the average budget shares to be same for both the populations. We also assume that variability exists in the distribution of budget share for one population but identical budget shares for everyone in the other population. In this situation the difference in the aggregate cost of living indices between two groups/populations boils down to the difference in the aggregate cost of living index and the cost of living index of an average/representative (with average budget share) individual for the same group/population. Often, there is ready access to group (or national) expenditure aggregates and it is easier to evaluate the cost of living index for an average individual. What would then be the bias – its sign and magnitude - if the group cost of living index were to be approximated by the cost of living index for a representative (average) individual? In this paper we propose a methodology that answers that question.

Using the Rothschild-Stiglitz definition of mean preserving spread we show the impact of heterogeneity in budget shares on group cost of living index. This paper finds that in most of the cases increase in the heterogeneity in budget shares increase the group cost of living index. Therefore, cost of living index is higher for a population with larger heterogeneity in budget shares. This result holds for a more general and important superlative index (that takes care of

the substitution bias and is generated from non-homothetic preference). On further investigation, it turns out that the impact of heterogeneity is larger; greater is the change in relative prices.

As mentioned earlier, an important goal of this paper is to characterize the bias that emerges from computing the cost of living index for a representative individual instead of the group cost of living index. Our theoretical framework shows that the bias depends on the variance in budget shares and the change in relative prices. Even if there is enough variability in budget share, the bias becomes negligible for small change in the relative prices. We also let the budget share be endogenous to relative prices and examine whether the earlier conclusion regarding the impact of heterogeneity continues to be valid.

Statistical agencies that use average budget shares to construct aggregate cost of living indices implicitly assume no heterogeneity and as we have already mentioned, the resulting bias is captured by our methods. Using Indian and US consumer expenditure data, we compute the bias. The bias computed from the real life data turns out to be small. It implies that even if the representative agent assumption is not justified theoretically, it may not be so much troubling from the empirical point of view.

"Border Prices, Pass-Through and Welfare: Palm Oil in India" (Job Market Paper)

Summary:- This paper is regarding the edible oil trade liberalization in India. India is the world's largest importer of edible oils. This follows a sustained program, initiated in the 1990s, of eliminating quantitative restrictions, removing the monopoly of government agencies in oils imports. Among the oil imports, palm oil constitutes the largest share. Besides being the cheapest oil, the major palm oil exporting countries (Indonesia and Malaysia) are relatively

closer than the major soya oil(which is the second largest imported edible oil in India) exporting countries.

Before 1994, all imports of edible oils were on government account as private trade was banned. The official policy was self reliance in oilseeds (which is an essential input to produce edible oil) production and there were government programs for promoting oilseeds production. India, however, continued to have one of the lowest oilseed yields in the world. The price support for oilseeds production was also less effective compared to the competing crops like rice and wheat and therefore oilseeds farmers could not make use of the best irrigated lands to improve productivity. Because of these concerns, Indian government liberalized importing edible oil in order to cut down its dependence on domestic oilseeds for producing edible oil. As a result of such import liberalization measures, India has gradually become the world's largest importer of edible oils and imports account for 70% of domestic consumption.

The objective of this paper is to examine the impact of the border price (the cumulative outcome of world prices, tariffs and exchange rates) of palm oil on domestic edible oil price and domestic wage rates of agricultural labor. Change in the imported palm oil price affects the domestic edible oil price and hence the price and wage rate in oilseeds production. Since the agricultural markets for various commodities are integrated, the change in wage rate is likely to affect the aggregate agricultural wage rate and not just the wage rate in oilseeds production. In the early 1990s when trade liberalization began, oilseeds were grown on 13% of the cultivable land and were next in importance only to the cereals of rice and wheat. Therefore, at the time trade liberalization was initiated, the share of oilseeds in total agricultural production was presumably large enough for there to be appreciable effects on wages in all of agriculture.

This paper is also a contribution to the literature on spatial impacts of trade liberalization. Constructing a theoretical model we show that the pass-through effect of the border price of palm oil on the domestic edible oil price and agricultural wage rate varies between port (coastal region) and hinterland (non-coastal region). The pass-through effect also varies between the high oilseeds producing regions and low oilseeds producing regions. The reason behind the spatial variation between port and hinterland is explained through the channel of transportation cost. On the other hand it is the spatial difference in the competitiveness of the local edible oil market that explains the varying pass-through impact between high and low oilseeds producing regions. The findings from our theoretical model regarding pass-through effects support the earlier literature (Nicita, 2009, Marchand, 2012, Atkin and Donaldson, 2015) that discuss the spatial impact of the change in border price. The key departure from the literature and the principal contribution of this paper is that it exploits prior information about the domestic availability of substitutes to examine how that affects the spatial transmission of border prices to domestic prices and wages.

The model predicts that for limited substitutability between the locally produced edible oil and imported palm oil, the pass-through effect is higher in ports relative to inland. Similarly limited substitutability ensures the pass-through elasticity to be stronger in the high oilseeds producing regions relative to low oilseeds producing regions. We do not get such findings if local oil and imported oil are perfect substitutes.

Assembling a panel data set at the district level for five periods (1993-94, 1999-2000, 2004-05, 2007-08 and 2011-12), the price and wage pass-through effects are estimated and compared spatially. We run a district fixed effect regression controlling for time trend and many other factors.

From the basic specification of our regression, it turns out that an increase in the domestic palm oil price (either from the increase in the world price or ad-valorem tariff rate or both) significantly (1% level) increases the domestic edible oil price. The pass-through elasticity in the low oilseed producing districts of non-coastal states is 0.63. If these (low oil producing) districts were located in coastal states, the pass-through elasticity would be significantly (1% level) higher by 0.12. Similarly, compared to the benchmark of low oil seed producing districts of non-coastal states, the pass-through is significantly higher by 0.15 in the high oil seed producing districts of non-coastal states. Therefore the empirical result is consistent with the imperfect substitute case in the theoretical model.

Turning to the wage regressions, it can be seen that the pass-through of palm oil border price on wages is also positive. The pass-through elasticity is 0.34 for the base category of a low oil producing district in a non-coastal state. But the differential wage impact across spatial categories are not as robust/prominent as compared to the price effect. The results for the price and wage regressions are robust to alternative specifications.

Finally first order welfare impacts for workers and consumers are computed using compensating variation measure. It turns out that spatially varying price and wage effects have important welfare implications. We find that the average compensating variation induced by the change in the palm oil world price or ad-valorem tariff rate vary spatially because of varying pass-through elasticity across regions.

"Poverty, Gender and Well Being: A Study on the Slum Population in Delhi"

Summary:- This paper is all about economics of happiness/subjective well being. Subjective well being/happiness as an empirical measure of welfare is gradually becoming more accepted

by the economists and the policy makers. Although there is a reasonable amount of literature on happiness or life satisfaction, there are few research papers on life satisfaction among the poor. The most notable exceptions are the papers by Banerjee, Deaton and Duflo (2004) and Case and Deaton (2005). These authors find that poor tend to report high levels of happiness/life satisfaction. This is quite a surprising finding given their low standard of living, inconveniences in life and deprivation in terms of facilities they receive. On the other hand, their studies find that the poor report low levels of financial satisfaction. Banerjee, Deaton and Duflo (2004) and Case and Deaton (2005) conjecture that the poor people are adapted to their life they experience every day. Yet they are not adapted in the same way to their financial status.

These authors were confined to rural areas only. In rural areas, there is less number of rich/affluent households surrounding the poor people. Therefore the rural poor are unlikely to be aware of a good life and hence are presumably accustomed to the life they experience. But does the story of adaption hold universally? The poor in urban areas are geographically proximate to affluent neighbourhoods and the consumption of the wealthy. If, relative to rural poor, they are more aware and therefore, more aspiring of a more comfortable life, then would adaptation play a lesser role in reporting life satisfaction? This paper reports on a recent survey on the low income population across the slums of Delhi intended to throw some lights on this issue.

Even if the poor over-report their well being, one may find enough variation in the reported life satisfaction score(in this paper, we use the terms happiness, subjective well being, well being and life satisfaction interchangeably and consider these as equivalent concepts). If the reported happiness measure shows enough variability, then it is interesting to find out its correlates/determinants. But the more interesting thing is to see whether these correlations differ systematically between men and women. When societies offer different opportunities and liberty

to men and women, they may experience life satisfaction differently and the factors that trigger it may also differ. The impact of any factor on subjective well being may also vary between male and female respondents because of divergent preferences. While recent work has drawn attention to the temporal and spatial variation in female well-being (relative to males), this paper is the first study, to the best of my knowledge, to examine relative well-being of women among the poor.

Using a worldwide sample from Gallup World Poll, Graham and Chattopadhyay (2012) find that as one moves from lower income to higher income countries or from less educated to more educated cohorts, subjective well-being of women relative to men improves. An interesting question is whether this relation reflects the impact of education alone or whether it is due to the country specific omitted factors especially relating to social norms and legal rights. Can we get a similar finding from our sample that has been drawn from a more homogeneous population? In our sample of urban slum dwellers, we can safely assume that there is no variation in the omitted variables relating to legal rights and social norms. What will happen to the well being of women relative to men in our data with improvement in income/education? This paper seeks to address this question.

In order to conduct our survey, entire Delhi is stratified into zones (East, West, North and South) and slums are chosen randomly from each of the zones. From each of the slums listed in our survey, the households are chosen through the '*k*' th household approach. This is a systematic sampling with every '*k*'th element in the frame is selected. From each household, we attempt to interview a female and a male (20 years or above). However, often enough, there is either a female or a male available for interview and not both. The sample consists of 1278 respondents residing in 989 households across 29 slums in Delhi. 60% of the respondents are

female and the rest are male. The survey was conducted during the entire month of March and first week of April, 2016.

In the questionnaire, the following question is asked to assess life satisfaction: In general terms would say you that you are satisfied with life? There are four choices to answer this question. The choices are `not at all satisfied' (score 1), `not very satisfied'(score 2), `pretty satisfied'(score 3) and `very satisfied' (score 4). Similar questions are asked on health satisfaction and financial satisfaction. Apart from asking questions on life, health and financial satisfaction, we ask a host of other questions. These include general information about the respondent and his/her family members, public facilities available in the slums and their qualities, mental and physical health of the individuals interviewed.

Analyzing our own survey data, we get quite similar results to Banerjee, Deaton and Duflo (2004) and Deaton and Case (2005). We find the reported life satisfaction of the urban poor to be on the higher side. Only 11.35% of the respondents report that they are 'not at all satisfied'. The most frequent response turns out to be 'pretty satisfied' (reported by 40.47% respondents). But there are more people reporting about low value of financial satisfaction. We find 46.71% respondents who are either 'not all satisfied' or 'not very satisfied' with their financial status. The percentage of people who say 'very satisfied' (i.e. the highest score) is only 6.26%. This is much less compared to the percentage of people who report the highest level of life and health satisfaction (16.9% and 23.9% respectively). Therefore our findings show that even in urban areas, low income people get accustomed to their poor living conditions and sufferings and hence don't complain about their life in general. The adaptation mechanism works even in an urban setting. But they express their concern more regarding their financial status.

We get enough variability in the reported well being data. The variables which are found to be correlated with the life satisfaction are financial satisfaction, health satisfaction, income, marriage, age, education, possession of assets (possession of refrigerator and two wheeler), public facilities (like functioning of drainage system) and mental health/psychological traits (like loneliness and stress). An ordered logistic regression is run to see whether these bivariate correlations persist after controlling for many other factors. Some of these variables show strong correlation with life satisfaction in the regression framework as well. These include financial satisfaction, health satisfaction, income, education, possession of fridge, functioning of drainage system, loneliness and stress.

Education shows the most interesting gender varying correlation in our data. The differential effect of education on life satisfaction across gender turns out to be statistically significant i.e. the reported life satisfaction score is significantly higher for an educated man compared to an educated woman (at 5% level of significance). This finding can be considered as a cross sectional counterpart of Stevenson and Wolfers (2009) regarding the declining female happiness in United States and the industrialized nations in Europe during 1970-2005 despite improvement in the objective measures for women in the same period of time(in our story, education is the objective measure). There can be several explanations for this finding. But the most probable may be the rising aspiration of women with the increase in the education. In that sense, our finding is supported by Lalive and Stutzer (2010) who find the life satisfaction of women to be higher in the traditional communities compared to liberal communities in Switzerland and explain their finding as a result of higher expectation of the women in liberal communities.

From our data, we also find an interesting gender varying bivariate correlation in terms of access to government subsidized foodgrain, sugar and kerosene (used for cooking and/or lighting) through ration shops. The access is determined by the possession of a 'ration' card. The average life satisfaction score of the women who possess a ration card is higher than those who don't possess it. But this does not turn out to be true for men. This finding can possibly be explained by the difference in preferences between men and women. The differential gender effect of possessing ration card does not turn out to be statistically significant in a regression framework when we control for other factors.