



<b>UNIVERSITY OF MANAGEMENT AND TECHNOLOGY</b>
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<b>UMT</b>
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**Mixture regression cum ratio estimators of population mean under stratified  
random sampling**

Submitted to  
School of Business and Economics  
in Partial Fulfillment of the Requirements  
for the Degree of  
MASTER OF SCIENCE

by

**Kanwal Iqbal – 14002203009**

**March 2017**

## Research Completion Certificate

Certified that the research work contained in this thesis entitled “**Mixture Regression cum Ratio Estimators of Population mean under Stratified Random Sampling**” has been carried out and completed under my supervision to my satisfaction by **Prof. Dr. Mohammad Moeen Butt.**, ID, **14002203009**, of **Kanwal IqbalMS Applied Statistics** program .

Signature\_\_\_\_\_

Date\_\_\_\_\_

Supervisor's Name\_\_\_\_\_

*DEDICATED*

*TO*

*MY PARENTS AND MY BROTHER*

## **Acknowledgment**

All Praise and Thanks to Almighty Allah Whom blessed me to encompass this dissertation. I pray for my deceased parents who nurtured in me the seed of learning.

I am indebted to my supervisor, **Prof. Dr. Mohammad Moeen Butt**, University of management and technology, Lahore, who has supported and guided me to accomplish this task and full assistance in the process of completing this thesis. I will always remember him as the most stimulating personality of my life.

I am grateful to the University of Management and Technology, Lahore for providing me opportunity to complete my MS. Program. I also owe a favor to my teachers at the UMT who encouraged me in my work.

I would like to thanks one of my best friends who encouraged me to complete this important task of life. I am also thankful to my parents who constantly persuaded and supported me financially to continue my research and higher studies. And lastly I owe my thanks to my family for their inevitable support.

**Kanwal Iqbal**

## Summary

In this thesis, single phase Mixture Regression cum ratio Estimators by using auxiliary variables and auxiliary attributes simultaneously have been proposed under Stratified Random Sampling. Special cases of the estimator are discussed and their mean square errors are also derived mathematically. A simulation technique has been used to observe the properties of proposed estimator which shows that the distribution of proposed estimator approximately normal. An empirical study has been conducted by incorporating quantitative and qualitative characteristics in the form of auxiliary attributes and variables simultaneously to compare the performance of proposed estimator. Comparisons are made with Moeen et al. (2012) single phase mixture regression cum ratio estimator under simple random sampling. It has been found that the mixture regression cum ratio estimator using multiple auxiliary variables and attributes simultaneously under stratified random sampling is more efficient than Moeen et al., (2012) mixture regression cum ratio estimator under simple random sampling.

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## **Chapter # 1**

### **1. Introduction**

In the research process, survey sampling is one of the basic tools. To provide information about a population attributes and obtain a sample from that population is called survey sampling. Survey sampling has two basic categories, probability, and non-probability sampling.

When all the individuals of the population have known probability of being selected in the sample is called probability sampling. Probability sampling facilitates us to use statistical theory to draw valid inferences about population and avoids a selection bias. With non-probability sampling, elements have no equal chance of selection in the sample.