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**KAHRAMANMARASH SUTCU İMAM UNIVERSITY
GRADUATED SCHOOL OF NATURAL AND APPLIED SCIENCE**

**INCOME DISTRIBUTION AND INEQUALITY IN
NORTHERN REGION OF IRAQ**

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**MASTER THESIS
DEPARTMENT OF BIOENGINEERING AND SCIENCES**

KAHRAMANMARAS-TURKEY 2015

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GRADUATED SCHOOL OF NATURAL AND APPLIED SCIENCE

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Thesis Submitted in candidature for
The degree of MASTER in
Department of Bioengineering and Sciences

KAHRAMANMARAŞ-TURKEY 2015

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DECLARATION

I hereby declare that all information in the thesis has been obtained and presented in accordance with academic rules and ethical conduct. I also declare that, as required by these rules and conduct, I have fully cited and referenced all material and results that are not original to this work.

TAHSEEN SALEEM IBRAHIM

Note: The original and other sources used in this thesis, the declaration, tables, figures and photographs showing the use of resources, subject to the provisions of Law No. 5846 on Intellectual and Artistic Works.

KUZEY IRAK'TA GELİR DAĞILIMI VE EŞİTSİZLİĞİ

(YÜKSEK LİSANS TEZİ)

TAHSEEN SALEEM IBRAHİM

ÖZET

Gelir dağılımı ölçüm yöntemlerinden biri olan Gini katsayısı sadece gelir eşitsizliğini ölçmek için değil aynı zamanda harcama dağılımlarını ölçmek içinde kullanılmaktadır. Bu çalışmada, Gini katsayısı ve Lorenz Eğrisi gelir eşitsizliğini ölçmek amacıyla kullanıldığı gibi, hanehalkı ve bireysel gelir göstergeleri için bilgi sağlaması, insani gelişim ile ilgili göstergeleri gözlemlemek ve sosyoekonomik koşulların değerlendirilmesi için uygun bir veri sisteminin oluşturulması ve ulusal yoksulluğu azaltma önlemlerinin uygulanmasını denetlemek amacıyla da kullanılmaktadır. Bu araştırmada Kuzey Irak'ta hanehalkları itibariyle gelir eşitsizliğini ölçmek amacıyla 2012 yılı Hanehalkı Sosyoekonomik Anket verileri kullanılmıştır. Tüm gelir dağılımı kriterleri dikkate alındığında, gelişmekte olan ülkelerde olduğu gibi Irak'ta da gelir dağılımı eşitsizliğinin çok yüksek olmadığı gözlenmiştir. Gini katsayısı değeri Kuzey Irak geneli için 0.34 olarak tespit edilmiştir. Duhok bölgesi en düşük Gini katsayısına (0.32) sahip iken, onu sırasıyla Süleymaniye (0.34) ve Erbil (0.35) izlemektedir.

Anahtar kelimeler: Gelir dağılımı, gelir eşitsizliği, Kuzey Irak

Kahramanmaraş Sütçü İmam Üniversitesi
Fen Bilimleri Enstitüsü
Biyomühendislik ve Bilimleri Anabilim Dalı. Ağustos / 2015

Danışman: Prof. Dr. Cuma AKBAY

Sayfa sayısı: 54

INCOME DISTRIBUTION AND INEQUALITY IN NORTHERN REGION OF IRAQ

(M.Sc. THESIS)

TAHSEEN SALEEM IBRAHIM

ABSTRACT

Despite the fact that Gini coefficient that is one of the measurement tools for income distribution can be used not only measuring income inequality but also expenditure distribution.

In this thesis, the Gini coefficient and Lorenz Curve were used for measuring income inequality, supervising the implementation of national poverty reduction measures and establishing an appropriate data system in order to evaluate the socio-economic conditions and observe indicators related to human development, as well as providing information on indicators for both household and individual income. In this research, data from the Iraq 2012 Household Socio-economic Survey were used to measure income inequality among households in Northern Iraq. According to all the criteria used, the degree of inequality is not very high, as is the case in many developing countries with similar circumstances to Iraq. The value of the Gini coefficient for Northern Iraq was calculated as 0.34. Duhok displayed the smallest Gini coefficient (0.32), followed by Sulaimaniya (0.34) and Erbil (0.35).

Key words: Income distribution, income inequality, Northern Iraq

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Institute of Science and Technology
Department of Bioengineering and Sciences, August / 2015

Supervisor: Prof. Dr. Cuma AKBAY

Page number: 54

ACKNOWLEDGEMENTS

I would like to thank everyone who has given me support and encouragement over the year in completing this dissertation. First of all, thanks to my supervisor, Prof. Dr. Cuma AKBAY, whose knowledge and technical expertise has made this an amazing learning opportunity and for their guidance and encouragement through the various stages of the M.Sc.

I am very grateful and thankful to my father; mother, my brothers, my sister and my wife for their support during my study and an impeccable understanding allowed me to accomplish this thesis.

I would like to express my deepest appreciation to other my friends and all those who provided me with assistance to complete this research.

I would like to thank my friends Diyar Moaz, Sarhang Razzaq, Mohammad Jamil, and Fatima Mohammad.

Finally, I would like to express thanks to all authority organization in Kurdistan Regional Government (KRG) especially Ministry of Planning, Kurdistan Region Statistical Office (KRSO) and Soran Statistics Directorate.

August, 2015
KAHRAMANMARAŞ, TURKEY

Tahseen Saleem Ibrahim

TABLE OF CONTENTS

	<u>Page No.</u>
ÖZET.....	i
ABSTRACT.....	ii
ACKNOWLEDGEMENTS.....	iii
TABLE OF CONTENTS.....	iv
LIST OF FIGURES.....	v
LIST OF TABLES.....	vi
LIST OF SYMBOLS AND ABBREVIATIONS.....	viii
1. INTRODUCTION.....	1
2. LITERATURE REVIEW.....	8
3. MATERIAL AND METHODS.....	14
3.1. Material.....	14
3.1.1. Research area.....	14
3.1.2. Survey sampling.....	15
3.2. Methods.....	16
4. RESULTS AND DISCUSSION.....	19
4.1. Socio-demographic Characteristics of Households.....	19
4.2. Household Income and Expenditure by Education Level of Household Head.....	23
4.3. Household Income and Expenditure by Income Groups.....	24
4.4. Income Distribution of Household by Residential Area.....	28
4.5. Income Distribution of Household by Governorate.....	31
4.6. Expenditure Distribution of Household by Residential Area.....	37
4.7. Expenditure Distribution of Household by Governorates.....	40
4.8. Gini Coefficient by Residential Area and Governorates.....	42
4.9. Sources of Income by Residential Area and Governorates.....	45
5. CONCLUSION and RECOMMENDATIONS.....	47
REFERENCES.....	49
CURRICULUM VITAE.....	54

LIST OF FIGURES

	<u>Pages No</u>
Figure 3.1. Northern part of Iraq	15
Figure 4.1. Demographic characteristics of households	20
Figure 4.1.1. Gender of house hold head	20
Figure 4.1.2. Residential area of household.....	20
Figure 4.1.3. Region of household	20
Figure 4.1.4. Age of household head	20
Figure 4.1.5. Education level of household head	20
Figure 4.2. Lorenz curve for Northern Iraq.....	30
Figure 4.3. Lorenz curve by residential area.....	31
Figure 4.4. Lorenz curve for Erbil.....	33
Figure 4.5. Lorenz curve for Duhok.....	35
Figure 4.6. Lorenz curve for Sulaimaniya.....	37
Figure 4.7. Lorenz curve for expenditure	39
Figure 4.8. Lorenz curve for expenditure by residential area.....	40
Figure 4.9. Sources of income by residence area.....	45
Figure 4.10. Sources of income by region.....	46

LIST OF TABLES

	<u>Page No.</u>
Table 4.1. Socio demographic characteristics of household by region.....	22
Table 4. 2. House hold income by education groups.....	23
Table 4. 3. Household income by income group.....	25
Table 4. 4. Household income and expenditure by household income and governorate....	27
Table 4. 5. Income distribution of household by residential area.....	29
Table 4.6. Income distribution of household by residential area for Erbil	32
Table 4.7 Income distribution of household by residential area's for Duhok.....	34
Table 4.8. Income distribution of household by residential area for Sulaimaniya.....	36
Table 4.9. Expenditure distribution of household by residential area.....	38
Table 4.10. Expenditure distribution of household by governorates.....	41
Table 4.11. Gini coefficient's by residential area (using income).....	42
Table 4.12. Gini coefficients by residential area and governorates (using expenditure)....	43

LIST OF SYMBOLS AND ABBREVIATIONS

CES	: Conference of European Statisticians
GNP	: Gross National Product
ICLS	: International Conference of Labor Statisticians
IHSES	: Iraqi Household Socio Economic Survey
ILO	: International Labor Organization
IMF	: International Monetary Fund
IQD	: Iraqi Dinar
KRG	: Kurdistan Region Government
KRSO	: Kurdistan region Statistics Office
KSU	: Kahramanmaraş Sutcu Imam University
UNDP	: United Nations Development Programmer
UNDP	: United Nations Development Programmer
UNU	: United Nations University
WDI	: World Distribution of Income
WIDER	: World Institute for Development Economics Research
WIID	: Income Inequality Database

1. INTRODUCTION

Widening income inequality is the challenge of our time. In advanced economies, the gap between rich and poor is at its highest level in decades. Inequality trends have been more mixed in the emerging and developing economies as countries with lower inequality, but the inequalities omnipresent in access to education, healthcare and finance remain. It is unsurprisingly then, that the extent of inequality, its drivers and what to do about it have become some of the most hotly debated issues for policy makers and researchers alike.

In recent centuries, the distribution of income has always been an especially important topic; however, little by little this topic has been sidelined by the arrival of issues such as the theories of economic growth. After World War II though, economic development with an emphasis on the economic aspects of income distribution was once again put in the spotlight (Nadri and Ghelich, 2009).

Of course, the issue of fair redistribution and how the state is to achieve it is, at its core, a political decision that economic analysis cannot answer. In recent decades, income inequality has increased in many parts of the world. This and the social tensions associated with fiscal consolidation that many have faced in part resulting from the global financial crisis. But I think that we can all agree that whatever degree of redistribution governments choose, it should be done with fiscal instruments that achieve their distributional objectives at a minimum cost to economic efficiency.

There are two experimental discipline in income distribution: the trend of per capita income to converge (decrease of inequality), and increasing inequality in the distribution of personal income in many countries (Schultz, 1998). Inequality has increased in Western countries in the 1980s and transition countries in the 1990s. The reasons for the increased interest income inequalities are the theoretical development and availability of income distribution data (Milanovic, 2002; Heshmati, 2004).

The central place accorded to Ricardo concerning the distribution of income in the political economy of the 19th century is also appropriate to 21st century socio-economic considerations. Although the sphere was mostly ignored by economists for decades, in the last twenty years, there has been a resurgence of interest due in part to the evolution of economic theory and through major developments in the distribution of interpersonal income in many developed countries (Atkinson, 1997; Cowell, 2007).

Income distribution is gender less in terms of being the manner with which income is distributed amongst members of a society. If everyone earns exactly the same amount of money, then the income distribution is perfectly equal. If no-one makes money, except for a person who earns all the money, then the income distribution is quite uneven. Economic analysis of income distribution is interpreted in two main ways: the functional distribution of income such as the distribution of income between the factors and the size distribution of income or distribution of income amongst persons (Cowell, 2007). The functional distribution of income is an integral part of the economic analysis of relative prices, production and employment. In this concept, there are several theories of income distribution corresponding to different theoretical and ideological positions on these key issues.

However, these types of analysis tend to focus on the same basic economic concepts: the use of productive factors (land, labor and capital), and the rate of remuneration for services, rent, wages and distribution of personal benefits. The distribution of income among individuals or between households can be reflected in key decisions. The above scenario determining income in the long term can be analyzed in terms of special cases of the household optimization problem, where household savings, self-investment in human capital or the purchase of children's education are determined by price signals (Cowell, 2007).

This document constitutes proposal for an alternative framework for analyzing income distribution. Income is the money that households receive from different sources; it is the most important demographic factor in terms of significantly affecting consumption, consumers' selection of shops or stores, and finally the store's sales volume. If consumers have more income, then clearly they spend more and generate high sales and profits for the retailers (Hasty, 1997; Iqbal et al., 2013).

Income inequality is a measure of societal conditions. Some argue that growing income inequality is potentially damaging to social life—'the rich get richer and the poor poorer' are thought to be bad for both developed and developing countries. There are three basic properties that one can expect the above indices to meet: average or independence of the scale, independent population size and the Pigou-Dalton condition (Heshmati, 2004). The Gini coefficient, the squared coefficient of variation and the two Theil's measures satisfy each of the three properties (Anand, 1997; Cowell, 2000 and Subramanian, 1997). The Gini coefficient is the share of income that would need to be distributed from

individuals above the mean income to those below it in order to achieve 'perfect' equality (Kennedy et al., 1996). The Gini index is the maximum vertical distance between the Lorenz curve and the line of 'perfect' equality; it is shown by the vertical line.

There are several ways of analyzing innately unequal distribution of size given income. The main tool for analyzing economic inequality is the Lorenz curve; as one of the most popular and intuitive methods. For any given batch of data, the Lorenz curve can be derived in several ways. One method is to consider the specific functional form of the hypothetical statistical distribution function close to the empirical function of the income distribution, and then to establish the Lorenz curve directly from it. The second possibility is to determine directly a parametric form of the Lorenz curve in accordance with the data.

In order to compare inequality between two distributions, one can draw Lorenz curves and conclude that inequality is unanimously higher in one distribution, if its Lorenz curve is everywhere below the curve of the other distribution. Any inequality measure content with the principles of transfer, of anonymity, and of mean independence will rank the two distributions in the same way as the Lorenz curves (Atkinson, 1970).

The analysis of income distribution focuses on both the income level and the relative income differences, the labor employed, the standard approach is to separate these two dimensions and using the Lorenz curve as a basis for analysis of the relative income differences. By displaying the deviation of each individual share of income from income that corresponds to perfect equality, the Lorenz curve captures the essential descriptive characteristics of the concept of inequality. The normative aspects of orders Lorenz curve have been discussed by Kolm (1969 and 1976), Sen (1973), and Atkinson (1970) who have demonstrated that Lorenz curve orderings of distributions with equal means may correspond to social welfare orderings.

Most of the research on income distribution concentrates on the measurement of income inequality through suitable indices (Palmitesta et al., 2000). The index belonging to the Gini families has been widely used to measure the uniformity of income, the level of social calm and the segmentation of labor market (Nygard and Sandstrom, 1981; Dagum, 1990). In the literature, the distribution of income has been noted according to two viewpoints: distribution of income among economic units, such as individuals or households; and distribution of income between factors of production, such as labor and capital (Abonori and Iraj, 2004).

Inequality is seen as an agent that can harm social relationships and may exacerbate conflict. There is a general consensus in the literature that high levels of income inequality can, if unchecked, ferment conflict internal to a country or community (Cramer, 2005). This disparity can be traced back to the disparity of regional development. However, inequality can also be linked to the path or the pace of development in different regions or countries. Classical economists are economists who are expected to support income inequality. According to them, income equality discourages savings. Income equality means a higher income for the working classes and a rise in their consumption.

The World Distribution of Income (WDI) has been a constant concern for economists and researchers worldwide. The convergence literature has convincingly established the divergence between the countries in two dimensions. First, poor countries growth rates have been lower than the rate of growth of their rich counterparts (a phenomenon called β -divergence) and second, the dispersion of income per capita across countries has tended to increase over time (a phenomenon called σ -divergence) by Barro et al. (1992).

It can be argued that excessive revenue is not good for the economy because it tends to kill the incentives to invest in physical and human capital. In this sense, income inequalities are considered the rate of return on investment. On the other hand, it can also be argued that excessive inequality creates social tensions and political instability. In this case, inequalities are seen by the poor as the rate of return on social and economic disruption.

The increasing frequency of growth miracles indicates that the fraction of poor countries is falling globally amidst projections that the global distribution of long-term revenue implies substantial improvements in the income of many countries (Heshmati, 2004).

There is also evidence that the large income distribution has a significant effect on the growth rate, with equal societies growing faster than to those that are substantially unequal. In addition, the average health of a society depends on the distribution of income, meaning that countries with more unequal distributions experience lower life expectancy. Equitable distributions of income, as well as the achievement of social objectives are, therefore, in addition to economic growth, essential aspects of development.

This thesis aims to explore income distribution and inequality, and to identify some policy conclusions emerging from its analysis. Many researchers have investigated the relationship between the distribution of income and development, starting with Kuznets' classic paper. Here he argued that income distribution is generally relatively more equal at low levels of income in the first stages of development. It then becomes more unequal as development proceeds and, finally, a reverse movement takes place entailing that income distribution becomes more equal again as countries approach the income levels of developed countries.

In order to be a subject of analysis, the absence referred to by the etymological definition of inequality must necessarily be associated with another measurable element. This is normally the unit we will measure and try to evaluate objectively in relation to other distributions of the same elements; the most common examples being income, wealth, consumption, as well as other normative elements such as welfare and utility. The principal, shared objective of differing economic and political systems in every society is to lift the quality of life for the majority of people by using the human and natural resources available rationally, in order to obtain stable growth across all sectors and so to distribute fairly the maximum quantity of profits and benefits of this process. At anytime in which the phenomenon of intermediate disparity is receding, an intervention by the government is urgently required to limit this phenomenon and so try to reduce distinction between social through the best possible economic policies.

The developing countries seek their plans to investigate level of living to be high and continued best level of living is considered as the physical necessities of life (e.g. food, clothes and residence). The economic development is not just a way to increase national income annually but is also the mean to raise the level of people living of the country (Erekat, 1997).

The problem of not equality income and wealth distribution is existent in a number of developed countries in the world that still deepens continuously with different period sequence and it has negative effect to the currency according to the different wide income which is reflected to the family income and how to distribute this income confirmatively. As long as the income distribution is not equal and untargeted (UNDP, 2001).

The average personal income in any economic countries sets the level of their livelihood. Meanwhile, the level of the quality of life in a society regulates, by the state's

supporting people, the amount of income required for people to live comfortably and to increase a part of personal income (Hussein, 1985).

In 2008, the Conference of European Statisticians (CES) completed a detailed review of statistics on income, living conditions and poverty. The senior Fitoussi commission report on the measurement of economic performance and social progress. The importance of this work has been reinforced by the publication of a Report by Stieglitz (2009), which contains recommendations on the need to focus on the household perspective and distributional aspects of economic well-being.

The purpose of this update has been to integrate the new developments in the field of the measurement of household income and expand the guidelines to take into account these new developments. It has also been very influential in the development of new international standards for statistics of household income at the micro level, as stated in the Resolution on Standards for Statistics of Household Income adopted by the International Conference of Statisticians work (ISLC) in December 2003 (ILO, 2004).

Despite the professed snobbery of the rich towards the poor and the reciprocal jealousy of the poor towards the rich, people with a similar income living in the same area also creates positive externality.

Other products and services will cater for a single income group, if more people in this income group are living in the same area. For example, a low income household will have a hard time finding a cheap fast-food chain in a high-income area, and it would be hard for a high-income household to find an expensive restaurant in a poor neighborhood. Recently neural scientific research has also shown that humans have social preferences that reduce inequality in outcome distributions (Tricomi et al., 2010).

If we adopt an individualistic approach to welfarist social economy, then it is logical to be interested in the welfare of individual or utility. In some respects the flow of income captures this, but it has been argued that consumption expenditure may be a more appropriate economic indicator (Blundell and Preston, 1998). We should also recognize that individual well-being can be determined not only by the level of its own income, but also its relationship to other incomes (Ferrer-i-Carbonell, 2005).

The Iraqi Household Socio Economic Survey (IHSES) defines the household income as the total income received from all the sources by all the members of the household, either in cash (monetary income) or in kind (non- monetary income). The

household income is investigated under 5 main sources categories in the survey questionnaire; employment, agricultural activity of both seasonal and non-seasonal crops, non-agricultural activities, from activity, property income and total transfer income.

According to Sen (1973), inequality measures can be divided into two large types: the objective and the systematic. The systematic measures usually deal with inequality from a view of its effect on a social happiness assignation. Here, inequality is no longer seen objectively and its measurement involves other criterion perspectives such as ethics, happiness or skill levels. In terms of probabilities, the most important measures of this type are the ones employing a social welfare function for the estimation of inequality persistence.

Small changes in income distribution can have a large effect on the level of national income (White and Anderson, 2001). In addition, changes in income distribution have an even greater effect on measures of the depth and severity of poverty, as confirmed by evidence from the Ivory Coast and Bangladesh (Wodon, 1999).

Thus, the key objectives of the study are to: (a) analyze the patterns of inequality in the Kurdistan region; and (b) investigate the effect of income inequality on key societal development in the region; namely, economic growth and poverty. Indeed, as Wilkinson and Pickett (2010) have noted, understanding the effects of inequality means that we have a policy handle on the well-being of whole societies.

This research provides an overview of experimental knowledge about income inequality in the Kurdistan Region, one mainly focused on the problems of the description of patterns and directions, and the data and its measurement. It does not concern itself as much with political analysis and understanding the causes and determinants of inequality. The evaluation shows good progress in the last two decades in the availability of the data and the quality of the measurement obtained.

The trend of income inequality needs to be looked at separately for rural and urban Iraq. As a developing region, Iraq has implemented and rejected economic and social policies for rural and urban areas, with urban characteristics being revealed that led to the accessibility of public services and human development (Knight and Song, 1999; Riskin et al., 2001; Gustafsson et al., 2008).

2. LITERATURE REVIEW

The problem of measuring income inequality can be traced to the end of the last century. For example, Pareto (1895) examined the question in a study on the distribution of personal income. This work seemed to have begun following an argument between Pareto and Italian and French socialists on the path and the tools through which a more even distribution could be achieved. Pareto based his work mainly on tax data and interpreted the α parameter of the model which he proposed as a measure of income inequality.

Lorenz (1905) introduced a graphical tool which has since then been called the Lorenz curve and has played an important role in subsequent studies on inequality.

A few years later, Gini (1909), in a study in which he analyzed the relations between social classes and wealth distribution, introduced a parameter α and argued that α , unlike Pareto's α , was a direct measure of concentration.

In addition, Kuznets (1955) connected national per capita income and inequality in the famous inverted U. He has said that the increase in productivity in the modern sector, without redistribution in favor of the rural sector, has led to a more unequal income distribution.

Oshima (1962) then stressed the fact the inequality in poorly developed countries results wasn't necessarily significantly dependent on the development stage of the economy, entailing that inequality depends on whether the countries themselves are undeveloped, less developed, semi developed and or completely developed.

In 1945, the Simon Kuznets theory was presented for the first time, showing that income inequality grows in the early stages of economic growth, but finally declined in the later stages (Atkinson, 1970).

In a study examining the economic causes of poverty in Iran, Praveen (1993) concludes that the economic duality of the adoption of industrial policy and the role of oil revenues in Iran has created unemployment, unequal distribution of income and poverty.

Applied research on the long-term properties of functional income distribution in Turkey is quite limited. In addition, a large majority of these studies are based on an analysis of data-point procedures. The Turkish Statistical Institute (TURKSTAT) sometimes indicates differences in pay between employees and self-employed earnings, partly reflecting a truncated functional distribution of income. Based on these reports,

Ensari (1997) showed that in 1973, 1987 and 1994, respectively, 28.3, 27.0 and 31.5 percent of income went to employees, and 71.7, 73.0 and 68.5 percent of income went to non-waged citizens in Turkey. In 2003, the Institute also reported some comparable statistics regarding 1994 and 2002 income distributions. According to the report, the functional income distribution approached equality more closely in 2002 compared to 1994.

Jones (1997) characterized the evolution of income distribution across the world using three different techniques. First, he uses a standard growth model, taking account of conditions in 1980 to project the current dynamics of income distribution. These results show little change in the top of the income distribution. Secondly, according to the findings from the cross-country growth literature, he interprets the change in growth rates around the world as an expression of the extent to which countries are at their stationary positions and predicts where the countries are being led.

Khalid (2000) analyzed the measurement of the poverty line in rural Iran during the period of 1971-1991. The results of this study indicate an increase in real per capita income, during the Islamic revolution and a time of increasing rural prosperity. However, factors such as inflation, population growth, productivity per capita, illiteracy of heads of households and wages will not have a significant effect on the percentage of the rural poor.

Barro (2000) analyzed data for a wide range of countries showing little overall relationship between inequality, growth rates and investment income. Greater inequality instead tends to retard growth in poor countries and encourage growth in richer economies. The inequality of the Kuznets curve, which first increases and decreases later in the economic-development process, emerges as a clear empirical regularity. However, this relationship does not explain most of the variation in inequality between countries or over time.

Fischer (2001) found that workers in the share of income were 38.7 percent in 2002 and contractors were from 34.5 percent in the same year, compared to 42.4 percent in 1994. This study has shown that liberalization due to increased income distribution in the case of nations with a large supply of land, while countries with a high level of capital produce a more equitable distribution of income.

Fishman and Simhon (2002) analyzed factors of industrial growth and regional inequality in China. This article examines the change of industrial function of 31 provinces

of China on the basis of the provinces' particular characteristics using 1985, 1995, and 2005's province data, and to grasp the relative importance and the difference of growth inequality using factors obtained from factor and cluster analysis. This study demonstrate that the trend in recent years is rapidly increasing regional inequality accompanying rapid increases in per capita income, and the acceleration of intra-regional inequality as well as extra-regional inequality, rural and urban inequality.

Sala-i-Martin (2002) used aggregate GDP data and within-country income shares for the period 1970-1998 to assign a level of income to each person in the world. They estimate global income inequality using seven different popular indexes: the Gini coefficient, the variance of log-income, two of Atkinson's indexes, the Mean Logarithmic Deviation, the Theil index and the coefficient of variation. They also find that most global disparities can be accounted for by cross-country inequalities, rather than those internal to a country. Within-country disparities have increased slightly during the sample period, but not nearly enough to offset the substantial reduction in across country disparities.

Heshmati (2004) analyzed the global distribution of income and income inequality. The data used here is based on UNU-WIDER World Income Inequality Data (SDIA) as an expanded version of the Deininger and Squire database (1996). The most widely used index of inequality is the Gini coefficient. The results of inequality in the world measured by the Gini coefficient have increased, while poverty measured by numbers has declined.

In an article written by Abrishami et al. (2005), the relationship between inequality and economic growth in the period of 1971-2002 has been examined by using Granger causality test and integration test. The results show a one-way causal relationship of income inequality on economic growth.

Shahateet (2006) analyzed regional economic inequality in Jordan using the raw data of two national household surveys on expenditure and income that cover 5.971 and 11.153 households in 1997 and 2002, respectively. The study applies four measures of inequality: the Gini index, Atkinson's index, 90/10 ratios and the standard deviation of the natural logarithm. The study concludes that economic inequality has increased over the five years of growth following 1997. The overall increase is estimated at about 17% indicating a shift in the function of income distribution indicating that income may have become more unequal.

Sala-i-Martin (2006) found that overall global inequality has been declining since 1980 due to convergence between countries. They have estimated the world distribution of income by integrating individual income distributions for 138 countries between 1970 and 2000. Country distributions are here constructed by combining national accounts GDP per capita, so as to anchor the mean with survey data to pin down the dispersion. Poverty rates and head counts are hence reported for four specific poverty lines. The rates in 2000 were between one-third and one-half of what they were in 1970 for all four lines. There were between 250 and 500 million fewer poor people in 2000 than in 1970. They estimated eight indexes of income inequality implied by world distribution of income. All of them show reductions in global inequality during the 1980s and 1990s.

Yassin (2007) concluded that the degree of inequality is so high according to all criteria that were used especially in 2005 in comparison to the years prior to the period of the study and in many developing countries which have similar circumstances to Iraq. The value of Gini coefficient reached 0.42 and 0.38 in 2005 and 2007 successfully.

The vast body of literature interrogated by Goldberg and Pavnick (2007) showed a simultaneous increase in the effects of globalization and inequality in most developing countries. The mechanisms through which income distribution is impacted by globalization are the country, time and the specific cases. It is important to note that the impact of trade liberalization should be considered in conjunction with other concurrent policy reforms and details of specific policy implementation. For this reason, one cannot turn to satisfactory policy prescriptions exclusively in pooled studies.

Ahmed (2009) analyzed the existence of a considerable variation in the income distribution in the interest of the upper classes through the aforementioned factors. It shows that % 60 of the Karkuk population receive %38 of the total income. Finally the study suggested several recommendations; one among the most important is the need of the government intervention to redistribute the income in favor of the lower classes through appropriate fiscal policies and creating other sources of income.

Atkinson and Brandolini (2010) provided a more pessimistic view of the evolution of distribution of world income, showing an upward trend in inequality. Income distribution in this trend also differs in the developing economies. Income inequality has fallen across Latin America in the last decade, while it has been growing in countries such as China, India and South Africa.

Bakare (2011) defined income inequality as a situation in which the money received for a certain period, especially as payment for work or interest on investments in various sizes and degrees, constitutes in an unfair difference in the rankings.

Another study by Jordan by Mansour (2012) found that, despite the importance of regional income disparities in global inequalities, there was a slight decrease in inequality during 2002-2010 mainly due to the effect of the region catching up economically.

Laithy et al. (2008) investigated poverty, growth and income distribution in Lebanon using data from a study entitled the “Comparative Mapping of Living Conditions between 1995 and 2004” produced in 2006, and the data generated by the “National Survey of Household Living Conditions” of 2004. Their research has analyzed the changes in the deprivation levels ten years after the publication of the first mapping study. This study shows striking regional differences in income in Lebanon despite moderate levels of poverty and inequality at the national level.

Mercan (2013) investigated the relationship between economic growth and income distribution in Turkey and the Turkish Republics of Central Asia and the Caucasus by using dynamic analysis of panel data with structural breaks. He has used data from the economies of Central Asia and the Caucasus (Azerbaijan, Kazakhstan, Kyrgyzstan, Tajikistan, Turkmenistan and Uzbekistan) and the Turkish economy during the period 1995-2009. The results indicate co-integration between sets. He finds that economic growth had a negative effect on income distributions amongst these countries during this period.

Kim (2013) analyzed the trends and sources of income inequality in the United States. This research uses data from the CPS March supplement derived from the 1994-2012 IPUMS-CPS. The sample covers 2,007,104 people who are at least 16 years in the work force and reports their positive hourly wages. This period was chosen because the major changes in the methodology of CPS survey were introduced in 1994. The results show that, from 1994 to 2012, income inequality in total income has increased significantly in the United States. This increase is explained by an increase in income inequality, financial income, transfer income and other income.

Garcia et al. (2013) analyzed the influence of macroeconomic factors on the distribution of personal income in developing countries by using a parametric modeling approach. The empirical analysis is conducted on a sample of developing countries where

both types of data are available: data on personal income distribution and macroeconomic indicators. Model parameters specifically related to inequality have then been used as dependent variables in econometric models to examine the impact that certain macroeconomic variables (GDP growth, inflation, employment and real interest rates) have on inequality. The results show that GDP growth, employment rate and real interest rate are macroeconomic factors with a greater impact in shaping the distribution of personal income in developing countries.

Kwon (2015) investigated Congress polarization and income inequality in the United States from 1913 to 2008. This study builds national time series data with information for the years 1913 to 2008. Regression, autocorrelation and Granger causality test vector are used to explore the temporal causal polarization of Congress and the income share of the top 0.1, 1.0, 5.0, and 10.0 per cent of employees in the United States. The results indicate that past values of the polarization of Congress are better predictors of higher income shares as vice versa. The results also show that the polarization in the House of Representatives has produced a more consistent and solid connection with the best income polarization in the Senate.

3. MATERIAL AND METHODS

3.1. Material

The Iraq Household Socio-Economic Survey (IHSES) is an annual survey dealing with the situation of social and economic characteristics of Iraqi households. It is divided into two parts according to the questionnaires involved in the collection: processing and analysing data. This survey is conducted by selecting samples from different areas in both urban and rural areas. The first part refers to household details such as household members' personal information, education, health, occupation, place of residence, and all other considerations relating to the household in question. The second part of the survey concerns the economic situation of the households, such as income and outcome data. The results of the survey are some of the most important data on which the establishment depends, particularly for community and socio-economic planning.

3.1.1. Research area

Research area was the Kurdistan Region, which is located north of Iraq. The Syria at the west, Iran is located at the east and Turkey at the south. The total number of inhabitants is 4.8 million people. The governorates of the Iraqi Kurdistan region are similar in geology, hydrology and climate conditions. The area consists of mountainous lands, uphill and fertile plains (UNDP, 2011). The main landscape in the north and northeast of the Kurdistan region is the Zagros Mountains. The highest peak in the Zagros Mountains is 3600 m above sea level. Snow covers high altitudes in the winter. The agricultural area is around 34%, while grasses and forests are the major land cover of the region. The area is characterized by an anticline/syncline system. The south of the region is the plains of the Tigris River. The land of Kurdistan region is the best in Iraq for agricultural production (Fadhil, 2010).



Figure 3.1. Northern part of Iraq (Iraqi Kurdistan)

3.1.2. Survey sampling

The sample for the Iraq Household Socio-Economic Survey was designed in 2012. The sample size was 25488 households in total, distributed across all Iraq governorates (118 districts and 216 households for each district). For Kurdistan's Region of Iraq districts, the number of households was 6254 households (KRSO, 2012). Each of the 2,832 sample clusters have captured nine households, distributed between governorates, districts, and rural and urban areas. The survey sample was designed to achieve proper estimations at the level of governorates, districts, urban and rural areas.

The data was collected from 6254 households across the Kurdistan region over a period of 12 months. This survey, based on a national sample, covers a universe of all the urban and rural areas of the three provinces of the Kurdistan region, Erbil, Sulaimanya and Duhok. This study uses a sample of 4147 households from urban area and 2107 households from rural area out of total 6254 households. Income information of the household members was collected individually under the five income sections strategically arranged in the IHSES questionnaire.

3.2. Methods

We estimate inequality using the Gini coefficient, defined as the ratio of the area between the diagonal and the Lorenz curve to the total area of the semi-square in which the lies curves (Todaro and Smith, 2002). The decline in the value of the Gini coefficient had more equitable income distribution; plus the value of the Gini coefficient, the more unequal the income distribution. A "0" indicates perfect equality (everyone has an income equal) and a value of "1" shows perfect inequality (one person has all the income).

The Gini coefficient satisfies four axioms transfer Pigou-Dalton principle of the independence of the income scale, people of principle and anonymity. There is a growing awareness that inequality in income size distribution has important ramifications for how the entire economy works. There are many ways to analyze the inherent inequality in distribution of income given size. The Lorenz curve is one of the most popular and intuitive methods. For any given batch of data, the Lorenz curve can be derived in several ways. One method is to take a specific functional form of the hypothetical statistical distribution function for the empirical approach based on income distribution, and then to establish the Lorenz curve directly. The second way is to specify a parametric form of the Lorenz curve data directly. The per capita income, calculated from estimates of Gross National Product (GNP) and population, is often used as a growth indicator. However, to maintain consistency in our analysis, we consider the expenditure per equivalent adult as a growth indicator calculated from sample surveys from which poverty and inequality measures were estimated means

The Lorenz curve is the most frequently used graphic technique for representing and analyzing income size distribution (Gastwirth, 1972; Jenkins, 1991). It is the relationship between the cumulative proportion of income units and the cumulative proportion of income received when units are arranged in ascending order of income. The 45 degree line is called the 'egalitarian' line. If a country has an equal distribution of income, then the Lorenz curve would be the 'egalitarian' line. Thus, 10% of households get 10% of revenue, 20% get 20% of income and so on. The further over the concavity of the Lorenz curve, the greater the inequality.

The shape of the Lorenz curve depends on the underlying statistical distribution function $F(x)$, bearing in mind that a number of hypothetical forms have been specified showing that that the distribution function $F(x)$ is not a good approximation over the entire

income data range (Ransom and McDonald, 1979; McDonald, 1984; Slottje et al., 1989). The Gini coefficient is the ratio of the difference between the absolute equality lines (diagonally) and the Lorenz curve to the triangular area below the diagonal. The Gini index is in the range of zero to unity. It can be shown that the Gini index is equal to a least twice the area under the Lorenz curve.

As we have mentioned before, the Lorenz graph performs as the natural instrument for depicting the Gini coefficient graphically. The Lorenz curve plots, in cumulative terms, the proportion of the total income (y axis) and the amount that each quantile of population (x axis) has. A 45 degree line represents absolute equality and the Lorenz curve represents the current distribution of the income. As the Lorenz curve reaches farther away from the 45 degree line, more inequality dominates the distribution. In this way, the Gini coefficient can be calculated as the ratio of the area between the Lorenz curve and the absolute equality line, divided over the total area under the 45° line.

$$\text{Gini} = \frac{A}{(A+B)} \quad \text{Eq. (3.1)}$$

Being that there are different ways to calculate the Gini coefficient, we now proceed to review the ones recording the most in the related literature (Jorge, 2011).

A first way of method we use to calculate the Gini coefficient (Dasgupta et al., 1973) is the one which produces estimates for a population homogeneous in its income values, and which is indexed in an increasing ($y_i \leq y_{i+1}$) order, using the following simplified formula (Jorge, 2011):

$$\text{Gini} = \frac{2 \sum_{i=1}^n iy_i}{n \sum_{i=1}^n y_i} - \frac{n+1}{n} \quad \text{Eq. (3.1)}$$

Which is “more mathematically tractable and computationally convenient for individual level data” (Allison, 1978)

Another way of calculating the Gini coefficient is by referring it to the Lorenz curve. As mentioned before, the Gini coefficient is defined as the ratio of the areas on the Lorenz curve graph, since A+B equals 0.5, the Gini coefficient will be:

$$\text{Gini} = \frac{A}{(0.5)} = 2A = 1 - 2B \quad \text{Eq. (3.2)}$$

If the Lorenz curve can be represented by a function $Y=L(X)$, the value of B can be calculated over the following integration formula:

$$\text{Gini} = 1 - 2 \int_0^1 L(X) dx \quad \text{Eq. (3.3)}$$

An alternative formula is the one described below. Observe how it clearly shows that the Gini coefficient is a measure of dispersion (known as Gini's coefficient of mean difference) divided by twice the value of the mean income:

$$\text{Gini} = \frac{\frac{1}{n^2} \sum_{i=1}^n \sum_{j=1}^n |y_i - y_j|}{2\mu} \quad \text{Eq. (3.4)}$$

Where the numerators are represents the average absolute difference between all pairs of incomes.

Finally, a more general and simplified formula for the calculation of the Gini coefficient was developed by Deaton (1997) with the following specification:

$$\text{Gini} = \frac{N+1}{N-1} - \frac{2}{N(N-1)\mu} \left(\sum_{i=1}^n p_i Y_i \right) \quad \text{Eq. (3.5)}$$

Where P_i is the income rank P of person i , with an income of Y , in a way that the poorest individuals receive a rank of N and the richest of 1.

4. RESULTS AND DISCUSSION

4.1. Socio demographic Characteristics of Households

Information is provided on the socio-demographic characteristics of the respondents in Figure 4.1. The figure shows the descriptive statistics for the respondents in the survey. It reports the frequency and the percentages of the independent variables. The results on the correlation analysis are also presented and discussed. Majorities of the respondents in the survey are males (89.8%) and females are (10.2%). The age distribution indicates that majority (40.1%) of respondent' falls in the age group of 25-35 years old and 28% in the age group of 35-44. Most of the respondents (63.3%) are from urban area. Most of the household head are illiterate and have no certificate (80.97%) and only 3.6% of the head of household graduated from university. The highest participation in the survey was staying in Sulaimaniya (51.4%) and the lowest participation (18.8%) was from Duhok.

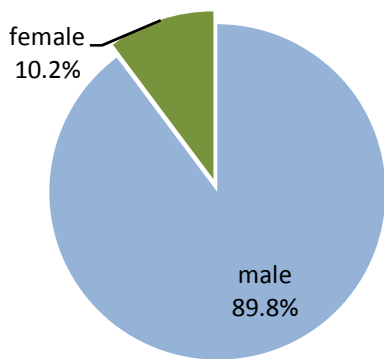


Figure 4.1.1. Gender of household head

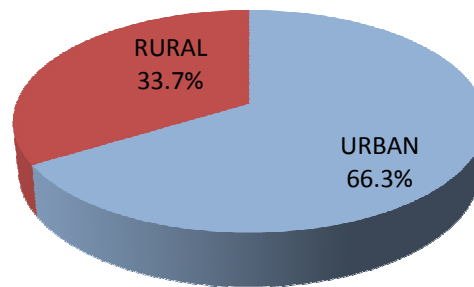


Figure 4.1.2. Residential area of household

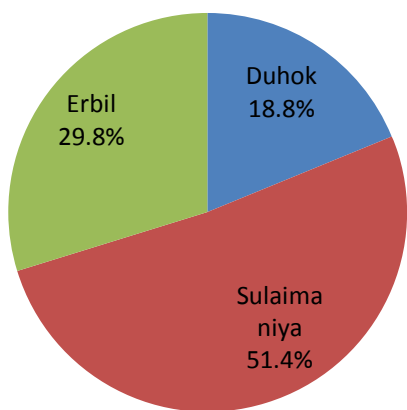


Figure 4.1.3. Region of households

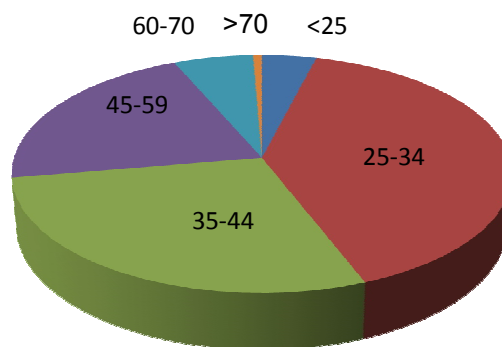


Figure 4.1.4. Age of household head

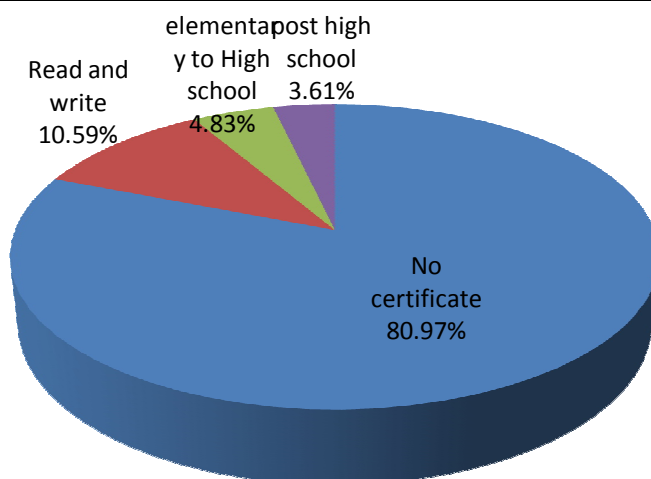


Figure 4.1.5. Education level of household head

Figure 4.1. Demographic characteristics of household

The gender, education and age of the head of household, and the household location and sizes by region are given in Table 4.1. The percentage of male heads of household is 88.2% in Erbil, 89.9% in Sulaimaniya, and 91.8% in the Duhok. In Erbil, 70.8% of surveyed households lived in an urban area. The equivalent numbers for Sulaimaniya and Duhok were 65.2% and 62.2%, respectively. The highest rate of education (without certification) was estimated in Sulaymani with at least 81.2 percent or more of the household members remaining illiterate. A lower illiteracy rates found, in Erbil at 80.7%. The IHSES 2012 found that 80.9% of household heads were illiterate in northern Iraq, with large regional discrepancies. The education level (post high school) of the heads of household in Sulaimaniya (4.2%) is higher than the household heads in Erbil (2.6%) and Duhok 3.7%. For the other level of education, Sulaimaniya is the larger of the two governorates and, in terms of the level of reading and writing, other governorates are superior to Sulaimaniya. Household size was found to be average 5.6 persons in research area. The average size of household in Duhok (7.4) is greater than in both Sulaimaniya (5.1) and Erbil (5.5).

Table 4.1. Socio demographic characteristics of household by regions

Variables	Gender of household head (%)		Percentage of household location (%)		Education level of head of household (%)				Size of household (member)	Age of household head of household (year)
	Male	Female	Urban	Rural	No certificate	Read and write	Elementary to high school	Post high school		
Erbil	88.2	11.8	70.8	29.2	80.7	11.2	5.5	2.6	5.5	45.1
Sulaimaniya	89.9	10.1	65.2	34.8	81.2	10.2	4.4	4.2	5.1	45.5
Duhok	91.8	8.2	62.2	37.8	80.8	10.7	4.8	3.7	7.4	43.3
Total	89.8	10.2	66.30	33.7	80.9	10.7	4.9	3.5	5.6	45.0

4.2. Household Income and Expenditure by Education Level of Household Head

Income inequality by education of household head is given in Table 4.2. The highest average incomes were estimated for the heads of households who had graduated from post-high school education in urban areas, while the lowest average incomes were estimated for the illiterate heads of households in rural areas. There is a positive correlation between education and income in urban areas. However, these relationships do not exist in rural areas. The average income of household in the urban areas was 2022.46 thousand IQD and for the rural areas was 1609.62 thousand IQD. Generally for Kurdistan, the average income of household was 1883.37 thousand IQD. We can say that an increased education level increases the average income but decreases the share of expenditure in income. The share of expenditure is closely linked to each level of education. Finally the low average income households often have a low level education, while high level education households receive a high average income.

Table 4.2. Household income by education groups

Household Income Group	Average income (1) (1000 IQD)	Average expenditure (2) (1000 IQD)	Share of the expenditure (2/1) (%)
	Urban		
No certificate	2017.89	2659.33	131.79
Read and write	2020.27	2601.90	128.79
Elementary to high school	2022.32	2550.39	126.11
Post high school	2128.68	2716.67	127.62
Total/Average	2022.46	2650.36	131.05
	Rural		
No certificate	1608.05	2291.45	142.50
Read and write	1632.09	2228.29	136.53
Elementary to high school	1593.53	2328.75	146.14
Post high school	1604.47	2241.53	139.70
Total/Average	1609.62	2285.26	141.98
	Overall		
No certificate	1879.98	2535.54	134.87
Read and write	1893.02	2479.43	130.98
Elementary to high school	1860.46	2466.73	132.59
Post high school	1961.67	2565.30	130.77
Total/Average	1883.37	2527.35	134.19

4.3. Household Income and Expenditure by Income Groups

As seen in Table 4.3, average income for the lowest income household in urban areas is 661.30 thousand IQD, while the lowest average expenditure is 1512.79 thousand IQD for the highest income households. The lowest average income in rural areas is 615.88 thousand IQD, and the lowest average expenditure is 1655.22 thousand IQD. In addition, the lowest average income of Kurdistan in urban areas is 638.34 IQD and the average of expenditure is 1584.80 thousand IQD. The average expenditure is larger than the average income in the areas researched, while the total share of expenditure in total income is 167.59 in the region. The last 20% of household income receive 41.00%, seven times more than first 20% of household incomes (6.78%). Share of expenditure in the lowest income group is very high, more than three times larger than the share of expenditure in the highest income group. As income increases, share of the total expenditure of total income decreases.

As shown in Table 4.3, the lowest 20 percent of households in this domain receive only 6.78 percent of households' total income. It can also be seen that the bottom 80 percent of households receive 59 percent, compared to 41 percent received by the top 20 percent of households.

Table 4.3. Household income by income group

Household income Group	Average income (1) (1000 IQD)	Average expenditure (2) (1000 IQD)	Share of the expenditure (2/1)	Share of income (%)
	Urban area			
Lowest-income household	661.30	1512.79	247.29	6.99
Lower- income household	1152.28	1998.87	173.97	12.19
Middle- income household	1587.56	2419.25	153.06	16.79
Higher- income household	2199.78	2920.39	133.20	23.26
Highest- income household	3854.92	3876.64	105.55	40.77
Total/Average	2022.46	2650.36	155.73	100
Rural area				
Lowest- income household	615.88	1655.22	305.21	6.58
Lower- income household	1127.13	1940.74	173.69	12.04
Middle- income household	1566.33	2370.44	152.49	16.73
Higher- income household	2174.40	2707.42	125.14	23.23
Highest- income household	3875.91	3567.64	96.87	41.41
Total/Average	1609.62	2285.26	190.92	100
Total				
Lowest- income household	638.34	1584.80	276.57	6.78
Lower- income household	1143.07	1977.59	173.87	12.14
Middle- income household	1580.55	2403.14	152.87	16.79
Higher- income household	2193.79	2870.17	131.30	23.30
Highest- income household	3860.10	3800.32	103.40	41.00
Total/Average	1883.37	2527.35	167.59	100

In Table 4.4, the average income of the lowest income group is 700.21 thousands IQD or (7.36%) in Duhok, while the highest income group is 3876.16 thousands IQD or (40.76%). This means that the last 20% are getting six times more than first 20%. Household income and share of expenditure for the lowest and highest income group are 280.58 thousands IQD and 116.21 thousands IQD respectively. The average income in Sulaimaniya for the lowest income group is 619.23 thousands IQD (6.6%) and the highest income group is 3839.51 thousands IQD (40.92%). The share of expenditure for the lowest and highest income group is 275.73 thousands IQD and 98.11 thousands IQD respectively, but in the Erbil governorate the lowest and highest are 645.09 thousands IQD (6.84%) and 3883.58 thousands IQD (41.2%) respectively. In terms of the total average income, Duhok has the highest income and Erbil has the lowest income in terms of total average income.

Table 4.4. Household income and expenditure by income groups and governorate

Household income group	Average income (1) (1000 IQD)	Average expenditure (2) (1000 IQD)	Share of the expenditure (2/1)	Share of income (%)
	Duhok			
Lowest- income household	700.21	1874.58	280.58	7.36
Lower- income household	1151.11	2192.61	191.87	12.11
Middle- income household	1586.38	2720.91	172.68	16.68
Higher- income household	2195.28	3377.07	152.96	23.09
Highest- income household	3876.16	4273.03	116.21	40.76
Total/Average	2125.17	3056.49	171.54	100
Sulaimaniya				
Lowest- income household	619.23	1543.27	275.73	6.60
Lower- income household	1144.98	1935.97	169.90	12.2
Middle- income household	1584.25	2317.27	147.03	16.88
Higher -income household	2194.85	2780.81	127.53	23.39
Highest- income household	3839.51	3576.63	98.11	40.92
Total/Average	1862.06	2424.10	164.33	100
Erbil				
Lowest- income household	645.09	1543.80	276.42	6.84
Lower- income household	1135.38	1919.60	169.78	12.05
Middle- income household	1571.05	2345.42	150.06	16.67
Higher- income household	2190.47	2697.05	123.80	23.24
Highest- income household	3883.58	3759.07	100.82	41.20
Total/Average	1767.75	2372.18	170.72	100.10

4.4. Income Distribution of Household by Residential Area

This section discusses the percentage share of income received by poorest to richest households by residential area in Northern Iraq. Table 4.5 shows the pattern of income distribution by 10% income group and residential area. Households in the first 10% income group receive 2.78% of the total income in urban areas, while the fifth 10% group gets 7.93% of the total income. However, the last 10% group receives 24.15% of the total income group. In contrast, in rural area households the first lowest 10% income group receives 2.19% of the total income, while the fifth 10% group gets 7.5% of the total income. However, the last 10% group receives 27.10% of the total household income.

Income inequality between rural and urban areas seems to be almost identical. However, the Gini coefficients show that equality in urban areas is greater than in rural area. As seen in Table 4.11, the Gini coefficient for urban areas was found to be 0.321, making it less than that for the rural areas (0.365). This study reveals that the poorest 20 percent received nearly 7.02 percent of total household income of region; the richest 20 percentage received 40.74 percentage of total income.

Table 4.5. Income distribution of household by residential area

Income Groups	Average	Maximum	Standard deviation	Percentage
Urban area				
1. 10%	563.15	783.33	162.82	2.78
2. 10%	924.91	513.15	74.03	4.57
3. 10%	1170.46	783.33	66.64	5.79
4. 10%	1377.98	1044.88	61.15	6.81
5. 10%	1603.99	753.70	69.94	7.93
6. 10%	1862.67	1044.88	77.17	9.21
7. 10%	2162.05	1279.97	98.08	10.69
8. 10%	2534.31	928.25	125.55	12.53
9. 10%	3142.29	1279.97	224.98	15.54
10. 10%	4885.16	1482.41	1199.00	24.15
Average	2022.46	1105.82	1263.09	100.00
Rural area				
1. 10%	353.22	513.15	106.00	2.19
2. 10%	646.17	783.33	63.75	4.01
3. 10%	847.02	1044.88	51.07	5.26
4. 10%	1009.46	753.70	52.08	6.27
5. 10%	1207.84	1044.88	60.71	7.50
6. 10%	1411.43	1279.97	52.66	8.77
7. 10%	1648.41	928.25	82.09	10.24
8. 10%	1997.33	1279.97	128.83	12.40
9. 10%	2616.70	1482.41	249.31	16.25
10. 10%	4363.78	1105.82	1027.94	27.10
Average	1609.62	1482.41	1163.65	100
Total				
1. 10%	492.50	783.33	176.64	2.61
2. 10%	830.95	1044.88	149.62	4.41
3. 10%	1061.44	753.70	165.02	5.63
4. 10%	1253.77	1044.88	183.80	6.66
5. 10%	1470.67	1279.97	198.94	7.81
6. 10%	1710.58	928.25	224.60	9.08
7. 10%	1988.92	1279.97	260.16	10.56
8. 10%	2353.32	1482.41	283.81	12.49
9. 10%	2965.14	1105.82	340.94	15.74
10. 10%	4709.69	1482.41	1169.74	25.00
Average	1883.37	1730.88	1245.77	100

In Figure 4.2, we seen that the proportion of households income in the first 10% is 2.61%, the fifth 10% is 7.81%, and the last 10% received 25.00% in total income household. Figure 4.2 shows the Lorenz curves for rural and urban areas. All the points of the Lorenz curve for the population in rural areas are closer to the line of perfect equality than the corresponding points of the Lorenz curve for population in urban areas. In this context, the population in rural areas can be said to be in a position of Lorenz dominance and can be regarded as having a more equal income distribution than the population in urban areas. All these figures indicate that the rural areas are more equal than the urban areas in all of the governorates of Kurdistan region.

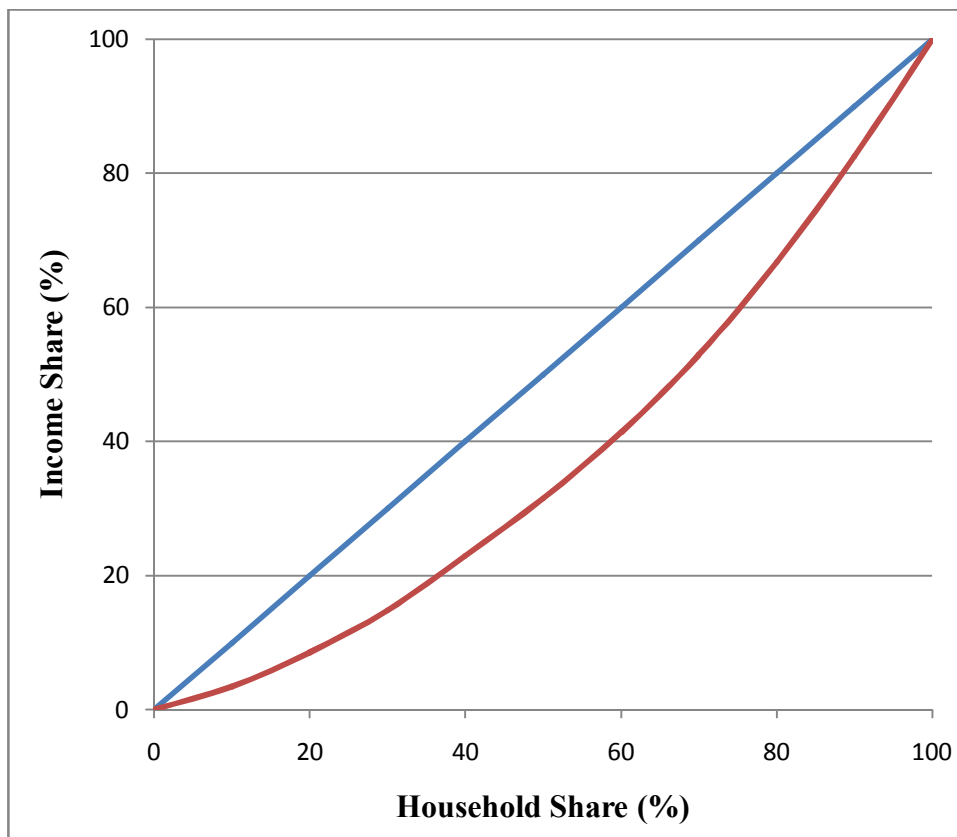


Figure 4.2. Lorenz curve for Northern of Iraq

The Gini Coefficient for the urban areas is 0.321 and 0.365 for the rural areas, while in the Kurdistan Region the Gini Coefficient is 0.340. In Figures 3 and 4, the first 10% in the urban areas receives 2.78% of total average income household, while in the fifth 10% they receives 7.93% and the last 10% receives 24.15%. Yet in the rural areas, the first 10% receives 2.19% and the fifth 10% receives 7.5%. Moreover, the last 10% in rural areas receives 27.10% in total average income household, entailing that the rural areas are more equal than the urban area. Overall, the richest 20 percent (9th and 10th decile groups)

receives nearly 40.74 percent of the total household income in northern Iraq while the poorest 20 percent (1st and 2nd deciles groups) receives only 7.02 percent. When the middle 60 percent (3rd to 8th deciles groups) or the middle three quintiles are considered, the corresponding figure is 52.24 percent.

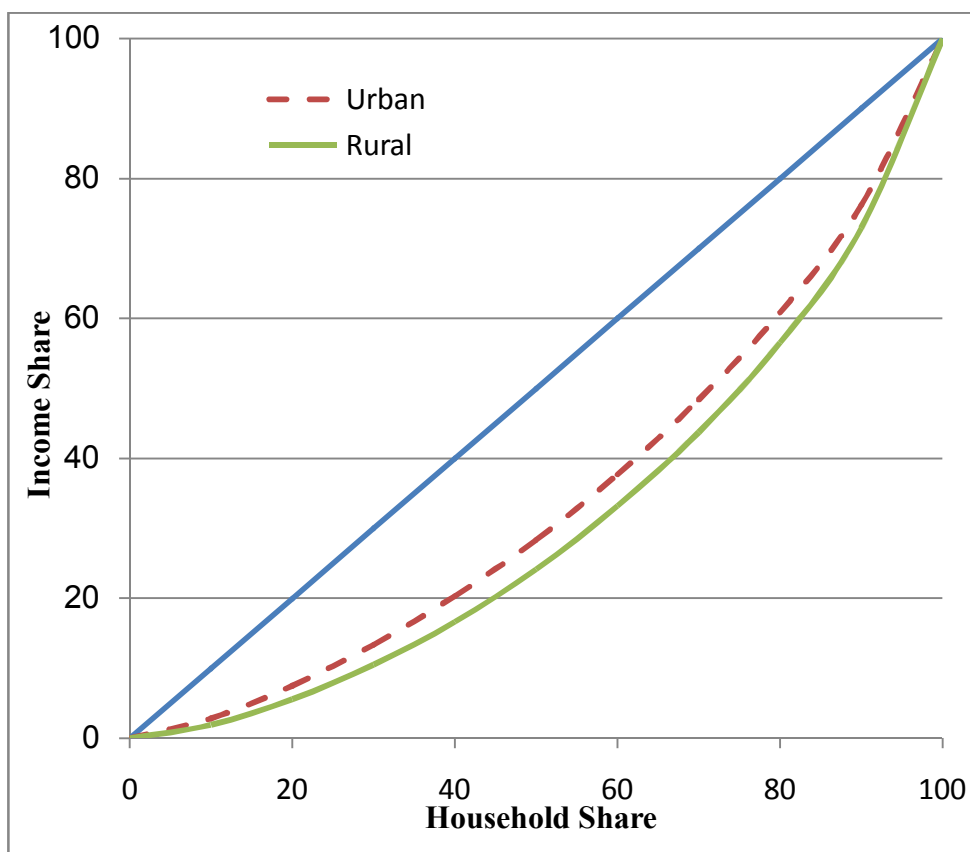


Figure 4.3. Lorenz curve by residential area

4.5. Income Distribution of Household by Governorate

In terms of income distribution of household head by residential area, the average income in the first 10% in urban areas is 547.09 thousand IQD and in the fifth 10% and last 10% are 1600.65 thousand IQD and 4883.69 thousand IQD respectively. However, in the rural areas the average income in the first 10% is 350.93 thousand IQD and in the fifth 10% the average income of household heads is 1204.20 thousand IQD and in the last 10% average income it is 4401.89 thousand IQD. In Erbil the last 10% household income is reaching a level four times greater than the first 10% household income.

Table 4.6. Income distribution of household by residential area for Erbil

Income groups	Average	Standard deviation	Percentage
Urban			
1. 10%	547.09	171.34	2.71
2. 10%	922.25	74.44	4.56
3. 10%	1163.87	63.66	5.76
4. 10%	1377.35	59.50	6.81
5. 10%	1600.65	70.32	7.92
6. 10%	1860.87	77.80	9.21
7. 10%	2150.14	91.13	10.64
8. 10%	2546.04	126.21	12.60
9. 10%	3161.63	220.43	15.64
10. 10%	4882.69	1200.33	24.16
Average	1911.52	1265.50	100.00
Rural			
1. 10%	350.93	105.28	2.18
2. 10%	647.38	63.64	4.01
3. 10%	848.31	56.17	5.26
4. 10%	1018.36	49.09	6.31
5. 10%	1204.21	61.39	7.47
6. 10%	1414.83	44.39	8.77
7. 10%	1640.08	79.42	10.17
8. 10%	2002.43	119.65	12.42
9. 10%	2600.65	234.34	16.12
10. 10%	4401.89	871.59	27.29
Average	1418.51	989.13	100.00
Total			
1. 10%	533.13	157.60	2.85
2. 10%	818.34	153.57	4.37
3. 10%	1045.67	165.47	5.58
4. 10%	1215.25	194.23	6.49
5. 10%	1457.19	192.41	7.78
6. 10%	1666.71	230.97	8.90
7. 10%	1963.38	265.30	10.48
8. 10%	2326.25	285.77	12.42
9. 10%	2992.72	302.47	15.97
10. 10%	4717.36	1214.86	25.18
Average	2125.17	1330.13	100.00

On the vertical axis we show the cumulative income share of this population. Figure 4.4 therefore shows that the first 50% of the household has 25.27% of the total income, but 50% of individuals in this population account for only 74.73% of the total income in Erbil.

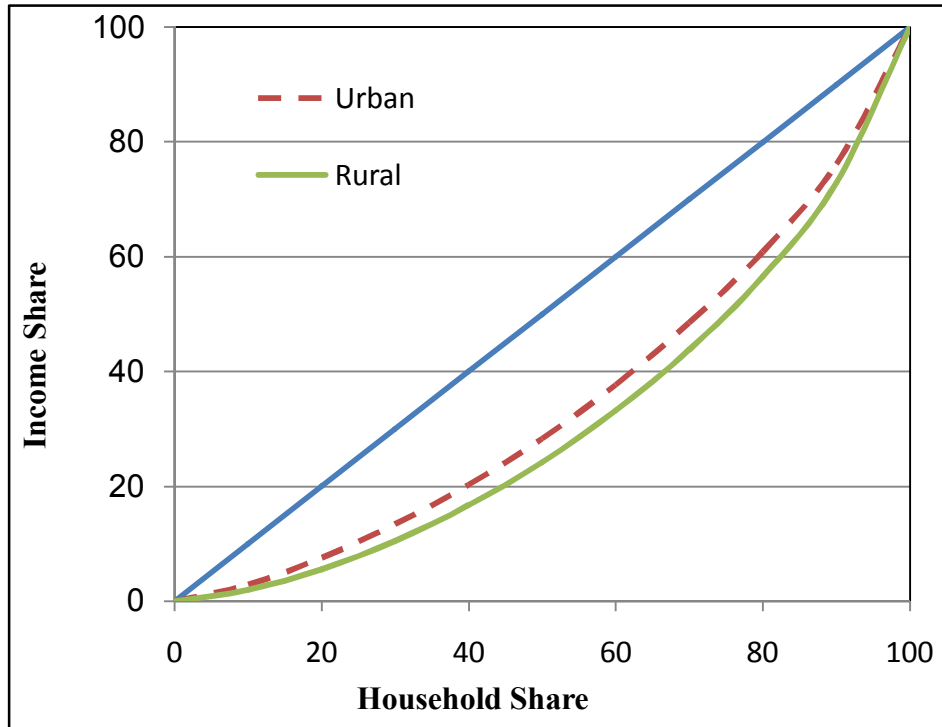


Figure 4.4. Lorenz curve for Erbil

For the income distribution of household head by residential area, the total average income of the first 20% in Duhok is 7.5% of the total average in urban areas and the last 20% is 39.82, while the middle 60% receives 52.68%. In rural areas, the first 20% receives 6.48% and the last 20% receives 43.44%. The medium 60% is given 50.08% of the total average in rural areas, but overall, the first 20% income group receives 7.22% in total, while the last 20% total income group receives 41.15% of the total average income group.

Table 4.7. Income distribution of household by residential area for Duhok

Income Groups	Average	Standard deviation	Percentage
Urban			
1. 10%	592.70	145.01	2.93
2. 10%	925.96	74.29	4.57
3. 10%	1166.78	66.64	5.76
4. 10%	1374.27	58.18	6.78
5. 10%	1595.68	73.24	7.87
6. 10%	1852.63	79.10	9.14
7. 10%	2156.46	103.25	10.64
8. 10%	2528.96	128.71	12.48
9. 10%	3121.42	216.90	15.40
10. 10%	4948.31	1245.38	24.42
Average	2288.38	1337.51	100.00
Rural			
1. 10%	403.48	94.37	2.48
2. 10%	650.17	70.89	4.00
3. 10%	849.82	44.14	5.23
4. 10%	1000.76	56.69	6.16
5. 10%	1225.36	59.61	7.54
6. 10%	1407.87	54.03	8.66
7. 10%	1649.62	85.56	10.15
8. 10%	2007.70	130.10	12.35
9. 10%	2682.17	250.46	16.50
10. 10%	4379.81	1092.60	26.94
Average	1856.83	1274.66	100.00
Total			
1. 10%	533.13	157.60	2.85
2. 10%	818.34	153.57	4.37
3. 10%	1045.67	165.47	5.58
4. 10%	1215.25	194.23	6.49
5. 10%	1457.19	192.41	7.78
6. 10%	1666.71	230.97	8.90
7. 10%	1963.38	265.30	10.48
8. 10%	2326.25	285.77	12.42
9. 10%	2992.72	302.47	15.97
10. 10%	4717.36	1214.86	25.18
Average	2125.17	1330.13	100.00

Figures 4.5 show the Lorenz curves for two populations (urban and rural) in the Duhok governorate. The Lorenz curve shows that the first 10% received 2.93% while the last 10% or richest 10% received 24.42% of total income in urban areas. However, in the rural areas inequality is greater than in urban areas between first 10% and last 10%. The Gini coefficients for urban and rural areas are 0.303 and 0.348 respectively.

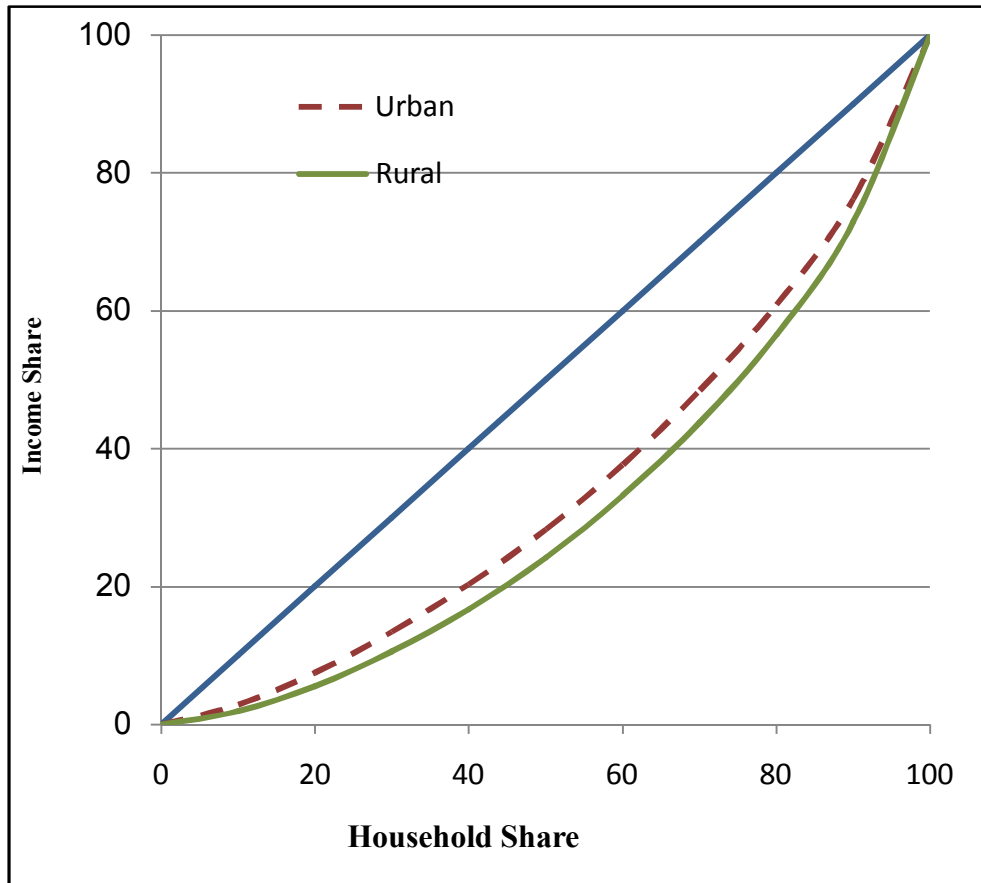


Figure 4.5. Lorenz curve for Duhok

In terms of income distribution of household head by residential area, the average income in the first 10% in urban area is 571.18 thousand IQD, while in the fifth 10% and last 10% they are 1609.43 thousand IQD and 4855.81 thousand IQD respectively. However, in the rural areas, the average income in the first 10% is 348.02 thousand IQD and in the fifth 10% the average income of household heads is 1202.05 thousand IQD, while in the last 10% the average income is 4343.24 thousand IQD.

Table 4.8. Income distribution of household by residential area for Sulaimaniya

Income groups	Average	Standard deviation	Percentage
Urban			
1. 10%	571.18	157.91	2.82
2. 10%	926.60	73.97	4.58
3. 10%	1175.83	68.27	5.81
4. 10%	1379.37	63.15	6.82
5. 10%	1609.43	68.27	7.96
6. 10%	1867.09	76.13	9.23
7. 10%	2169.58	99.18	10.73
8. 10%	2529.51	124.17	12.50
9. 10%	3143.82	231.74	15.54
10. 10%	4855.81	1180.01	24.01
Average	1999.68	1221.86	100.00
Rural			
1. 10%	348.02	106.68	2.17
2. 10%	644.40	62.26	4.02
3. 10%	844.70	50.79	5.27
4. 10%	1007.13	51.63	6.28
5. 10%	1202.05	59.82	7.49
6. 10%	1411.35	56.32	8.80
7. 10%	1651.80	82.27	10.30
8. 10%	1991.32	132.06	12.41
9. 10%	2597.70	251.66	16.19
10. 10%	4343.24	1039.84	27.07
Average	1604.26	1178.69	100.00
Total			
1. 10%	480.12	177.25	2.56
2. 10%	826.49	152.24	4.40
3. 10%	1072.69	166.12	5.71
4. 10%	1262.32	183.11	6.72
5. 10%	1476.83	202.13	7.86
6. 10%	1718.05	225.35	9.15
7. 10%	2000.54	260.64	10.65
8. 10%	2336.72	287.89	12.44
9. 10%	2935.85	357.39	15.63
10. 10%	4668.20	1155.76	24.86
Average	1862.06	1221.44	100.00

The Lorenz curve in Figure 4.6 shows that the poorest 10 percentage of total income receives 2.82%, while the richest 10 percentage receives 24.01% of total income in urban areas. However, in the rural areas in Sulaimaniya the poorest 10 percent receive less than urban area (2.17%), but the richest 10 percent receives more than the urban areas 27.07%.

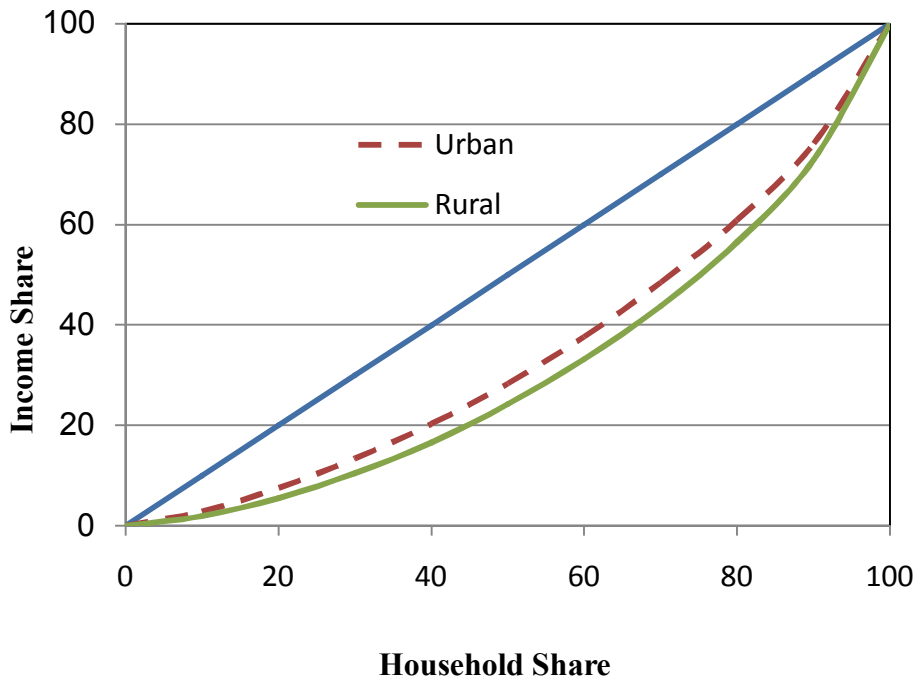


Figure 4.6. Lorenz curve for Sulaimaniya

4.6. Expenditure Distribution of Household by Residential Area

However higher the ratio is, the income gap between these two groups is greater, so increasing inequality in income distribution. However lower the ratio, the income gap between the richest and poorest households is less and income inequality decreases. The average monthly expenditure of rural households in the Kurdistan region is 2285.26 thousands IQD and the average expenditure in the urban areas is 2650.36 thousands IQD overall, while the total average expenditure in Kurdistan region is 2527.35 thousands IQD. The first 10% in urban are getting 5.26 % of total average expenditure and in the fifth 10% getting 9.19% and the last 10% receive 16.58%.

However, in rural areas the first 10% receives 6.12% and the fifth 10% receives 9.70%, while the last 10% in rural areas receives 15.12% in total average expenditure. Moreover, in terms of the total average expenditure, the first 10% receives 5.64% of the total while the fifth 10% receives 9.30% and the last 10% is receives 16.13% of total

expenditure. The last 10% of household (highest income group) in total average spend three times more than first 10% of household (lowest income group).

Table 4.9. Expenditure distribution of household by residential area

Income groups	Average	Maximum	Standard deviation	Percentage
Urban area				
1. 10%	1336.70	7575.99	948.86	5.26
2. 10%	1664.49	8875.44	1076.42	6.55
3. 10%	1868.17	6531.22	987.36	7.35
4. 10%	2114.94	6039.16	1049.17	8.32
5. 10%	2337.27	8481.38	1245.44	9.19
6. 10%	2495.93	9038.63	1361.30	9.82
7. 10%	2697.82	8485.46	1360.42	10.61
8. 10%	3135.64	9075.90	1497.20	12.33
9. 10%	3560.35	8930.03	1664.20	14.00
10. 10%	4215.18	9119.11	1909.47	16.58
Average	2650.36	9119.11	1606.15	100
Rural area				
1. 10%	1499.42	8705.25	1101.61	6.12
2. 10%	1835.47	7678.56	1095.43	7.49
3. 10%	1863.28	8230.38	1062.90	7.60
4. 10%	2035.51	8046.39	1169.63	8.30
5. 10%	2377.35	9033.95	1368.40	9.70
6. 10%	2362.48	8720.19	1312.88	9.64
7. 10%	2528.04	6802.05	1306.13	10.31
8. 10%	2908.74	7671.88	1577.14	11.87
9. 10%	3396.46	9042.89	1838.10	13.85
10. 10%	3707.61	8967.19	1928.69	15.12
Average	2285.26	9042.89	1490.15	100
Total				
1. 10%	1424.96	8705.25	1036.89	5.64
2. 10%	1744.64	8875.44	1087.86	6.90
3. 10%	1866.20	8230.38	1017.65	7.38
4. 10%	2088.80	8046.39	1089.98	8.27
5. 10%	2351.42	9033.95	1289.24	9.30
6. 10%	2454.93	9038.63	1346.97	9.71
7. 10%	2655.51	8485.46	1348.06	10.51
8. 10%	3085.18	9075.90	1517.00	12.21
9. 10%	3523.96	9042.89	1704.19	13.94
10. 10%	4077.12	9119.11	1926.47	16.13
Average	2527.35	9119.11	1577.38	100

In Figure 4.7 we see the proportion of household expenditure in the first 10% of average income is a share of 5.67 %, while for the fifth 10% it is 9.30%. Furthermore, the last 10% in average expenditure receives 16.13 % in total average expenditure household in residential areas, while the Gini coefficient for Kurdistan region by using expenditure is 0.33.

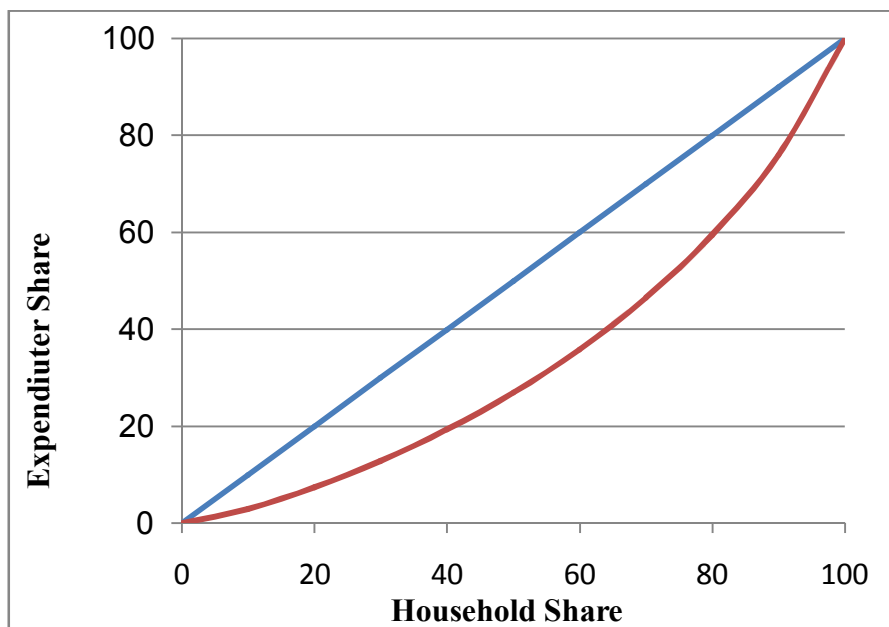


Figure 4.7. Lorenz curve for expenditure

Figure 4.8 shows the Lorenz curve for expenditure. The first 10% in the urban receive 5.26 % of total average expenditure, while in the fifth 10% they receive 9.19% and the last 10% receives 16.58%. However, in rural areas the first 10% receives 6.12% and in the fifth 10% they got 9.70%, while the last 10% in rural areas receives 15.12% in total average expenditure. Based on the 2012 data, the Lorenz curve for gross expenditure indicates that the top 10 percent of households earned approximately 16.13 percent of total household income (Figure 4.7). In contrast, the bottom 10 per cent of households earned about 5.68 per cent of total income, while the Gini coefficient for disposable income is 0.330.

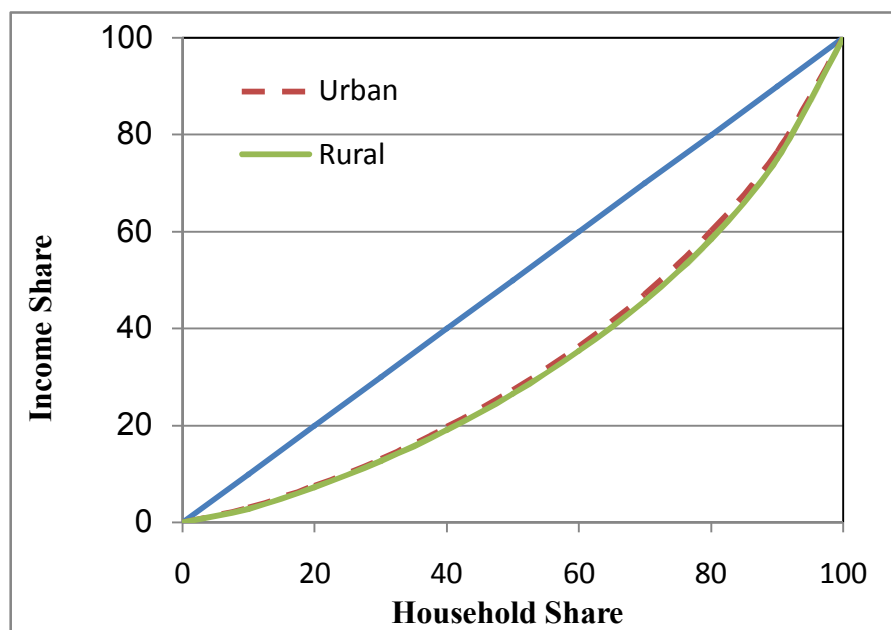


Figure 4.8. Lorenz curve for expenditure by residential area

4.7. Expenditure Distribution of Household by Governors

The expenditure distribution of household head by governorate is given in Table 4.8. The average expenditure in the first 10% in Duhok is 502.03 thousand IQD, while in the fifth 10% and last 10% they are 1462.38 thousand IQD and 4789.15 thousand IQD respectively. However, in Sulaimaniya the average expenditure in the first 10% is 459.36 thousand IQD, in the fifth 10% the average income of household head is 1459.76 thousand IQD and in the last 10% average expenditure it is 1862.06 thousand IQD. Finally, in the Erbil the average expenditure of household in the first 10% is 470.32 thousand IQD, while in the fifth and last 10% they are 1453.91 thousand IQD and 4748.66 thousand IQD

respectively. In the end, we can say that Duhok has the highest average expenditure household while Sulaimaniya has the lowest average expenditure household.

Table 4.10. Expenditure distribution of household by governorates

Income groups	Average expenditure	Maximum	Standard deviation
Duhok			
1. 10%	502.03	673.33	122.70
2. 10%	811.20	928.18	74.39
3. 10%	1033.99	1145.73	67.77
4. 10%	1258.39	1356.67	59.11
5. 10%	1462.38	1566.04	64.11
6. 10%	1709.34	1844.07	75.94
7. 10%	2001.26	2169.38	91.98
8. 10%	2381.14	2619.58	125.52
9. 10%	3029.58	3478.40	238.96
10. 10%	4789.15	8276.46	1194.73
Average	2125.17	8276.46	1330.13
Sulaimaniya			
1. 10%	459.36	677.30	147.76
2. 10%	807.07	928.20	74.36
3. 10%	1030.30	1149.94	64.36
4. 10%	1254.32	1356.37	60.42
5. 10%	1459.76	1571.50	62.25
6. 10%	1702.89	1843.20	77.32
7. 10%	1996.69	2176.56	98.05
8. 10%	2384.07	2620.26	124.96
9. 10%	2991.72	3476.45	240.74
10. 10%	4673.59	8313.02	1137.53
Average	1862.06	8313.02	1221.44
Erbil			
1. 10%	470.32	676.25	151.06
2. 10%	812.78	928.75	76.49
3. 10%	1036.99	1149.79	64.13
4. 10%	1246.53	1356.44	61.41
5. 10%	1453.91	1570.74	64.60
6. 10%	1698.89	1838.33	79.40
7. 10%	2005.40	2176.46	95.83
8. 10%	2402.49	2622.79	136.22
9. 10%	2985.44	3476.10	258.60
10. 10%	4748.66	8260.65	1150.74
Average	1767.75	8260.65	1212.19

4.8. Gini Coefficients by Residential Area and Governorate

The Gini coefficient is a summary measure for the distribution of incomes within a region. It does not indicate anything with respect to the relative levels of average income of the different regions. To present income distribution within the different governorates of the region, we used a Gini coefficient which takes a value of between 0 and 1. Higher values of Gini coefficients represent higher inequality. While the Erbil governorate appears to be in an advantageous position with respect to income share, the Gini coefficient of this region was 0.347, the highest among the region. The lowest Gini coefficient registered in Duhok was 0.324. The results show that the urban and rural Gini coefficients, as well as the national Gini coefficient, are significantly small, which implies that the gap between the rich and the poor is mainly due to the gap between urban and rural areas. It was calculated the Gini coefficient of urban areas in the province of Sulaimaniya for years 1977, 1987 and 2002 were 0.71, 0.73 and 0.74 respectively. The result showed Gini coefficient increasing between 1977-2002. But the Gini coefficient for urban area in Sulaimaniya in 2012 was 0.341 that was showed the decreases inequality in Sulaimaniya (Jalal 2008).

Table 4.11. Gini coefficients by residential area and governorate (using income)

Regions	Urban	Rural	Overall
Duhok	0.303	0.348	0.325
Sulaimaniye	0.314	0.376	0.339
Erbil	0.338	0.342	0.347
Overall	0.321	0.365	0.340

With respect to household expenditure, the Gini coefficients for Duhok in the urban and rural areas are 0.308 and 0.325 respectively. The equivalent figures for Sulaimaniya are 0.313 and 0.337, while for Erbil they are 0.333 and 0.335 respectively in both residential areas. The highest Gini coefficient or unequal distribution of income related to Erbil is 0.335, while the lowest Gini coefficient related to Duhok (0.315).

Table 4.12. Gini coefficients by residential area and governorate (using expenditure)

Regions	Urban	Rural	Overall
Duhok	0.308	0.325	0.315
Sulaimaniye	0.313	0.337	0.325
Erbil	0.333	0.335	0.335
Overall	0.323	0.339	0.330

In terms of East Asian countries, the recent study conducted by Krongkaew & Matzin (2007) finds a relationship between economic growth and inequality in income distribution in East Asia. In his study, eight countries are included: China, Indonesia, Korea, Malaysia, the Philippines, Singapore, Thailand and Vietnam, most of which have achieved high economic growth through various increases in the average income per capita.

However, income distribution reflects different patterns from country to country, entailing that the relationship between economic growth and inequality in income distribution is different. The Gini coefficient dropped from 0.34 in 1965 to 0.32 in 1999 in Korea. It also decreased from 0.50 to 0.47 from 1966 to 1999 in Singapore, while in Indonesia it dropped from 0.34 in 1976 to 0.33 in 2002, falling from 0.51 in 1970 to 0.46 in 2004 at Malaysia, whilst the coefficient has risen in the Philippines, Thailand and Vietnam. It also rose in China from 0.29 in 1981 to 0.46 in 2002 and in Philippines from 0.49 in 1961 to 0.51 in 2002 and in Thailand from 0.41 in 1962 to 0.50 in 2002, while in Vietnam it rose from 0.33 in 1993 to 0.41 in 2001.

Yassin (2010) has therefore concluded that, in many developing countries which have similar circumstances to Iraq and especially in 2005, the degree of inequality is very high according to all the criteria that were used in comparison to the years prior to the period of the study. According to his study, the value of Gini coefficient reached 0.42 and 0.38 in 2005 and 2007 successfully.

In this research I have calculated the Gini coefficient for three governorates in the Northern region of Iraq for 2012. Using income household for Duhok in urban and rural areas, the Gini coefficients were 0.303 and 0.348 respectively; for Sulaimaniya in the urban areas it was 0.314, 0.376 in rural areas, while for Erbil it was 0.338 and 0.342 respectively in both residential areas. Overall, the Gini coefficient for the Kurdistan region was 0.34.

Finally, these results show that the Gini coefficient for Northern region of Iraq in this study is less than for those studied in Iraq by Yassin (2010) and East Asia by Krongkaew & Matzin (2007). Overall, this means that in the Kurdistan region, income distribution is more equal than in other regions of Iraq and in the countries studied in East Asia.

4.9. Sources of Income by Residential Area and Governorate

Figure 4.9 compares urban and rural income sources and reflects different proportions of household incomes. In urban areas, income from employment is the highest income sources after that income from activity; income from agriculture is the lowest income sources in urban areas. However, in rural areas the lowest income sources are property income and followed that transfer income. Moreover, in rural areas income from employment and income from other activity is larger than from other sources. Income from agriculture is clearly very different for both areas.

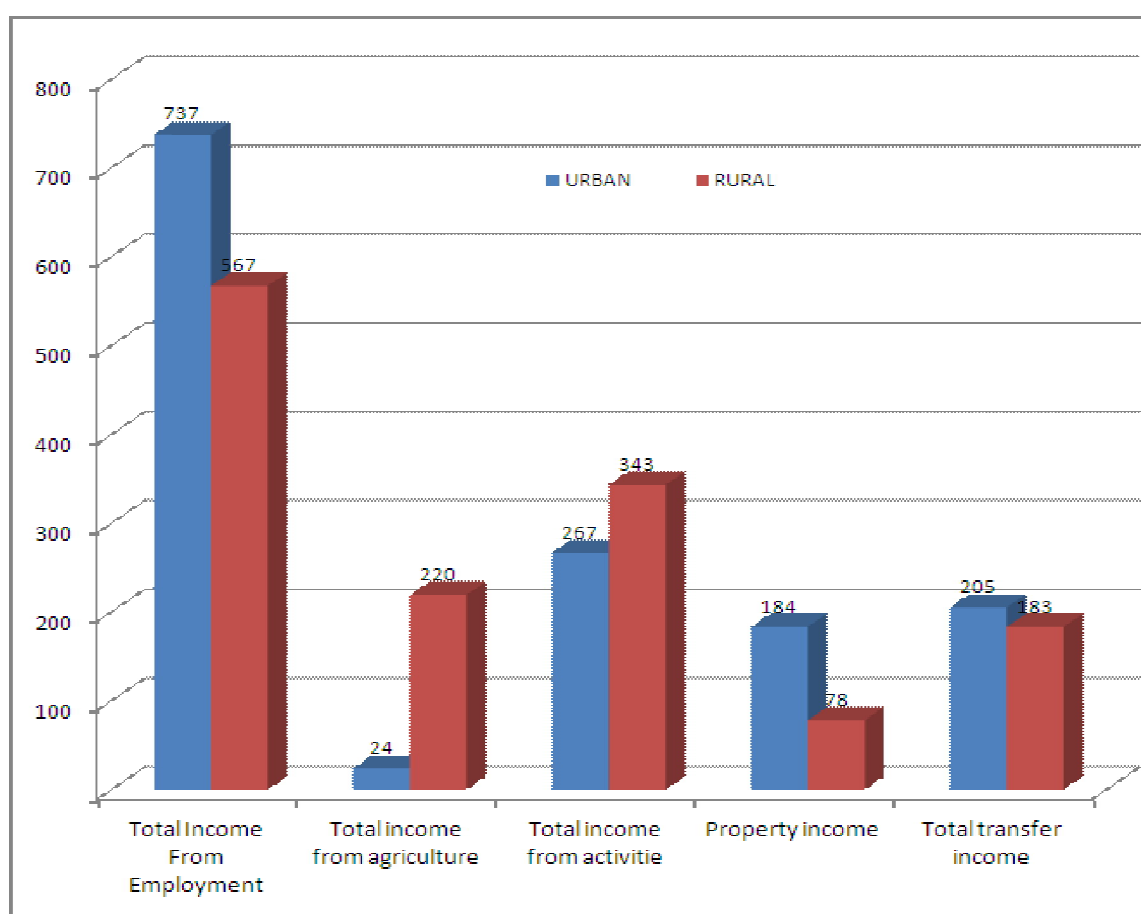


Figure 4.9. Sources of income by residence area

Figure 4.10 compares regional differences in household income sources. The income from employment is the biggest income sources, followed by income from other activity. In the latter category, the Duhok governorate has the highest rate of 80 %. This chart shows that, for income sources in other regions, Sulaimaniya receives the highest rate of income from agriculture. The income from agricultural activities is the least in this region of the employment categories. Employment income, in addition to the wages and salaries earned by employees, includes income gained by employers and own account workers engaged in both agricultural and non-agricultural sectors in the region.

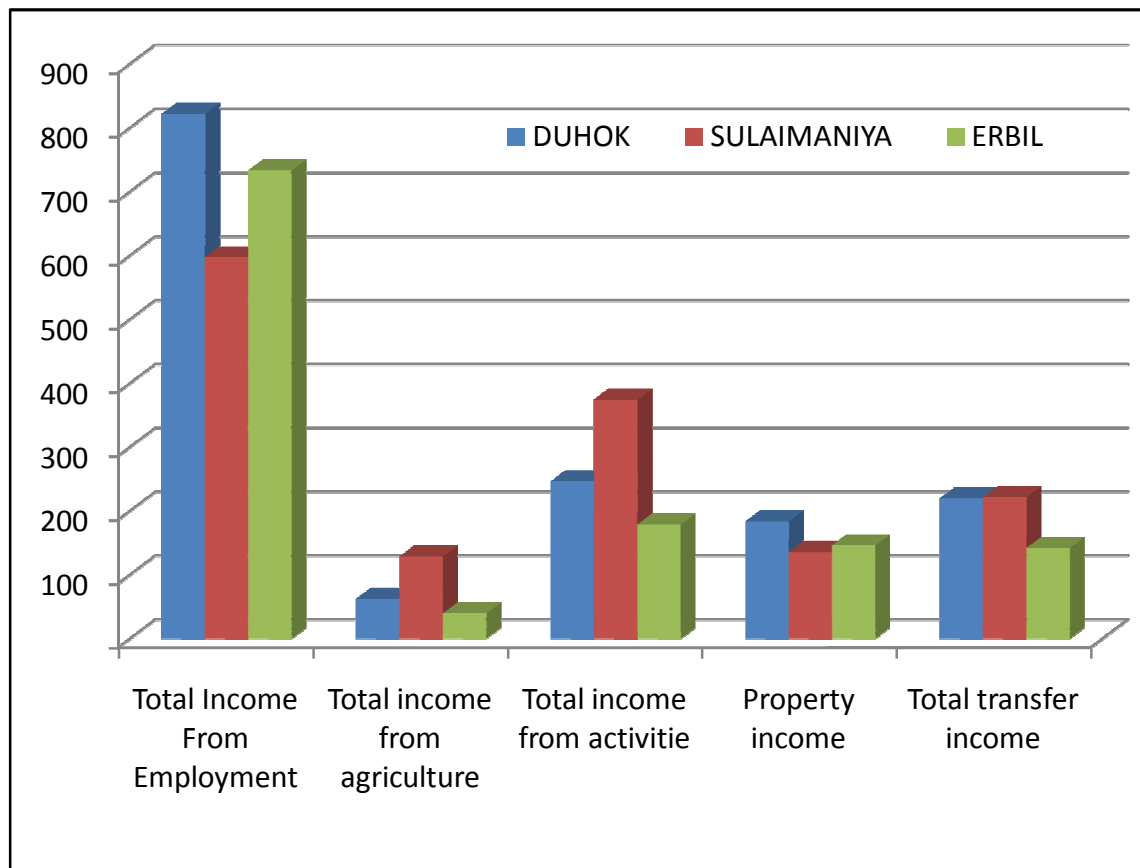


Figure 4.10. Sources of income by region

5. CONCLUSION AND RECOMMENDATIONS

This study documents the research results for household income by using Iraqi Household Socio Economic Survey data for 2012. The data provides a rich source of information for estimating income distribution and inequality in the Kurdistan region. This study also evaluates the theory of income distribution and inequality in three provinces of northern Iraq, using data from the 2012 survey to calculate the Lorenz curve and the Gini coefficients. The derived Gini rate suggests the existence of income distribution inequality in the study population, but the calculated Gini rate for the region is relatively moderate. On the other hand, the results showed that the derived Gini rate was declining compared with the Gini rate calculated in 2007.

Income distribution and income inequality is one of the most important problems for the development of countries where poverty is the fundamental economic problem. In particular, preventing corruption, being able to generate policies that will reduce unemployment and democratization hold great importance for a government needing to be robust in economic and political terms to solve these economic problems.

Although a number of studies have investigated inequality and its causes for some Arab countries, the literature in this domain remains limited. This thesis attempts to address the knowledge gap and contribute to the understanding of the extent, the evolution and the determinants of income inequality in different regions by examining the sources of inequality between rural urban areas. The result show income from employment is the biggest income sources in the Kurdistan region and income from agriculture is the lowest income sources.

Based on the findings of this study and its conclusions, we recommend that the government attempt to discover the causes of this difference and, after determining the differences, find ways to eliminate these factors. Furthermore, policy makers should adopt both long-term and short-term programmers and policies in order to minimize the differences in income. These can include increasing workers' rights, and developing more welfare provisions for poor, low-income and unemployed people.

Households in the first lowest 10% income group received 2.61% of the total income, while the fifth 10% group received 7.81% of the total income. However, the last 10% group received 25.00% of the total household income. The lowest Gini coefficient

registered in Duhok was 0.324. The results show that the urban and rural Gini coefficients, as well as the national Gini coefficient, are significantly small. This implies that the gap between the rich and the poor is mainly due to the gap between urban and rural areas.

The results also show the composition of the share of the different productive sectors in economic growth, how they are affected and how income is distributed. If the share of agriculture in economy is increasing, for example, then the distribution economy will be more balanced.

This conclusion points to the fact that many countries in the world accept negative policies against their agricultural sector, driving a strong emphasis on the transfer of investment resources from this sector to the industrial and public sectors.

According to the results, a reduction of the level of income inequality may be suggested. Economic policies should be applied in order to facilitate economic growth in the agricultural sector. The fraction of low-skilled workers and low-income classes in the empirical evidence suggests that in the process of development, the industrial sector has a leading role, while the role of the agricultural sector is reduced.

Some other recommendations are;

- Redistribution of income in favor of the initial class using opportunity financial policies and create other sources of income and diversification.
- The need to achieve a balance between the goal of increasing economic development and the objective of reducing inequality in income distribution because the increase GDP growth does not necessarily lead to greater equality in the distribution of income and so that the increase in per capita GNP.
- Must increase the state's efforts in combating poverty and the low level of access between groups of Kurdistan society.

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