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Income Inequality and Its Measures: Evidence from OECD and European Countries

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Abstract
This paper is by nature an exploration study aimed to examine the measures of income inequality and is integrated with an empirical investigation of possible factors affecting the level of inequality. Recent data shows that the gap between poor and rich has been widening on an international scale. The way to solve this "sharing of created economic value" problem begins with the problem of how to measure inequality. Our literature review revealed different ways of measurement and how the concept of inequality was approached as well as it determines possible candidates for factors in empirical analysis. By making reference to De Maio's findings (2007), most widely used methods of measurement are mentioned. A description of current situation in developed and developing economies based on most popular measure, which is Gini coefficient, is also provided. Our empirical setting, to define factors influencing Gini coefficient, is employing data for 32 developed and developing OECD and EU countries in 2011 and 2012. We estimated an OLS model to the relation between Gini coefficients and several pre-identified regressors. We have found a linear relation with average income tax rate (taxrate) and with labor force participation rate (laborrate). The fact that public policies in taxation and labor force participation should be altered to cope with inequality is stressed in the paper.

Introduction and Motivation

When we look at the economics discipline from its "social" point of view, we will see that it has three important decisive areas: Production of goods and services which will add economic value to the world, delivery and promotion of those products and finally fair distribution of economic value created as a result of this process. From a general perspective, market economies and economic agents which are operating in those structures are mostly focusing on production techniques and how to carry out delivery operations more efficiently. On the other hand, methods or policies to address unequal sharing of generated value among stakeholders of the society are neglected. During the development of the field, many explanations from different schools of thought have been put forward. For instance, while Marxians said that substitution threat of capital against workers had put the wages down and unemployment up due to job automation and cost minimization aims of the market system. On the other hand, Neoclassical people argued that rising wage differences are due to rising productivity differences among worker groups. Despite the fact that there are different types of income distribution such as across regions, industries, functionalities; we will focus on mainly income distribution across individuals.

No matter what the explanation is, the increasing impact of this problem is non-negligible. Poverty index of World Bank showed that, in 2011, almost 2.2 billion people live on less than $2.5 a day[1]. Despite the fact that certain improvement was observed, the process is unequal. Fewer than 50 million of the extremely poor lived in Latin America and the Caribbean, Middle East and North Africa, and Eastern Europe and Central Asia combined. While this is the case, top 1% share of the total pre-tax income in the US increased to record high level of 22.46%[2] (see Exhibit 1). Global organizations, influence groups, policy makers etc. are tying cope with this phenomenon more seriously. As it's indicated in a media briefing, G20 is directed to aim inequality through reforms in tax codes[3]. Moreover, 2015 World Economic Forum considered inequality in its "The Global Risks Report"[4]. Hence it's worthy subject to study.

The structure of the paper is as follows: Section 1 provides literature review and Section 2 describes

[1] http://www.worldbank.org/en/topic/poverty/overview
[2] http://inequality.org/income-inequality/
[3] https://www.oxfam.org/sites/www.oxfam.org/files/file_attachments/oxfam_media_brief_-_turn_the_tide.pdf
[4] http://www.weforum.org/reports/global-risks-report-2015

widely used measures of inequality. Section 3 examines Gini coeffciients of selected OECD and developing countries with a special reference to Turkey and Pakistan. Data, model and results of empirical work is demonstrated in Section 4 and lastly Section 5 will close the discussion by mentioning possible policy implications.

Section 2: Literature Review

In this section, our aim is to mention some studies and authors whose main interest is centered on income inequality. Earlier studies about this subject regard it as a social phenomenon and tried to impose a qualitative explanation about the concept of inequality. In his book, Arthur Okun stated that pursuing an egalitarian political systems and social structure have generated discrepancies in economic well-being. His argument is focused on the fact that main efficiency source of US economy that is implementing a system of rewards and punishments. This system ensures an efficient economy at the expense of gaps between material wealth of the layers of society. During his investigation of income inequality, he differentiates the concepts of income and wealth but then he accepts wealth as contained by income flow. In this context, he found that about two-thirds of US households' wealth is obtained from wages and salaries. Hence any discrepancy in income distribution can be said to correspond to labor markets, despite some other income sources exist like interest, dividend, property income etc. He further mentioned the role of transfers and defined them as comprising one-tenth of all US households' income at that time. Although no formal connection can be made at this point, one would speculate that existence and efficient use of transfers might lead less inequality. In terms of the prevention of earnings inequality, Okun provided some conceptual solutions without empirical evidence. Decreasing nepotism as well as racial and sexual discrimination in work environment is suggested as one solution. Actions of legislators were necessary according to Okun.

Another early study about this field was done by (Kuznets, 1955). He characterized the long term changes in personal distribution of income. He made some specifications to narrow down the definition of income and inequality. For instance, the concept of distribution should cover all groups of country (not only upper tail or lower tail segments) or income definition should be national income in a country (US in that study). One striking trend data presented by Kuznets is that, in UK share of top 5% segment declined from 46% in 1880 to 24% in 1947. Such a restoration of income equality was also observed in US such that from 1929 to 1950s, share of bottom 20% segment on country income had shown an upper trend. This decline in inequality is found to be correlated with significant rises in real income per capita. One important proposition of his work is that as technology and economic performance rises to higher levels, income is less subject to transient disturbances. Apart from this piece of his work, Kuznets' contribution to income discrepancies topic is a tool called "Kuznets Curve". According to this concept, when an economy develops, market forces initially increases inequality but eventually decreases it. This transition period is explained through industrialization phase. If an economy moves from agricultural structure to industry-focused structure, then an internal migration is observed. During early times, labor force in industries would experience slower wage rise and probably agriculture workers would experience wage decreases that all are likely to result inequality. But as transition is completed benefits of rapid-growth and rising welfare will be observed that is likely to decrease inequality. Illustration of Koznets curve is in Exhibit 2.

Banerjee and Duflo (2003) on the other hand objected the linear relation assumption between growth and inequality in a cross-country data set. Using non-parametric methods, they showed that growth rate is an inverted U-shaped function of net changes in inequality. They also identified that movements in the inequality are related to growth reductions in the next period. Authors have clarified that estimated relationship is robust to variations in control variables and estimation methods. This paper is critical in the sense that standard procedure of assuming simple linear relation between inequality and subsequent growth was changed to a non-linear pattern. To apply the data set of OECD companies, authors used two model specifications. Perotti (1996) and Barro (2000) specifications include different control variables such as PPP, education, GDP, government consumption, rule of law, fertility etc.

Xavier Sala-i-Martin (2002) has published a paper for National Bureau of Economic Research, discovering the trend of inequality around the world for the period between 1970 and 1998. This study is very rich in terms of the use of varied measures of inequality that we will define in upcoming sections. At first glance, despite all measures showed a recovery of inequality for the world, Martin specified that if Africa does not have growing prospects, then inequality would rise again. When we look at the current data, his estimation at that time about the possible divergence of Asian and OECD countries from other part of the world in terms of income generation (of course in the case of continuation of growth prospects for OECD countries and Asian tigers) has been realized. The across-country study conducted in this paper is widely affected by size issues of China. From their analysis, they found that approximated Gaussian density function for income distribution shifted to the right (world became richer), poverty rates that they composed declined etc. However, their most striking finding is that most income inequalities can be fully accounted for by the decline in across-country inequalities.

Furthermore, authors argued that when China's convergence to rich countries process is completed, then income inequality will be increased again because of divergence from African countries effect.

In another study, Andrew Berg and Jonathan Ostry (2011) who work as researchers at IMF contradicted the Okun's traditional view of trade-off between equality and efficiency of economy. Okun's main argument was that searching for inequality will make economy less efficient due to the loss of some assets during redistribution process and decreasing incentive to invest and grow. However, Berg and Ostry (2011) found that equality appears to be an important ingredient in promoting and sustaining economic growth. Their argument includes some observations such that widening inequality is characterized by huge borrowing for individuals, financial sector booming, sometimes huge financial crisis. They used Gini coefficient to measure inequality. They looked at whether factors such as institutions, education, health, macroeconomic instability, public debt and trade openness influence the likelihood that a growth spell will end or not. The result was a statistical model of growth duration that relates the expected length of a growth episode to several of these variables. At the end of study, number of variables are found to be important and associated with longer growth spells. These variables are income distribution, political institutions and trade openness.

Just for the sake of content, we examined following paper too. Bourguignon (1979) studied the decomposability nature of some inequality measures. A decomposable measure is defined as a measure such that the total inequality of a population can be disaggregated into a weighted average of same phenomenon existing within subgroups of population and inequality that is observed between them. According to the study, only zero-homogeneous income weighted decomposable measure is Theil's coefficient and the only zero-homogeneous population weighted decomposable measure is the logarithm of the arithmetic mean over the geometric mean.

To form a model which describes the factors influencing income inequality, we extended our literature review to studies aimed to identify possible candidates for those factors. In literature different factors has been identified in different countries like for Mexico; Campos, Esquivel and Lustig (2014) found that income inequality first increased in Mexico from 1989-1994 and then decreased from 1994-2010, They used different market factors like demand and supply of labor (skill wise), some institutional factors like minimum wage rate, unionization and cash transfers. Institutional factors and labor demand were the main cause of increase in inequality from 1989-1994 while from 1994-2006 inequality decreased due to changes in supply and, to a lesser extent, in demand. Government transfers also played a significant role in decreasing inequality after 2000. They also found that inequality declined due to a decline in non-labor income inequality.

Li, Squire and Zou (1998) found that a measure of civil liberties, the initial level of secondary schooling, a measure of financial depth and the initial distribution of land are important determinants of income inequality. Gupta, Davoodi and Terme (2002) found that if there is more corruption in a country it will increases income inequality as well as poverty. They also showed that if corruption increases by one standard deviation it will increases the Gini coefficient of income inequality by almost 11 points and income growth of the poor by almost 5 percentage points per year. They also found that if there are such policies in a country which help in reduction of corruption are also helpful in reduction of income inequality and poverty there.

Xie and Zhou (2014) conducted a study in China and they found that income inequality has been increasing in China since last three decades and it is at its highest level in 2010 they found that main reasons of inequality in china are due to regional disparities and the rural-urban gap, means this gap is due to large regional variation in country as well as there is a large gap between rural and urban residents while comparing their results with US they said that these factors are not important in US but in US factors like personal and family income level and race are important determinants.

Section 2: Inequality Measures

De Maio's study (2007) summarizes all of the contemporary methods used to measure inequality both in academia and practice. Firstly, Gini coefficient is most popular one. It's derived from Lorenz curve. Exhibit 3 shows composition of Lorenz curve. This curve indicates the percentage of total income earned by cumulative percentage of the population. Considering a hypothetical perfect society, poorest 50% of the society would obtain 50% of total income and 45 degree line will be perfect equality line. In a society with income inequality, let's say, poorest 50% of the population would obtain 20% of total income. This Lorenz curve is used to derive Gini coefficient. This statistic is equal to the size of the area between Lorenz curve and 45 degree line of equality divided by the total area under 45 degree line of equality, in Exhibit 3. The Gini coefficient can be represented as between 0 and 1 or over percentages. A coefficient of 0 reflects perfect equal society while a value of 1 for the coefficient reflects perfect unequal society in terms of income equality. One weakness of Gini coefficient is that it is incapable of differentiating different kinds of inequalities. For instance, Lorenz curves may intersect with each other showing different income distribution. Nevertheless, we may have ended up with similar Gini coefficients. This puts limitation in comparison of Gini coefficients.

Secondly, another measure called Atkinson Index allows for varying sensitivity of inequalities in different parts of the income distribution. The rationale behind this measure is a solution to incapability of Gini

to give different parts of income distribution varying weights. This index has a sensitivity parameter ε which varies from 0 (researcher is indifferent for the nature of income distribution) to 1 (at which researcher is focused on the income position of the very lowest income group). This measure is proposed as a way to incorporate concept of social justice into the analysis. In practice ε value of 0.5, 1, 1.5 etc. are used. An intuitive explanation of this index is as follows: Atkinson index values can be used to calculate the proportion of total income is required to achieve an equal level of social welfare as at present if incomes were perfectly distributed. For example, an Atkinson index value of 0.20 suggests that we could achieve the same level of social welfare with only 1–0.20=80% of income. The theoretical range of Atkinson values is 0 to 1, with 0 being a situation of equal distribution.

Thirdly, coefficient of variation (CV) is also used. It's calculated by dividing the standard deviation of the income distribution by its arithmetic average. Highly equal distributions would have smaller variances and smaller standard deviations as such CV will be smaller. One weakness of CV is that it does not have particular upper bound as Gini coefficient. Moreover, two ingredient of the statistic which are mean and standard deviation are likely to be affected by outlier (high or low) income values. Without an approximation to normal distribution it's not a good method. Fourth measure is decile ratios. The calculation is implemented by taking, for instance, the income earned by the top 10% of households and dividing that by the income earned by the poorest 10% of households. Fifth measure is "Generalized Entropy" index. This one also has a sensitivity parameter α that varies in the weight given to inequalities in different parts of the income spectrum. The more positive α is, the more sensitive GE(α) is to inequalities at the top of the distribution. The value of 0 represents being a state of equal distribution while values that are greater than 0 represents income inequality. One striking feature of GE is that GE is decomposable. It can be broken down to population subgroups. This makes it possible to analyze between and within area effects. More specifically, the mean log deviation of income measure is functionally equivalent to the GE(0) index and Theil's entropy measure is equivalent to the GE(2) index. Other methodologies are "Kakwani progressivity index", "proportion of total income earned", "Robin Hood index" and "Sen poverty measure".

Section 3: Current Trend

3.1 Gini Values for OECD Countries

As we determined to investigate individual income distribution and to use Gini as methodology, looking at current situation with these considerations is promising. OECD income distribution database specifies Gini coefficient between 1996 and 2011 for some countries[1]. Exhibit 4 shows the trend of Gini for OECD countries for this period. It seems like there is an upward trend in Gini coefficient for OECD average so that income distribution became uneven during this study horizon. Apart from that OECD's latest "Income Inequality Update" study specifies lots of information about this issue. Exhibit 5 shows the Gini coefficients for G20 countries over a time horizon between 2007 and 2011. It seem that as of 2011, Chile (0.503), Mexico (0.482), Turkey (0.412) and US (0.389) are far more problematic countries in terms of income inequality. Best performing countries on the other hand are Norway (0.250), Iceland (0.251), Denmark (0.253), Czech Republic (0.256) and Finland (0.261). This cross-section comparison can be supported by a timewise examination. Exhibit 6 indicates percentage point changes in the Gini coefficient from 2007 to 2011. From the data, Spain, Ireland and Greece had experienced largest worsening in income equality in this 4 years period.

Another comparison can be made with this country group through poverty rate. How OECD defines poverty rate is as follows[2]. A concept called relative income poverty is measured by poverty rate and poverty gap. The poverty rate is the ratio of the number of people who fall below the poverty line and the total population; the poverty line is here taken as half the median household income. The concept of income in this and above analysis is defined as households disposable income including earnings, self-employment, capital income, government transfers etc. Exhibit 7 indicates poverty rates of OECD countries. As of 2011, countries in the sample with highest poverty rate are Mexico (21.4), Israel (20.9), Turkey (19.2), Chile (17.8). On the other hand, countries with lowest poverty rates are Czech Republic and Iceland (5.9), Denmark (6.0), Finland (6.6), Norway (7.7). In timewise comparison, Exhibit 8 shows the percentage point changes in relative poverty rate and again Spain, Ireland, Greece are getting poor at higher speed. One remark here is that since some data for Turkey in 2007 is not available, percentage growth in poverty rate and Gini between 2007 and 2011 can not be computed for Turkey.

3.2 Turkey Case

As we observed from above OECD data, Turkey has 3rd highest Gini coefficient and has 3rd highest poverty rate

[1] http://www.oecd.org/els/soc/income-distribution-database.htm
[2]http://www.oecd-ilibrary.org/sites/factbook-2010-en/11/02/02/index.html?itemId=/content/chapter/factbook-2010-89-en

among all OECD countries. These results indicate that Turkey has a problematic stance in terms of income inequality. In terms of poverty rate Turkey is experiencing an increase. Furthermore, this time-wise analysis for Turkey can be expanded up to 2013 by a data from Turkish Statistical Institute. Exhibit 9 shows the trend of Gini coefficient for Turkey. This data proves that despite a worse position among industrialized and developing countries in terms of income inequality, Turkey is getting better. Three specific comments should be made about Turkey at this point. From one perspective, we obtained regional Gini data from TUIK and made following analysis. Exhibit 10 shows that there are regional differences in terms of income inequality and pattern is very consistent. Apart from this, Istanbul has high inequality. Mediterranean and Aegean regions have started to experience inequality during recent years. Second comment is somewhat related to one factor that might increase inequality. Exhibit 11 includes tax burden on employment. Despite current improvement, Turkey is still above OECD average[1]. More taxes on employment will put downward pressure on wages hence that can lead to income discrepancies among industries or working fields. Third consideration is that limitations put by employment protection legislation on part time job is very high in Turkey. Exhibit 12 includes the data. Turkey has even highest limitations in this area. Part time jobs are particulary important in the sense that it contributes the flexibility of employment market and enhances some parties who are out of labor force but want to work. Decrease in this limitation may bring more smooth distribution of income towards especially women, handicapped people and even some student groups.

One additional comment could be related to other indirect measures of inequality. Exhibit 13 provides the tendencies of GDP per capita index and real minimum wage index since 1978 till today[2]. Widening and fluctuating gap between per capita GDP and real minimum wage indicates that despite Turkey has been prospered, the workers whose likelihood depends on minimum wage did not take enough share from it. Gap between these two measures especially got worse during 1980s and one explanation is that with the abolishment of import substitution policy, foreign goods came to Turkey. It is safe to assume that majority of those goods and services had higher quality than their domestic counterparts. With declining sales, market share and profitability of domestic firms, they had to cut operational expenses mainly labor. This could be the main reason behind sloppy growth and even no growth of real minimum wage.

3.3 Pakistan Case

Anwar (2005) provides details about changes in Gini coefficient across time in both rural and urban areas of Pakistan, Gini coefficient was observed to be higher in urban areas as compared to rural areas. Main reason behind this can be that urban population is more diversified in terms of skills, education, and union membership etc. as compared to population of rural areas. Exhibit 14 tells us about the variation of Gini coefficient in Pakistan across time. Exhibit 15 shows the share in income in various groups across time in Pakistan as we can see that there is economically significant difference in income between lowest 20% and richest 20% of population while middle 60% has almost same of less income than middle 60% of population. Kemal (2006) found four main factors that govern personal income distribution and these factors are:

- Distribution of assets (56% of land was owned by 14% of population).
- Functional income distribution (highest value of Gini was 0.299 was among skilled labor, while low values of Gini coefficient was may be to most people who are government employees).
- Transfers from other households, government and rest of the world.
- Tax and expenditure structure of the government.

Furthermore, four major ways of doing public expenditures were identified that effect income distribution patterns:

- Employment creation.
- Basic infrastructure needed by poor farmers, micro entrepreneurs, and labor-intensive manufacturers.
- Primary education, basic health care, safe water and sanitation.
- Cash and food transfers to reduce the vulnerability of the marginalized segments of the society.

There some suggested ways to reduce income inequality, especially in Pakistan as possible candidates as follows: Employment, Generation Small and Medium Enterprises, Supportive Infrastructure, Agriculture development (R&D etc.), Fisheries, Proper Land Distribution, Housing Financing, Improving governance, Investing in human capital, Rural sector development, Social Protection, Human Resource Development, Access to Justice etc.

Section 4: Data, Model and Results

From all of these previous investigations, we intuitively identified the factors that could be correlated with income inequality. Especially, from literature review, current trend and country-specific analysis; identified possible covariates are GDP, transfers, minimum wage, financial depth, trade openness, debt, PPP, tax, gender

[1] https://www.hazine.gov.tr/File/?path=ROOT%2f1%2fDocuments%2fSayfalar%2fEkonomi_Sunumu.pdf
[2] http://www.disk.org.tr/wp-content/uploads/2014/12/gorsel2.jpg

wage gap and corruption. By benefiting contemporary data from OECD[1], we planned to construct a basic empirical model to determine the possible impact of all these variables. Our choice of sample is shaped by the availability of data. First of all Gini coefficient is chosen as dependent variable. From two OECD database, we have found that when we combine 2011 and 2012 values of Gini for countries we can get a solid sample size excluding Belgium, Japan and Russia which do not have Gini values despite combined values of 2011 and 2012. Hence other data for regressors are also taken form 2011 or 2012 values, whichever is available. After constructing Gini coefficient values of OECD and some EU countries as dependent variable, we have specified following regressors which are all related to previously found factors influencing income inequality:

Regressors	Abbreviation	Explanation
GDP per capita	gdp	US$, current prices, 2012 values
Labor force participation rate	laborrate	Labor force divided by total working age population, 2011 values
Central gov't debt	debt	Gov't debt as % of GDP, 2011 values
Public social expenditure	transfer	Sort of transfer, as % of GDP, 2011 values
Marginal and effective income tax	taxrate	Average income tax, 2011 values, for single person
Inflows of foreign population	migration	By nationality, migration destination
Trade openness	export	Goods export, 2011 values, million US $
Depth of financial system	finassets	Financial assets of institutional investors, million US $, 2011

Hence our model comes out to be as follows:

$$Gini = \beta 0 + \beta 1 * DEBT + \beta 2 * EXPORT + \beta 4 * GDP + \beta 5 * LABORRATE + \beta 6 * MIGRATION + \beta 7 * TAXRATE + \beta 8 * TRANSFER + \varepsilon$$

Our sample size is consisted of 32 developed and developing OECD and EU countries for which the respective data is extracted from OECD database. By using Eviews (you can find Eviews output at Appendix part), we have made OLS estimation for these dependent and independent variables. This estimation yielded interesting results. Firstly, model is jointly statistically significant as we can reject the H0 of all coefficient estimations are simultaneously equal to zero at 95% traditional confidence interval with this level of low p-value of F-statistic. Adjusted R-square is 53.83% which states that almost 54% of variation in Gini coefficient (dependent variable) is captured by variation in these regressors. However, when we look at the individual significance of coefficient estimates we see that (at 5% alpha value) only laborrate and taxrate regressors can reject the H0 of coefficient being equal to 0 (laborrate and taxrate are statistically significant as their p-value are either lower than or very close to 0.05).

Variable	DEBT	EXPORT	FINASSETS	GDP	LABORRATE	MIGRATION	TAX RATE	TRANSFER	CONSTANT TERM
Coeficient	0.000125	4.97E-09	2.80E-10	-7.15E-07	-0.002490	6.60E-05	-0.004253	-0.001272	0.640859
Significance					*		*		

"*" represents the significance of variable at 0.05 significance level

This diagnosis resembles to existence of multicollinearity. We calculated "Variance Inflation Factors" (see Eviews output part in Appendix) to see which regressors are likely sources of multicollinearity. The rule of thumb we use here is that whenever VIF of a regressor exceeds 20 then it's a source of multicollinearity. Labor rate, transfer and tax rate variables are found to be correlated with this logic. By excluding laborrate and transfer, we made another OLS estimation with remaining regressors. This time, gdp and taxrate become significant but adjusted R-square of specification decreased to 47.3%. We have tried another specification with labor rate, tax rate, gdp and transfer as regressors. Output of OLS estimation can be again seen in Appendix part. This time adjusted R-square comes out to be 48.8%. Here tax rate is again significant at 0.05 alpha, but labor rate is only significant at 0.10 alpha value. Other regressors are still not significant, whereas model is jointly significant. Our last specification is using only so far found significant variables which are labor rate and tax rate. In this time, we proved that the income inequality (which we measured by Gini coefficient) can be explained by labor rate (labor force participation rate) and tax rate (average income tax rate) variables. The estimated equation provided below showed that income inequality is inversely related to both labor force participation rate and average income tax rate:

Substituted Coefficients:

==========

GINI = -0.00298342308363*LABORRATE - 0.00485069965847*TAXRATE + 0.657141713112

In this analysis, we explicitly assumed that, the relation between these labor rate and tax rate variables have linear relation with Gini. However, one alternative could be non-linear such as quadratic relation. By adding squared version of tax rate and labor rate to the model specification we can test this hypothesis. With such specification when we run the model, we see that for laborrate quadratic relation assumption is not valid as

[1] http://stats.oecd.org/

coefficient for that is not significant. On the other hand for taxrate variable coefficient is significant which shows quadratic convex relation as coefficient is positive. Incremental positive impact of taxrate on decreasing Gini value (inequality) is increasing.

Substituted Coefficients:

==========

GINI = -0.0212245861543*LABORRATE - 0.0161500851734*TAXRATE + 0.000126629111395*LABORRATE^2 + 0.000234498339544*TAXRATE^2 + 1.42959390263

Section 5: Policy Implications and Conclusion

As we know that income inequality is a common phenomenon which exist in every country, although it is impossible to get a Gini coefficient of zero but there should be such policies in a country that should help to decrease Gini coefficient to a minimum level. As results from above empirical studies show that labor participation rate and tax rate systems are main determinants of income inequality but the sample used is restricted to limited countries, so we can not apply these results to all countries. However many other studies also show that these two variables significantly determine Gini coefficient. Denmark is one of the countries which have highest tax rates and it is also one of the countries which minimum value of Gini coefficient. Literature review part of this report also reveals that factors are not same for every country. Like for china and U.S factors are totally different. These factors in different countries depend upon their geographical location, infrastructure status, political and judicial system, law and order situations etc. So, it will be better for different countries to develop policies according to their own situations.

APPENDIX
EXHIBITS

Exhibit 1

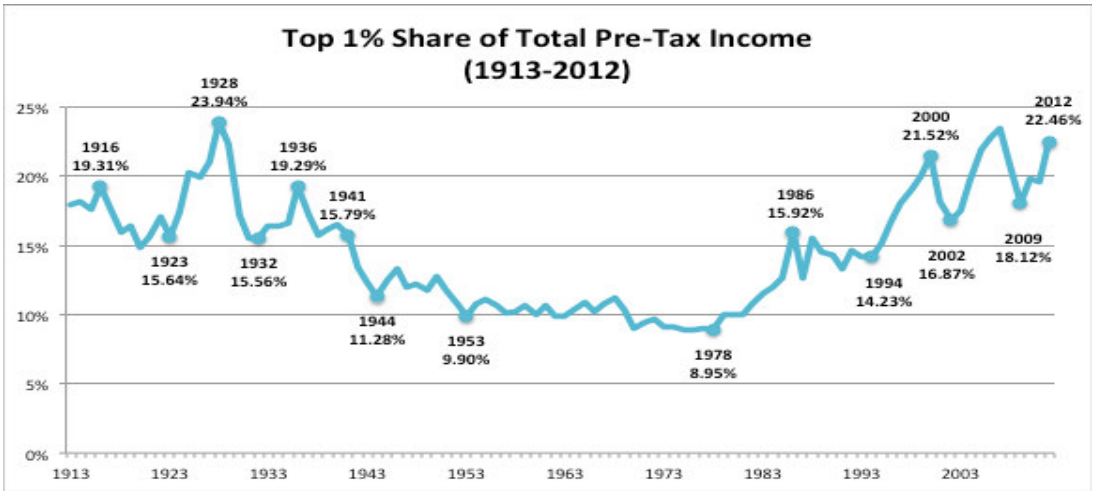


Exhibit 2

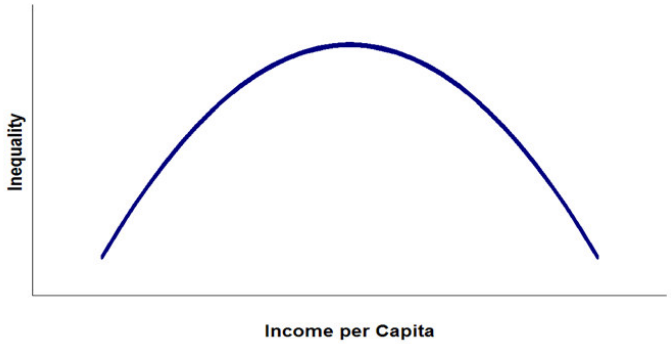


Exhibit 3

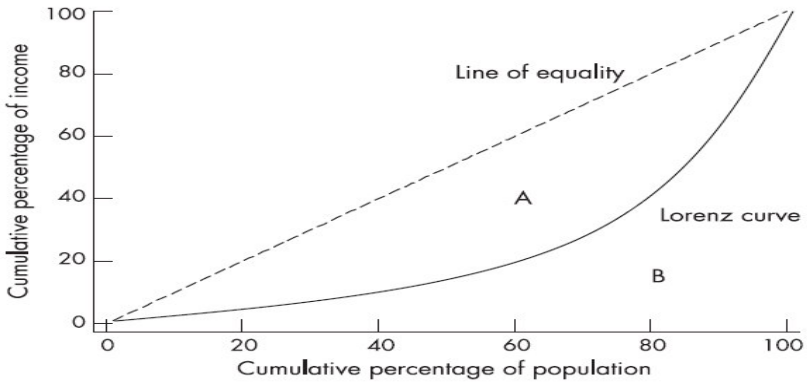


Exhibit 4

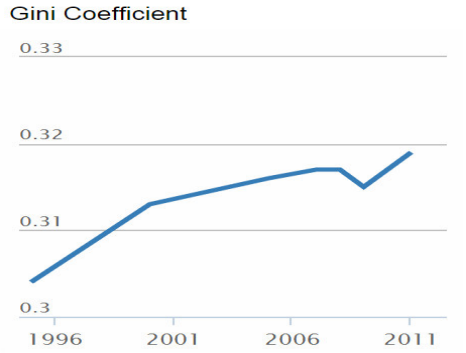


Exhibit 5

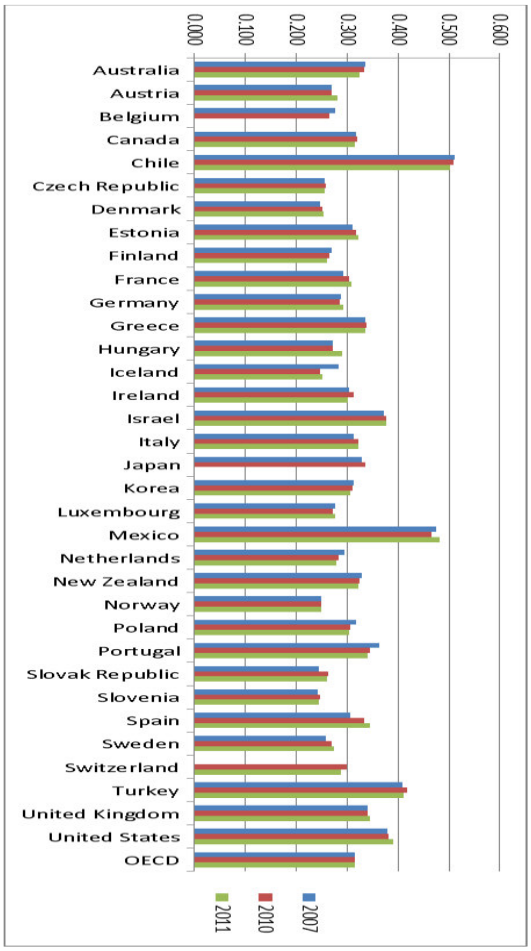


Exhibit 6

Percentage point changes in the Gini coefficient of household market and disposable incomes between 2007 and 2011

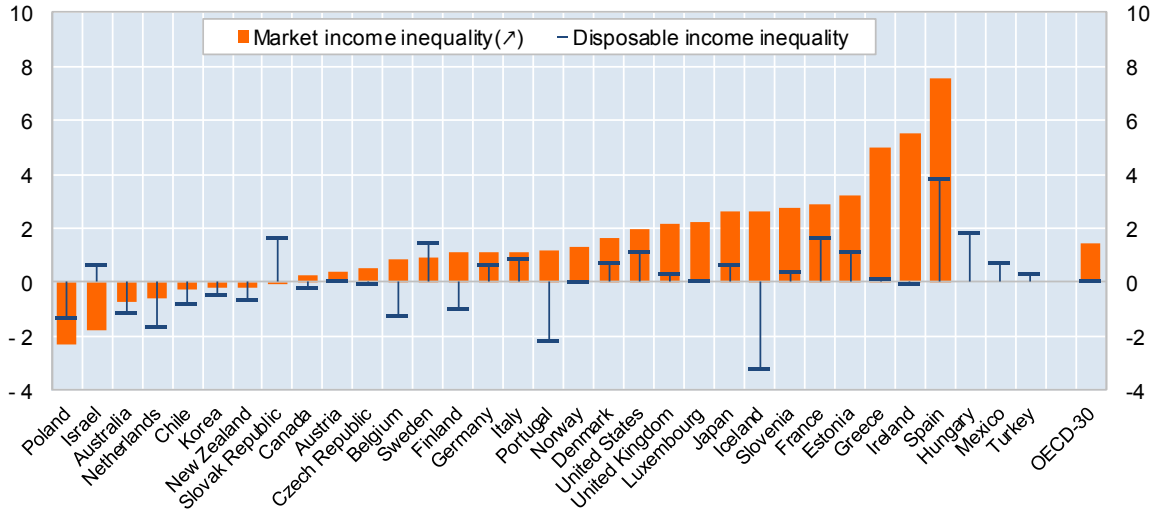


Exhibit 7

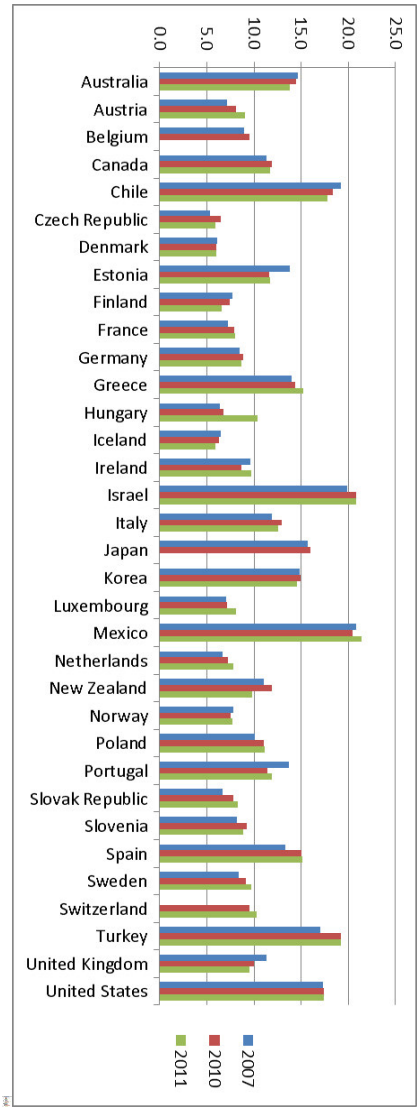


Exhibit 8

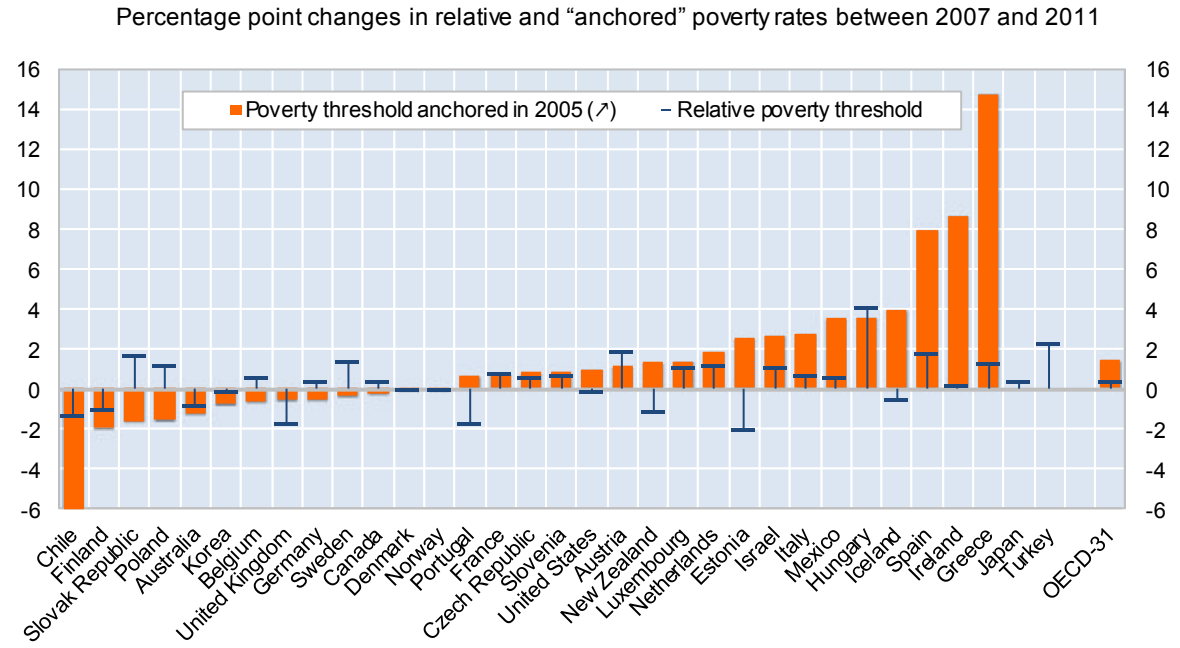


Exhibit 9

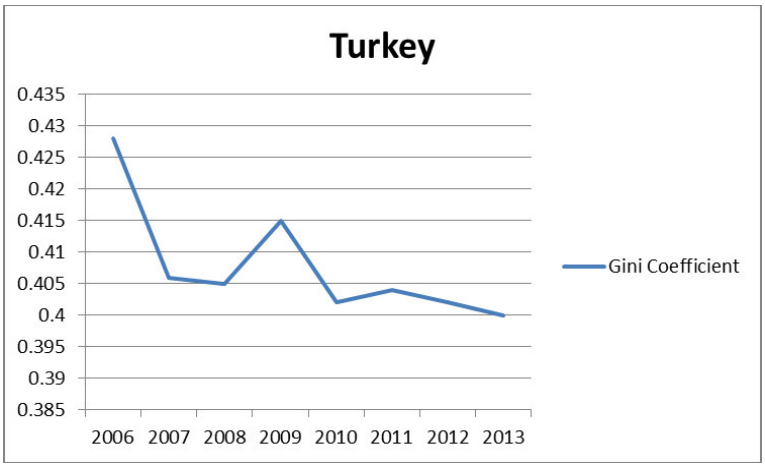


Exhibit 10

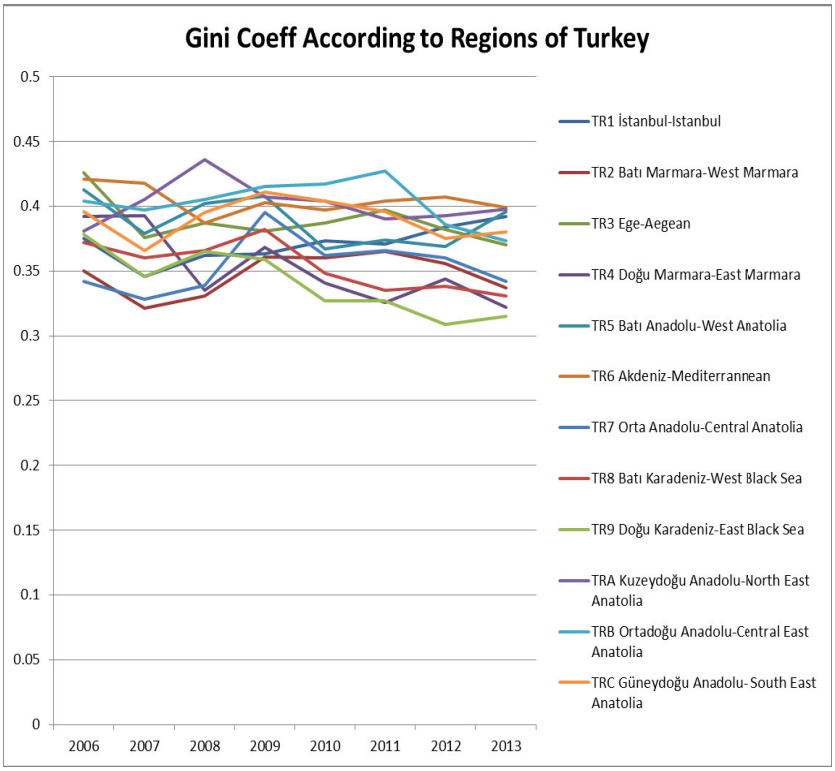


Exhibit 11

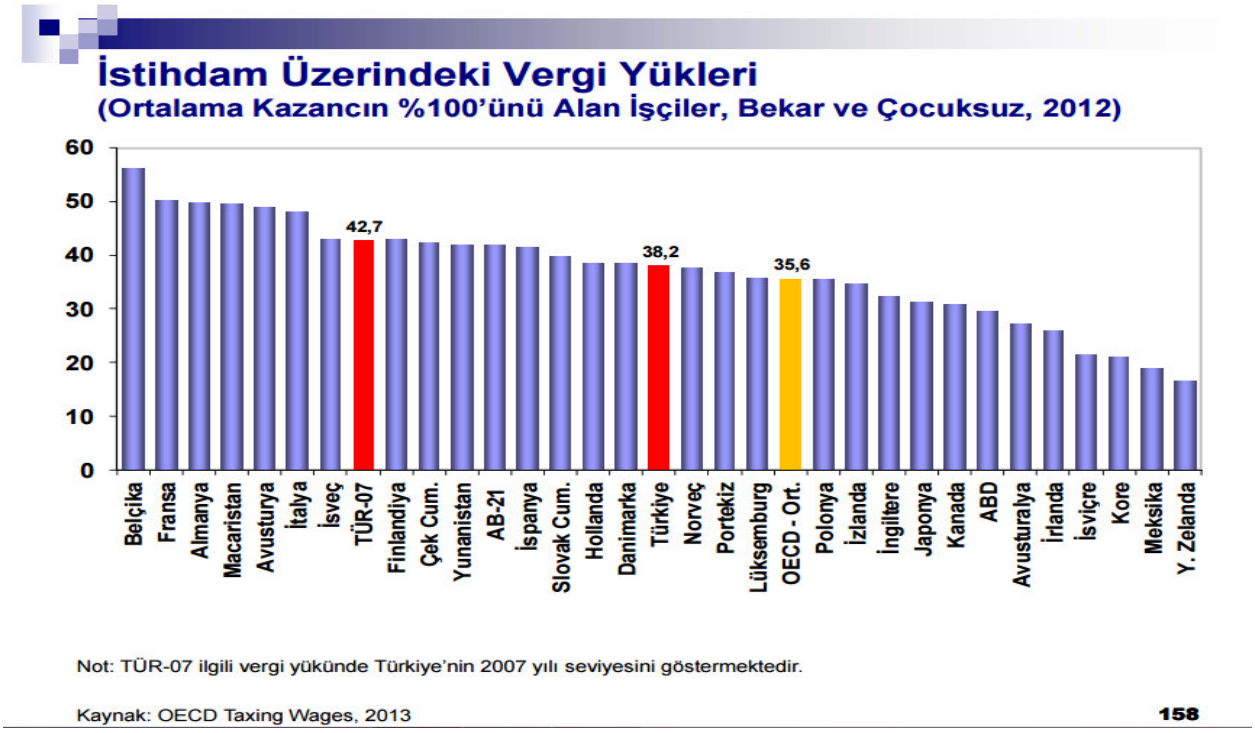


Exhibit 12

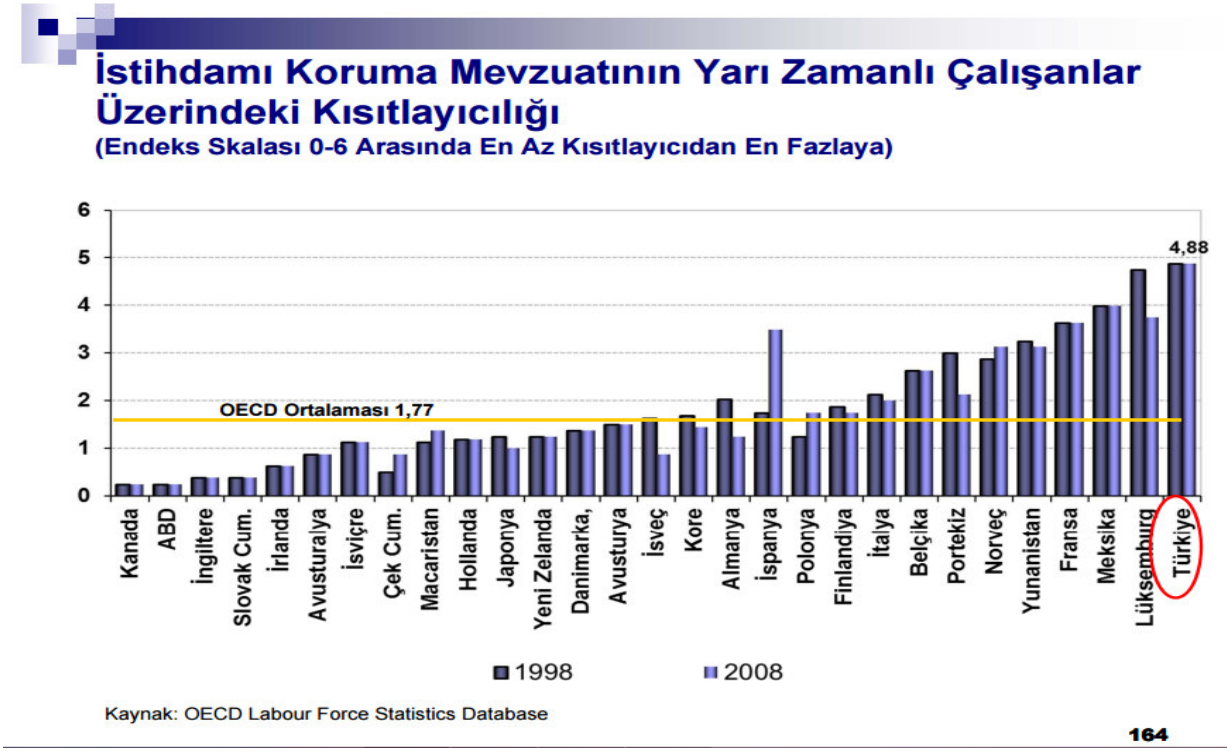
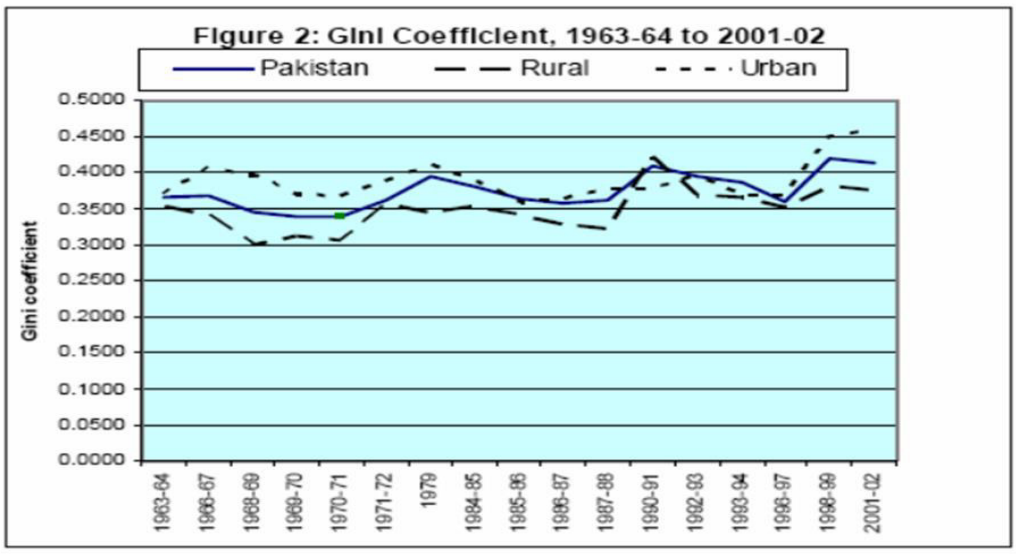


Exhibit 13

Exhibit 14



Source: Anwar (2005)

Exhibit 15

Table 2: Shares in Income of various groups: Pakistan

	Poorest 20%	Middle 60%	Richest 20%
1963-64	7.28	48.29	44.42
1966-67	7.36	48.10	44.54
1968-69	7.81	49.42	42.77
1969-70	7.91	49.87	42.23
1970-71	8.04	49.74	42.22
1971-72	7.79	47.94	44.27
1979	7.19	45.71	47.11
1984-85	7.10	47.33	45.57
1985-86	7.41	48.44	44.16
1986-87	7.67	48.42	43.91
1987-88	7.66	48.17	44.16
1990-91	6.07	46.40	47.53
1992-93	6.59	46.97	46.44
1993-94	6.57	47.75	45.69
1996-97	7.11	49.38	43.51
1998-99	6.57	44.76	48.67
2001-02	6.66	45.26	48.08

EVIEWS OUTPUT

Estimation Equation:

==========

GINI = C(1)*DEBT + C(2)*EXPORT + C(3)*FINASSETS + C(4)*GDP + C(5)*LABORRATE + C(6)*MIGRATION + C(7)*TAXRATE + C(8)*TRANSFER + C(9)

Dependent Variable: GINI
Method: Least Squares
Date: 05/10/15 Time: 14:16
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.000125	0.000307	0.408094	0.6870
EXPORT	4.97E-09	5.75E-08	0.086433	0.9319
FINASSETS	2.80E-10	1.28E-09	0.219007	0.8286
GDP	-7.15E-07	6.30E-07	-1.134492	0.2683
LABORRATE	-0.002490	0.001238	-2.010992	0.0562
MIGRATION	6.60E-05	9.58E-05	0.688949	0.4977
TAXRATE	-0.004253	0.001518	-2.801119	0.0101
TRANSFER	-0.001272	0.002132	-0.596579	0.5566
C	0.640859	0.087505	7.323676	0.0000

R-squared	0.657456	Mean dependent var	0.316347
Adjusted R-squared	0.538310	S.D. dependent var	0.061907
S.E. of regression	0.042065	Akaike info criterion	-3.266956
Sum squared resid	0.040697	Schwarz criterion	-2.854718
Log likelihood	61.27130	Hannan-Quinn criter.	-3.130311
F-statistic	5.518071	Durbin-Watson stat	2.416116
Prob(F-statistic)	0.000587		

Variance Inflation Factors
Date: 05/10/15 Time: 14:23
Sample: 1 32
Included observations: 32

Variable	Coefficient Variance	Uncentered VIF	Centered VIF
DEBT	9.45E-08	5.790494	1.567685
EXPORT	3.30E-15	13.00405	8.051790
FINASSETS	1.63E-18	2.281793	2.163651
GDP	3.97E-13	11.66156	1.577761
LABORRATE	1.53E-06	153.4430	1.393062
MIGRATION	9.17E-09	13.68818	9.563846
TAXRATE	2.31E-06	27.86960	2.419375
TRANSFER	4.54E-06	39.53061	2.818118
C	0.007657	138.4780	NA

Estimation Equation:
==========
GINI = C(1)*DEBT + C(2)*EXPORT + C(3)*FINASSETS + C(4)*GDP + C(5)*MIGRATION + C(6)*TAXRATE + C(7)

Dependent Variable: GINI
Method: Least Squares
Date: 05/10/15 Time: 14:27
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DEBT	0.000143	0.000301	0.474128	0.6395
EXPORT	2.81E-08	6.02E-08	0.467012	0.6445
FINASSETS	6.81E-10	1.35E-09	0.505234	0.6178
GDP	-1.26E-06	6.22E-07	-2.026252	0.0535
MIGRATION	1.68E-05	9.97E-05	0.168662	0.8674
TAXRATE	-0.004905	0.001244	-3.943534	0.0006
C	0.465548	0.032168	14.47223	0.0000

R-squared	0.575081	Mean dependent var	0.316347
Adjusted R-squared	0.473100	S.D. dependent var	0.061907
S.E. of regression	0.044937	Akaike info criterion	-3.176459
Sum squared resid	0.050484	Schwarz criterion	-2.855829
Log likelihood	57.82334	Hannan-Quinn criter.	-3.070179
F-statistic	5.639121	Durbin-Watson stat	2.408633
Prob(F-statistic)	0.000815		

Estimation Equation:
==========
GINI = C(1)*GDP + C(2)*LABORRATE + C(3)*TAXRATE + C(4)*TRANSFER + C(5)

Dependent Variable: GINI
Method: Least Squares
Date: 05/10/15 Time: 14:32
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP	-6.11E-07	6.02E-07	-1.013851	0.3197
LABORRATE	-0.002260	0.001251	-1.806454	0.0820
TAXRATE	-0.003839	0.001517	-2.530131	0.0175
TRANSFER	-0.001355	0.002021	-0.670371	0.5083
C	0.630091	0.086936	7.247778	0.0000

R-squared	0.554125	Mean dependent var	0.316347
Adjusted R-squared	0.488070	S.D. dependent var	0.061907
S.E. of regression	0.044294	Akaike info criterion	-3.253319
Sum squared resid	0.052974	Schwarz criterion	-3.024298
Log likelihood	57.05311	Hannan-Quinn criter.	-3.177405
F-statistic	8.388781	Durbin-Watson stat	1.969460
Prob(F-statistic)	0.000156		

Estimation Equation:
==========
GINI = C(1)*LABORRATE + C(2)*TAXRATE + C(3)

Dependent Variable: GINI
Method: Least Squares
Date: 05/10/15 Time: 14:36
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LABORRATE	-0.002983	0.001101	-2.709028	0.0112
TAXRATE	-0.004851	0.001025	-4.733054	0.0001
C	0.657142	0.083431	7.876430	0.0000

R-squared	0.528258	Mean dependent var	0.316347
Adjusted R-squared	0.495725	S.D. dependent var	0.061907
S.E. of regression	0.043962	Akaike info criterion	-3.321926
Sum squared resid	0.056047	Schwarz criterion	-3.184514
Log likelihood	56.15082	Hannan-Quinn criter.	-3.276378
F-statistic	16.23717	Durbin-Watson stat	1.977742
Prob(F-statistic)	0.000019		

Estimation Equation:
==========
GINI = C(1)*LABORRATE + C(2)*TAXRATE + C(3)*LABORRATE^2 + C(4)*TAXRATE^2 + C(5)

Dependent Variable: GINI
Method: Least Squares
Date: 05/11/15 Time: 22:30
Sample: 1 32
Included observations: 32

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LABORRATE	-0.021225	0.015433	-1.375236	0.1804
TAXRATE	-0.016150	0.004462	-3.619404	0.0012
LABORRATE^2	0.000127	0.000106	1.195941	0.2421
TAXRATE^2	0.000234	9.14E-05	2.566174	0.0161
C	1.429594	0.568911	2.512860	0.0183

R-squared	0.630310	Mean dependent var	0.316347
Adjusted R-squared	0.575541	S.D. dependent var	0.061907
S.E. of regression	0.040333	Akaike info criterion	-3.440692
Sum squared resid	0.043922	Schwarz criterion	-3.211670
Log likelihood	60.05107	Hannan-Quinn criter.	-3.364778
F-statistic	11.50852	Durbin-Watson stat	1.535091
Prob(F-statistic)	0.000014		

References

Anwar, T. (2005). Long-term changes in income distribution in Pakistan: Evidence based on consistent series of estimates. *CRPRID, Islamabad.(Discussion PaperNo. 3).*

Banerjee, A. V., & Duflo, E. (2003). Inequality and growth: What can the data say? *Journal of economic growth, 8*(3), 267-299.

Berg, A., & Ostry, J. (2011). equality and efficiency. *Finance & Development, 48*(3), 12-15.

Bourguignon, F. (1979). Decomposable income inequality measures.Econometrica. *Journal of the Econometric*

Society, 901-920.

Campos-Vázquez, R., Esquivel, G., & Lustig, N. (2014). The rise and fall of income inequality in Mexico, 1989-2010. *Falling Inequality in Latin America: Policy Changes and Lessons, 140*.

Gupta, S., Davoodi, H., & Alonso-Terme, R. (2002). Does corruption affect income inequality and poverty? *Economics of Governance, 3*(1), 23-45.

Hussain, A., Lal, I., & Mubin, M. (2009). Short run and Long run Dynamics of Macroeconomics Variables and Stock prices: Case Study of KSE (Karachi Stock Exchange). *Kashmir Economic Review*, *18*(1).

Kemal, A. R. (2006). Income Inequalities in Pakistan and a Strategy to Reduce Income Inequalities. *Background Paper for PRSP-II, PRSP Secretariat, Government of Pakistan*.

Kuznets, S. (1955). Economic growth and income inequality. *The American economic review*, 1-28.

Li, H., Squire, H., & Zou, H. F. (1988). Explaining international and intertemporal variations in income inequality. *The Economic Journal, 108*(446), 26-43.

Sala-i-Martin, X. (2002). The disturbing" rise" of global income inequality (No. w8904). *National Bureau of Economic Research*.

Xie, Y., & Zhou, X. (2014). Income inequality in today's China. *Proceedings of the National Academy of Sciences, 111*(19), 6928-6933.

Zubair, M., Burney, A. I., Sarwat, S. S., & Mubin, M. (2014). Macroeconomics Relations between Exchange Rate Instability, Exchange Rate Volatility, Trade and Economic Growth Variables: The Case of Pakistan. *Journal of Economics and Sustainable Development*, *5*(13).