INTEREST AND SOCIAL JUSTICE: THE IMPACT OF REAL INTEREST RATE ON INCOME INEQUALITY

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ABSTRACT

Interest, as its prohibited by Allah(swt), has a remarkable impact on social justice. In this paper, the effect of interest on social justice is analyzed in the context of real interest rate and income inequality. Income inequality is a well-known phenomenon which arises when there is an unequal distribution of assets, income and wealth among society. The unequal distribution of income, generally, leads to the division of society, as the bottom of the society suffers from this division, while the top of the society reaps the benefits of it. Changes in the real interest rate leads to distortions in income equality and thereby social justice. Both low and high interest rates may have an inequalizing impact on income. Hence, the thing that produces the inequalities is not the increasing or decreasing interest; rather it is interest itself.

Keywords: Income inequality, Interest Rate, Social Justice, Islamic Economics.

FAİZ VE SOSYAL ADALET: REEL FAİZ ORANININ GELİR ADALETSİZLİĞİ ÜZERİNDEKİ ETKİSİ

ÖZ

Faizin, Allah(svt) tarafından yasaklandığı üzere, sosyal adalet üzerinde ciddi bir etkisi vardır. Bu çalışmada faizin sosyal adalet üzerindeki etkisi reel faiz oranı ve gelir adaletsizliği bağlamında değerlendirilmeye çalışılacaktır. Gelir adaletsizliği, toplum içerisinde varlıkların, gelirin ve servetin adaletsiz paylaşımı sonucu ortaya çıkan bir durumdur. Adaletsiz gelir dağılımı ise genellikle toplumun bölünmesine yol açar; toplumun alt gelir grupları bu durumdan zarar görürken, üst gelir grupları bu durumdan fayda sağlarlar. Bu çalışmada reel faiz oranındaki değişimlerin gelir adaletsizliğine sebep olarak sosyal adalete zarar verdiği üzerinde durulmaktadır. Hem düşük hem de yüksek faiz oranları gelir adaleti üzerinde bozulmalara sebebiyet vermektedir. Dolayısıyla, gelir adaletsizliklerini üreten artan veya

Anahtar Kavramlar: Gelir Adaletsizliği, Faiz Oranı, Sosyal Adalet, İslam İktisadı

In the name of Allah, The Most Gracious, The Most Merciful

"And what Allah restored to His Messenger from the people of the towns - it is for Allah and for the Messenger and for [his] near relatives and orphans and the [stranded] traveler - so that it will not be a perpetual distribution among the rich from among you. And whatever the Messenger has given you - take; and what he has forbidden you - refrain from. And fear Allah; indeed, Allah is severe in penalty." (59:7)

Justice is an integral component of Islam. The reflection of justice in the social context constitutes one of the outstanding features of Islamic economics. The fundamentals of Islamic economics are Tawhid (Oneness of Allah (swt)) and justice/equilibrium. In the Holy Qur'an, Allah (swt) stated that;

"We have already sent Our messengers with clear evidences and sent down with them the Scripture(Book) and the Balance that the people may maintain [their affairs] in justice. And We sent down iron, wherein is great military might and benefits for the people, and so that Allah may make evident those who support Him and His messengers unseen. Indeed, Allah is Powerful and Exalted in Might." (Qur'an 57:25)

In relation to social justice, by the narration of Ummu'l Mu'mineen Aisha(ra), Rasulullah (saw) states that;

"*The people who came before you were destroyed because whenever a noble person among them stole, they would let him go. But if one who was weak stole, they would carry out the Hadd punishment on him.*" *Then he said:* "*By the One in whose hand is my soul, if Fatimah bint Muhammad were to steal, I would cut off her hand.*" *(Sunan an-Nasa'i, 4906)*[1]

Also in the *Last Sermon,* The Messenger of Allah (saw) states that;

"Allah has forbidden you to take usury (interest), therefore all interest obligations shall henceforth be waived. Your capital is yours to keep. You will neither inflict nor suffer any inequity. Allah has Judged that there shall be no interest and that all the interest due to Abbas ibn 'Abd al-Muttalib (Prophet's uncle) be waived."[2]

Leading Islamic economists Chapra(1992, 1996) and Naqvi(1994) points out the importance of justice in economic and social sub-spaces. Chapra(1996:25) explicitly asserts that "Islamic economics is based on a paradigm which has *socio-economic justice* as its primary objective. This

[1] Classified as *Sahih,* in Sunan an-Nasa'i Vol. 5, Book 46, Hadith 4906
[2] See Al-Bukhari, Hadith 1623, 1626, 6361

objective takes its roots in the belief that human beings are the vicegerents of the One God, Who is the Creator of the Universe and everything in it." Chapra(1992) explains the implications of the principle of justice in economic sense; as all the basic needs of society should be fulfilled, all of the members may have a respectable source of earning, the income and wealth distribution should be equitable, and in line with these objectives economic growth and stability can be attained in a more balanced way. On the other hand, Naqvi(1994) explains the role of Islamic ethical axioms in the individual, social and economic contexts, he acquires the attention on *Tawhid, Equilibrium and Beneficience(al-Adl wa'l Ihsan), Free Will(Ikhtiyar)* and *Responsibility(Fard).* In his classification, *Tawhid* constitutes the *vertical dimension* which links the finite and imperfect institutions with the Perfect Being(swt), while *al-Adl wa'l Ihsan* descibes the *horizontal dimension* by which "the various elements of life be (re-)ordered to produce the best economic dispensation"(Naqvi 1994:28). It also "..provides for a complete description of all the virtues of the basic set of social institutions— legal, political and economic(Naqvi 1994: 27). He also adds that "on the economic plane, the principle desires a first-best configuration of the production, consumption and distribution activities, with the clear understanding that the needs of all the least-privileged members in Muslim society constitute the first charge on the real resources of the society."

Interest and Social Justice in the Context of Income Inequality

Social Justice and Income Inequality

In the light of these viewpoints, social justice is a question of equal opportunities which seeks to establish a fair and just relation between the individual and society. Equitable income and wealth distribution is one of the key indicators of social justice. In that sense income inequality, which denotes a distortion in equality of opportunities, is one of the most remarkable phenomenon which threats the existence and stability of social justice. So, in this paper the impact of interest on social justice will be analyzed in the context of income inequality.

Income inequality refers to the extent to which income is distributed in an uneven manner among a population. Income is not just the money received through pay, but all the money received from employment (wages, salaries, bonuses etc.), investments, such as interest on savings accounts and

dividends from shares of stock, savings, state benefits, pensions (state, personal, company) and rent. When the overall state of income inequality in the world considered, there has been an increasing trend of income inequality throughout the last two decades at world level. Current state of income inequality in the world, in accordance with UNDP, has increased in high income countries by 9 percent and in low and middle income countries by 11 percent in the late of 2000s compared with the early 1990s(UNDP 2013). Also, at regional level, household income inequality increased in the developing world on average, except Africa and Latin America and the Caribbean. The detailed information can be seen below in the Table 1.

Table 1: The percentage change in Gini Index of the world regions from early 1990s to late 2000s.

Region	Number of Countries	Gini Index early 1990s	Gini Index late 2000s	Percentage Change
Africa	26	48	44,4	-7.5%
Arab States	6	36,1	36	-0,3%
A&P	13	35,9	40	11,4%
ECIS	19	33	43,8	32,7%
LAC	20	51,4	48,4	-5,8%
All	84	38,5	41,2	7

Source: Solt (2009).

In addition, when the changes in inequality experienced in different income status groups are analyzed, there is an overall increase in income inequality except the lower-middle class and upper middle class, which stay constant throughout the period between early 1990s and late 2000s, as it can be seen from Table 2.

Table 2: Changes in income status groups and income inequality from early 1990s to late 2000s.

Income Group in the Early 1990s	Change in Income Group by the Late 2000s	No. of countries	Gini Index early 1990s	Gini Index late 2000s	Percantage Change
Low Income	No Change	27	36.4	38.6	6.044%
	Moved to Lower-Middle	6	36.5	41.5	13.699%
Lower-Middle Income	No Change	24	44.5	41.3	-7.191%
	Moved to Upper-Middle	17	39.2	47.1	20.153%
	Moved to High Income	3	32.7	39.5	20.795%
	Moved to Low Income	3	37.5	42.3	12.800%
Upper-Middle Income	No Change	7	54.4	50.3	-7.537%
	Moved to High Income	5	43.7	43.9	0.458%
High Income	No Change	24	41.9	45.7	9.069%

Source: Solt (2009).

Income Inequality and Interest

Interest is one of the most outstanding factors which violates income equality and therefore social justice. As Iqbal(2007) indicates that there are "various manifestations of corruption —the prohibited actions— that distort the socio-economic equilibrium"(Iqbal 2007: 45). Interest constitutes one of them and it is evaluated as zulm/oppression (2:279) which is the converse of justice, as Prophet(pbuh) equated it with "the absolute darkness in the Day of Judgement"3. The declaration of "War from Allah and His Messenger"(2:279) is excessively adequate to understand the degree of this oppression. For comprehending the impacts of interest better, Chapra(2003)4 explains how interest has a distorting impact on need fulfillment, full employment, optimal growth, equitable distribution of income and wealth and economic stability; as he remarks that such an ".. injustice undermines brotherhood and solidarity, accentuates conflict, tensions, and crime, aggravates human problems, and thus leads ultimately to nothing but misery in this world as well as in the Hereafter."

Furthermore, as Siddiqi(2002) states, modern researches have shown that it results in inefficient allocation of society's resources as it contributes to the instability of the system. As interest is a type of unfair gain which guarantees a fixed rate of return with no risk, the burden should be undertaken by entrepreneurs and workers. Thus the value of participation, labor and risk-taking become less meaningful and access to finance of the bottom income groups—by which the income gap may be tighten—cannot be realized, because the wealth and income are more likely to possessed by top income groups. Zaman and Zaman explain this situation; "banning interest should have the effect of allowing for greater access by population to finance, and hence lead to a better income distribution" (Zaman & Zaman 2001:10). Hence, it is inevitable that such a system will produce inequalities, especially the given behavioral foundations of the microeconomic agents in conventional theory which legalizes and even encourage the interest, while positioning it on the normative principles of positivism and secularism.

Moreover, interest provides an unproductive and unfair gain to the asset owners, through which the allocation of resources flows from the ones who deliver their labor to survive and to produce, to the ones who reap the

[3] Sahih Muslim (1955), vol. 4, p. 1996:56, Kitab al-Birr wa al-Silah wa al-Adab, Bab Tahrim al-Zulm, from Jabir ibn Abdullah.

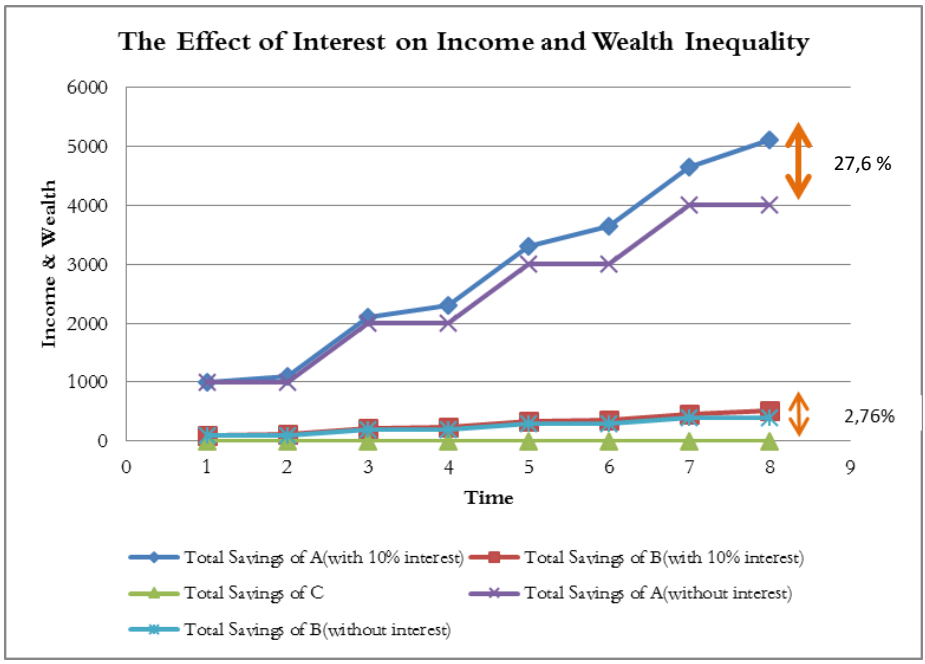
benefits of others' labor. It is a type of zulm by which the wealth and income concentrate on the hands of rich (59:7). Naqvi explains that *zulm* "..denotes a *social disequilibrium* in the sense that the resources of society flow from the poor to rich"(Naqvi 1994:28). To show this situation in a basic model, from the inspirational instance of Zarabozo(2007), assume that individual A saves $1000 per month and takes 10% rate of interest while individual B saves 100$ per month taking 10% rate of interest and individual C cannot save. In four months the income and wealth gap between A, B and C can be widen by 27,6%, compared with the case in which the agents don't deposit their savings in a bank in return for interest. In this model, individual A and B are assumed to not exhibit any altruistic behavior such as infaq. The details can be seen in Table 3 and Figure 1. Also it shouldn't be missed that notwithstanding there seems to be an increase in the wealth of the richer ones in society via interest, it cannot be taken as an increase in a whole sense, as Allah(swt) states that "*And whatever Riba you give so that it may increase in the wealth of the people, it does not increase in the sight of Allah"*(30:39).

Table 3: The Effect of Interest on Income and Wealth Inequality

Interest Rate	**Total Savings of A(with 10% interest)**	**Total Savings of B(with 10% interest)**	**Total Savings of C**	**Total Savings of A(without interest)**	**Total Savings of B(without interest)**	**The Widening Percent of Income Gap**
T1	1000	100	0	1000	100	0,00%
T2(10% interest)	1100	110	0	1000	100	10,00%
T3(Savings + T1)	2100	210	0	2000	200	5,00%
T4(10% interest)	2310	231	0	2000	200	15,50%
T5(Savings + T1)	3310	331	0	3000	300	10,33%
T6(10% interest)	3641	364,1	0	3000	300	21,37%
T7(Savings + T1)	4641	464,1	0	4000	400	16,03%
T8(10% interest)	5105,1	510,51	0	4000	400	27,63%

In this context, the widening income gap means that there is a flow of resources in the economy to the rich ones. Because of the reason that the top income groups getting richer, they would have more power to canalize the production activities. The demand for luxurious and conspicuous consumption would increase and the resources in the economy would be re-allocated at the expense of the poor. As a result, according to Zarabozo(2007), the lesser resources allocated to the goods that the poor demands and the supply of them will reduce and the prices would increase — which exacerbate the poor people's overall economic situation.

Figure 1: The effect of interest on income and wealth inequality



Chapra explains this situation through a metaphor of plebiscite; if each unit of currency represents one vote in the economy, the top income groups would have much more votes compared to the poor ones;

"In the absence of an equitable distribution of income in the economy, allocation of resources produced by the market system may not be in conformity with the wishes of the majority of consumers. It would allow the upper strata of income groups, getting a share of national income significantly more than in proportion to their numerical size, to divert

scarce national resources, by the sheer weight of their votes, into products considered socially less desirable. Therefore, the resultant allocation of resources would also be socially less desirable." (Chapra 1979: 26)

In addition, the role of real interest rate on income inequality has been questioned in the literature of economics. Milanovic(2005) and Stiglitz(2015) has important findings on the subject. The most outstanding is the study of Milanovic(2005) which tries to explain the impact of globalization on income inequality by analyzing different 10% income percentiles. He uses real interest rate as an explanatory variable and concludes that real interest rate is always pro-rich; only top 20% reap the benefits of it while remaining 80%'s income reduces by high real interest rates. Even middle-classes lose when interest rate is high. These findings are parallel with the thesis above.

On the other hand Stiglitz(2015), in his recent study, found out that low rate of interest also leads to an inequalizing effect. He analyzes the relationship between credit creation, monetary policy and inequality by developing a theoretical model and concluded that in the short run, "lowering real interest rate leads to an increase in the net income of capitalists by a certain amount and a reduction of income of workers by a corresponding amount. It is, in effect, a direct transfer from workers to capitalists"(Stiglitz 2015: 22). Moreover, recently the "near-zero level interest" policy of FED is also critized due to its negative externalities on income inequality, as it leads stock prices to be higher—by which the stock owners be more advantegous— and low borrowing costs—by which the large corporations can have an additional capital to boost corporate profits. Consequently, *real interest rate has an inequalizing effect on income, regardless its inequalizing impact stems from either its rise or fall. It does not necessarily be low or high in order to increase the inequality; the problem stems from the system which operates on the basis of interest.*

Thus, the aim of this study is to show the impact of real interest rate on income inequality on a relational basis. So, it is not expected to find out either increasing-decreasing or positive-negative real interest rates have an inequalizing effect on income. Also, it does not try to investigate the channels, through which the income inequality be affected by the real rate of interest. It only concentrates on the distortional effect of real interest rate on income inequality.

Data Collection and Model Specification

This study is conducted to show the impact of real interest rate on income inequality in different country groups. In order to realize this aim, a wide range of countries and variables have been taken into consideration.

The data consist of a balanced panel data covering 77 countries across the world with yearly observations from 2004 - 2011. The panel comprises 362 country-year observations across 12 numeric variables, when the missing values are excluded.

The data are divided into seven different groups in order to conduct a more detailed analysis and to reach more accurate conclusions. These groups comprise World, regional groups —Asia, Sub-Saharan Africa and Central and Latin America— Organization of Islamic Cooperation(OIC), Developing Countries and Developed Countries. The country lists can be seen in Appendix 1-2-3. Also MENA region, with its six countries, has been taken into consideration in some analysis, but due to the number of countries the regression analysis didn't conduct for MENA region.

In addition, much of the data suffers from inconsistency across countries and time, notwithstanding, the data collected from accredited sources. Hence, interpolation method is applied for both dependent and independent variables in some extent. Moreover, for model specifications, the detailed information according to different country groups can be seen in Appendix 4. It includes the Hausman test, LM test and Multicollinearity test.

The Model

The baseline regression model is following;

$$Yi_t = \beta_0 + \beta_1 Inti_t + \beta_2 Growth_{it} + \beta_3 Educ_{it} + \beta_4 logRuralPop_{it} + \varepsilon_{it} \quad ; \quad (2)$$

$\{i = 1,\ldots..,N\}$; $\{t = 1,\ldots\ldots,T\}$

Where ;

Yit is Gini Index and Palma Ratio

Int_{it} is Real Interest Rate,

$Growth_{it}$ is GDP per capita Growth,

$Educ_{it}$ is Secondary School Enrollment Rate

LogRuralPopit is the logarithmic term of Rural Population.

ε_{it} is the error term.

In addition to the baseline model, some explanatory variables are also used as all the dependent and independent variables can be seen with their detailed explanations in Appendix 5. Also the descriptive statistics for dependent variables in terms of country groups can be found in Appendix 6.

Estimation Results

Estimation results are to be evaluated in terms of different regions and country groups, by the light of the their own characteristics. There are seven different countries-groups and the world sample as the analysis will be started by analyzing the Central and Latin America region. However, the results of Asia region and Sub-Saharan Africa regions will not be interpreted due to the insignificant impact of real interest rate variable on income inequality in both regions. The regression results of Asia and Sub-Saharan Africa regions can be seen in Table 4 and Table 5 respectively.

Central & Latin America Region

For Central and Latin America region, the outstanding variables are real interest rate, secondary school enrollment rate and rural population in terms of level of significance. Also the R-squares are within the range of 39,12%-40,64%. The real interest rate has an increasing effect on income inequality—when it is measured by Gini Index. One percent increase in real interest rate may result in 0,034-0,051 increase in income inequaity.

Central and Latin America region has a high mean of Gini Index which is 51,447. It represents that, in the region, there is a high level of inequality. When we analyze the Palma Ratio, the mean is 36,447. These statistics show that the region has the highest inequality mean values compared with

other regions. In such region, the real interest rates may be around zero level as income equality will be influenced positively by such intervention. On the other hand, for both Gini Index and Palma Ratio regressions, secondary school enrollment rate and rural population are significant at the 1 % level of significance. Education has a curative impact on income inequality in that sense, however, the rural population has a detrimental effect on it. The main reason behind this finding may be the population density in the rural units. In average terms, the ratio of rural population to the total population in the region is about 29,52%, which means almost one third of the population in Central and Latin America live in rural units. The increasing impact of it may be stemming from this fact.

Also, for both primary and secondary school enrollment rates are at the higher levels and close to each other in the region, the enrollment in the secondary education may influence income equality in a positive way. In addition, for Palma Ratio, agriculture sector value added and the size of the shadow economy are significant as they worsen the income inequality. The underlying reason of this situation may be linked with the reliance of the region to the agriculture sector. When we think about the impact on population density in rural units in the region with the reliance factor this impact is meaningful.

Organization of Islamic Cooperation (OIC)

In the Organization of Islamic Cooperation countries, for Gini Index, real interest rate, rural population and size of the shadow economy variables are significant. The R-squares change within the range of 36,09% - 48,00%. 20 of the 57 Organization of Islamic Countries are included in this study as seven of them are from Asia, 5 of them from Sub-Saharan Africa, 6 of them from MENA and the remaining two from Europe. However, as it is mentioned above, in these regions the explanatory variables have different impacts. In this country group, real interest rate has an increasing impact on income inequality also. The possible reasons of it may be related to inflation. As it is known, when the interest rates decrease, inflation increases.

This change will influence the bottom more than the top as the income of the bottom not to increase as frequent as prices, and regarding this change their purchasing power will decrease. So, inflation decreases the purchasing power of the bottom relative to the top, whose income increases in parallel with inflation. So, the income gap may widen by this way and income

inequality may increase. In the adverse case, which means interest rates rise and inflation decreases, their relative purchasing power may increase and this may lower the income inequality. OIC countries may experience such scenario. Secondly, the role of savings may step in. An increase in interest rates may increase the people's propensity to save and then subsequently savings may increase. In that case, people who can save the money, may gain by using the money that they have saved through making investments in the future and the income inequality may increase. The impact of rural population has a crucial role for OIC countries in order to reduce income inequality. A one percent increase in rural population leads to a 0,840 – 0,990 points decrease in Gini Index. So, OIC countries may implement particular policies which promote rural development and rural live.

They may tend to give incentives to the agriculture sector and they may make rural units more attractive to live in. In addition, the size of the shadow economy is another important determinant of income inequality in OIC countries. When the size of the shadow economy grows, the income inequality decreases as one percent increase results in a 1,465 point decrease in Gini Index which constitutes an important amount. However, the growing shadow economy may have some consequences as the important proportion of economic activity may not be registered. On average, in OIC countries the 35,11% of the economy can be named as shadow economy, which is an important amount to think about. So every percent increase may result in a loss of control of the state over economic activities, notwithstanding it reduces income inequality greatly.

Table 4: The regression results of Asia Region

ASIA REGION

	Gini Index					**Palma Ratio**				
Number of Regressions	{1}	{2}	{3}	{4}	{5}	{1}	{2}	{3}	{4}	{5}
Constant	440.671	425.729	410.459	517.600	438.383	370.742	354.409	336.497	481.252	378.456
	[171,245]	[172,746]	[174,736]	[225,882]	[182,209]	[146,997]	[147,484]	[148,854]	[192,705]	[156,363]
RealInterestRate	-0.015	-0.088	-0.010	0.005	-0.014	-0.044	-0.123	-0.038	-0.015	-0.045
	[0,084]	[0,121]	[0,084]	[0,093]	[0,086]	[0,072]	[0,104]	[0,072]	[0,079]	[0,073]
GDPGrowthRate	-0.199	-0.181	-0.150	-0.171	-0.199	-0.162	-0.142	-0.106	-0.122	-0.162
	[0,106]	[0,109]	[0,119]	[0,119]	[0,108]	[0,091]	[0,093]	[0,102]	[0,102]	[0,092]
SecondarySchoolEnrollmentRate	-0.170	-0.172	-0.174	-0.196	-0.169	-0.169	-0.171	-0.173	-0.206	-0.172
	[0,057]	[0,057]	[0,057]	[0,075]	[0,061]	[0,049]	[0,049]	[0,049]	[0,064]	[0,052]
log(RuralPopulation)	-51.536	-49.544	-47.298	-60.285	-51.214	-45.036	-42.858	-40.233	-57.604	-46.120
	[22.403]	[22.604]	[22,921]	[28,013]	[24,014]	[19,231]	[19,299]	[19,526]	[23,898]	[20,607]
RealInterestRate^2		0.004					0.004			
		[0,005]					[0,004]			
TradeOpenness			-0.021					-0.024		
			[0,023]					[0,020]		
AgricultureSectorVA									-	
									-	
SizeoftheShadowEconomy				-0.292						-0.419
				0.552						[0,471]
log(PriceLevelofInvestment)					-0.053					0.179
					[1,304]					[1,119]
Observations	63	63	63	63	63	63	63	63	63	63
R-square	0.2298	0.2429	0.2451	0.2350	0.2298	0.2591	0.2796	0.2849	0.2732	0.2596

Standard Errors are given in brackets.

: Significant in 10% level of significance

: Significant in 5% level of significance

Table 5: The regression results of Sub-Saharan Africa Region

SUB-SAHARAN AFRICA REGION

	Gini Index						Palma Ratio					
Number of Regressions	{1}	{2}	{3}	{4}	{5}	{6}	{1}	{2}	{3}	{4}	{5}	{6}
Constant	3.251	-1.861	-19.449	13.941	30.822	-46.272	-58.478	-59.635	-86.252	-43.781	-15.388	-184.072
	[32,562]	[32,724]	[41,719]	[27,366]	[29,868]	[36,318]	[51,695]	[54,983]	[75,021]	[46,635]	[47,498]	[65,365]
RealInterestRate	-0.041	-0.206	-0.004	-0.054	0.005	-0.102	0.066	0.334	0.091	0.050	0.150	0.016
	[0,104]	[0,217]	[0,113]	[0,096]	[0,099}	[0,075]	[0,253]	[0,447]	[0,263]	[0,232]	[0,243]	[0,200]
GDPGrowthRate	-0.031	0.004	-0.051	0.030	0.044	0.271	0.132	0.138	0.112	0.274	0.281	0.807
	[0,112]	[0,121]	[0,116]	[0,106]	[0,110]	[0,110]	[0,292]	[0,314]	[0,306.]	[0,279]	[0,303]	[0,303]
SecondarySchoolEnrollmentRate	0.306	0.324	0.319	0.220	0.265	0.147	0.650	0.654	0.671	0.515	0.573	0.591
	[0,131]	[0,131]	[0,129]	[0,114]	[0,114]	[0,141]	[0,212]	[0,221]	[0,216]	[0,199]	[0,183]	[0,215]
log(RuralPopulation)	4.075	4.670	6.398	4.348	3.755	3.578	8.177	8.304	11.092	8.830	7.995	8.745
	[4,228]	[4,233]	[4,990]	[3,533]	[3,612]	[4,852]	[6,688]	[7,054]	[8,816]	[5,989]	[5,681]	[7,138]
interestsq		0.008						0.002				
		[0,009]						[0,194]				
TradeofGDP			0.074						0.084			
			[0,084]						[0,160]			
AgricultureSectorVA				-0.330						-0.508		
				[0,130]						[0,224]		
SizeoftheShadowEconomy					-0.585						-0.957	
					[0,251]						[0,430]	
log(ppp)						14.443						29.710
						[3,816]						[9,674]
Observations	25	25	25	25	25	24	25	25	25	25	25	24
R-square	0.3184	0.2872	0.3272	0.5611	0.2986	0.3558	0.4738	0.4717	0.4709	0.6332	0.5247	0.4805

Standard Errors are given in brackets.

	:	Significant in 10% level of significance
	:	Significant in 5% level of significance
The Red Font Color	:	The model is not significant in terms of F-statistics

For Palma Ratio, the interesting things is that the squared term of real interest rate is significant at the 10 % level of significance as the real interest rate is significant itself also. So that the pattern of the impact of real interest rate may be observed more precisely and accurately. A one percent increase in real interest rate decreases the Palma Ratio by 0,285 points. Well, we can ask the question of to which extent it will have a decreasing impact on income inequality. To answer this, we may do a basic calculation which aims to calculate the critical point at which the pattern of interest rate change; means the point at which the real interest rate starts to increase income inequality. When we calculate this point, the level is 17,81%. After this rate, an increase in real interest rate has a detrimental influence on income equality. When we look to some country-year observations, we recognize the fact that an increase in real interest rate will be harmful for income equality in some OIC countries, because their real interest rate levels have already been over the critical point— as those observations constitute 7,35% of the sample. Also, one percent increase in rural population has a curative impact on income inequality by 0,511-0,515 points in terms of Palma Ratio.

In OIC countries, the results show us that this country group has a different pattern in the all country group samples which are used throughout this study. The reason behind this finding may be the presence of the negative interest rates as they constitute 27,94% of the real interest rate observations in OIC sample. In the other country group samples in which real interest rate has an increasing effect on income inequality the proportions are much more less than this percentage as in Central & the Latin America region the rate is 12% while in Developing Countries the rate is 13,8%. When 27,94% is compared with these percentages, one of the reasons behind this fact may be the presence of negative interest rates. Also, the impact of negative interest rates should be further researched on income inequality in order to understand the situation in a better way. The other possible reasons may be related to inflation and saving channel. The world inflation, average for this study is 7,46%, while OIC average is 8,02% in terms CPI. Also, world gross domestic savings average in terms of GDP is 17,78%, while this ratio is 18,29% in OIC countries. Notwithstanding, there is not huge differences between the averages, these factors may also have an impact on the pattern difference.

Table 6: The regression results of Central & Latin America Region

CENTRAL & LATIN AMERICA REGION

	Gini Index						**Palma Ratio**					
Number of Regressions	{1}	{2}	{3}	{4}	{5}	{6}	{1}	{2}	{3}	{4}	{5}	{6}
Constant	-416.490	-405.036	-391.584	-411.368	-424.267	-407.062	-988.048	-976.797	-965.270	-935.375	-1012.058	-963.976
	[126,249]	130.491	[27,443]	[127,284]	[125,368]	[128,222]	[246,05]	[254,448]	[249,886]	[241,604]	[239,550]	[249,689]
RealInterestRate	0.043	0.051	0.043	0.042	0.034	0.043	0.040	0.048	0.040	0.033	0.011	0.040
	[0,015]	0.027	[0,015]	[0,015]	[0,016]	[0,015]	[0,030]	[0,053]	[0,030]	[0,029]	[0,031]	[0,030]
GDPGrowthRate	0.008	0.006	0.036	0.006	0.015	0.011	0.014	0.012	0.040	0.000	0.038	0.023
	[0,056]	0.057	[0,060]	[0,056]	[0,056]	[0,057]	[0,109]	[0,110]	[0,118]	[0,107]	[0,107]	[0,110]
SecondarySchoolEnrollmentRate	-0.118	-0.119	-0.124	-0.119	-0.097	-0.116	-0.227	-0.228	-0.232	-0.263	-0.162	-0.220
	[0,027]	[0,027]	0.027	[0,027]	[0,030]	[0,028]	[0,052]	[0,053]	[0,053]	[0,051]	[0,057]	[0,054]
log(RuralPopulation)	72.694	70.947	69.277	71.818	72.207	71.608	158.904	157.188	155.779	149.896	157.400	156.130
	19.267	19.914	[19,404]	[19,446]	[19,121]	[19,471]	[37,551]	[38,831]	[38,048]	[36,912]	[36,536]	[37,916]
RealInterestRate^2		0.000						0.000				
		[0,000]						[0,001]				
TradeOpenness			-0.030						-0.028			
			[0,024]						[0,047]			
AgricultureSectorVA				0.078						0.804		
				[0,178]						[0,337]		
SizeoftheShadowEconomy					0.228						0.704	
					[0,142]						[0,271]	
log(PriceLevelofInvestment)						-0.632						-1.614
						[1,310]						[2,550]
Observations	125	125	125	125	125	125	125	125	125	125	125	125
R-square	0.3912	0.3920	0.4006	0.3924	0.4064	0.3926	0.3507	0.3510	0.3529	0.3853	0.3915	0.3533

Standard Errors are given in brackets.

	:	Significant in 10% level of significance
	:	Significant in 5% level of significance

Table 7: The regression results of Organization of Islamic Cooperation

ORGANIZATION of ISLAMIC COOPERATION

	Gini Index						Palma Ratio			
Number of Regressions	{1}	{2}	{3}	{4}	{5}	{6}	{1}	{2}	{3}	{4}
Constant	619.208	621.474	621.442	562.352	781.161	635.589	414.197	416.140	419.400	377.612
	[150,398]	[0,133]	[152,483]	[153,858]	[146,613]	[151,730]	[123,138]	[119,937]	[124,438]	[127,112]
RealInterestRate	-0.108	-0.303	-0.110	-0.132	0.001	-0.111	-0.118	-0.285	-0.120	-0.133
	[0,074]	[0,133]	[0,075]	[0,076]	[0,076]	[0,076]	[0,061]	[0,108]	[0,061]	[0,062]
GDPGrowthRate	0.026	0.057	0.032	0.050	0.068	0.031	-0.061	-0.035	-0.048	-0.046
	[0,057]	[0,059]	[0,064]	[0,059]	[0,054]	[0,060]	[0,047]	[0,048]	[0,052]	[0,049]
SecondarySchoolEnrollmentRate	0.114	0.145	0.116	0.124	0.054	0.112	0.034	0.060	0.038	0.040
	[0,087]	[0,087]	[0,088]	[0,086]	[0,086]	[0,088]	[0,071]	[0,071]	[0,072]	[0,071]
log(RuralPopulation)	-83.980	-84.570	-84.256	-75.057	-99.001	-86.530	-56.836	-57.341	-57.478	-51.094
	[21,150]	[20,673]	[21,429]	[21,813]	[19.883]	[23,040]	[17,316]	[16,868]	[17,488]	[18,021]
interestsq		0.009						0.008		
		[0,005]						[0,004]		
TradeofGDP			-0.005						-0.012	
			[0,026]						[0,021]	
AgricultureSectorVA				-0.327						-0.211
				[0,229]						[0,189]
SizeoftheShadowEconomy					-1.465					
					[0,467]					
log(ppp)						0.420				
						[1,419]				
u	68	68	68	68	68	68	68	68	68	68
R-square	0.3609	0.4035	0.3615	0.3900	0.4800	0.3622	0.2647	0.3183	0.2701	0.2853

Standard Errors are given in brackets.

: Significant in 10% level of significance

: Significant in 5% level of significance

Developing Countries

For Developing Countries, in terms of Gini Index, real interest rate, GDP growth rate, secondary school enrollment and the squared term of real interest rate are significant. There are 305 observations in this sample and, in that sense, the results are more robust. The R-squares are relatively low because there are many other determinants of income inequality which don't take place in the regression models of this study. They are changing between 11,65% - 14,74%, however they are valuable in order to publish. Real interest rate increases income inequality in developing countries as one percent increase in interest results in 0,046-0,050 points increase in Gini Index. For detailed analysis, when we include the squared term of it, the critical point is 24% for interest. This means that real interest rates have an increasing pattern until 24% level after that level it has almost zero effect. Only 6.56% of the countries have real interest rate levels which are higher than the critical point as it means that the income equality in remaining others will influence negatively by an increase in interest rates.

When the other parameters taken into consideration, GDP growth rate also leads to an increase in income inequality in developing countries as one percent increase in interest rates results in 0,068-0,095 points increase in income inequality. In addition, the secondary school enrollment rate has a curative impact on income inequality for this country group. It has 0,055-0,074 points decreasing impact on income inequality per percent increase in interest rate. Moreover, the secondary school enrollment rate has a decreasing impact on inequality while it is found out that an increase in rural population may trigger an increase in inequality. The R-squares for Palma Ratio changes between 11,95% - 13,68%.

The reasons behind the finding above, which is related to interest rates, may be the impact of capital-productive investments and accelerating portfolio investment flows. Increasing interest in developing countries may decrease the level of capital-productive investment and correspondingly the income inequality may occur. Because the gain of these investments may be shared by all society and they may be directed and managed in favor of the poor by implementing related regulations and policies by the government. Another reason is increasing interest rates may accelerate the portfolio investments which may lead to increasing yields for the investors. They will, so to say,

Table 8: The regression results of Developing Countries

Developing Countries

	Gini Index						Palma Ratio				
Number of Regressions	{1}	{2}	{3}	{4}	{5}	{6}	{1}	{2}	{3}	{4}	{5}
Constant	-53.305	2.017	[80,593]	-64.675	-52.999	-62.963	-188.527	-134.558	-185.629	-187.097	-191.313
	[79,831]	[80,858]	[0,018]	[79,853]	[80,013]	[79,886]	[103,893]	[106,063]	[105,222]	[104,039]	[104,459]
RealInterestRate	0.049	0.048	0.047	0.046	0.048	0.050	0.051	0.050	0.051	0.050	0.051
	[0,018]	[0,018]	[0,018]	[0,018]	[0,018]	[0,018]	[0,023]	[0,023]	[0,023]	[0,023]	[0,023]
GDPGrowthRate	0.080	0.068	0.095	0.084	0.078	0.068	0.031	0.019	0.034	0.024	0.028
	[0,030]	[0,031]	[0,033]	[0,031]	[0,032]	[0,032]	[0,040]	[0,040]	[0,043]	[0,042]	[0,041]
SecondarySchoolEnrollmentRate	-0.067	-0.055	-0.070	-0.074	-0.065	-0.060	-0.132	-0.120	-0.132	-0.122	-0.130
	[0,030]	[0,030]	[0,030]	[0,030]	[0,031]	[0,030]	[0,039]	[0,039]	[0,039]	[0,041]	[0,039]
log(RuralPopulation)	14.535	6.294	12.665	16.625	-14.341	16.579	32.432	24.392	32.058	31.524	32.999
	[11.59]	[11,756]	[11,674]	[11,620]	[11,661]	[11,634]	[15,083]	[15,421]	[15,242]	[15,163]	[15,213]
interestsq		0.001						0.001			
		[0,000]						[0,000]			
TradeofGDP			-0.018						-0.004		
			[0,014]						[0,019]		
AgricultureSectorVA				-0.195							
				[0,120]							
SizeoftheShadowEconomy					0.023					0.108	
					[0,125]					[0,163]	
log(ppp)						-1.230					-0.342
						[0,805]					[1.053]
Observations	305	305	305	305	305	304	305	305	305	305	304
R-square	0.1165	0.1474	0.1223	0.1265	0.1166	0.1252	0.1195	0.1368	0.1196	0.1211	0.1199

Standard Errors are given in brackets.

: Significant in 10% level of significance

: Significant in 5% level of significance

earn more money by doing nothing at the expense of the poor while the increasing interest rates may decrease the investment and the employment decreases too.

For Palma Ratio, real interest rate has again a detrimental impact on income equality. The real interest rate and its squared term are significant as well as secondary school enrollment rate and rural population. The critical point for Palma Ratio is 25% level for interest rate as until that point it increases the income inequality.

Developed Countries

For Developed Countries, we only took the Palma Ratio results due to the insignificance of the Gini Index models in terms of F-statistics. The Palma Ratio models have R-squares which are changing between the range of 25,42% - 44,19%. The real interest rate, squared term of it, rural population and size of the shadow economy variable are significant. An increase in interest rate increases Palma Ratio by 0,162 points until the level of 81%. After that point, its increasing pattern turns to a decreasing trend with a very little change. One of the reasons behind the increase may be that the increasing interest rates may appreciate the national currency as foreign portfolio investments may increase by that way. So increasing foreign portfolio investments may increase the income inequality also.

In addition, to increase the rural population by developing the required policies and incentives will be an important action for developed countries as it decreases the Palma Ratio by 0,281-0,295 points. The main reason behind this fact is the population density of urban units in developed countries. For both national and international levels, urban units of developed countries take an important level of migrations as an important proportion of them are made from rural to urban places. Developed countries may give importance to rural development and they may promote the livestock sector in addition to agriculture and forestry sector because some of the developed countries have unproductive and non arable lands to be engaged in agriculture.

Also, growing shadow economies have a great impact on income inequality in developed countries as one percent increase in the size of the shadow economy leads to 0,798 point decrease in income inequality.

Almost in all of the country groups, the size of the shadow economy has a similar impact on income inequality.

We also understand that the increasing income inequality does not depend on the size of the shadow economy; rather it has a decreasing impact on income inequality. Notwithstanding the increasing formal economy is encouraged and desired aim of the governments, growing shadow economy also benefit the society in a particular sense. It may be in favor of the poor as the bigger and more important economic transactions should be documented in general if they are not done illegally through byways.

The World

For World sample, in which there are 362 observations, real interest rate, GDP growth rate, secondary school enrollment rate, agriculture sector value added and price level of investment variables are significant for Gini index. The real interest rate has an increasing impact on income inequality as one percent increase in interest rate results in 0,042-0,043 points increase in Gini Index. This may be because of the reasons explained in detailed above as the real interest rate mainly influences the income inequality through inflation, investment and savings channel. The possible country group-specific reasons behind the impact of interest are explained for each country group. For GDP growth rate, it also increases the Gini Index by 0,048-0,073 points. Secondary school enrollment rate decreases the inequality in a world sample. This shows the fact that the world has to give more importance to secondary education. In addition, by being engaged in agriculture sector more, the world may decrease the income inequality by promoting agriculture sector, as every percent increase in agriculture value added leads to 0,188 point decrease in Gini Index. Lastly, for Gini Index, the price level of investment has a decreasing impact on it. Investments should be made in favor of the benefit of the whole society rather than just for the benefit of specific income groups or special interest groups. The society as a whole should reap the benefits of investment and the poor should be benefited from them in terms of employment, increasing income and life standards, etc.

For Palma Ratio, we have an opportunity to observe the pattern of real interest rate in a better way as it has an increasing impact by 0,039 points on Palma Ratio which continues to the interest level of 40%.

It is a very interesting finding that many countries in the world shouldn't increase the real interest rates if they want to reduce inequality. They may decrease, as even they may approach it to the zero level in terms of its possible dangerous consequences in some specific countries—especially the countries where it has a reducing impact on income inequality.Secondary school enrollment has a curative impact on Palma Ratio by 0,127-0,139 points. The need for education comes in sight again. Rural population also has a decreasing effect on Palma Ratio. This shows us that the growing crowd in urban units may not be a good sign for income inequality, however rural places may be transformed into a more attractive place to live by promoting rural development and making policies which involves charming incentives. Also, the importance of the agriculture sector shines too in Palma regression for the world sample. It has a curative impact on Palma Ratio by 0,200 points which shouldn't be ignored.

Summary of the Results

To sum up, at the end of the results part, the results should be summarized in order to show the outcomes better. The real interest rate has an increasing impact on income inequality—both for Gini Index and Palma Ratio— in Central & Latin America, Developing Countries, Developed Countries and the World samples. In Developed Countries, its increasing impact maintains until the interest level of 81% for Palma Ratio, as its increasing influence will fade away after that point— see Figure 2. These can be among one of the strong and significant findings which reveals detrimental impact of real interest rate on social justice. The OIC group may be counted as an exception which is incongruous with the main pattern. The reasons behind these facts should be further studied as inflation, investment, consumption, savings, policies related to capital flow and exchange rate and the excess presence of negative interest rates compared with other country groups, may be the possible reasons behind it. Because the development level is not a matter for the impact of interest as it increases the income inequality in both developing and developed countries.

Table 9: The regression results of Developed Countries

Developed Countries

Palma Ratio

Number of Regressions	{1}	{2}	{3}	{4}	{5}	{6}
Constant	201.642	211.738	206.555	203.718	236.135	222.708
	[32,775]	[32,585]	[31,025]	[29,401]	[33,662]	[36,769]
RealInterestRate	0.065	0.162	0.064	0.069	0.118	0.067
	[0,025]	[0,053]	[0,026]	[0,029]	[0,028]	[0,024]
GDPGrowthRate	-0.050	-0.067	-0.036	-0.047	-0.011	-0.053
	[0,073]	[0,071]	[0,082]	[0,085]	[0,067]	[0,071]
SecondarySchoolEnrollmentRate	-0.101	-0.120	-0.106	-0.107	-0.172	-0.131
	[0,095]	[0,092]	[0,101]	[0,115]	[0,090]	[0,096]
log(RuralPopulation)	-28.126	-29.564	-28.490	-28.104	-29.084	-28.714
	[5.248]	[5,211]	[4,894]	[4,514]	[5,083]	[5,336]
interestsq		-0.001				
		[0,000]				
TradeofGDP			-0.021			
			[0,033]			
AgricultureSectorVA				-0.392		
				[0,460]		
SizeoftheShadowEconomy					-0.798	
					[0,261]	
log(ppp)						-3.463
						[2,528]
Observations	57	57	57	57	57	57
R-square	0.2675	0.2633	0.3016	0.2542	0.4419	0.2854

Standard Errors are given in brackets.

: Significant in 10% level of significance

: Significant in 5% level of significance

Table 10: The regression results of the World Sample

WORLD

	Gini Index						Palma Ratio					
Number of Regressions	{1}	{2}	{3}	{4}	{5}	{6}	{1}	{2}	{3}	{4}	{5}	{6}
Constant	7.464	11.873	7.121	-18.913	-9.022	-13.593	61.114	61.632	64.932	60.565	56.775	61.743
	[7..284]	[71.503]	[71.259]	[70.393]	[70.657]	[70.067]	[15.494]	[15.526]	[15.717]	[15.077]	[16.437]	[16.137]
RealInterestRate	0.042	0.033	0.042	0.041	0.043	0.043	0.052	0.039	0.051	0.050	0.049	0.052
	[0.014]	[0.015]	[0.014]	[0.014]	[0.014]	[0.014]	[0.017]	[0.019]	[0.017]	[0.017]	[0.018]	[0.017]
GDPGrowthRate	0.059	0.057	0.072	0.063	0.060	0.047	0.015	0.012	0.026	0.018	0.010	0.012
	[0.028]	[0.028]	[01.032]	[0.028]	[0.029]	[0.028]	[0.035]	[0.035]	[0.038]	[0.035]	[0.035]	[0.036]
SecondarySchoolEnrollmentRate	0.070	-0.070	0.072	-0.073	-0.072	-0.064	-0.127	-0.126	-0.128	-0.139	-0.121	-0.125
	[0.027]	[0.027]	[0.027]	[0.027]	[0.029]	[0.027]	[0.032]	[0.031]	[0.032]	[0.032]	[0.033]	[0.032]
log(RuralPopulation)	7.951	5.077	6.008	10.010	8.374	9.637	-4.262	-4.344	-4.653	-3.632	-4.129	-4.161
	[10.398]	[10.580]	[10.513]	[10.138]	[10.543]	[10.390]	[2.208]	[2.213]	[2.194]	[2.173]	[2.223]	[2.234]
interestsq		0.000						0.000				
		[0.000]						[0]				
TradeofGDP			-0.016						-0.013			
			[0.013]						[0.016]			
AgricultureSectorVA				-0.188						-0.199		
				[0.112]						[0.104]		
SizeoftheShadowEconomy					-0.030						0.082	
					[0.117]						[0.102]	
log(ppp)						-1.411						-0.379
						[0.751]						[0.941]
Observations												
R-square												

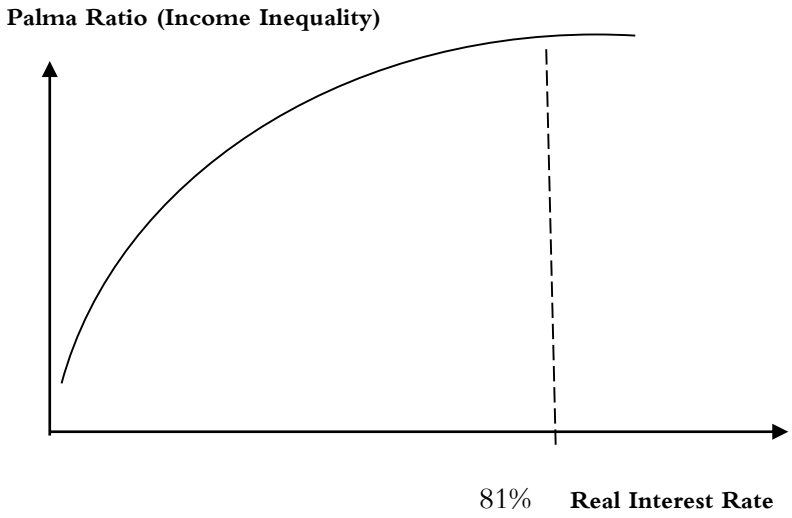
Standard Errors are given in brackets.

: Significant in 10% level of significance

: Significant in 5% level of significance

For the World, real interest rate and GDP growth rate have increasing impact on the inequality. For the sample of World, higher interest rates have an inequalizing impact on income. This is one of the explicit instances of the negative impacts of interest to society in the world scale. Also, we can understand that when the countries being wealthier they may become more unequal due to the income distribution and wealth concentration in the hands of the rich at the expense of the poor.

Figure 2: The Impact of Real Interest Rate on Income Inequality in Developed Countries



On the other hand, secondary school enrollment rate, agriculture sector value added and price level of investment may cure the inequality in a certain proportion. The supporting policies and required incentives should be prepared and implemented to overcome the income inequality. *In general, the findings shows that interest rate has a significant influence on income inequality, which proves that the thesis of this study is valid, either for lower or higher real interest rates.*

Also, the significant impact of rural population should not be ignored as it decreases the inequality in Asia, OIC, Developed countries—which is important to be thought together with the study of Østergaard (2013) in which rural population has decreased impact on inequality in Sub-Saharan Africa— and the World as for Palma Ratio. On the other hand, it has a detrimental impact on Central & Latin America as the population density

in rural units in this region is at high levels compared with many others as developing countries may be influenced from such reason.

Agriculture sector value added decreases the inequality in Sub-Saharan Africa region both for Palma Ratio and Gini Coefficient; however, it has an increasing impact in Central & Latin America region. Also, in world sample it decreases the inequality both for Palma and Gini. This may be owing to the increasing need for rural development as there are increasing migrations from rural to urban units. The required policies should be implemented in order to benefit from such gap. May be, the decreasing impact is stemming from the reason that scarcity of workers in the agriculture and rural areas would drive up wages, thereby reducing inequality in the whole economy. In the study of Odedoukun and Round (2001), it is found out that, the share of agriculture sector in the economy increases the inequality by increasing the income of top 20% while decreasing the remaining others. In addition, it is found out that the size of the shadow economy increases the inequality in Central & Latin America region, while it decreases in Sub-Saharan Africa, OIC and Developed countries. This finding also ties in the findings of Østergaard (2013). Moreover, it is found out that the price level of investment increases the inequality in Sub-Saharan Africa. This finding ties in the result of Odedokun and Round (2001), in which they use Private investment in terms of GDP.

Also, the price level of investment decreases the Gini Index in world sample as it may show us that the investments may be beneficial for the poor in general.

CONCLUSION

This study examines the impact of real interest rate on income inequality both from theoretical perspectives and from an empirical model. Emprical results show that real rate of interest has a significant impact on the real interest rates— especially in OIC, Central & the Latin America region, Developing Countries, Developed Countries and for the World sample. In order to understand the main reasons behind, further research can be conducted in order to investigate the channels through which the real interest rate influence income inequality. Thus, in the light of findings, one can easily understand that real interest rate leads to distortions in income inequality and thereby social justice.Both low and high interest rates may

have an inequalizing impact on income. Also, the conclusions of Milanovic(2005) and Stiglitz(2015) are in parallel with these results. Hence, the thing that produces the inequalities is not the increasing or decreasing interest; rather it is interest itself. Naqvi makes valuable evaluations on this proposition. He indicates that "the injuctions against riba signifies a distinctive *socio- economic philosophy* which abhors social exploitation in all forms, including unbalanced and iniquitous financial relationship"(Naqvi 1994: 110). Moreover, zero rate of interest is not a solution either. It is not adequate to span an Islamic economy. In that sense, it is also not sufficient to abolish interest in the economy by profit-loss sharing ratio only, as he said "to replace interest by profit is not necessarily an Islamic reform either, because it might replace capitalism based on interest and profit by a capitalism which is based on only profit"(Naqvi 1994: 111). Thus, the income inequalizing effect of real interest rate should be evaluated within the systemic understanding. Mainstream economics could identify the behavioral foundations of microeconomic agents within their normative values and could set the related institutions by which these behaviours be realized on an ongoing basis. Hence, the main focus should be on constructing an economic system whose framework, value system, foundational axioms, methodology, operational principles/mechanisms and functional institutions are derived from Qur'an and Sunnah, as economic sub-space should be analyzed within an integrative framework in which the moral, legal, political and social sub-spaces are also taken into account (Asutay 2007: 5).

Table 11: The impact of the independent and explanatory variables on dependent variables

	Asia		Sub Saharan Africa		MENA		Central & Latin America	
	Gini	Palma	Gini	Palma	Gini	Palma	Gini	Palma
Real Interest Rate					-	-	+	+
GDP Growth Rate	-	-						
Secondary School Enrollment Rate	-	-	+	+			-	-
Rural Population	-	-			-	-	+	+
Trade Openness						-		
Agriculture Sector VA			-	-		+		+
Size of the Shadow Economy			-	-		+	+	+
Price Level of Investment			+	+				
	OIC		Developing		Developed		World	
	Gini	Palma	Gini	Palma	Palma		Gini	Palma
Real Interest Rate	-	-	+	+	+		+	+
GDP Growth Rate			+				+	
Secondary School Enrollment Rate			-	-			-	-
Rural Population	-	-		+	-			-
Trade Openness								
Agriculture Sector VA							-	-
Size of the Shadow Economy	-				-			
Price Level of Investment							-	

Briefly, one of the essential requirements of it is the elimination of the interest from the economic system as it leads to many disorders, inequalities and unfairness in the society. The main aim of this study is to prepare an evidence which shows that the interest leads to social injustice in society in the context of income inequality. The economic approach of Islam should be implemented in that sense as the world is disgruntled about the injustice and the unfairness which have been produced by Capitalism since the beginning of its implementation process. Therefore, Islamic Economics is not a system which produces such inequalities, unfairness, and social disorders; rather it promotes both moral and material welfare of the society, while it strives to prevent the emergence of such problems in the society. The prohibition of interest is the order of Almighty Allah (SWT). So, the success can be attained through by following the holy teachings of Allah (SWT) and His religion, Islam and us Muslims, should strive to prove our claim; the claim of submitting ourselves to Allah (SWT) as His slaves.

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Appendix

Appendix 1: The Country List According to Regions

Asia	Sub Saharan Africa	MENA	Central & Latin America	OIC
Bangladesh	Angola	Egypt, Arab Rep.	Argentina	Albania
Bhutan	Burundi	Iraq	Bolivia	Azerbaijan
China	Cameroon	Jordan	Brazil	Bangladesh
Fiji	Congo, Rep.	Qatar	Chile	Cameroon
India	Ethiopia	Syrian Arab Republic	Colombia	Egypt, Arab Rep.
Indonesia	Gabon	Yemen, Rep.	Costa Rica	Gabon
Kyrgyz Republic	Kenya		Dominican Republic	Indonesia
Lao PDR	Liberia		Ecuador	Iraq
Malaysia	Namibia		El Salvador	Jordan
Maldives	Nigeria		Guatemala	Kyrgyz Republic
Mongolia	Sierra Leone		Honduras	Malaysia
Pakistan	South Africa		Jamaica	Maldives
Philippines	Swaziland		Mexico	Nigeria
Sri Lanka	Tanzania		Nicaragua	Pakistan
Tajikistan	Uganda		Panama	Qatar
Thailand	Zambia		Paraguay	Sierra Leone
Vietnam			Peru	Syrian Arab Republic
			Uruguay	Tajikistan
			Venezuela, RB	Uganda

Appendix 2: The Country List According to Development Level

Developing Countries				Developed Countries
Albania	El Salvador	Moldova	Thailand	Argentina
Angola	Ethiopia	Mongolia	Uganda	Chile
Armenia	Fiji	Namibia	Ukraine	Croatia
Azerbaijan	Gabon	Nicaragua	Venezuela, RB	Estonia
Bangladesh	Georgia	Nigeria	Vietnam	Hungary
Belarus	Guatemala	Pakistan	Yemen, Rep.	Lithuania
Bhutan	Honduras	Panama	Zambia	Qatar
Bolivia	India	Paraguay		Slovak Republic
Bosnia and Herzegovina	Indonesia	Peru		Slovenia
Brazil	Iraq	Philippines		Uruguay
Bulgaria	Jamaica	Romania		
Burundi	Jordan	Russian Federation		
Cameroon	Kenya	Serbia		
China	Kyrgyz Republic	Sierra Leone		
Colombia	Lao PDR	South Africa		
Congo, Rep.	Liberia	Sri Lanka		
Costa Rica	Macedonia, FYR	Swaziland		
Dominican Republic	Malaysia	Syrian Arab Republic		
Ecuador	Maldives	Tajikistan		
Egypt, Arab Rep.	Mexico	Tanzania		

Appendix 3: The Country List of the World Sample

World			
Albania	Dominican Republic	Lao PDR	Russian Federation
Angola	Ecuador	Liberia	Swaziland
Armenia	Egypt, Arab Rep.	Lithuania	Serbia
Argentina	El Salvador	Macedonia, FYR	Sierra Leone
Azerbaijan	Estonia	Malaysia	Slovak Republic
Bangladesh	Ethiopia	Maldives	Slovenia
Belarus	Fiji	Mexico	South Africa
Bhutan	Gabon	Moldova	Sri Lanka
Bolivia	Georgia	Mongolia	Syrian Arab Republic
Bosnia and Herzegovina	Guatemala	Namibia	Tajikistan
Brazil	Honduras	Nicaragua	Tanzania
Bulgaria	Hungary	Nigeria	Thailand
Burundi	India	Pakistan	Uganda
Cameroon	Indonesia	Panama	Ukraine
Chile	Iraq	Paraguay	Uruguay
China	Jamaica	Peru	Venezuela, RB
Colombia	Jordan	Philippines	Vietnam
Congo, Rep.	Kenya	Qatar	Yemen, Rep.
Costa Rica	Kyrgyz Republic	Romania	Zambia

Appendix 4: The Results of Hausman and Other Diagnostic Tests

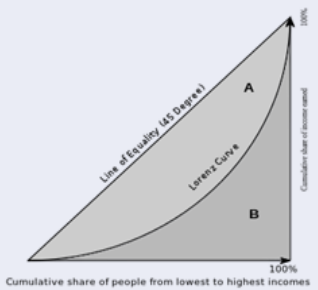
	Hausman Test*			Heteroscedasticity** (LM Test Probabilities)		
	Number of Countries	Gini Index	Palma Ratio	For Gini Index	For Palma Ratio	**Multicollinearity*** **
Developing Countries	67	Fixed-Effects	Fixed-Effects	0,7277	0,1393	Multicollinearity does not exist.
Developed Countries	10	Random-Effects	Random-Effects	0,9434	0,7594	Multicollinearity does not exist.
OIC	21	Fixed-Effects	Fixed-Effects	0,3462	0,0521	Multicollinearity does not exist.
Sub-Saharan Africa	16	Random-Effects	Random-Effects	0,8178	0,7730	Multicollinearity does not exist.
Asia	17	Fixed-Effects	Fixed-Effects	0,5157	0,3090	Multicollinearity does not exist.
MENA	6	Fixed-Effects	Random-Effects	0,0829	0,4911	Multicollinearity does not exist.
Central and Latin America	19	Fixed-Effects	Fixed-Effects	0,9162	0,0736	Multicollinearity does not exist.
World	77	Fixed-Effects	Random-Effects	0,8561	0,1964	Multicollinearity does not exist.

* : Hausman test has been used to differentiate between fixed effects model and random effects model in panel data. In order to understand which one is more appropriate to use, the first thing is to find Chi square and then to find the probability that is greater than the Chi square value founded. If this value is greater than the significance level(0,05 for this study), Random-Effects model should be used; as in reverse case Fixed-Effects model should be used.

** : For LM Test, Breusch-Pagan / Cook-Weisberg test used. For the test, the probabilities which are less than 0,05 imply that there is heteroscedasticity.

*** : It is measured by using Variance Inflation Factors(VIFs); as the VIF values which are greater than 10 are seemed as an indicator for the existence of multicollinearity.

Appendix 5: Dependent and Independent Variables I

Dependent Variables		
Gini Coefficient	Criticism of Gini Coefficient	Palma Ratio
Gini Index or Gini Coefficient, which is a well-known inequality measurement, measures the inequality among the values of a frequency distribution. It is commonly used for measuring inequality of income or wealth (Gini, 1936). It is derived from Lorenz Curve. The Gini coefficient can be calculated by using the area that is between the "Line of Equality" and "Lorenz Curve" and the total area under the "Line of Equality" that means i.e. G = A / (A+B). It is generally expressed theoretically ranged from 0 to 100. 	The main criticism is on about its relativeness; it is relative rather than absolute. For instance, Mellor (1989) explains that even the number of people in absolute poverty decreases in a developing country, the Gini coefficient may increase due to the increasing inequality of income. The other ciritism is made by Chuen (2010) as he stated that the reasons of income inequality change, measured by Gini, can be due to structural changes as the growing population and the income mobility. The income mobility. The Gini coefficient is simple, and this simplicity can lead to oversights and can confuse the comparison of different populations; for example, while both Bangladesh (per capita income of $1,693) and the Netherlands (per capita income of $42,183) had an income Gini index of 0.31 in 2010 (UNDP, 2011). Also, when there is extreme wealth inequality there may be the low income Gini coefficient while there shouldn't be as Domeij and Flodén (2010) explain it	The Palma Ratio can be defined as the ratio of the top 10% of the population divided by the bottom 40% of the population in terms of share of gross national income. The ratio is the product of the study of Chilean economist Gabriel Palma. In his study, Palma (2011), he found that middle class incomes almost always constitute half of the gross national income as the other half is shared by top 10% and poorest 40% of the population. It is formed and included into the dataset by using the income of the top 10 % divided by the bottom 40 %. Palma Ratio may address the Gini coefficient's over-sensitivity to changes in the middle income class and insensitivity to changes at the top and bottom. In that sense, it more accurately shows the economic impacts of income inequality. Also, Cobham and Summer(2013) specified that it addresses the struggle between rich and poor better when compared with the Gini coefficient as it may be a better option for policymakers.
Correlation between Gini Coefficient and Palma Ratio is found as 90.7% for the sample used for this study.		

Appendix : Dependent and Independent Variables II

Independent Variables			
Real Interest Rate	GDP Growth Rate	Population	Globalization
The real interest rate data starts from 1999 instead of 2004 in order to see its impact in a more precise way. Also, we take its squared term in order to understand and explain its effect on income inequality more accurately. This variable adds an unique feature to this study, because this study is the first study in the literature whose main aim is to question the impact on real interest rate on income inequality. As it is mentioned in the Literature section, Milanovic(2005) brought up the impact of real interest rate on the matter by using it as an explanatory variable in his study.	GDP per capita annual growth rate is chosen for this model due to its appropriateness for the dataset used in this study, compared with logGDP per capita which is used for previous studies such as Barro(2000).	Rural population is taken for expressing the importance of population. It is stated in logarithmic terms to show the effect of the percentage change in rural population on income inequality. The rural population has an important place for income inequality due to the increasing migration to urban places as this migration has been a vital determinant on the lives of many migrants.	Trade openness, which is the ratio of the sum of the exports and imports in terms of GDP, is taken as an indicator of globalization. This ratio represents the level of globalization as the impact of globalization on income inequality are questioned in many studies such as Milanovic(2005) and Barro(2000). Milanovic(2005) concluded that the effect of it depends on the initial income level and it makes income distribution worse before making it better.
Note: Except the price level of investment data, all of the datasets have been taken from World Bank.			

Appendix 7: Dependent and Independent Variables III

Independent Variables			
Education	Sector Value Added	Size of the Shadow Economy	Investment
As reviewed in the literature section, education has an important impact on income inequality. The secondary school enrollment rate has been taken to measure the effect of education. Especially, when measuring for developing countries where the tertiary education enrollment rate is low, the secondary school enrollment rate is a better option to use to measure the effect of education. It is used by several studies before such as Abdullah(2013) and Barro(2000). This variable, also, may reflect the effect and importance of human capital on income inequality. As, the previous studies proved that education has a curative effect on income inequality.	The value added by agriculture sector in terms of GDP have been used.Value added by agriculture sector includes agriculture, forestry and hunting together. Value added is the net output of a sector after adding up all outputs and subtracting intermediate inputs. Also, it is a good measure to be used in order to show the importance of rural development and its supporting policies on income inequality.	Shadow economy has been defined as "all the economic activities that contribute to the officially calculated(or observed) gross national product but are currently unregistered" or "market-based production of goods and services, whether legal or illegal, that escapes detection in the official estimates of GDP . This variable shows the size of the shadow economies in terms of GDP. The required data is provided by F. Schneider(2010), World Bank. Previously, this variable was used in the study of Østergaard(2013), as the findings showed that, in Sub-Saharan Africa it has a curative effect for income inequality.	Price level of investment is included to measure the impact of investment on income inequality. It is calculated as PPP(Purchasing Power Parity) over investment divided by the exchange rate times 100. Taking investment into consideration through this way is more appropriate to show the investment levels in a standardized way. It is expected to have a negative sign in the model for many countries except the ones in which the investment has been mostly made by the elites who keep the power and most of the income in their hand.
Note: Except the price level of investment data, all of the datasets have been taken from World Bank.			

Appendix 8: Descriptive Statistics for Gini Index

	Gini Index			
	Developing Coutries	**Developed Coutries**	**Asia**	**Sub-Saharan Africa**
Observation	305	57	63	25
Mean	41,981	37,023	37,481	46,118
Maximum	67,4	52,5	46,9	67,4
Minimum	24,24	24	30,02	29,83
Std. Dev.	9,678	8,824	4,472	9,853
	Central & Latin America	**MENA**	**OIC**	**World**
Observation	125	21	68	362
Mean	51,447	33,918	35,735	41,201
Maximum	62,834	41,5	48,83	67,4
Minimum	40,47	25,048	25,048	24
Std. Dev.	4,411	4,754	4,962	9,707

Appendix 9: Descriptive Statistics for Palma Ratio

	Palma Ratio			
	Developing Coutries	Developed Coutries	Asia	Sub-Saharan Africa
Observation	305	57	63	25
Mean	24.306	19.318	16.913	30.67
Maximum	88.387	92.051	26.27	88.387
Minimum	8.021	8	11.554	11.401
Std. Dev.	13.73	12.955	3.949	19.436
	Central & Latin America	MENA	OIC	World
Observation	125	21	68	362
Mean	36.447	17.783	17.675	23.521
Maximum	69.187	92.051	92.051	92.051
Minimum	19.178	10.78	10.78	8
Std. Dev.	9.789	17.148	4.115	13.715