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INFLUENCE OF HOUSEHOLD DECISION
MAKING ON INCOME INEQUALITY

Bachelor Thesis

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I hereby declare that I wrote this Bachelor Thesis independently and used only sources and aid indicated.

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Abstract

The thesis revolves around how individuals play a role in the level of income inequality through the decisions they make, whether that be; (i) level of consumption, (ii) savings and investment, (iii) time allocation and hours worked, (iv) the rate of female labour participation and (v) religiosity.

Regression analysis performed for aforementioned decisions on measures of inequality, through Ordinary Least Squares (OLS) regression model. Countries chosen for analysis were Czech Republic, South Africa, Tajikistan and United States. The Czech Republic and South Africa were chosen based on being counterparts in the area of the measures of inequality. In contrary, Tajikistan and United States were chosen based on being counterparts in the area of Gross Domestic Product (GDP).

Data sources used include the Global Consumption Income Project (GCIP), the International Labour Organization Database (ILOSTAT), European Social Survey (ESS), World Values Survey (WVS), OECD Library, etc.. In addition, an online survey was conducted to identify preferences based on income group when choosing who to marry.

Results from the regression showed that most of the decision variables were significant in all countries. There were different trends amongst the countries for each variable, some having negative relationships, positive. The trends were backed up by the characteristics and circumstances of the country. Female labour participation had most significance, but rather a positive relationship- where if more females worked, income inequality would increase.

The data was also tested for reverse causality, to which it was present in most of the decisions, paving way for perception that individual can be constrained by their income and unfair distributions.

Keywords: Income Inequality, Consumption, Time Allocation, Labour Participation, Savings

JEL Classification: J710, J310, D10, D15

Abstrakt

Práce je o roli, kterou jednotlivci hrají v příjmové nerovnosti díky jejich rozhodnutí, co se týče i) úrovně spotřeby, ii) úsporů a investic, iii) alokace času a odpracovaných hodin, iv) míry účasti žen na trhu práce a v) religiozity.

Regresní analýza byla provedena pro výše uvedená rozhodnutí měřící nerovnost pomocí modelu OLS (Ordinary Least Squares). Vybrané země pro analýzu byly Česká republika, Jihoafrická republika, Tádžikistán a Spojené státy. Česká republika a Jihoafrická republika byly vybrány, jelikož jsou protějšky v oblasti míry nerovnosti. Naopak Tádžikistán a Spojené státy byly vybrány na základě toho, že jsou protějšky v oblasti hrubého domácího produktu (HDP).

Použité zdroje dat jsou: projekt Global Consumption Income Project (GCIP), databáze Mezinárodní organizace práce (ILOSTAT), Evropský sociální průzkum (ESS), Světový průzkum hodnot (WVS), OECD, atd. Kromě toho byl proveden online průzkum identifikující preference při výběru manžela/manželky založené na příjmové skupině, ve které se dotázaný nachází.

Výsledky z regresní analýzy ukázaly, že většina proměnných byla významná ve všech zemích. U jednotlivých proměnných mezi jednotlivými zeměmi se ukázaly různé trendy; některé měly negativní poměr, některé pozitivní. Trendy záležely na různých charakteristikách a okolnostech, ve kterých se každá země nachází. Nejvýznamnější trend byl účast žen na trhu práce; pokud by více žen pracovalo, vzrostla by nerovnost příjmů.

Data byla také testována na reverzní kauzalitu ve všech rozhodnutích a vyšlo najevo, že jednotlivci mohou být omezeni svým příjmem a nespravedlivým rozdělením příjmu.

Klíčová slova: Příjmová nerovnost, spotřeba, alokace času, účast na trhu práce, úspory

Klasifikace JEL: J710, J310, D10, D15

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List of Abbreviations

- ESS- European Social Survey
- GCIP- Global Consumption Income Project
- GDP- Gross Domestic Product
- ILOSTAT- International Labour Organization Database
- OECD- Organization for Economic Co-operation and Development
- WVS- World Values Survey

Introduction

Often, in our day to day lives we take things as given. Some individuals could have all they want, meanwhile others struggle to survive. This is a concept that we deem unfair but we accept it as given. Few question why, when and how we arrived to this situation. Explanations could be provided and assumptions could be made on why some are so rich and successful, maybe portraying them to be hardworking. Similarly, assumptions are made on individuals with lower income and have them be deemed as undetermined and unproductive.

As an immigrant raised in a different environment and financial situation to my parents and experiencing the difference in income to relatives in my home country, it was a concept that I was curious to what marks such opposites in the levels of earnings. Could the level of earnings be inherited, so that the income of the parents be a reflection or projection to the income of their children? Are rich individuals simply rich because they already have cumulative wealth stocked up by their predecessors, and this affects their earnings level? In contrary, do poor people continue to be poor for generations because they lack enough cumulative wealth? These questions have pushed the motivation to analyze whether individuals could improve the inequality by changing their behavior.

Economists have driven the study on what we refer to as income inequality. Briefly, income inequality refers to the deviation from equality amongst income of individuals. There are many factors to this social phenomenon, such as structure of the state, openness to international trade, average level of education, etc. Majority of the factors have been external and were not affected by the individuals earning the income themselves.

Few researchers have looked at the situation in the view of the individuals and how they are the main drivers of the income they receive. Though it will not be as large of an indicator as corruption which has inequality invested within the factor, individuals have in some form of a control and potential to influence their earnings.

Individuals make decisions in the current period that influences not only their income in the following periods but also the inequality of their earnings in comparison to other individuals' earnings. Choices can either be made blindly, where the individual is not aware it could affect future earnings, or they could be made cognitively with the future in mind.

This study aims to explore how choices such as; (i) amount of consumption, (ii) time allocation, (iii) investment, (iv) female labour and (v) religious practices encountered by the average household could affect their income and the measure of inequality. Through the analysis, I hope to identify where individuals are able to alter their choices to pave the way for higher future earnings and further improve the inequality.

Particularly, the question of interest in this study will be;

To what extent do the decisions that households and individuals make affect future earnings and the measure of inequality.

The study is divided into two parts. Firstly, the theoretical background where I will provide explanations to income inequality and previous literature done on the factors, this is represented in section 1.1 and section 1.2 . I will then follow up in section 1.3, by exploring the behavior of individuals and whether there are differences between individuals of different income groups (section1.4.).

The second part marks the practical analysis, which includes the research procedure, data sources, and model used (sections 2.1 to 2.6). Finally, I will follow up with the results and a discussion on my findings, as well as comparison to alternate factors.

1.Theoretical Background

1.1 Income Inequality

1.1.i Definition

As we embark onto the exploration of the factors of income inequality, it is important to understand what the social phenomenon is. We start by separating the term to “income” and “inequality”. Inequality is a reference to a condition in the absence of equality and is used often as relation to a concept; in our case, income. Income itself is the monetary earnings that an individual receives- it is further divided to labour and non-labour income based on if the individual provided a service in return for the monetary earning.

Since the explanation is so broad, income inequality can be interpreted in many forms. The concept can be seen from afar as the difference in incomes of individuals, regardless of attributes. However, “perfect income equality” in this case would be unrealistic as individuals have different professions that require different levels of skills, education, and experience. Yet, the vast difference in incomes often do not reflect the difference in profession. If we were to judge incomes by dividing into professions, there still will not be the same income for all individuals.

1.1.ii Types & Effects

In current periods, overall , the difference between incomes have increased to such an extent that in the unequal regions- such as the Middle East- the top 10% of the population earn 61% of the total national income (FACUNDO, PIKETTY, CHANEL, SAEZ, & ZUCMAN, 2018). This is not only present between countries; where a vast amount of developing countries with majority below global poverty line juxtapose developed countries, but also present between citizens of each nation. It is very common to see poorer neighborhoods bordering luxury estates in all nations.

On another perspective income inequality can be interpreted as two individuals performing the same work but yielding different amounts of income.

Income inequality in this perspective can be divided into different types based on what the cause/determinant of the difference is. Common factors include ethnic, gender and geographic entity of the individual.

Ethnic income inequality emerges when individuals will have different incomes to the same job based on the ethnicity of the individual, further linking it to ethnic inequality where ethnic segregation is present (Lewin-Epstein & Semyonov, 1992). In the United States figures, which may still reflect other nations in terms of racial discrimination, statistics show that white individuals are paid more for the same profession than other races (U.S. Department of Commerce, Bureau of the Census, 2017). There are certain preference reasons as to why so, these which are in itself plagued with racial discrimination. During the application process, white individuals are more likely to be accepted for the job, thus they tend to have other options available, thus so will ask for a higher income. Whereas other races are less likely to be chosen and so will settle for any rate of income.

In another case, we have gender income inequality- more commonly referred to as the gender wage gap. Considering OECD countries, the average female individual earns about 87% of the average male individual's income. Employers have different explanations as to why so, some offer lower salaries to compensate for possible maternal leave, others state that women earn lower due to requesting unpaid time off work and less willingness to work overtime (Bolotnyy & Emanuel, 2018).

Referring back to the broad income inequality interpretation sense. We can also view income inequality as two individuals, with the same characteristics, earning two different levels of income in two different countries. Of course, this can be explained by price levels and living expenses- wage being a reflection of these costs. However, in most cases, though living expenses do not differ greatly, wages still differ by a large amount.

Income inequality itself causes a lot of issues in terms of its fairness. Take into consideration, there are people who have feasts and buffets where only little of the food is consumed the rest thrown into waste, then there are people who struggle to find food to eat and starve. The inefficient allocation of resources which may seem like a concept that just is

as it is, and nothing can be done to fix it, could be the main cause in serious global issues such as world hunger and poverty.

Another issue that brings income inequality to significance, is the difficulty of mobility of individuals in between classes. Rarely does an individual in the lowest class moves its way up to the higher classes. Thus, if an individual is born into a class; depending on resources, geographical immobility, etc. , he will remain in said class (Piketty, 1998).

1.1.iii Measuring Inequality

To be able to consider when income inequality becomes an issue, is important to understand how it is measured. To base it in quantitative measures, we can start with looking at it through distribution of income. Introduced by Max O. Lorenz (1905), the total income of a nation is transformed into a cumulative function, where the population is divided into groups. If perfect income equality is present, every individual will receive their proportional share of the income, such that each receive the average. If any individual receives less or more than their proportional . To help visualize and compare between nations, a Lorenz curve is used. The Lorenz curve is such defined as;

$$L(p) = \frac{1}{\mu} \int_0^p f(t) dt$$

Where L denotes the Lorenz curve, p reflects a quantile of the population, f(t) describes the distribution function, and μ is the average of all income receiving individuals. The function is designed such, to allow for different types of income distribution.

It is assumed that f(t) is a non-decreasing, and as L(p) responds to F(x) distribution function, the curve will be convex. At the line of perfect income equality, since here the distribution is equal, then L(p) will be equal to p. Where every pth quantile will receive pth share of total income.

With this, we can graph the Lorenz curve as following:

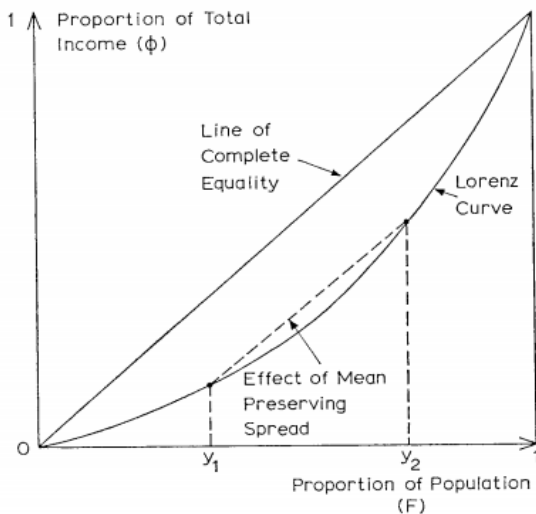


Figure 1 Lorenz Curve, Source- Atkinson (1969)

As you can see on Figure 1, there is a line at a 45 degree angle cutting through the middle. This is line of perfect income equality, where each proportion of the population will receive their portion of total income, such that each portion is equal to the average level. However with the deviation from income equality, you'll find the Lorenz curve shown above, where portions of income are disproportionate. Atkinson, with similarities to Stiglitz, proposed the idea of income transfers from individuals of higher income (Y_2) to lower income (y_1) as a means of decreasing the inequality (Atkinson 1970) .

Further on, the Gini coefficient is derived from the Lorenz curve and is the most common numerical representation of income inequality. It is based on how far away a nation's Lorenz curve is from the line of perfect income equality. Thus, we can use the area constrained by the Lorenz curve and line of perfect equality as a base for the deviation from perfect equality. If we refer to areas A and B, A will be the amount that is deviated from inequality. However, we take it as a ratio, thus it is area of inequality over the whole area under the perfect line.

In this case;

$$G = \frac{A}{A + B}$$

Where G denotes the Gini coefficient.

Since it reflects the area of the graph between the Lorenz curve and the line of perfect income equality, it takes a value between 0 and 1. The closer to zero, the more equal since the area between the curves is lower. The highest value would be 1, where one individual receives all the income. The Gini coefficient can then be multiplied by 100 to transform it into a percentage, making the Gini Index.

Other common measures of income inequality include the Palma Ratio and Theil Index.

The Palma ratio, inspired by Jose Gabriel Palma, is the ratio of the richest 10% share of total income to the poorest 40% share of total income. It was introduced due to discovering that the inequality is primarily when comparing the top 10% to the bottom. The middle class had relatively similar income levels and was stable (Cobham, Schlogl, & Sumner, 2016).

The Theil index is more complicated than the previous two as the approach is more looking at income inequality as a byproduct of income distribution. In other words, it takes into consideration differences both between groups and within groups. For example, looking at income inequality between incomes of people in rural and urban areas, Theil's approach takes into account the difference in urban and rural areas alone as a factor in the income inequality. This approach came up due to the Gini being prone to inaccuracy regarding having information on every single individual's income and their portion to the total income is difficult.

The approach looks at the overall Theil index (TI) as a sum of the TI between group and across group. The indicator through this takes into account geographic position, nationality, to look more at whether there are traps of inequality (Cowell, 2003).

1.2 Literature Review

Now that we understand the concept and the different interpretations to it, we can look into different causes to both income inequality and the increase in income inequality that have been proposed by previous researchers.

The most popular factor of income inequality is economic growth. Known for the Kuznets Curve, Simon Kuznets introduced the concept that as an economy grows it will face rising income inequality before it starts to slow down. From this, it is expected that more developed countries will have a lower Gini, whereas countries in transition will have higher (Kuznets, 1955). However, at the time of study, data was more difficult to find, and analysis was only done on three countries. This may have resulted in a generalization bias on his findings, however many studies have been done since then that promote the same findings.

A strong factor that multiple studies have explored is education. The theory was first introduced by Becker & Chiswick (1966), who found that with an increase in the average level of education, there was a lower measure of income inequality. Later, Knight & Sabot (1983), who as well tested the Kuznets curve, added that there was a reflection of income inequality based on an unequal distribution of education.

Going deeper into the role of education, the rich have the ability to afford more years of schooling at prestigious schools that promise greater returns to salaries. This connects wealth to income inequality, as in order to have higher earnings, one would need enough starting resources.

Further in the research Anderson et al. (2014) examine the role of policies and public spending on the income inequality of the United Kingdom, their results showed that government spending had a negative effect on the inequality measures. Though it depends on the characteristics of the spending (i.e. building schools in rural areas will reduce it, whereas spending on tertiary education will only benefit middle- and high-income level households.)

Adding on to the role of the state, how and to who, the government addresses their policies pave the role for increasing income inequality, especially rural-urban income inequality. Rural-urban income inequality is where an individual working in the rural area of a country, earns significantly less than an individual working in the urban area. Since governments tend to focus on urban areas, and less on rural areas- such as building schools, health clinics, etc. Then the urban area continues to develop with higher incomes, while the rural areas remain the same, if not worse since more individuals move to the urban areas (Yang,1999). This coincides with the previous research that if brought minorities into inclusion it will reduce the income inequality, however often it is a more costly approach, as governments perform in favor of the majority- which are in urban areas.

The state structure also plays a large role in income inequality. States heavily involved in bribery and corruption will tend to have a higher measure of income inequality. This is due to those who are of a higher class will have more contacts and be seen as a high social figure. This allows them to make deals or alter state policies that are favourable towards them and not the society as a whole (Gupta, et al., 1998) . In these countries you will also have students paying their way through their education and being given more chances than lower classes. This links with the resources factor, usually richer individuals will be able to buy their degrees, skipping the stage of education, and will boost their income at a younger age.

What hasn't been looked at and can be brought to attention, is how day to day decision making of individuals affect their economic level. Could it be that the lower income level households have a different rationality when it comes to making decisions; whether that be purchasing goods, making loans, investing, or what they choose to spend their time on (I.e, working or choosing leisure). In addition, bigger decisions can be taken into consideration such as who individuals choose to marry. We will go deeper into how the decision making affects income inequality later on. It is important first to look at the rationality of individuals.

1.3 Individual Behavior & Rationality

To think rationally, is to think by logical means. Individuals face situations in which they have to make decisions on a day to day basis. This can be as basic as choosing what type of bread to buy, choosing whether to go by car or take transport, or bigger decisions such as making deals on a mortgage. Individuals simultaneously perform cost-benefit analysis when comparing the two (or more) outcomes- and go with the one that will provide higher payoffs. Thus, economists have developed models to predict what an individual would choose to do given the resulting payoffs.

However, these are based theoretical assumptions. In the real world, individuals are faced with imperfect information, where they underestimate/overestimate the benefits of some actions, leading them to make the wrong decisions. Or they make decisions that benefit them in the short term but do more harm in the following periods. Therefore, individuals will not always act by rational means, even if true cost-benefit analysis yields one outcome, individuals will in fact perform the other. Some do not even consider the payoffs and choose spontaneously.

All in all, the models are a good basis to predicting what a rational individual would do. If an individual chooses the outcome predicted by the model he so is rational. If not, he may be assumed to be irrational based on idealistic terms.

1.3.i Consumption

Often, individuals will be faced with choosing what to consume, due to constraint drilled in individuals to purchase either one of two substitutes. There are different hypotheses to how much one will consume, but most derive that consumption is relative to income. If income is higher, consumption will also be higher. However, it may be rigid and take time to adjust to changes in income. Like general decision making, decisions regarding consumption will also either show rational factors to an individual or irrational (here considered as myopic).

Milton Friedman paved the way for the discussion of spending money relative to the income with the introduction of the permanent income hypothesis. He stated the individuals will spend based on a long term average income that they deem as the “permanent income”.

If in the situation that receive higher than this permanent income, they are safe to spend more money, and vice versa. In addition, people will then project how much they receive at what age.

Introduced by Modigliani and Brumberg, individuals tend to make intelligent choices when looking at how much they want to spend at what age. The rational individual will expect to not earn as much during retirement and so adjust his spending in advance. For example, if they were currently earning a certain income they will consume less in order to save and cumulate wealth for later on in the life-cycle (Deaton, 2016).

Some however, struggle to look that far into the life-cycle, for many reasons such as the current environment they live in, and so adopt a myopic attitude.

Going by Friedman’s approach, how a consumer will spend will be based entirely on his attitude and expectations. If he expects to receive higher he will either spend more money in the current period or use it as an opportunity to save more.

A rational individual will “spend wisely”, in relatively small amounts, enough to cover all his needs and a few of his wants, amount he saves will be cumulated. A myopic individual is not future-oriented and will spend the amounts he earns as his utility is derived from spending all he earns over the course of the month.

A rational individual will have the following utility consumption function:

$$u(C_t, C_{t+1}, C_{t+2}, C_{t+3}, \dots) = u(C_t) + \beta E_t[u(C_{t+1})] + \beta^2 E_t[u(C_{t+2})] + \beta^3 E_t[u(C_{t+3})] + \dots$$

Where c denotes the aggregate consumption in period’s t , u is the utility from said consumption, β is the the discounting factor to which an individual values future consumption. With every future period, the expected utility will get smaller in present terms. Hence, the individual is more towards spending the in the present as utility is higher (Jones,2009).

However this depends on the discounting factor, if they value the future more, the expected utility will be higher with future periods and thus so, will spend less in the present to get higher utility in the future.

If we further derive it to get marginal utility;

$$u'(C_t) = E_t[u'(C_{t+1})]$$

We come up to optimization that the individual will value utility from consumption the same both at the current period, and the future periods. Here, the individual gets the same amount of utility from consuming X amounts in the current period to Y amounts in the future periods. At the maximum utility level, the individual should be indifferent in the utility of consumption he gets from consuming more in the current or future period(Jones 2009).

$$u'(C_t) = E_t[\beta(1+r)u'(C_{t+1})]$$

The same still applies to if it is consumption of an asset that will yield more (according to $\beta(1+r)$) in the future, the marginal utility is the same, thus is indifferent to consuming more in either period, as in the either amounts will yield the same level of utility.

1.3.ii Investment and Savings

Following on to the next decision making, households and individuals are left with the tradeoff of consuming more in the present, or saving and having more to spend in the future. In an ideal situation, in terms of investment, spending wisely and spending some earnings on assets and shares in the current period, is likely to increase potential income in future periods.

With the improvement in earnings, it will help the financial situation of individuals and work to reduce income inequality.

However, there is a loophole to this, and was touched on earlier with regards to consumption. Households and individuals can only invest and save, if they have the money to. Especially with the risky environment of investments, one needs space to expect a loss, therefore, poorer individuals will not have the capacity to invest (Lipton,1977).

As a result, we may find that the richer individuals perform investments and have the ability to save, further improving their situation, whereas the lower income stay the same. Already, we can identify that in the situation where investment increases (given that it is unlikely for poor individuals to be able to save) in the higher income groups, we can expect income inequality to increase.

We can also look at it in the perception of choosing what to invest on. Projects run by lower income individuals are less likely to be considered for investment as they do not signal success, as oppose to individuals of higher income. More are willing to trust the individual who deems more likely to bring profit- and as mentioned earlier with stereotypes and signaling that income shows on the success of the individual. As a result, the higher income individual benefits, even though investing in the project of the lower income individual could have improved his position in the income distribution (Wilson & Wilson, 2017).

1.3.iii Time Allocation

As the saying goes , *time is money*'. Not only will an individual make choices on what to purchase, he will also make a choice on what to spend their time doing. Though this a lot more difficult in real world terms, as everyone has given in into procrastination at some point. How an individual chooses to spend their time will affect greatly their income and consumption. By either choosing to work an hour longer, or go out for dinner not only signals what kind of individual they are but can show relatively how much money they earn.

Also choosing to work on developing themselves as human capital, by reading or learning a new skill as oppose to scrolling through the internet, they choose to better themselves and benefit in the future. These are decision choices made by future-oriented individuals, whereas short-sighted individuals will forgo future payoffs/consequences and only focus on immediate payoffs. This can be a reason as to why individuals may choose to spend a night out that gives them immediate high utility and do not take into account the resulting fatigue the next day.

How individuals spend their time is important to take into account as one of the decision making that shapes an individual's income in the following period, if not it could be

considered as most important. It is a no brainer, that if an individual is more work oriented and will work longer hours as opposed to having leisure, they will earn higher in the following period.

One will choose how to allocate their time on either work or leisure. This will also shaped by the given budget constraint; the amount of income to which is available, and limited to, for one to spend .

The constraint can be defined in terms of hours by.

If,

$$L = T - H$$

And,

$$C = w(T - L) + v$$

Then the budget constraint is ;

$$C = (wT + V) - wL$$

Where H represents hours worked, w denotes the wage rate of the individual, V represents non-labour income, and L is the number of hours devoted to leisure. An individual will then choose how to allocate time T based on whether they want more income ready for the consumption of goods, or they value leisure more and want more time devoted to leisure (Borjas, 1995). If we look at the allocation as the individual's utility from a combination of consumption (proportional to hours worked) and leisure.

We can use the utility function

$$U = F(C, L)$$

Where U denotes the utility derived from a combination of C- consumption, and L- leisure. The assumption that $L=T-H$ holds, and further we will identify that the higher H, the higher C, but lower L.

The function can be graphically represented as shown in Figure 2,

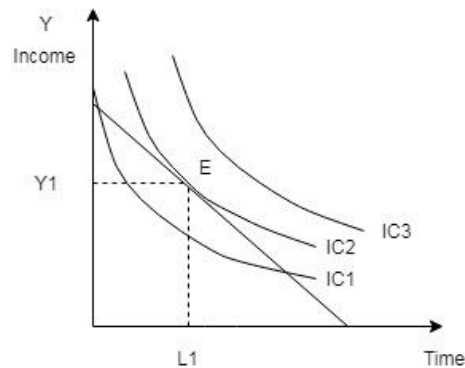


Figure 2 Indifference Curve to Leisure & Consumption - own diagram

If we take into consideration that as L increases, Y will decrease, due to less hours being worked and more taken in leisure. IC 1, 2, and 3 represents indifference curves ; which are combination of consumption and leisure that yield the same amount (i.e all combinations on IC 1 generate the same amount of utility). Utility is then optimized with regards to the budget constraint by acting on IC2, which is tangent to the constraint at point E.

However, this approach only takes into account leisure and work as time use. Since leisure was difficult to quantify, it was measured as the remaining time left after hours have been worked. However, let's say there is 168 hours available in a week, thus making $T=168$. The average job will require 40 hours of labour a week. 168 less 40, will make 128. This does not mean the individual has 128 hours of leisure time. The hours fail to account for necessary activities such as sleeping, eating, showering, etc. As well as time devoted to housework (Felman & Hornik,1981). What is by traditional model; 128 hours of leisure, will be around 50 hours. This is crucial to consider since wL in the constraint is represented as the opportunity cost to not working, but situations like necessities should not be accounted as opportunity costs, since conditions such as lack of sleep or malnutrition will affect ability to work desired hours. We can however implement housework as opportunity cost as it will not affect the individual's productivity.

Thus,

$$C = (wT + V) - w(L + M)$$

Where M denotes housework. As for necessities, we can implement into the time constraint.

$$L = T - H - M - N$$

Where N denotes necessary activities.

This allows a better understanding into the time allocation choices an individual makes. Taking into account both a time and budget constraint also shapes how a person will spend their leisure time. What a person will do during their free time is based on how much money they have and also how long they have. If they have a full day off and enough money, they may take a day trip sightseeing, or they will rather relax at home. It will also be based on the person's preferences of either resting or choosing personal improvement.

Another subjective that coincides with time management is how many in the household are working. Since each household will have transferrable amount of housework, if one is not working and only performing housework, then the other has more time to allocate between work and leisure.

1.3.iv Female Labour Participation

This leads to the discussion of women in the household and whether they work. The concept of women working depends greatly on the nation and its society. The more developed countries see women as a requirement for steady growth, and it definitely proves so. When couples are both working, respectively at a certain income level, this will be double the household income. This alone can, not only improve income of the household, but also be enough to improve their social class.

However, in certain countries, mostly developing but also religious countries. Women in the labour force is not desired for two things; the idea of social honour, and exposure of women to non-related men. In developing countries, only the very poor women work and that

is on the field (Eswaran, Ramaswami, & Wilima, 2013). This is due to the wage of the men not being high enough to be able to feed the family himself, thus the two and the children have to work on the field to bring food to the table.

As a result, it has become a social concept that if the wife works it implies that the man is not earning enough to cover the costs. Thus, most men in these countries do not allow their wives to work in fear that it will give the wrong impression of how much the man is earning to the society.

1.3.v Religiosity

An important characteristic that shapes how individuals and households make decisions is the religiosity of the individuals. The message and values that each religion transmits and the extent to which a household is religious will affect the decision they make when it comes to female participation and hours worked. Religion, in itself, is a decision to make. An individual will face the choice of maintaining and conducting actions upon their faith, or to forgo it and do other actions. They are also faced with the choice of teaching the values of their faith to their children.

Religiosity a factor that coincides with both time allocation (choice of religious activities such as praying or attending church/mosque) and female labor participation. Depending on the country and the religiosity of the household, the ability of the women to work in the household greatly depends on the permission of others in the household due to exposure of the woman (Hargrove et al, 1985).

In households of higher religiosity, particularly in Muslim-majority countries, the head of household will be more reluctant to have a women in the household working. This is not secluded to males being head of household, households with elder females also do not want to prevent the exposure the women will receive to other men.

Regarding influencing the job and/or earnings, an individual's choice in taking time to pray subtracts away from time working. For the case with Muslims, there are five obligatory prayers, two to three of which may take place during the working time of individuals (each prayer is scheduled) . The prayers can take up to half an hour based on the structure of each prayer. Not only will this time be deducted but it also affects the productivity in the work place

(Kuran,2018). If there is a nearing deadline and the prayer time is also soon to finish, the individual is faced with a difficult situation where he has only time to do one.

Adding on to this, in the month of Ramadan, where individuals can not drink or eat during the day, it reduces their thinking ability as they get both hungry and tired. As a result, their performance decreases. In occupations which are more difficult, such as farming, it greatly harms their health, especially working under the sun. This may cause health issues which may prevent the individual from working in the future periods.

The extent to which a household is religious affects their way of thinking and approach to these decisions. A religious person and a non-religious person will not have the same mindset when concluding decisions. Religious people are more reluctant when considering nine to five jobs because they are afraid it will deter them away from praying the five obligatory prayers. They go further to ensure that they are allowed to pray at the workplace (Kuran, 1995).

This signals the employer on the precautions and may deter the employer from hiring or promoting the individual based on the large breaks and the decreased productivity during the month of Ramadan. Thus so, it will affect the job of the individual and prevent them from their potential job that non-religious individuals achieve.

However, most religious individuals have the mindset that they do not mind having income they receive and perceive it as in their path and that if God wills, they will receive higher income (Tilioine et al., 2008).

Now that we have an idea as to how individuals make decisions- regarding consumption, time, income, etc. We need to again consider that there are different types of individuals both rational and irrational, there are many factors as to why individuals are different but let's explore how individuals differ by income class.

1.4 Income Group

Income groups or class is an important aspect in today's culture and society, as well as the most visible issue of income inequality. A class is defined as a number of individuals that share common attributes, in this case level of income. Depending on the society, classes will

affect other areas in the society. Take into example, India has to this day a caste system that is more than just income. The class you are born into will affect your relationships, ability to attend prestigious schools, etc. As a result, people rarely “move out” of their class (Raheja, 1988). This, in itself, already affects income inequality as though one in a lower caste may have the skills and ability to go through quality tertiary education, his social class is a border preventing him on doing so. Nevertheless, in most countries, social class rarely affects other areas.

Though can be further divided to smaller segments, there are five main income groups; poor, lower class, middle class and higher class, and rich. These are generally based on each nation, rather than global intervals. There are many reasons as to why so, it is common for living expenses to be higher in some countries, lower in others. Thus, in global terms, two individuals which may have the same income in two different countries, could be living very different lives. One would be considered as a middle class in a developing country but be considered poor in a developed country. Thus, it is more appropriate to base it on relative terms to each nation. Which is why it is difficult to quantitatively state each class, but often, to take as a visualization, the bottom 20% are considered poor, next 20% are considered lower class, next 40% are of middle class, and remaining 20% high class/rich, respective to the nation.

There is however, a universal “line of poverty” which is currently at \$1.90 a day.

It is not an absolute statement, those below the world poverty line may be doing just fine in their own nation where living costs are extremely low, as opposed to someone that is above the world poverty line but struggling to survive in another country where living costs are higher.

The individuals in said income groups can be very different to one another, not just in what they own and how much they earn, the class they are in affects their behaviors and mindset. I’ll explore through the different classes and how they differ in terms of their values and decisions they take as a starter to seeing how they affect the income they earn.

The poor group (i.e. individuals earning less than \$1.90 per day) mostly earn income on a daily basis. Since their living conditions are low they do not have a future outlook and

only goal is to survive through the day. Therefore, if they were to be paid monthly, they would spend their earnings straight away and struggle for the rest of the month until the next pay day (Banerjee & Duflo, 2007).

The issue here is, with these individuals, they do not have any other choice but to adopt a myopic mindset. It is ideal for individuals to save a certain amount of money, but for individuals in the poor income groups, they have no space to save(Hatlebakk,2012). We cannot identify the poor as myopic individuals, but only consider that their actions mirror those of myopic behavior, just here they have no other option.

In addition to this, most of individuals in the poor class have professions consisting of working on the field or through informal jobs where what they sell, or service for, they receive money straight away. Rarely does an individual who receives paycheck once a month be paid little enough to be considered amongst poor class.

The inconsistency in when they get paid affects their ability to look into the future, because they get paid each time they make a service or sell crops in small amounts. The small amount of money given gives cognition that they cannot save some part of it because they cannot survive otherwise. Since they use this approach each day, at the end of the month they have saved little to nothing. The lack of money also drives many to borrowing in order to survive, it is also very unlikely that they will be able to pay it off. Due to this, it decreases their credit impression which deters other individuals from providing loans (Gandy, King, Hurle, Bustin & Glazebrook, 2016).

Also, in terms of time management, most of their time is gone into to working, time is crucial to those in poor class as the opportunity cost to leisure though is small, it is what they need to survive thus have little leisure. Since they work longer hours without break, their productivity and health decreases over time which further affects their ability to work in the following periods.

In larger decisions- such as marriage and children, the poor tend to be married to those of the same financial state. In addition, they tend to have a greater number of children, which

means they have higher living costs- implying there will not be space for saving money (Banerjee & Duflo, 2007).

The lower class are still relatively similar to the poor with their approach to consumption. The professions however may differ, as if they were to work official jobs but receive minimum wage, they will usually be paid once a month. Thus, even if they are urged to spend in small consistent amounts, they may still have impulsive buying personalities and will suffer days approaching next payday.

Nevertheless, depending on the relative measures of the nation, they may have more opportunities than the poor. Lower class can choose to send their children to school as opposed to working in child labor since they can afford it. This action/decision is a more future-oriented approach as they believe that they will benefit from educated children in the long term (education ensures higher income). Like the poor, they may also choose to work longer hours since their wages are low and face the same process of decreasing productivity over time.

The middle class is the hardest to identify because it is the section in which its size differs the most between nations. Whereas, the rich are at about 10% in most nations, middle class could be 40% in one nation and 80% in another. In the middle class, the average individual may be earning the average income as it is more towards the medium income value. Majority if not all middle class will go through a once a month pay day scheme, and so will have future oriented approaches to consumption. Middle class individuals will also be earning a good amount to not only cover necessities but also to save some amount of money that will gradually accumulate over time.

In addition, middle class individuals will be earning enough to afford leisure time, since their wages are higher they will work the hours needed to cover expenses and some additional wants, as well as saving. Then cater to some hours of leisure. This will allow them to rest and recover from work, which will maintain their productivity. The middle class is also the interval with the most varied types of people. Here what approach they take in terms of consumption is based primarily on their intertemporal preferences. Each person has different utility

functions on whether they want to spend more money in the present period or in the future periods. Thus, there will be both still be myopic individuals, simply because their utility is more inclined towards spending in the present, rather than it being a budget constraint that doesn't allow to save them a lot. They may spend a lot but still save a good amount.

The higher class is both similar and coincide with the richest 10%. The consumption attitude in particular, since they have enough income, they save vast amounts of money that goes into their assets for the future periods. However here, individuals will be spending in the moment since they earn high amounts of income, they can have a myopic approach yet still be future oriented by what they are spending on. Individuals will have be able to invest and set up business projects. In terms of time, because they earn a high amount, individuals pass the maximum willing to work curve and start to value leisure hours more than working. They also earn high enough to perform activities in leisure. Individuals in these classes also shop for the sake of leisure, thus both consuming and taking away from work hours (Kelly, 1978). In case of marriage and children, richer individuals tend to marry only those of their social class, as well have fewer kids (which implies lower living expenses).

It is now important to test whether there is a cycle of individuals in said classes making decisions that affect their persistence in said classes.

2. Empirical Section

2.1 Research Motivation

Prompting on earlier in the thesis, previous research was done on other areas of significance; government policies, education, corruption. It was difficult to find research on whether it is individual themselves that influence their income- further expanding it to whether individuals are a lever in the growing income inequality. This inspired needed analysis as taking the individuals into consideration can help reduce the income gap through changing individuals' approach. Now that we've gone through the core areas that are involved

with households and income, we will follow into the actual process of finalizing a relationship between decisions households make and income inequality.

Whilst performing research and branching out to the different areas that were needed to describe, I found that there may be a present reverse causality in my research. While individuals' decision making could affect their income and in turn income inequality. It can also go the opposite way where the income they are receiving and resulting income group may affect their behavior and decisions they make. Thus, in addition, I will analyze whether there is an influence of income inequality on household decision making, then compare which effect is more significant.

2.2 Research Hypothesis

As I want to analyze how decision making of households affects income inequality;

Formally, my hypothesis that I will defend is as following:

Decision making of households does have an effect on income inequality.

Though, this will not be the raw hypothesis that is reflected in regressions since decision making of households will be broken down to the consumption, hours worked, female in the labour force, etc. In addition, income inequality is not directly affected, the direct influence is on the change in income in the following periods. From the change of income we can abbreviate an influence on income inequality.

The raw hypotheses will be looked into further later on, with a breakdown on each decision situation.

As mentioned briefly, we may be facing reverse causality, thus I will also analyze the effect of income inequality on the decision making of households.

The hypothesis in this situation is as following;

The present income inequality will have an effect on the decision making of households.

2.3 Research Procedure

The research analysis will go as followed;

To find how consumption will affect the rate of income inequality, I will settle a regression of average consumption of each decile on the measures of inequality-Gini, Palma, Theil. I will use the data under Global Income Consumption Project by Rahul Lahotti, Arjun Jayadev, and Sanjay G. Reddy for the analysis. I have selected four countries as sub samples of the analysis- which will be elaborated later on.

For analyses on investment and savings, I will extract data from the OECD Library for the Czech Republic, South Africa and United States. As Tajikistan is not under OECD countries, I had found data from World Bank's Global Findex. The data regarding financial assets and savings are taken and binded with the measures of inequality (taken from GCIP), for the same years in order to perform the analysis.

After this, I will look at how hours worked of individuals, additionally total hours of households, affects the income in the following period. This is a given as the more hours worked, the higher the income- using hourly wage as a basis, but it may be a space for income inequality to worsen as some may work more to get the same earnings as others.

I will then look at whether the female in the household are working. As mentioned in the theoretical part, when the females are also working the total household income more or less doubles the total income than if it was just the male, *ceterius paribus*.

Data for both hours worked and female participation is taken from the ILOSTAT database. The same procedure as investment will follow, with binding the values with the measures of inequality.

After this, I will look at religiosity's effect on income inequality. The indicators of interest will be whether an individual belongs to a religion, and whether the individual identifies as religious or not. These variables will be transformed into dummy variables –as

the surveys are cross-sectional. The share of individuals who answer yes will then be used as the measure of religiosity.

In addition, since I wanted to evaluate the role marital choices and preferences play in income inequality, I wanted to find a trend related to individuals characteristics, income group and their spouse preference. However, since it was difficult to find survey data specific to my inquiries, I created and distributed a survey through Survio services. This will further be elaborated on in the survey section 2.5.

Finally, a brief comparison will be done to other alternate factors of income inequality. Then, I will test for any present reverse causality.

The softwares that I will use for performing analysis are Gretl Program and R Studio. Both are used in order to compare and identify if the output was accurate. If there are different output for the same formula, then there was a mistake in the regression, whereas I wouldn't be aware had I used only one.

2.4 Data Sources

2.4.i Global Income Consumption Project

The Global Income Consumption Project was introduced by Rahul Lahotti, Arjun Jayadev, and Sanjay G. Reddy in 2018. The project was inspired by the rising growth of income inequality, and the idea that though global income was rising, there was not much change to the wellbeing of individuals. The aim was to provide a base for analysis in any inquiry regarding consumption and income. Regarding time period, the dataset has observations from 1960-2015, and projections for future periods based on current trends. The project consists of a scope of more than 160 countries and consists of different surveys based on the region of interest. Sources include EU-SILC, LID, SEDLAC, UNI-WIDER(WIID), Povcalnet and WYD (Lahotti, Jayadev, Reddy, 2016).The project is separated into two datasets; Global Consumption Dataset (GCD) and Global Income Dataset (GID), respectively. Further they have three indicator datasets that are focused on; income inequality, consumption inequality, and consumption poverty. The project is available to the public in Stata and Excel

formats. Since I will use Gretl program and R Studios to run my analysis, the Stata file is most convenient.

To help for a smoother analysis, I have appended the two datasets. The variables include:

- “country”- Country Name
- “coun3”- Country Code
- “year”- Year
- “atkinson2”- Atkinson Index $\alpha=2$
- “gini”- Gini Index- measure of income inequality
- “incomeX”- mean income of decile X
- “consumptionX”- mean consumption of decile X
- “theil” –theil GE index- measurement of income inequality
- “palma”- Palma ratio- measurement of income inequality
- Etc.

The listed variables are the ones I use and are relevant to my inquiry, further variables were income definition, secondary source, survey questions, etc.

I appended the datasets to allow me to test whether the consumption of individuals in each quintile influences the income, and vice versa. Before each had observations only for consumption and income, respectively. Since the observations of each individual is divided into quintiles I will have to run a regression for each quintile- though this will be to my advantage as I can see whether there is a difference in significance of consumption on income in each income group. I can further test it on different classes of income, such as the the bottom 40%, middle class, and the top 90%.

According to the authors, income of an individual can be derived from consumption through the following formula;

$$SI_{ij} = \alpha_i + \beta_i SC_{ij} + \gamma_i X + \varepsilon$$

Where SI denotes the share of income for quantile i, SC denotes the share of consumption for quantile i, X is a set of controls of country income level, region and income concept (wealth or income), i and j are for quantile (i) and country (j), respectively.

When trying the regressions, the coefficient for SC is higher at the bottom and top quintiles and less in the middle quintiles.

Further to help identify whether there is a difference in the effect based on region, I have chosen four countries to compare and run analysis on. I do so by restricting the sample based on criterion (In Gretl);

country= XXX

Based on the number allocated to the country, which can be found on the string table provided by the dataset. This drops all other observations of other countries, allowing us to run an accurate regression analysis. In R studios, I use a filter `country=="Country X"`.

However, the variables in the files are strictly limited to data on consumption. Therefore, to explore on how time use, labor participation of females, religiosity etc. affect the income level, I will use the ILOSTAT- provided by the International Labour Organisation (ILO). Further datasets will be used, but to an asymmetric disadvantage, as some countries have more data available than others.

2.4.ii International Labour Organisation

The ILOSTAT database is a source for labour statistics, with indicators ranging from share of informal employment in rural/urban areas to hours worked by occupation. The ability to adjust the variables of the dataset to only add ones I needed worked to my advantage as I wanted to only explore female participation rate and time use of individuals.

Selected indicators are as follows:

- Labour force participation rate by sex
- Average weekly hours worked by sex and economic activity

- Average weekly earnings by sex and economic activity

To this dataset, I added Gini, Palma, Theil observations taken from the GCIP datasets, to ensure that there is consistent values used through the regressions for more accurate analysis and comparisons.

2.4.iii World Values & European Social Survey

To test whether religiosity influences the level of income inequality, I will use the data included in World Values Survey (for countries South Africa and United States) and European Social Survey (for the Czech Republic). For the case of Tajikistan, I used national Demographic Health Surveys.

The World Values Survey is a research project whose objective is to explore people's values in different countries and how they change over time. Wave 6,5,4,3,2 and 1 were chosen for analysis for both South Africa and United States. The surveys indicators vary from political views, to views on education, to religion, etc. The ESS has similar variables however their aim is to find social trends in the values amongst different European countries.

2.5 Survey

Due to a lack of data on marriage preferences that was accustomed with income group, I had created my own in order to understand whether there are certain trends in the characteristic or income group of the individual that shape their preference. This reflects the theory stated earlier on that educated or persons earning a higher income would only prefer marrying persons that are educated and of higher income.

I created the survey through Survio services, which is an online free survey creator that has a section to aid students and professors with academic research. The survey was done in English, as it commonly spoken amongst many nationalities and to ensure furthest reach and allowed easiest input for majority of readers.\

One limitation regarding this is the exclusion of non-internet users. This also marks individuals of lower income groups. As internet services are either a product they cannot afford, or a product that they do not deem necessary amongst other things.

Questions included where about the individual's characteristics, gender, nationality, employment status, etc. This helped identify and control whether there is a trend in the gender or culture of the individual, aside from the income group.

I settled the hypothesis that the female individuals would not prefer a significant other of lower income as it disempowers the idea that the male is the bread winner of the household. In contrary, male individuals would not prefer to marry those of higher income for the same reason. Survio provided the advantage of analyzing and summarizing the responses to what share of individuals answered what, frequency of answers, etc. I did however have to further download the responses to analyse any trends.

2.5.i Survey Questions

First, respondents were asked to state their nationality and where they were based in. This was done to conduct for any underlying preferences based on culture. Then they were asked to state their age and household structure (i.e. how many females/males there are, how many of them work, etc.).

Then questions regarding marriage and time use were asked on the next pages.

Questions on marriage preferences were asked as following;

For preferences based on education of the significant other:

Would you marry another of a lower education level?

Would you marry another of a higher education level?

Would you marry another of the same education level?

For preferences based on income of significant other

Would you marry another of a lower income level?

Would you marry another of a higher income level?

Would you marry another of the same same level?

To which each answer had a limited Yes/No option.

Questions on time use were asked as following:

What do you usually spend your time doing?

What would you rather spend time doing?

Respondents were asked to further state why they could not do desired activity. This is set to explore why and how individuals spend their time and whether there are any constraints present that prevent them performing desired activity.

2.5.ii Results

Though small, there was only 45 respondents to the survey, it was enough to identify a trend in the characteristics of the individual and their preferences on marriage.

The results on marriage preferences can be seen below.

Marital Preferences based on Income and Education of Spouse

	Income Level		Educational Level	
	Yes	No	Yes	No
Lower	25	20	25	20
Higher	40	5	42	3
Same	43	2	42	3

Table 1- Results of own survey

Of the 45 responses, 60% were female, we may encounter asymmetric findings that may show inaccurate or general results that can not generalize the whole population. However, it was enough to find a trend to support or disprove my hypothesis. Of all the responses, 20 responded no to both lower educational and income level.

All those who responded no were female. Therefore, we can support the hypothesis that females will not be willing to marry another of lower income/educational level.

On the contrary, males showed no preference and were willing to marry of all statuses, whether that was lower, higher or the same. Thus, my hypothesis was disproven in the case of male preferences.

In terms of income group, I encountered a bias issue in the area that most of my respondents were students who were not employed/looking for work, thus it was difficult to identify their income group to be able to analyse where income groups play a role in the preference.

However, of the 40% who do work, those achieving higher were more willing to marry someone of lower income. One limitation here was that those earning higher were mostly males. 70% of females were students and not looking for work but were also amongst those who did not prefer marrying another of “lower income”. Thus, here there may be a bias as these respond based on an expectation of the income they will have once they start working rather than a true value of income that earn.

Regarding time use and leisure, there no significant trends that could be picked up based on income group. Most respondents said meeting friends, reading, cooking, etc.

However, when asked what they would rather be doing and why they are unable to do so, many responded with learning, self-development and traveling. Reasons for not doing where obligations such as work and studying. Here we can see in a constraint where people want to develop on themselves to gain skills but are constrained to other obligations that take up time.

2.6 Data Model

2.6.i Sample Countries

To set a broad interpretation if the relationship is present, four countries were chosen for greater accuracy. I have selected based on the attributes of each country. Selected countries were the Czech Republic, South Africa, Tajikistan and United States. The Czech Republic and South Africa, respectively are countries on opposite sides of the spectrum regarding income inequality. South Africa struggles with a lack of state infrastructure. Most policies only benefit

those of high income groups, which as we said earlier further drives the income inequality, hurting individuals of lower income groups more than higher.

Whereas, United States and Tajikistan, are counterparts with respect to gross domestic product. This is chosen to see if the Kuznets Hypothesis that was described earlier on in the thesis, is present.

Tajikistan, in particular, is my home country, thus so I have firsthand experience in both the income inequality and decision making rationality of individuals.

In addition, Tajikistan is a primarily Muslim country, where women are not desired in the labour force, reasons such as for class honour and women exposure (similar to India's situation described earlier on in the thesis). We can explore whether the lack of women in the labor force plays a role in the rate of income inequality

First, to compare the inequality of all four countries, Ive performed summary statisites on Gini coefficient, Palma Ratio and Theil Index..

The Czech Republic has the lowest observations in the measures; Gini Coefficient, Theil Index, and Palma Ratio. The average Gini was 0.295, Palma ratio was 0.79 and Theil was 0.09.

South Africa as the highest observations. The average Gini was 0.664, more than three times the Gini of the Czech Republic, the average Palma was 8.54, and the average Theil was 0.72. It is already clear from these figures that South Africa is the counterpart of the Czech Republic with respect to measures of inequality.

For Tajikistan, the average Gini was 0.345, Palma ratio was 1.81, and Theil was 0.18. Though it is higher than the Czech Republic, it is relatively small compared to South Africa.

Lastly, for the United States , the average Gini is 0.312, Palma ratio is 1.76, and Theil is 0.23. When compared to Tajikistan as its counterpart in GDP, we can see that they are relatively similar, thus in this case (not succumbed to generalizing) we can state that GDP does not affect the income inequality.

2.6.ii Consumption

To start the exploration, we will look at how the consumption will affect income inequality. The basic approach is to run an Ordinary Least Squares regression with consumption as the explanatory variable and Gini coefficient as explained variable. I will also test whether these differ depending on the measure of income inequality, for accurate results.

The regression will be as following;

$$G = \beta_0 const + \beta_1 consumption_1 + \beta_2 consumption_2 + \dots + \beta_{10} consumption_{10} + \varepsilon$$

Where G denotes the Gini coefficient, β denotes the coefficient of the consumption of each decile 1,...,10, and ε is the error term. β is such that if consumption increases by one unit, ceteris paribus, the Gini coefficient will increase by β units. Through this equation, we can not only analyse whether the variables do have an effect but also to see consumption of which income group affects the Gini coefficient the most.

We can take it further and identify whether the same income group holds by testing on other measures of inequality such as Theil Index and Palma Ratio.

Regarding the hypothesis, I will hold that the null hypothesis H_0 will be that consumption does *not* affect the change in Gini coefficient. On the other hand, the alternate hypothesis H_1 , will be that consumption does affect the change in Gini coefficient.

Further, we can analyse whether consumption affects Gini through its effect on income and so we can run a two stage least squares regression. Which we use consumption as the instrumented variable.

2.6.iii Investment and Savings

To test the effect of investment and savings, we will look at the variable household assets ratio of total financial assets, which is found in the OECD iLibrary Database. For Tajikistan, World Banks Global Findex is used instead. In terms of savings, the variable is

the percentage of total disposable income that the individual saves. We can design the regression as following:

$$G = \text{const} + \beta_1 \text{household_assets} + \beta_2 \text{savings} + \varepsilon$$

Where as described above, household assets are the percentage of total assets that are under households names, and savings is the percentage of total income that is saved.

I would expect that with an increase in assets and savings, the Gini would decrease as more have returns to future earnings. However, since we looked at the constraint of lower income individuals with regards to saving and investing, we would only see an increase as a result of higher income individuals investing more- thus it's expected to increase the Gini coefficient.

2.6.iii Time Use

Referring back to time allocation, as mentioned before, finding data on work hours regarding time use is most accessible. This is due to accurate measurement of time spent at work, especially in contracts with hourly wages.

To be able to analyse the effect of work hours on the Gini coefficient , I appended the data extracted (customized) from the ILO database to the GCIP dataset. Through this I could regress gini on hours.

The regression will be as following;

$$\log G = \text{const} + \beta \text{hours_worked} + \varepsilon$$

Where hours_worked is the average number of weekly hours, other variables take as given in the previous consumption analysis.

The only issue here is the data source (ILOSTAT) does not provide hours worked divided by the quintile, thus it is difficult to compare hours worked amongst income groups. However, we can take a broad assumption and compare amongst countries of different national income levels. Here we will use the developing countries as a reflection of low income and developed countries as a reflection of high income. As we mentioned in the section 1.3.ii, lower income groups tend to work longer hours as their hourly earnings are lower (work longer to gain larger income).

One limitation to this approach is that the differences in hours worked and cannot be fully derived by the income level of the country, other factors such as culture, customs, and laws play also play a large role in how many hours the average individual works a week.

2.6.iv Female Labour Participation

In the situation of the females role in the household and whether it she works and earns income or not can greatly affect the total household income and further, difference in incomes. Two individual males in two different households with the same exact income could have different total household income levels , as one will have a female working and so adding on the cumulative household income. This can pave the bar and have one household less off and increase income inequality that could've been reduced with the potential income of the female had she worked.

The equation can be expressed as following:

$$G = \beta_0 + \beta_1 female_{particip} + \varepsilon$$

Where, as previous formulae, G denotes the Gini coefficient, and female particip represents the percentage of labor force that is female. The formula is fabricated as such that with an one unit increase in the female participation (which is expressed as a ratio to the labor force), the Gini coefficient will change by β units.

Regarding the null hypothesis, we will test that female participation will have no effect on the Gini coefficient. If rejected, we can identify that the female labor does affect the Gini coefficient.

2.6.v Religiosity

As mentioned earlier in the theoretical framework, how religious an individual is, affects their approach and mindset both on other decisions but also to the income that they receive. In the exploration, it was brought to attention that the more religious the individual is (depending on the choice of religion), the less they will pay attention or strive for higher earnings, and so take their earnings as given. We can test this by performing a regression analysis of the Gini coefficient on measure of religiosity.

As mentioned earlier, the data I will be using is of the World Values Survey (WVS) and European Social Survey (ESS). The variable of interest was whether individual belongs to a religion (ESS) and whether the person is religious (WVS). The observations were either “1”- being religious/belonging to a religion, “2”- not being religious/not belonging to a religion, and “-999” for any unanswered, not asked, etc.

I will be deriving dummy variables from the above (values encoded as 1), indicating whether or not the individual is religious (1 being religious, 0 being non religious). I will then perform summary statistics to find the share of individuals that are religious in the country. Since the surveys are cross-sectional, I record the share in each year and add it to the Gini observations.

The regression will be performed as following;

$$G = \beta_0 + \beta_1 \log(\text{religiosity}) + \varepsilon$$

Where religiosity denotes the observations of the share of individuals. A logarithm was done as religiosity is a share of population, hence cannot increase by one unit, now can by one percent. The formula is then designed as such that with a percentage increase in religiosity, the Gini coefficient will change by $\beta/100$ units.

One disclaimer, however, to this approach is that it is only how the religious individuals will affect the Gini coefficients. Thus, it is only the rate at which individuals and households choose to be religious that we are analyzing, not how religion affects income inequality directly.

2.7 Data Results

2.7.1 Analysis of Consumption

Since I have chosen to examine and compare four countries, and ten income variables, the showcase of results will be organized based on countries. Each country will have a regression table based on income groups.

2.7.1.i Czech Republic

To start off, we can have a look at the summary statistics regarding the average consumption of each decile (measured in dollars).

Table 2- Summary Statistic of Consumption Deciles- CZ (Source:GCIP- own calculations)

Variable	Mean	Median	S.D.	Min	Max
consumption1	118.6	122.6	28.6	68.7	167.4
consumption2	161.4	165.9	42.0	93.0	235.7
consumption3	192.3	196.5	49.0	111.	279.3
consumption4	220.9	224.1	55.5	127.	319.6
consumption5	250.1	253.4	62.7	144.	361.8
consumption6	282.3	286.6	71.2	163.	469.9
consumption7	321.1	323.0	82.3	184.	470.1
consumption8	373.6	373.4	98.2	213.	554.3
consumption9	461.2	457.2	126.0	260.	696
consumption10	843	821.8	254.7	406.	1299

Even if the Czech Republic is described as a more or less equal country, it still has its extremes on ending deciles. For the case here, individuals in decile 10 earn almost eight times, on average, the amount consumed by individuals in decile 1.

In comparison to income values, all income groups spend more or less half of their income. Now that we had a glimpse to the trends in consumption of individuals in each decile, we can perform the regression.

The regression for sample Czech Republic, filtered where country code variable is equal to 'CZE' generates the following output presented in Table 3.

Table 3- Regression analysis of Gini on consumption- Czech Republic (Source:GCIP-own calc.)

	Coefficient	Standard Error	P-value
Consumption of income group			
Low Income Groups			
Coefficient	0.2915	0.0055	2.06e-046 ***
Decile ₁	-0.0020	0.0003	5.44e-08 ***
Decile ₂	-0.0023	0.0036	0.5146
Decile ₃	-0.0067	0.0078	0.3916
Decile ₄	0.0029	0.0431	0.4925
Middle Income Groups			
Coefficient	0.2953	0.0077	2.54e-039***
Decile ₅	-0.0196	0.0931	0.0401**
Decile ₆	0.0562	0.0261	0.0362**
Decile ₇	-0.0537	0.0240	0.0296**
Decile ₈	0.0168	0.0069	0.0184**
High Income Groups			
Coefficient	0.2888	0.00467	4.44e-051 ***
Decile ₉	-0.0003	5.082e-05	1.38e-07***
Decile ₁₀	-0.0008	2.5140e-05	3.17e-010 ***

***' 0.01 '**'0.05 '*'0.1

Firstly, to explain the regression, for a unit increase, ceterius paribus, in average consumption of individuals in decile 1, the Gini coefficient will decrease by 0.002 units. For a unit increase in consumption of decile 2, the Gini coefficient will increase by 0.0023 units, and so forth. Overall, the consumption of decile 6 as the biggest influence, increasing the Gini coefficient by 0.056 with a unit increase.

Following up, we can also test our null hypothesis H_0 through the p-values. For the lower income group samples, only the consumption of decile 1 is lower than 0.05, we can only reject the null hypothesis for the case of decile 1. This is a given as since they consume in lower amounts, a unit increase is a big change, leading to reducing Gini more significantly. However, in the middle- and high-income groups, we can reject the null hypothesis for all income variables, thus disproving that consumption of income groups has no effect on Gini coefficient.

To analyse further, I tested if the null hypothesis holds when analyzing other measures of inequality, such as the Palma Ratio and Theil Index. The trend where the middle-income groups have the bigger coefficients, also holds for the other measures

2.7.ii South Africa

To get an idea of the vast difference in how much on average each decile consume (in dollars), we can look at the summary statistics.

Table 4 Summary Statistics of Consumption- South Africa (Source:GCIP-own caluclations)

	Mean	Median	S.D.	Min	Max
consumption1	23.20	23.63	3.960	12.91	32.10
consumption2	34.00	33.94	5.692	24.37	50.76
consumption3	45.78	45.36	7.333	33.08	64.25
consumption4	59.68	59.60	8.870	44.21	77.87
consumption5	76.94	77.44	10.41	58.92	94.14
consumption6	99.60	99.19	12.39	79.25	126.4
consumption7	131.7	134.9	16.15	107.1	174.2
consumption8	182.7	186.7	25.47	137.8	253.1
consumption9	283.0	288.6	52.49	190.9	419.7
consumption10	788.7	760.8	301.1	375.1	1515

As is apparent, individuals in decile 10 on average consume more than 30 times as much as individuals in decile 1. What can also be seen as the change is gradual until decile 9, where it then triples. This goes to show that decile 10 can take account for most contribution the high inequality. If we further take it into consideration with the income of each decile, only decile 1 , on average, consume more than they earn, meaning that they had to borrow.

We can then perform the regression, with Gini as the explained variable and consumption of decile_i as the explanatory.

Table 5 Regression analysis: Gini on Consumption- South Africa (Source: GCIP-own calculations)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Consumption of income group			
Low Income Groups			
Coefficient	0.5335	0.0599405	5.84e-012 ***
Decile ₁	−0.0918	0.00995161	1.86e-012 ***
Decile ₂	0.2643	0.0276737	6.05e-013 ***
Decile ₃	−0.3559	0.0351333	8.33e-014 ***
Decile ₄	0.1586	0.0157831	1.08e-013 ***
Middle Income Groups			
Coefficient	0.6582	0.055591	2.99e-016 ***
Decile ₅	−0.0713	0.06324	0.2645
Decile ₆	0.2174	0.13028	0.1012
Decile ₇	−0.2050	0.0881	0.0240 **
Decile ₈	0.0588	0.0190	0.0032 ***
High Income Groups			
Coefficient	0.4254	0.037035	5.30e-016 ***
Decile ₉	−0.0004	0.000175	0.0148 **
Decile ₁₀	0.0003	3.05E-05	2.12e-015 ***

***, 0.001 ***, 0.01 * 0.05 .1' '1

Here, the lower income groups have the larger coefficients, where decile 3 has the highest. A unit increase in the average consumption of individuals in decile 3 will lead to a 0.355 unit decrease in the Gini coefficient. This differs to the Czech Republic's trend of middle-income groups and may be a result of lower income groups facing the issues of the inequality.

Regarding the null hypothesis, all income groups, except for decile 5 and 6, have a p-value less than 0.05, thus we can reject the null hypothesis that the consumption of individuals has no effect on the Gini coefficient in favour of the alternate hypothesis that the average consumption of individuals does affect the Gini coefficient. At deciles 5 and 6, we fail to reject H_0 that the consumption has no effect.

2.7.iii Tajikistan

Again, to start off we observing the variables through summary statistics.

Table 6 Summary Statistics of Consumption-Tajikistan (Source: GCIP- own calc.)

	Mean	Median	S.D.	Min	Max
consumption1	49.29	54.11	24.74	11.36	81.77
consumption2	70.37	77.41	35.49	16.48	117.0
consumption3	88.01	97.01	44.68	20.55	146.6
consumption4	104.2	115.0	53.20	24.18	173.9
consumption5	120.2	132.9	61.69	27.71	200.9
consumption6	137.4	152.0	70.77	31.42	229.7
consumption7	157.3	174.2	81.32	35.71	263.2
consumption8	183.3	203.1	95.05	41.30	307.0
consumption9	225.0	249.1	116.8	50.31	376.5
consumption10	354.8	383.5	175.1	80.72	579.5

The income inequality is not too bad in absolute terms, given that Tajikistan is developing country, even decile 10 does not have too high of a value. However, in ratio terms, decile 10 consumes 7 times as much as decile 1. In addition, all income groups consumed less than they earned, which comes as a surprise as Tajik individuals are known to borrow a lot.

For the analysis filtered to Tajikistan as the country. The regression was generated, each listed based on the income of decile group please see Table 7.

Table 7 Regression Analysis: Gini on Consumption- Tajikistan (Source:GCIP- own calculations)

	Coefficient	Standard Error	P-value
Consumption of income group			
Low Income Groups			
Coefficient	0.2542	0.0007	2.21e-087***
Decile ₁	-0.0183	0.0020	3.54e-012***
Decile ₂	0.0785	0.0789	9.01e-013***
Decile ₃	-0.1047	0.0831	1.62e-013***
Decile ₄	0.0441	0.1053	3.073e-013***
Middle Income Groups			
Coefficient	0.2577	0.0004	8.51e-098***
Decile ₅	-0.0631	0.0049	1.32e-017***
Decile ₆	0.1674	0.0125	2.18e-018***
Decile ₇	-0.1465	0.0104	2.87e-019***
Decile ₈	0.0416	0.0027	2.62e-020***

High Income Groups

Coefficient	0.2665	0.0015	3.25e-075 ***
Decile ₉	-0.0004	4.535e-05	5.65e-014***
Decile ₁₀	0.0027	2.8818e-05	2.85e-013 ***

***' 0.001 '**' 0.05 '*'0.01 ' '1

Similar to the Czech Republic, the largest coefficient is found in decile 6, where a unit increase in the average level of consumption will increase the Gini coefficient by 0.164 units. There is however, no trend found in the results to identify the reasoning behind so.

In terms of the null hypothesis H_0 , the p-values are lower than 0.001, thus we can reject the null hypothesis that the consumption has no effect on Gini coefficient, the hypothesis held same for other measures of inequality.

2.7.iv United States

First to analyse the consumption patterns of the United States.

Table 8 Summary Statistics- Consumption- US (Source: GCIP- own calculations)

	Mean	Median	S.D.	Min	Max
consumption1	293.8	300.6	63.83	167.5	390.0
consumption2	443.3	448.8	99.95	251.7	588.3
consumption3	560.4	576.7	120.4	322.1	727.8
consumption4	670.0	696.5	141.1	386.7	863.5
consumption5	782.1	817.2	164.7	450.9	1008
consumption6	905.7	947.9	193.3	519.7	1172
consumption7	1054	1102	230.3	600.3	1372
consumption8	1256	1309	283.4	707.2	1642
consumption9	1594	1652	375.3	884.6	2118
consumption10	3150	3183	809.5	1713	4358

We can see individuals consume most of the four countries- though we have to consider higher GDP per capita and inflation rates. The same trend is followed with extremes at both ends, and middle deciles being stable.

For the analysis catered to United States, the regression analysis is presented below;

Table 9 Regression analysis- Gini on consumption- US (Source:GCIP-own calc.)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Consumption of income group			
Low Income Groups			
Coefficient	0.3349	0.0037	5.11e-068***
Decile ₁	-6.65e-05	0.0158	0.8458
Decile ₂	-0.0001	0.0424	0.0117***
Decile ₃	0.0007	0.0416	2.09e-07***
Decile ₄	0.0004	0.0141	3.85e-012***
Middle Income Groups			
Coefficient	0.3598	0.0034	4.29e-062***
Decile ₅	-0.0044	0.0006	3.41e-08
Decile ₆	0.0093	0.0016	2.22e-07***
Decile ₇	-0.0075	0.0013	3.08e-07***
Decile ₈	0.0023	0.0003	1.88e-08***
High Income Groups			
Coefficient	0.3388	0.00322	3.66e-063 ***
Decile ₉	-1.12e-05	1.659e-05	0.5041
Decile ₁₀	1.46e-05	7.692e-06	0.0638

***' 0.001 '**' 0.01 '*' 0.05 ' '1

The coefficients are much smaller in comparison to the other three countries; however the same trend is followed with decile 6 having the largest influence equal to 0.0093 units. This implies that with a unit increase in the average level of consumption in decile 10, the Gini coefficient will increase by 0.0093 units.

Regarding, the null hypothesis, all the decile groups are significant, hence we reject null hypothesis for all cases except for decile 1. This implies that decile 1's average level of consumption has no effect on Gini coefficient.

2.7.2 Analysis of Investment and Savings

The data extracted from the OECD Database is measured in the percentage value of financial assets under households over the total financial assets. Financial assets include shares, equity, insurance, pension funds, etc. As Tajikistan is not an OECD country, data was not available, thus so I used data from the World Bank's Global Findex. Over all, ~50% of assets were under households for the Czech Republic, accounting for the highest amongst the four countries, whereas the other three had around 15-20%. Financial assets was recently more introduced in Tajikistan, however it has a rapidly increasing trend.

In terms of savings, the rates are low through out all countries, accounting for 5-6% of all income. The results of the regression can be found on the table 10;

Table 10 Regression Analysis- Gini on Household Assets and Savings (Source, GCIP, Global Findex, OECD iLibrary, own calc.)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Czech Republic			
Intercept	0.3158	0.043765	4.46E-06
Household assets	-0.0008	0.000911	0.386
Savings	-0.0016	0.001419	0.288
South Africa			
Intercept	0.4151	0.26645	0.142
Household assets	0.0201	0.01975	0.327
Savings	-0.0188	0.0141	0.203
Tajikistan			
Intercept	0.4464	0.000472	7.51e-12 ***
Household assets	0.0035	0.002283	0.197
Savings	-0.0003	0.00016	0.12
United States			
Intercept	0.3909	0.011685	5.35e-14 ***
Household assets	0.0020	0.001146	0.1005
Savings	-0.0015	0.000765	0.0702 .

***' 0.01 '**' 0.05 '*'0.01 ' '1

In the analysis, household assets observations were the ratio of total financial assets that are under the households' individuals name. Savings observations are the ratio of the total disposable income that the individual chooses to save.

From the sign of coefficients, we can identify that there is a commonality with regards to the savings variable. Amongst the countries, the savings variable has a negative coefficient on the Gini, this implies that with an increase in the savings

The relationship for South Africa and Tajikistan were negative, indicating that with an increase in the investment, the Gini coefficient will decrease. In contrary, for the Czech Republic and United States, the relationship is positive, implying that with an increase in investment, the Gini coefficient will increase.

However, if we consider the null hypothesis and the p-values, the p-values for all countries are greater than the 5% significance level, thus so we fail to reject the null hypothesis, implying that household assets have no effect on the Gini coefficient.

2.7.3 Analysis of Time Use

Data for time use was most difficult to find amongst all the choices that individuals make. I then succumbed to use hours worked as a measure of how individuals spend their time. Even though this may be restricted to data on employed persons, we are looking at income inequality, thus so the data on unemployed persons will not be relevant to the inquiry.

Though the ILOSTAT had full data on the Czech Republic, South Africa and United States, in terms of average weekly hours worked, only data for one year was available for Tajikistan.

To compensate for the lack of data on Tajikistan, I had found other data from the Tajik Demographic & Health Survey.

First, to perform a summary statistic where we can identify if there are any differences in hours worked based on the differences of the countries.

The countries did not differ greatly in the number of hours, the average being more or less 40 hours. The United States had the lowest on average amongst the four countries. The regressions were then per country and the results could be found on Table 11.

Table 11 Regression analysis- Gini on Time Use (Source: ILOSTAT, own calc.)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Czech Republic			
Intercept	0.1998	0.0346	9.92e-07 ***
Hours worked	0.0015	0.0008	0.0265
South Africa			
Intercept	1.0626	0.520282	0.0619
Hours worked	-0.0086	0.012149	0.4925
Tajikistan			
Intercept	0.5682	0.0218	1.04e-09 ***
Hours worked	-0.0030	0.0034	0.4047
United States			
Intercept	0.3256	0.0826	0.00149
Hours worked	0.0022	0.0022	0.34319
***' 0.001 '**' 0.01 '*' 0.05 ' '1			

Overall, the variables seem to be quite significant, going back to the perception that the Gini coefficient is a value between 0 and 1. All the countries have a positive coefficient except for Tajikistan. This implies that with an increase in the average number of hours, the rate of inequality will increase.

This is a surprise as sectors such as industry are the ones with have higher average hours, but incomes amongst individuals in these sectors are more equal.

Tajikistan is the only country with a negative coefficient, meaning that as average hours increase, then inequality will decrease. This is reasonable as individuals working on farms have relatively less asymmetry in their incomes as oppose to other sector.

2.7.4 Analysis of Female Labor

To recall the regression formula is as following;

$$G = \beta_0 + \beta_1 female_{particip} + \varepsilon$$

For the regression, I used data extracted from the ILOSTAT database, accustomed to labour participation rate as the indicator. The participation rate's values were measured in percentage value (i.e the ratio times 100).

The regression has been done separately alternating by the countries. I will first showcase them onto the table below then elaborate on the findings for each country based on their characteristics.

Table 12 Regression analysis- Gini on Female Participation (Source:ILOSTAT, own calc.)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Female Labour Participation			
Czech Republic			
Intercept	0.4144	0.0652	9.92e-07 ***
Female labour	-0.0030	0.0013	0.0265 **
South Africa			
Intercept	0.300724	0.197001	0.1405
Female labour	0.009588	0.004993	0.0673 *
Tajikistan			
Intercept	0.1874	0.0218	1.04e-09 ***
Female Labour	0.0038	0.0007	7.47e-06***
United States			
Intercept	0.2258	0.0445	3.11e-05 ***
Female Labour	0.0032	0.0008	0.000488 ***

***' 0.01 '**' 0.05 '*'0.1 ' '1

If we compare between countries, all countries have a positive relationship between female participation and the Gini, except for the Czech Republic. This finding did not support my predictions as I had thought that with an increase in the labor force participation of women, more women could contribute to the household income and improve their financial situation, thereby reducing the inequality.

2.7.3.i Czech Republic

A possible explanation to the positive relationship lies in the Gini coefficient of the countries. The Czech Republic has the lowest Gini coefficient of the four countries, and is the only country with a negative relationship. This implies that when women do choose to join the labour force, their earnings will be less unequal to others. The fair income distribution also improves the household situation and so will decrease the Gini. In this case, a one percentage point increase in the labour participation rate of females will lead to a 0.003 unit decrease in Gini. We can also identify the intercept is 0.41, implying that if the female participation rate was zero, then the Gini would be 0.41, which is almost double the actual Gini of the Czech Republic (average value of 0.25).

Regarding the null hypothesis H_0 that the coefficient of female participation rate is equal to zero, the p-value for the regression is 0.02655. As we can see, the value is lower than 0.05. Thus, we can reject H_0 for the case of the Czech Republic, at 5% significance levels.

2.7.3.ii South Africa

South Africa has the largest influence, with increasing the Gini index by 0.00096 units with a percentage point increase in the participation rate of females.

As mentioned before, South Africa has the highest Gini coefficient of the four. Adding on to the explanation used for the Czech Republic, though in the opposite sense. Even if women work in South Africa, they will receive unfair pay compared to male workers. If we consider the concept that women in households of higher income groups will not work as a response to social representation, the women who do choose to work will be of the lower income groups. If women in the lower deciles do work, they will receive earnings that contribute to the income inequality rather than improve it.

Regarding the null hypothesis H_0 , the p-value for the regression is 0.0673, which is greater than 0.05. Thus, we can reject the null hypothesis that female participation has no effect on the Gini coefficient, only at 10% significance levels.

2.7.3.iii Tajikistan

As mentioned earlier, Tajikistan has an average Gini coefficient of 0.3043. The coefficient of constant implies that if women were not to work, then the coefficient would be 0.183. This can be backed up by the idea mentioned before that Tajikistan is a conservative and religious country, where men are the breadwinners of the family. A woman working harms this representation and “brings exposure” to herself (Furkingham, 2000). Thus, to deter women away from working, the earnings of a woman will be significantly lower than a man, for the same occupation. If no women work, then the inequality amongst men will only be 0.183.

However, regarding the null hypothesis, the p-value is less than 0.05. Thus, we can reject the null hypothesis at 5% significance levels.

We can further test if it is applicable to other measures of inequality.

Table 13 Regression analysis- Theil & Palma on female participation (Source: ILOSTAT, own calc.)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Female Labour Participation			
Palma			
Intercept	5.1478	1.3077	0.000436 ***
Female labour	-0.09071	0.04276	0.04199 **
Theil			
Intercept	0.7307	0.1780	0.00027***
Female labour	-0.01382	0.005821	0.029474 **

***' 0.001 '**' 0.01 '*' 0.05 ' '1

What is interesting here is that the female participation has a negative relationship on both Palma and Theil whereas having it being positive in Gini. This goes to show the different aspects of inequality and how one section could worsen while another improves. Here as well, the p-values are less than 0.05, thus we can reject the null hypothesis at 5% significance level.

2.7.3.iv United States

United States takes the same concept and position as Tajikistan and South Africa . Since there is a wage gap between men and women, more women working will contribute more to the measure of income inequality rather than improving it.

Through the regression, the p-value was 0.048, which is less than 0.05. Thus, we can reject the hypothesis that the female labour participation has no effect on the Gini coefficient, for the case of United States.

I further found data particularly regarding households and families that was not available for the other countries. The data was extracted from the National Census Bureau under the Current Population Survey. The indicator of interest was ‘Table MC-1. Married Couples by Labor Force Status of Spouses: 1986 to Present’ (United States Census Bureau, 2018). The data held the total number of couples, the portion in which both spouses work, the portion where only the husband works, the portion where only wife works, and the portion where none work. Over all, couples where both work had the largest portion.

I then performed analysis of the measures of inequality on couples where both work and couples where only the wife works to see the effect where the wife is involved.

The regression formula was done as following:

$$G = \beta_0 + \beta_1 \log(\text{both_work}) + \beta_2 \log(\text{wife_only}) + \varepsilon$$

Since the observations are in thousands, log is done instead as one unit change will not have a large influence. The findings are presented in table 14.

Table 14 Regression Analysis- Gini on Wife working (Source: U.S. Census Bureau- own calc.)

	Coefficient	Standard Error	P-value
Spouse Participation			
Gini			
Intercept	-0.1155	0.2765	0.679
Both work	0.0296	0.0280	0.301
Wife only	0.0344	0.0055	1.54e-06
Palma			
Intercept	-6.02014	2.0060	0.00602**
Both work	0.60782	0.2032	0.00618**
Wife only	0.30088	0.0399	7.03e-08***
Theil			
Intercept	-0.47668	0.2976	0.122
Both work	0.04648	0.3015	0.136**
Wife only	0.04260	0.0059	1.58e-07***

***' 0.001 '**' 0.05 '*' 0.1 ' '1

For the Gini coefficient, households where only the wife worked had a larger influence on Gini coefficient. Again here, both had a positive relationship, where I had expected it to be negative as we sketched that if both work then it will help the financial situation of the households, as there is underused potential of the female to work.

The only support to it is the wage inequality, thus when the woman is working, she will face the gender income inequality when earning money, therefore contributing to the inequality.

2.7.5 Analysis of Religiosity

First, to describe the religious state of each country; the Czech Republic is one of the least religious countries in the world, which can be found with the low values for a majority of religion-themed variables in the survey (around 20% of the population belong to a religion, 2% consider themselves as very religious).

South Africa has a reasonably high religiosity, around 80% of individuals identify as a religious person, but only 60% see faith as an important quality in teaching their children.

Already we can see a pattern when comparing the two countries as counterparts in income inequality, with the Czech Republic being a relatively non-religious country and having a low income inequality, and South Africa being a religious country and having high income inequality.

Tajikistan is the most religious of the four countries (on average 98.5% of the population identify as religious), but has reasonably lower income inequality, thus the pattern may not hold. We can compare as well to U.S., which has similar measures of inequality, but lower rates of religiosity (only around 65% of the population are religious). From the descriptions, it seems to be that there is no relationship between religiosity and income inequality, however we can move to the regression to finalize.

To recall the regression formula for religiosity;

$$G = \beta_0 + \beta_1 \log(\text{religiosity}) + \varepsilon$$

Again, with a percentage increase in the religiosity, the Gini coefficient will change by $\beta_1/100$ units. See table 15 for the results.

Table 15 Regression Analysis- Gini on Religiosity (Source: World Values Survey, European Social Survey, TJK Demographic & Health Survey-own calc.)

	Coefficient	Standard Error	P-value
Czech Republic			
Intercept	0.2774	0.009075	1.71e-13***
Religiosity	0.0087	0.006047	0.172
South Africa			
Intercept	0.88203	0.09668	9.56e-07 ***
Religiosity	1.81791	0.45033	0.001649 **
Faith as Child Quality	-0.25462	0.04713	0.000159 ***
Tajikistan			
Intercept	0.4253	0.01223	3.26e-14***
Religiosity	-0.6870	0.38041	0.0941 .
United States			
Intercept	0.389384	0.012671	6.68E-06
Religiosity	-0.02779	0.028505	0.385
Faith as Child Quality	-0.009751	0.028181	0.747
***' 0.001 '**' 0.05 '*'0.1 ' '1			

There is not a common trend, if we look at the p-values, we can only reject the null hypothesis at 10% significance levels. If we take into consideration the signs of the coefficients, it is positive for the Czech Republic and South Africa. This implies that with an increase in the religiosity, the Gini coefficients will increase. However, the p-value for the Czech Republic is 0.172, which is higher than 0.1, meaning that the values fall outside the rejection region. As a result we fail to reject the hypothesis at 10% significance levels, for the case of the Czech Republic. Nevertheless, the positive relationship for South Africa had supported our claims that with an increase in religiosity, less will strive to earn higher.

On the other hand, Tajikistsn, and United States have a positive relationship. This may be a reflection of the more giving side of religious values. That when more are religious, they tend to donate to charity or, for example, perform zakat- a duty of Islam that encourages giving to the less fortunate (Kuran,2018). As a result, the Gini coefficient may decrease.

As data was available in World Values Survey (for countries South Africa & United States), I further regressed the Gini on both religiosity and whether the household sees faith as an important quality to teach their children. Again, this variable is a limited 1-Yes, 2-No observation, thus so could be transformed into a dummy variable. The share of individuals who answered with yes is then used as the observation. The household's outlook on teaching faith is important to consider as it indicates whether the religiosity will persist for future generations.

For South Africa, though religiosity has a positive relationship, importance of teaching faith has a negative relationship. This could be due to encouragement to display and demonstrate values in front of the children, like mentioned above, more will be willing to donate to less fortunate as a demonstration to children. P-values here are smaller than 0.05, thus we can reject the null at 5% significance levels.

2.8 Reverse Causality

2.8.i Consumption

Consumption is not unlimited, individuals are not free to consume the extent to which they would like, and are constrained by money, time, place, etc. So, while researching how an individual's consumption affects its income and the nations status in income inequality, we cannot neglect the perspective that how an individual chooses to consume can be influenced by their income. Thus so, we can analyse the influence that aspects such as income, Gini, share of their consumption has on the individual's consumption.

We can formulate the influence as following:

$$consumption_{ij} = \beta_0 + \beta_1 \log(gini) + \varepsilon \quad \begin{array}{l} i = (1, \dots, 10) \\ j = (1, \dots, 162) \end{array}$$

Where consumption is average level of consumption, i represents the decile and j represents the respective country.

A logarithm of Gini is used as we cannot increase Gini coefficient by one unit (only ranges from 0 to 1). Thus so, it will be a one percent increase in Gini leads to a $\beta_1/100$ unit change in the consumption. Further the formula can be adjusted to not only analyse other measures of inequality, such as Palma Ratio, or Theil Index, but also the income for each decile.

A common trend across each country was that for each measure of inequality has a negative influence on the consumption for all income groups except for decile 10, where it was positive. This implies that where the inequality measures increase, the average level of consumption will decrease by ~0.5 units. This can be explained, as more will grow uncertain on the future of income inequality and it leaves an influence on their incomes and thus so choose to consume less and save more. Whereas for the top 10, a rising income inequality will be to their benefit, thus so they will spend more.

2.8.ii Time use

Though hours worked is not flexible all the time, as there are different occupations, with different levels of requirements regarding time. We can assume this case that individuals are faced with the decision to work over time or not. If there is income inequality present and individuals have perfect information of this inequality, they will be less reluctant to work overtime as they may perceive it as unfair that they have to work extra to have the same income as another individual.

We can test this with the following formula;

$$\log(hours_{worked}) = \beta_0 + \beta_1 \log(gini) + \varepsilon$$

Like the situation with consumption, log of Gini is used as increasing the gini coefficient by one unit is not possible.

However, results did not show as expected, but were a reflection of the results found in regression of hours worked on Gini coefficient.

The relationship for the Czech Republic, South Africa and United states were all positive, meaning that if the Gini coefficient increased by 1%, hours worked will increase by 0.3 – 0.7 % (amongst the three countries). This can pave the way for one of two effects that with an increase in income inequality, more are found working longer to receive the same

amount of income as certain others who have higher wage rates. It can also be in the case where there is asymmetric information in which households are not aware of the inequality present, therefore work longer to achieve the same level as other individuals.

In contrary, for Tajikistan, there was a negative relationship. This could be the other effect, where individuals are aware of the income inequality. Tajikistan is a country known for its corruption and unfairness that being said, with an increase in income inequality, more will be reluctant to work longer hours as they will not be earning the same as another individual.

To handle the reverse causality, I would propose a field experiment where individuals are deceived they are all receiving the same exact earnings- though in reality there is unfair distribution. No one is allowed to state their earnings, and each individual has some flexibility to their hours. Through this we can identify a trend without the preceding income inequality.

2.8.iii Female Participation

The wage gap has been something that we have been acting towards closing the most amongst the other forms of income inequality. However, it would be expected that if the rate of income inequality increases, this projects the wage earnings of female individuals, hence there may be a greater difference between men and women by either increasing mens' wage or decreasing womens' wage. As a result, more employers could be keener to employ female individuals, thus increasing the participation rate of females.

The following regression can be done to test for the influence of Gini on female labour force participation.

$$\log(\text{female labour}) = \beta_0 + \beta_1 \log(\text{gini}) + \varepsilon$$

As expected, there was a positive trend in the Czech Republic, South Africa, and the United States. Where a percentage increase in the Gini coefficient lead to 0.3 percent increase in the labor force participation of females.

In the case of Tajikistan, however, the coefficient is negative, but to a very small extent. Again, this could be based on another fact that, within the household, females have a low chance of being able to work already. If the income inequality were to increase, it would make less sense for the women to work if they are receiving much less than the men.

The solution to the reverse causality is very similar to the case with time use, alas this time it will be women choosing to work in labour or not.

2.9 Alternate Factors

Although I explore decision making of individuals as a factor of income inequality, it is not a statement that is the strongest factor, but rather it is one of the factors less commonly explored. It is realistic to state that individuals have little influence as they are constrained by their financial situation, hence the immobility in income (Hatlebakk,2012). To make it a brief comparison, I have chosen the Czech Republic (by random) to perform an analysis on hours worked, female participation, and in addition GDP per capita, and educational level. Education was measured in the percentage of adults who have achieved tertiary education.

Table 16 Regression- alternate factors comparison (Source: OECD iLibrary, ILOSTAT- own calc.)

	<i>Coefficient</i>	<i>Standard Error</i>	<i>P-value</i>
Gini			
Intercept	4.59E-01	9.56E-02	0.000723 ***
Hours worked	1.03E-03	1.98E-03	0.612963
Female Participation	-4.99E-03	2.19E-03	0.046236 **
GDP per capita	-4.69E-06	1.34E-06	0.005711 **
Education Level	1.81E-03	6.32E-04	0.016785 **
***' 0.001 '**' 0.05 '*' 0.1 ' '1			

When comparing the results, on the coefficients alone, since there are many variables, the coefficients are small. Female participation has the highest coefficient, in comparison to GDP per capita and education level. However in terms of p-values, we can reject the null hypothesis that the variables have no effect Gini at 5% significance levels, for all variables except for hours worked. The results do not indicate absolutely that female participation has a stronger effect than GDP per capita and educational level, but rather for the case of Czech Republic it persists.

2.10 Discussion

To sum up the findings, as we explored through how different decisions that individuals and households face and have to make; whether that be how much they choose to consume in that period, how many hours they work, etc.

For the case with consumption, across all income groups in chosen countries, consumption in middle deciles affected the measures of inequality the most. This does not have much support as to why it is so. However in terms of signs of coefficients, lower deciles had negative coefficients, which is a given as with increases in consumption, the lower deciles are covering their necessities which will support them in the next period. In contrary, higher deciles have a positive coefficient, which is a reflection of the rich continuing to spend money as they have all they need, this increase in spending increases the inequality.

For the case of investment and savings, the variables were not significant enough, thus so we failed to reject the null hypothesis of no effect on measures of inequality. However, based on our explorations, it was maybe due to inappropriate data- since the ratios do not divide by the income group, and we found that if investment were to increase- it would only increase in higher income levels. If we were to have data by the decile on household investments, it would be possible to find an effect.

For the case of hours worked, these results were also unexpected as three of the four countries had positive coefficients. This may be a touch on broader income inequality, since there laws for maximum hours in the office but more leniency with industry and farming, if there were to be an increase in the average hours worked, it will come from the industrial and agricultural sector. Broadly, the income amongst the sectors differ greatly, therefore increasing the income inequality. Tajikistan on the other and had a negative coefficient, this would be as a result of focus on the sectors, i.e. when they are working higher hours, this is because of the industry and farming sectors, who amongst themselves have lower income inequality.

For the case of female participation, all countries except for Czech Republic had a positive coefficient. This is a reflection of the initial income equality present in the country. When there is high inequality, especially gender, additional working of the female will contribute to the inequality more rather than improve it by improving their economic situation. On the other hand, Czech Republic has low Gini, both broadly but also based on gender.

Regarding the religiosity, data was only significant for the case of South Africa, to which we were able to also involve the importance of teaching the children faith and values. The coefficient was negative which may be as a result of demonstration of values and donating to the less fortunate- thus encouraging redistribution- and decreasing inequality.

Lastly, a comparison was done for alternate factors- Education and GDP per capita for the case of Czech Republic. The results shown showed that female participation had the most influence, with regards to Czech Republic.

Limitations & Evaluation

There were many limitations that were encountered in the scope of the thesis, particularly in the data gathering. Having different decision making situations prompted me to look for different data studies as they were not all gathered in the same dataset. Even with this, some of the data was not what I was hoping, or I would have performed more accurate results had I had data that were more detailed. I would have wanted to analyse the behavior of each decile but this was only applicable to the area of consumption.

Also regarding the survey, since it was done under a short time, I didn't get as many responses as would be sufficient to perform a full analysis and thus could only compare the results. There were many spaces for overestimating/underestimating answers- as I had asked for income range.

For future circumstances, given I had the scope, I would perform the field experiment controlled for reverse causality, but also a lab experiment analyzing how individuals make decisions when provided different levels of money- to test how individuals are affected and behave based on their earnings.

Conclusion

The objective of this paper was to explore whether individuals could play a part in the earnings they receive and in the difference to earnings of other individuals. Decisions which influence the individual's and households income were identified as the extent to which they consume, how they allocate their time, whether the females in the household work, etc.

The subject was important to consider in the drive to reducing income inequality as the solution could be in the hands of the households through changing their habits and how they affect their income- in cases where they are flexible to do so.

Data was analyzed separately based on the country and the decision variable of interest. Of the data, female labour participation rate was found to be the most significant amongst all the decisions in the role of influencing the income inequality.

The survey gave additional insight to the characteristics of individuals and how they spend their time but also marital preferences, this was to identify whether there would be a cycle to which higher income households marry only higher income households. The results did not identify a trend in the income group, but only female respondents of a range of income groups said no to marry lower income individuals. In contrary, males had no preference.

Further, the data from data sources was tested for any reverse causality present, in which the Gini coefficient will influence the explanatory variables. Reverse causality was present in all of the variables, with support to the influences such as speculation, awareness of income inequality, etc.

Though I had met my hypothesis and identified where the null hypothesis of the decision having no effect on Gini coefficient could be rejected, I believe the data was not large enough to set an accurate statement. The data was also briefer, data with more detail regarding the characteristics and terms of data would have worked more to my advantage.

In future circumstances, I could extend the survey further to more countries to identify where we can find a cycle in the strict boundary of higher income individual marrying those of higher income, and observe where these leads to a cycle trap in income inequality.

Appendix

Survey Questions

- 1) Are you male or female?
 - a. Male
 - b. Female
- 2) Which age group best represents your age?
 - a. 18 and younger
 - b. 19 to 26
 - c. 27 to 39
 - d. 40 to 49
 - e. 50 and older
- 3) In what state or territory do you live in?
- 4) What is your nationality?
- 5) How many males and females are in your household?
- 6) How many males and females work in your household?
- 7) Which of the following categories best describes your employment status?
 - a. Employed, working 1 to 39 hours
 - b. Employed, working over 40 hours
 - c. Not employed, looking for work
 - d. Not employed, not looking for work
 - e. Retired
 - f. Not able to work
- 8) Would you be willing to another person of different educational level?
-Matrix answer with rows lower, higher and same, columns- yes, no
- 9) Would you be willing to another person of different educational level?
-Matrix answer with rows lower, higher and same, columns- yes, no
- 10) What is the highest level of education you have received?
- 11) What was your net income in the last year (in dollars)?
 - a. 0-4999
 - b. 5000-9999
 - c. 10000-19999
 - d. 20000-34999
 - e. 35000-49999
 - f. 50000-64999
 - g. 65000-84999
 - h. 85000-99999
 - i. 100,000 and above
- 12) What do you usually spend your time doing?
- 13) What would you rather spend time doing? list reasons as to why you can't do desired activity
- 14) What do you value most in life?
- 15) What is your current occupation? What would you have wanted to be?

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