UNIVERSIDADE CATÓLICA PORTUGUESA

Regional inequality in Portugal

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Abstract

Inequality, especially income inequality, is the main reason for several social problems, among which the reduction of social cohesion and consequent rising criminality, health and scholar decline, among others.

Income inequality is related with the uneven distribution of income, which often results in different opportunities for the individuals, which may even find themselves in cases of extreme poverty. Income is not equally distributed across any country and varies across geographical space. This study supports the idea that it is fundamental to not simply analyze income inequality at the National level, but also analyze how inequality varies across different degrees of urbanization, namely: (i) large urban areas, (ii) small urban areas, and (iii) rural areas.

Moreover, we go beyond the standard Gini index, which is sensitive to changes at the middle of the income spectrum, but almost blind to shifts at the upper and bottom deciles, and apply several income share ratios as alternative inequality indicators, allowing us to infer about differences between deciles of the income distribution. Compared with other European countries, Portugal has a medium level of inequality. However, this study concluded that income inequality in Portugal has been decreasing since 2015 and that among the three degrees of urbanization, large urban areas contain the higher levels of inequality (even though rural areas presented a slight increase in 2019). The progressive tax system is one of the measures taken to reduce inequality. Furthermore, our analysis is done in terms of individuals and not households, which identifies levels of inequality that are “smoothed” by the later.

Keywords: Inequality, Income Inequality, poverty, social justice , degrees of urbanization

Resumo

A desigualdade, nomeadamente a desigualdade de rendimentos, é a principal razão para diversos problemas sociais, entre os quais a redução da coesão social e o consequente aumento da criminalidade, declínio escolar e de saúde.

A desigualdade de rendimentos está relacionada com a distribuição irregular e desigual de rendimentos, que muito frequentemente resulta em diferentes oportunidades para os indivíduos, os quais podem inclusivamente encontrar-se em situações de extrema pobreza. O rendimento não está distribuído de igual forma dentro de um país em termos geográficos. Este estudo apoia a ideia de que é fundamental não analisar somente a desigualdade de rendimentos a nível nacional mas também ao nível dos graus de urbanização: (i) grande áreas urbanas, (ii) pequenas áreas urbanas e (iii) áreas rurais. Além disso, este estudo vai além do tipicamente usado Índice de Gini, que é praticamente insensível a alterações nos decis de base e de topo, através da utilização de rácios de participação de rendimentos como indicadores alternativos de desigualdade, permitindo-nos inferir relativamente às diferenças entre os decis da distribuição. Comparativamente a outros países Europeus, Portugal possui um nível médio de desigualdade. Contudo, neste estudo concluímos que a mesma tem vindo a diminuir desde 2015 e que de entre os três graus de urbanização, as grandes áreas urbanas possuem os maiores níveis de desigualdade (apesar de as áreas rurais terem apresentado um ligeiro aumento em 2019). O sistema de impostos progressivo é uma das medidas adotadas para reduzir a desigualdade.

É fundamental referir que a nossa análise é feita em termos de indivíduos e não de agregados familiares, os quais têm um "smoothing effect" na desigualdade.

Palavras-chave: desigualdade, desigualdade de rendimentos, pobreza, justiça social, graus de urbanização.

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Chapter 1

Introduction

As stated by David Hume (1752), any state becomes weak if there is a too great disproportion among the citizens. Income inequality is a hurdle our society is facing and dealing with in an increasing path. But do we actually know or understand what people in general are talking about when they refer to inequality? Inequality of what and between who? It is fundamental to have a clear notion of these questions if we aim to have an even more clear view into this topic.

Income inequality has been closely followed due to its major importance in people's lives and living conditions. When comparing the inequality in income distribution in Portugal and in the remaining countries of the European Union, several studies show that our country has a bad classification in the ranking: there is a considerable level of inequality between individuals at both the degrees of urbanization and national levels.

When speaking about inequality, it is important to keep in mind two questions: inequality of what and between who? In this study I will be analysing income inequality in Portugal and by different degrees of urbanization. I will analyse if there are greater levels of income inequality between individuals in large urban areas or in rural areas and how have the levels of inequality been evolving after the economic crisis. The analysis of the economic differences and challenges individuals face during a certain period is fundamental in order to build adequate policies and a fair society.

Economic inequality is related with the disparities of income distribution, which often result in different opportunities for the individuals, which may even find themselves in cases of extreme poverty. Inequality indexes support our analysis on the disparities between economic agents inside and between different regions, and are often computed through the calculation of indicators such as the Gini index and the ratios between fractions of income owned by individuals – the Palma ratios, which have been gaining an emergingly attention and help us understand how considerable are the disparities and how much do the richest individuals earn when compared to the poorest. The comprehension and analysis of these indicators is fundamental to the elaboration of policies that promote the territorial cohesion, with the aim of protecting regional growth. I will also compare the inequality indicators calculated for our country with indicators from other countries, based on relevant literature.

This study supports the idea that it is fundamental to not simply analyze income inequality in national terms but also at the regional level, e.g. by degree of urbanization. The initial idea was to make an analysis in terms of the NUTS-II. However, there are no available data, and consequently we decided to analyse income inequality in national terms and by degrees of urbanization. Income is not equally distributed across countries and, therefore, it is extremely important for Governments to analyze these differences and inequalities in order to formulate adequate policies that support the individuals living in severe conditions such as poverty and extreme poverty. Analyzing how inequality distinctly affects differently populated areas was one of the main observations developed in this study, which supports the idea that there should be different plans to target and reduce these disparities across the country.

The results show that there was an initial impact in inequality after the crisis, but this increase was reversed in 2015. After that, inequality in Portugal started decreasing. In national terms, the Gini index has been decreasing over the years, presenting an initial index of 0,352 in 2011 and 0,316 in 2019. There was also a decrease of the Palma ratios, which translates into a decrease in inequality as well. The data analysis helped us also conclude that, for the year gap studied, there has been a decrease of inequality since 2015, which was also verified in the OECD data.

However, the importance of studying inequality at different levels emerges here: despite the country presenting an overall decrease in inequality, rural areas actually presented an increase of inequality in 2019. Furthermore, at the three degrees of urbanization, it was possible to observe that the reductions in inequality were not always monotonic.[1]

In terms of degrees of urbanization, our conclusion was that large urban areas present a higher level of inequality than small urban areas and rural areas. Small urban areas presented a not very significant decrease in inequality described by both Gini index (varied from 0,33 to 0,30) and the Palma ratios (e.g. the 10% richest went from earning 12,38 times more than the 10% poorest, to earning 10,31 times more).

In terms of the Gini coefficient, the rural areas presented an increase from 0,30 to 0,31 in 2016, followed by a decrease until 2018 and reaching a coefficient of 0,29. However, in 2019 they presented an slight increasing tendency, which goes along with the Palma ratios. Despite this increase being minor and being the degree of urbanization with smaller inequality, the levels of inequality in rural areas are

[1] Such fluctuations surely amount to fluctuations at the regional level by NUTS-II regions. However, since there was no available data for this level of disaggregation, we could not analyse inequality to this extent.

still very big. For instance, the 10% richest went from earning 10,97 times more than the 10% poorest, to earning 9,99 times more.

These conclusions reflect the relevance of this type of more specific analysis across Portugal.

I will start by presenting the Inequality Indicators in Chapter 2, so that the reader has a clearer notion of some of the concepts and indicators that will be discussed throughout the Thesis. Chapter 3 corresponds to the Literature Review, where I present perspectives of different authors and an historical overview of income inequality and how it has been evolving through time. In Chapter 4, it is presented the Empirical Analysis, with the Data Description, Data Processing and Descriptive Statistics. After that, in Chapter 5, I analyse Regional inequality in Portugal and by degree of urbanization. This Chapter is followed by Chapter 6, Discussion of main findings, where I discuss and interpret the results obtained and draw some conclusions. I conclude this Thesis with my interpretations of the analysis in Chapter 7.

Chapter 2

Inequality indicators

In order to provide a better understanding of some concepts and indicators that will be mentioned through the study, we consider it is important to start by introducing those indicators. In that sence, the present Chapter provides a description of many indicators usually used to measure inequality. In order to do the income inequality analysis proposed by this Thesis, we ended up using two inequality indicators: the Gini Index and the Palma ratios. Still, it is important to know some of the alternatives available when measuring inequality.

In order to better understand the main concept of this Thesis, which is, as mentioned, income inequality, I will begin by presenting different notions of the income concept itself. Generally speaking and from common knowledge, we know that income corresponds to money or some type of equivalent that people, businesses or the Government get in exchange for some type of good or service. It may also come from investments, rents, pensions, Social Security, and many others. As explained by Alperin and Van Kerm (2013), income may be affected by several factors: employment and labour market factors (such as retirement, job mobility, promotions, unemployment), household demographic factors (birth or death of a household member, divorces), private transfers, returns on investments, changes in taxes or benefits, among others.

There is not a global or general concept of income. Despite being a common term, authors have different opinions regarding what should be considered and taken into account to calculate income. The multiple definitions for the concept arise from the fact that it may be used for multiple purposes: as stated by John R. Brooks (2018), there are income definitions for taxes, measurement of national productions and household resources, transfers, individual wellbeing and household resources, health care subsidies, loans, student financial aid grants and many others. For this many distinct goals, different variables are taken into consideration, and there is not only just one concept that is considered as the correct or general one. Brooks (2018) continues by stating that any operative definition of income is mainly a political choice and inherently incorporates normative views about justice, social policy and economics, therefore being driven by policy objectives and pragmatic concerns. Also, income is whatever society wants it to be in order to achieve a result that the democracy believes to be appropriate and fair. Therefore, the fact that some items are comprised in the concept means that these are the centre of normative comparisons between individuals. An unequal distribution of income between citizens leads to income inequality, which can be diminished by taxes and policies, hopefully resulting in a broader "index of equality".

Nuno Alves (2012, p.41) distinguishes three types of income. The first type mentioned is original income, which includes "all types of income generated from market sources, plus pensions". We then obtain the gross income, which results from the addition of the social benefits in cash to the original income. Lastly, Alves explains that by subtracting income taxes, as well as Social Security contributions paid by the workers, we get the disposable income. As reminded by the author, these distinctions assume that taxes affect all types of income, including cash benefits.

According to EUROSTAT[2], the total disposable income of a certain household corresponds to the addition of the personal income received by all household members to the income received at household level. The disposable household income comprises: all income from work (employee wages and self-employment earnings), private income from investment and properties, transfers between households and all social transfers received in cash, including old-age pensions, and excludes imputed rent (such as money that one saves on full (market) rent by living in one's own accommodation or in rented accommodation at a price that is lower than the market rent) and non-monetary income components, in particular value of goods produced for own consumption, social transfers in kind.

The current definition of total household disposable income used for the calculation of EU-SILC[3] based indicators excludes:

- Imputed rent – such as money that one saves on full (market) rent by living in one's own accommodation or in rented accommodation at a price that is lower than the market rent;
- Non-monetary income components, in particular, value of goods produced for own consumption, social transfers in kind and non-cash employee income except company cars.

As reported in the 2017 report from the EU-SILC (Atkinson et al., 2017; Chap. 2.3.2.), there are two main aggregates which are computed from the EU-SILC data: total gross household income (GI) and total disposable household income (DI).

The total gross income (GI) corresponds to the sum of employee income – EI (cash or near-cash employee income and non-cash employee income, excluding

[2] Source: https://ec.europa.eu/eurostat/cache/metadata/en/ilc_esms.htm
[3] European Union Statistics on Income and Living Conditions

employers' social insurance contributions), with self-employment income – SEI (excluding goods produced for own consumption), with pensions received from individual private plans - PP, with current transfers received – CTR (social benefits and regular inter-household cash transfers received), with other sources of income – OI (such as capital income):

GI = EI + SEI + PP + CTR + OI

The total disposable household income (DI) corresponds to the difference between gross income and the current transfers paid (CTP) – tax on income and social insurance contributions, on wealth and regular inter-household cash transfers paid.

DI = GI – CTP

On the other hand, Atkinson (2015) considers that the outcome is the annual gross (net) employee cash or near income, which he defines as the monetary component of the compensation in cash payable by an employer to an employee, which includes the value of any social contributions and income taxes payable by an employee or by the employer on behalf of the employee to social insurance schemes or tax authorities. This variable reflects the relation between the labour income and individual circumstances before state intervention. Differences in earnings originating from this variable are likely to reflect the effect that paternal education has on the individual skill accumulation process, on the individual costs in exerting effort, and on equal access to all positions offered in the job market.

Now, when speaking about measuring inequality, a relevant question emerges: Inequality between who? It is imperative to note that some of these indicators only make sense if we're speaking of inequality in a macro level (for example, inequality between countries), while others can be used in a micro level (for instance, inequality between NUTS-II, degrees of urbanization, households, and individuals).

The Gross Domestic Product (GDP) is an indicator usually associated with economic growth, measuring the evolution and prosperity of countries. In individual terms, the GDP *per capita* calculates the economic output per person in a given economy taking into consideration multiple factors such as production, investment, imports and exports. This is one of the most used indicators taken into consideration by Governments when formulating their economic policies in many domains, such as productivity (GDP per worker), development (GDP per capita), budget sustainability (public debt in percentage of GDP), among others.

The GDP growth rate measures how fast na economy is growing, and is related with unemployment rates and inflation. The GDP at Purchasing Power Parity (PPP) is the calculated GDP converted into the international dollar. However, this is not the most commonly used measure of inequality since it does not consider other relevant aspect besides the economic growth of a country. There are many differences between countries, different standards of living and well-being, both in developing and developed countries, and different political systems. Consequently, it is mandatory that we go much further than simply the GDP in order to analyse the income inequality of a country. We need to consider the well-being of citizens, if they have access at least to the basic needs, the education and health levels, leisure, environment, technology, and many other aspects that exist nowadays but are not available for everyone.

As stated before, inequality does not merely refer to not being able to earn or achieve a certain amount of money as a monthly wage, that is, inequality is not only about the scarcity of monetary resources. It is also related to the standard of living and consumption levels of families. Consequently, it is important to present an indicator that estimates the ability of families to have access to goods and services that enable them to have a standard of living appropriate to the society in which they are inserted.

The indicator of material deprivation corresponds to the living condition of a household who is not able to have access to at least three of the following nine items. In case the family cannot acquire at least four of these items, we classify it as living a situation of severe material deprivation:

- Ability to assure the immediate payment of an unexpected expense close to the monthly amount of the poverty line without borrowing money;
- Ability to pay one week of vacation per year away from home, supporting the accommodation and travel costs for all household members;
- Ability to promptly pay rents, credit instalments or current expenses related (or not) with the main residence;
- Ability to eat a meal that includes meat or fish (or a vegetarian equivalent) at least every two days;
- Ability to keep the house properly heated;
- Ability to have a washing machine;
- Ability to have colour television;
- Ability to have a phone or mobile phone;
- Ability to have a car.

The poverty threshold corresponds to the minimum level of income essential to live in a given country and access basic needs. Since income distribution and wage levels vary across countries, this threshold does also differ. The poverty line is related to the amount of income an individual needs in order to acquire those basic needs. In developed countries, the standard of living is usually higher, and consequently, measuring inequality goes beyond the capacity of affording these needs. The basic needs approach is more frequently used to measure inequality in developing countries and was firstly introduced in 1976, in the International Labour Organization's World Employment Conference. There are several lists of basic needs, but international poverty reduction programs usually include food, safe drinking water, shelter, clothing, basic education and healthcare as the main topics. Consequently, if you do not have the means to attain the required basic needs, you are classified as a poor individual. This perspective provides us a notion of poverty in absolute terms, since it does not make reference to other indivuals' income but to a defined baseline.

In developed countries, the concept of relative poverty is more commonly used since the outstanding problematic is not concerned with the access to basic needs but with the redistribution of income. A person can be relatively poor when compared to someone who lives in the same country, while not being poor in absolute terms, when compared with someone who lives in a developing country and has no access to the basic needs mentioned above.

Therefore, an indivual facing absolute poverty involves a failure of human rights and basic needs (for example, having no access to drinking water or food), whereas relative poverty compromises a flaw in redistributive policies.

The at-risk of poverty threshold corresponds to the percentage of population whose income is less than 60% of the median equivalised disposable income after social transfers. In consideration of distintict standars of living across countries, using this indicator would only be realiable after some adjustments, otherwise the results would be very discordant. We should consequently keep in mind the Purchasing Power Parity (PPP), which is an economic theory that compares your purchasing power in different countries by creating a theoretical exchange rate that allows you to buy the same basket of goods in the countries being compared.

The Gini index, described in Figure 1, also known as Gini coefficient, is one of the most commonly used indicators to measure the income distribution among a population. The coefficient takes values from 0 to 1, with 0 representing perfect equality and 1 representing the hypothetical situation in which a single individual would receive all the income generated in the economy. Hence, the larger the Gini index, the greater the inequality, which means that richer individuals attain a much higher percentage of the total income of a specific population.

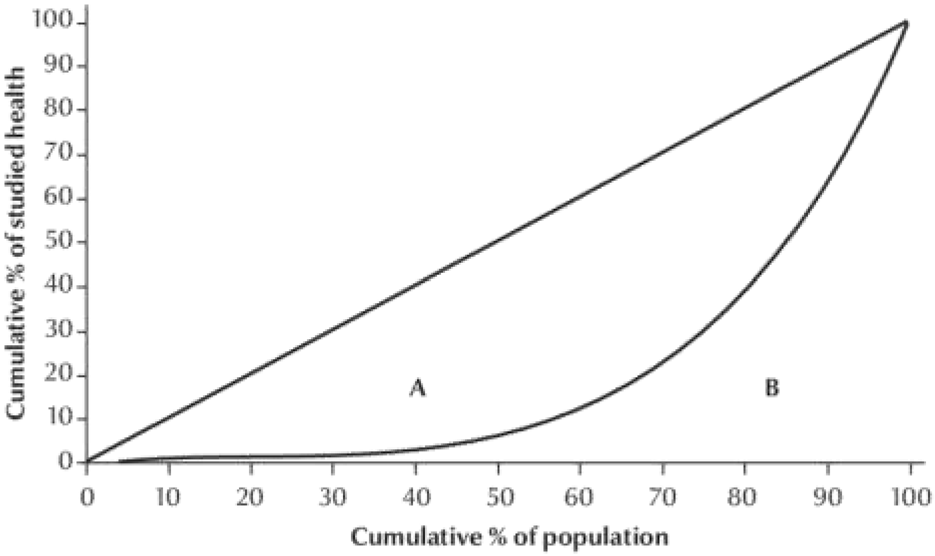

Figure 1 - The Lorenz Curve and the Gini coefficient calculation

Source: De Maio, 2007, p. 850

As explained by De Maio (2007), the Gini coefficient is mathematically and graphically represented by the Lorenz curve, which illustrates the income distribution by plotting the population percentile by cumulative income in the vertical axis and income on the horizontal axis. The Gini coefficient is represented in Figure , and corresponds to the difference between the areas below the line of perfect equality (usually the line with the 45º angle, 0,5 by definition) and the area below the Lorenz curve, divided by the area below the perfect equality line. In other words, it corresponds to twice the area between the Lorenz curve and the perfect equality line.

We should, however, be conscious that this is not an absolute measure of income distribution or wealth and that the indicator has some limitations. Countries may have the same Gini index and be very distinct in terms of wealth, wages or GDP per capita. Some critics state that it flattens distortions in the income distribution and may lead to incorrect interpretations. The Gini index and its calculation is not intuitive, since we need to calculate the area below the Lorenz curve and then divide it by the area below the perfect equality line. Furthermore, the values of the Gini index will be different depending on a calculation based on household incomes or individual incomes, which implies that the rankings of countries may vary. Also, it does not consider the absolute changes in income. For example, the Gini index may be decreasing due to the reduction in income inequality while the number of individuals living in extreme poverty is increasing. Additionally, it does not capture the social benefits given by Governments that aim to reduce inequality.

Consequently, we may use the Gini index when analysing income inequality, but it is crucial to complement the analysis with other indicators that take into consideration the downsides of the latter.

An emergingly used indicator of income inequality is the Palma ratio, suggested by Cobham and Summer (2013). Following the research made by Gabriel Palma (2011) that explained that in a vast number of countries the fifth to ninth deciles (40%-90%, corresponding to the middle class) take the aproximately 50% of the total income, the two authors came up with the concept of Palma ratio, which is very sensitive to changes in the extremes of the income distribution.

The OECD[4] defines the Palma ratio as the ratio between the income of the top 10% of the population with the highest income divided by the income of the bottom 40% of the population with the lowest income, that is, the income of the

[4] Source: https://data.oecd.org/inequality/income-inequality.htm

10% richest people divided by the income of the poorest 40% (P40/P10). Palma (2011) found out that the middle classes' income accounts, in the majority of situations, to around 50% of the country's Gross National Income, whereas the remaining 50% is attained by the top 10% richest and the 40% poorest individuals. Many policies, mainly inclusive development policies, are based on the Palma ratio and on lifting the incomes of the poorest 40%. When the Palma ratio is smaller than one, it means that the income of top 10% is smaller than the income of the bottom 40%. For a country whose Palma ratio is, for example, equal to three, that means that the income of the top 10% is three times higher than the income of the bottom 40%. This ratio is much more intuitive than the Gini index.

From the above described Palma ratio, many other ratios emerged. Another commonly used indicator is the ratio P90/P10 (another Palma ratio but considering distinct deciles of the population), which corresponds to the ratio between the proportion of income belonging to the richest 10% and the income attained by the poorest 10% individuals. We then have other ratios such as P95/P05, P80/P20, P50/P10, and others, which only change the percentiles being considered.

Chapter 3

Literature review

In the present chapter I will present the concept of income inequality in the perspective of different authors, developing more in depth the distinct concepts of income but also mentioning concepts which are closely related with income inequality, such as inequality of opportunities, income mobility, social exclusion and others.

In the EUROSTAT book edited by Atkinson, Guio and Marlier (2017), the authors agree on the importance that has emergingly been given to the study of households' income and quality of life of the individuals. Due to the later crisis' impact, there was a need to analyse the countries not only in macroeconomic terms mainly through the evaluation of the performance of the Gross Domestic Product (GDP), but also at the microeconomic level. As explained by Atkinson, Guio and Marlier (2017, p. 65), the statistics of the EU-SILC "form the basis for the EU social indicators and for judging success in terms of social inclusion across EU countries". As the authors explain, the first years of the economic crisis were defined by a decrease in GDP greater than the decrease in household incomes, due to the protection provided by policy packages. Afterwards, austerity policies led to a fall in household incomes. "These events have led to a longer-term debate about the way in which the fruits of growth have been shared in the past. In both cases (…) there are important distributional issues" Atkinson, Guio and Marlier (2017, p.66).

Rodrigues, Figueiras and Junqueira (2016) concluded that Portugal is one of the most unequal countries in Europe. Their calculation of the inequality indicators shows that there was an aggravation of the inequality levels between 2009 and 2014. “Due to the fact that the mean income of the individuals located at the top of the income ladder did not grow, the worsening of inequality is, therefore, inseparable from the huge contraction of the lower earnings” Rodrigues, Figueiras and Junqueira (2016, p.15). The maximum amount of poverty intensity in Portugal was reached in 2013, with an amount 30,3%. The authors point out the fact that in periods of economic recession, there may be a decrease in the poverty line associated with the decrease of the median income. This may lead to some families being no longer considered poor, even though they are still facing poverty. We should be aware of this “trap” when analysing income inequality, as well of the importance of the Index of Consumer Prices, in order to avoid getting biased results due to the variations in median income. Furthermore, the use of more appropriate indicators, such as the Palma ratios, can help us get a clearer perspective of inequality in our country. The Palma indicators calculated by the authors show that, from 2009 to 2014, the year with a greater Palma ratio was 2013. The P95/P05 ratio in 2013 was 19,7, which means that the top 5% richest individuals earn 19,7 times more that the poorest 95%. In the following year, the ratio was 18,7. Also, the Gini index in 2013 was 0,345, followed by 0,340 in 2014.

Thus, income inequality corresponds to the way in which income is distributed among citizens, and the unevenness of this distribution and its growing path are the reasons why this topic is in the center of public debate nowadays. According to a Pew Research Center survey (2014), “Nuclear weapons. Ethnic conflict. Global warming. Americans have a lot to be worried about these days. But what do they see as the biggest threat to the world? Inequality”[5].

[5] Source: https://www.pbs.org/newshour/nation/americans-consider-inequality-worlds-greatest-danger

We should then try to understand why this is presently such a relevant matter. The reduction of inequality is a mean to an end. Inequality, specially income inequality, is the main reason for several social problems, among which the reduction of social cohesion and consequent rising criminality, health and scholar decline, among others. Money and income play a major role in people's lives. Someone with low income has reduced economic power, which means that he or she has no ability to improve his quality of life nor the one of those who depend on him, neither can he make major decisions that benefit himself. A household that has a low monthly income does not have access to the same quality of life as one who owns a much greater amount of income at the end of the month. One of the solutions mentioned by OECD (2010) to the inability of poor families to invest in their children's education is the creation or design of government-supported loans or grant systems for students who are not able to afford higher education or support to the poorer families for financing this type of investments. These policies reduce the current income inequalities between parents regarding the investment in education, which leads to improvements in economic growth and income inequality.

The main concern presented by Atkinson (2015) is not only that the rich are getting even richer, but that the economy is headed to such a way that most people are losing. Reducing inequality is not only a matter of transfers and tax policies. It is, instead, defined by many factors, such as globalization, technology development, financial services growth, changes in payment standards, increasingly smaller trade union rights and others, which result in economists not finding a general solution to it. Atkinson (2015) also analyses economic inequality emphasizing global responsibility, presenting a theory not only focused on economics but also sociology, human decision-making and political philosophy.

When speaking about inequality, many people associate it with the above-mentioned inequality of opportunities, which is achieved when the circumstances do not play any role in order to get the result. As stated by the European Commission (2017, p.2), "the inequality of opportunities may contribute to income inequality, and vice-versa". As Atkinson (2015) explains, the inequality of opportunities is an *ex ante* concept, since everyone should have the same starting point. The majority of the redistributive activity is associated with posterior results, and therefore, the inequality of results in an *ex post* concept. However, we should not neglect the result: it is important because even though there is equality of opportunities at the beginning, in some situations the final result is deprivation. Also, inequality of results for the present generation may lead to the basis of an unfair advantage for the next generation.

There are many reasons to believe that the actual level of inequality is excessive, and those reasons may be faced in terms of a wider theory of justice. One century ago, economists would analyse inequality basing themselves on utilitarian terms. The utilitarianism only focused itself on the sum of the individual utility. According to Amartya Sen (1988), it did not focus on the interpersonal distribution of that sum by any means. And that is why, when analysing inequality, we need to attribute distributive weights, with more weight to those who are facing a worse position.

Defining inequality also depends on each person's concept of what is fair, or on what a given society interprets as fair. John Rawls (1971) faces justice as the fundamental virtue of social institutions and defines the principles of justice in a "primary" status, before the existence of laws and people knowing who they are, and which is their social status. This leads to people acting fairly, since they do not know if they are poor or have precarious life conditions, which leads to them voting with caution. Therefore, a fair society for Rawls includes social justice, legal justice, exchange justice and distributive justice, and is organized to favour the more disadvantaged. Rawls (1971) associates the principles of justice with the access to essential goods, which are defined as things that a rational man might deserve, such as rights, opportunities, income and wealth. Sen (1988) criticizes this view stating that it does not consider the variations people have in converting essential goods in quality of life, and proposes focusing on capabilities instead of essential goods, defining social justice in terms of available opportunities according to the role of each individual. The major notions of this theory is that it focuses on what the goods may provide to the individuals, and not only on the results obtained but also in the range of opportunities, which are an essential aspect of individual freedom, as stated by Sen. This leads us to focusing on the inequality of economic resources, taking into account also the principles of justice.

Another relevant concept associated with income inequality is income mobility. Individuals move across the income ladder, some of them acquiring a better quality of life and a higher income, while others suffering a negative impact and sometimes even falling into poverty[6].

The fact that an individual can have access to certain economic resources may influence his opportunities and, therefore, his quality of life and of those depending on him. Markus Jäntti et al. (2006, 2007) examined the different impacts of parental income on their children's earnings across the income ladder. They concluded that there is more stickiness of the earnings at the bottom and top of the income ladder. In other words, men at the top of the income distribution are more expected to attain higher status, whereas men whose fathers have low earnings will more probably have lower earnings as well.

Contradicting this stickiness at the tails of the income distribution, Julia B. Isaacs (2008) concluded that in the middle of the income distribution, the mobility is

[6] This concept will be further explained.

higher, and daughters verified higher earnings mobility than sons. Nonetheless, this parental economic status is very influential in some developing countries such as Ecuador, Peru and Brazil. Compared to these countries, the United States have a high level of mobility. However, as the author explains, studying economic mobility by itself does not mean that a country is doing well in terms of economic growth. Isaacs (2008, p.4) mentions the ambition of many Americans of "getting ahead may mean enjoying a higher standard of living than one's parents". However, this does not mean they are actually getting far in the income distribution, they may be living relatively better than their parents but still in a bad position when compared with the remaining individuals in the income distribution. Again, the degree of income inequality is relevant and should be taken into consideration.

Another aspect that should be taken into consideration is the intertemporal smoothing effect of income, which implies that an individual's income across several years is smoother than annual income, which presents greater variations. This dispersion of smoothed incomed is lower than the yearly dispersion. Consequently, as shown by Shorrocks (1978) and Alves & Martins (2012), an increase in income mobility leads to a decrease in income inequality in a specific time frame, which endorses the idea that the higher the levels of mobility, the more bearable a given level of inequality should be, due to the fact that it implies a smaller level of permanent inequality. Evidence shows that inequality is reduced by income mobility[7]. Atkinson (2015) defends that not all the differences in economic results represent an "unjustified inequality": "some people earn more than other for perfectly justified reasons, such as working more hours, performing unpleasant tasks or assuming higher responsibilities" (p.45). He continues by mentioning that among the more important justifications for these

[7] However, some papers do not find a correlation between income inequality and mobility. E.g. the working paper from Mogila, Melo and Gaspar (2020)

disparities, there is the fact that some individuals invest in training due to the fact that their jobs require more aptitudes.

On the other hand, the European Commission states that growth may be affected when inequality becomes too large. Poor people may not be able to invest in training or education, and without any external support, they end up being "trapped" in the lower income ladders, since there is no way to evolve. Poverty is defined by the United Nations (1990) as the lack of opportunities in the areas of education, health and command over resources, and also for participation in the democratic processes. In some extreme cases, yet very common in developing countries, people may not even be able to escape poverty, since a great amount of capital is need in order to do it. This situation in called poverty trap.

Furthermore, social justice in negatively affected by inequality and this can lead to social exclusion, the European Commission explains. The concept of social justice has already been developed above, but social exclusion is also very important. Amartya Sen (2000, p.5) defines social exclusion as "constitutively a part of capability deprivation as well as instrumentally a cause of diverse capability failures". Faria (1995) defends that social exclusion is a way of integrating poverty, deprivation, and lack of access to goods or assets into a single framework.

3.2. Income inequality through History

In this section, I will analyse the evolution of income inequality in the past, due to the major importance it may have for its future evolution. Atkinson (2015) mentions in his book the well-known Santayana's quote that states that "Those who cannot remember the past are condemned to repeat it" (p. 15). History and the analysis of the evolution of inequality are fundamental for economists and politicians not only to comprehend and anticipate possible shocks that may arise from economic cycles, but also to plan and reach their objectives and targets.

Piketty (2013) stated that the most part of the income inequality changes in the twentieth century were due to the shocks that happened between 1914 and 1945. The great decrease in inequality that occurred during this period is the result of both wars, which had tremendous economic and political shocks, and definitely changed the economy of all countries. Everyone was impacted, both the poor and the rich. For example, in Denmark, the Netherlands, Norway, South Africa, Sweden, the United Kingdom and the EUA, there was a relevant decrease in the percentages of the higher income deciles, after 1945. In France, the percentage of the top 1% went from 18,3% to 7,5%. In the UK, after World War I (1914 to 1918), the higher income percentages from this social group decreased from 10,7% to 8,7%, mainly due to the loss of overseas assets. In France, this percentage varied from 18,3% to 17,9%. And in the countries which did not enter the War, such as Denmark and the Netherlands, the income level even increased. However, the War did not have as a result a notorious redistribution of income, and that is why, in countries such as the UK, there was a capital tax to avoid the increase in wealth. Piketty (2013) underlines the presence of many counter movements in the period between the wars to combat the existence of the many changes taking place. An example of that, in France, was the deflation between 1929 and 1935, whose distributive consequences were compensated with changes in taxes and with the Matignon agreements regarding the workers' rights. During World War II (1939 to 1945), there was a global decrease in inequality. The top 1% also suffered a decrease in income in all the analysed countries by Atkinson (2015), except for Switzerland. During this period, there was a greater reduction in income inequality, due to the post-war "chaos" and the new agreements made, since Governments started focusing more on the health and well-being of their citizens. Also, there was a greater sense of social solidarity between individuals.

It is also important to underline the post-war period since there was an expansion of the income distribution. However, inequality did not follow this distribution, and there was only a relevant increase in domestic inequality in the decade of 1980. This fact proves that the increase in the income differences does not always lead to an increase in inequality. The most important advance in the labour market in this period was that women started entering it in a growing path. In 1947, 22% of married women were part of the paid workforce, whereas in 1977 this percentage was 47%. The composition of the household income was changing, firstly in the lowest income families. However, after 1970, richer married women, with a higher position in the income ladder also started joining the labour market, which ended up increasing inequality. What was a levelling force at the beginning, started working in the opposite direction. Then, there was also an increase in progressive taxes. However, many of the analysis made do not help us conclude much since the Gini coefficient was calculated based on income before taxes, and consequently this does not reflect the impact of the high-income taxes. It is important to keep in mind that the taxable base is as important as the taxes, and that the reason for the limited efficiency of these high taxes is that the base was destroyed.

Philippe Van Kerm and Maria Noel Pi Alperin (2013) analysed the intertemporal distribution of income prior to the onset of the Great Recession in 26 European countries. The authors studied the levels of inequality and progressivity in income gains and losses and analysed how these are related to inequality and poverty indicators. The income gains registered in all countries were disproportionately pro-poor, that is, the gains and policies associated are built in such a way that it targets poorer people, with the aim of reducing poverty. One of the downsides of this study is that there may be potential issues associated with the cross-country comparability of the data, as also as the short period under analysis. There is diversion in the data collection methods used across countries, with some of them using register data from administrative sources and others relying on household surveys, which may end up not reflecting the real levels of inequality between countries.

Despite taking into consideration the discrepancy in gains and losses in the estimation of growth, the equivalent income growth index does not consider if those who start with a lower level of income achieve higher gains. With this, Alperin and Van Kerm (2013, p.935)) address a topic that sometimes generates speculation but is very relevant: "inequality in gains and losses might after all be desirable if people with low incomes at the initial period get high income gains and richer people get lower growth (or suffer the losses)". What this means is that if the poor are able to attain more income and gains while the richer do not face an equivalent increase in income, or even if they have losses that translate into gains for poorer people, this can actually be beneficial for society overall. The concept of progressive taxes and the distribution of gains and losses being progressive tends to, *ceteris paribus,* lead to a reduction in inequality of aggregate income and inequality in the second period, if this is not offset by the reranking of individuals (Jenkins and Van Kerm, 2006; 2011).

The main conclusions from the above study of Alperin and Van Kerm (2011) were that the mean percentage income growth has an inverse relation with the level of income, with the low income countries growing more than the richer countries, which is verified when we consider progressivity-adjusted measures destined on poorer people. This income growth has been higher in the new countries that entered the European Union, and in the more unequal countries tends to exist higher volatility.

Regarding our country, Alperin and Van Kerm (2013, p. 937) stated: "The reduction of inequality (…) is the lowest in Portugal which cumulates both the highest annual inequality and the lowest inequality reduction from aggregating income over time".

Chapter 4

Empirical Analysis

The present chapter is destined to analyse income inequality in Portugal, first as a whole, and then by (three) different degrees of urbanization, through the treatment of the data obtained from ICOR. I will start by describing this database and its data, as well as the steps taken during my analysis. Later, I will analyse income inequality and some of its indicators.

4.1. Data description

Since 2003, INE (*Instituto Nacional de Estatística*) has been conducting an annual survey called ICOR (*Inquérito à Condições de Vida e Rendimento*) to analyse matters such as living conditions, distribution of income and social exclusion in Portugal. Many other European countries do the same type of surveys, which are gathered by the statistical office of the European Union, more commonly known as EUROSTAT. The data collected is available at the European Union Statistics on Income and Living Conditions (EU-SILC) database. These surveys are done to a representative sample of the portuguese families with the aim of obtaining an overview of our country's situation.

The data I will be analysing on this study reflects the Post-Troika period[8], that is, from 2011 to 2019. Furthermore, the type of data used is longitudinal data so that it is possible to compute the evolution of a household or individual over time and see how different individuals move in different ways and how the composition of the poorest group changes as some individuals enter and other leave it. Cross-sectional data would ignore "the reshuffling of individuals in the income distribution over time" (Jenkins and Van Kerm, 2003, p.2).

The above-mentioned longitudinal datasets will be covering periods of four years, based on a rotating panel sample. This sample is composed by several rotation groups, with similar size and design in order to be representative of the population. These rotational groups remain in the survey for four years, and every year, one of them is dropped and replaced by a new one, always keeping a rotational plan of four replications, that is, observations of a certain individual are available up to four years.

Figure 3 shows that between the years t and t+1 there is an overlap of 75%, while between t and t+2 it corresponds to 50%, 25% between t and t+3, and zero after that:

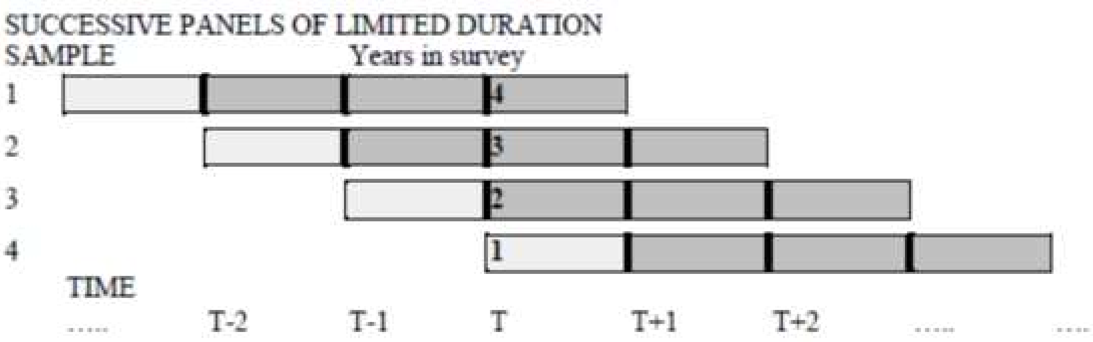

Figure 2 - Rotational design of the datasets
Source: CIRCABC

[8] The financial crisis had a huge impact in the economy and was followed by the FMI intervention. In 2011, there was a complete change in the socio-economic context, and for that reason, the period that followed was the one chosen to be studied.

The ICOR database contains four different files – the household register file (D), the household data file (H), the personal register file (R) and the personal data file (P), with complementary information for each other as follows: the D-file presents the year of the survey, the country, household ID (hh_id), region, degree of urbanization, etc.; the H-file also contains the year of the survey, the country, household ID, the type of household, rents, access to different goods, etc.; the R-file also shares the year of the survey, the country, household ID, the person ID (person_id) and information about the individual such as age, gender, activity status, etc.; lastly, the P-file, as the remaining files, shares the year of the survey, the country, person ID and more specific information about the individual.

4.2. Data processing

The first step for computing the data is the merge of the databases. In order to do that, there must be some mutual key variables between the different files. The key variables used to do that were: year, country, household ID and personal ID.

The original data spans over 9 releases (2011 to 2019), containing the period 2008-2019. The reason for using the releases 2011, 2012 and 2013 is to minimize the loss of observations in the year of 2011 due to the rotational design of the database. I started with the release from 2019, imported the D-file for that same release and renamed the variables so that when I further merged this file with the remaining three, these would have common variables. Figure 4 illustrates how the four datasets can be merged:

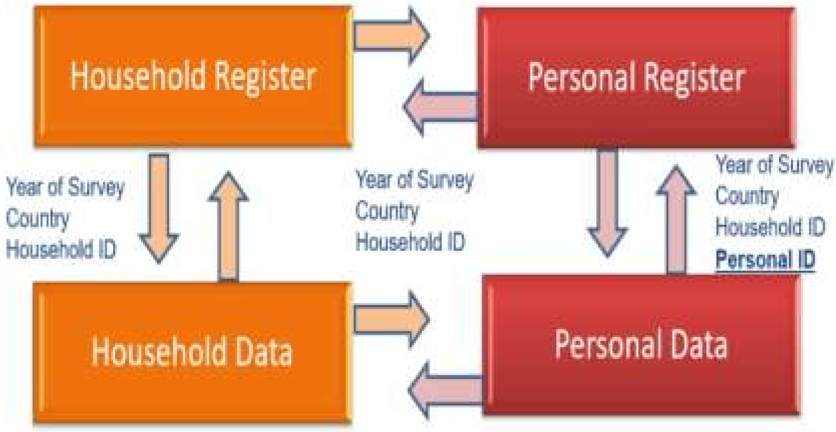

Figure 3 - EU-SILC basic structure and linkages
Source: GESIS (Third DwB Training Course, 2014)

For the release of 2019 (containing the period 2016-2019), I merged the D and H-files, which created a preliminary *master* file, and then consecutively merged the preliminary master file with the R and P-files to create a *final master* file for the 2019 release.

In order to merge the D and H-files, I did a one-to-one merge over the variables year, (country, despite there only being one) and hh_id. After that, I merged the R-file with the preliminary master file, following a many-to-one merge over the variables year, country and hh_id. Then, I merged the P-file with the new master file on a one-to-many merge over the variables country and person_id. Finally, I dropped the duplicates in terms of year and person_id.

I ended up having a final master file for the year of 2019 with all the data merged into this single file. Next, I did the same thing for all the remaining releases under analysis. When the master files for each year were created, I merged all of them into one single master file containing all the data, following a one-to-one merge over the variables year, country, rotation_group, hh_id and person_id. Between each merge, I dropped the duplicates in terms of year, person_id, and hh_id.

The total amount of observations obtained for each year was the following:

PB010 / year	Frequency
2008	2 969
2009	7 889
2010	13 180
2011	17 539
2012	18 383
2013	18 551
2014	18 885
2015	24 667
2016	31 258
2017	35 034
2018	32 268
2019	21 537
Total	**242 160**

Table 1 - Amount of observations per year after databases' merge

The variable under analysis is total income, which is equal to the sum of the employed individual's income (which corresponds to the income paid by an employer to an employee in return of some type of work, both in gross (PY010G in ICOR) and net (PY010N in ICOR) terms), with the monetary income (PY050N and PY050N in ICOR) they earn from being self-employed.

The initial idea was to analyse income inequality across the country in terms of NUTS-II (*Nomenclatura das Unidades Territoriais para Fins Estatísticos*) regions, which is divided in seven units: Norte, Algarve, Centro, Área Metropolitana de Lisboa, Alentejo, Região Autónoma dos Açores e Região Autónoma da Madeira. However, when analysing the data available, we concluded that there is no data regarding the NUTS-II from the years 2013 until 2017. For that reason, income inequality will be analysed in terms of the *degree of urbanization* (durb), which is divided in: rural areas, small urban areas and large urban areas. These three degrees of urbanization are classified by INE[9] as follows: 1 – Densely populated areas: contiguous grid cells of 1km^2 with a population density of at least 1.500

[9] https://www.ine.pt/xportal/xmain?xpid=INE&xpgid=ine_cont_inst&INST=6251013&xlang=pt

citizens per km^2 and a minimum population of 50.000; 2 – Intermediate area: clusters of contiguous grid cells of 1km^2 with a density of at least 300 people per km^2 and at least a population of 5.000; 3 – Thinly populated area: grid cells outside urban clusters.

It was also necessary to adjust income over time for inflation. In order to do that, I merged the master file with the latest data available on Harmonized Indies of Consumer Prices (HICP) provided by the EUROSTAT in order to convert all income values calculated to current prices of 2015 (in this year, the index was 100%, so this is considered the normal year).

I then checked if observations of singular individuals appeared in more than four years since they are not supposed to be followed for more than that period of time. However, some are followed for 6 years. This is also verified for some countries in the paper from Melo et al. (2019). However, to the best of my knowledge, there is no paper using longitudinal data from EU-SILC that explains for how many years the same people appear in the study. For more information, check the paper from GESIS by Borst (2016).

I dropped all observations for the years 2008-2010, as well as the ones for which individuals had no income (missing or zero value, which corresponds to the observations such that the flag variable $PY050N\_F = 0$ and $PY010N\_F = 0$).[10]

I followed by generating the new income variable, both in net and gross terms. Hence, the new variables under analysis are: the total net income, $totalincomen = PY050N + PY010N$, and the total gross income, $totalincomeg = PY050G + PY010G$. Then, I deflated both variables and replaced them by the following: $totalincomen = totalincomen/infl_weigh$t and $totalincomeg =$

[10] The value "0" means that no income was reported. See chapter "Income Flags" in the Methodological Guidelines and Description of Target Variables from EUROSTAT (2015).

$totalincomeg/infl\_weight$, where $infl\_weight$ corresponds to the yearly HIPC index divided by 100.

All individuals are aged 16 or more years old. I dropped the observations for individuals with more than 65 years old since it corresponds to the retirement age and considering retirement income like pensions, retirement or profit sharing plans, Individual Retirement Accounts (IRA's), insurance contracts and others would have a perverse effect on inequality (it would reduce it and make us believe it is lower than it actually is).

In order to remove any outliers, I followed the Alperin and Van Kerm (2013) criteria, which drops any observations smaller than 75% of the lowest income percentile or higher than 125% of the highest income percentile.

The total number of observations was the following:

Year	Observations
2011	6 948
2012	5 610
2013	3 613
2014	7 842
2015	10 652
2016	13 928
2017	15 804
2018	15 049
2019	10 233
Total	**89 679**

Table 2 - Final number of observations after data clearing

4.3. Descriptive Statistics

This Chapter presents a summary of the descriptive statistics through the nine years under analysis. Table 3 presents for each year, the number of observations available, the mean total net income, the median net income and its standard deviation, as also as the minimum and maximum amounts observed for this type of income. Similarly, Table 4 presents the same statistics but for the total gross income variable.

Table 3 allows us to conclude that, over the nine years under analysis, the mean net income has always been superior to the median net income, which is a common conclusion when speaking about the income distribution. This is the first indicator that shows that the distribution in unequal.

The mean net income decreased from 2011 to 2017, with the exception of the years 2014 and 2016, in which there was an increase. The highest mean income recorded was in the year of 2019, with a net amount of 10 264,95€. The standard deviation in this year was of 6 392,667€. Furthermore, we can see that the differences between the minimum and the maximum income amounts are tremendous, with the lowest amount registered corresponding to 468,20€, against a maximum amount of 50 489,24€ in that same year. This minimum value, which has not changed much over the years, is extremely small because it likely corresponds to income reported once or twice in a year by self-employed individuals (like e.g. a rendered service). The difference between the mean income and minimum income over the years is big, with a difference of 9 784,38€ in 2019. The difference between the mean and maximum incomes is much greater, with an amount of 40 345,30€ in 2019.

Year	Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
2011	6 948	9 958,20	8 154,13	7 012,59	478,56	49 483,54
2012	5 610	9 542,52	7 945,43	6 393,89	474,70	49 735,26
2013	3 613	9 477,34	7 867,54	6 366,97	472,65	50 247,06
2014	7 842	9 522,38	7 841,38	6 366,16	477,39	50 524,05
2015	10 652	9 486,79	7 883,24	6 398,73	480	50 515,58
2016	13 928	9 683,85	8 077,21	6 355,13	476,95	50 556,44
2017	15 804	9 604,42	8 137,20	6 246,08	468,2	50 489,24
2018	15 049	9 706,67	8 123,79	6 216,09	473,40	50 386,84
2019	10 233	10 264,95	8 581,62	6 392,67	480,57	50 610,25

Table 3 - Summary statistics of totalincomen

Speaking in gross terms, the mean gross income is also greater than the median gross income, which is, again, normal in terms of income distribution. The minimum and maximum amounts are also very distinct between themselves, with a difference of 83 706,76€ between the two amounts in 2019. The mean gross income presents some increases and decreases over the years, but it presents a growing tendency since 2017.

Year	Obs.	Mean	Median	Std. Dev.	Minimum	Maximum
2011	6 958	13 281,55	9 796,928	10 974,48	543,816	82 440,69
2012	5 616	13 008,14	9 836,222	10 476,75	543,5657	83 854,06
2013	3 614	12 390,65	9 366,784	10 148,39	541,2202	82 915,2
2014	7 833	13 081,37	9 745,145	10 729,71	536,3898	83 602,8
2015	10 650	13 005,79	9 700,738	10 896,89	539,3259	84 000
2016	13 921	13 303,68	9 841,395	10 974,19	551,5264	83 777,8
2017	15 794	12 969,45	9 738,363	10 558,8	538,1605	84 091,3
2018	15 043	13 070,71	9 754,86	10 455,58	539,6518	84 363,63
2019	10 228	13 848,19	10 416,41	10 656,59	539,9672	84 246,73

Table 4 - Summary statistics of totalincomeg

Chapter 5

Regional Inequality

The aim of this Chapter is to present an analysis of the income inequality indicators considered more relevant, as explained in Chapter 2: the Gini index and the Palma ratios.

5.1. Regional inequality in Portugal

Table 5 presents the inequality indicators[11] for Portugal regarding total net income (a graphical representation of this table is available in Appendix A). As we can see, the Gini index has been decreasing over the years, presenting an initial index of 0,352 in 2011, 0,321 in 2018 and 0,316 in 2019. These values are close to the ones presented by the OECD (0,337 in 2011, 0337 in 2012, 0,341 in 2013, 0,338 in 2014, 0,336 in 2015, 0,331 in 2016, 0,32 in 2017 and 0,317 in 2018, with still no available information for 2019), with the index verifying a decreasing tendency but still translating a considerable level of inequality when compared to other countries. For example, according to the OECD, the European country presenting the lowest Gini coefficient was, in 2018, the Slovak Republic, with an index of 0,236, followed by Slovenia with 0,249 and Norway with 0,262.[12]

[11] The variables P51, P95, P91 and P94 correspond to the Palma ratios P50/P10, P90/P50, P90/P10 and P90/P40, respectively.
[12] Source: https://data.oecd.org/inequality/income-inequality.htm

Regarding the Palma ratios, the evolution through time was not as linear as of the Gini index. However, we can observe that the general conclusion was that all ratios ended up decreasing, which also translates into a decrease in inequality.

The ratio P50/P10 shows that, in 2011, the lower median income earners earned 14,29 times more than the 10% poorest individuals, whereas in 2019, this ratio dropped to 12,75. Regarding the ratio P90/P40, it has also decreased over the years. In 2011, the 10% richest individuals earned 1,40 times more than the 40% poorest, with this value decreasing to 1,18 in 2018 and 1,15 in 2019. The OECD data presents values of 1,34 in 2011 and 1,21 in 2018.[13]

Despite a clear decrease of the Gini index and the Palma ratios, Portugal still presents a higher level of inequality when compared to other European countries. Melo et al. (2019) analysed the inequality levels in other European countries. In Spain, the Gini index was 0,33 from 2011 to 2014, and 0,34 for next two years. Regarding the ratio P90/P50, it was 0,89 in 2011 and increased until 0,92 in 2016. In France, the Gini coefficient alternated between 0,26 and 0,27 from 2011 to 2016, and the ratio P90/P50 was also very stable around 0,70 and 0,71, presenting the later amount in both 2011 and 2016. The Gini index in Finland maintained the value of 0,24 in the mentioned years, and the ratio P90/P50 increased from 0,60 to 0, 62, stabilizing this amount until 2016.

On the other hand, there are some clear differences between the ratios P50/P10 and P90/P10 when comparing the ones obtained below with the ones presented by the OECD and by Melo et al. (2019). As previously mentioned, the ratio P50/P10 corresponds to the ratio between the median and the 10% poorest individuals, while the ratio P90/P10 corresponds to the ratio between the 10% richest individuals over the 10% poorest. While our Palma 51 was 14,29 in 2011 and 12,75 in 2019, the OECD presents the values 2,1 and 2 for the respective years.

[13] Source: https://data.oecd.org/inequality/income-inequality.htm

One of the reasons for this discrepancy may be the fact that in our study we are analysing income and inequality in individual terms, whereas the OECD analysis it in household terms: "household disposable income". Actually, having more than one household member participating in the labour market decreases income inequality, even if one of the individuals has a lower income, since its impact will be offset by the income of the other individuals (Alves and Cardoso, 2020). Consequently, it is normal that our indicators have a higher ratio, since we are considering individual income, which does not present any smoothing effects as household income does. I added one indicator to the analysis, which is the "Income quintile share ratio", S80/S20, which corresponds to the ratio of the average income of the 20% richest to the 20% poorest. The initial years presented below are distinct from the ones presented by the OECD. However, the values become closer to the OECD ones from 2016 onwards: 5,6 in 2016, 5,2 in 2017 and 5,1 in 2018.

Year	Gini	Palma51	Palma95	Palma91	Palma94	S80/S20
2011	0,35	14,29	1	14,25	1,40	7,20
2012	0,34	13,87	0,92	12,80	1,28	6,30
2013	0,34	13,58	0,93	12,60	1,30	6,55
2014	0,34	14,41	0,91	13,12	1,27	6,30
2015	0,34	14,16	0,94	13,25	1,30	6,53
2016	0,33	13,25	0,89	11,84	1,24	5,98
2017	0,32	13,46	0,86	11,59	1,19	5,72
2018	0,32	13,19	0,86	11,28	1,18	5,75
2019	0,32	12,75	0,84	10,68	1,15	5,49

Table 5 - Summary measures of income inequality in Portugal (totalincomen)

In what concerns the total gross income, the results presented in Table 6 present clear differences due to the tax impact on income (a graphical representation of this table is available also in Appendix A). We can verify that income taxes in

Portugal have a clear progressive effect, mitigating inequality. We can conclude that by comparing the inequality indicators in gross terms, Table 6, with the indicators in net terms, Table 5, with the later presenting lower amounts, which indicates a lower amount of inequality. Nevertheless, in gross terms, there has also been a clear decrease in the level of inequality, with the Gini index varying from 0,39 in 2011 to 0,37 in 2019. The ratio P90/P10 shows that in 2011, the richest 10% individuals earned 17,29 times more than the poorest 10% individuals, while in 2019 the ratio decreased to 14,32, with this representing a big decrease in inequality between these two deciles.

Melo et al. (2019) compare the Gini index in net and gross terms in order to analyse if the country is progressive or regressive. For the country to be progressive, the ratio must be lower than 1, "because inequality based on net income is lower compared to gross income", explain Melo et al. (2019 - p.114). As we have already concluded above, our state is clearly progressive. Melo et al. (2019) compared the progressiveness between Spain and France. The authors concluded that it is greater in Spain, where the ratio is around 0,9, while in France it is equal to and even exceed 1, which suggests that taxes are not redistributive at all. However, Melo et al. (2019) point out that "France did not have a deduction-at-source system by 2016" and that "gross labour is net of tax on social contributions" (p.115), which might explain the absence of variation between the two Gini indexes.

Year	Gini	Palma51	Palma95	Palma91	Palma94	S80/S20
2011	0,39	13,88	1,25	17,29	1,74	8,06
2012	0,39	13,33	1,20	16,06	1,68	7,69
2013	0,39	13,45	1,22	16,45	1,72	8,04
2014	0,40	14,41	1,25	17,95	1,75	8,17
2015	0,40	14,39	1,29	18,63	1,83	8,64
2016	0,40	13,36	1,25	16,65	1,75	7,95

2017	0,38	13,40	1,18	15,85	1,65	7,44
2018	0,38	13,42	1,17	15,67	1,63	7,49
2019	0,37	12,87	1,11	14,32	1,54	7,05

Table 6 - Summary measures of income inequality in Portugal (totalincomeg)

5.2. Regional inequality by degree of urbanization

In what concerns inequality across the three degrees of urbanization, we found some issues. Not only does the degree of urbanization only appear after 2011, but also there is a much lower amount of observations and missing values for the years 2012 to 2014, as we can verify in Table 7, which presents the number of observations since 2012 and for the three degrees of urbanization.

	Degree of urbanization			
Years	**1**	**2**	**3**	**Total**
2012	349	221	236	806
2013	1 273	813	947	3 033
2014	3 112	2 373	2 805	8 290
2015	8 618	7 227	8 822	24 667
2016	10 578	9 626	11 054	31 258
2017	11 328	10 970	12 736	35 034
2018	10 840	10 017	11 411	32 268
2019	7 194	6 695	7 648	21 537
Total	53 292	47 942	55 659	156 893

Table 7 - Number of observations per degree of urbanization

Consequently, the analysis regarding the degrees of urbanization will only be made for the year gap from 2015 to 2019. It makes no sense to include the years 2012 to 2014 in this part of the analysis due to the considerable difference in the number of observations, as also as there is no way to know if we are excluding poor or rich individuals, pertaining to which degree of urbanization. For that reason, the graphs below are relative to the years 2015 to 2019.

Appendix D contains the tables that incorporate the data gathered regarding the multiple inequality indicators by degree of urbanization and that originated the graphs presented in the following pages. Appendixes B and C present the tables that analyse each degree of urbanization with the corresponding inequality indicators.

Figure 4 represents the evolution of the Gini index from 2015 to 2019 in the three degrees of urbanization. As we can see, the level of inequality is higher in the large urban areas over the years and has a decreasing tendency, with a Gini coefficient of 0,355 in 2015 and 0,327 in 2019. Small urban areas have also registered a decrease in the level of inequality. However, in 2018 there was an increase to 0,313, compared to a level of 0,303 in the previous year. In 2019, inequality decreased to 0,304. Contrarily to the other two degrees of urbanization, rural areas presented an increase of the Gini Index in the year of 2019, which had been decreasing since 2016. Nevertheless, rural areas present the lowest level of inequality when compared to large and small urban areas.

Melo et al. (2019) also compared the evolution of the Gini coefficient by degree of urbanization until 2016. They verified that in Spain, rural areas present the lowest level of inequality, around 0,32 in 2016. In 2014, the small urban areas surpassed the large urban areas, leading to a coefficient of 0,34 against 0,33, respectively. In France, in 2012, rural areas had a considerable increase in inequality, superior to the other two degrees of urbanization. After that, the ranking of degrees of urbanization was similar to the Portuguese one, with large urban areas (0,28) being the most unequal ones, followed by small urban areas (0,26) and rural areas (0,24), in 2016. The same was verified in Finland, with Gini indexes in 2016 of 0,22 in rural areas, 0,23 in small urban areas and 0,26 in large urban areas.

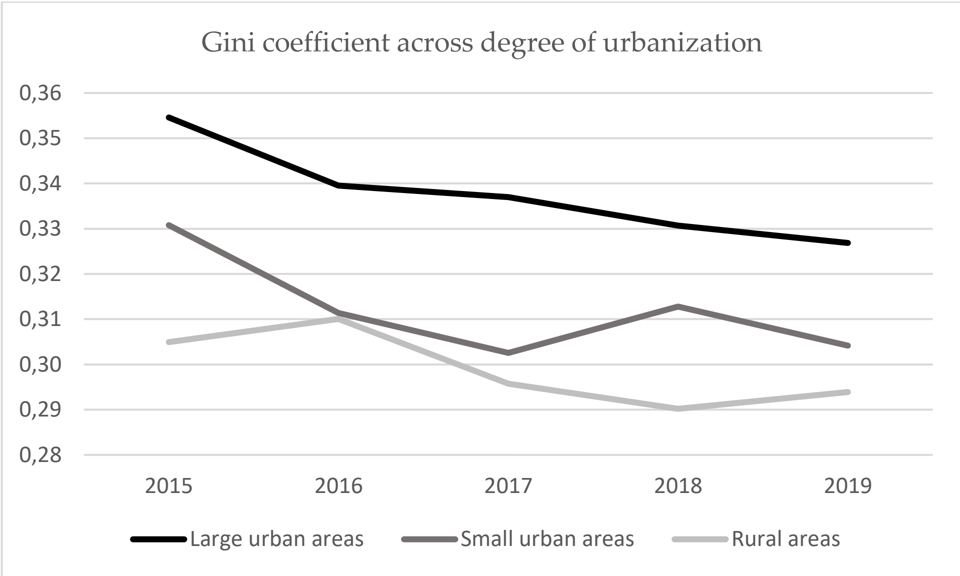

Figure 4 - Gini coefficient across degree of urbanization

Figure 6 represents the evolution of the Palma ratio 50/10 by degrees of urbanization. One of the main changes was the variation of the ratio in large urban areas, which varied from 14,7 to 12,4 in the years 2015 to 2019. This means that in 2015, the lower median earners were earning 14,7 times more than the 10% poorest workers, whereas in 2019, the lower median individuals were earning 12,4 times more than the 10% poorest. There was an overall decrease of the ratio, with the exception of 2017, with an increase of inequality, mainly in rural areas. This, together with the fact that the Gini indexes almost coincide in small urban areas and rural areas for 2016and 2017, suggests that the relationship between inequality and the degree of urbanization may not be monotonic.

Regarding small urban areas, the ratio did not follow a unique direction, presenting increases and decreases. In the overall, it varied from 13,7 to 13,1.

In rural areas, the level of inequality increased until 2017, reaching its highest of 14,7, and then decreased until 13,2 in 2019.

In Figure 6, it seems that the highest levels of inequality are focused in rural areas, followed by small urban areas.

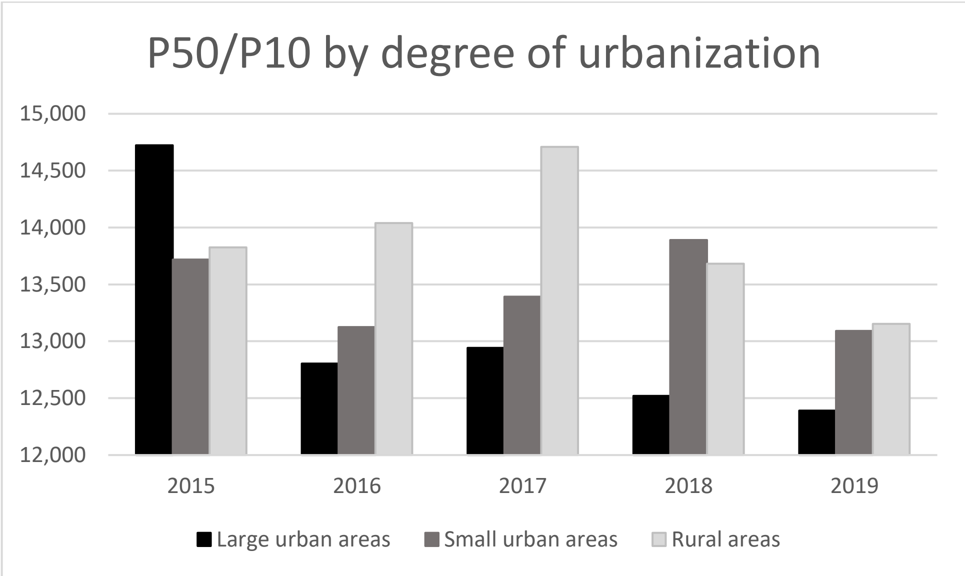

Figure 5 - P50/P10 by degree of urbanization

Regarding the ratios P90/P50 and P90/P10, we can verify that in both cases, inequality has been decreasing in more populated areas. On the other hand, small and rural areas have not been very stable nor did they follow a tendency over the years. Still, the amount of inequality is higher in large urban areas, followed by small urban areas and rural areas.

Figure 7 shows that large urban areas went from a ratio of 1 to 0,88 between 2015 and 2019, which means that in 2015 the 10% richest individuals earned 1 time more than those below the median of the income distribution, while in 2019 they earned 0,88 times more. Small urban areas went from a ratio of 0,90 to 0,79, and rural areas with a slight decrease from 0,79 to 0,76, in 2015 and 2019 respectively.

In terms of degree of urbanization, we can only compare two years with the report from Melo et al. (2019) since the last years analysed in it was 2016. Nevertheless, we can verify that in Spain the ratio P90/P50 in small urban areas remained stable, with a value of approximately 1,05, whereas in rural areas it presented a slight decrease, from approximately 0,95 to 0,93. In France, the difference between the two degrees of urbanization[14] was lower, with large urban areas varying from 0,93 to 0,92 and rural areas varying from 0,89 to 0,86.

In Figure 8, the variation of the ratio was larger in more densely populated areas and went from 14,7 to 10,88, which means that in 2015 the 10% richest individuals earned 14,7 times more than the individuals below the median income distribution, while in 2019 they earned 10,88 times more.

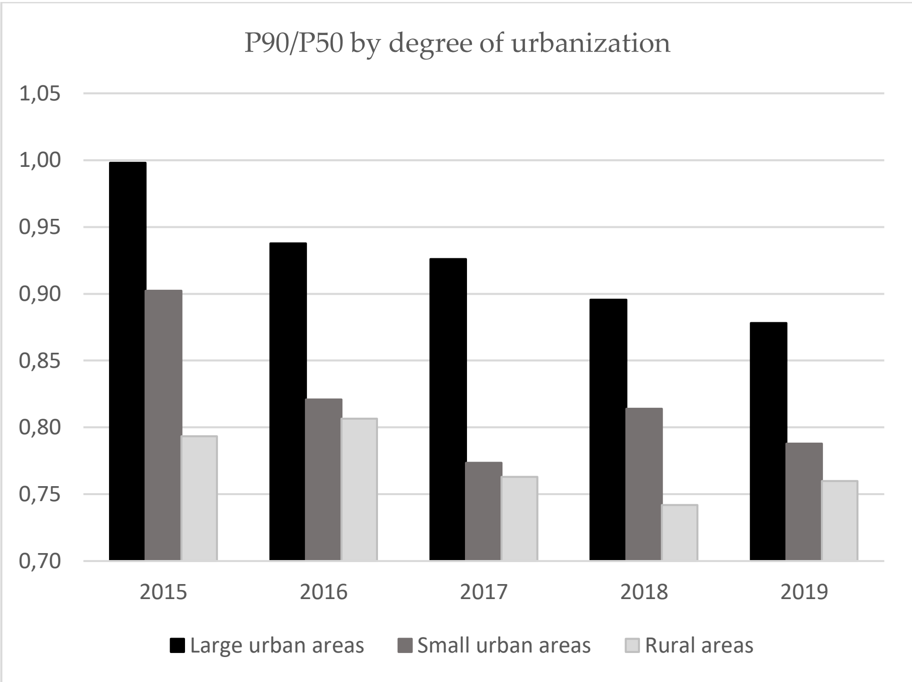

Figure 6 - P90/P50 by degree of urbanization

[14] Only two degrees of urbanization were compared for the Palma ratios in the graphs from Melo et al. (2019)

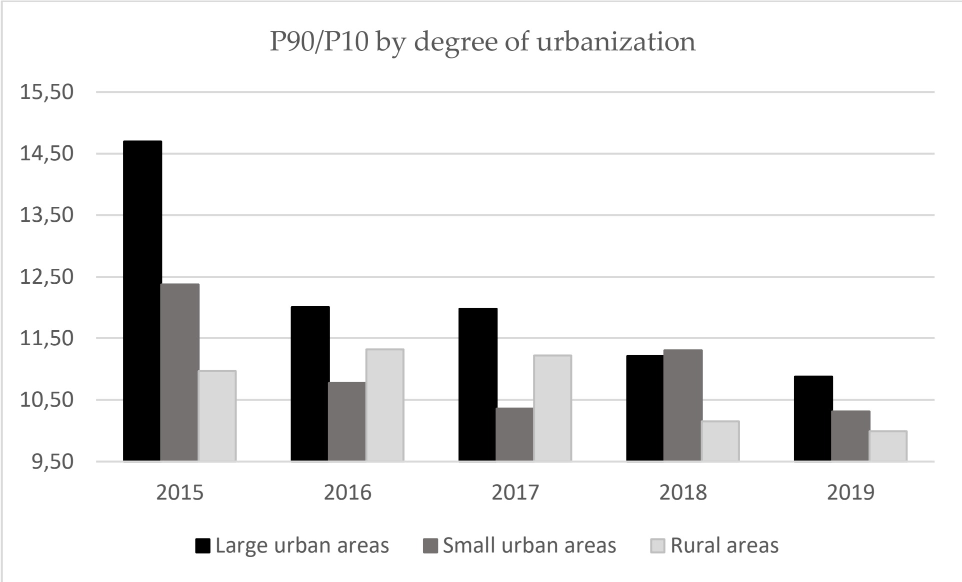

Figure 7 - P90/P10 by degree of urbanization

The ratio P90/P40 shows us that there has been an overall decrease of inequality in the three degrees of urbanization. While the densely populated areas had a variation of the ratio from 1,40 to 1,21, the small urban areas varied from 1,26 to 1,08, and the rural areas from 1,11 to 1,04. Again, the greatest variation of inequality was in large urban areas, but these still present the higher level of inequality.

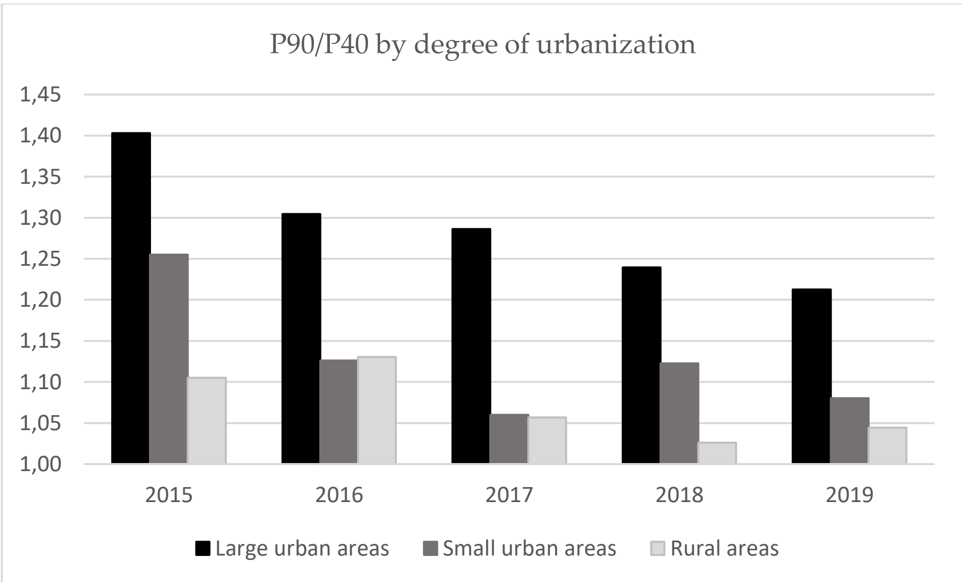

Figure 8 - P90/P40 by degree of urbanization

Chapter 6

Discussion of main findings

The analysis and results presented in the previous Chapter help us conclude that the Post-Troika period faced an initial decrease in the mean total income, followed by an increase from 2017 onwards. Despite this later increase in the mean and median incomes, there is a clear discrepancy between the minimum and maximum incomes presented in tables 3 and 4, as also as an increase between the difference of these two. The minimum income cannot be compared with the minimum national wage since the first corresponds to self-employed individuals or workers who do not have a permanent contract or full-time job.

An important note in terms of the analysis made is that the studies with which we compared income inequality both in Portugal and other countries use the household disposable income as the main variable. Contrarily, and as already explained, we decided to study income inequality in terms of individuals. Our aim is to analyze singular individuals and not households, due to their smoothing effect in terms of income inequality. For instance, if we consider an hypothetic situation in which an household has an individual who earns enough money to be located at the 10% top decile and two individuals who earn the average national wage: this household will have a smoothing effect when being considered for inequality analysis. On the other hand, if we consider the individuals separately, the level of inequality will be much higher. This may be an interesting analysis to do since household inequality in a given country may be considered low, but if we calculate the individual income inequality, the later may end up being much higher, proving that income inequality in that country is actually not as low as thought. Haddad and Kanbur (1990) concluded that not considering this intra-household inequality may actually underestimate the levels of inequality up to 30%.

In national terms, the Gini index has been decreasing over the years, presenting an initial index of 0,352 in 2011 and 0,316 in 2019. On the other hand, the Palma ratios for Portugal did not present always a decreasing tendency, but the overall conclusion is that there was a decrease of the ratios, which translates into a decrease in inequality as well. The data analysis helped us also conclude that, for the year gap studied, there has been a decrease of inequality since 2015, which was also verified in the OECD data[15].

Despite this clear decrease of the Gini index and the Palma ratios, Portugal still presents a high level of inequality when compared to other European countries, as previously mentioned. Policies need to be adapted to each country and to the targets they are seeking. Atkinson (2015) considers the investment in education and training fundamental. He also makes several general proposals that aim to reduce inequality, such as: policy-makers should consider the evolution of technologies and encourage innovation in such a way that it increases employability and the human dimension in service provision; in order to prevent and reduce unemployment, the Government should adopt a target and offer public employment at the minimum wage to those who seek it; a proportional or progressive property tax relying on up-to-date property assessments; among others. Each country needs an evaluation and determination of the most important means to reduce inequality. The above-mentioned ones may not even make sense for certain countries, but education and training are definitely universal ones. Furthermore, we have already seen that progressive taxes have a

[15] Source: https://data.oecd.org/inequality/income-inequality.htm

positive impact in reducing inequality, as shown in Tables 5 and 6, and this is a measure that is used in Portugal. In our country, technology is also evolving and in many cases substituting human labour, which leads to an increase in unemployment. For that reason, I believe that the measure suggested above by Atkinson (2015) makes total sense, we need to incorporate technology in such a way that it does not increase unemployment. This may be difficult in many situations due to firms aiming to increase benefits and reduce costs, but there should be some regulation and supervision by the Government, since an increase in unemployment also has increased costs. These measures would allow to control the measure, mentioned after, related with the target unemployment and minimum wages.

In what concerns the relationship between the evolution of inequality in Portugal and the three degrees of urbanization, the results were not as always monotonous.

The densely populated areas followed the national tendency with a decrease of the Gini index since 2015. Furthermore, the four Palma ratios computed (P50/P10, P90/P50, P90/P10, P90/P40) also presented a decrease over the last five years studied. Nevertheless, large urban areas still present the higher level of inequality. Large urban areas, which are densely populated, usually have a higher job offer, which leads to individuals moving to the big cities or their peripheries, leading to a populational growth of these areas. The individuals living in there have more diverse wages since they cover and work in distinct areas. On the other hand, inequality is usually smaller in rural areas, which are less populated, since the job offer is much more reduced and the variety of jobs is not so big. For that reason, wages are more similar, and for that reason, inequality is usually lower.

The small urban areas still were the second most unequal degree of urbanization in 2019 as they were in 2015 (however, not much higher than rural areas). Small urban areas are between large urban and rural areas in terms of urbanization, so the argument presented in the previous paragraph also explains why is in the middle in terms of inequality. The overall conclusion of this degree of urbanization is that there was a decrease of inequality. However, that decrease was not very significant during the five years, neither in terms of the Gini index (varied from 0,33 to 0,30), nor in the Palma ratios (e.g. the 10% richest went from earning 12,38 times more than the 10% poorest, to earning 10,31 times more). There was definitely a variation but there is still much space for improvement , since the actual levels of inequality are still high.

In terms of the Gini coefficient, the rural areas presented an increase from 0,30 to 0,31 in 2016, followed by a decrease until 2018 and reaching a coefficient of 0,29. However, in 2019 they presented an slight increasing tendency, which goes along with the Palma ratios. However, despite this increase being minor and being the degree of urbanization with smaller inequality, the levels of inequality in rural areas are still very big. For instance, the 10% richest went from earning 10,97 times more than the 10% poorest, to earning 9,99 times more.

As already mentioned and explained, in terms of degrees of urbanization, our conclusion was that large urban areas present a higher level of inequality than small urban areas and rural areas. As concluded by Melo et al. (2019), large urban areas are not the most unequal across countries, this inequality varies from country to country. In Spain, small urban areas present the higher level of inequality, while Finland presents higher inequality in densely populated areas during the whole period under analysis. In the case of France, in 2012 rural areas presented the highest level of income inequality and large urban areas the lowest. However, this situation was reserved and large urban areas returned to the highest level.

Moreover, in Portugal, the ratio P50/P10 helped us conclude that the 50% poorest earn considerably more than the 10% poorest in small urban areas and rural areas compared to large urban areas, since the ratio of the later in much smaller and hence, represents a lower level of income inequality. This may imply that, in large urban areas, all of 50% poorest have very similar incomes and the difference of incomes only starts to be noticed after that, which means that in that area there is a higher percentage of the population with lower incomes, while in small urban areas and rural areas, lower incomes only are obtained by a smaller percentage of the population.

Nevertheless, regarding the ratio P90/P10, the graph describes that inequality between the 10% richest and the 10% poorest is higher in densely populated areas, but does not present a very big difference from the other two degrees of urbanization. This shows that there are very big differences in income between the 10% poorest and 10% richest individuals in the big cities, which confirms the previously mentioned statement that there is a wide variety of jobs and wages in large urban areas, with very distinct qualities of life.

This study supports the idea that it is fundamental to not simply analyze income inequality in national terms but also in terms of degrees of urbanization (and very likely in other levels, such as NUTS-II, for example). Income is not distributed in an equal form across countries, and consequently it is of extreme importance that Governments analyze these differences and inequalities in order to formulate adequate policies that support the individuals living in severe conditions such as poverty and extreme poverty. Furthermore, following the comparisons made with other countries in the previous chapters, we can conclude that Portugal needs to focus on reducing inequality and formulating the plans and policies to ensure this reduction. The OECD identifies Bulgaria as the European country with the highest Gini index in 2018 of 0,408. Despite not presenting such a high index, our country still has a long way to go.

Nevertheless, we should highlight the decreasing inequality tendency that Portugal has been presenting over the last years.

As it was mentioned through the Thesis, sometimes it is not only a question of income inequality but also of inequality of opportunities. Hence, programs that promote the equality of opportunities between citizens and boost social inclusion by offering jobs, giving free access to education and support for the poorer families to achieve higher education can help reduce the levels of inequality across countries.

Conclusion

The aim of this dissertation is to analyze the evolution of income inequality in Portugal and in its degrees of urbanization, during the year gap 2011 to 2019. In order to measure income inequality, it was necessary to begin by computing the total amounts of income for all the years under analysis, both in net and gross terms, clear the data and do the data analysis and interpretation.

This Thesis helped us conclude that, even though there is an overall decrease of income inequality in Portugal, that inequality is not equally distributed across the country. Different degrees of urbanization have different levels of inequality and for that reason, applying general policies may end up not reducing inequality as expected. For policies to be efficient, it is necessary that Governments carry out studies on how income inequality varies across the country not only by degrees of urbanization but by regions and other criteria as well. Despite the negative evolution of the indicators which turns out to be positive for our citizens, the higher inequality areas need to be targeted in order to reach a more equitable and fair society. In terms of degrees of urbanization, our conclusion was that large urban areas present a higher level of inequality than small urban areas and rural areas.

This study also aims to supplement some of the already available information regarding income inequality in Portugal since our levels of inequality are still very high and not acceptable when compared with other European countries, as mentioned in the previous Chapter. It is mandatory for the analysis to be done in other levels despite simply the national one.

The main limitations encountered are associated with the data. The first limitation was that there are no available income data for the NUTS-II division for years 2011 to 2017. Also, in terms of degrees of urbanization, these only appear in a larger number from 2015 onwards, which compromises the analyses of the precedent years. For that reason, from 2011 to 2014, the analysis was only at the national level. Furthermore, most available studies analyze income inequality in household terms, which leads to different indicators and conclusions, as well as a smoothed income inequality effect.

For future developments and studies, it would be interesting to analyze income inequality in terms of the NUTS-II, for example, or in an even more detailed sense. However, for that to happen, it is mandatory to collect data to this extent and for several years.

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Appendix A – Income inequality in Portugal

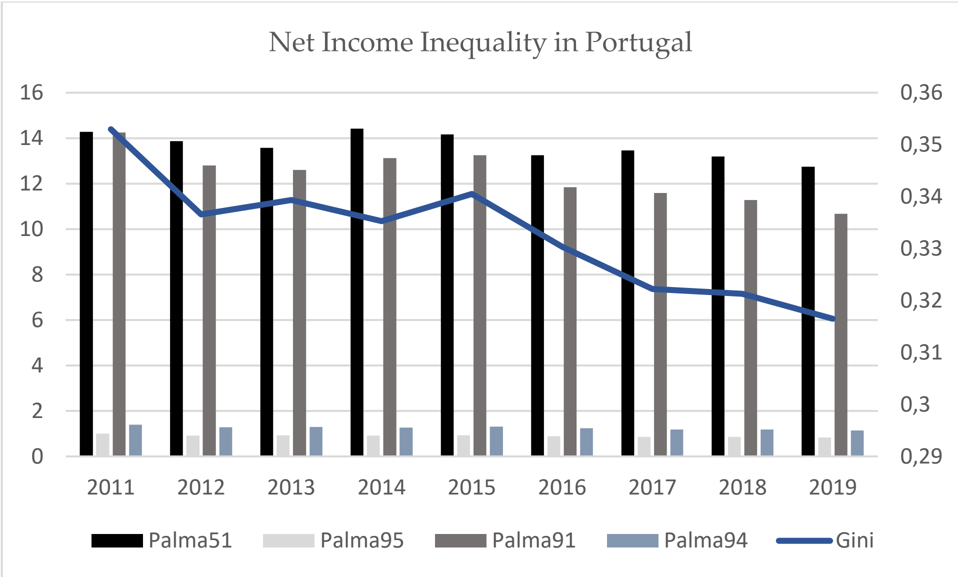

Figure 9 - Net income inequality in Portugal (totalincomen)

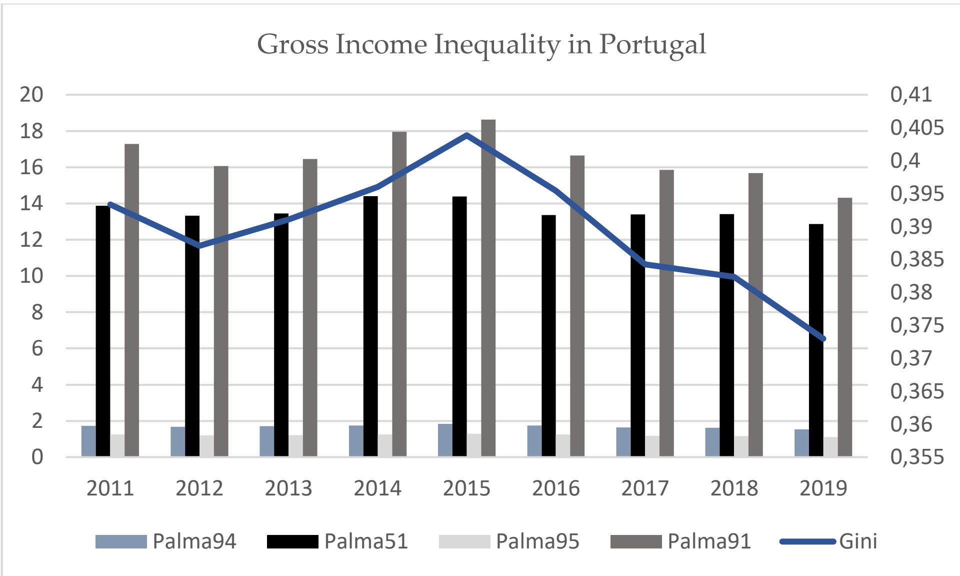

Figure 10 - Gross income inequality in Portugal (totalincomeg)

Appendix B – Income inequality by degree of urbanization (totalincomen)

Year	Gini	Palma51	Palma95	Palma91	Palma94
2011	?	14,2852	0,99737	14,2476	1,3955
2012	0,35711	13,8888	0,92379	12,8303	1,28549
2013	0,33809	13,2928	0,93699	12,4552	1,30847
2014	0,33804	14,5156	0,9133	13,2571	1,273
2015	0,35458	14,7241	0,99811	14,6963	1,40304
2016	0,33952	12,804	0,93769	12,0062	1,30448
2017	0,33698	12,9413	0,92588	11,982	1,28624
2018	0,33069	12,5189	0,89567	11,2128	1,23961
2019	0,32685	12,3919	0,87813	10,8818	1,21265

Table 8 - Summary measures of income inequality for durb=1 (totalincomen)

Year	Gini	Palma51	Palma95	Palma91	Palma94
2011	?	14,28516	0,997372	14,24761	1,395499
2012	0,324868	13,71348	0,922593	12,65196	1,281869
2013	0,306488	13,54708	0,926326	12,54901	1,292869
2014	0,337216	14,28986	0,915734	13,08571	1,274798
2015	0,330783	13,71837	0,90217	12,37629	1,255213
2016	0,311375	13,1259	0,820839	10,77425	1,125989
2017	0,302543	13,39104	0,773593	10,35921	1,059983
2018	0,312777	13,89023	0,813941	11,30582	1,122776
2019	0,304178	13,09186	0,787891	10,31496	1,080006

Table 9 - Summary measures of income inequality for durb=2 (totalincomen)

Year	Gini	Palma51	Palma95	Palma91	Palma94
2011	?	14,28516	0,997372	14,24761	1,395499
2012	0,273998	13,68446	0,920817	12,60088	1,278803
2013	0,313035	13,96331	0,939637	13,12044	1,31292
2014	0,297985	14,53361	0,902381	13,11485	1,256713
2015	0,304955	13,82599	0,793445	10,97016	1,105241
2016	0,31005	14,04018	0,806481	11,32314	1,13043
2017	0,295769	14,70858	0,763119	11,2244	1,056762
2018	0,290191	13,68267	0,741925	10,15152	1,026051
2019	0,293888	13,15321	0,759798	9,993782	1,044271

Table 10 - Summary *measures of income inequality for durb=3 (totalincomen)*

Appendix C – Income inequality by degree of urbanization (totalincomeg)

Year	Gini	Palma51	Palma95	Palma91	Palma94
2011	?	13,87922	1,245867	17,29166	1,735274
2012	0,398249	13,3516	1,205108	16,09012	1,684921
2013	0,392111	13,1996	1,241725	16,39027	1,742558
2014	0,40041	14,62723	1,266906	18,53132	1,787273
2015	0,418817	14,94712	1,393811	20,83347	1,988867
2016	0,406021	12,9497	1,320801	17,10398	1,862629
2017	0,401748	13,05148	1,285878	16,78261	1,810109
2018	0,392361	12,85853	1,225482	15,75791	1,711761
2019	0,384011	12,55588	1,171183	14,70524	1,634452

Table 11 - Summary measures of income inequality for durb=1 (totalincomeg)

Year	Gini	Palma51	Palma95	Palma91	Palma94
2011	?	13,87922	1,245867	17,29166	1,735274
2012	0,378155	13,14107	1,205552	15,84223	1,682522
2013	0,346868	13,43105	1,220692	16,39518	1,712065
2014	0,385658	14,32412	1,253756	17,95895	1,766086
2015	0,391508	13,95194	1,231878	17,18709	1,732467
2016	0,373464	13,22839	1,123603	14,86347	1,560416
2017	0,361236	13,31262	1,045801	13,92236	1,442487
2018	0,371843	14,13847	1,101606	15,57502	1,533959
2019	0,359883	13,3539	1,041312	13,90558	1,440584

Table 12 - Summary measures of income inequality for durb=2 (totalincomeg)

Year	Gini	Palma51	Palma95	Palma91	Palma94
2011	?	13,87922	1,245867	17,29166	1,735274
2012	0,308811	13,0909	1,202367	15,74007	1,677278
2013	0,349817	13,78434	1,240772	17,10323	1,740475
2014	0,34726	14,49626	1,248704	18,10153	1,756938
2015	0,362343	14,05313	1,072563	15,07286	1,490462
2016	0,367935	14,07323	1,09313	15,38387	1,523062
2017	0,346713	14,55856	0,999026	14,54438	1,379796
2018	0,345826	13,68341	0,994582	13,60927	1,377008
2019	0,345442	13,00048	0,990546	12,87756	1,369076

Table 13 - Summary measures of income inequality for durb=3 (totalincomeg)

Appendix D – Gini index and Palma ratios by degree of urbanization

Year	Large urban areas	Small urban areas	Rural areas
2011	-	-	-
2012	0,36	0,32	0,27
2013	0,34	0,31	0,31
2014	0,34	0,34	0,30
2015	0,35	0,33	0,30
2016	0,34	0,31	0,31
2017	0,34	0,30	0,30
2018	0,33	0,31	0,29
2019	0,33	0,30	0,29

Table 15 - Gini coefficient by degree of urbanization

Year	Large urban areas	Small urban areas	Rural areas
2011	14,29	14,29	14,29
2012	13,89	13,71	13,68
2013	13,29	13,55	13,96
2014	14,52	14,29	14,53
2015	14,72	13,72	13,83
2016	12,80	13,13	14,04
2017	12,94	13,39	14,71
2018	12,52	13,89	13,68
2019	12,39	13,09	13,15

Table 16 - Palma 51 by degree of urbanization

Year	Large urban areas	Small urban areas	Rural areas
2011	1,00	1,00	1,00
2012	0,92	0,92	0,92
2013	0,94	0,93	0,94
2014	0,91	0,92	0,90
2015	1,00	0,90	0,79
2016	0,94	0,82	0,81
2017	0,93	0,77	0,76
2018	0,90	0,81	0,74
2019	0,88	0,79	0,76

Table 17 - Palma 95 by degree of urbanization

Year	Large urban areas	Small urban areas	Rural areas
2011	14,25	14,25	14,25
2012	12,83	12,65	12,60
2013	12,46	12,55	13,12
2014	13,26	13,09	13,11
2015	14,70	12,38	10,97
2016	12,01	10,77	11,32
2017	11,98	10,36	11,22
2018	11,21	11,31	10,15
2019	10,88	10,31	9,99

Table 18 - Palma 91 by degree of urbanization

Year	Large urban areas	Small urban areas	Rural areas
2011	1,40	1,40	1,40
2012	1,29	1,28	1,28
2013	1,31	1,29	1,31
2014	1,27	1,27	1,26
2015	1,40	1,26	1,11
2016	1,30	1,13	1,13
2017	1,29	1,06	1,06
2018	1,24	1,12	1,03
2019	1,21	1,08	1,04

Table 19 - Palma 94 by degree of urbanization