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RESEARCH PROJECT

Estimating the Income Distribution in North Macedonia: An Approach Based on Previously Unavailable Tax Data

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August 2021

London, United Kingdom

Abstract

The rise in income and wealth inequality around the world, has served as motivation for researchers to estimate income and wealth distributions, search for the driving factors and come up with mitigating strategies. To do so, countries need to base their approaches on reliable estimates and data. The main purpose of this paper is to use previously unavailable tax data to accurately estimate the income distribution and its composition in North Macedonia. Although there is body of literature dealing with income inequality, the previous estimations of the total income distribution for North Macedonia were based on household income survey data, which are inherently not successful in capturing the top shares. I use the generalized Pareto interpolation method to estimate the total income distribution based on personal income tax tabulations. My results reveal that household surveys significantly underestimate income inequality, as shown by the income shares and the Gini coefficient. Furthermore, I find that North Macedonia has higher top, and lower bottom shares when comparing to both countries from the Balkan region and the European Union. As one of the last countries in Europe with a flat tax rate system, the conclusions from this paper on the high-income inequality in North Macedonia, could serve as a starting point for policy makers. Finally, I offer my suggestions on additional research areas that would strengthen our understanding of income inequality in North Macedonia.

JEL Codes: E01, H24, J3 D31, D63, H26, N30

Acknowledgments

I would like to thank Clara Martínez–Toledano for her continuous support and constructive comments throughout the whole process. Without her guidance this paper would not be the same. I would also like to thank the Public Revenue Office of North Macedonia, for providing me with access to the previously unavailable personal income tax data.

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1. Introduction

Income and wealth inequality have been increasing in many regions across the world. As such, both topics have been at the centre of interest for a broad range of stakeholders including politicians and academics. This, in turn, has resulted with an extensive body of empirical literature aimed at estimating income and wealth distributions, but also dealing with the shortcomings of different methodologies and data sets.

In this paper, I focus on income inequality in North Macedonia. First and foremost, the aim of this paper is to provide a reliable and robust estimation of the income distribution. The previous empirical literature on income inequality in Macedonia, uses household income survey data. In this paper however, I estimate the total income distribution, using generalized Pareto interpolation (Blanchet, et al., 2017), based on previously unavailable personal income tax tabulations. The estimates show that using household income survey data to estimate the total income distribution, significantly underestimates inequality in Macedonia. With the use of tax data, I capture the top income shares with high accuracy and consistency, which I find to be underestimated in the previous studies. The second purpose is to provide a comparative analysis between income inequality in Macedonia as a candidate country and the rest of European Union member countries, as well as with other Balkan countries. Here, I show that North Macedonia is substantially more unequal compared to both its neighbours and Europe. The final and third goal of this paper is to analyse the evolution of income inequality and its composition in North Macedonia. In this part, I conclude that in recent years, most of the total income growth has been captured by the middle 40%. In relation to the decomposition of total income, I show that, in line with other literature, within certain categories such as dividends and interest, income concentration is significantly higher when compared to other categories.

To the best of my knowledge, this paper is the first one to offer an estimation of the total income distribution based on tax data, thus providing the most reliable, and up to date, results on income inequality in North Macedonia. As a result, the paper can be used as a starting point for further research, as well as to better inform the policymakers in the decision-making process.

The paper is organized as follows: First, I provide an overview on the most important literature on inequality with a focus on estimating inequality in different regions as well as literature on different methodologies. Secondly, I explain the personal income tax in North Macedonia and its most important changes and reforms. In the third part of this paper, I focus on providing detail on the data sets used to construct the total fiscal income, as well as the tax tabulations themselves. In the same part, I explain the methodology I use, the generalized Pareto interpolation, along with all the assumptions that I made to estimate the income distribution. In the last two parts of this paper, I present the empirical results and highlight the main findings and contributions, in addition to briefly discussing the limitations of the paper.

2. Literature Survey

In the past few decades, economic inequalities have risen in many countries in the world and as a result there has been an increasing interest from scholars, policymakers, and all other stakeholders to study and understand the evolution of inequality. Although the topic itself has served as motivation for researchers even in the nineteenth century, the trend has been substantially accelerated by popular publications such as Piketty (2014). Piketty (2014) main focus is to offer an extensive overview on the evolution of economic inequalities and the capital distribution. He provides insights into the drivers of the general increase in inequality and suggests policies to mitigate the risks of becoming an extremely unequal society.

Some of the earliest contributions on income inequality can be traced back to the seminal work of Kuznets (1953). In his paper, Kuznets uses different data sources including previously unavailable income tax returns, to provide an analysis of the evolution of income inequality, specifically the top shares, for the United States from 1913 to 1948. In another influential piece, Kuznets (1955) elaborates on the possible differences and drivers of income inequality in developed and developing countries. One of the important indications made is that one should expect inequality to decrease through the advancement of industrialization, as lower income workers shift to better paying jobs. Kuznets' hypothesis has served as a pillar for further research on the measurement and evolution of income inequality.

The most substantial work in the field of income inequality has been done on the evolution of top income concentration over the 20th century for developed countries. For France, Piketty (2001, 2003) constructs homogeneous long-run inequality series from 1901 to 1998 by looking at income, wage and inheritance tax returns. Using the Pareto interpolation technique, the author argues that although income inequality has decreased in the post-war years due to external factors, progressive taxation policies prevented the rise of inequality. Contrary to income, authors conclude that wage inequality has been stable over time, therefore strengthening the possible explanation that the changes in income were mostly driven by capital income. On the other hand, Piketty & Saez (2003) construct homogenous series of top income shares using income tax returns for the period 1913-1998 for the United States. In line with the conclusions for France, the authors find that income inequality evolved similarly as in France – decreasing during the beginning and middle of the 20th century and has been unable to recover fully mostly because of tax policy. However, as opposed to France, the top wage shares in the US have the 'U' distribution implied by Kuznets (1953). Atkinson (2002) also builds top income shares using tax, national income, and survey data for the United Kingdom from 1918 to 1998. The conclusions from the paper were similar if one were to look only around the wartime period. However, the author finds that in the United Kingdom the income of the top 1% and 0.5% has recovered substantially from the low points in the late 1970's.

To further the understanding of income inequality in the 21st century, there are several papers with major contributions. Atkinson, Piketty & Saez (2011) look at twenty-two countries in Europe, North America, Latin America, Australia and New Zealand and Asia. In accordance with previous literature, the long-run top share series of the countries display a consistent decrease of inequality throughout geographies in the pre-war and war period, though there are notable differences based on the country's involvement in the wars. In the post-war period, inequality

has been increasing in all countries but at different speeds and magnitudes. Probably the most important observation of the authors is that for most countries, this growth in inequality was led by growth of income from labour and not capital income. The second paper by Alvaredo et al. (2013), strives to offer different explanations as to the exponential rise in inequality and explain the striking differences even between countries that are at similar economic development level. The authors emphasize that even though inequality is on the rise in all countries, important factors such as tax policy are shaping the magnitude and growth rates of the increase in inequality.

One important shortcoming of the above-mentioned literature is that it focuses only on measuring concentration of income at the top of the distribution. Therefore, one cannot make inferences about what are the trends in the bottom and middle-income shares, i.e., the rest of the distribution. To that end, Alvaredo et al., (2017, 2021), develop a new methodology named distributional national accounts (DINA). The framework combines different data sources like income tax data, survey data and national accounts to create estimates for the overall distribution of income. By doing this, one could look at the evolution, not only for the top income, but for any decile of the income distribution. This development led to a new array of literature aimed at estimating the overall income distribution for the United States (Piketty et al., 2017), for Spain (Artola et al., 2019) and for France (Garbinti et al., 2018). As a result of this, an increasing amount of literature and data was gathered for many countries at the World Inequality Database. The most comprehensive work on inequality is the "World Inequality Report 2018" by Alvaredo et al. (2018). The report analysed not only developed but also developing countries including China, India, Russia. One important observation is that inequality is not consistent through geographies. Even though for developed countries inequality has been on the rise, for developing countries like Brazil, Sub-Saharan Africa and the Middle East as regions, inequality has been stable and shows decreasing trend, but it is still at the highest levels in the world (Alvaredo et al., 2019). Blanchet et al. (2019), combine different data sources and previous empirical literature under the DINA framework to build the whole income distribution and provide long-run evolution of the share of different deciles for the European continent. The authors conclude that just like other regions, inequality has been rising in Europe, with substantially higher growth rates in the period from 1980 to 1990 compared to the recent past. However, the paper indicates that Europe is a more equal region than the United States and these differences can be explained by and large with higher pre-tax equality in Europe. Finally, there are no indications that the European countries' tax and redistribution systems are fairer and better at decreasing inequality compared to those of the United States.

Kuznets Hypothesis (Kuznets, 1955) states that countries should experience different trends in inequality based on the level of industrialization and development. Even within the European Union and the Eurozone, countries have different economic and institutional structures that influence inequality (Acemgolu & Johnson, 2005). Blanchet et al. (2019), conclude that inequality is highest in Eastern Europe as a region within the European continent, with Northern Europe being the most equal even when looking at pre-tax income. Hence, it is important to also look at long-run top income series or even the whole income distribution in Central and Eastern European countries (CEE). Inequality series for some of these countries

have been built by a part of the academic literature that focuses on global inequality, such as Bourguignon (2015) and Milanović (2016). At the same time, there has been a vast body of papers looking at the inequality of CEE countries before and after the transition such as Milanovic (1998, 2016, 2017); Rose & Viju (2014); Zaidi (2009).

Kump and Novokment (2018) construct long-run top income shares for both Slovenia and Croatia starting from the 1960's. Even though both countries were communist and part of Yugoslavia, the drivers of the moderate increase in inequality have been different, state versus foreign ownership of capital, for Slovenia and Croatia. Bukowski and Novokmet (2019) construct the whole income distribution for Poland. The authors find that the transition from communist to a capitalist society has resulted in Poland become one of the most unequal countries as the top 1% of income earners experienced double the growth of the bottom 50%. Other long-run inequality series have been built for the Czech Republic (Novokmet, 2018), as well as Hungary (Mavridis & Mosberger, 2017). As expected, all the ex-communist countries have seen an increase in inequality, as the top labour and capital income rose a result of the transition to a capitalist system. Like the developed world, the top income shares display a U-shape pattern in all Eastern European countries as concluded in Novokmet (2021). Looking at the region, Koutsampelas & Tsakloglou (2013) use survey microdata to estimate the overall income distribution for Greece.

The academic literature covering the topic of inequality in the Republic of North Macedonia is mostly based on survey data like Rakipi & Hadzimustafa (2017) or the use of consumption to estimate inequality, as seen in Petreski & Jovanovic (2013). Other authors such as Bucevska (2019); Kozhuvarov & Petkovski (2018); Tevdovski (2015); Trpeski (2015), have used the Gini coefficient, which is also based on household disposable income surveys. These papers find that contrary to global trends, income inequality as measured by the Gini coefficient has decreased in North Macedonia by 32% from 2007 to 2015 (Bucevska, 2019). However, one should be aware of the shortcomings of using the Gini coefficient as a reliable measure of representing inequality, as it does not provide an overview of the evolution of income shares for different deciles. Therefore, the purpose of this paper is close the gap in the empirical literature on income inequality for North Macedonia, and to estimate the entire income distribution based on previously unavailable personal income tax data and studying the evolution of income inequality. So far and to the best of my knowledge, this has not been done.

3. The Personal Income Tax in North Macedonia

The personal income tax in the Republic of North Macedonia was first introduced by law in 1993, published in the 80th edition of Official Gazette. As such, throughout the years there have been several important reforms, such as the one in 2001, 2004, 2006, and 2017 as well as 2018.

The personal income tax affects every resident and non-resident that has received income based on their economic activity in North Macedonia and it is filed at the individual level. Taxable income is classified in one of the following components: labour income (including pensions), income from self-employment, copyright income, income from sales of agricultural produce, income from trademarks, patents and other intellectual property, rental income, dividends and other income from capital, capital gains, gambling income, insurance income and other income. All these income categories are subject to taxation independent on whether the taxpayer had received them in the form of monetary benefits, securities (such as dividend shares), or other products and services. The personal income tax is calculated on the base of the sum of the overall personal income from all the taxable components. The overall personal income is summed up at a gross level and several allowances are taken off to get to the tax base. Under the current law, these reductions include non-taxable annual income of 96,000 MKD (1,558 EUR), health and social insurance benefits costs and several well defined normative or actual costs which serve as allowances exclusively for non-labour income components. The reduction of 96.000 MKD (1,558 EUR) is adjusted every year for the 50% of the increase in the average net monthly salary. However, there are some specific income streams which are considered non-taxable under the personal income tax, and they include but are not limited to, social benefits, unemployment benefits, disability benefits, child benefits, natural disaster state relief as well as state subsidies in agriculture and other income components. Other important income components that are not being taxed under the current regulation include interest up to 15,000 MKD (243 EUR) per year, interest from municipal or state debt instruments such as bonds, life or health-insurance income as a result of damages, etc. Therefore, when looking at the personal income tax data, this will have implications both on the lower end and upper end of the income distribution, as the people that rely heavily on social transfers as well as major debt holders are not paying taxes on that income.

When it was first introduced in 1993, the personal income tax rates were set as progressive, starting at 23% for income levels up to two average monthly net salaries, 27% on the income level from two up to five average salaries and 35% for income above five average salaries. However, the tax base for capital gains income, unlike the other income categories, was calculated as 50% of the capital gains. The tax reform from 2001, removed the third tranche of the progressive tax schedule, reduced the rates from 23% to 15% for annual income of up to 360,000 MKD (5,843 EUR) and almost halved the top tax rate from 35% to 18%, for income above 360,000 MKD (5,843 EUR) threshold. At the same time, the tax base for the capital gains income was increased from 50% to 70%. Only few months after the reform and during the same year, the second tranche of the tax rate changes to a fixed payment of 54,000 MKD (876 EUR) and 18% on the income above 360,000 MKD (5,843 EUR). Throughout the years, the different

components of the income were taxed with the same tax rates, however these tax rates depended on the level of income, on an annual net basis.

Most of the changes to the personal income tax are focused only on changing the tax rates themselves. For example, in 2004 a third tranche was introduced once again with the first 360,000 MKD (5,843 EUR) being taxed at 15%, from 360,000 to 720,000 MKD (5,843 EUR to 11,686 EUR), the tax constitutes 18% on the income in this tranche and a fixed payment of 54,000 MKD (876 EUR), and lastly from 720,000 MKD (11,686 EUR) – a 24% tax rate and a fixed payment of 118,000 MKD (1,915 EUR). The most important reform, however, got implemented from 2007 when the personal income tax schedule went from progressive to a flat tax rate of 12% and then one year later to 10% on all the income components. This represented a significant shift of the tax and the overall fiscal policy of North Macedonia, one which still has not been reversed. In this regard, in 2019 the government of North Macedonia introduced a new legislation that shifted the personal income tax schedule from flat to progressive. The reform was approved by law in 2018, while the implementation of the reform itself started in 2019. The new personal income tax system has a low tax bracket with a 10% tax rate on annual personal income of up to 1,080,000 MKD (17,529 EUR), and a higher bracket with a tax rate of 18% on the income above that threshold. Throughout 2019, taxpayers were paying according to the new regulation, however, by the end of the year, the legislation regulating the progressive tax rates was put on hold with implementation scheduled for 2023, and North Macedonia once again, had a flat tax rate of 10%. However, it is important to note that current regulation recognizes a tax rate of 15%, which applies specifically for the income generated from intellectual property rights, rental income, capital income and capital gains, gambling income, insurance, and other income.

The residents and non-residents that had generated income from any of the taxable income components, had the obligation to file their own annual personal income tax statement. However, the number of people that filed their PIT form was determined by the governing laws and their respective changes. As such, in the analysed period, from 2009 to 2017, the residents that had no other income than income from wages or pensions, were not specifically required to file their PIT forms as their employers or pensions funds paid their taxes for them. This resulted in 205,000 PIT forms filed in 2009, or approximately 13% of the adult population. The tax data provided by the Public Revenue office portrays the evolution of the fraction of adult population that files the PIT form. With the law reform of 2017, it is the tax agency itself that since 2018 files the annual personal income tax form. This resulted in a doubling of the number of people that file, from 500,000 to more than one million taxpayers, increasing the fraction of people that file up to 65% of adult population, in 2018 and 2019, respectively. Each taxpayer needs to check the filling for discrepancies and report any incorrect data. Therefore, the personal income tax is paid for every transaction and then it is cross-checked at the end of the calendar year, therefore they might be eligible to pay more taxes or get a tax refund based on the filing made by the tax authorities. The difference between the tax authorities filling and the actual personal income tax obligation might come from the fact that taxpayers are required to pay their personal income tax upfront every month throughout the year, and the former is based on their income from the previous year. Therefore, any differences in the tax base based

on the current's year income are resolved after the tax authorities file the annual personal income tax statement for the taxpayer.

4. Data and Methodology

One of the main contributions of this paper is getting access to previously unavailable personal income tax data for Macedonia. The dataset used to construct the income distribution consists of the tax tabulations based on the personal income tax and provided by the relevant tax authority in Macedonia – the Public Revenue Office. I also use the household disposable income survey data and population estimates from the State Statistical Office of the Republic of North Macedonia.

4.1 Tax Tabulations Data

The paper uses tax tabulations for the period 2009 to 2020 i.e., a total of twelve years. The tabulations categorise each taxpayer into one of four tranches, pre-determined by the Public Revenue Office, based on his/her annual total income. The tranches are defined by a minimum and maximum for the total annual income in MKD (Macedonian denar), and are set at:

- From 1 to 10,000 MKD (0.02 to 162.3 EUR)
- From 10,001 to 100,000 MKD (162.3 to 1,623.2 EUR)
- From 100,001 to 1,000,000 MKD (1,632.2 to 16,231.5 EUR)
- Above 1,000,001 MKD (Above 16,231.5 EUR)

Even though the categorisation of each taxpayer individually is done based on his/her total annual income, the data also provides the composition of total income in each of the brackets. The income composition is based on the law that governs personal income taxation in each respective year. For instance, in the 2019 tax reform income from insurance was defined as a distinct type of income and started to be taxed differently. The data thus includes an additional 'Income from insurance' category for the years 2019 and 2020, which is not available for the other years (from 2009 to 2018). Within the analysed period the types of income differ based on the changes in the personal income tax form. From 2009 to 2017 there were 25 different types of income categories and from 2018 onwards, they were reduced to 11 types of income categories. The income categories that are present in the most recent years in the data are the following:
1) Income from labour (salaries and bonuses), 2) Income from pensions, 3) Other income from labour (contracts, board members remuneration, internships, volunteers, vacation benefits, members of parliament's salaries, other public servants' salaries, etc.), 4) Income from self-employment (income of sole traders), 5) Income from sales of agricultural products, 6) Income from property and property rights, 7) Income from intellectual property and copyrights, 8) Income from capital (dividends, share of the profits in for-profit entities, interest, etc.),9) Income from capital gains (sale of securities, sale of ownership in private companies etc.), 10) Income from gambling and similar activities, and 11) Other income (types of income not categorised by the law such as income from online advertising at a personal website, etc.).

An illustrative example of how data in the tax tabulations is recorded, can be explained by the following example: imagine a taxpayer with total income of 1,540,000 Macedonian denars (24,995 EUR). The taxpayer's income comes from: 1) 1,040,000 MKD (16,879 EUR) from labour, 2) 300,000 MKD (4,869 EUR) from dividends and 3) 200,000 MKD (3,246 EUR) from providing services based on a contract. This individual is categorized in the last bracket of taxpayers with total income above 1,000,000 MKD (16,230 EUR). His individual identity number is recorded in the total number of individuals that filed their taxes in that tranche, as well as his total income is added to the sum of the income of all individuals in that bracket. However, unlike the income from labour, which is above one million MKD, the other types of income that this individual reported, are below that threshold. It is important to note that all these types of income are recorded in the same bracket. Therefore, the same taxpayers might appear more than once as a number in the different types of income, however, they will be recorded only once in the final number of total individuals that belong to that tranche. In the case of this example, the individual will appear once in income from capital, income from labour and also once in other income from labour.

Within the scope of these twelve years and as previously mentioned, there were several important reforms of the law governing the taxation of personal income in Macedonia. However, one of the most important ones that deserves to be mentioned in this section of the paper is the reform of 2017. Table 1 shows the total number of personal income tax filers, the total income reported to the tax authorities as well as the number of tax filers as a percentage of the total adult population, i.e., 20 years or older. The tax data has two breaks in terms of the income reported and the number of people filing their PIT forms, one in 2013/2014 and one in 2017/2018. For example, total reported income has doubled in 2018 compared to 2017, with the number of taxpayers in the bracket from 10,001 to 100,000 MKD (162 EUR to 1,623 EUR) growing at 300% in one year. The reason behind this increase is the fact that with the reform from 2017, it is the Public Revenue Office itself that does and files the personal income tax forms on behalf and with the consent of the taxpayers. Before this reform, it was allowed and 'common knowledge' amongst the locals, that only individuals that earn their income from multiple categories other than salaries or pensions should file their tax returns. Since majority of the population in Macedonia get their income exclusively from salaries or pensions, income streams on which taxes are paid immediately as they go through the banking system and are recorded by the Public Revenue office, the number of personal income tax filers was as low as 13.2% of the total adult population.

Table 1: Pre-tax Total Income, per year, as reported by the tax authorities

Year	Income in MKD	Income in EUR	Individual forms filled	Forms filled as % from adult population
2009	78,384,913,454	1,272,242,782	204,567	13.36%
2010	83,294,494,276	1,351,928,763	203,836	13.21%

2011	88,771,807,812	1,440,829,450	217,601	13.98%
2012	98,209,029,958	1,594,002,264	245,353	15.64%
2013	100,196,470,435	1,626,259,833	244,494	15.48%
2014	160,660,819,503	2,607,639,136	469,496	29.55%
2015	170,672,558,117	2,770,136,760	481,937	30.16%
2016	188,539,154,999	3,060,124,309	506,554	31.59%
2017	207,688,676,530	3,370,934,635	522,537	32.47%
2018	353,382,357,356	5,735,646,487	1,057,298	65.49%
2019	354,459,252,131	5,753,125,254	1,056,347	65.25%
2020	378,986,378,268	6,151,217,920	1,028,487	63.39%

Source: Public Revenue Office of North Macedonia, Author's calculations

Finally, when looking at the data in the tax tabulations, it is important to contextualise it with the overall economy and institutional capacities of North Macedonia. A study by Kelmanson et al., (2019), estimates the informal sector to be at 38% in 2016. Looking at North Macedonia's 2019 GDP of $12,6 billion[1], this would amount to at least $2.5 billion. Similarly, the Labour Force Survey from 2017 estimates the unreported workers in the informal sector at 18.5% of the total employed workforce or approximately 130,000 people. The European Commission report from 2021 goes on to say "...hidden salaries are the most acute problem with income being partially or completely undeclared by almost 44% of employees". As the size of the informal sector is substantial, this will have result with some consequences on the accuracy of the findings in this paper. However, it is important to note that the data provided in the tax tabulations, although not perfect, is the most reliable and appropriate dataset that will yield the most accurate results under the mentioned limitations.

4.2 Income Survey Data

The State Statistical Office conducts a survey of approximately 500,000 households on their total disposable income, i.e., income after personal income tax and health and social insurance contributions, starting from 2010 and until the present. The respondents are asked to self-report their income in five categories: 1) Income from labour, 2) Income from self-employment, 3) Income from property, 4) Social transfers and 5) Private transfers. The survey reports the average total disposable income per household, by income categories, by quantiles and by years.

Surveys are often considered to be underreporting the top tail income (Blanchet et al, 2018). Using both the survey data in combination with the tax data provides a better and more comprehensive overview of total income, as it captures the whole distribution more extensively and provides better estimates on both the reported and not reported (informal) income of the population (Alvaredo et al., 2017). In fact, the survey respondents might, and often do, report income that is not recorded in the tax data such as private transfers, higher salaries than those reported, or other categories of income which do not appear in the tax data. On the other hand, the tax data is comprehensive for the period 2018-2020, as the number of

[1] Source: IMF – World Economic Outlook Database, April 2021

individuals that filed the PIT forms and the income recorded in the tax data is almost triple the size, at more than one million taxpayers, compared to the period 2009-2017 where the average is approximately 334,000.

4.3 Population Size Data

In North Macedonia, the relevant authority for providing census and population statistics is the State Statistical Office. However, this is an extremely difficult task as the last reliable census data was collected in 2002. With two recent attempts at building another census, in 2015 and 2020 being cancelled or postponed, the State Statistical Office is using the census data from 2002 and annual birth/mortality tables, as well as net migration to extrapolate population estimates. One of the shortcomings of these estimates of the population size, is that they are widely believed to be overestimating the population as there has been a significant increase in migration and difficulties in measuring migration with reliability, especially younger and educated individuals.

For the purposes of this paper, the dataset provided by the State Statistical Office that is being used is assumed to be correct, as it is the most accurate source available. It is also important to note that the actual data used refers to the adult population, i.e., those above 20 years, as per the DINA methodology (Alvaredo et al., 2017).

4.4 Estimation of Total Fiscal Income

The total fiscal income that is distributed to the adult population is needed to perform the generalised pareto interpolation and get the total income distribution. For this purpose, I transform and combine survey income data from the State Statistical Office and the personal income tax data provided by the Public Revenue Office.

As the surveys report the average total disposable income per household, to get a comparative estimate of the total fiscal income, I multiply the average total disposable income by the number of households being surveyed. This provides the total disposable income for the whole population. I then adjust total disposable income to get the total fiscal income, by adding the personal income tax collected as well as the legally required health and social security contributions to the total disposable income. As per the mentioned shortcomings of the data, in the period 2009-2017, the total fiscal income as estimated from the survey data is significantly higher compared to the total income recorded in the tax data. Conversely, for 2018 and 2019, the survey data suggests lower total fiscal income compared to the tax data. Although this is counterintuitive, the tax data records more than the five income categories contained in the surveys, so when the share of the population that files PIT forms is higher, it is reasonable for the tax data to indicate higher total income compared to the survey data.

To get a reliable estimate for the total fiscal income, I use the tax data as a benchmark and adjust it using the reported income from the surveys. The tax data correctly reports pensions, income from capital, such as dividends, as well as the reported amount of wages and bonuses. However, because of the size of the informal sector in North Macedonia, the reported figures

in the tax data do not necessarily capture the true total income. Some income categories, such as income from property or labour income, are more susceptible and easier to underreport as people often deal with cash. To account for this, each of the categories of income from the survey are scaled to total income at the population level, using the number of households surveyed. As the tax rate on personal income is flat at 10%, the taxes and social security benefits are also proportionally distributed among the income categories to get to the comparable gross total income. Finally, the total fiscal income is calculated as the sum of the total fiscal income captured in the tax data and the positive differences between the survey reported income from labour, income from property and income from self-employment. Similarly, I add social and private transfers to the final estimates, as both categories are not represented in the tax data but are recorded in the survey.

For some years, such as 2009 and 2020, survey data is non-existent. Thus, using the same methodology of adjusting the tax data with the survey implied income is impossible. In these instances, I estimate the total fiscal income based on the ratio between the total income recorded in the tax data and the total fiscal income, using the 2010 ratio for 2009 and the 2019 ratio to estimate the total fiscal income for 2020.

4.5 Generalized Pareto Interpolation

There is an extensive body of literature, noting that power law, i.e., a Pareto distribution, is useful at estimating the top income distribution, starting with the work of Pareto (1896) and Kuznets (1953) as cited by Blanchet et al., (2018). However, in recent years, it has been proven that using this method to estimate the income distribution does not provide completely accurate results even for the top tail (Atkinson, 2016), as it assumes that the Pareto coefficient is constant above a certain top threshold, thus assuming that inequality is also constant throughout the different top brackets.

As a result, Blanchet et al., (2017), come up with the concept of generalized pareto interpolation which relaxes the constant Pareto coefficient assumption of Pareto models, and instead is using a "non-parametric definition of power laws". The method relies on estimating income or wealth distributions using a 'generalized Pareto curve' which is a curve of the inverted Pareto coefficient, noted as $b(p)$, where p is the rank and defined as $0 \leq p > 1$. The inverted Pareto coefficient itself, is calculated by dividing the average income above the rank p with $Q(p)$, the p-th quintile.

$$b(p) = \frac{\mathbb{E}\left[\, \mathrm{X} \,|\mathrm{X} > Q(p)\right]}{Q(p)}$$

Another way to define and the inverted Pareto coefficient is the following:

$$b(p) = \frac{1}{(1-p)Q(p)} \int_{x}^{+\infty} Q(u)\, \mathrm{d}u$$

Where p represents the cumulative distribution function (CDF) of x , and x is any income level above 0. This definition allows the inverted Pareto coefficient for to evolve throughout the distribution, thus enabling to make inferences about the concentration of income within the distribution itself, by looking at the movement of $b(p)$ in relation to p.

The generalized Pareto interpolation is particularly useful when working with tax tabulations, such as in the case of this paper, as it allows to easily calculate the $b(p)$ for each p reported in the tax data. The personal income tax tabulations for North Macedonia, are limited to $K = 4$ number of fractiles i.e., $0 \leq p_1 \leq \cdots \leq p_4 < 1$, and the respective income quantiles denoted by $q_1 < \cdots < q_4$. The last input needed for the interpolation can be income shares, both top or bottom, average income above the bracket, average income within the bracket, etc. For the purposes of this paper and based on the format of the tax tabulations provided, I use the average income in the bracket. Using this information, the inverted Pareto coefficients, and therefore the generalized Pareto curve, can be estimated by calculating $b(p_1)$ up to $b(p_4)$. The interpolation is constrained so that:

$$\forall\, x \geq 0, \quad \varphi(x) = -\log \int_{1-e^{-x}}^{1} Q(p)\, \mathrm{d}p$$

The theory as well as empirical applications of the generalized Pareto interpolation[2] are explained extensively in Blanchet et al., (2017, 2018).

4.5.1 Tax Data Limitations and Transformations

The tax data provided by the Public Revenue office consists of four broad brackets, the total gross (pre-tax) income per bracket and the number of individuals in that bracket. However, the evolution of the share of the adult population that files PIT forms and other shortcomings of the previously unavailable tax data, required creative adjustments, based on defendable assumptions, to get the necessary inputs for the generalized Pareto interpolation. Therefore, in this part of the paper I aim to record and provide the rationale behind every data transformation and the necessary assumptions behind it.

During the period from 2018-2020, as previously noted, income is well captured in the tax data. Only 35% of the total adult population did not get their PIT form filed by the Public Revenue office, meaning that approximately 500,000 people did not earn a single Macedonian denar on their bank accounts. Based on the data related to the size of the informal economy in North Macedonia, it is safe to assume that some of these people did earn income in cash and did not report it. Therefore, I redistribute the residual income, the difference between the total fiscal income and the total income as captured by the tax data, to the bottom two brackets, proportionately. I make this redistribution based on the assumption, that it is more likely for the bottom of the population to work and get paid in cash, thus not reporting some (or all) of their income to the tax authorities.

[2] Research tools for using the method are provided by WID World and are available on: https://wid.world/gpinter/

Using the same weights for the residual income redistribution, I also redistribute the 500,000 adults that did not report any income, as it is unlikely that one third of the adult population lives without any income.

In 2017, the tax reform shifted the responsibility for filing PIT forms from the individuals to the Public Revenue Office. Before this reform, individuals that had a single income stream from either labour or pensions, were not required to file their PIT forms. Therefore, the share of people reporting their income was at 32% of all adults, with more than 1 million individuals in the residual bracket with 0 reported income. To account for this, I assume that 2017 had the same population distribution as 2018. The assumption is based on the differences in the total adults in each bracket when comparing 2017 to 2018. For the first three brackets, 2018 has more than double the total number of individuals that filed taxes in those brackets compared to 2017. There is another large break in the tax series in 2013, when the number that file their taxes also halved to 15% of the total adult population. Unlike the 2018-2017 difference which is methodological, this break has no apparent explanation, as there were no crisis nor methodological changes that could explain this difference. I make the same adjustment and assume identical distribution in 2013 as 2014. Lastly, using the growth rates of the population in each bracket, I adjust the distribution of the population for the years after 2017 and 2013.

After getting the right population distribution for all years, I use the tax data on bracket averages to get the total implied income per bracket. I then, downscale the income in each bracket, based on their historical proportions in the total income, to match the total fiscal income for that year. I rescale the top bracket income to match the bracket average from the tax data. By doing so, I make sure that the top end of the distribution is captured accurately and consistently throughout the years. Lastly, as mentioned before, I redistribute the residual income and the adults in the residual bracket to the bottom brackets.

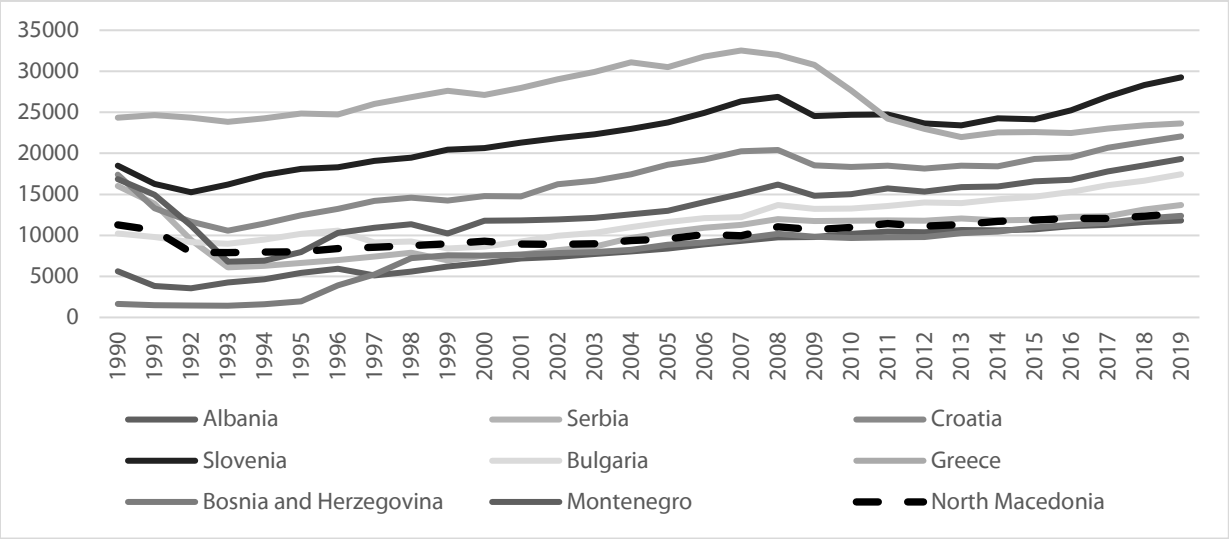
Given that the tax data provided by the Public Revenue Office was prespecified into four brackets, the total income distribution is estimated using a generalized Pareto interpolation with three brackets. With the rescaling and other data transformations to get the necessary inputs for the interpolation, the average below the first bracket was higher than the prespecified minimum threshold. Therefore, when estimating the total income distribution, I assume a first bracket threshold of 30,000 MKD (487 EUR). To make sure that the empirical results are reliable and robust, I conduct sensitivity analysis by changing the threshold to 25,000 and 35,000 MKD (405 EUR to 568 EUR) and re-estimate the distribution. From the sensitivity analysis, I conclude that changing the threshold does not affect the results in any significant way. The detailed effects of these changes in threshold are provided in the Appendix 1.

5. Empirical Results

The Socialist Republic of Macedonia gained its independence from SFR Yugoslavia at an independence referendum in 1991. With the will to embark on succession talks to become a

member of the European Union, the country changed its name into North Macedonia in 2018, almost three decades later, thereby settling the, as long, dispute with Greece.

Figure 1: National Income, per capita, in millions €

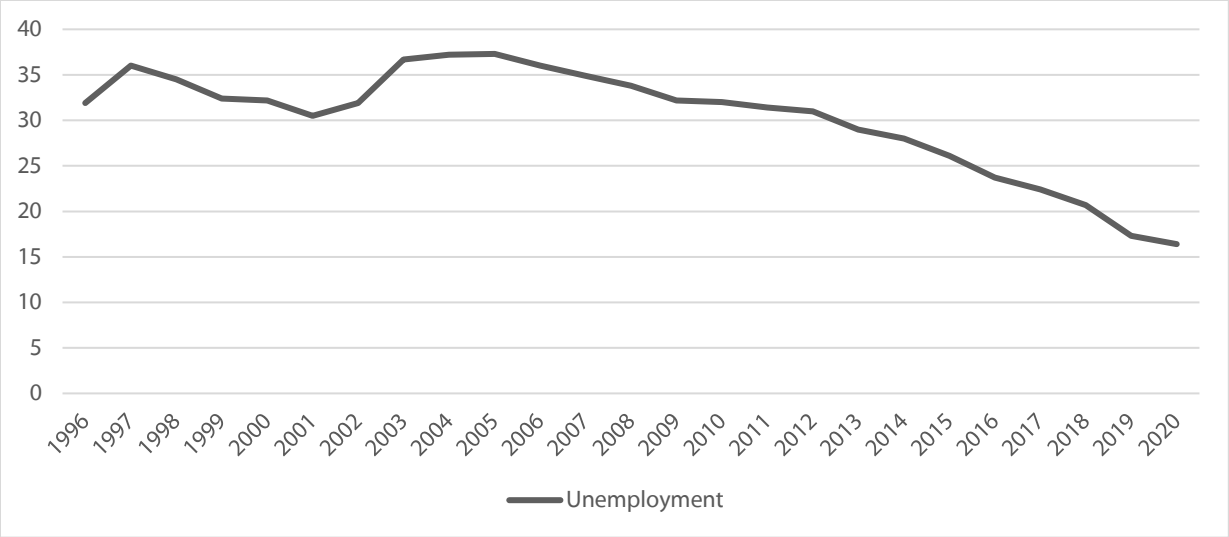


Source: WID World data.

In its 30 years of independence, North Macedonia has been through a domestic war conflict, and multiple political crisis and has been under substantial influence from foreign powers as the region is important geopolitically to both the East and the West. This, in turn, has resulted with a limited focus on economic growth, thus the economy has been performing consistently below the potential GDP. Looking at the per capita national income, North Macedonia has been constantly lagging in both level and growth terms compared to its neighbouring countries, as well as the other countries that were part of Yugoslavia.

North Macedonia is a small and open economy, with the bulk of the exports going to trade partners in the European Union. However, even the exports have low added value while the producers are heavily dependent on imports, thus creating a trade deficit for a long period. The country has also been struggling with extremely high unemployment. Unemployment rates (Figure 2) are even higher when looking at young adults as the unemployment rate for 15 to 29 year-olds sat at an average of 35.4% in 2020. Macedonia had some success in tackling the issue of unemployment as it can be inferred by the decreasing rates. However, this success could be the result of the high "brain-drain" that the country has been facing, rather than better employment opportunities.

Figure 2: Unemployment rate, in %



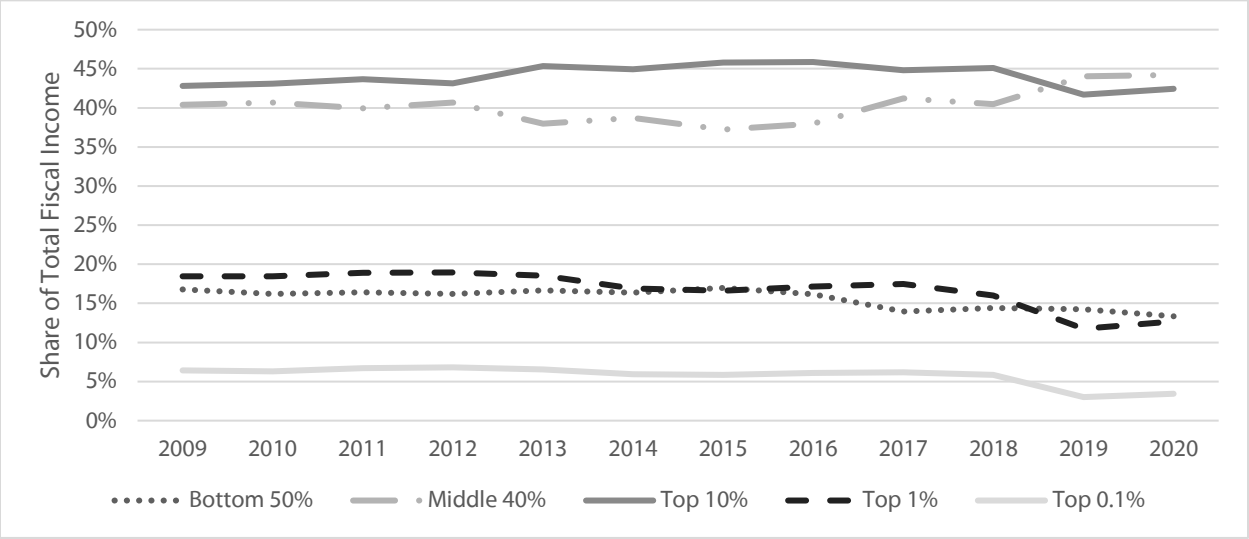
Source: State Statistical Office of North Macedonia.

5.1 Evolution of the Income Distribution in North Macedonia

The results of applying the generalized Pareto interpolation technique to the tax tabulations make it possible to study the evolution of income inequality in North Macedonia from 2009 to 2020. When looking at the data, the bottom 50% make as much of the total income as the top 1%. Similarly, the middle 40% of the population earn less compared to the top 10% of the population. The general trend of the total income distribution shows that most of the growth in recent years is captured by the middle 40% and top 10%, while the bottom 50% did not experience any growth in their income share, but an even further decline starting from 2016. Furthermore, the top shares are relatively stable throughout the years but the top 1% experiences a sharp 26.6% decline in 2019.

Looking at the decomposition of the total income (Figures:11,12 and Appendix 2 and 7 to 10) and comparing the evolution of the top 1% share from 2018 and 2019, it becomes more likely than not, that this decline in the top shares is not a result of reduction of income inequality. Instead, it is a reaction of the individuals in the top tail of the distribution to the introduction of a progressive tax schedule starting from 2019, which introduced a second bracket tax rate of 18%, and a new 15% tax rate on income from capital, property, intellectual property, and insurance.

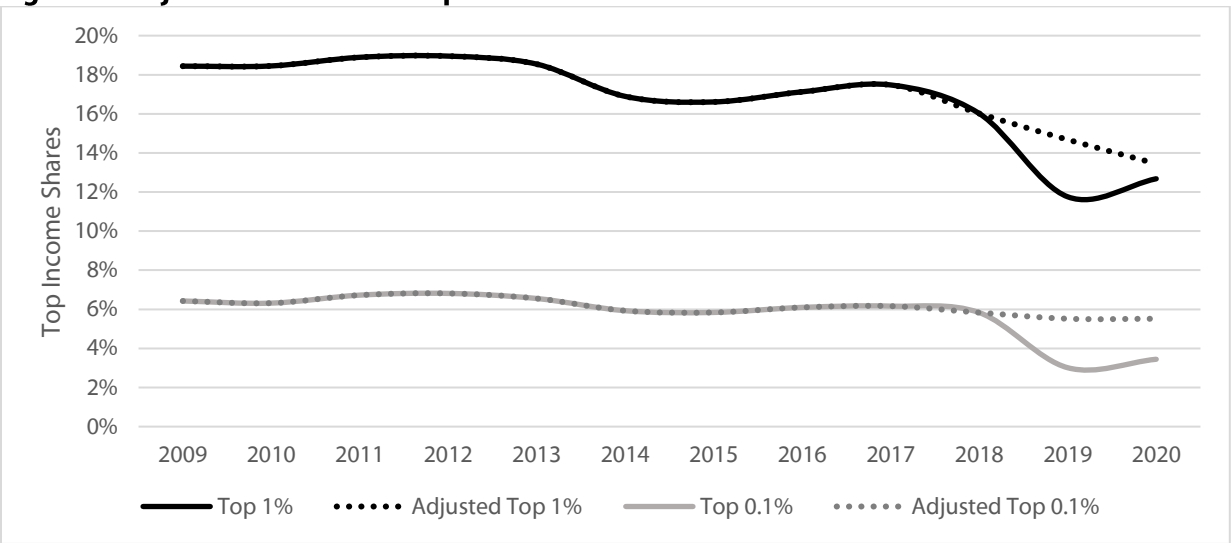
Figure 3: Evolution of the total income distribution



Source: Author's estimation based on tax data.

The empirical evidence I present suggests that all taxpayers rushed to sweep their financial assets, 'under the rug', or relocate them abroad as a response to the tax reform, as it can be seen that the share of dividends in the total income decreased from 25% to 10% for the top bracket. However, the rich were most successful in this process, resulting in a 66% decrease of the reported income from capital (dividends and interest). The 'bounce back' effect in the top income shares in 2020 can also be explained as the result of the Government's decision to postpone the implementation of the progressive tax system to 2023, only one year after its introduction. I estimate the counterfactual evolution of top income shares absent the 2019 personal income tax reform, by using the historical growth rate from 2017/2018. The results of this estimation are shown in figure 4.

Figure 4: Adjusted evolution of top income shares

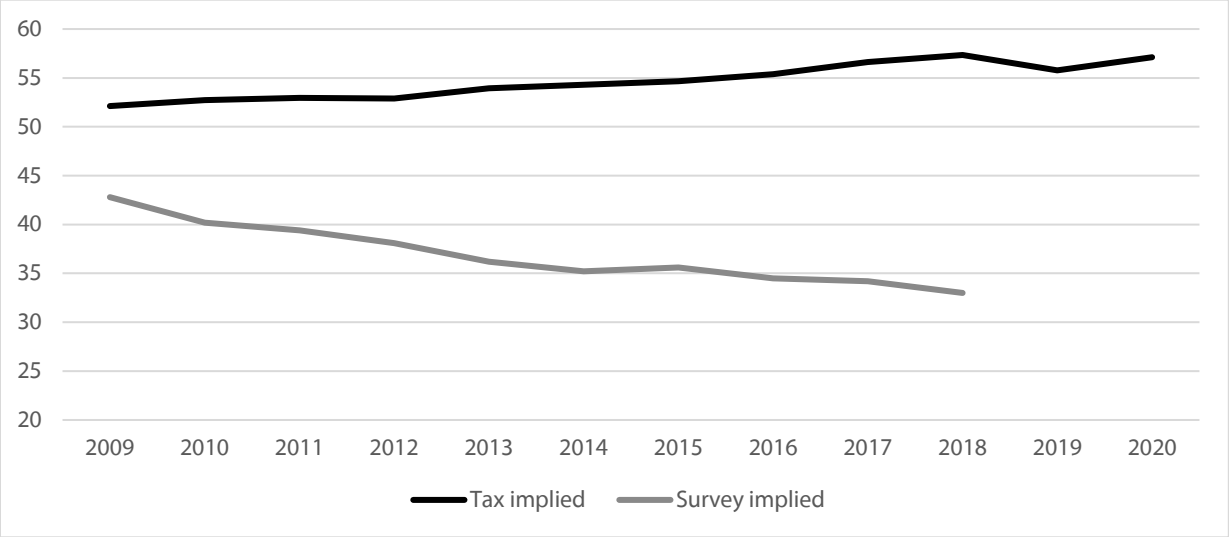


Source: Author's estimation based on tax data.

The top income shares had a negative trend even before the drop from 2019, however, without the excessive reaction to the tax reform, this decline would be substantially smoother compared to the actual change, as per the simulation.

5.2 Comparison of the estimated income distribution from different data sources

Figure 5: Evolution of Gini coefficient across time

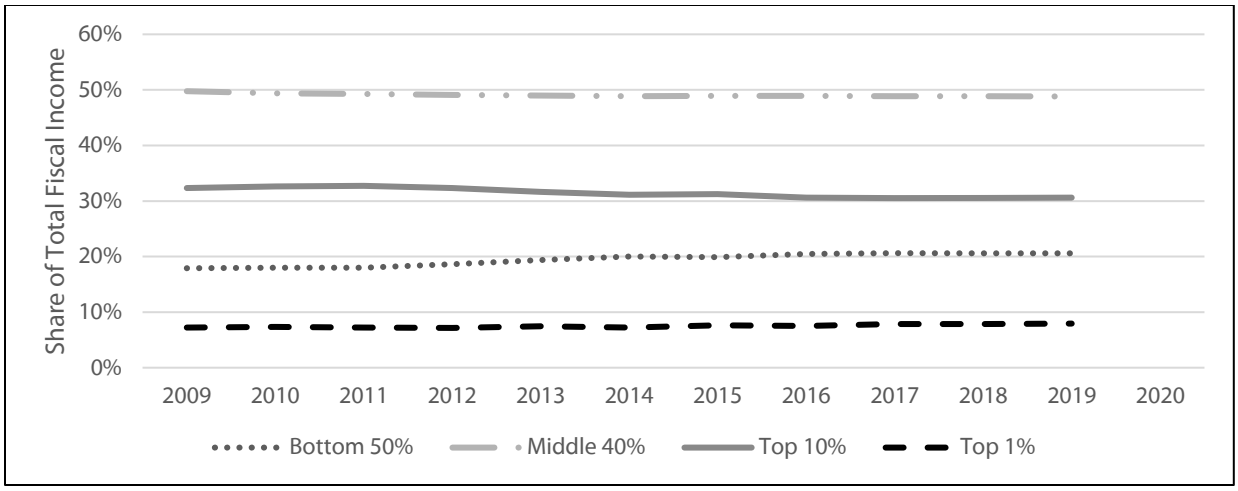


Source: World Bank Estimates, Author's estimation.

Previous estimations of the total income distribution for North Macedonia, were built by using household income surveys, such as the data published by the World Inequality Lab, or the Gini index estimated using that same set of survey data. With the results of the income distribution based on the previously unavailable tax data, I show that the Gini coefficient is significantly underestimated and that the decline in the income inequality as captured by this measure, is in fact incorrect, as the tax implied Gini has increased over time.

Similarly, with the personal income tax data becoming available for the first time, it is of great interest to understand how different data sources affect the estimation of the income distribution and its evolution. Figure 6 represents the evolution of the income distribution for North Macedonia, as estimated by the World Inequality Lab. It becomes clear that the inherent inability of income surveys to correctly capture the top income shares, has led to underestimation of the top income shares and overestimation of the middle, and bottom income shares. For example, the tax data used for the purposes of this paper is consistently good in capturing the top income shares, especially in the period where a high proportion of the adult population filed their PIT forms, such as 2018-2020. When comparing the top 1%, the income shares from the tax data are, on average higher, by 2.3 times compared to with the top 1% income shares estimated based on the survey data.

Figure 6: Evolution of Total Income Distribution



Source: WID World's data on North Macedonia, based on household income surveys.

The series reported by the World Inequality Lab are also substantially smoother and with less fluctuation when compared to the income distributions based on the tax data. Other than the subtle trends of the top 10% income share to decrease, while the bottom 50% income share increases, the other income shares are represented as almost perfect straight lines, thus indicating little movement in the middle 40% income share or the richest 1%. This is in contrast with the larger movements that one can observe in the evolution of the income distribution based on tax data, such as the decrease of the income share of the richest individuals, and the subsequent rise of income share in the middle 40%, right after a tax rate increase.

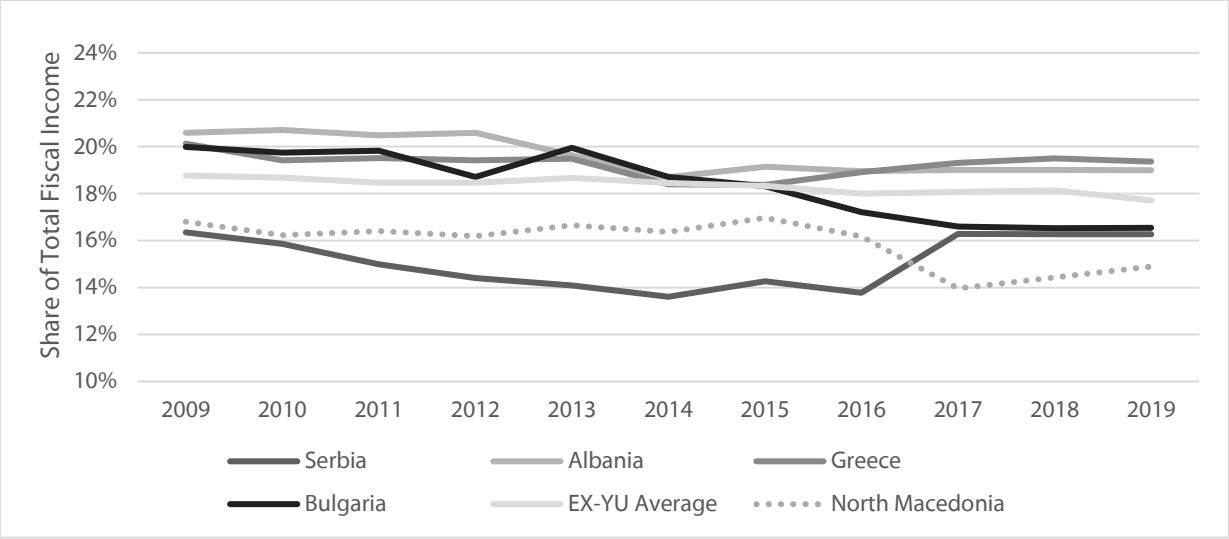
5.3 An international comparison of the income distribution

In a historical and international context, it is important to compare North Macedonia with two sets of countries and regions. First, I compare Macedonia with its neighbouring countries, the other ex-Yugoslavia countries as they have structurally similar political systems and economies, and the Eastern European block, as they share a socialist history. Later, I compare North Macedonia with Germany, its largest trade partner, Europe, and the European Union, as the country shifted its focus from 2018 to this day, in a joint effort to become the Union's latest member. For this comparison I use the adjusted series, as presented in Figure 4. It is also important to note that this comparison is not perfect, as the WID data on the income distributions of the other countries is based on the DINA methodology, while I use the fiscal income concept and generalized Pareto interpolation. However, the comparison is still useful to observe the differences in the evolution of the income distributions since shifting from one to the other methodology does not result in significant differences, as noted in Alvaredo et al., (2017).

Figure 7 represents the bottom 50% shares of Balkan countries including two European Union members: Greece and Bulgaria, which are North Macedonia's neighbours. The income distribution based on tax data for North Macedonia, implies a lower share of total income for the bottom 50%, when compared to the neighbouring countries, including the average from

the countries that were part of Yugoslavia. The only country with lower share for the bottom 50% is Serbia. However, Serbia is the only country that shows meaningful growth in the share of the poorest, while North Macedonia displays a further drop from 2016 onwards, thus becoming the country with the lowest share for the left tail of the income distribution.

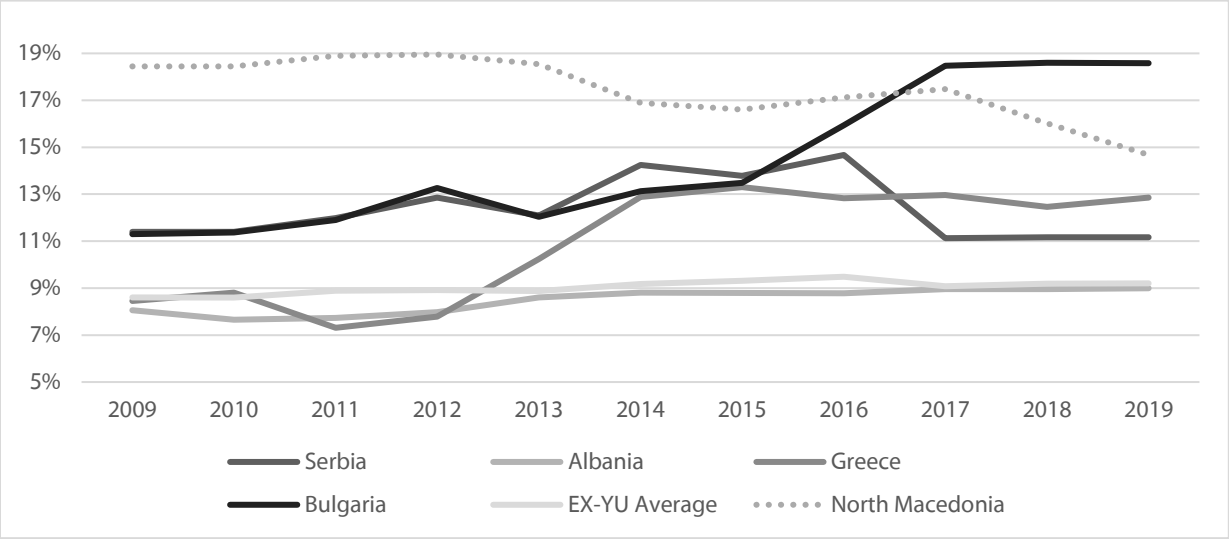
Figure 7: Bottom 50% shares: Balkan countries



Source: WID World data, Author's estimation based on tax data for North Macedonia.

The differences when looking at the middle 40% or even the top 10% across the Western Balkans, are also substantial. North Macedonia has the highest share for the top 10% and the lowest for the middle 40%, compared to both the Balkan region and Europe as a whole. Nevertheless, there are major differences in the evolution of the top 1% share across the Balkan region. North Macedonia exhibits the highest shares for the top 1%. Nevertheless, the shares are starting to converge towards the regions' average as Macedonia is the only country with a declining share of the top 1%. Contrary to this, Bulgaria, which is a part of the European Union and has a progressive tax system, has experienced exponential growth in the shares of the top 1%.

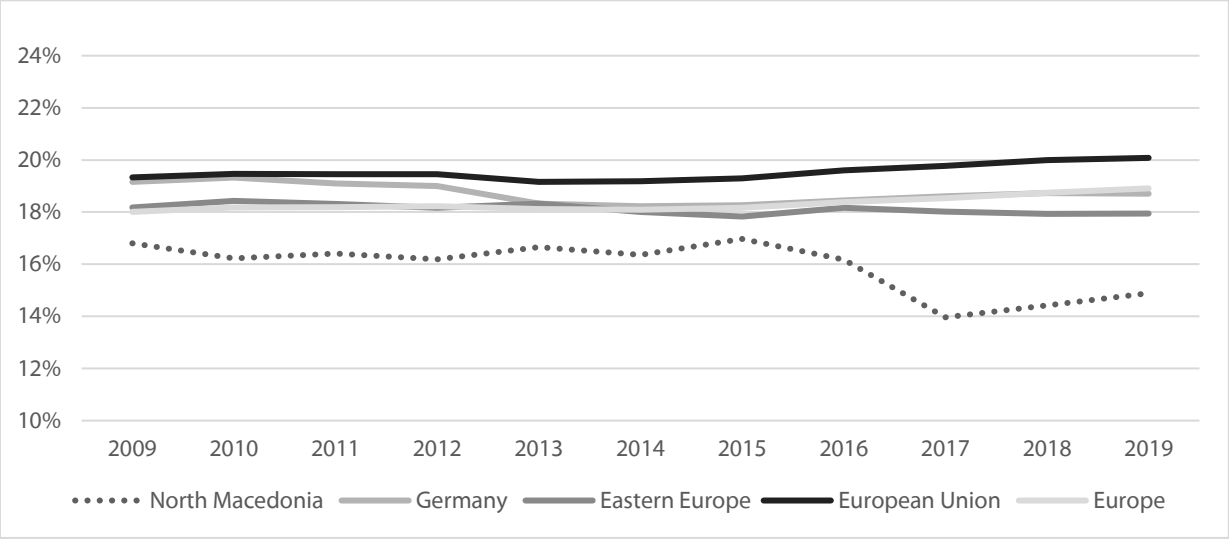
Figure 8: Top 1% shares: Balkan countries



Source: WID World data, Author's estimation based on tax data for North Macedonia.

The differences in the shares and trends are even more expressed when comparing North Macedonia to Germany, the European Union, and Europe as a whole, but the conclusions are the same. The share of the middle 40% for North Macedonia are lower but have converged to those of the European region in 2019. However, North Macedonia's bottom 50% shares are lower when compared to the bottom 50% shares in the European Union and exhibit a further drop from 2016 onwards.

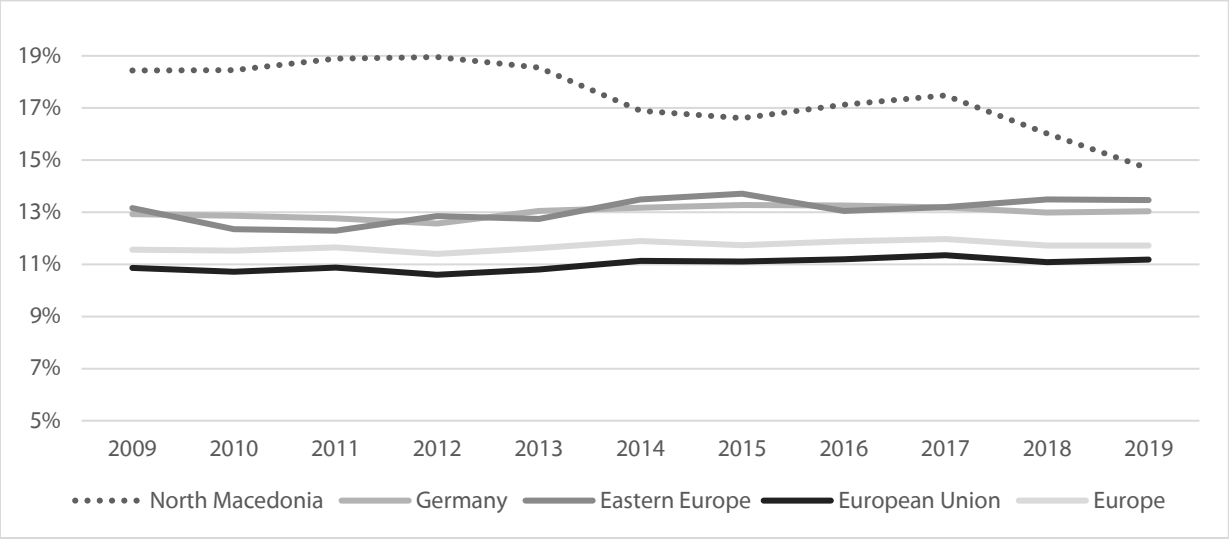
Figure 9: Bottom 50%: North Macedonia vs. Rest of Europe



Source: WID World data, Author's estimation based on tax data for North Macedonia.

The top 1% share is substantially higher when compared to the share of the richest in Germany, and the average of the other countries both in Europe and the European Union. However, in the from 2017 onwards, the adjusted top shares have been converging to the European average.

Figure 10: Top 1% shares: North Macedonia vs. Rest of Europe



Source: WID World data, Author's estimation based on tax data for North Macedonia.

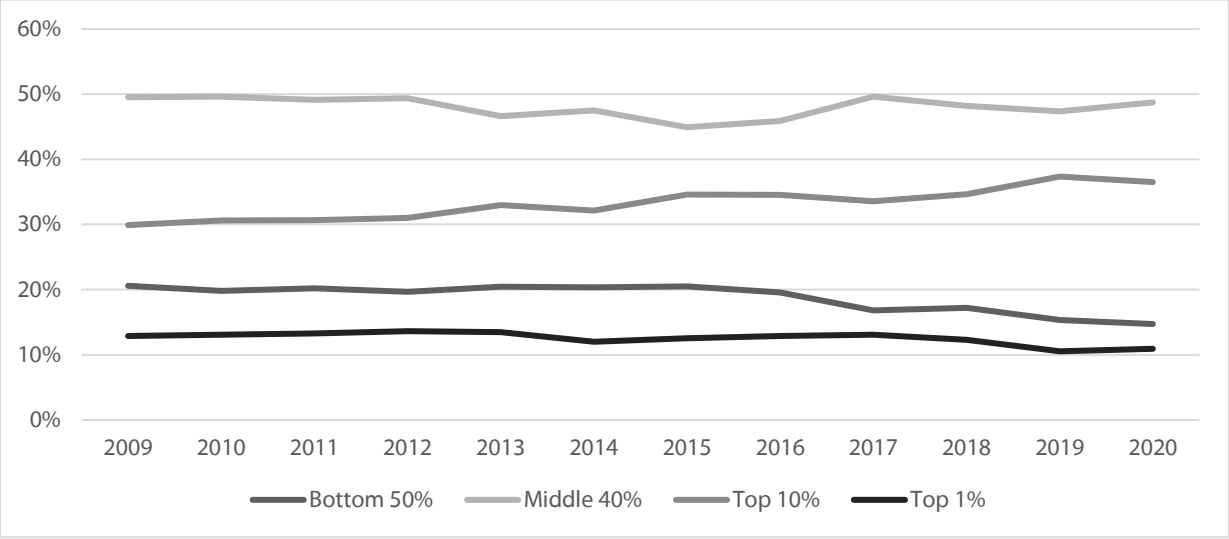
5.4 Decomposition of the Total Income

The personal income tax tabulations also contain data that I use to estimate the composition of the total income, using the income categories explained in part 4 of this paper. However, the brackets, bracket thresholds and averages in the tax tabulations are by construction based on the total income, thus making it impossible to get the inputs necessary to use the generalized Pareto interpolation method and get the shares for each income category.

To estimate the composition of total income, I calculate the share of each income category in the total income, for each bracket. I, then, assign each of the brackets from tax tabulations to the percentiles estimated for the total income, matching them based on the percentile and bracket thresholds. By doing so, I estimate the distribution of each of the main income categories, presented in the Appendix.

Income for labour is similarly distributed across the population as the total income, with the middle 40% capturing around 50% of total labour income. The bottom 50% and top 1% have seen a decline in their share of labour income while the top 10% has experienced a consistent and steady increase in their share.

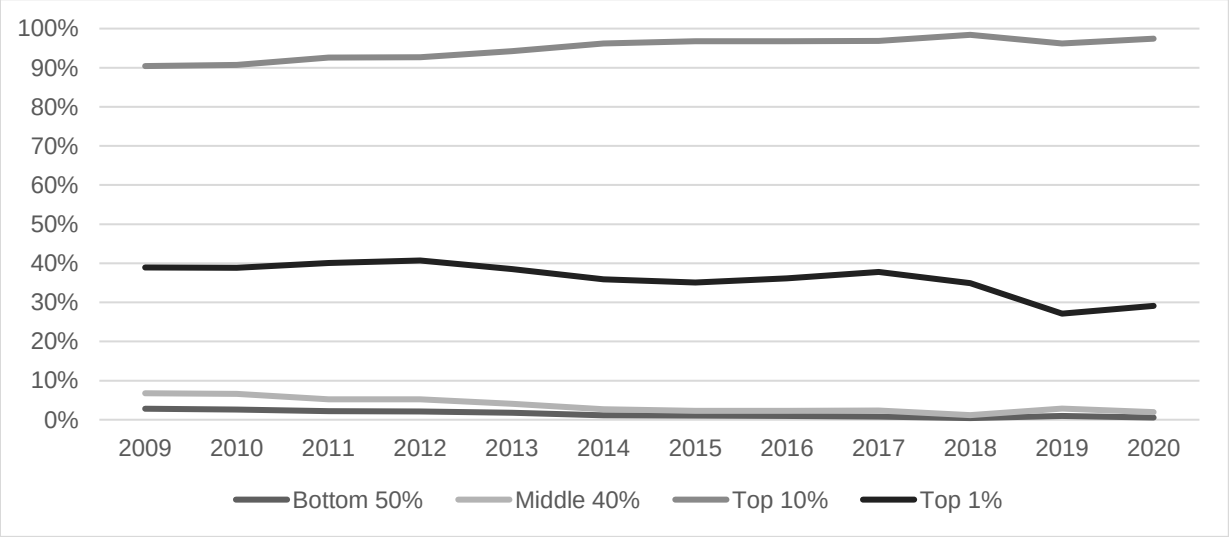
Figure 11: Distribution of Income from Labour



Source: Author's estimation based on tax data for North Macedonia.

The income from dividends, shows that almost all the dividends get distributed to the top 10%, while both the middle 40% and bottom 50% shares are almost non-existent, indicating that the ownership of financial assets is exclusively in the hands of the top tail of the distribution. It is interesting to note the large decrease in the shares of income from dividends of the top 1%, in 2019. This evolution of the income from dividends distribution, further supports the conclusion that the richest individuals were quick to react to the higher income taxes introduced with the tax reform of 2019. On the other hand, income from property (Appendix 8) seems to be more equally distributed than financial assets, with the top shares reaching as high as 75% compared to the almost 100% for interest and dividends.

Figure 12: Distribution of Income from Dividends



Source: Author's estimation based on tax data for North Macedonia.

6. Conclusion

For the purposes of this paper, I use previously unavailable personal income tax data to estimate the total income distribution and its composition for the period 2009-2020, for North Macedonia. Based on the tax tabulations, I use generalized Pareto interpolation to estimate the shares of the income distribution. I conclude that previous estimates of the income distribution and other inequality measures such as the Gini coefficient, based on household survey income data, differ substantially from the estimated shares based on the tax data. The top shares have been significantly underestimated by the survey-based distributions, which has also led to substantial Gini coefficient underestimation. Similarly, I compare North Macedonia with its neighbouring countries and the European Union as a region. I find that North Macedonia has both higher top, and lower bottom shares. Lastly, the total income distribution indicates that there might also be a high level of wealth inequality, as the top 10% of the population received almost a 100% the income from dividends and interest, and up to 75% of income from property.

The stated findings that I present in this paper, should be seen as a more reliable estimate of the total income distribution, its evolution, and its decomposition. As such, they should serve as a cornerstone for policymakers, better information for all stakeholders and to enrich the public debate on income inequality in Macedonia. In the paper, however, I also highlight the numerous assumptions needed to estimate the income distribution from the tax tabulations. Therefore, the conclusions of this paper, should be taken and analysed as an important addition, but still, only a small part of the wider array of previous empirical literature. This, however, provides possibilities for further research into this area.

To strengthen the understanding of income and wealth inequality as well as provide further evidence on the conclusions of this paper, it would be useful if the Public Revenue Office and the State Statistical Office of North Macedonia, provide and ease the access to both tax and survey microdata. This, in turn, would decrease the need for assumptions and it would create a filed for relaxing the previously imposed assumptions in this paper, thus increasing the reliability of the estimates. Furthermore, both agencies could increase the segmentation and decomposition of the data itself, as well as increase the time frame for which this data is available. By doing so, they would allow scholars to broaden the scope of this paper and look at wealth inequality, as well as build a long run series of the income and wealth distribution. Lastly, it would be of extreme importance to look at how different socio-economic factors affect the income and wealth distributions, as well as how specific policies might affect the shares and their evolution.

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8. Appendix

Appendix 1: Sensitivity analysis of the income distribution by changing the first bracket threshold

Threshold: 25,000

	Bottom 50%	Middle 40%	Top 10%	Top 1%
2009	16.80%	39.90%	43.30%	18.40%
2010	16.20%	40.20%	43.60%	18.40%
2011	16.40%	39.40%	44.20%	18.90%
2012	16.20%	40.20%	43.70%	19.00%
2013	16.70%	37.50%	45.80%	18.50%
2014	16.50%	38.10%	45.40%	16.80%
2015	17.00%	36.80%	46.20%	16.60%
2016	16.20%	37.60%	46.30%	17.10%
2017	13.90%	40.90%	45.20%	17.50%
2018	14.40%	40.20%	45.40%	16.00%
2019	14.20%	43.80%	42.00%	11.80%
2020	N/A	N/A	N/A	N/A

Source: Author's estimation based on tax data for North Macedonia.

Threshold: 30,000

	Bottom 50%	Middle 40%	Top 10%	Top 1%
2009	16.80%	40.41%	42.79%	18.44%
2010	16.22%	40.67%	43.11%	18.45%
2011	16.41%	39.93%	43.66%	18.89%
2012	16.19%	40.67%	43.14%	18.95%
2013	16.66%	37.99%	45.35%	18.54%
2014	16.36%	38.72%	44.92%	16.89%
2015	16.97%	37.22%	45.81%	16.61%
2016	16.18%	37.96%	45.86%	17.13%
2017	13.96%	41.21%	44.83%	17.48%
2018	14.42%	40.47%	45.11%	16.02%
2019	14.25%	44.05%	41.69%	11.76%
2020	13.35%	44.21%	42.44%	12.68%

Source: Author's estimation based on tax data for North Macedonia.

Threshold: 35,000

	Bottom 50%	Middle 40%	Top 10%	Top 1%
2009	16.80%	40.90%	42.30%	18.40%
2010	16.20%	41.20%	42.60%	18.40%
2011	16.40%	40.40%	43.10%	18.90%
2012	16.20%	41.20%	42.60%	19.00%
2013	16.70%	38.50%	44.90%	18.50%
2014	16.50%	39.00%	44.50%	16.80%
2015	17.00%	37.60%	45.40%	16.60%
2016	16.20%	38.40%	45.50%	17.10%
2017	14.00%	41.60%	44.50%	17.50%
2018	14.40%	40.80%	44.80%	16.00%
2019	14.30%	44.30%	41.40%	11.80%
2020	13.40%	44.40%	42.20%	12.70%

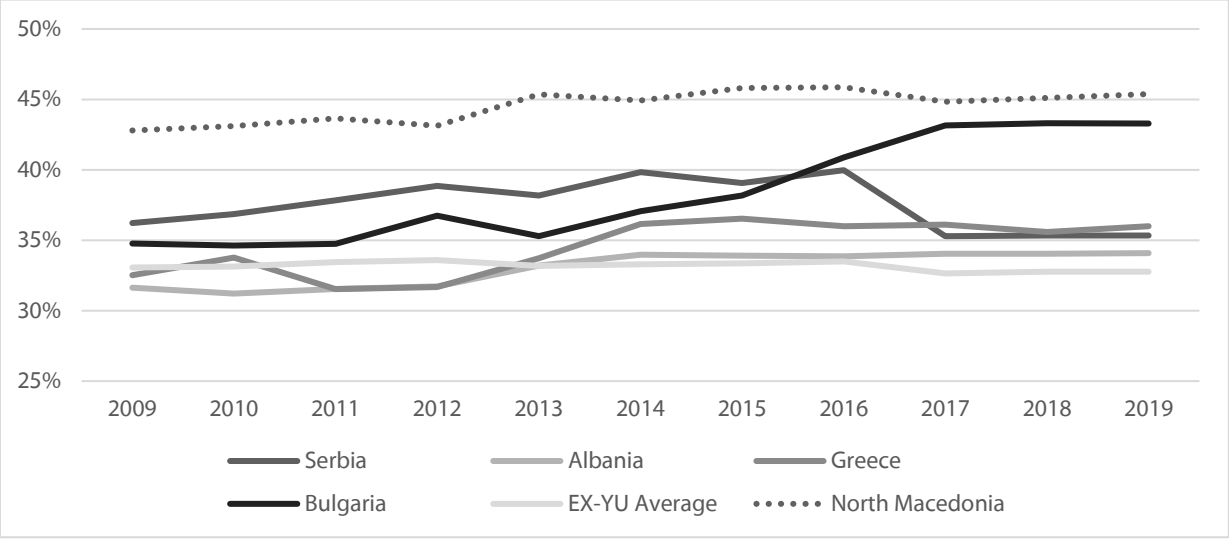
Source: Author's estimation based on tax data for North Macedonia.

Appendix 2: Total Income Decomposition for 2017-2020

2017	1 -10.000 MKD	4.05%	0.14%	N/A	1.46%	9.18%	0.01%	85.16%
2017	10.001-100.000 MKD	39.47%	2.55%	N/A	7.19%	1.52%	0.01%	49.26%
2017	100.001 -1.000.000 MKD	78.61%	5.11%	N/A	2.33%	0.56%	0.00%	13.38%
2017	Above 1.000.000 MKD	48.89%	0.65%	N/A	6.15%	21.26%	0.12%	22.94%
2018	1 -10.000 MKD	13.97%	5.36%	1.26%	0.41%	2.75%	0.01%	76.24%
2018	10.001-100.000 MKD	39.32%	24.45%	2.54%	1.96%	0.53%	0.01%	31.18%
2018	100.001 -1.000.000 MKD	65.64%	20.67%	0.72%	1.34%	0.34%	0.00%	11.28%
2018	Above 1.000.000 MKD	42.29%	0.60%	2.49%	4.72%	25.75%	0.12%	24.03%
2019	1 -10.000 MKD	14.92%	5.95%	0.89%	0.49%	2.89%	0.01%	74.85%
2019	10.001-100.000 MKD	39.91%	25.68%	1.80%	2.15%	0.46%	0.01%	29.99%
2019	100.001 -1.000.000 MKD	65.59%	20.21%	0.47%	1.29%	0.29%	0.00%	12.15%
2019	Above 1.000.000 MKD	54.69%	0.80%	2.82%	5.22%	10.28%	0.12%	26.08%
2020	1 -10.000 MKD	12.82%	5.15%	1.63%	0.68%	3.30%	0.01%	76.42%
2020	10.001-100.000 MKD	41.68%	17.87%	3.47%	2.39%	0.60%	0.01%	33.99%
2020	100.001 -1.000.000 MKD	67.71%	20.79%	0.51%	1.13%	0.28%	0.00%	9.58%
2020	Above 1.000.000 MKD	52.84%	0.75%	1.96%	4.56%	14.39%	0.12%	25.38%

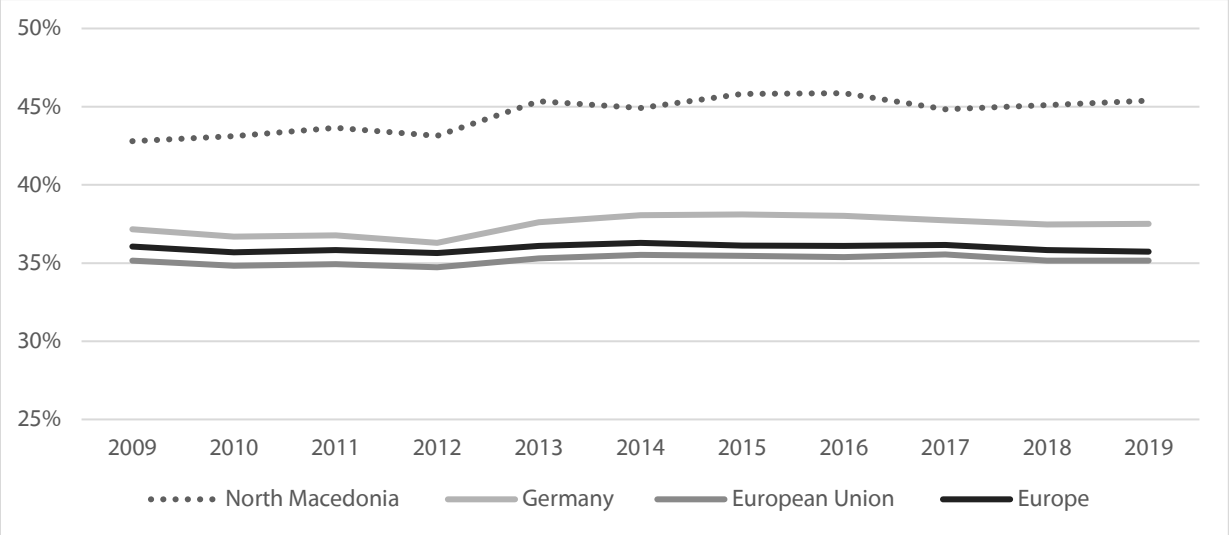
Source: Author's estimation based on tax data for North Macedonia.

Appendix 3: Top 10% shares in Balkan countries



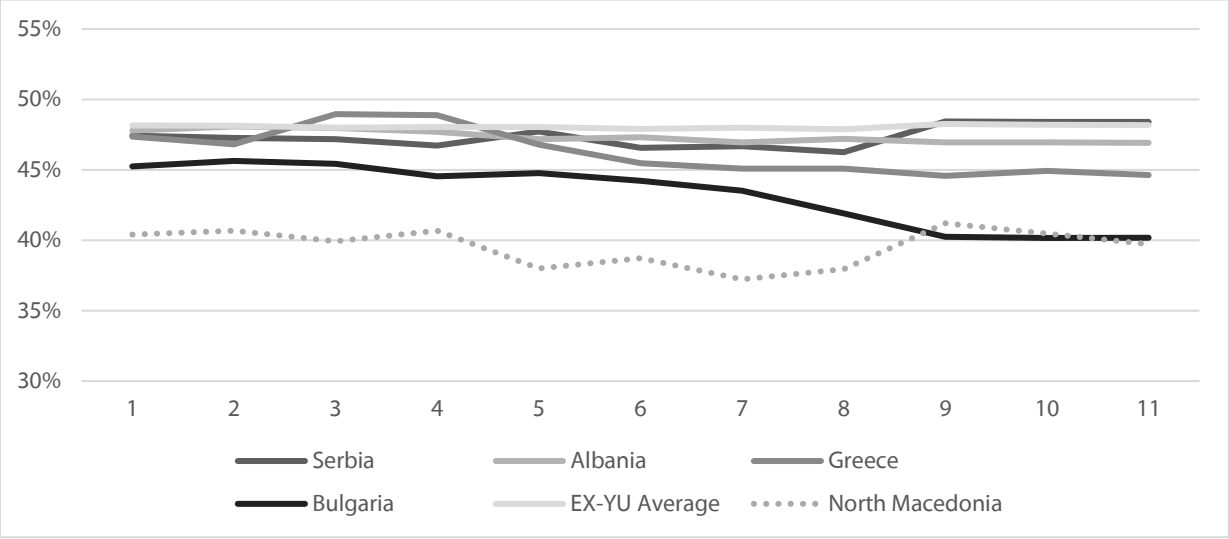
Source: WID World data, Author's estimation based on tax data for North Macedonia.

Appendix 4: Top 10% shares: North Macedonia vs. Rest of Europe



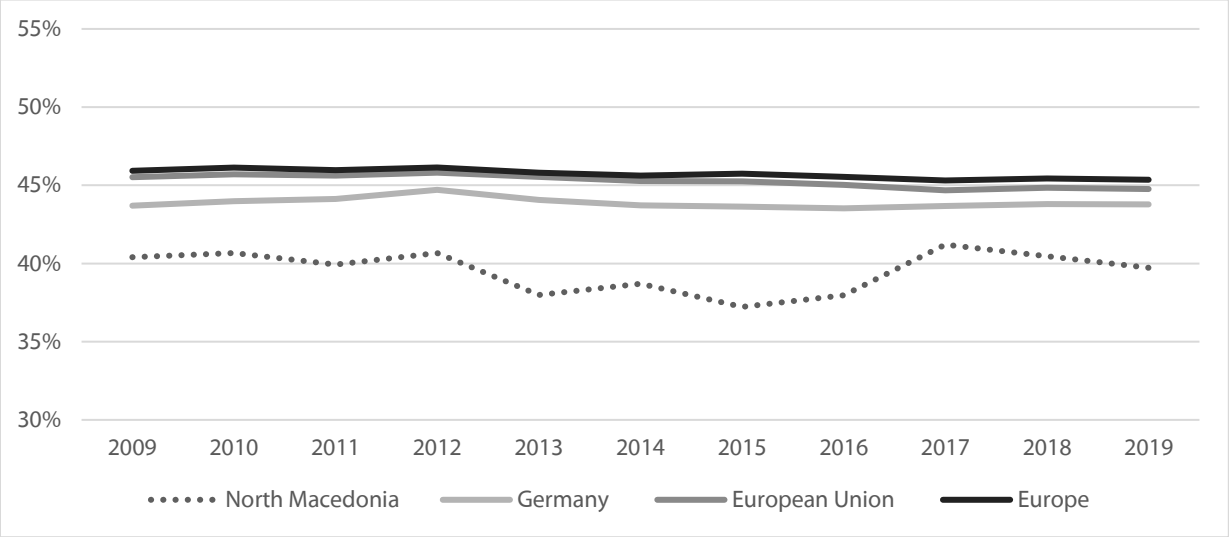
Source: WID World data, Author's estimation based on tax data for North Macedonia.

Appendix 5: Middle 40% shares: Balkan countries



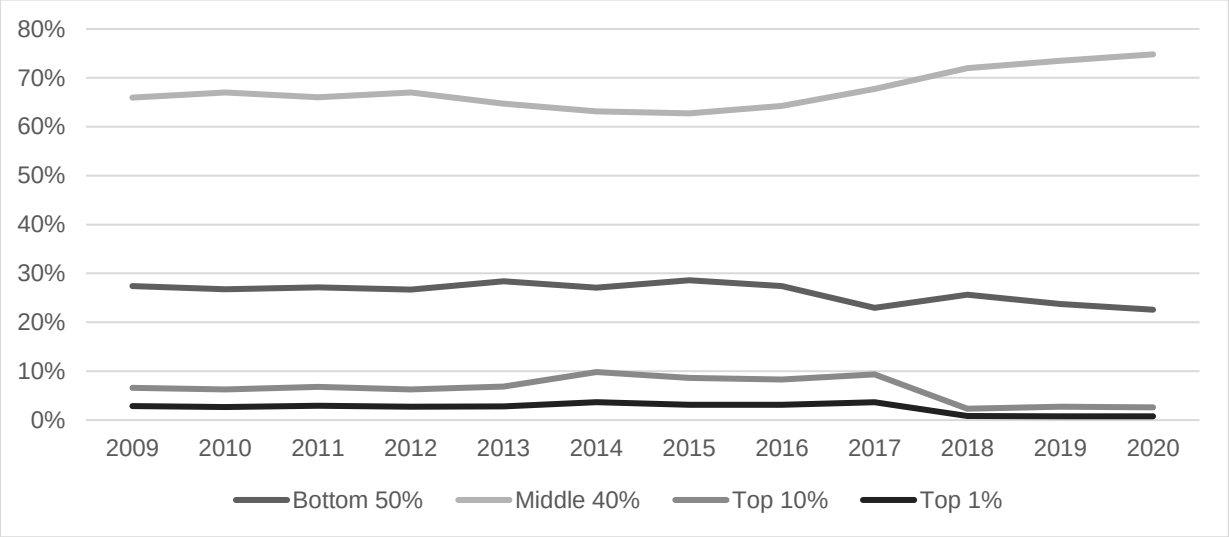
Source: WID World data, Author's estimation based on tax data for North Macedonia.

Appendix 6: Middle 40% shares: North Macedonia vs. Rest of Europe



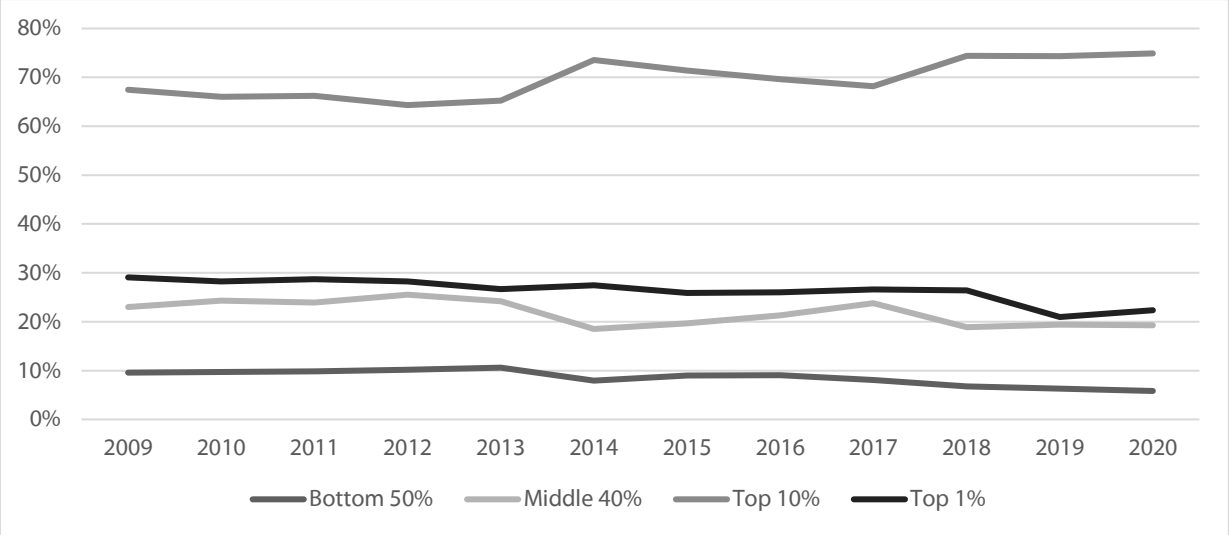
Source: WID World data, Author's estimation based on tax data for North Macedonia.

Appendix 7: Distribution of Income from Pensions



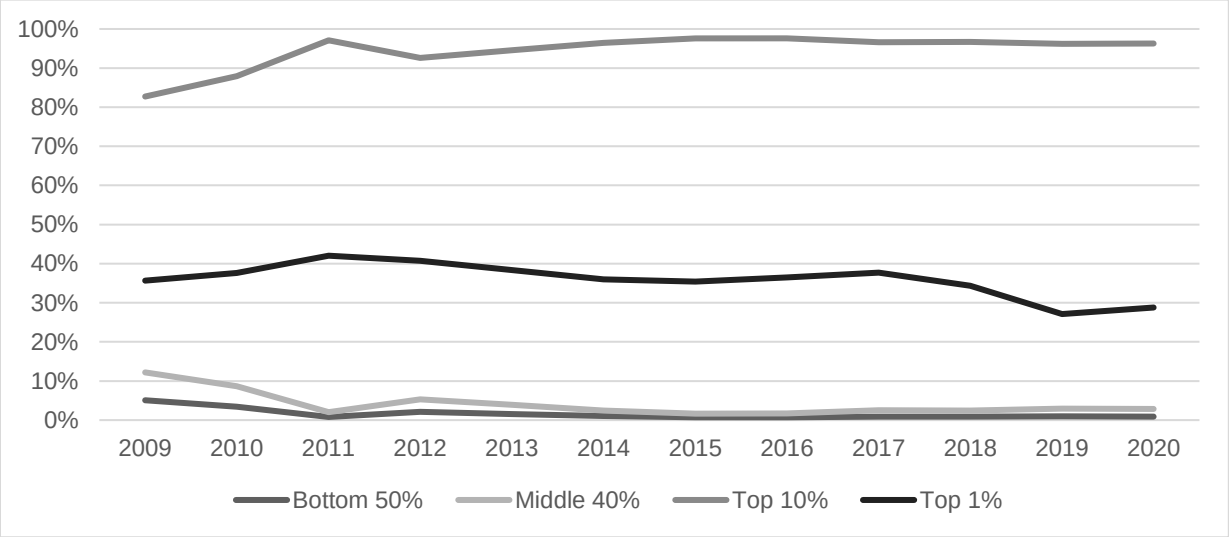
Source: Author's estimation based on tax data for North Macedonia.

Appendix 8: Distribution of Income from Property



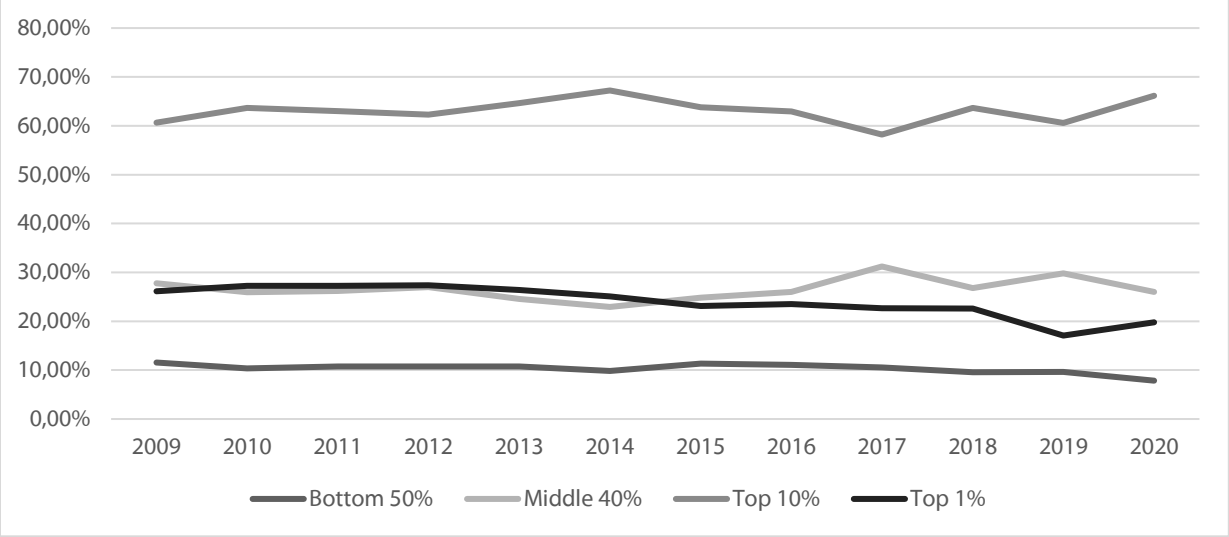
Source: Author's estimation based on tax data for North Macedonia.

Appendix 9: Distribution of Income from Interest



Source: Author's estimation based on tax data for North Macedonia.

Appendix 10: Distribution of Other Income



Source: Author's estimation based on tax data for North Macedonia.