INCOME INEQUALITY IN THE 21ST CENTURY IN POLAND

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Abstract. This paper combines micro-level tax data, household surveys and national accounts data to provide consistent series of income distribution in Poland over the 2000-2018 period. We find that inequalities in Poland are one of the largest in Europe. In 2018, the share of income accrued to the top 10% is 37.4%, to the middle 40% is 41.1%, and to the bottom 50% is 21.5%. The top 1% earns 13.4% of the total income. The increase in income inequality during this period was largely driven by high business incomes in top income shares. The extent of redistribution in Poland is modest. The tax system is regressive at the top of the income distribution due to lower taxation of business income and the low burden of social contributions. Finally, we show that top income groups are dominated by business owners, males, and big city dwellers, and these groups have been the largest beneficiaries of Poland's strong growth since 2000. Gender inequality has been high and stable in Poland, with a steeply decreasing female share with income rank (e.g. the share of females in top 0.1% group was 18% in 2018) .

1. Introduction

Poland's post-communist transition success has been frequently quoted (e.g., Piatkowski 2018). The real average national income per capita has more than doubled since 1990 – the fastest growth in Europe. In the same period, as the recent work by Bukowski and Novokmet (2021) shows, Poland also transformed from being one of the most equal countries in Europe, to being one of the most unequal. The Polish spectacular growth has not lifted all the boats equally.

Bukowski and Novokmet (2021) highlight two periods of a particularly strong rise in Polish inequality: the period instantly following the transition from communism and capitalism, and after 2004 (when Poland joined the EU). Whereas the former was an inevitable consequence of the transition from a socialist to a market economy, and the accompanying free-market reforms, the origins of the latter are less well known. Yet, the data constraints do not allow the authors to investigate in depth the dynamics of income distribution after 2000.

This paper aims to shed light on the rise of inequality in the 21st century Poland, by combining administrative tax micro-data with household survey data and national accounts to provide consistent series of the distribution of income in Poland from 2000 until 2018. The estimates presented in this paper are first to utilise the administrative tax registries in Poland and a first step in the construction of the Distributional National Accounts (DINA) (Alvaredo et al., 2016). In addition, we provide a breakdown of the series by income sources and demographic characteristics. For the most recent year of our analysis, we also present a comparison of the pre-tax and post-tax income distributions.

We find that today inequalities in Poland are one of the largest in Europe. Using a couple-split definition of income, we document that in 2018 the share of pre-tax income going to the top 10% is 37.4%, to the middle 40% is 41.1%, and to the bottom 50% merely 21.5%. The top 1% earns 13.4% of the total income. These are conservative estimates, as alternative definitions of income generally produce a higher level of inequality.

The redistribution in Poland does little to lower the level of economic disparities.[1] The tax system (social contributions direct taxation) has an unequalizing effect on the distribution of income, while social transfers have an equalizing effect. Consequently, the redistribution has a small and positive effect on both the bottom 50% and the top 1% income shares, at the cost of the middle 40% and top 10-1%.

We document two periods of growth in inequalities, 2004-2008 and after 2013. In these years, Poland's strong economic growth has disproportionally benefited the top income groups. For instance, the average annual growth rate of income of the top 0.1% group between 2000 and 2018 was 4.6%, whereas the population average 3.2%. This group is dominated by business owners –around 90% of its income comes from business income – and males – less than 20% of them are females. The rich are also overrepresented among the population of metropolitan areas, although we observe an interesting pattern of the growing importance of rural areas.

Women are economically disadvantaged, and their position has not improved since 2000. The average raw gender income gap in the analysed periods is 33% - the mean income of women is one-third smaller than the mean income of males - and generally remained unchanged over the analysed period. The largest gaps can be found in business sectors and among pensioners, moreover, those gaps have been increasing in time. The gender gap in terms of labour income has been falling and was in 2018 at the level of 17%.

This paper is organised as follows. In Section 2 we discuss the data and methodology. In Section 3 we present the level and evolution of income inequality since 2000. In Section 4 we provide the decomposition by the source of income, the place of living and gender.

[1] The study ends with the year 2018, so it doesn't cover subsequent tax reforms. The reforms from 2019-2022 were aimed at reducing inequality and improving overall progressivity of the system and include among other, introduction of solidarity levy, changes in the health insurance contribution and an increase of the tax-free amount.

2. Methodology and Data

We combine micro-level income tax data, household surveys and the national account (NA) data in order to construct new income distribution series in Poland for the period between 2000 and 2018. We take the fiscal income distribution from the tax data as a starting point. First, we add tax-exempted income to the bottom of the fiscal income distribution using the EU-SILC survey and NA data. Second, we add capital income (not observed in the tax data) to the top of the fiscal income distribution using the HFCS survey and NA data.

2.1. Data

We use three types of data: (1) microdata from the tax and population administrative registries; (2) household surveys and (3) National Accounts and various administrative reports. For the years after 2016, we supplement the tax records with micro-level data from social security and social insurance registries.

2.1.1 Administrative registries

Personal Income Tax (PIT) registry. The micro-level tax data is administered by the Ministry of Finance of the Republic of Poland. The unit of observation is a tax return. As it is possible to submit more than one return depending on the source of income (i.e., there are separate forms for income from wages/transfers, business, capital gains and rents) and the type of taxation (i.e., progressive or linear), we aggregate all individual's incomes across the forms, to obtain data at an individual level. Married couples and single parents have a right to submit a joint tax form under the progressive income tax schedule, but we observe the individual incomes of each spouse and parent.

Population registries. The PESEL registry is the main source of information on Polish citizens. Each citizen has a unique identification number, which can be used to link individuals across various data sources. The registry provides information on age,

gender and marital status. Importantly, it allows us to identify marriages even when only one or none of the spouses appear in the tax registries.[2]

***Social and health insurance registries*.** The individual-level information on social security contributions is from the registries of the Social Insurance Institution (*Zakład Ubezpieczeń Społecznych*). The data include the amount paid by employees, employers and self-employed for four types of contributions: (1) pension contributions; (2) health contributions; (3) sickness contribution; and (4) work-accident contribution.

Social security registry. For years 2017-2018, the Ministry of Labour and Social Policy of the Republic of Poland provides data on social transfer. We define social transfers as a sum of family benefits and alimonies and divide it equally among adult household members. We do not include social assistance, as the data is not available.

2.1.2 Survey data

The EU Statistics on Income and Living Conditions (EU-SILC). The household survey data on income distribution is collected by Eurostat. The reference population is all private households and their members aged above sixteen. For Poland, the sample consists of 6000 households and 15000 individuals every year and the data spans is available from 2004. The income from capital is defined at household level, whereas income from employment, self-employment and pension benefits at the individual level. In order to make the definition of income comparable to the tax data, we include income from employment, self-employment, pension, and rental of a property or land. Employment income consists of employee cash or near cash income and non-cash employee income. Self-employment is defined as cash benefits or losses from self-employment (including royalties). We equally split the household-level incomes among all adults in the household.

[2] The PESEL ID is also sometimes given to foreigners who are permanent or temporary residents. However, we include both foreign and Polish citizens, as we are primarily interested in inequalities among the residents of Poland. Yet, the number of foreigners in the tax microdata is small, for instance, it slightly exceeds 2% in 2018.

Household Finance and Consumption Survey (HFCS). The detailed data on capital income (e.g., dividends, interests) for households is collected by European Central Bank and national central banks in Europe. We use the survey wave from 2014, which include data on 3500 households. The survey oversamples the rich individuals.

2.1.3. Aggregated data

The National Accounts data are published annually by the Central Statistical Office of Poland and are produced according to the SNA standards (2008). We use this data in our imputations (see Section 2.2) to obtain the control population and the aggregates for dividends, interests and income in agriculture. We complement the latter with aggregated data the Agriculture Social and Health insurance (KRUS). In the imputation of income taxed using presumptive taxation, we use the total taxed incomes published in reports of the Ministry of Finance, Republic of Poland.

2.2. Methodology

2.2.1 Baseline population concept

The population of interest are all individuals aged 20 years and abvove, who are residents of Poland. The tax registries capture those who submit a personal income tax return, regardless of the level of imposed tax. Not everyone needs to submit a return (e.g., unemployed, students who are not working) and thus do not appear in the tax registries. We use population data from the Central Statistical Office of Poland (*Główny Urząd Statystyczny*) and append the missing people[3] to the raw micro-level tax data and define income groups (e.g., the bottom 50%, middle 40%, top 10%). We use the same population concept in the survey data.

2.1.2 Income concept

In our baseline estimates, we use the pre-tax fiscal income concept, which we define as:

[3] That is, for each year we add the difference between the total number of people aged 20-year-old or more and the total number of taxpayers aged 20-year-old or more.

pre-tax fiscal income = employment income + pensions + business income + rental income + capital income + agricultural income + other personal taxable income.

Compared to the broader national income concept (benchmark according to the DINA methodology), we do not include imputed rents of homeowners, income retained in businesses and paid corporate income taxes, and other sources, such as collective consumption. We also do not include employers' social security contributions. Our definition is thus close to the 'traditional' gross income concept. In the appendix, we also show results with added realized capital gains.

When analysing the effect of redistribution, we look at post-tax income, defined as:

post-tax fiscal income = pre-tax fiscal income – personal income taxes – social security contributions– health insurance contributions + social transfers.

Our baseline is couple-split concept, which provides a good approximation for the actual resources available to individuals. For each legally married couple we aggregate all taxable sources and equally divide among the spouses. For those who are unmarried, we leave their income unchanged. When analysing the gender composition of income groups, we use the individual definition of income, in which we attribute all taxable income to individuals who earned them. In the appendix, we also present the main series of income inequality using the individualistic concept of income.

2.1.3 Income imputations

Our series rely on the administrative tax micro-data. Such data has several advantages over alternative sources of income data, primarily, the household surveys. It is well documented that household surveys suffer from poor coverage of top incomes due to higher non-response and under-reporting among richer respondents, as well as due to specific survey collection constraints and top coding. In contrast, the administrative tax registries provide a much better picture of top incomes, because

almost all income earners must report their income for tax purposes, misreporting is punishable by law, and there are no sampling nor top-coding issues.

Nevertheless, compared to our definition of pre-tax income, the available tax data mises information on: 1) non-taxable income (e.g., certain transfers, agriculture income, small job contracts); 2) capital income from dividends and interests. The first omission underestimates mostly lower deciles of the income distribution, whereas the missing capital incomes are concentrated mainly at upper deciles. We impute those missing incomes using external data, namely, household surveys and national accounts. The methodology is similar to the Distributional National Accounts (DINA) guidelines (Alvaredo et al. 2016) and consists of several steps.[4]

First, we add to the poorer half of the population (bottom 50%), the value added of the agriculture sector (from NA), assuming that each member of this group earned the same average agricultural income. We also add the aggregated taxes and contributions paid by farmers. To avoid the double-counting of the income of agriculture workers, as their income appears in the tax data and the value-added data, we exclude wages of agriculture workers from the NA data.

In the second step, we estimate other tax-exempted incomes using the EU-SILC survey data. First, we assume that the tax-exempted incomes accrue to all people below the 24th percentile[5] of the couple-split distribution of income.[6] Second, in each EU-SILC wave (2004-2016, described below) we calculate the ratio between the average income above and below that threshold (the EU-SILC data capture all taxable and most non-taxable sources of income). Finally, we impute the missing income from the tax records, by accruing to the population below the thresholds the average income

[4] DINA methodology has been recently applied to, for instance, the USA (Piketty et al.2018), France (Garbiniti et al., 2020), China (Piketty et al., 2019), Russia (Novokmet et al., 2017), or Netherlands (Bruil et al., 2022), etc.

[5] The choice of the threshold does not affect the final estimates.

[6] In the appendix we also show results when using individualistic concept of income. In this case we assume that the tax-exempted incomes accrue to all people below the 32nd percentile for the income distribution.

which equals the average income above the thresholds multiplied by the estimated ratio from EU-SILC.[7]

We impute capital income (e.g., dividends, interests), which is taxed at the source, and not captured in the tax micro-data.[8] Although we know the total income from those sources from NA, we do not know how they are distributed across the population. For this purpose, we use the second wave (2014) of the HFCS survey data and calculate the distribution of capital income across (total) income groups. Next, we distribute the aggregates across income groups in the tax registries using the estimated distribution from HFCS. In the Polish case, the addition of dividends has a negligible effect on the level and evolution of income inequality. The reason is that most of (broad) business income is taxed through PIT.[9]

Revenues from small businesses operating in selected industries and from private renting can be taxed by using presumptive taxation. Therefore, the data on taxpayers using this taxation contains only information on revenue, but not income. For taxpayers whose revenue originates from business activities we assume that income constitutes 75% of revenue, and for rents 90%. Although presumptive taxation was introduced in the early 1990s, the tax registries contain micro-data on income taxed using this form of taxation only since 2004. For the years 2000-2003, we redistribute the aggregated income taxed using presumptive taxation according to the empirical distribution from 2004.

Finally, we do not include capital gains in our baseline estimates. Their taxation was introduced in 2004 and information on this source of income does not exist for the earlier years.[10] Furthermore, it is reasonable to look at inequality series excluding

[7] For years 2000-2003, we use the ratio calculated in EU-SILC from 2004. For 2017-18, we use the ratio from 2016.

[8] Dividends from abroad are captured by the tax data.

[9] The distributed corporate income in the form of dividends is double taxed at the total effective tax rate of 34.4%. In comparison, high-income unincorporated businesses are taxed at a flat rate of 19%. As a result, a large number of business owners prefer to run the so-called pass-through companies in order to be taxed according to PIT. The implication is that a big part of the corporate profits is directly captured in the tax micro-data as the business income of individuals.

[10] Specifically, we do not include realized capital gains from sales of financial assets (taxed at the flat rate using the PIT 38 form) and capital gains from real estate sales (taxed at the flat rate using the PIT 39 form). The taxation of realized capital gains from sales of financial assets has been introduced in

capital gains as taxable income only captures realized capital gains (i.e., capital gains are taxed on a realization rather than on an accrual basis). An important rationale for this choice is that realized capital gains may often cause significant short-term volatility in comparison to other, more stable, annual income sources due to the lumpiness of its realization (quite often induced by tax law changes). Moreover, the national accounts do not include capital gains in the national income concept (also in line with the DINA guidelines; Alvaredo et al. 2020). In the appendix, we show that the inclusion of realized capital has a negligible effect on the level and evolution of inequality.[11]

3. Evolution of income inequality

3.1. Baseline series

Starting with our baseline series for pre-tax couple-split income, the first result to emerge is that of high inequality of income in Poland. Descriptive statistics for 2018 are presented in Table 1 and in Figure 1. The richest decile earned 37.4% of the total income – lower than the middle four deciles (41.1%), often labelled as the middle class, and significantly more than the poorest half of the population (21.5%). The top 1% (around 300 thousand people) and the top 0.1% (around 30 thousand) captured 13.4% and 4.9% of the total income respectively. The average income of the top 10% is almost 9 times higher than of the bottom 50%, while of the top 1% is almost 31 times higher than of the bottom 50%. Inequality in 2018 is only slightly lower than in 2007, when it reached Poland's all-time high (Bukowski and Novokmet 2021), with the top percent share at 14.5% and the top decile share at nearly 40%.

We next look in Figure 2 at the evolution of income shares in Poland since 2000. After the first few years of stable inequalities, a substantial increase took place between 2003 and 2007, when the top 10% income share rose by 4.1 percentage points. This rise was driven mainly by the top 1%, which increased its share by 3.1 percentage points. The middle 40% and bottom 50% income shares fell by 2.2 and 1.5 percentage

2001, and capital gains from real estate sales in 2009 (subject to a 19% flat rate tax). Comparable information for the earlier periods is not available.

[11] The tax statistics show that, for instance, between 2004 and 2013 the income from realized capital gains was less than 1% of the total income.

points respectively. The changes in the distribution of income are comparable in magnitude to 1989-1993, the years immediately following the transition to capitalism (Bukowski and Novokmet, 2021).

Table 1: The statistics on the income distribution in Poland in 2018.

Income group	Number of adults	Income threshold	Average income	Income share
Total population	30,339,299	0 zł	41,188 zł	100.0%
Bottom 50%	15,169,650	0 zł	17,683 zł	21.5%
Middle 40%	12,135,720	24,998 zł	42,318 zł	41.1%
Top 10%	3,033,930	73,426 zł	154,189 zł	37.4%
Incl. top 5%	1,516,965	101,467 zł	223,298 zł	27.1%
Incl. top 1%	303,393	236,907 zł	550,266 zł	13.4%
Incl. top 0.1%	30,339	897,354 zł	2,021,347 zł	4.9%
Incl. top 0.01%	3,034	3,292,935 zł	7,047,867 zł	1.7%

Distribution of income among adult individuals. Income is split equally among spouses. The estimates of pre-tax fiscal income as defined in Section 2. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

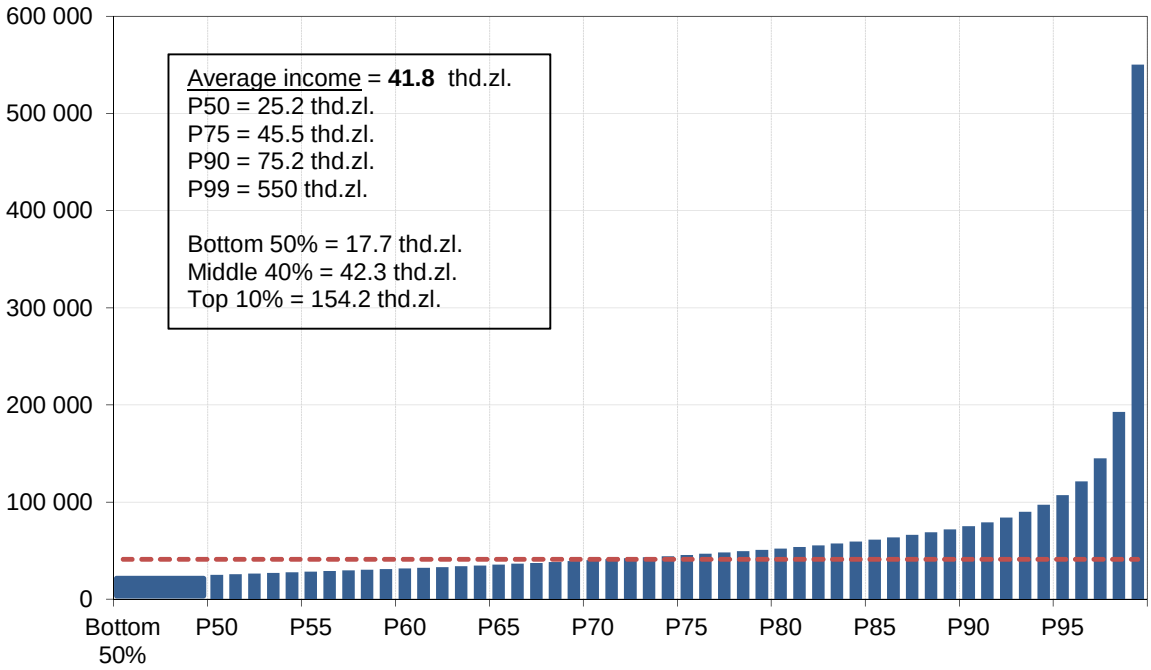


Figure 1: Average income by percentiles of pre-tax fiscal distribution in 2018

Distribution of income among adult individuals. Income is split equally among spouses. The series are based on pre-tax income as defined in Section 2. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

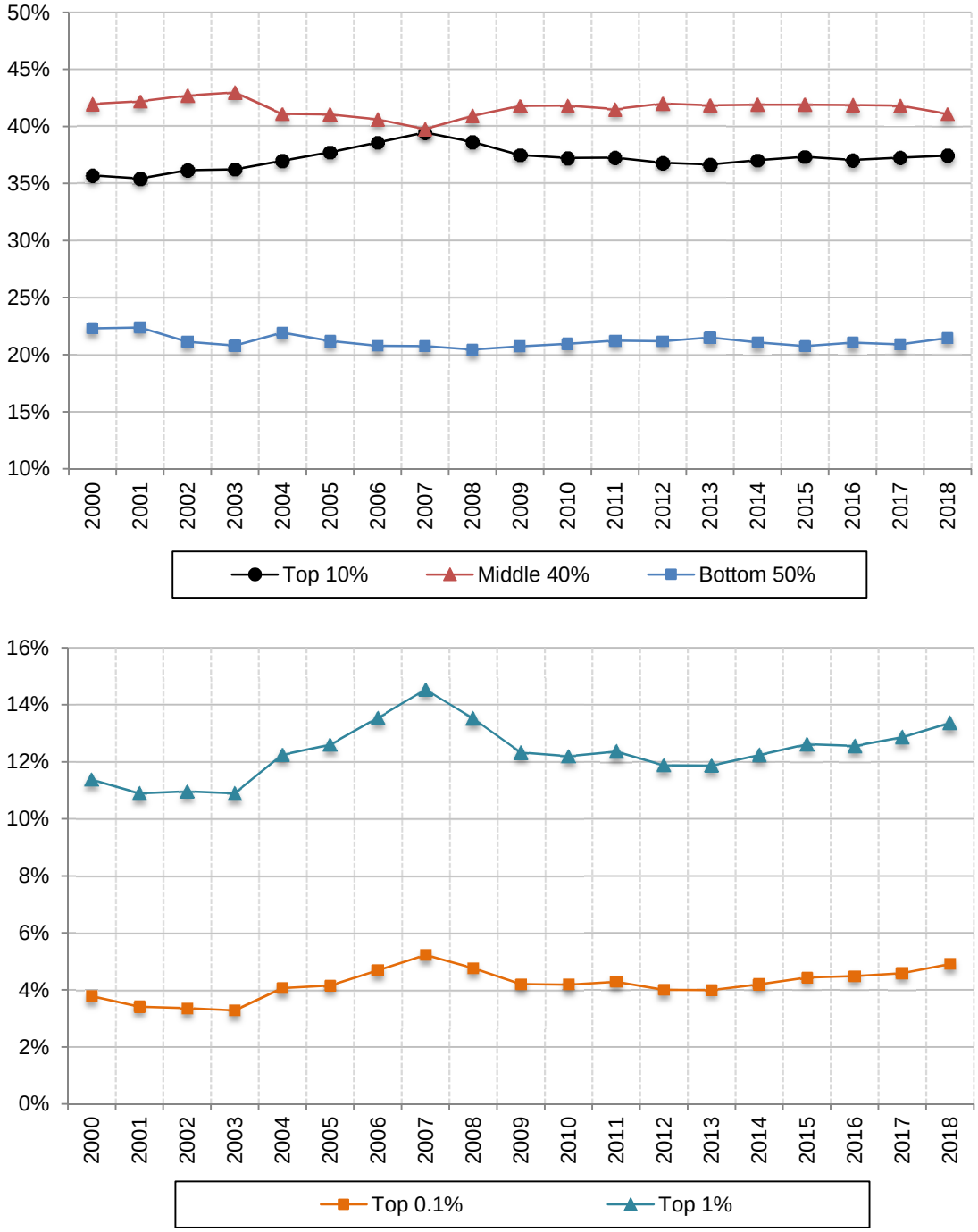


Figure 2: The couple-split income inequality in Poland 2000-2018

Distribution of income among adult individuals. Income is split equally among spouses. The series are based on pre-tax income as defined in Section 2. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

The period from the Great Recession until 2013 is marked by a decline and a stabilization of the top income shares. The top 10% income share declined by 3.1 percentage points, which was entirely driven by the declining share in the top 1% – particularly during the first years of the crisis. However, since 2013 we observe an increase in the top 1% income share, by 1.5 percentage points. Interestingly, over the same period the top 10% share rose by only 0.4 percentage points, and the middle 40% fell by 0.8 percentage points. The bottom 50% remained unchanged. This shows that the recent rise of inequality was driven by the increasing concentration at the very top of the income distribution and the corresponding fall of the income share of those between the 90th and 99th percentiles.

Overall, the findings from this section are in line with Bukowski and Novokmet (2021), who draw the long-run picture of inequality in Poland by constructing equal couple-split measures of income shares from combined tax tabulations and household survey data. The authors show that in 2015, the top 10% earned 35% and top 1% earned 12.9% of the total income. Our estimates are more precise, as we rely on micro-level data from tax registries and find higher estimates for the top 10% (37.3%), but almost the same levels for the top 1%. The similarity of the results provides support for their claim that official survey-based measures strongly underestimate both the level and the rise of income inequality in Poland since 1989.

In Figure 3, we juxtapose the Polish series with estimates from Czechia, France, Germany, Hungary, and the UK (from the World Inequality Lab (WIL)), which were derived using a methodology akin to ours. It's crucial to acknowledge that while the comparability the presented series is probably greater than those reported in OECD or Eurostat publications, institutional differences across countries (for instance, the prevalence of pass-through companies) could still influence the measurements of income inequalities. This underscores the need for the expansion of Distributional National Accounts, which offer near-ideal international comparability.

The Polish Top 10% income share is larger than in Germany or the UK (one of the most unequal countries in Western Europe) and in Czechia and Hungary (which have the level of inequality more similar to France; e.g. see Bukowki and Novokmet, 2021; Novokmet, 2018; Garbinti et al. 2018). Moreover, Poland has been among the most

unequal countries in the EU since its entrance in 2004. Similar conclusions can be drawn from the comparison of the top 1% income shares (available upon request). When it comes to the bottom 50%, however, Poland is much closer to the levels of France or Hungary, and significantly above the level of Germany and the UK. This suggests that the position of the Polish middle class (the middle 40%) is relatively weak in comparison to other countries.

3.2. The distribution of economic growth

We next consider the distributional effects of economic growth by looking at the growth experience of different income groups. As shown in Figure 4, over the 2000–2018 period, average real (fiscal) income per adult has increased by 72%, or at about 3.1% per year. However, the growth incidence curve for the 2000-2018 period suggests that this average growth has not been experienced by all groups. Both the bottom 50% and middle 40% experienced below-average growth over this period, respectively 66% and 68% (or 2.8% and 2.9% per year), while the top 10% increased by 80% (or 3.3% per year) However, the growth of the top decile was heavily tilted towards the groups within the top 5%, which are the only groups that experienced above-average growth rates. Specifically, the curve displays a marked upward-sloping shape above the 95th percentile, with growth particularly steeply increasing for the groups within the top 1% (the 99th increased by 79%; the 99.5th by 87%, the 99.9th by 123%).

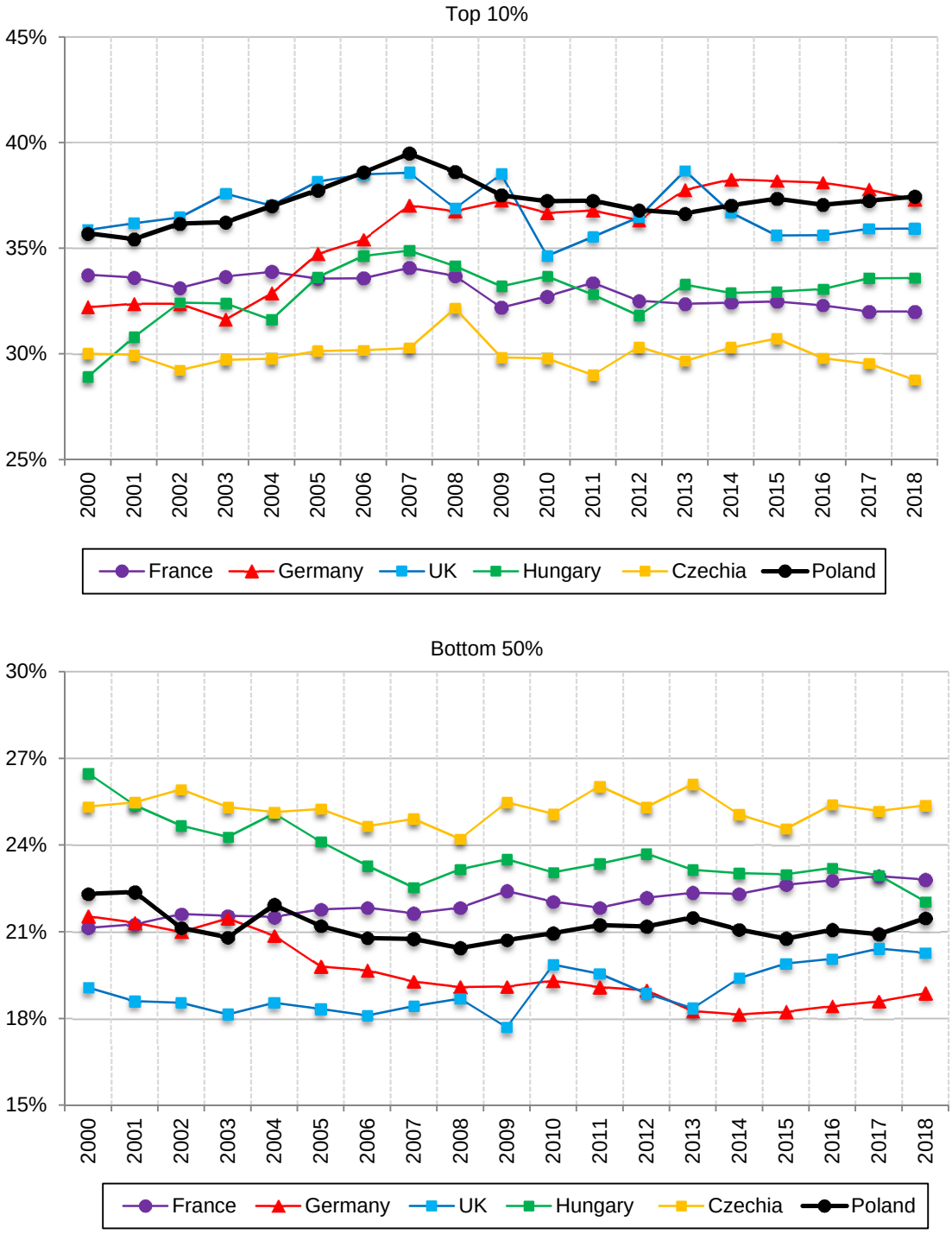


Figure 3: Top 10% and Bottom 50% in Poland and other European countries

Distribution of income among adult individuals. Income is split equally among spouses. Source: Poland: authors' computation based on tax registries, household survey data and national accounts; France, Germany, UK, Hungary and Czechia: World Inequality Database. See Section 2 for more details. Note that institutional differences across countries (for instance, the prevalence of pass-through companies) could impar the comparability of the estimates.

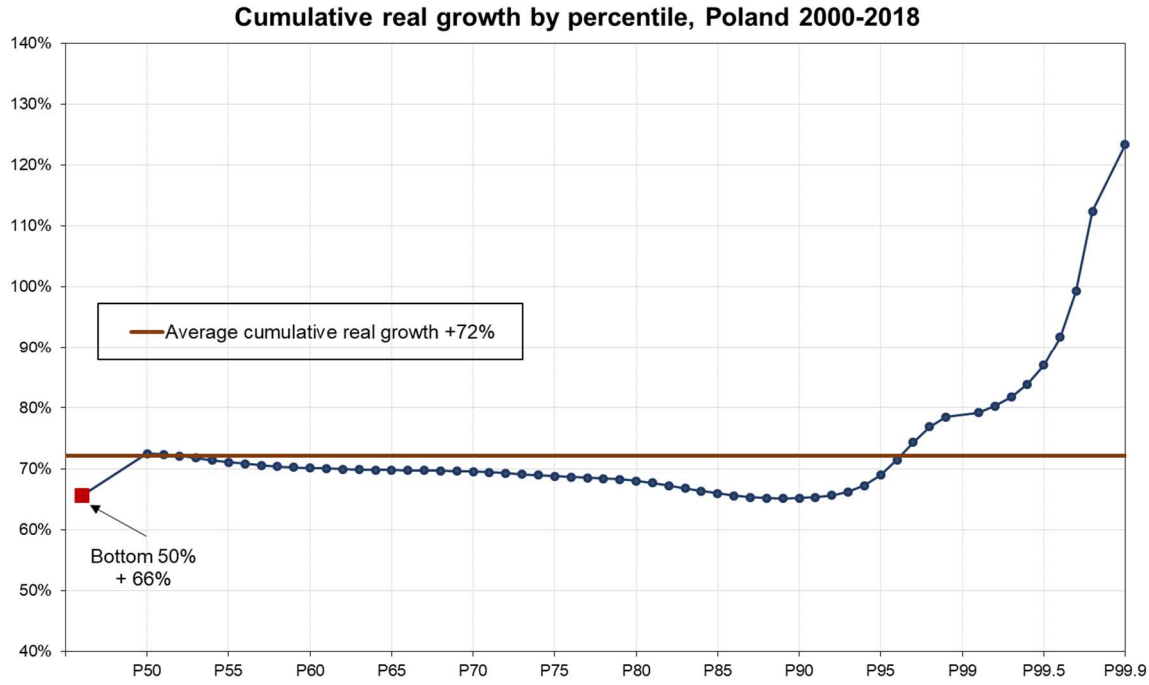


Figure 4: Cumulative real income growth by percentile in Poland, 2000-2018

The figure shows the cumulative real growth of fiscal income by percentile over the 2000-2018 period. The unit of observation is adult individual. Income is split equally among spouses. The series are based on pre-tax income as defined in Section 2. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

Table 3 provides an insight into the distributional growth patterns for the two (9-year) subperiods of equal length: 2000-2009 and 2009-2018. First, it can be seen that average income growth was higher in the second period (2009-18): about 3.9% per year, in comparison to 2.3% per year in the 2000-9 period. However, the distribution of growth was more skewed in the 2000s, with growth rates increasing as one moves up the distribution: 1.4% per year for the bottom 50%, 2.2% per year for the middle 40%, and 2.8% for the top 10%. In contrast, the growth was more equal in the 2010s: in fact, the growth was the highest for the bottom 50%, which grew at the above-average 4.3% per year (in comparison to 3.7% per year for the middle 40% and 3.9% per year for the top 10%).

Table 2: Average annual growth rate and the distribution of growth in Poland

Income group	2000-2018		2000-2009		2009-2018	
	Average annual growth rate	Share in the total growth	Average annual growth rate	Share in the total growth	Average annual growth rate	Share in the total growth
Total population	3.1%	100%	2.3%	100%	3.9%	100%
Bottom 50%	2.8%	21%	1.4%	16%	4.3%	23%
Middle 40%	2.9%	40%	2.2%	41%	3.7%	40%
Top 10%	3.3%	39%	2.8%	43%	3.9%	37%
Top 5%	3.5%	29%	2.9%	32%	4.1%	28%
Top 1%	4.0%	16%	3.2%	15%	4.8%	16%
Top 0.1%	4.6%	6%	3.5%	6%	5.7%	7%
Top 0.01%	4.2%	2%	1.8%	1%	6.6%	3%

The table shows the average annual real growth rates of fiscal income and its distribution by population groups. The unit of observation is the adult individual. Income is split equally among spouses. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

3.3. Robustness

We further elaborate on the effect of various empirical choices on the estimated level of inequality. Adding realized capital gains does not alter the results (Figure A2).[12] The top 1% and 0.1% income shares in 2018 are higher by around 0.5 percentage points compared to the series without capital gains (Figure 2). We also observe similar three phases in the evolution of inequalities, except that the inclusion of capital gains produces a stronger rise of the top income shares during the period directly preceding the Great Recession. For instance, in 2007, the top percentile shares are 1 percentage points higher compared to the baseline series without capital gains. Consequently, between 2004 and 2007, the top 1% and top 0.1% income shares rose from 12.3% to 15.6%, and from 4.3% to 6.1% respectively.

Table 3: Income shares in Poland 2018

			Bottom 50%	Middle 40%	Top 10%	Top 5%	Top 1%	Top 0.1%	Top 0.01%
couple-split	(1)	raw	18.0%	43.3%	38.8%	28.2%	14.0%	5.2%	1.8%
	(2)	(1) + population	14.3%	44.9%	40.9%	29.6%	14.6%	5.4%	1.9%
	(3)	(2) + agriculture income	16.9%	43.5%	39.6%	28.7%	14.2%	5.3%	1.8%
	(4)	(3) + EU-SILC correction	21.4%	41.1%	37.4%	27.1%	13.4%	5.0%	1.7%
	(5)	**(4) + capital income**	21.4%	41.1%	37.5%	27.2%	13.4%	4.9%	1.7%

[12] As mentioned above, because taxation of this source was introduced at the beginning of the 2000s, we can only produce these series since 2004.

(6)	(5) + capital gains	21.1%	40.9%	38.0%	27.7%	13.9%	5.3%	2.0%

Distribution of income among adult individuals. Income is split equally among spouses. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

The evolution of income shares constructed using the individualistic concept are presented in Figures A3-A4. The level of income inequality is higher than in the case of couple-split incomes,[13] but we document a similar evolution. The top 10% income share rose between 2000 and 2007 from 40% to 43%.[14] The rise in that period is mostly driven by the top 1% income share, which rose from 13.4% to 17% between 2000 and 2007. After 2008, the series for the top 10% fell and stabilized at around 41% and slightly increased between 2013 and 2018. The top 1% experienced a stronger rise after 2013 and today is at the level of 15.7%. Those developments are reflected in a fall of the bottom 50% and middle 40% income shares before 2008 and subsequent rise and stabilization.

Table 3 illustrates how the estimated income shares change with each step of the construction of our baseline series for 2018.[15] The first row shows the estimates for the series with wages, self-employment/business income and pensions only, and only for those who appear in the tax registries. The highest estimates are in the second row, where we add people who do not appear in the tax registries, and we assume that their income is zero. The third row adds agriculture income to the bottom 50%, and the fourth row further adds to this group other non-taxable income sources estimated from EU-SILC. These two modifications mechanically increase the share of the bottom 50%. Adding capital income (dividends and interests) produces the baseline estimates but has a little overall effect on inequality – in fact, these are relatively conservative estimates compared to other versions. Finally, adding realized capital gains increases slightly the estimates.

3.4. Redistribution

[13] This is because marriages are not perfectly assortative, that is, there are income gaps between spouses, such that equally dividing income within couples results in a more egalitarian distribution of income.

[14] Including realized capital gains leads to an upward correction of the estimates by 1 pp and a rise from 41% to 44% between 2004 and 2007 (Figure A5).

[15] Table A1 presents the income shares for individualistic definition of income.

In this section, we analyse the effect of redistribution on income inequality in Poland in 2018.[16] We focus on the role of direct taxation, direct contributions, and social transfers. The first result to emerge is the relatively small effect of redistribution on the level of inequality. Figure 5 shows the ratio between post-tax to pre-tax income shares. The net beneficiaries of the system - with higher post-tax than pre-tax income shares (i.e., with a ratio above 1) - are in the lower half of the distribution, up to the 60th percentile (with the bottom 50% as the largest beneficiaries). Net contributors are situated in the upper four deciles, with the ratio monotonically declining all the way until the very top income percentiles (suggesting rising progressivity of the tax and transfer system in this part of the distribution). Finally, and quite surprisingly, the 99th percentile becomes the net beneficiary of the tax and transfer system, whose post-tax share slightly exceeds its pre-tax share.

We next provide a more detailed breakdown of the redistributive effects of specific categories of taxes and transfers. In Figure 6, we look separately at the bottom 50%, middle 40%, top 10% and top 1% income shares, including and excluding taxes, contributions and transfers. Looking from the leftmost bar in each graph, we first estimate income shares for gross income combined with employer contributions (e.g., contribution to labour-related funds); the next bar shows the baseline gross income concept. The third bar presents income shares after deducting personal income tax; the fourth bar also deducts employee social contributions and health insurance. Finally, the rightmost bar adds social transfers and benefits.

[16] We limit the analysis only to 2018, because the comprehensive data on social transfers are only available since 2017. The results for 2017 are similar and are available upon request.

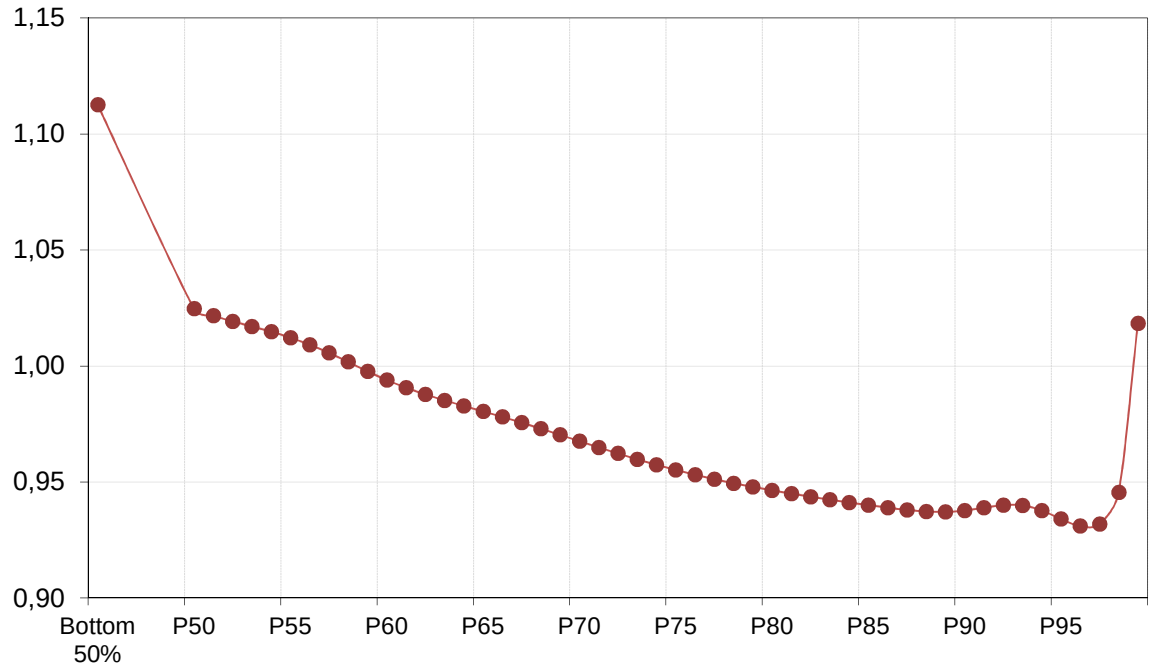


Figure 5: The ratio of post-tax to pre-tax income shares, Poland 2018

The unit of observation is adult individual. Income is split equally among spouses. The series are based on pre-tax and post-tax incomes as defined in Section 2. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

Adding employer contributions to gross income raises the share of the middle 40% and is irrelevant for the top decile. On the other hand, it reduces the income share of the bottom 50% and the top 1%. Since employer contributions fall only on employees, this pattern is a result of a relatively high share of employment income in the middle 40% and a relatively high share of pensions in the bottom 50% and business income in the top 1% (as explained in more detail in the next section).

Personal income taxation in Poland reduces the level of inequality, but the effect is small. The share of the bottom 50% increases by 0.9 percentage points and the middle 40% by 0.5 percentage points. The small distributional effect of the taxation system in Poland is a result of the option to tax business income using 19% flat tax, which is especially beneficial for high-income individuals (Chrostek et al. 2019; 2020; Kopczuk 2012).

The small redistributive effect of direct taxation is more than offset by the effect of employees' social contributions and health insurance. These deductions are calculated as a percentage of gross income with a cap on the level, which means that

high-income individuals pay relatively less than low-income ones (Chrostek et al. 2019; 2020). Indeed, although the combined effect of the contributions on the bottom 50% income share is positive and small (0.6 percentage points), they reduce the middle 40% share by 1.8 percentage points and increase the share of the top percentile by 1.2 percentage points.

Finally, we consider the role of social transfers in shaping inequality in disposable income. The most important element in the Polish safety net is a child allowance program *500+*. Introduced in 2016, *500+* provides a monthly allowance of around €109 to parents for each child except the first one (in the case of low-income individuals, for every child). The positive distributional effect of *500+* and other social programs is visible in the rise of the bottom 50% income share by 1.2 percentage points and the corresponding fall of the top 10% share. Interestingly, it is neutral for the middle 40% and induces only a small decline for the top 1% (by 0.4 percentage points).

Overall, the redistribution in Poland has a limited effect on income inequality. Strikingly, the top 1% income share is 0.3 percentage points *higher* in terms of disposable income (after tax and other compulsory deductions), than in terms of gross income. The second winning group is the bottom 50%, for which the difference is 2.5 percentage points. In contrast, the income share of the top 50% excluding the top 1%, is negatively affected by the redistribution. For instance, the gap between disposable and gross income shares for the middle 40% is -1.3 percentage points. These results are generally in line with a low PIT progressivity and a relatively low reliance on income (vs. consumption taxes) in Central and Eastern Europe (Blanchet et al., 2019).

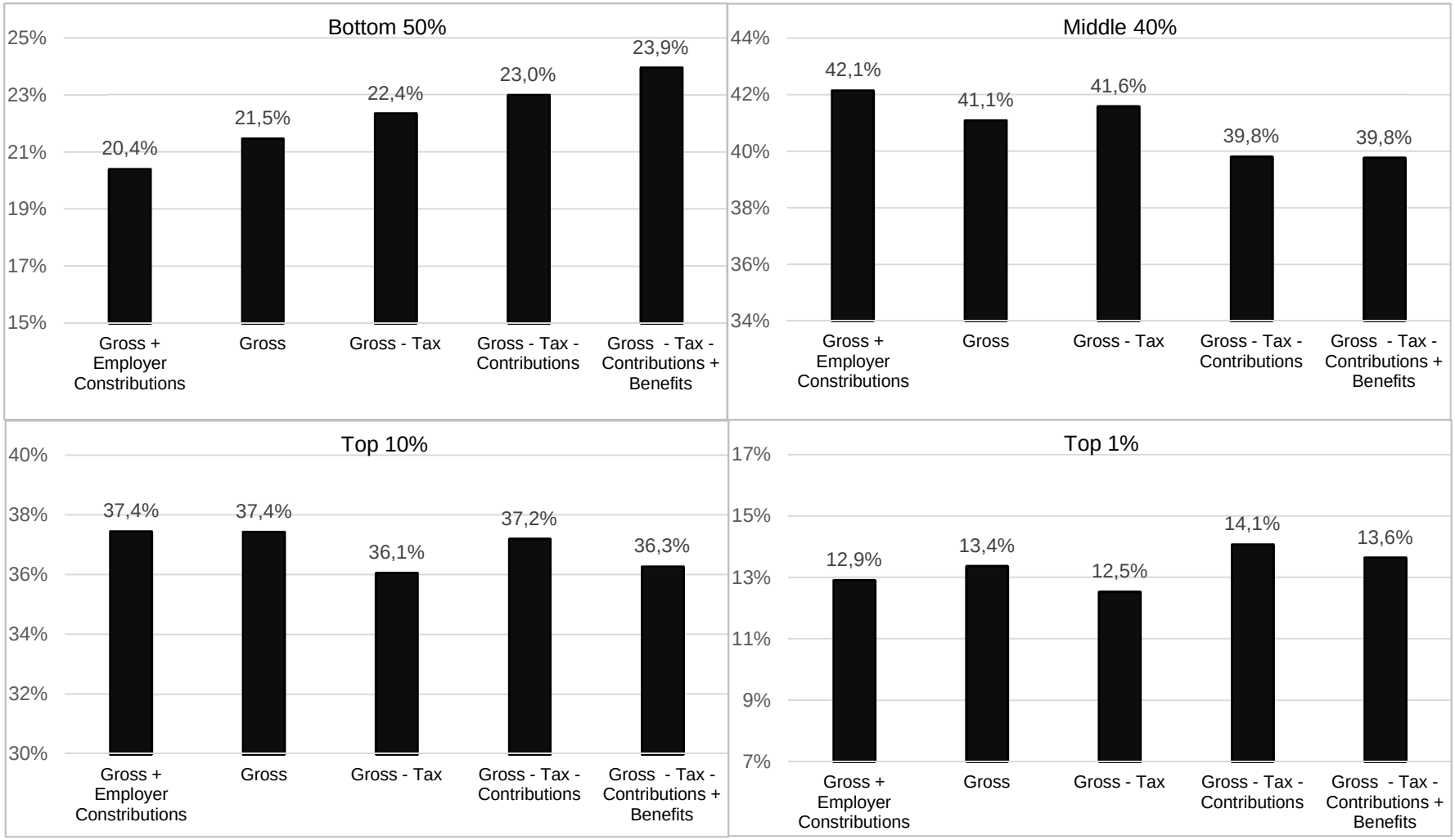


Figure 6: Redistribution and couple-split income inequality 2018

Distribution of income among adult individuals. Income is split equally among spouses. The series are based on income from employment, self-employment, business, pensions, dividends and interest rates, Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details

Another way to assess the progressivity of the Polish tax system is to look at the distribution of the tax burden across the population. We show in Figure 7 the average (effective) tax rate across the upper half of the income distribution. The average tax rate of a specific income group is calculated by dividing the total taxes of the group by its fiscal (gross) income. The figure also provides a breakdown by three tax types, distinguishing between social security contributions and two schedules of the personal income tax—the so-called flat tax schedule and the progressive schedule (the latter also includes some smaller taxes as *ryczałt*).[17]

The main takeaway is that the Polish tax system is not progressive. It is almost flat between the 50th and 95th percentiles (the average tax rate modestly increases from 25% for P50-60 to 32% for P90-95, where it peaks). Beyond that, the tax system becomes highly regressive. The average tax rate drops to 20% for the richest Poles, thus less than any other groups in the upper half of the income distribution. We should be reminded that these same high-income groups taxed at relatively lower rates also experienced above-average growth rates (Figure 4). Overall, the working of the tax system is likely to further aggravate income inequality in the future.

As can be seen from the figure, the main reason why high-income individuals pay relatively less in taxes is that their income is disproportionally taxed at the flat PIT schedule. This is because the rich in Poland disproportionally rely on the so-called business income (Bukowski and Novokmet, 2021; see below) that is taxed at the uniform rate of 19% and it is thus favored to wages, which are subject to the top marginal tax rate of 32%.[18] Furthermore, note that top business incomes in Poland are largely taxed according to the pass-through concept and hence wholly subject to PIT (Kopczuk and Zwick, 2020). The fact that businesses are dominantly organized as pass-through (unincorporated) firms in Poland implies that our series is less sensitive to not including undistributed profits of incorporated businesses (owned by Polish residents),[19] and hence less sensitive to not including corresponding corporate taxes

[17] Adding consumption taxes—notably VAT—would make the tax system still more regressive, since it would increase the relative tax burden of the poor (who consume the bulk of their income). Imputations of consumption taxes is currently under construction.
[18] For this reason, it is probable that many high wages are artificially shifted to business income (e.g. see Gordon and Slemrod, 2000).
[19] Namely, since corporations have increasingly retained profits (Bauluz et al., 2022), the rich individuals owning these corporations have been increasingly taxed according to the corporate income tax (and

to estimate average tax rates (as Saez and Zucman (2020) have showed to be the case in the U.S.).

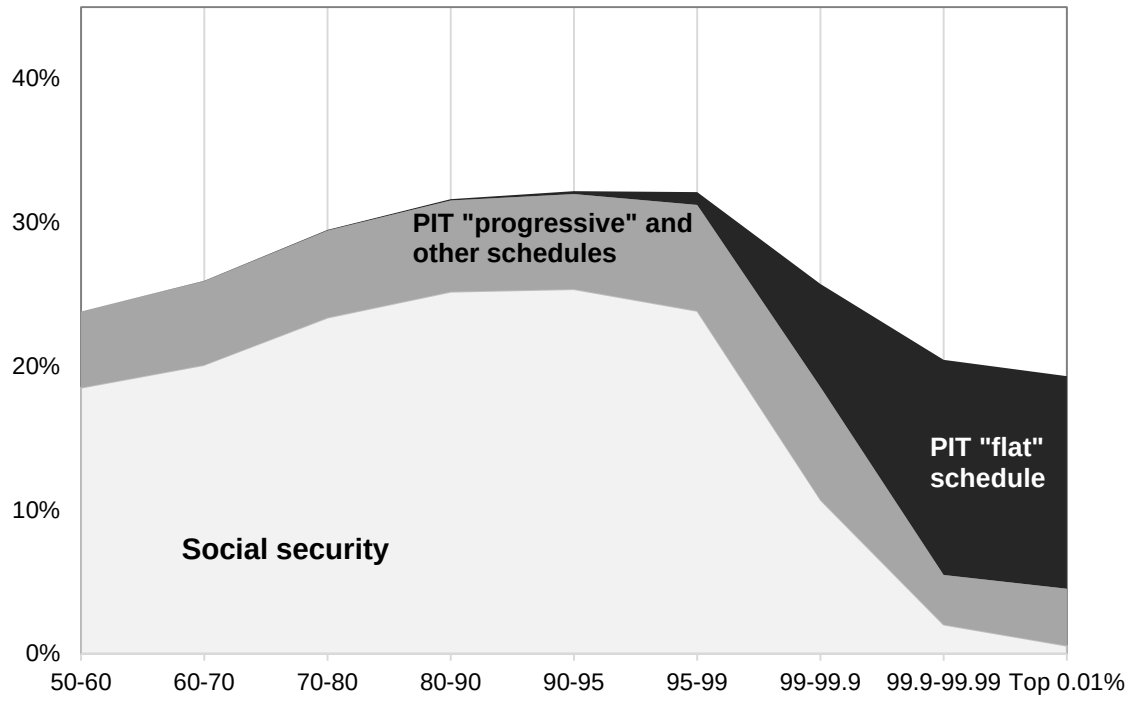


Figure 7: The distribution of the tax burden across the population, Poland 2018

The unit of observation is the adult individual. Income is split equally among spouses. The series are based on pre-tax and post-tax incomes as defined in Section 2. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

4. Decompositions of Income Inequality

4. 1. Income sources

Our series provide several new income inequality breakdowns. In this section, we start with the analysis of decomposition by income sources. The data for the bottom 50% is provisional as they do not include the imputed income from the EU-SILC and agriculture income. In addition, the income from dividends and interest is also excluded, as well as income from realized capital gains. Because income taxed using presumptive taxation is only available in the tax data since 2004,[20] we restrict our

less by personal income tax, as corporations decreasingly pay out dividends, while unrealized capital gains are not subject to PIT).

[20] In the baseline series presented in Section 3, we impute income taxed using presumptive taxation for the years 2000-2003.

analysis to the period 2004-2018. The presented graphs are for couple-split individuals.

The composition of income is heterogenous, as evidenced in Figure 8 for 2018. The income of the poorest 50% is mostly pensions (58%) and wages (40%). The higher we look in the distribution of income, the bigger the role of wages and the smaller of pensions. In the ninth decile (P80-P90), the former constitutes 79% of the total income and the latter only 11%. In the top decile, however, business income is the most important source. Between the 90^{th} and 95^{th} percentiles, it constitutes 16% of the total income and between 95^{th} and 99^{th} percentiles its share more than doubles to 34%. In the top 0.01%, 95% of income is from business sources and only 4% from employment. Pensions practically disappear in the top 1%.

The importance of business income has been growing. Figure 9 shows that the business income share in the total income rose from 17% in 2004 to 22% in 2018. This is in line with the literature documenting the decline of labour share since the 1980s across developed countries, including Poland (Karabarbounis and Neiman 2014; Growiec 2012; Bukowski and Novokmet 2021). The shift towards business income is especially visible in the top 1%. Between the 99^{th} and 99.9^{th} fractile, the business income share rose by 15 percentage points from 55% to 70%, and at the top 0.1% by 9 percentage points from 82% to 91%. The series also suggest a pro-cyclicality of business income, as changes in the shares broadly follow those of GDP.

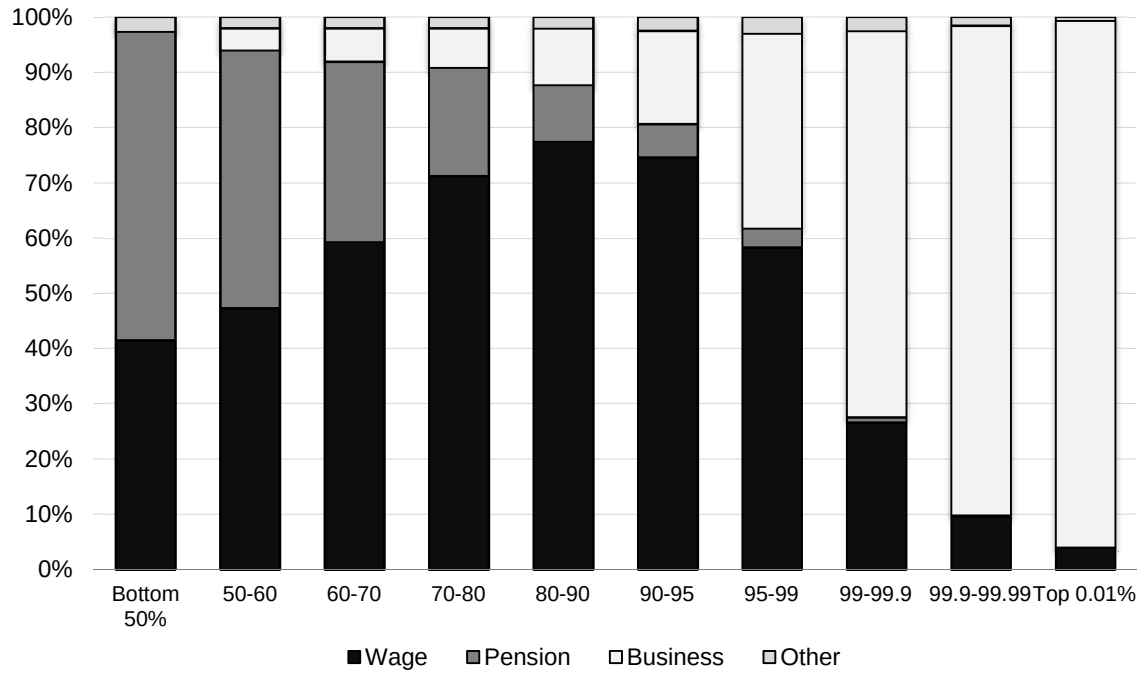


Figure 8: Income sources across the income distribution 2018

Distribution of income among adult individuals. Income is split equally among spouses. The series are based on income from employment, self-employment, business and pensions. Dividends and interests are excluded. The decomposition for the bottom 50% do not include the EU-SILC correction and agriculture income Source: authors' computation based on tax registries. See Section 2 for more details.

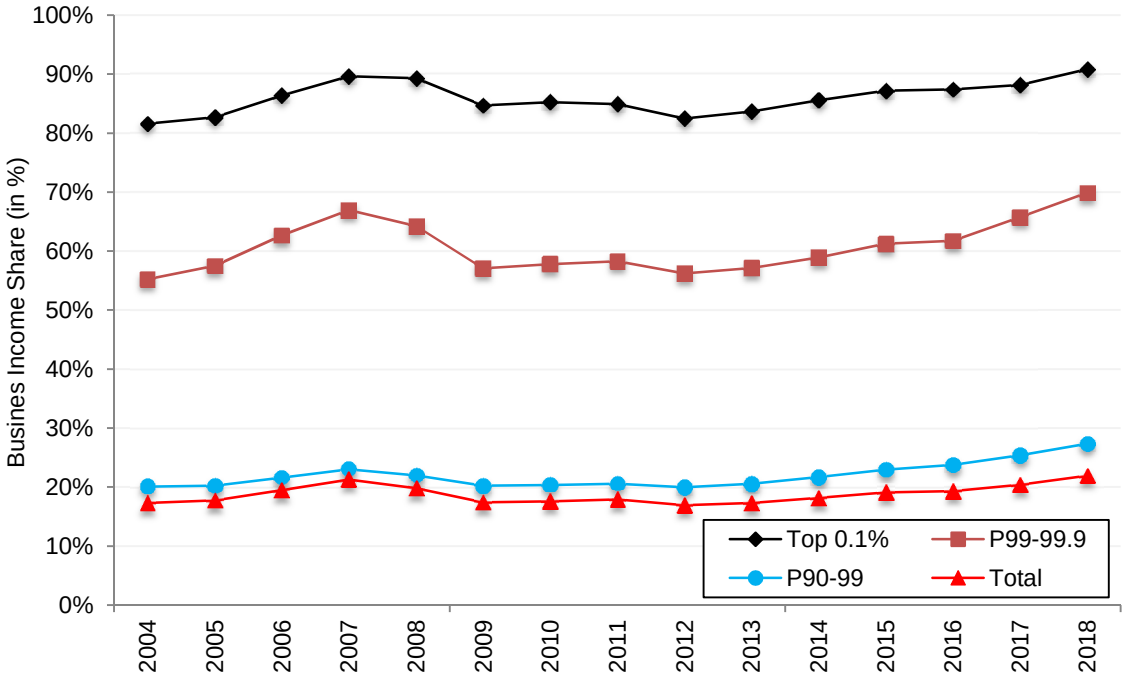


Figure 9: The share of business income, total, top 10%, 1% and 0.1%

Distribution of income among adult individuals. Income is split equally among spouses. The series are based on income from employment, self-employment, business, pensions and capital gains. Dividends and interests are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

Business income combines capital and labour components, and its rising importance might be interpreted as a combination of the rising return to capital, the rising return to the human capital of entrepreneurs (e.g., Smith et al., 2019) and the artificial change of income classification induced by tax optimization (Gordon and Slemrod 2000; Kopczuk 2012; see section 2.2.). The latter mechanism might be particularly pronounced in Poland, thanks to the flat taxation of business income, which provides a tax advantage over the progressive schedule.[21] Some high-income individuals might thus misreport their labour income as business to avoid higher taxation.

We argue that tax optimization is not the main explanation for the high business income share in the top income groups. We construct an alternative measure of business share excluding the business income of self-employed taxpayers without employees.[22] This group might consist of tax-avoiding high-income employees, however, it might also include genuine entrepreneurs. This exercise, therefore, provides a lower-bound estimate of the business income share for the top income groups. Table 4 shows business income share according to two definitions of income: the left column is for the baseline tax definition of business activity; the right column restricts the definition to only people who employ other people directly as sole proprietors or through partnership (lower bound). The results show that, consistently across the top income groups, the lower-bound business income share is lower than the original estimates, but the difference is not large, especially for the top income groups largely relying on business income, i.e. for the top 0.1% group (whose share of business income is only moderately reduced from 83% to 76%). We believe that this exercise effectively demonstrates that top business incomes in Poland do not simply stand for misreported labor income of high-income employees for tax purposes. However, it does not preclude that top business incomes reflect to an important extent a return to human capital (Smith et al., 2019; Kopczuk and Zwick, 2021), and generally distinguishing the relative importance of human versus physical capital at the top is an avenue for future research.

[21] Before 2003, taxpayers reporting business income were taxed using either 32% or 40% tax rates. After 2004, they gained an option of reporting business income using the flat rate of 19%. A decrease in marginal top rates for business income below the top rates applicable to earnings might have induced substantial shifting of high earnings to business income (e.g., Gordon and Slemrod 2000).
[22] We can do this only for 2017-2018.

Table 4: Business share by the definition of business, 2018

Top Income Group	Business Income Share	
	Business = Tax Classification	Business = Employers
Top 0.1%	83,2%	75,9%
Top 1-0.1%	67,6%	50,3%
Top 10-1%	24,4%	11,6%
Middle 40%	6,1%	2,1%
Bottom 50%	-2,0%	-3,9%

Distribution of income among individuals. The table shows business income share for two definitions of business. The left column is for the baseline tax definition of business activity. The right column restricts the definition to only people who employ other people as sole proprietors or through partnerships. Dividends and interests are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

We now turn to the analysis of inequalities *within* income sources. This is important for understanding the overall evolution of income shares presented in the previous section. Changes in inequalities within sources directly contribute to changes in total income inequality (in combination with the relative importance of income sources in total income). The rising importance of business income at the top, as documented above, implied rising top income shares since business income is more concentrated than wages and pensions. Figure 10 investigates the evolution of the top 1% share within each income source. Inequality among those with business income is higher than among workers and pensioners. In 2018, the top 1% of businessmen and businesswomen earned 26% of the total business income, but the top 1% of workers and pensioners only 8%. Moreover, these shares remained stable.

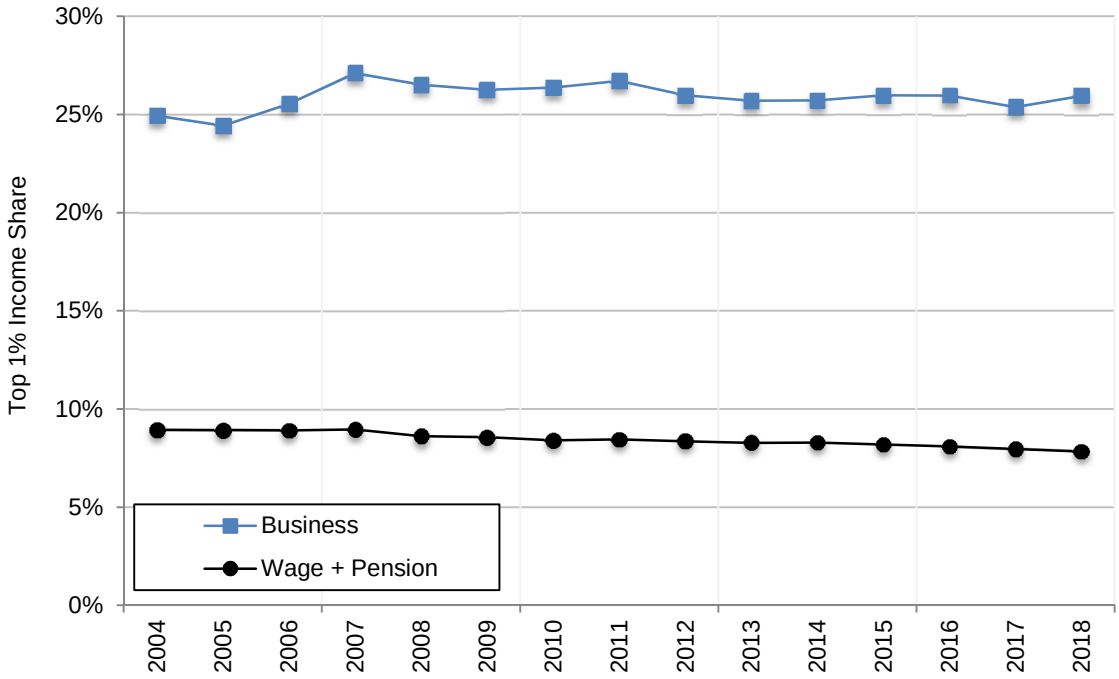


Figure 10: The top 1% within business income and wage with pension income

Distribution of income among individuals. Business is the income from self-employment and business. Wage + Pension is income from employment and pensions. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

An alternative way of investigating the overall contribution of inequality within and between the sources to the total inequality is to decompose the Theil index of income inequality.[23] We focus on income from business and wages (including pensions) and divide the population into three non-overlapping groups: those whose income is only from business sources; those whose income is only from employment or pensions; those whose income is from multiple sources ("mixed"). The upper panel of Figure A6 presents the decomposition of the overall Theil index of inequalities into the between-group component and the three within-group components; the bottom panel presents the same data but expressed as a share of the total Theil index. The Theil index evolves similarly as the top income shares presented in Figure 2. In terms of structure, the inequality within those who earn income only from employment or pensions is the most important contributor to the overall level of inequality, however its contribution declined from 50% in 2004 to 37% in 2018. This development is mirrored by the rise of the contribution of inequality within those who earn only business income, which

[23] Unlike Gini coefficient or the top income shares, the Theil index is a perfectly decomposable measure of inequality.

rose from 30% to 34%.[24] The contribution of the inequality within those who earn income from employment/pensions *and* business is relatively small, but rose from 9% to 13%.[25] The shift of income from wages/pensions to capital described in Figure 7 is reflected in the rise of the between component from 12% to 16% (the bottom panel of Figure A7).

Overall, this section provides suggestive evidence that the overall level of inequality is increasingly shaped by the shift of income from labour to business, and, to some extent, by the growing dispersion of income within business and falling within labour.

4. 2. Regional analysis

In this section we analyse the geographic aspect of inequalities. As argued in Section 3.2, the top income groups were the main winners of the robust Polish growth after 2000. Where do these people live? Figure 11 focuses on the place of living of the national top 1% group categorized into four types of municipalities: cities with a population above 250 thousand; cities with a population below 250 thousand; semi-urban municipalities; and rural municipalities. The Polish rich live predominately in urban areas. In 2018, nearly 60% of people from the national top 1% lived in either small or big cities (much more in cities larger than 250 thousand) but this share was much higher in 2004 (71%). On the other hand, the share of the Polish rich living in rural municipalities rose from 14% in 2004 to 21% in 2018. The results for the national top 0.1% income group are presented in Appendix Figure A7 and also show a substantial rise of the contribution from the rural areas.

[24] These two findings contrast with the stable top 1% wage/pensions and business shares presented in Figure 5. The two measures, however, are not directly comparable because they are sensitive to different parts of the distribution (i.e., the Theil index is more sensitive to the middle part) and the underlying populations are different (e.g., the business contribution to the Theil index is based only on those who earned business income, while the top 1% share of business income includes those without business income).

[25] This is consistent with the *homoplutia* hypothesis of the rising fraction of individuals who earn both labour and business/capital income (Milanovic 2019).

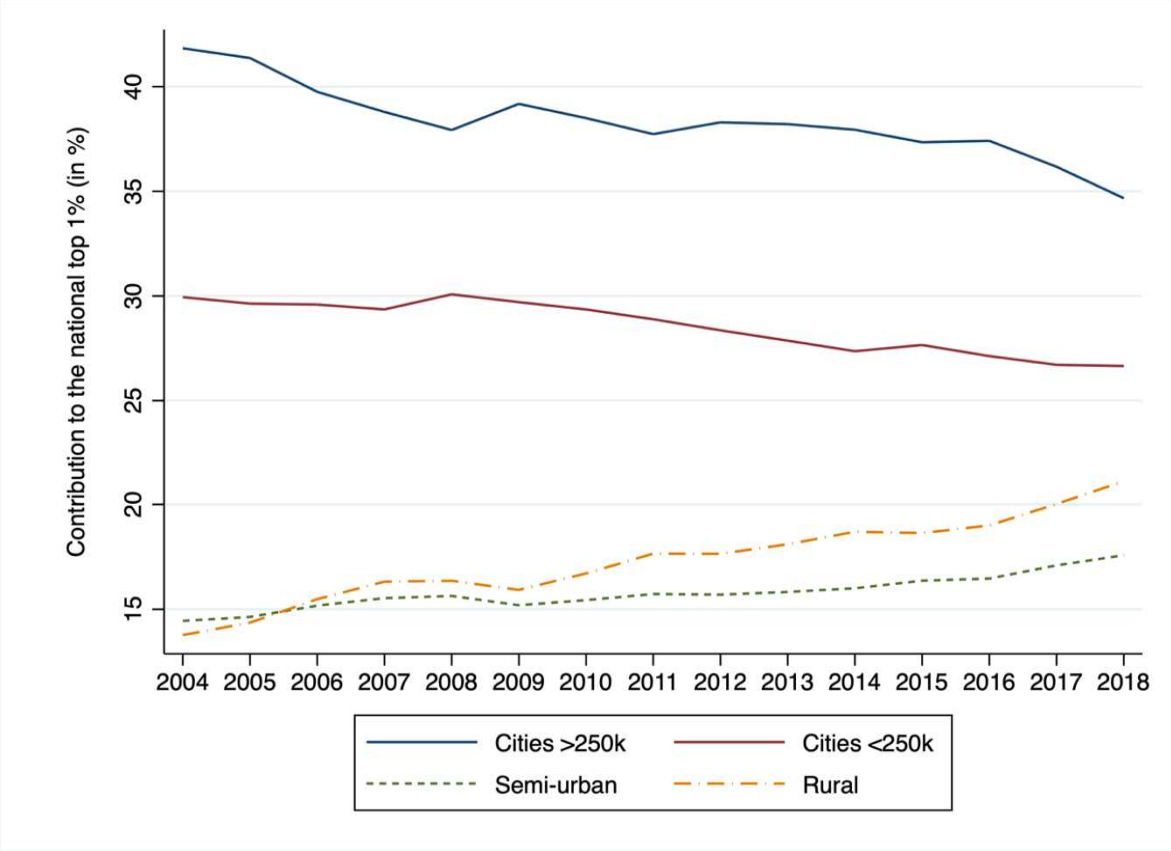


Figure 11: The absolute contribution to the national top 1% income group

The population of interest are adult individuals. Income is split equally among spouses. The national top 1% income groups is defined as in Figure 2 and based on income from employment, self-employment, business and pensions. Dividends and interests are excluded. Source: authors' computation based on tax registries. See Section 2 for more details.

The more populous places mechanically contribute more to the national income groups, yet the growing importance of rural areas is not only explained by changing population size. In Figure 12 we present the contribution to the national top 1% income group relative to the population of municipalities. If the rich were equally distributed across space, the relative contribution should be exactly 1% everywhere. This is not the case. People from the national top 1% are overrepresented among inhabitants of cities with the population above 250 thousand. In 2018, around 1.5% of those living in big cities belonged to the national top 1% group, a decline from 1.7% in 2004. Other places in Poland are underrepresented among the national top 1% group. However, while the relative contribution in cities with a population 250 thousand has been falling, the contributions from the rural and semi-urban areas have increased. The rise of the rural areas is particularly striking, as they improved their relative importance by half (from 0.5% to 0.75%). A similar rise is also observed when looking at the national top 0.1% in Figure A7.

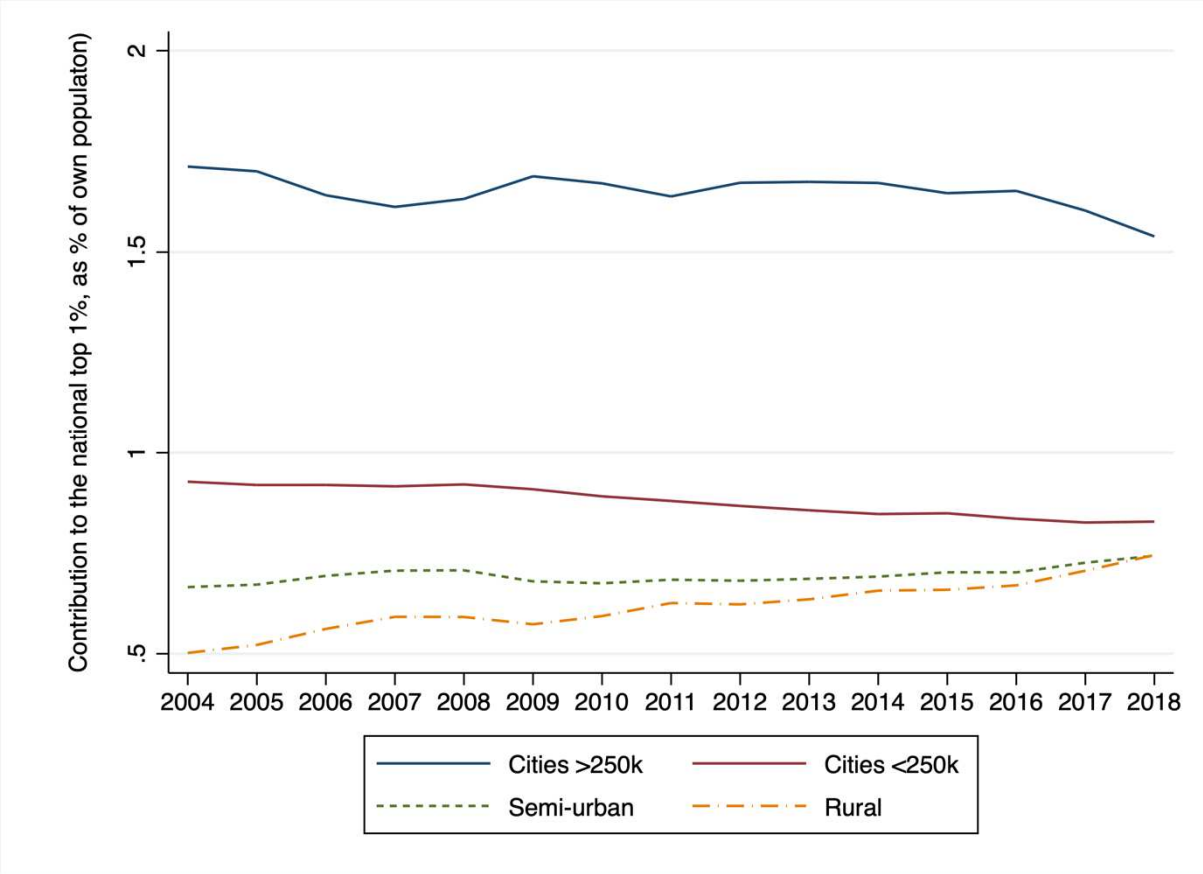


Figure 12: The relative contribution to the national top 1% income group

The population of interest are adult individuals. Income is split equally among spouses. The national top 1% income groups is defined as in Figure 2 and based on income from employment, self-employment, business and pensions. Dividends and interests are excluded. Source: authors' computation based on tax registries. See Section 2 for more details.

As evident from Figure 13, the rich tend to be the most overrepresented in counties surrounding big metropolitan areas, such as Warsaw, Cracow, Wrocław, Poznań or Gdańsk. Interestingly, they are also relatively more likely to live in the Western part of Poland than in the Eastern parts (except Warsaw and Mazovian region). We can only hypothesise that the traditional industrial clusters in Silesia and Wielkopolska, as well as proximity to Germany (influencing Foreign Direct Investment) might partially explain the West-East gradient.

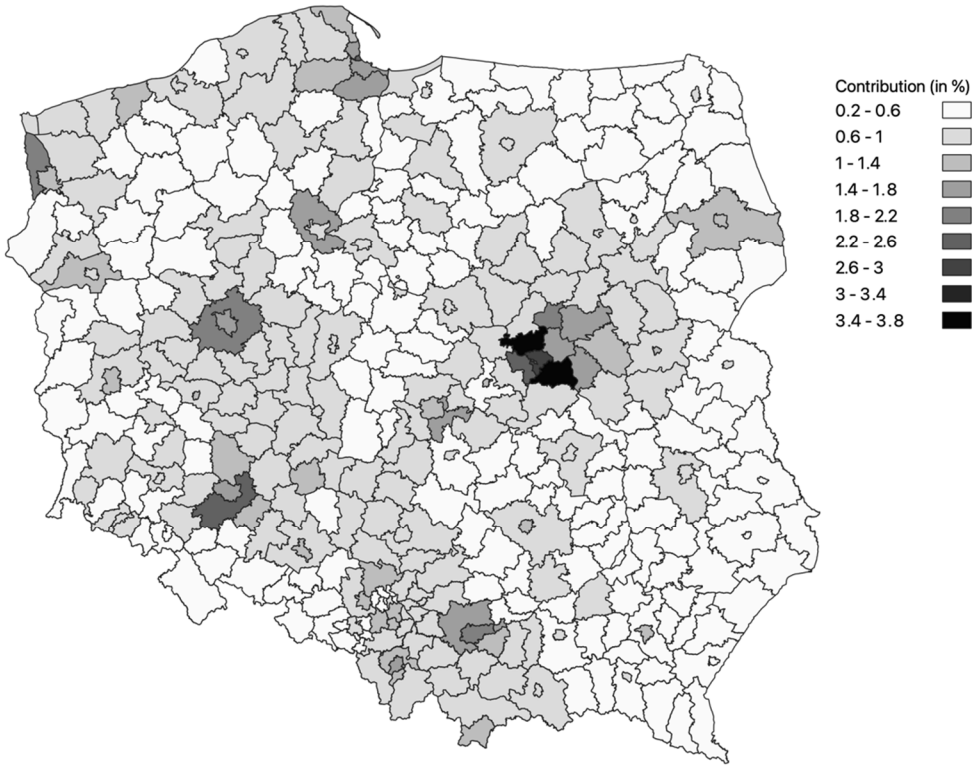


Figure 13: The relative contribution to the national top 1% income group in Polish counties in 2018

The population of interest are adult individuals. Income is split equally among spouses. The national top 1% income group is defined as in Figure 2 and based on income from employment, self-employment, business and pensions. Dividends and interests are excluded. Source: authors' computation based on tax registries. See Section 2 for more details.

4.3. Gender

In the final section we turn to the gender analysis of the income groups in Poland and the resulting gender income gaps. The first result is that of significant underrepresentation of women in the top income groups. The upper panel of Figure 14 presents the share of females in various parts of the income distribution in 2018. The red line denotes the overall share of women in the taxpayer population (53%). In a hypothetical situation when gender does not matter for income, one should observe the same share of 53% for every part of the distribution. This is not the case. Women are overrepresented in the income groups up to the sixth decile and underrepresented in the income groups above. In the ninth decile, 44% of individuals are females and this share is falling as we move upward the distribution. 34% of individuals are female between the 90^{th} and 95^{th} percentiles. Within the top 1%, the share is still lower, as women represent a quarter of those between the 99^{th} and 99.9^{th} percentiles and only

16% of those in the top 0.01%. As depicted in the bottom panel of Figure 14, the share of women in the top income groups have hardly changed during the last two decades. Despite the strong economic growth and the EU accession in 2004, women are as underrepresented among the rich today as they were in 2000.

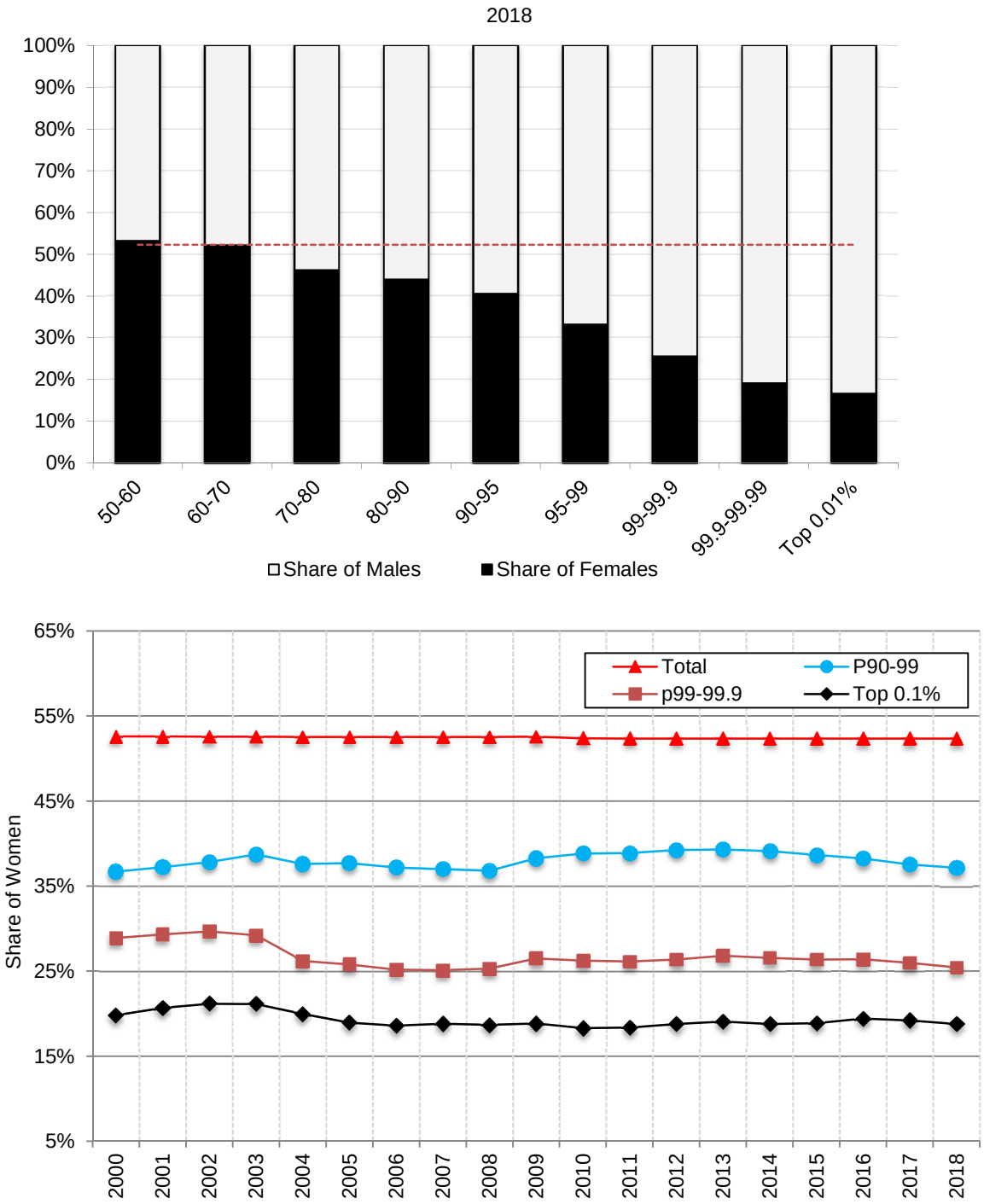


Figure 14: Gender composition of income groups.

Distribution of income among adult individuals. The series are based on income from employment, self-employment, business, pensions and capital gains. Dividends and interests are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

The negative relationship between the representation of women and the level of income points to a substantial gender income gap. Indeed, as documented in Figure 15, over the entire analysed period the average raw gender income gap was 33%, meaning that the income of women is on average one-third lower than that of men. The evolution of the gap mimics the evolution of the top 1% income share (Figure 2). The period between 2003 and 2007 is marked by a strong widening of the gap, from 29% to 39%. In the period following the Great Recession, the gap narrowed to around 33%, plateaued for six years and started to grow again in 2016. Strikingly, the gap in 2018 was 1 percentage point larger than in 2000. The similarity of the top 1% income share and the raw gender income gap is a result of the underrepresentation of women in the top income groups (Figure 14). In other words, the position of females vs. males is worsening when inequalities are on rise and more income is concentrated among the rich.

The position of women and the gender gap vary across income sources. In Figure 16 we present the raw gender income gap separately for business income, wages and pensions, excluding those with zero income from each source.[26] In 2004, female business owners earned on average 32% less than male business owners, after which the gap increased to around 36% and stabilised at this level. The gender gap in pension income increased almost monotonically since 2007, rising from 23% to almost 28% in 2018. This pattern could be related to the earlier female retirement age, historically lower earnings, and the longer average length of life (currently men live 72.6 years on average and women 80.7), which lower the average pension of women relative to men. In contrast, the raw gender wage gap was around 20% until 2009 and has been falling since then. In 2018, women earned on average 17% less than men in terms of annual wage.

[26] The other way to look at the relationship between gender and income source, presented in Figure A8, is to analyse jointly the representation of women in each source and the 'female' share of income from each source.

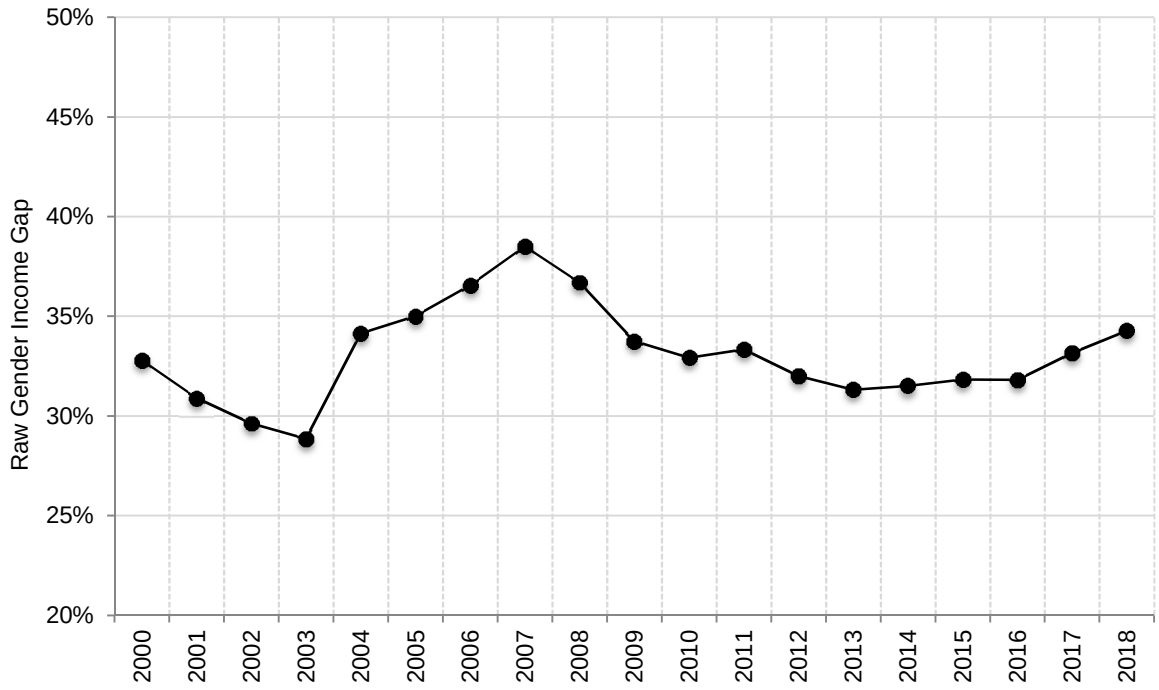


Figure 15: Raw gender income gap

Raw gender income gap is defined as the difference between average income of men and women as a proportion of men's average income. Distribution of income among adult individuals. The series are based on income from employment, self-employment, business, pensions and capital gains. Dividends and interests are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

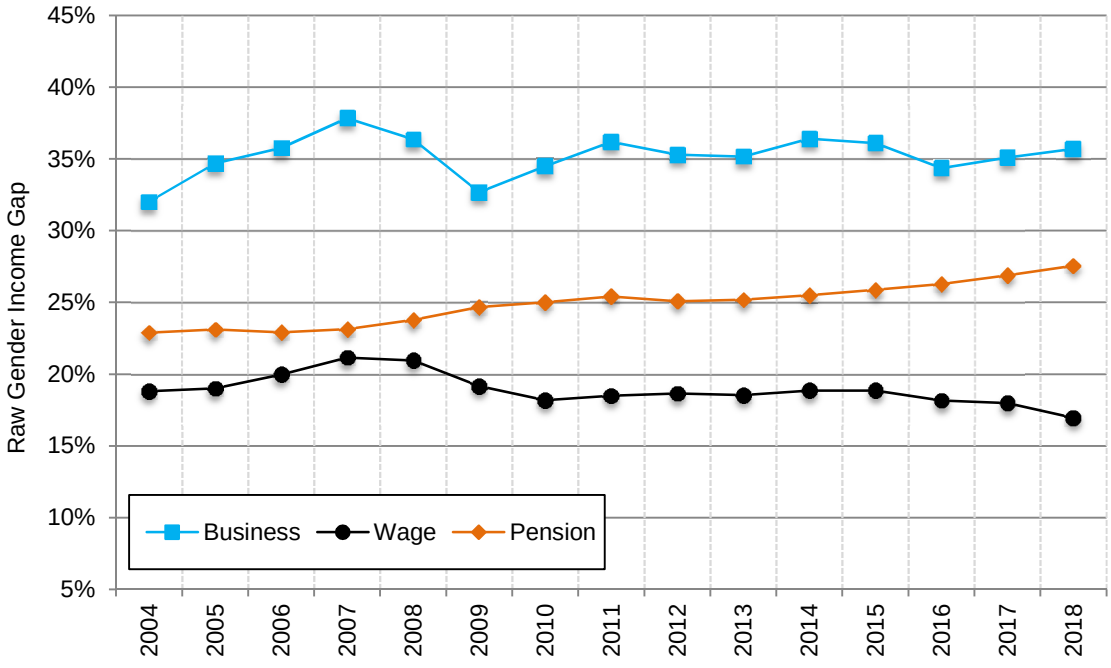


Figure 16: Raw gender income gap by income source

Raw gender income gap is defined as the difference between average income of men and women as a proportion of men's average income. Distribution of income among adult individuals. The series are based on income from employment, self-employment, business, pensions and capital gains. Dividends and interests are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

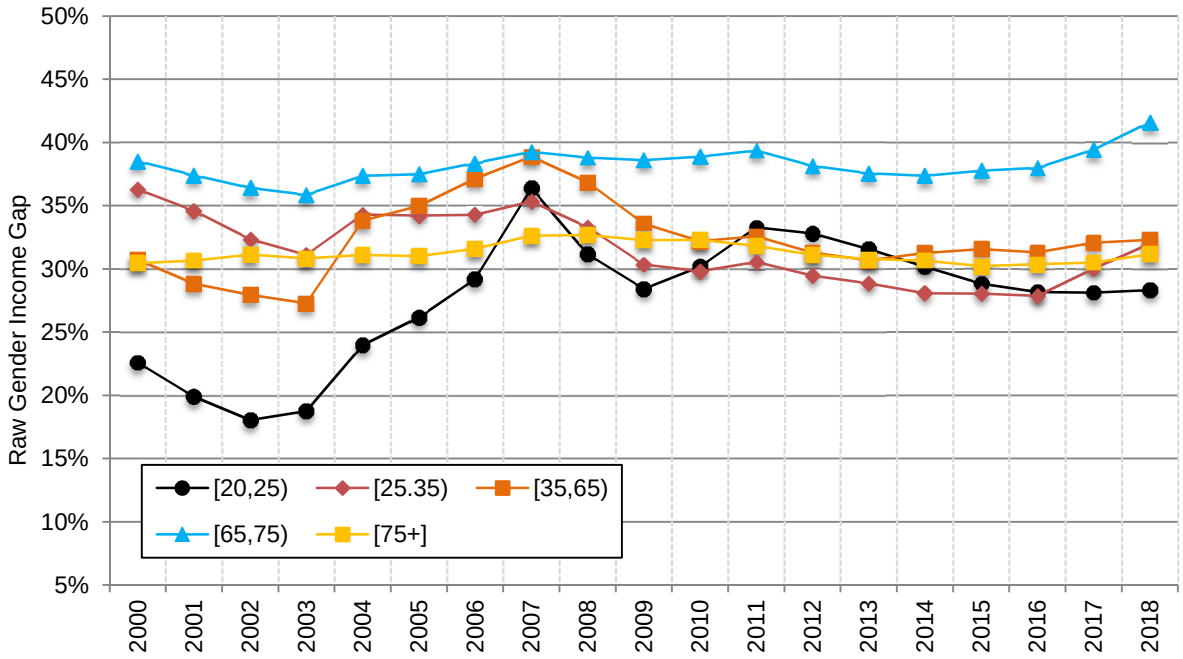


Figure 17: Raw gender income gap, total, by age groups

Raw gender income gap is defined as the difference between average income of men and women as a proportion of men's average income. Distribution of income among adult individuals. The series are based on income from employment, self-employment, business, pensions and capital gains. Dividends and interest rates are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.

Finally, we report heterogeneity across age groups. Figure 17 presents the raw gender income gap for four age groups: 20-29, 30-59, 60-69 and 70+.The difference between men and women in their twenties is smaller than for older groups. The lower level of gender gap might be because women in their twenties are less likely to have children - which is known to have a negative effect on income (e.g., Kleven et al., 2019) - compared to older women. However, the gender gap in the age group 2—25 has converged to the other ones through time. The difference in gaps between people aged 20-25 and 35-65 in 2000 was around 10 percentage points, whereas in 2018 only 3 percentage points, and this trend was driven by the growing gender gap among the youngest individuals. Women in their sixties experience the largest income gap, which is an outcome of two things: earlier retirement age for women and relatively low level of pensions compared to regular employment income. The latter effect is additionally reinforced by the existence of a gender pension gap, as visible for the age group 70+, which almost exclusively consists of pensioners. Worryingly, the gender gap in this group rose substantially after 2015.

5. Conclusions

This paper combines micro-level tax data, household surveys and national accounts data to provide consistent series of income distribution in Poland over the 2000-2018 period. We establish seven facts about income inequality in Poland during the last two decades.

1. Income inequalities in Poland are high. The share of income obtained by the top 10% is 37.4%, by the middle 40% is 41.1%, and by the bottom 50% is merely 21.5%. The top 1% earns 13.4% of the total income. These present one of the highest levels of income inequality in Europe.

2. We document a substantial growth in inequalities in the periods 2003-2007 and 2013-2018. The most recent rise is driven almost entirely by the top 1% income share.

3. The extent of redistribution in Poland is quite limited. The tax and transfer system has a small positive effect on both the bottom 50% and the top 1% income shares, at the cost of the middle 40% and top 10-1%. Specifically, the tax system (social contributions direct taxation) has an unequalizing effect on the distribution of income, while social transfers have an equalizing effect.

4. The top income groups are dominated by income from business whose share was on the rise. High and rising importance of business income contributes to the rise in income inequality.

5. Those in the national top 1% income group mostly live in big cities, however, we document the growing importance of rural and rural-urban areas.

6. Consistently throughout the entire analyzed period, the top income groups are dominated by males. The narrower the top income group, the higher share of males. Males also earn around 75% of business income.

7. The raw gender income gap is around 33% and generally remained unchanged over the analysed period.

A portrait of an archetypical rich in Poland today is thus of a male, a business owner, and a city dweller. This group has been the biggest beneficent of Poland's spectacular growth since 2000.

References:

Alstadsæter, A., Jacob, M., Kopczuk, W., & Telle, K. (2017). Accounting for business income in measuring top income shares: Integrated accrual approach using individual and firm data from Norway. mimeo.

Alvaredo, F., Atkinson, A., Chancel, L., Piketty, T., Saez, E. and Zucman, G. (2016). "Distributional National Accounts (DINA) Guidelines: Concepts and Methods used in WID.world", WID.world Working Paper 2016/02.

Buluz, L., Novokmet, F., and Schularick, M. (2022). The Anatomy of the Global Saving Glut. CEPR Discussion Paper DP17215

Baldwin, R. E. (2016). *The great convergence: information technology and the new globalization*, Cambridge: The Belknap Press of Harvard University Press.

Blanchet, T., Chancel, L., & Gethin, A. (2019). How unequal is Europe? Evidence from distributional national accounts, 1980-2017. WID Working Paper No. 2019/6

Bruil, A., van Essen, C., Leenders, W., Lejour, A., Möohlmann, J., and Rabate, S. (2022). Inequality and Redistribution in the Netherlands. CPB Discussion Paper.

Bukowski, P., and Novokmet, F. (2021). Between communism and capitalism: long-term inequality in Poland, 1892–2015. *Journal of Economic Growth*, 26, pp.187–239.

Chrostek, P., Klejdysz, J., Korniluk, D., & Skawiński, M. (2019). Wybrane aspekty systemu podatkowo-składkowego na podstawie danych PIT i ZUS 2016. *Warszawa: Ministerstwo Finansów*.

Chrostek, P., Klejdysz,J. & Skawiński, M. (2020). Wybrane aspekty systemu podatkowoskładkowego na podstawie danych administracyjnych 2017. *Warszawa: Ministerstwo Finansów*.

Garbinti, B., Goupille-Lebret, J., & Piketty, T. (2018). Income inequality in France, 1900–2014: Evidence from Distributional National Accounts (DINA). *Journal of Public Economics*, 162, 63–7

Gordon, R. H., and Slemrod, J. B. (2000). "Are 'Real' Responses to Taxes Simply Income Shifting Between Corporate and Personal Tax Bases?", In J. B. Slemrod (ed.), *Does Atlas Shrug? The Economic Consequences of Taxing the Rich*, Cambridge: Harvard University Press.

Growiec, J. (2012). “Determinants of the labor share: evidence from a panel of firms”. *Eastern European Economics*, 50(5), 23-65.

Karabarbounis, L., and Neiman, B. (2014). “The global decline of the labor share”. *The Quarterly Journal of Economics*, 129(1), 61-103.

Kleven, H., Landais, C., Posch, J., Steinhauer, A., & Zweimüller, J. (2019, May). Child penalties across countries: Evidence and explanations. In *AEA Papers and Proceedings* (Vol. 109, pp. 122-26).

Kopczuk, W. (2012). “The Polish business “flat” tax and its effect on reported incomes: a Pareto improving tax reform?”, *mimeo.*

Kopczuk, W., and Zwick, E. 2020. “Business Incomes at the Top." *Journal of Economic Perspectives*, 34(4): 27-51.

Lindner, A., Novokmet, F., Piketty, T., & Zawisza, T. (2020). Political conflict, social inequality and electoral cleavages in Central-Eastern Europe, 1990–2018. World Inequality Lab WP 2020/25

Milanovic, B. (2019). *Capitalism, alone*. Harvard University Press.

Novokmet, F. (2018). The long-run evolution of inequality in the Czech Lands, 1898–2015. WID.world Working Paper Series No 2018/06.

Novokmet, F., Piketty, T., and Zucman, G. (2018). “From Soviets to oligarchs: Inequality and property in Russia 1905-2016.” *The Journal of Economic Inequality*, 16(2), 189-223.

Piatkowski, M. (2018). *Europe's growth champion: Insights from the economic rise of Poland*, Oxford University Press.

Piketty, T., Saez, E., & Zucman, G. (2018). Distributional national accounts: Methods and estimates for the United States. *Quarterly Journal of Economics*, 133(2), 553–609

Piketty, T., Yang, L., & Zucman, G. (2019). “Capital accumulation, private property, and rising inequality in China, 1978–2015”. *American Economic Review*, *109*(7), 2469-96.

Saez, E., and Zucman. 2019, Z. The Triumph of Injustice: How the Rich Dodge Taxes and How to Make Them Pay. W. W. Norton & Company.

Smith, M., Yagan, D., Zidar, O., & Zwick, E. (2019). Capitalists in the Twenty-first Century. *The Quarterly Journal of Economics*, *134*(4), 1675-1745.

Appendix:

Table A1: Income shares in Poland 2018, individualistic concept

			Bottom 50%	Middle 40%	Top 10%	Top 5%	Top 1%	Top 0.1%	Top 0.01%
individualistic	(1)	raw	15.4%	42.7%	41.9%	31.1%	16.1%	6.2%	2.2%
	(2)	(1) + population	11.3%	44.1%	44.6%	33.0%	17.0%	6.5%	2.3%
	(3)	(2) + agriculture income	14.0%	42.8%	43.3%	32.0%	16.5%	6.3%	2.3%
	(4)	(3) + EU-SILC correction	18.0%	40.7%	41.2%	30.5%	15.7%	6.0%	2.1%
	(5)	**(4) + capital income**	18.0%	40.7%	41.3%	30.5%	15.7%	6.0%	2.1%
	(6)	(5) + capital gains	17.6%	40.7%	41.8%	31.0%	16.2%	6.4%	2.4%

Distribution of income among adult individuals. In the lower panel, Iincome is split equally among spouses.. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

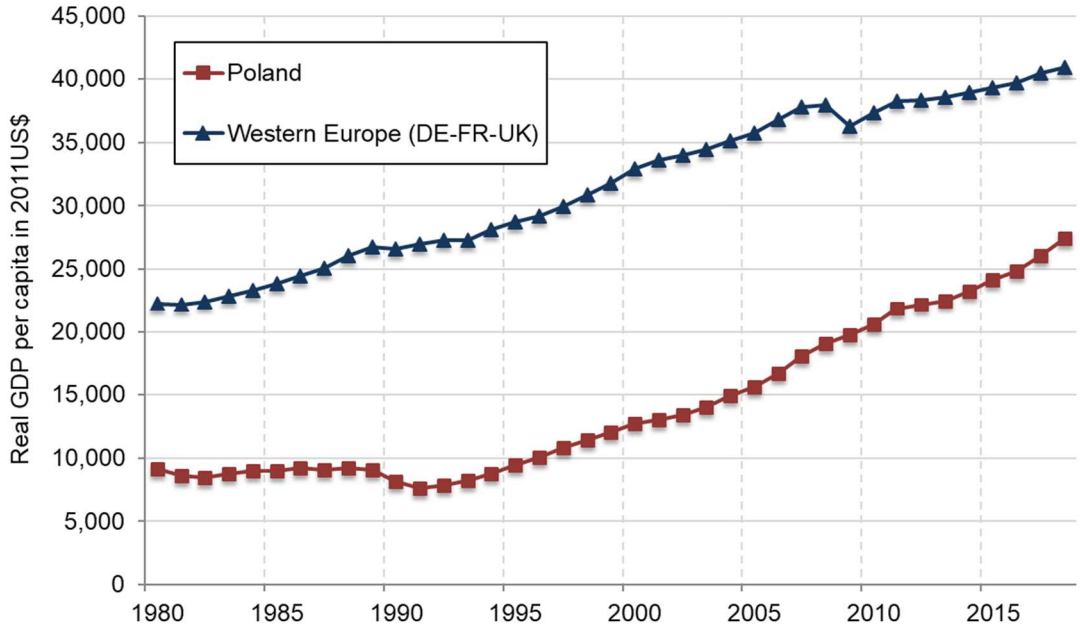
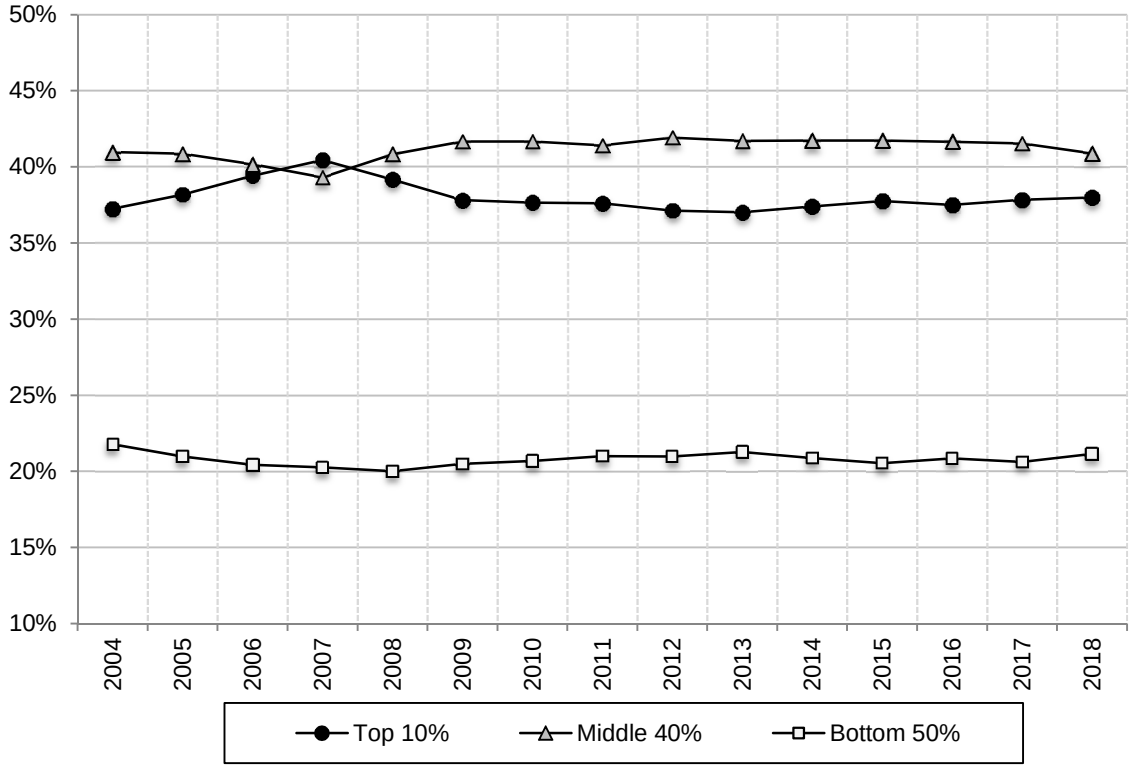


Figure A1: The evolution of real GDP per capita in Poland and Western Europe
Source: Maddison database. Note: Western Europe is unweighted average of Germany, France and the UK



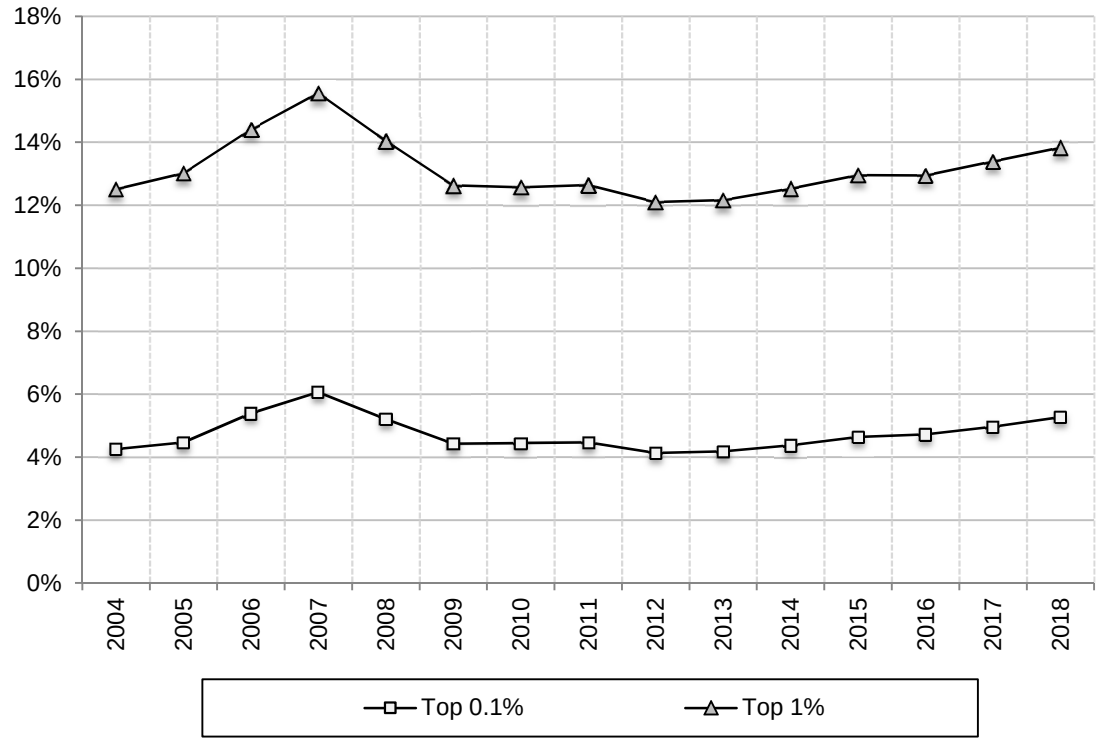


Figure A2: The couple-split income inequality 2004-2018, including capital gains

Distribution of income among couples. The series are based on pre-tax income from employment, self-employment, business, pensions, dividends, interest rates and realized capital gains. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

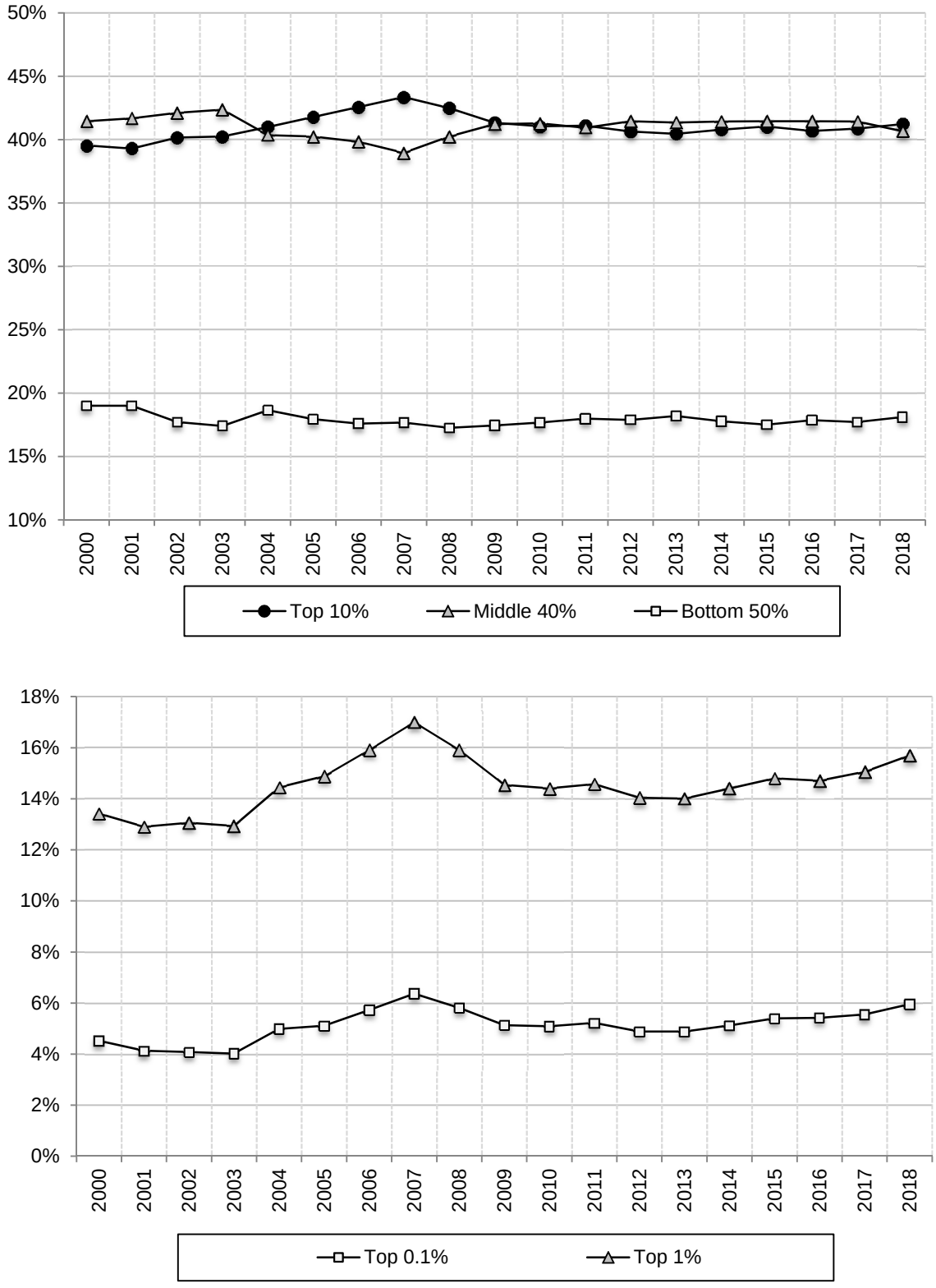


Figure A3: The individual income inequality in Poland 2000-2018

Distribution of income among individuals. The series are based on pre-tax income from employment, self-employment, business, pensions, dividends and interest rates. They exclude income from realized capital gains. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

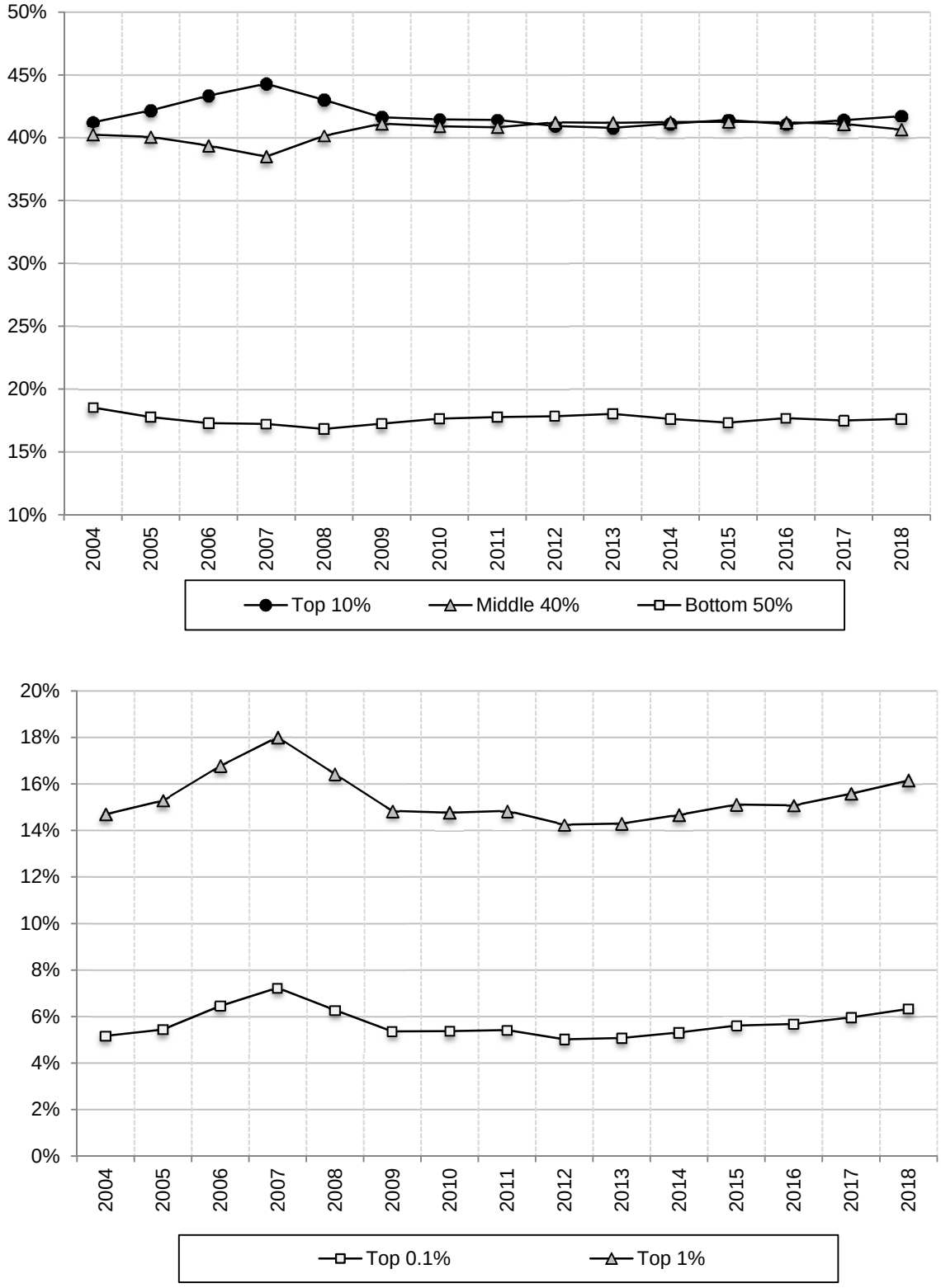


Figure A4: The individual income inequality 2004-2018, including capital gains

Distribution of income among individuals. The series are based on pre-tax income from employment, self-employment, business, pensions, dividends, interest rates and realized capital gains. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

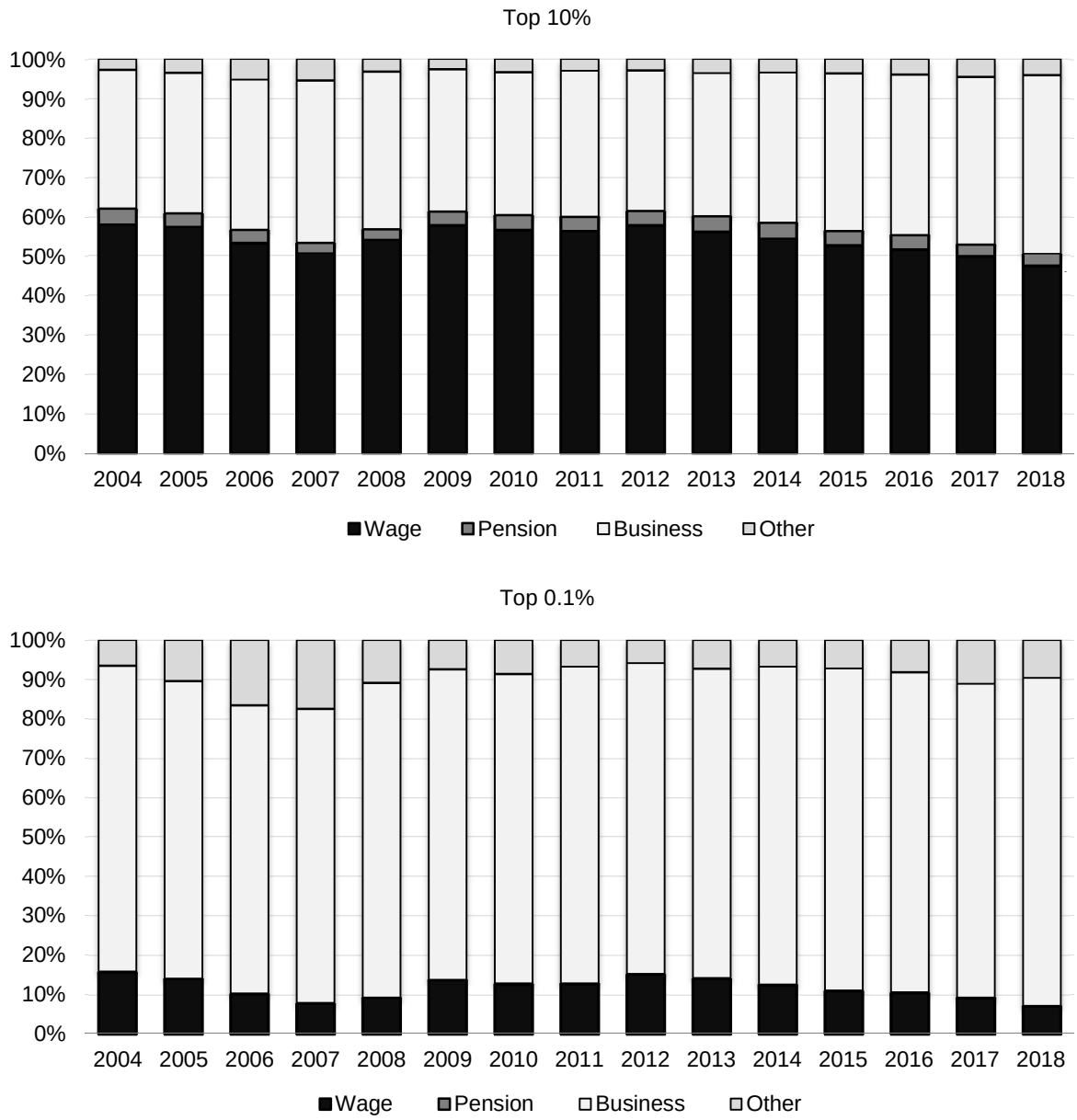
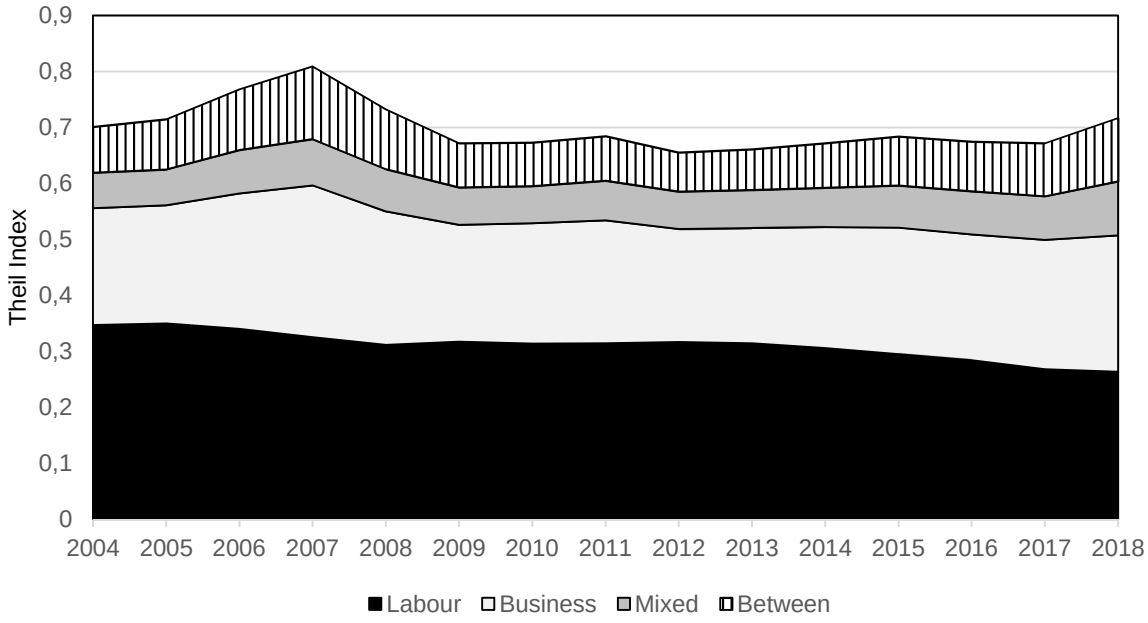


Figure A5: Income sources across years, top 10% and top 0.1%

Distribution of income among individuals. The series are based on income from employment, self-employment, business, pensions and capital gains. Dividends and interest rates are excluded. The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.



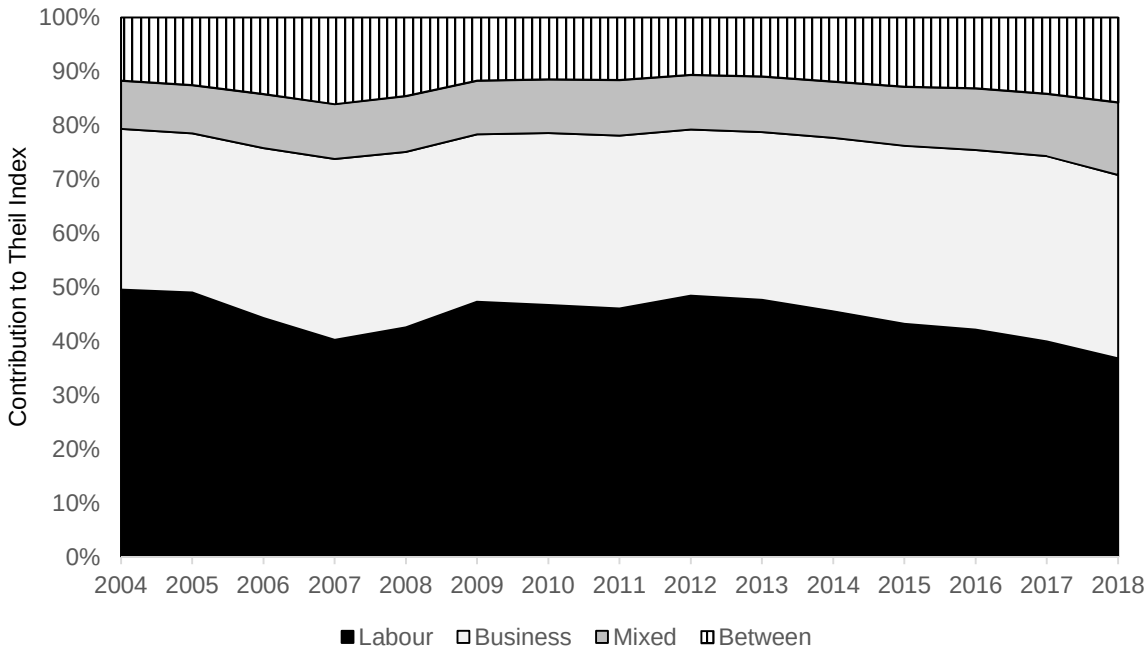
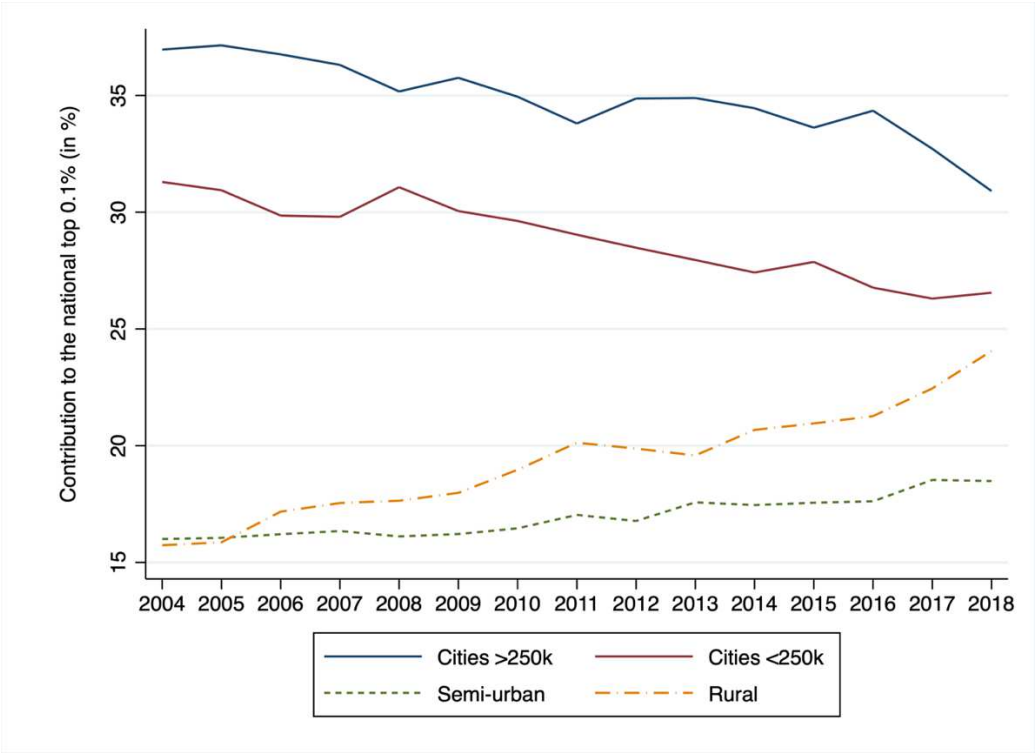


Figure A6: Theil Index and its components

Distribution of income among individuals. Business are individuals whose income is only from business. Labour are individuals whose income is only from employment. Mixed are individuals whose income is from business and employment. Labour income includes pensions. Source: authors' computation based on tax registries. See Section 2 for more details.



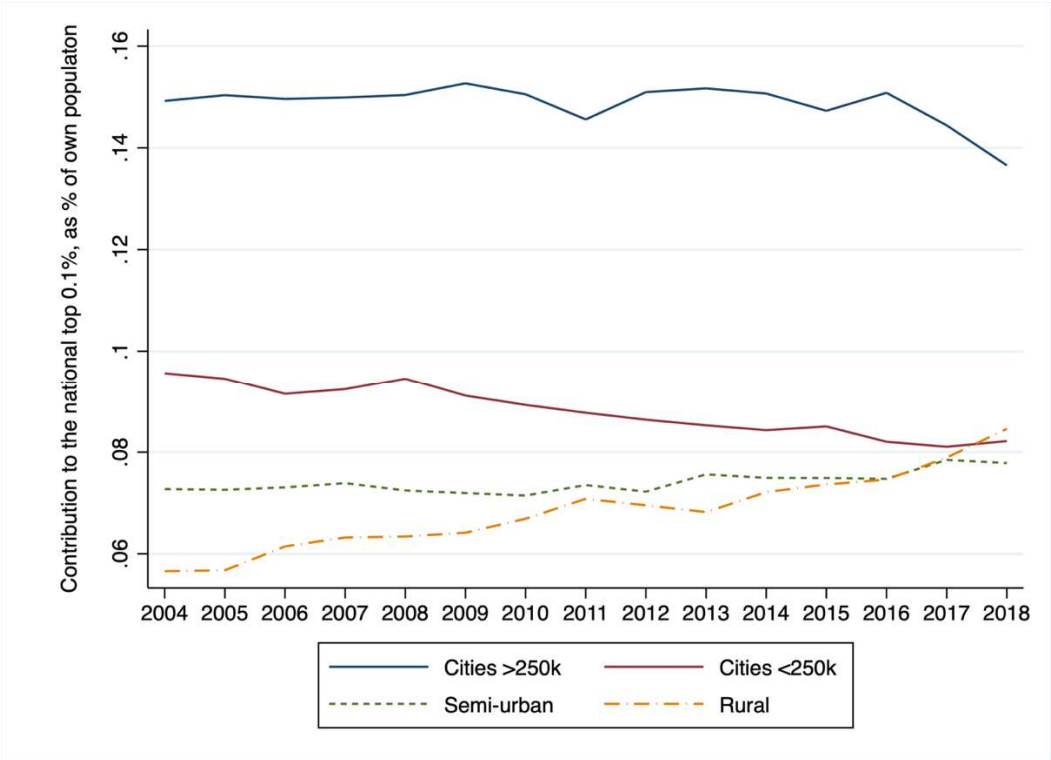


Figure A7: Contribution to the national top 0.1% income group by the place of living in Poland

Distribution of income among couples. The definition of the national top 0.1% income group is based on pre-tax income from employment, self-employment, business, pensions, dividends, interest rates and realized capital gains. Source: authors' computation based on tax registries, household survey data and national accounts. See Section 2 for more details.

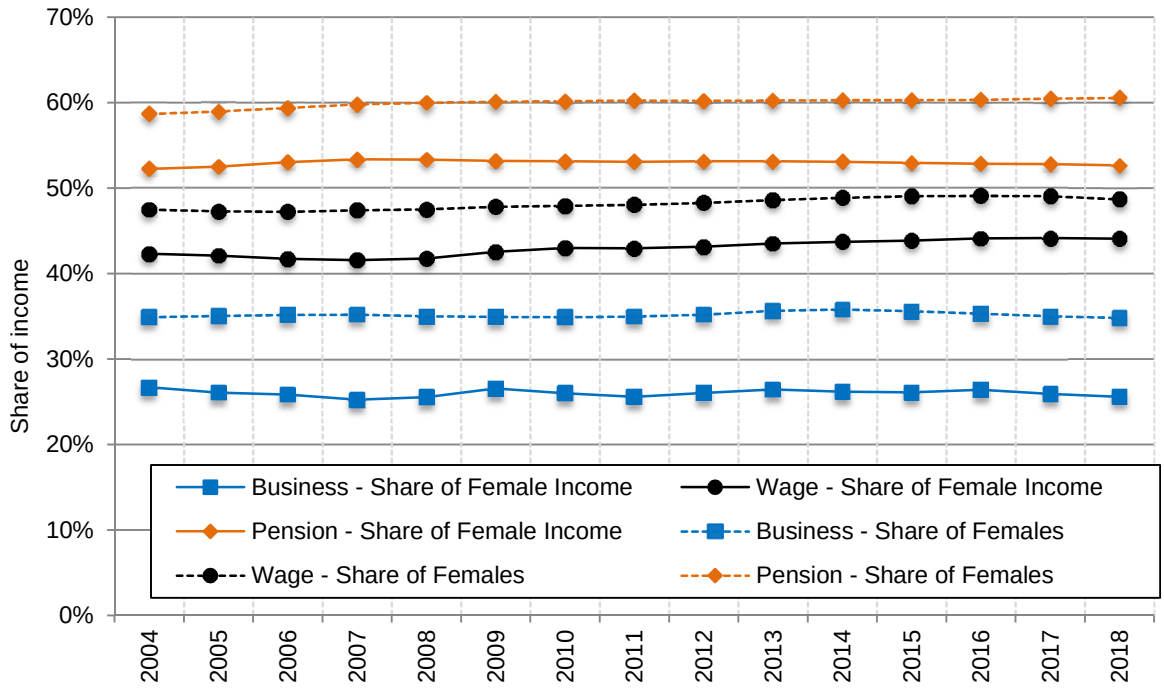


Figure A8: The share of females in total business, wage and pension income

Distribution of income among adult individuals. The series are based on income from employment (wage), pensions and business (including self-employment). The series do not include the EU-SILC correction and agriculture income. Source: authors' computation based on tax registries. See Section 2 for more details.