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# INCOME INEQUALITY IN SOUTH KOREA, 1933-2022: EVIDENCE FROM DISTRIBUTIONAL NATIONAL ACCOUNTS

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# Income Inequality in South Korea, 1933-2022: Evidence from Distributional National Accounts\*

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## Abstract

This study presents “Distributional National Accounts (DINA)” for South Korea. We combine household survey micro data, tax data, and national accounts to construct annual pretax income inequality series which is coherent with macro aggregates. We show the distribution of pretax national income over the period from 1933 to 2020, with detailed breakdown by age, gender, and income composition in the years from 1996 to 2020. This series allows for a much richer analysis of the long-run income inequality trend in South Korea than previous work based on fiscal tabulation (N.-N. Kim, 2018), which only includes top income shares and misses an increasing component of tax-exempted capital income in recent years. Our new series suggests that after the Asian financial crisis in 1997, income inequality has worsened due to the rise of tax-exempted capital income concentration at the top. Additionally, South Korea is characterized with relatively higher gender inequality and lower old-age income shares compared to the United States and France. Compared to other East Asian countries, South Korea exhibits relatively lower levels of income inequality, mostly due to the fact that its national income growth was more equally distributed in the early stages of economic take-off in the 1980s, even though income inequality has worsened over the last three decades. Rather strikingly, despite similar economic backgrounds and development trajectories, there is a huge gap in pretax national income inequality between Taiwan and South Korea. This gap stems mostly from the fact that the distribution of capital income in Taiwan has been much more unequal than that in Korea.

**JEL Codes:** D3, E01, O53

# 1 Introduction

The narrative of the Korean economic miracle has captivated economists for decades. In the 1960s, South Korea stood among the world's poorest nations. However, the post-1960 Korean economy underwent a remarkable transformation. From 1960 to 1988, the country experienced an annual GDP per capita growth of approximately 6.2% (Lucas, 1993). It is now a well-established fact that Korea achieved one of the most successful economic developments over several decades. Remarkably, this prosperity persisted beyond the period mentioned above, with the Korean economy sustaining positive growth throughout the 1980s and 1990s until the onset of the Asian financial crisis in 1997. Figure 1 illustrates the average national income among adults in Korea from 1933 to 2022, showing a 7.4% annual increase in per adult national income during this period.<sup>1</sup> While conventional wisdom suggests that Korean economic growth halted after this crisis, at least in terms of per adult national income growth, it continued to expand even in the 2000s, nearly matching the rapid pace seen in the 1980s and 1990s.

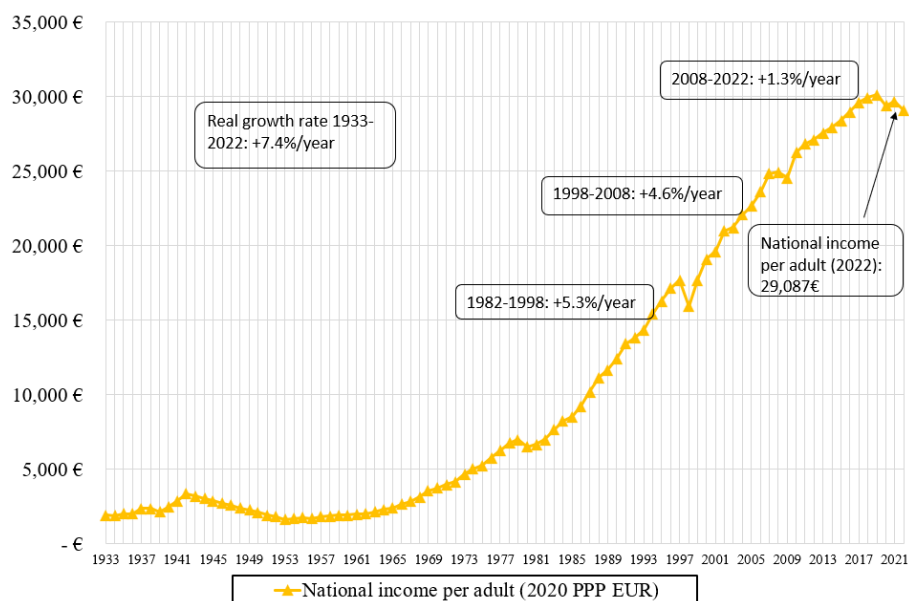
After these decades of sustained economic growth, the so-called "miracle on the Han river", people start to question if this economic growth model was a successful one. In fact, according to OECD (2023), 40.4% of senior citizens in Korea are still in poverty, which is the highest rate among OECD countries. Did this "successful economic development" really get Korea out of poverty without rising inequalities at the same time? Regardless of disciplines, many scholars tried to answer this question. However, it is impossible to find an answer to this question without any quantitative inequality data. Unfortunately, there had not been much research done to put Korean economic inequality on the map until very recently. N. Kim and Kim (2015) did a very first attempt to build the long-run series of Korean income inequality using homogeneous fiscal data, in the spirit of Piketty and Saez (2003).<sup>2</sup> The caveat of their research is that it only covers fiscal income and the top of the income distribution. The bottom and middle income percentiles are missing and so

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<sup>1</sup>The significant dip in 1997 was attributed to the Asian financial crisis.

<sup>2</sup>This series is available at World Inequality Database as fiscal income inequality series in Korea (hereinafter "WID series").

Figure 1: Per adult national income trend in Korea, 1933-2022



Notes: National income divided by adult population. We linearly interpolate the missing years, i.e., 1943-1952. Korea got independent in 1945 and had a civil war in 1950-1953 so we do not have any data point for these years.

are individual characteristics such as gender, age or years of schooling, etc. Additionally, in the 1980s and 1990s, tax data are not fully available due to missing data issues.<sup>3</sup>

In such a context, this study aims to construct a better income inequality series in Korea and show the long-run Korean income inequality trend from various perspectives. For that purpose, we use the Distributional National Accounts (DINA) approach (Piketty et al., 2018; Alvaredo, Atkinson, et al., 2020) to show not only the distribution of fiscal income, but also the distribution of other components of national income. This current DINA series for South Korea combines survey data, tax data, and national accounts, so that we can handle the inequality figures constructed from survey and tax data in a consistent manner with macroeconomic aggregates. we discuss the DINA project in detail in Section 2.

Our DINA series has several new findings. First of all, from a historical perspective,

<sup>3</sup>In fact, the total income inequality series is only available from 1976 to 1985 and from 1995 to 2016. We discuss this data issue in the appendix. Please see the appendix A for details.

top pre-tax national income shares declined during the period between the 1930s and 1970s and started to increase afterwards, which is consistent with the global and East Asia inequality measures from [Chancel and Piketty \(2021\)](#). The decline in the top incomes during the first period is attributed to the mixture effects of Independence, World War II and Korean war, which is compatible the worldwide narrative during the same period of time as well ([Piketty, 2014](#)). Top incomes have increased in the aftermath of the Asian financial crisis and it has now reached almost the same level as that in the colonial era. The second finding is that there is a rise of top income concentration in the recent years mostly associated with an increase in capital income inequality. [Figure 7](#) shows the top 1% income share from 1982 to 2020. Since the Asian financial crisis, top income shares has increased due to rise of capital income. [Figure 12](#) provides graphical evidence to explain the soaring top income concentration in recent years. The third finding is how in reality people over 65 years old are earning relatively lower income than other age groups. [Figure 14](#) presents that people who are more than 65 years old earn 60-80% of average adult income in 2020, which did not improve much compared to 1996. The fourth finding is that even though the gender gap in labor income decreased a lot from 1996 to 2020, still most men get paid 2.5-3 times more than their female counterparts except when they are in their 20s. Lastly, income inequality in Korea was higher than that in other East Asian economies, e.g. China and Taiwan, in the 1980s, but now it is relatively lower than China and Taiwan. This is mostly due to the reduction in income inequality in Korea during the late 1980s and early 1990s with policy instruments such as the introduction of pension system, minimum wage, and intensified capital income taxation which was absent in Taiwan and China.

The remaining part of this paper is organized as follows. In Section 2, we discuss the related literature in this topic. In Section 3, we talk about the data sources that we used and explain the concept and methodology of DINA. In Section 4, we present Korea DINA series from 1933 to 2020 and provide the result by inequality breakdowns: gender, age, and income decomposition from 1996 onwards. This paper is the first attempt to try showing the detailed pictures of income inequality in Korea for the last 40 years. After that, we

compare this Korea DINA income series with other Asian countries whose DINA series are also available. The main purpose of DINA series is to construct the homogeneous inequality series in order to perform valid cross-country comparison. Unlike the other continent, comparative inequality analysis in East Asia is rarely done.<sup>4</sup> This paper contributes to providing similar analysis results in East Asia. In conclusion, we discuss other possible research avenues in the future.

## 2 Related literature

Although [Piketty \(2014\)](#) attracted vast research interests in inequality and put inequality studies in the mainstream economic and political discussions, the attempt to estimate income distribution has a long-standing history in the economics discipline. [S. Kuznets \(1953\)](#) tried to combine income tax tabulation data with national accounts to estimate the top income shares in the US from 1913 to 1948. Then, [Piketty \(2003\)](#) tried to expand this top income distribution analysis in the French context. [Piketty and Saez \(2003\)](#) refined and constructed the top fiscal income inequality series for the US. Ever since then many researchers tried to construct similar top fiscal income series. In the context of East Asia, [Moriguchi and Saez \(2008\)](#) constructed the long-run top fiscal income distribution series for Japan. Then, using the tax data available in Korea, [N. Kim and Kim \(2015\)](#) and [N.-N. Kim \(2018\)](#) constructed the top fiscal income inequality series for Korea, from 1933 to 2016.<sup>5</sup>

However, using the fiscal income data has some disadvantages. The biggest downside is that tax-exempted incomes are missing in tax data. This also contributes to the gap between national income and fiscal income.<sup>6</sup> Due to this discrepancy between macroeconomic total and fiscal income series, economists find it challenging to answer the distribu-

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<sup>4</sup>In fact, [Blanchet, Chancel, and Gethin \(2022\)](#) did the comparative inequality research in Europe and [Alvaredo et al. \(2019\)](#) did that for the Middle East.

<sup>5</sup>[N.-N. Kim \(2018\)](#) is the updated version of [N. Kim and Kim \(2015\)](#). The current WID fiscal income series in Korea is based on [N.-N. Kim \(2018\)](#).

<sup>6</sup>Other than tax-exempted income, other factors influencing such a gap between the national account and the fiscal data include tax avoidance, tax evasion, etc ([Piketty et al., 2018](#); [Alvaredo, Chancel, et al., 2020](#)).



tional macroeconomic questions as previously mentioned, i.e., how equally the economic growth has been distributed over the entire population. Also, fiscal data usually miss out the distribution of middle and bottom income shares. Estimating bottom and middle income distribution is as important as estimating top income shares, because it completes the whole picture of one country's income distribution. Furthermore, in the Korean context, we can only get access to tax tabulation data which do not provide any individual characteristics.<sup>7</sup> Lastly, since each country has their own tax system and household survey, it hinders the accurate cross-country comparison of inequality. The homogeneous methodology employed to construct inequality series is hence necessary for conducting a cross-country comparative analysis in a consistent way. Because of these shortcomings, some researchers measure income distribution solely based on survey data. However, household survey data usually have more serious under-reporting and hence non-representative issues which are mostly concentrated in the top income distribution (Alvaredo, Atkinson, et al., 2020; Alvaredo, Chancel, et al., 2020; Carletto et al., 2022).

This is where the system of "Distributional National Accounts (DINA)" steps in. [Alvaredo, Atkinson, et al. \(2020\)](#) share this critical point of view on using fiscal income data and try to reconcile it by adding other datasets. The basic idea is to estimate top income distribution using tax data and estimate the bottom income distribution using survey data. They combine these two datasets and national accounts, so that this income inequality can be consistent with the macroeconomic data. [Piketty et al. \(2018\)](#) is the first application of this DINA methodology on the US. This DINA series captures 100% of national income in the US and also shows the detailed income growth by income groups that is consistent with the growth in macroeconomic totals. Using the individual characteristics (such as gender and age etc.), they also suggest very detailed long-run inequality trend of each sub-groups' income distribution, such as female income shares evolution over the years. Moreover, since every country follows the System of National Accounts, when producing its national accounts, these series are homogeneous among all countries and enable us to

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<sup>7</sup>Recently, Korean National Tax Service started to provide tax micro data but only for very recent years (2015-2020).

do a cross-country comparison in a comprehensive manner. World Inequality Lab pursues this project as a global inequality project and Korea DINA is a part of this big global project.

### 3 Data and Methodology

For the countries where the tax micro data are not available, the household survey dataset becomes the main data source (Alvaredo, Atkinson, et al., 2020). Korea is one of such cases. Currently, tax micro data are not available, therefore we are using household survey data as the main data source instead.

#### 3.1 Survey data

The main household survey data we used is the Household Income and Expenditure Survey (HIES). Statistics Korea started HIES in 1963 and has been doing this survey ever since.<sup>8</sup> As of 2020, the sample size is 7,200 households from all over the country. Basically, Statistics Korea provides a household ledger to each sample household and checks the contents every month. HIES contains various information including housing type, residential type, deposit, rent, imputed rent, wage, business income, financial income, expenditure, tax and social contributions, as well as individual characteristics, e.g. age, education, gender, occupation, etc.

However, HIES micro data is not available before 1990. Instead, we use the survey tabulation data for 1982, which is the first year when distributional information is available in a tabulated form. Another point to be noted is HIES did not include certain types of households. For example, before 2019, HIES did not include any farm or fishery household in its sample. It is because HIES started as the urban household survey and Statistics Korea has separate household surveys to cover farm and fishery households. Thus, we use these two supplementary household surveys to cover the full population with survey

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<sup>8</sup>There was a household survey before 1963, but it was not a nationwide survey.

data.<sup>9</sup> These two supplementary household surveys are Farm Household Economic Survey (FaHES) and Fishery Household Economic Survey (FiHES) respectively. FaHES and FiHES are the farm and fishery household version of HIES. Hence, it is compatible with combining with HIES for every year. The limitation of using this data is they do not have any distributional tabulation data for earlier years, for instance 1982, and their micro data are available from 2003 onwards.

Lastly, there is another survey data that we used, called the Household Expenditure Survey (HES). HES was conducted only three times (1991, 1996, and 2000) and was shut down after 2000. Nonetheless, the reason we used this survey data is that even though we can combine three homogeneous household surveys conducted by Statistics Korea every year, it is still better to use one household survey from Statistics Korea that covers all types of households than combining several similar surveys. However, one of the major shortcomings is that HIES does not include single-member households before 2006, and the only distributional information of these households that we could find is in tabulated forms. Conversely, HES covers not only farm and fishery households but also single-member households for all three years, i.e., 1991, 1996, and 2000.<sup>10</sup>

### 3.2 Tax data

In Korea, we have two different types of personal income tax systems: global income taxation and withholding taxation. [Moriguchi and Saez \(2008\)](#), [N. Kim and Kim \(2015\)](#), and [N.-N. Kim \(2018\)](#) explain this complicated tax system in very rigorous detail.<sup>11</sup> In the Korean personal income tax system, there is the term ‘global income’, which refers to the total sum of wages, business income, interest income, dividend income, pension income, and other incomes. This global income is usually taxed through self-assessed procedures, so every taxpayer who is obliged to undergo global taxation needs to report

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<sup>9</sup>HIES also misses out other types of households over the years. Please see Appendix A for details of all issues with data. We described every issue that we faced while using household survey data.

<sup>10</sup>This data is also compatible with HIES. In this sense, you can treat this HES survey as the full-population expanded version of HIES by Statistics Korea.

<sup>11</sup>In fact, as a legacy of colonialism, Korea has a very similar personal income tax system to the Japanese one.

their income themselves. However, only a portion of total taxpayers are subject to this global income taxation. These taxpayers are usually top income earners due to the nature of its structure. This is because most incomes are normally taxed at source when they occur. For example, you pay 14% of your interest income through withholding taxation whenever you receive interest income. However, if your yearly financial income is over 20 million KRW, then you are obliged to be part of global income taxation, and your interest income should now be taxed at your global income marginal tax rate, which is the same as the (total) personal income tax rate. The criteria for being included in global taxation place most global income taxpayers in the upper income distribution. Thus, normally, taxpayers who earn more than 20 million KRW through financial activities face a higher marginal tax rate, and they end up paying the difference from the tax amount that has already been paid through withholding taxation.

This unique global income taxation was introduced in Korea because Japanese colonial government ran a global income taxation back in the days. But it was gone with Korea's independence in 1945. Korean government reinstated this global income taxation later in 1975. Unlike now, in the early years, the global income used to include real estate income, wage, business income, and other incomes. The interest and dividend income were included in 1996.<sup>12</sup> People with business income are required to report the global income, but if you have only wage, your tax affairs end with the year-end settlement of wage and salary, without reporting global income. Also, if your financial income combined with interest and dividend income is less than 20 million KRW, you do not have to report your financial incomes through global income taxation. Hence, there are some taxpayers that only exist in withholding taxation data. To construct the DINA income series, it is necessary to combine the withholding taxation data and global taxation data. Japan has a similar situation, so we are using the same methodology employed by [Moriguchi and Saez \(2008\)](#) and its modified one in [N. Kim and Kim \(2015\)](#) to combine these two tax data. After we combined two tax data and erase the overlapped observations,<sup>13</sup> by using

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<sup>12</sup>Before 1996, the tax on interest and dividend income was only withheld.

<sup>13</sup>For the details of tax data issue, please refer to Appendix A.

the non-parametric generalized Pareto interpolation method, we estimate the full income distribution from tax data.

### 3.3 Income concept

The income concept of the Korea DINA series is based on the income category from the System of National Accounts (SNA). As [Garbinti et al. \(2018\)](#) pointed out, the income concept of the DINA series relies on the system of national accounts, primarily because there is no other series that attempts to provide an internationally consistent definition of income and wealth. According to the System of National Accounts 2008,

$$NationalIncome = GDP - CapitalDepreciation + NetForeignIncome \quad (1)$$

In this paper, we aim to construct a consistent pretax national income distribution. Pretax national income is the sum of all pretax income that goes to every adult in the economy who owns production factors, i.e., labor and capital, before any operation of the tax and transfer system except for pension and other social insurance programs ([Alvaredo, Atkinson, et al., 2020](#)).<sup>14</sup> Hence, we subtract pension and other social insurance contributions from individual income and add pension and other social insurance benefits, e.g., unemployment insurance benefits, to his or her income.

There is another income concept called "pretax factor income". The difference between pretax factor income and pretax national income lies in whether you consider the operation of pension and social insurance. Given that the age structure in Korea has changed rapidly over the last 20 to 30 years, it is much better to use pretax national income instead of pretax factor income. This is because retirees generally have lower factor income since their main income sources are from pensions, and it biases the long-run series in one

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<sup>14</sup>The DINA series takes into account the operation of pensions because this allows us to construct a long-run income inequality series that is less sensitive to changes in the population pyramid in one country. Please see [Alvaredo, Atkinson, et al. \(2020\)](#) for details.

country and international comparisons for this mechanical reason.<sup>15</sup> Therefore, we chose pretax national income as the main income concept in the Korea DINA series.

Now, let's delve into the unit of observation employed in the DINA series. The standard unit for the DINA series is the equal-split adults, which involves having income information for couples and dividing that couple's income equally between each partner (referred to as the 'narrow equal-split unit'). It is essential to recognize that the Korea DINA series is crafted based on survey microdata, facilitating the construction of the DINA series with a household unit. However, for the sake of comparability with other countries, our primary DINA series is based on the equal-split unit. It's crucial to note that the equal-split unit in the Korea DINA series entails the equal distribution of household income among every adult member in the household (referred to as the 'broad equal-split unit'). This practice is not uncommon when constructing the DINA series in scenarios where tax microdata is unavailable, as is the case in China. It is imperative to consider this distinction when drawing comparisons between the Korean series and the US or France DINA (Alvaredo, Atkinson, et al., 2020). In the US and France, their equal-split unit involves dividing couples' income equally between each partner.<sup>16</sup> Naturally, when comparing our fiscal income estimates, constructed by amalgamating tax and survey data, with the WID series, we adopt an individual unit. This is feasible in Korea due to the availability of detailed information for every household member in our household survey microdata.<sup>17</sup>

### 3.4 Methodology

In this sub-section,<sup>18</sup> we describe step by step how we constructed Korea DINA income series from 1982 to 2020. Generally, we start with the HIES micro data. We combine Fa-

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<sup>15</sup>Some countries with more elderly citizens will be more likely to have higher income inequality.

<sup>16</sup>In reality, it is logical to evenly distribute household (or couple) income among each adult in the household (or among couples). Even in instances where one does not have personal income, if their partner is employed, they ultimately share and spend their partner's income. For a more detailed discussion, please refer to [Piketty et al. \(2018\)](#).

<sup>17</sup>It is noteworthy that in 1982 and 1991, we only possess tabulation data based on the household unit, limiting our ability to construct the DINA equal-split adult unit for these two years. Please refer to Appendix A for an in-depth exploration of data issues.

<sup>18</sup>For 1982, 1991, and 2000, we use a different approach to construct the Korea DINA series due to the data limitation. Please see Appendix A for detailed discussions.

HES and FiHES data with HIES data (hereinafter ‘the combined raw survey’). Then, we Pareto-interpolate the distribution of fiscal income from tax tabulation data, using generalized Pareto interpolation techniques (Blanchet, Fournier, & Piketty, 2022). Afterwards, we correct the combined raw survey, using tax data (hereinafter ‘the corrected survey’) with the non-parametric reweight and replacement approach to correct top distribution of survey (Blanchet, Flores, & Morgan, 2022). Lastly, we use national accounts data to fill the gap between our fiscal income and national income, which means distributing tax-exempted capital income, such as imputed rent or retained earnings. This process is to reconcile our fiscal income with pretax national income.

**Step 1** We estimate income shares using the combined raw survey. After estimating the individual-level income shares,<sup>19</sup> we get equal-split income shares separately. The equal-split here means the "broad" definition of equal-split from Alvarado, Atkinson, et al. (2020), which is that within each household, every adult household member is assumed to earn equally, so we “equally split” total household income to each adult household member, even though they do not report any actual income. It is somewhat reasonable that even adults without any income still consume goods and services with financial help from other household members.<sup>20</sup> We use the equal-split unit as the benchmark unit of observation to be consistent with the other DINA series in the World Inequality Database (WID). Also, there has been a demographic change recently in South Korea, e.g. the number of single-member households over the last few decades. If you use this equal-split approach, your DINA estimates are more neutral to these changes than individual unit approach. It is one of the reasons why an equal-split adult is the benchmark unit of observation for DINA studies.

**Step 2** As mentioned before, top-income individuals are under-represented in survey data. So we correct this top income distribution from survey data using fiscal data in this

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<sup>19</sup>Korean household survey data is household-based but it contains every household member’s individual-level information in each household.

<sup>20</sup>Actually, the empirical evidence suggests the financial sharing among married couples is somewhere between full sharing and none. For more details, see Chiappori and Meghir (2015).

step. Following the [Blanchet, Flores, and Morgan \(2022\)](#) (hereinafter “BFM correction”), we correct top income shares in survey data, using tax data. Basically, this correction is a non-parametric approach to adjust the weight of survey, assuming the continuity of the density of income. They use endogenously determined “merging point” between tax and survey data, above which they combine tax data with survey data. Then, they re-weight and replace the observations, while preserving the original survey micro data, assuming there is no re-ranking among observations. So, with tax data, top income distribution in the survey data above the merging point gets close to the top income distribution in tax data, which is known to represent the reality better than survey data. Additionally, in survey data, if some income percentiles are under-represented (i.e., top income distribution above the merging point), then other income percentiles should be over-represented (i.e., income distribution lower the merging point), because the sum of weights in survey should be equal to the sum of population. In a nutshell, we correct top income shares above the merging point by fiscal data while we systematically correct income shares below the merging point as well.

**Step 3** Finally, we reconcile the pretax fiscal income series while distributing tax-exempted capital income, e.g., imputed rent<sup>21</sup> and retained earnings with pretax national income.<sup>22</sup> Within fiscal income data, the private shares of corporate undistributed profits are not included. South Korea is not alone in this case ([Khalid & Yang, 2021](#)). Therefore, to construct the DINA series, it is very important to take these profits into account. It is because without considering this aspect, it can underestimate the inequality estimates, given that this is really deferred dividend income in the broad sense. To correct this part, we take net primary income of corporations per adult from national account data and redistribute the private part of it proportional to individual property income, because of the absence of the detailed auxiliary data that helps to distribute the retained earnings ([Alvaredo, Atkinson, et al., 2020](#)). At the last stage of this step, we re-scale this income to match with the

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<sup>21</sup>All household survey data in Korea have imputed rent information. So we used this distribution.

<sup>22</sup>While doing this step, we assume that tax evasion and tax avoidance do not vary by income shares ([Khalid & Yang, 2021](#)). But, tax evasion is usually positively correlated with income and wealth ([Alstadsæter et al., 2022](#)). Hence, our results should be the lower bound of true income inequality.



pretax national income at national account level.

### 3.5 Data sources and methods for historical series (1933-1981)

With the fiscal historical series extended from [N.-N. Kim \(2018\)](#), we are attempting to extend our DINA series to 1933.<sup>23</sup> The main purpose of this exercise is to provide a concise picture of a century-long trend of income inequality in Korea. This historical DINA series is very rudimentary and relies on many assumptions. The first starting point is to compute the ratio of national income shares to fiscal income shares by income groups and years from our main DINA series, then we apply this ratio to construct the historical series. Following the methodology from [Garbinti et al. \(2018\)](#), we also use the assumption that this gap between fiscal income inequalities and national income inequalities has increased over time because in 1933, the tax system was so limited that people did not try hard to optimize their tax burden. The amount of tax-exempted income should be negligible at that time. As a result, we assume that the ratio is growing linearly from 1 in 1933 to the ratio we observed in 1982.<sup>24</sup> As figures 30 and 31 show, when retained earnings are very low, the gap between pretax national income and fiscal income is trivial. It is reasonable to assume that retained earnings were extremely small in the earlier period in Korea. Besides, in section 4.2, we observe the growing importance of tax-exempted capital income at the top distribution in recent years. Nevertheless, our historical DINA series should be considered as incomplete and hopefully will be improved with better data.

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<sup>23</sup>The fiscal historical series (1933-1942 and 1976-1981) is based on the individual unit. Hence, we need to transform this series to an equal-split unit. Ideally, we could use detailed information on household structure, but unfortunately, this kind of information is not available in our tax tabulation data. Thus, we assume that the ratio of fiscal income per individual unit to equal-split unit has not changed before 1982. In 1982, we have tax data corrected survey micro data so that we can compute this ratio. The difference between the equal-split unit and individual unit comes from the difference in bargaining power in couples. In this context, we are assuming that the income power dynamic between men and women did not change before 1982 in Korea. Although it is not a perfect approach to estimating it, we hope it will be further revised with better data in the future.

<sup>24</sup>The ratio '1' means inequality in pretax national income is assumed to be the same as the one in fiscal income.

## 4 Results

### 4.1 Long-run trends in income inequality in Korea

Before diving into our benchmark series (1982-2020), we discuss the long-run trends of inequality in Korea for the whole last century. In this historical series, we report the evolution of top income groups from 1933 to 2020 in Figure 2. The major long-run transformation is the fall of top income class and its return in the most recent decades. The top 10% income shares decreased gradually, from about 50% of total income to below 30% of total income in 1970s. This phenomenon is observed almost everywhere in the world (Chancel & Piketty, 2021). It is the result of Independence, World War II, Korean war and land reform consecutively. When Korea got independent from Japan, lots of wealth owned by Japanese were forbidden to be taken out of Korea. A big chunk of lands were owned by Japanese. A number of Japanese, who accumulated their wealth in colonial Korea, had to leave the assets behind and went back to Japan after the Independence. Their wealth was redistributed later through auctions with price cheaper than market value (N. Kim, 2013). Korean war (1950-1953) affected to decrease the top income shares as Piketty and Saez (2014) explain it. They emphasize that the war directly destructs domestic capital assets (real estate, factories, machinery, equipment)', which leads to a decrease in the top income shares. After that, Korean land reform (1950-1961) successfully redistributed land from big owners ("jiju") to tenants and it facilitated the dismantling of the big landowner's class in South Korea, which contributes to lowering the top income shares in the 1950s and 1960s (Jeon & Kim, 2000). In fact, before the land reform, this rent was the biggest source of top income earners (N. Kim & Kim, 2015). Then after the 1980s, top 10% pretax national income shares started to increase except for the early 1990s and has not reached to the level of colonial-era yet, but as high as in the 1950s, which will be further discussed in our benchmark series. We can observe the similar trend in top 1% income shares over the same period of time (Figure 3).

Concerning our benchmark series for the most recent decades (1982-2020), first of all, it's important to reiterate that as Figure 1 shows, per adult national income has increased

substantially over this period of time. Especially before the 1997 Asian financial crisis, national income per adult increased 5.3% per annum. That being said, even after the financial crisis, the average national income grew almost as much as the previous time period (4.6% per annum), which is in contrast to the general belief that Korean economic growth did not continue after the financial crisis. Overall, per adult national income has been increasing by 3.9% per annum during this period, which is similar to France during their "thirty glorious years" (Garbinti et al., 2018).

Table 1: Income thresholds and income shares in South Korea, 2020

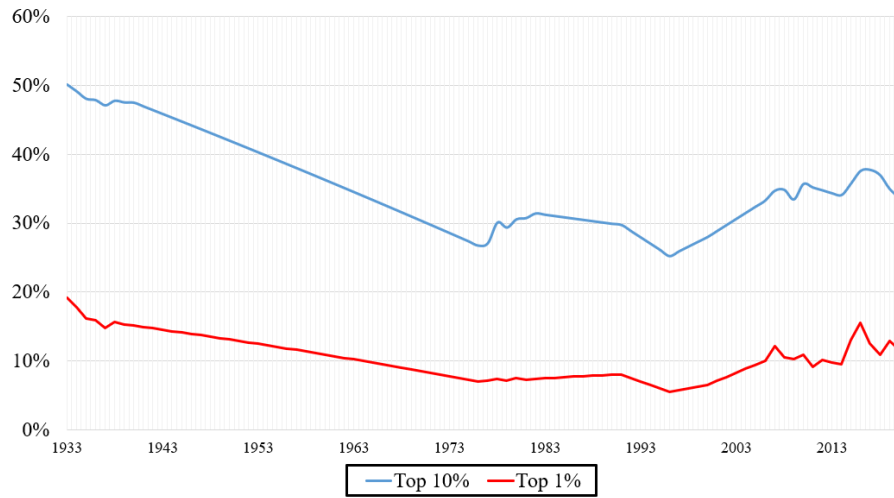
Income group	Number of adults	Income threshold (KRW)	Average income (KRW)	Income share
Full population	42,992,739	0	36.2 million	100.0%
Bottom 50%	21,496,370	0	15.6 million	21.7%
Middle 40%	8,598,548	27.8 million	40.3 million	44.6%
Top 10%	4,299,274	64.1 million	122 million	33.7%
Incl. Top 1%	429,927	164.1 million	423.6 million	11.7%
Incl. Top 0.1%	42,993	817 million	1.6 billion	4.4%

Note: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income (before all taxes and transfers, except for pensions and unemployment insurance). Percentiles are based on the total adult population. In 2020, 1,345 KRW is exchanged for 1 EUR.

In Table 1, we report thresholds, average income, and income shares of main population groups observed in 2020. In 2020, average adult national income is 36.2 million KRW. Average income per adult in bottom 50% is 15.6 million KRW, which is less than half of the average among the full population. Hence, the bottom 50% income share of total national income is 21.7%. The average national income in the middle 40% is 40.3 million KRW, which is slightly above the overall average. So, Middle 40% takes 44.6% of national income. Lastly, the average income within top 10% is 122 million KRW, which is about 3.4 times more than the average among the full population. Therefore, top 10% income share is 33.7%.

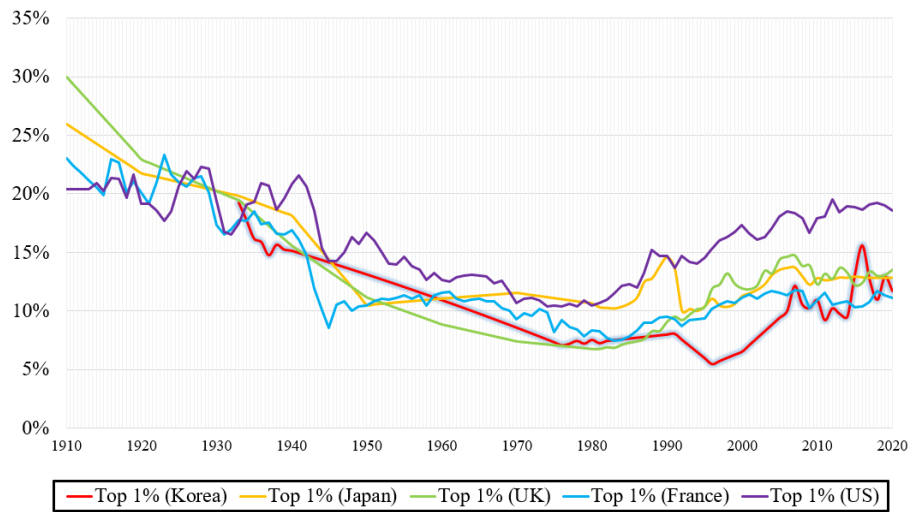
Next, we present the long-run evolution of these income shares from 1982 to 2020 in Figure 4. Overall, middle 40% income share has not changed much, except for the early

Figure 2: Income Inequality in Korea 1933-2020



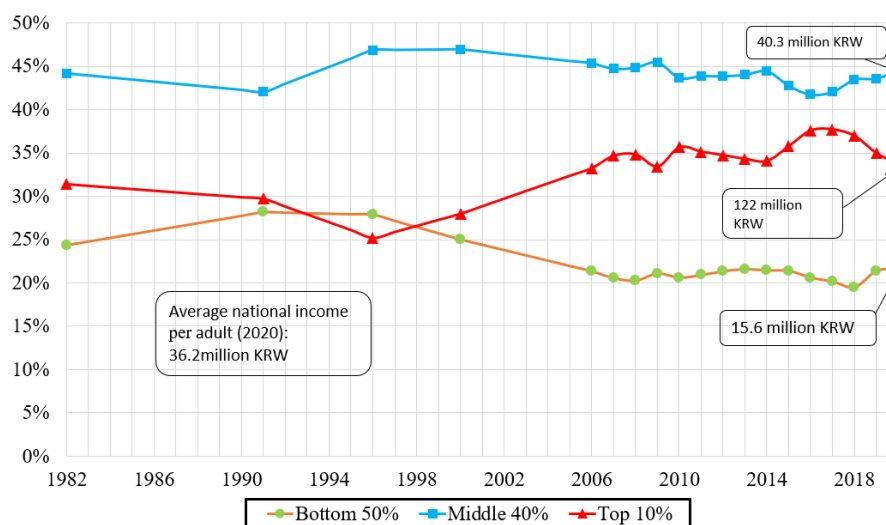
Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income. Percentiles are based on the total adult population. We linearly interpolated income shares for missing years. Before 1945, the series covers all Korean and Japanese residents in Korean peninsular. After 1945, it only covers Koreans who live in South Korea.

Figure 3: Top 1% Income Shares: Korea vs Other Countries 1910-2020



Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income. Percentiles are based on the total adult population. We linearly interpolated income shares for missing years. Before 1945, the series covers all Korean and Japanese residents in Korean peninsular. After 1945, it only covers Koreans who live in South Korea. Korea series start in 1933.

Figure 4: Income shares in South Korea 1982-2020



Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income. Percentiles are based on the total adult population. We linearly interpolated income shares for missing years.

1990s when the middle 40% income share increased. This increase in the middle 40% was accompanied by the drop in top 10% income share which happened in the early 1990s, given that bottom 50% share stayed stable. Then why did top 10% income shares decrease in the early 1990s? The most plausible story is the unique financial income taxation in Korea. Before 1996, all financial income was taxed through withholding taxation with a flat tax rate. This flat tax rate was very low due to the outdated financial system; tax authorities could not match financial income with each individual, so they put a low flat tax rate on all financial incomes.<sup>25</sup> Tax authorities could not identify financial account holders because before 1993, people did not have to conduct any financial transactions with their real names. Hence, many people could conduct financial activities with other people's names or even fake names. This custom prohibited tax authorities from tracking down each individual's financial income or activities, so they had to put the relatively low flat tax rate for everyone through the withholding system. This flat tax rate was only 15-20% throughout the 1980s and it rose to 40% in 1989. Then in 1991, this flat rate increased to 60%, which means all financial incomes in Korea were taxed at 60% with no

<sup>25</sup>Tax authorities could not know whether each financial income belongs to the rich or the poor.

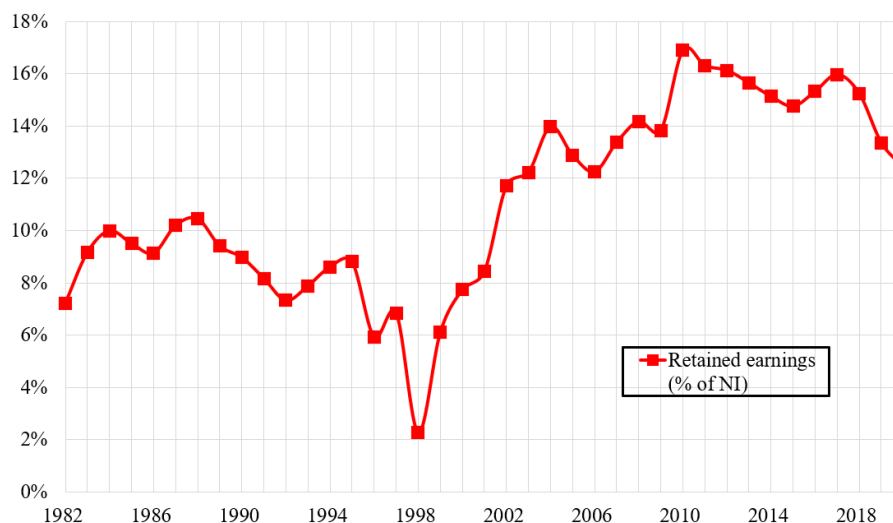
exceptions. This increase in flat tax rate could be implemented upon the awareness of capital income inequality in the society back then. After this intensified capital income taxation, top income shares in Korea decreased gradually until 1996 when the financial income component was integrated into the global taxation system. Hence, since 1996, small amounts of financial incomes (smaller than 40 million KRW) were taxed with 15% flat rate and all financial income above this threshold was taxed with their global taxation rate, whose top marginal tax rate was only 40% by then. As a result of this tax reform on financial income, top income shares increased consistently since 1996.

Bottom 50% income shares increased in the 1980s, thanks to several policies that targeted on increasing bottom 50% income shares, including national pension system and minimum wage policy. But after the Asian financial crisis, it has decreased. This drop in the bottom 50% has been partially reflected in the increase of top 10% income shares in the 1990s. Additionally, in Korea, in the late 1990s, there were changes of economic structures in the country which could have exacerbated the extent of income inequality. Korean labor law had been losing its protection power since mid-1990s and in 1996, the right-wing party amended the labor law in favor of employers. This change in labor law enabled companies to create lots of temporary jobs and to sack their employees much more easily than before. Eventually, it amplified the negative effect of the Asian financial crisis on unemployment and wage reduction in 1997 and 1998 (Keum & Cho, 2001; Cho, 2004). As a matter of fact, since 1997, part-time and temporary employment have increased a lot. According to Cho (2004), in 1997, 20.9% of all wage workers have one-year or less contract at work, but this proportion increased to 29.6 % in 1999. This trend has continued ever since, now Korea has a much higher share of temporary or part-time workers in its labor market, compared to other advanced economies. According to Schauer (2018), the total share of non-regular positions at the labor market is 49% in 2013.<sup>26</sup> Besides, most non-regular positions give relatively lower wages and less social benefits than regular positions. In 2016, a temporary position has an hourly wage of about 66 percent of the

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<sup>26</sup>In Korea, regular positions are full-time and tenured. This number comes from when we count employees who have a temporary (fixed-term) or part-time contract.

Figure 5: Retained earnings (% of NI) in Korea, 1982-2020



Notes: The real retained earning comes from the private part of net primary income of corporation in National Accounts. It is expressed in billion 2015 KRW and the percentage of national income. Source: Bank of Korea.

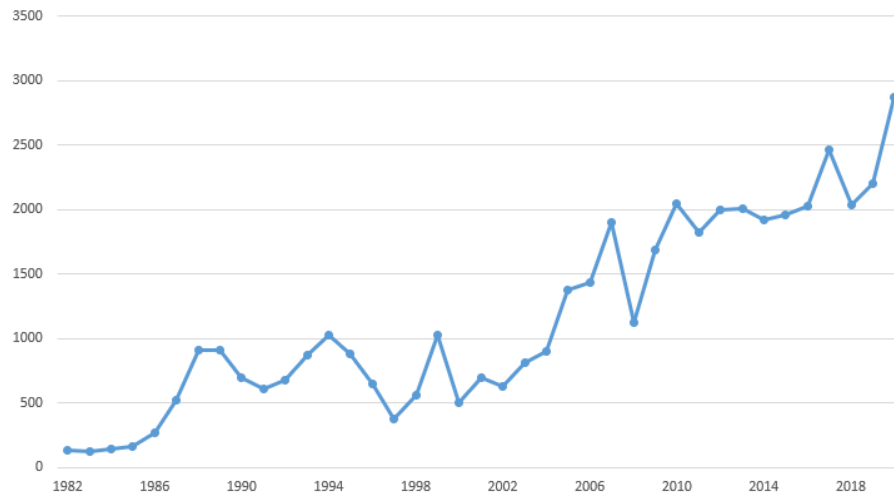
hourly wage of a regular position, and a part-time position receives an hourly wage of on average 62 percent of a regular position's. Such a labor market reconstruction after the financial crisis shifted the bottom 50% income share further downward. Bottom 50% income share has not reinstated the income share to its pre-crisis level ever since and now is even lower than in 1982. It is a rather striking result obtained by checking the long-run trend of the bottom 50% and middle 40% national income shares.

Top 10% income shares increased consistently after the Asian financial crisis and in the most recent years, it has started to decrease, which is induced by the fall of retained earnings (Figure 5), because labor income shares have not changed much for all these years.<sup>27</sup> The recent fall in retained earnings is caused by a new tax policy which stipulates that from 2018 onward, the Korean government would start to tax retained earnings with the marginal tax rate of 20% for big companies.<sup>28</sup> In fact, if we go up to higher top income groups, the evolution in rising income shares is even more distinctive. As it's shown in

<sup>27</sup>Please see section 4.2 for details.

<sup>28</sup>Korean government started this tax policy from 2015 onward. However, before 2018, the marginal tax rate was only 10%, which seemed to be too small to affect corporate saving behaviors. Besides, in 2015 and 2016, global automobile and semi-conductor industry were in a boom, which affected greatly the revenues of conglomerates in Korea.

Figure 6: KOSPI Index, 1980-2020



Notes: This index is calculated as the ratio of total value of stocks in the market in the present to the total value in the reference point. The reference point is January 4th, 1980. The index is 100 on January 4th, 1980. Source: Korea Exchange

Figure 7, top 1% income share was less than 6% in 1996 and rose up to 12% in 2020. It increased by more than twofold over the course of 25 years. As previously mentioned, this has been affected by the combined effect of tax reforms in financial income, financial market cycles,<sup>29</sup> and the rise of retained earnings in Korea. For example, in 2007, top 1% income share increased a lot due to the boom in financial market along with the increase in retained earnings. As a consequence of the Great Recession, the financial market in Korea also went into a recession in 2008, which lowered top 1% income shares. This is because when a financial market is in a recession, top incomes are less invested in financial market, which lowers the concentration of financial income at the top. Since we redistribute retained earnings following the distribution of (financial) property income, it has a larger effect on DINA estimates. Figure 8 presents the graphical evidence by showing that the top 1% income consists of more (financial) property income and retained earnings in 2007 than in other adjacent years (2006 and 2008).<sup>30</sup> The increase in top 1% income

<sup>29</sup>When a financial market is in a boom, more investments are made in financial assets which is prone to be concentrated at the top of the income distribution.

<sup>30</sup>If we look at Figure 11, top 10% income and its capital income did not increase as much as the top 1% in these two years. It means that this tax reform did not affect much behavior of people located in p90-p99. Response to business cycle and tax policy while changing financial asset portfolio seems to be more concerned with people in the very top. You can find the same evidence in the tax tabulation data. Please see the online appendix A2.2.



shares in 2015 and 2016 is due to the expanding financial cycle and tax reform regarding dividend incomes. Korea government provided the special tax incentives to those who earn dividend income, from 2015 to 2016. For these two years, dividend income tax rate (from the stocks with high return rate) decreased in withholding taxation (14% to 9%) and global taxation (38% to 25%).<sup>31</sup> Korea government implemented this tax reform to further revitalize the financial market with dividend payment schedules. Figure 9 provides graphical evidence that in these two years, the top 1% have higher shares of income from financial assets and retained earnings than other adjacent years respectively. As a result, top 1% income shares increased a lot in 2015 and 2016. Then, after the new left-wing government put a stop to this tax incentive and increased top marginal tax rate from 38% to 40%,<sup>32</sup> top 1% income share dropped and so did the income share of financial assets despite the boom in the financial market. In 2018, top 1% income share kept decreasing by the aforementioned effect of tax policy on retained earnings, and increased top marginal tax rate from 40% to 42%. In 2020, even though there was a boom in the financial market, income from financial asset did not increase, because people have been more risk-averse to invest more in financial assets during the Covid year (Huber et al., 2021).

## 4.2 Inequality snapshot 1: rise of capital income inequality

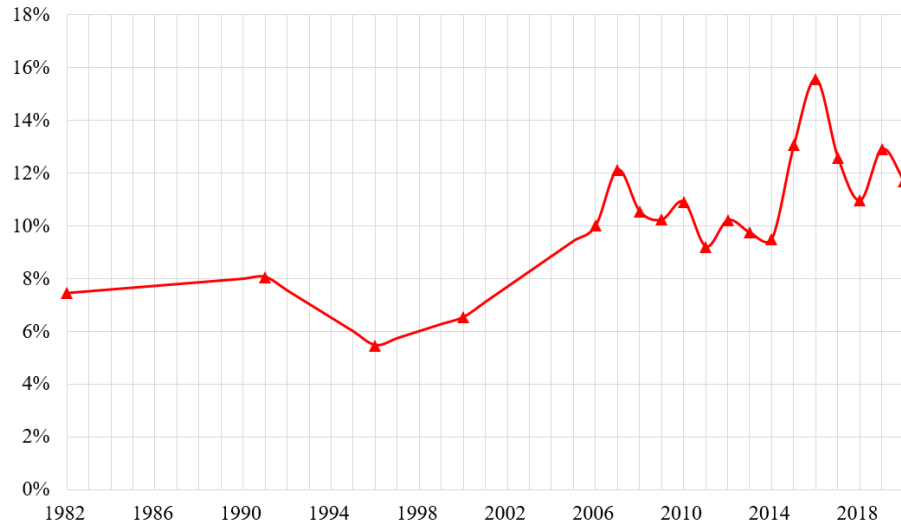
Now we move on to examining the growth incidence curve to better understand the change in income shares in detail. Table 2 reports the real income growth by income groups. From 1982 to 2020, average national income among adults increased 322% in real terms in South Korea. It is tremendous income growth and such income growth has been more or less equally distributed except for the very high income earners (top 0.1%). Figure 10 graphically depicts this distribution of income growth over this period. As we previously discussed, in the recent years, compared to the top 10% income share, we see a much bigger increase of inequality in higher income shares, i.e., top 1%. This pattern is

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<sup>31</sup>If you earn more than 8.8 million KRW, the marginal tax rate decreases from 35% to 25%. If you are in the top 1%, then your marginal tax rate decreased from 38% to 25%.

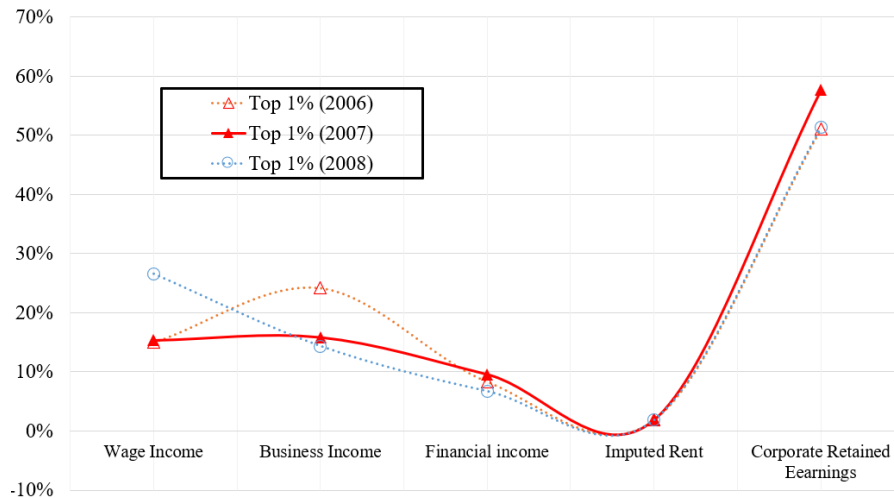
<sup>32</sup>There might be an extra anticipation effect. This left-wing government made a huge political agenda called "Twizzer Tax Increase" that targeted increasing the tax burden of top incomes only. Top income earners might anticipate this marginal tax rate will keep increasing after that, which happened in reality.

Figure 7: Top 1% income share in South Korea, 1982-2020



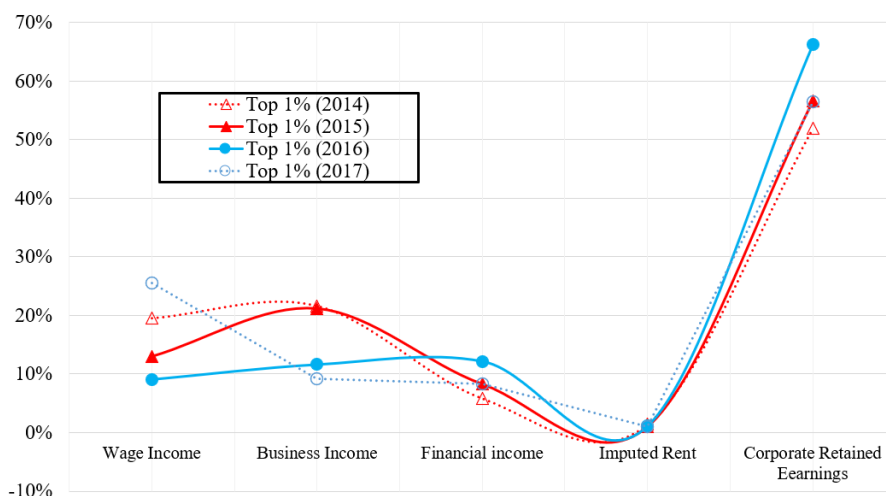
Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income (before all taxes and transfers, except for pensions and unemployment insurance). We linearly interpolated income shares for missing years.

Figure 8: Top 1% income decomposition in South Korea, 2006-2008



Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income (before all taxes and transfers, except for pensions and unemployment insurance). Compared to 2006 and 2008, top 1% income earners earned their income more from their (financial) assets in 2007, which increases their income from retained earnings in our estimate.

Figure 9: Top 1% income decomposition in South Korea, 2014-2017



Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income (before all taxes and transfers, except for pensions and unemployment insurance). Compared to 2014, top 1% income earners earned their income more from their (financial) assets in 2015. Then, they increased their financial assets more in 2016, which increases their income from retained earnings in our estimate. In 2017, with the tax benefit gone, they decreased their financial assets even though the financial market was in boom in that year.

similar to the French growth incidence curve during the recent 30 years (Garbinti et al., 2018). To see the distribution of income growth more clearly, we compare the share of this income growth by income groups. Bottom 50% income group took 21% of this accumulated growth in Korea during this period and top 10% took 34% of accumulated income growth. Even though bottom 50% income group increased a lot, top income groups benefited much more than the rest of the population. All in all, it is noteworthy that bottom 50% benefited as much as top 10-1% from economic growth during this period.

Garbinti et al. (2018) explained this similar bottom income group's growth in France by a huge increase in minimum wage after the 1968 protests. In fact, in Korea, minimum wage policy started in 1988 and intensified greatly in the early 1990s. Also, public pension system started in 1988 and unemployment insurance started in 1995.<sup>33</sup> These new policy implementations increased minimum wage incomes and pension allowances of

<sup>33</sup>In Korea, retirees are located at the bottom of the income distribution, hence it increased the bottom 50% income shares. Please see section 3.3 for details.

Table 2: Real income growth and inequality in South Korea, 1982-2020

Income group	Average annual growth rate	Total cumulated growth	Share of total cumulated growth
Full population	3.9%	322%	100%
Bottom 50%	3.5%	276%	21%
Middle 40%	3.9%	325%	45%
Top 10%	4.1%	353%	34%
Incl. Top10-1%	3.6%	287%	21%
Incl. Top 1%	5.1%	563%	13%
Incl. Top 0.1%	6.6%	1,052%	5%

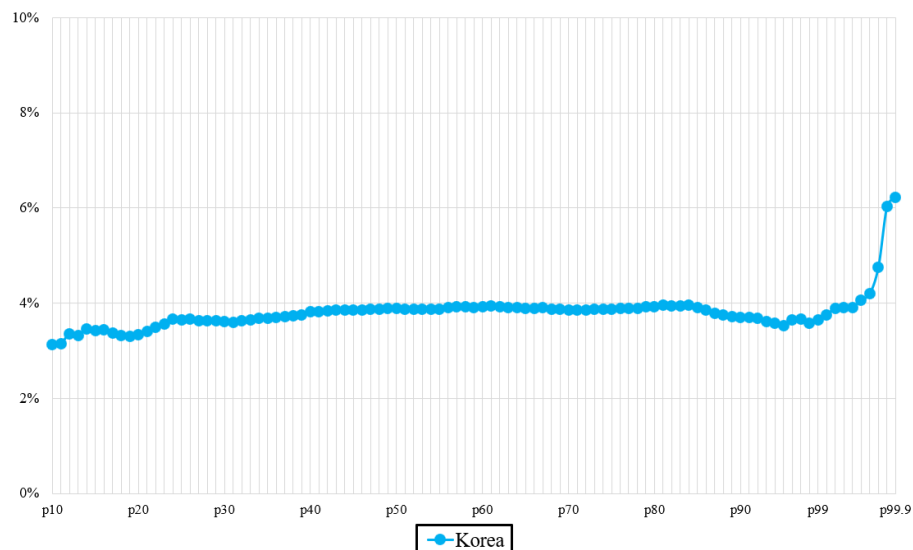
Note: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income (before all taxes and transfers, except for pensions and unemployment insurance). Income here means national income. Percentiles are based on the total adult population.

the lower-income groups, which allows the bottom 50% income group to grow as much as other income groups in this period of time.

The larger increase in top income distribution is driven by the increase in capital income in recent years. Figure 12 shows the recent increase in capital income in top 1% income distribution. This increase actually gets bigger, if you go up further in top income groups. [N.-N. Kim \(2018\)](#) also found rising capital income concentration in top fiscal income groups, which in a way facilitates the top fiscal income shares to get higher in Korea. This new DINA series is compatible with his findings. However, the new DINA series further adds on two important new findings. First of all, top income shares are mostly dependent on the change in capital income in recent years. If you see Figure 11, the labor income in top 10% distribution has not increased much over this period (15.3% to 20.1%). Conversely, total income in the top distribution has increased greatly (25.2% to 33.7%). It is the case only for top income groups over this period and if you go up higher in top distribution, this tendency gets stronger.

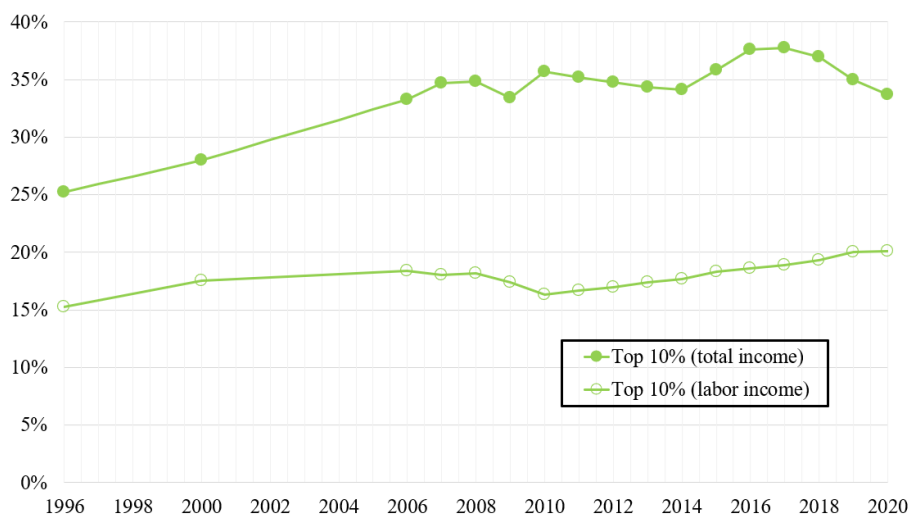
Another new finding is the rise of tax-exempted capital income in the top income distribution. Figure 13 shows the difference between DINA series and fiscal income series.

Figure 10: Annual real income growth in Korea, 1982-2020



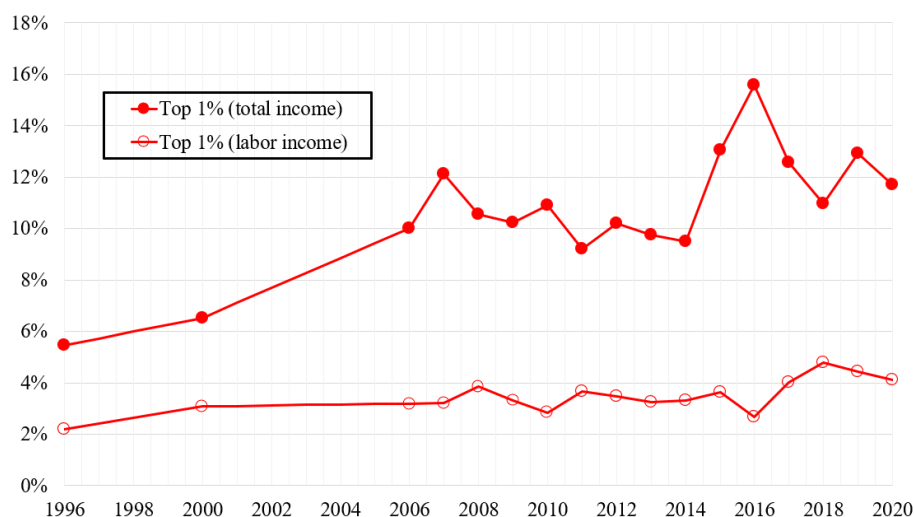
Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Income here means pretax national income (before all taxes and transfers, except for pensions and unemployment insurance).

Figure 11: Top 10% income shares: total income vs labor income



Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Fiscal income series is based on the corrected survey using tax data. Labor income includes wage, pension, unemployment insurance, and 70% of mixed income. We linearly interpolated income shares for missing years.

Figure 12: Top 1% income shares: total income vs labor income



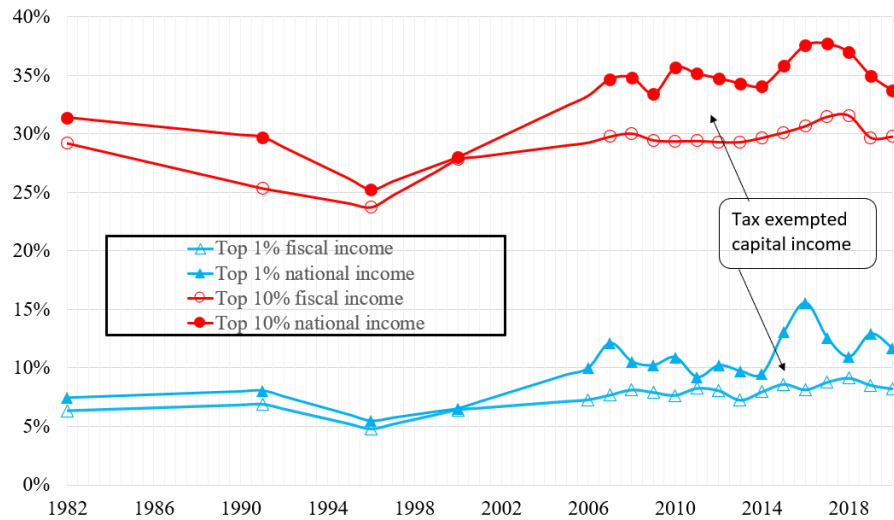
Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Fiscal income series is based on the corrected survey using tax data. Labor income includes wage, pension, unemployment insurance, and 70% of mixed income. We linearly interpolated income shares for missing years.

This gap represents tax-exempted income and you can find that tax-exempted income got shrunk around the Asian financial crisis due to the decrease in retained earnings. However, since the early 2000s, it has increased and it affects the pretax national income trend greatly. In short, the increase in top income shares has been affected by the rise of capital income and this effect gets bigger in the most recent years. Especially, this upward trend in income inequality is driven by the increase in tax-exempted income. This result is compatible with the rise of tax-exempted capital income that is described in Figure 5.

### 4.3 Inequality snapshot 2: stuck in poverty

In this subsection, we look into how severe senior poverty rate is in Korea. Examining Figure 14, it becomes evident that individuals aged 65 and above possess significantly lower total income compared to the average adult. In 1996, the income of those aged 65 and above did not even reach 80% of the average adult income. By 2020, there is a slight improvement, attributed to enhanced public pensions in 2008 and 2014. The Korean government initiated additional public pension benefits for retirees in the bottom 70% in

Figure 13: Income shares: national income vs fiscal income shares



Notes: The unit is the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Fiscal income series is based on the corrected survey using tax data. pretax national income includes tax-exempted labor and capital income. We linearly interpolated income shares for missing years.

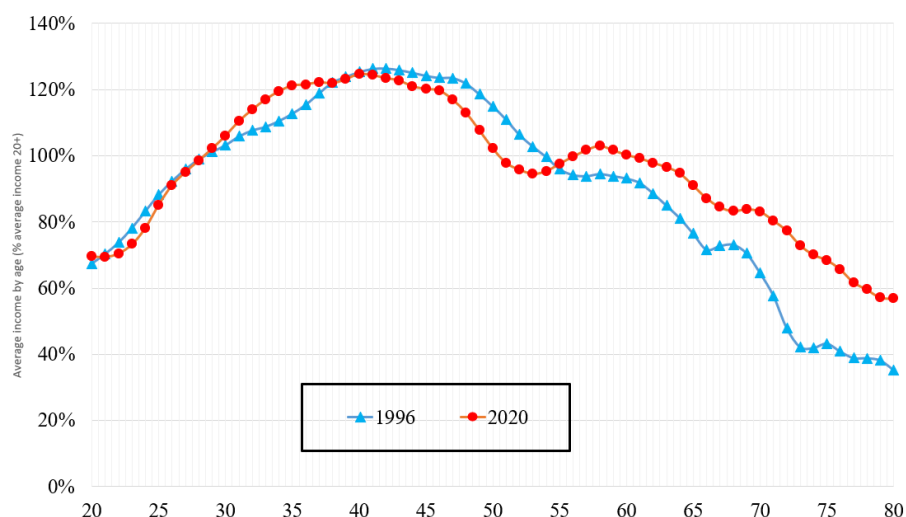
2008 and doubled the amount in 2014.<sup>34</sup>

From Figure 15 and 16, it could be seen that while there is a considerable increase in labor income for senior citizens in 2020 compared to 1996, a parallel improvement in capital income is not observed. Despite senior citizens earning more capital income than the average adult, the overall total income remains below 80% of the average adult total income. This suggests that the capital income earned by average senior citizens is insufficient to offset their lower labor income compared to the average adult. The notable shift from 1996 to 2020 is the increasing difficulty for the younger generation to accumulate or own capital. In 2020, individuals in their early 50s are the first age group to earn more capital income than the average adult, marking a significant delay compared to 1996.

Lastly, a comparison with global trends highlights the severity of senior poverty in Korea. According to [Piketty et al. \(2018\)](#), in the United States, the average income of senior

<sup>34</sup>It's worth noting that this extra pension was introduced alongside a reduction in the national pension benefit, aiming to uplift lower income brackets. This pension is funded through tax taxes, unlike the national pension in Korea.

Figure 14: Age-income profile in Korea, 1996-2020



Notes: The unit is the individual unit. Y-axis represents average income by age cohort with respect to the adult average income. 140% means this age group earns 140% of average adult income.

citizens (65 years and above) in the bottom 50% surpasses the average income of the entire population since the mid-2000s. Similarly, in France, the average total income of senior citizens surpasses that of the average adult (Garbinti et al., 2018). This discrepancy emphasizes that, despite recent pension reforms, senior citizens in Korea continue to face significantly lower incomes compared to their counterparts in other advanced economies, underscoring the persistence of senior poverty in the country.

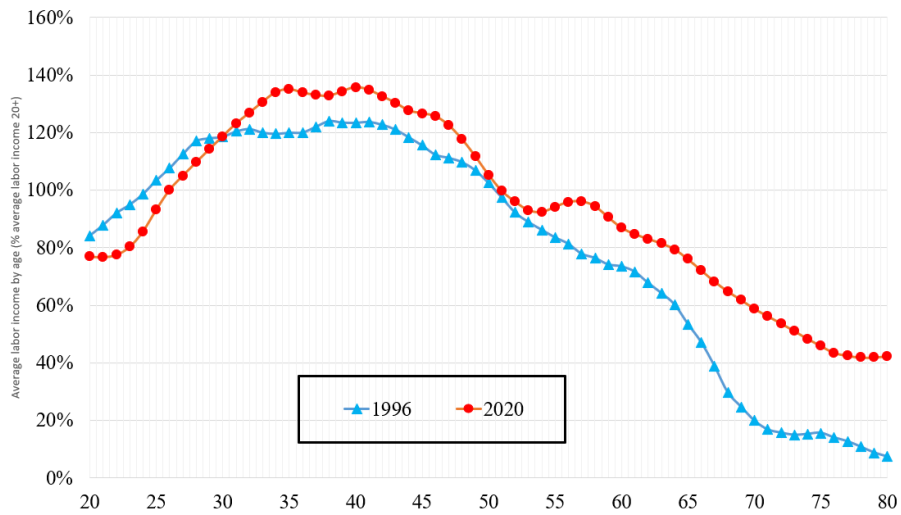
#### 4.4 Inequality snapshot 3: gender inequality

Concluding the examination of inequality trends, a comprehensive analysis of gender disparities is undertaken. The Korea DINA series offers valuable insights into the long-term trajectory of the gender gap in national labor income, utilizing reliable top income distribution data. The overarching observation is that, while the gender gap in labor income has diminished over the past 25 years, it remains pronounced.

Illustrated in Figure 17, the ratio of average male labor income to female labor income across various age groups reveals a consistent reduction in the gender gap owing to increased female participation in the labor market. Nonetheless, the disparity persists sig-

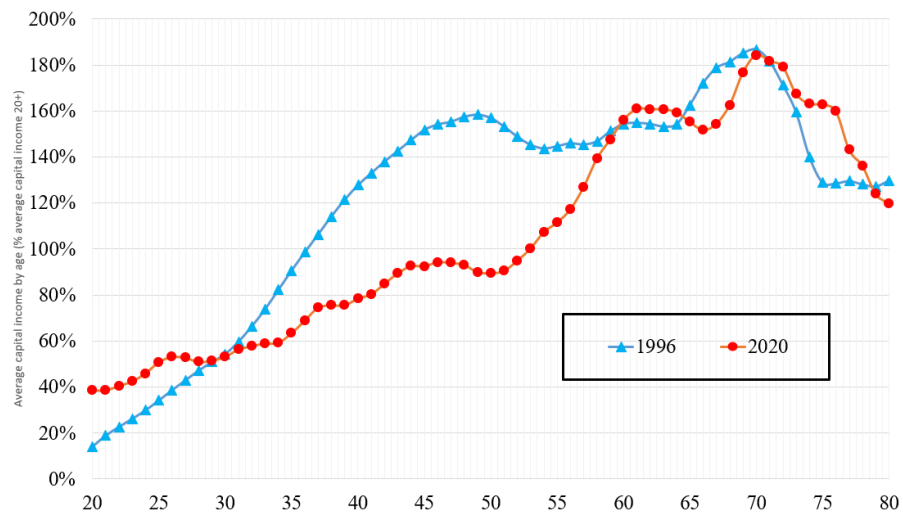


Figure 15: Age-labor income profile in Korea, 1996-2020



Notes: The unit is the individual unit. Y-axis represents average labor income by age cohort with respect to the adult average labor income. 140% means this age group earns 140% of average adult labor income. Labor income includes wage, pension, unemployment insurance, and 70% of mixed income.

Figure 16: Age-capital income profile in Korea, 1996-2020



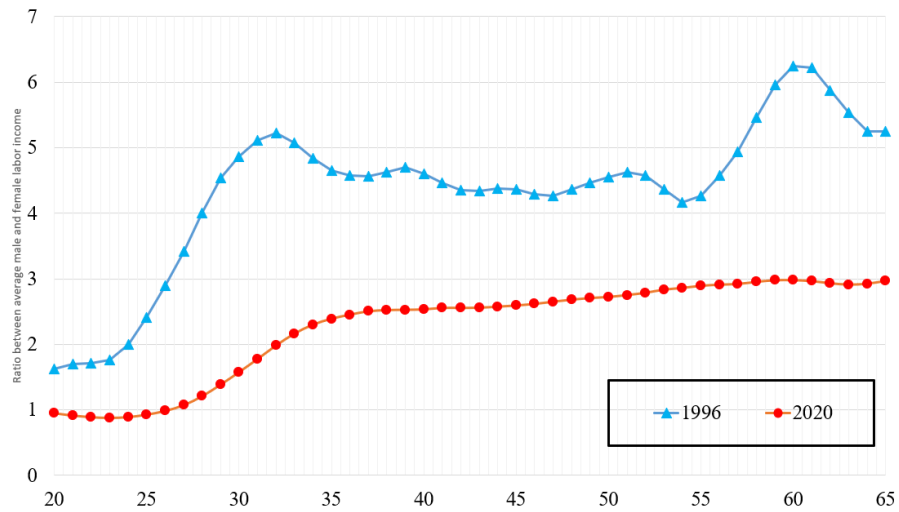
Notes: The unit is the individual unit. Y-axis represents average capital income by age cohort with respect to the adult average capital income. 140% means this age group earns 140% of average adult capital income. Capital income here includes 30% of mixed income.

nificantly. In 2020, men at the age of 35 earned labor income 2.5 times more than their female counterparts. This substantial gap, notably absent in younger age groups, can be attributed to the inadequacy of childcare support and parental leave policies in Korea. It is common for female workers to leave their jobs to provide full-time support to their children, particularly evident in Figure 20, depicting female labor market participation by age.

During the early twenties, the female labor market participation rate surpasses the average and peaks, only to witness a sharp decline around the age of 30, typically coinciding with marriage and the birth of the first child. This decline, occurring later in recent years due to delayed marriage and childbirth, highlights the impact of societal changes on women's career trajectories. The gender gap in labor income begins to stabilize in the late thirties, as stay-at-home moms seek re-entry into the labor market, preventing further widening of the gap. Figure 20 demonstrates an uptick in female labor market participation rates in their late thirties, driven by the necessity of supporting families on a single income. However, this re-entry into the labor market, as found by [Goldin and Mitchell \(2017\)](#) in the US, hampers opportunities for better job promotions compared to their male counterparts.

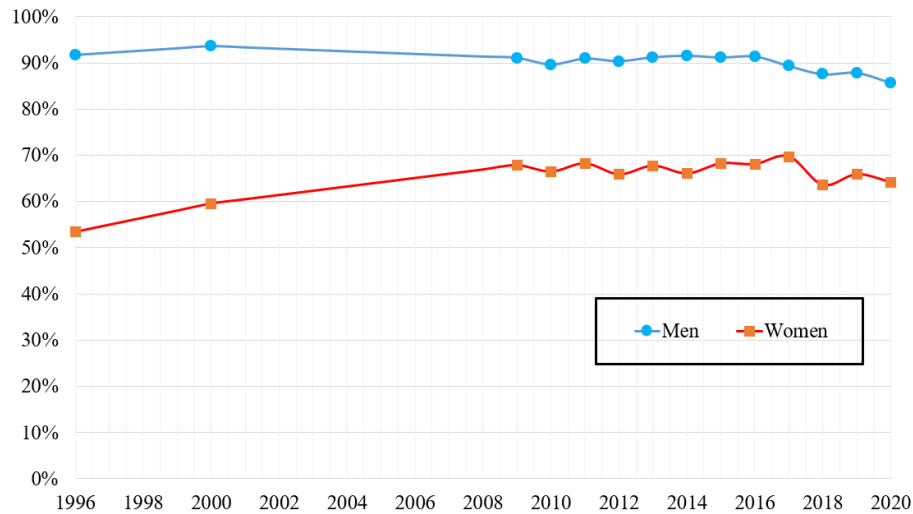
As individuals reach their late forties, the gender gap in labor income starts expanding again. Men, who remained in the workforce, begin to ascend to higher positions, resulting in a threefold income difference by the age of 55. Figure 19 reveals that around 20% of the top 10% labor income group comprises females, with less than 40% among the top 50% earners. Despite a two-decade increase in female labor market participation, there is still room for improvement. In contrast, France exhibits a higher female share of top income, with around 30% in the top 10% labor income and over 40% in the top 50%, according to [Garbinti et al. \(2018\)](#).

Figure 17: Gender gap in labor income in Korea, 1996-2020



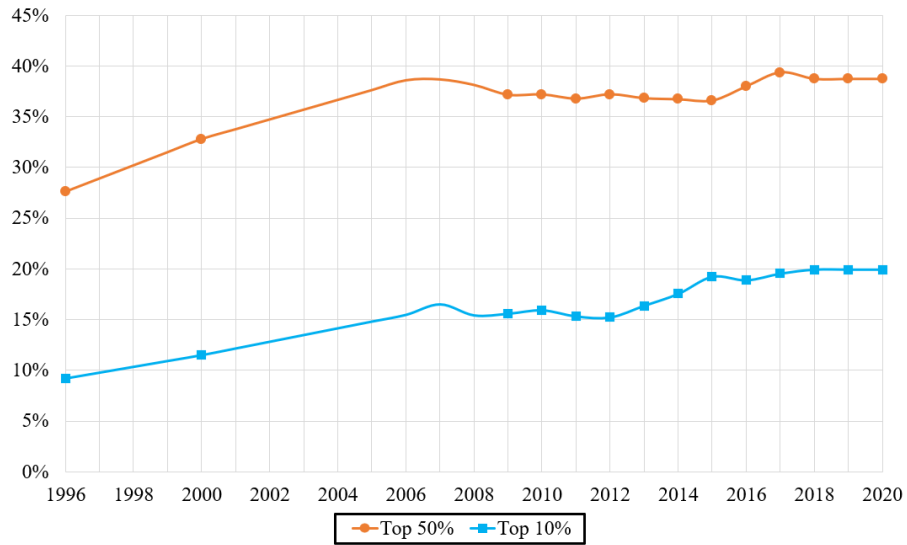
Notes: The ratio of average male labor income to female labor income by age. Labor income includes wage, pension, unemployment insurance, and 70% of mixed income.

Figure 18: Labor market participation rate by gender in Korea, 1996-2020



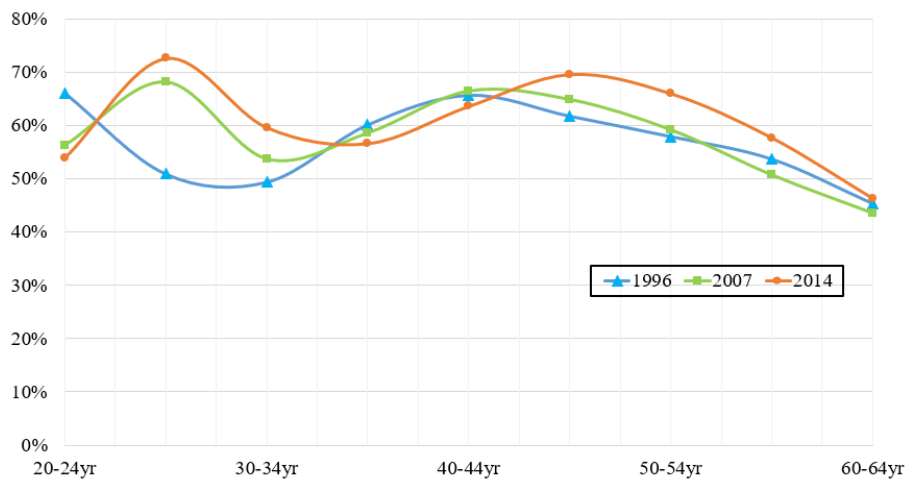
Notes: It is calculated by the fraction of men and women those who have labor income to total number of people among age 25 to 59. Labor income includes wage and 70% of mixed income. We linearly interpolated income shares for missing years. Female labor market participation rate increased consistently and from late 2000s, it stabilized.

Figure 19: Shares of women in top labor incomes in Korea, 1996-2020



Notes: The individual unit. Labor income includes wage, pension, unemployment insurance, and 70% of mixed income. We linearly interpolated income shares for missing years. The increase of female share is due to the rise of female labor market participation rate that we found in figure 18.

Figure 20: Female labor market participation rate by age in Korea, 1996-2014



Sources: Statistics Korea

## 4.5 International comparison: Korea and East Asia

In this last section, we finally present the comparative income inequality analysis in East Asia. Before we report the results, we would like to clarify the rationale behind the comparison between the Korea DINA series and the Taiwan & China DINA series.

First of all, the most prominent reason for comparing Korea and Taiwan is that both economies are similar in many ways, especially in terms of their economic backgrounds. Both countries are in East Asia with the experience of being colonized by Japan until the end of World War II and had gone through similar economic development pathways ever since. They are both densely populated countries without much natural resource. Even how they overcame these struggles is similar. As [P. W. Kuznets \(1988\)](#) pointed out, these two countries had shifted their main industry from agriculture to manufacturing within a very short period of time. Additionally, trade has been crucial to both economies and played a very important role in their respective economic take-off, since they both have only small-scale domestic markets and are hence export-oriented. Moreover, their initial economic development was very much interventionist and state-driven. And from a political economy point of view, they became democratized around the similar period of time as well <sup>35</sup> In addition, we also put China in this comparative analysis, because it will help us to obtain an overview of the trends in economic inequality of East Asia in general.<sup>36</sup>

The starting point of this comparative analysis is the evolution of the average national income in Korea, Taiwan, and China. As can be seen in [Figure 21](#), expressed in purchasing power parity terms, average national income among adults in Korea was less than 70% of that in Taiwan in 1982. Then, the gap between these two countries gradually shrank and as of 2020, Korean national income per adult is 76% of the Taiwanese level. It is interesting that even though both countries experienced similar economic growth at the same time,

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<sup>35</sup>Political ideologies have been greatly affecting economic inequalities throughout the history. Please see [Piketty \(2020\)](#) for detailed discussions with cross-continent examples.

<sup>36</sup>Nonetheless, please note that the comparative analysis between Korea and China is much more meaningful when Taiwan is included.

the gap has shrunk over the years. It means unlike the general perceptions, the Korean economy enjoyed relatively more growth during this period than Taiwan. Also, the remaining gap in recent years seems to be stemming from the gap in productivity between these two countries. For China, the story is quite different (Figure 22). During the 1980s, Korea initiated its economic development ahead of China, resulting in a swifter economic growth rate for Korea compared to China. However, by the 1990s, the situation stabilized as China underwent a significant surge in economic growth. Subsequently, in the early 2000s, the disparity in average national income between Korea and China narrowed further. This can be attributed to China's accelerated economic growth surpassing that of Korea, coupled with enhanced productivity on the Chinese side.

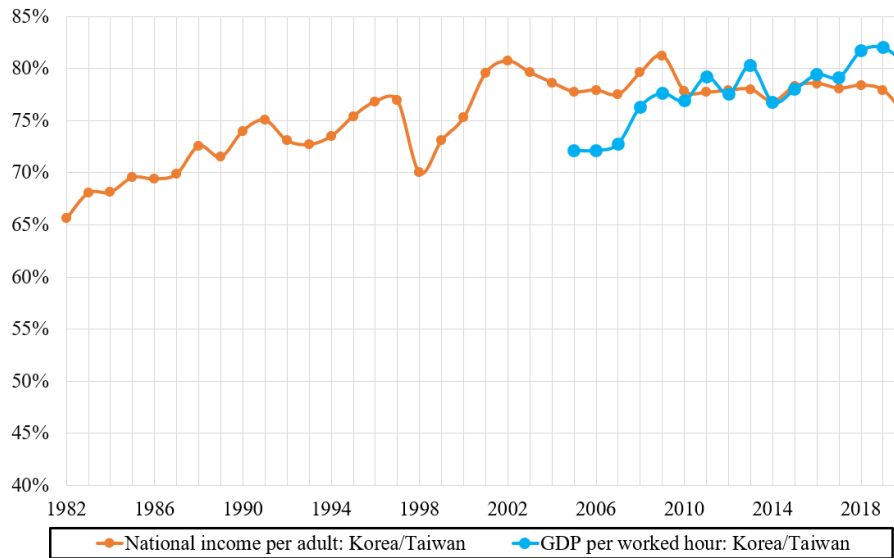
Next we present the long-term trend of income distribution in Korea, Taiwan, and China. A noteworthy finding is that, since the late 1990s, Korea has exhibited lower income shares for the top 10% and top 1% when compared to China and Taiwan, as depicted in Figures 23 and 24.<sup>37</sup> Contrary to the assumption that Korean inequality has improved during this period, the comparatively lower income shares in Korea are a result of worsening inequalities in the other two countries. In fact, the highest top 1% and 10% income shares were recorded in Korea in 1982, but since the mid-1990s, Korea's top income shares have consistently remained lower than those of China and Taiwan. This is attributed to the continuous increase in top income shares in China (and Taiwan), whereas Korea experienced a mitigation of income inequality in the early 1990s until the Asian financial crisis.

Another factor contributing to Korea's comparatively lower inequality levels than China and Taiwan today is the distinct evolution of bottom 50% income shares. Figure 25 illustrates the top 10% and bottom 50% income shares in Korea, China, and Taiwan from 1982

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<sup>37</sup>It's important to bear in mind that the comparison that has been conducted in this paper is based on the income inequality series which are constructed with relatively similar underlying micro data and similar timespan across countries. As such, the Taiwanese inequality series that is the most comparable to the Korean series is the one constructed with survey micro data, corrected at the top with fiscal tabulation and then matched to the macro national income aggregates. We did not use the inequality series from C. Chu et al. (2023) based on tax micro data (2001-2018), as it is much less comparable to the Korean series, although it shows a much higher level of income inequality in Taiwan than the survey-based series.

Figure 21: Average income and productivity: Korea vs Taiwan, 1982-2020

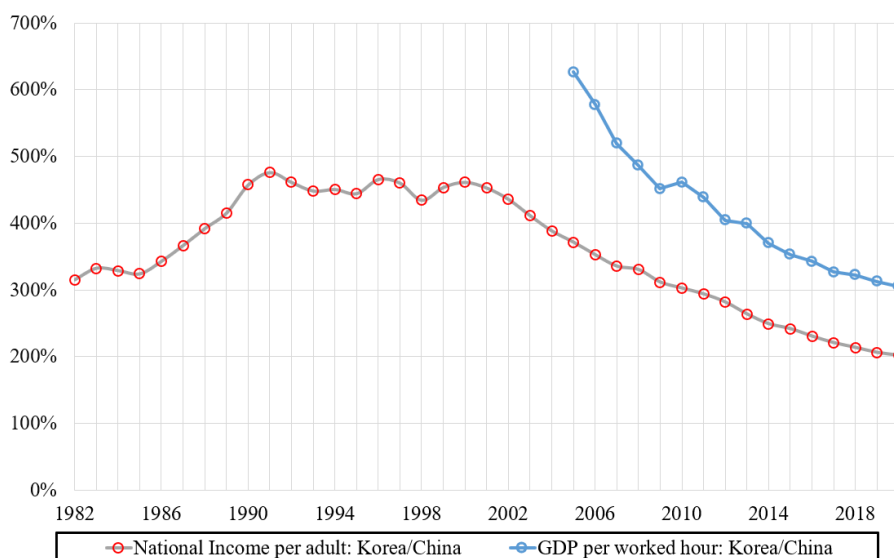


Notes: The ratio of Korea to Taiwan for GDP per worked hour (ILO) and per adult pretax national income; Taiwan from WID. Both series are in 2020 PPP EUR.

to 2020. Before the financial crisis, bottom 50% income share increased in Korea, while it declined in China and Taiwan. Despite a post-crisis decline in bottom 50% income share in Korea, the historical increase in the 1980s and early 1990s has kept it significantly higher than in the other two countries. Notably, the collapse of bottom 50% income in Taiwan explains why bottom 50% average income in Korea surpasses that in Taiwan, even though Korea’s average national income is 25% smaller than Taiwan’s national income per adult in 2020. In real terms, as can be seen in Figure 26, bottom 50% average income experienced substantial growth in Korea compared to Taiwan. By the mid-1980s, bottom 50% real average income in Korea had already surpassed that in Taiwan. Throughout the 1990s, bottom 50% income witnessed more substantial growth in Korea than in Taiwan. Notably, China did not observe any increase in bottom 50% real income before the early 2000s, resulting in a considerable gap in bottom 50% real income between Korea and China at present.

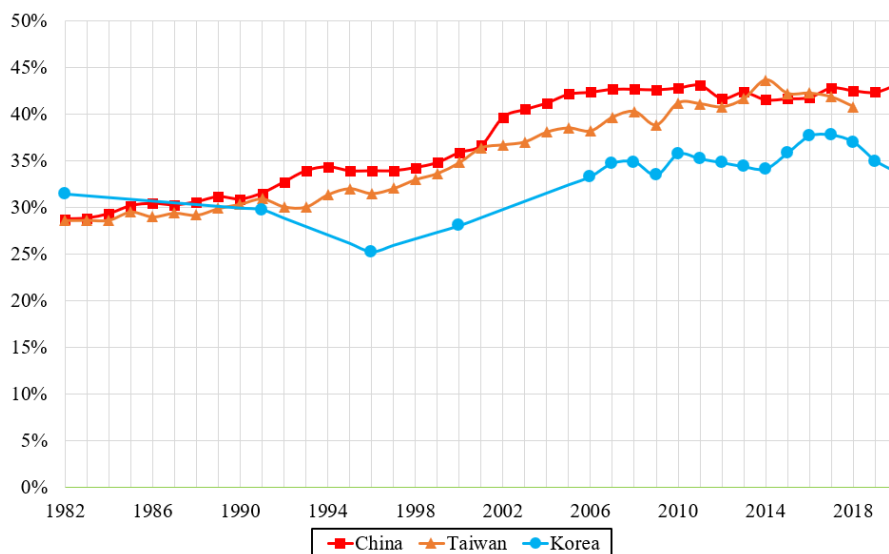
Let’s delve into the growth incidence curve to gain a comprehensive understanding of the growth patterns in Korea, Taiwan, and China during the specified period. A comparison with the United States and France, as documented by [Piketty et al. \(2018\)](#) and [Garbinti](#)

Figure 22: Average income and productivity: Korea vs China, 1982-2020



Notes: The ratio of Korea to China for GDP per worked hour (ILO) and per adult pretax national income; China from WID. Both series are in 2020 PPP USD.

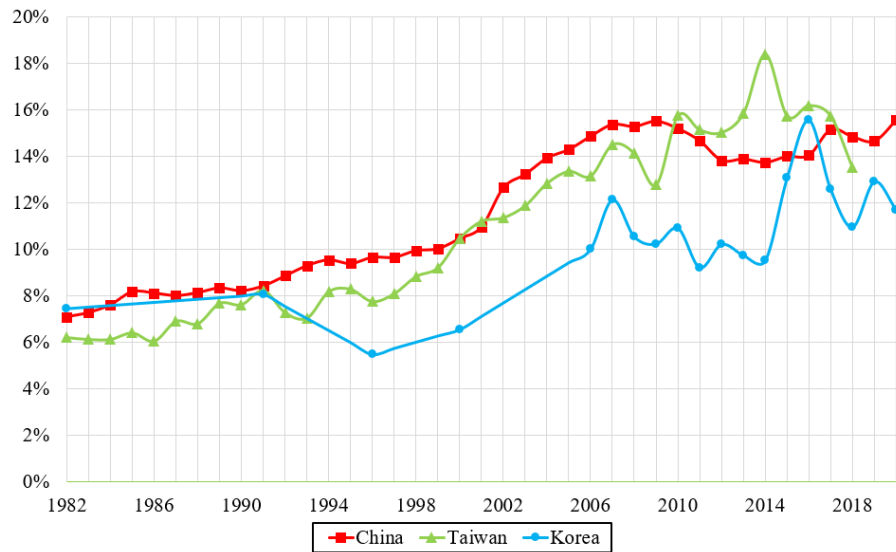
Figure 23: Top 10% income shares in East Asia, 1982-2020



Notes: The equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Taiwan series is revised one of C. Chu et al. (2023) and China series are from WID. We linearly interpolated income shares for missing years.

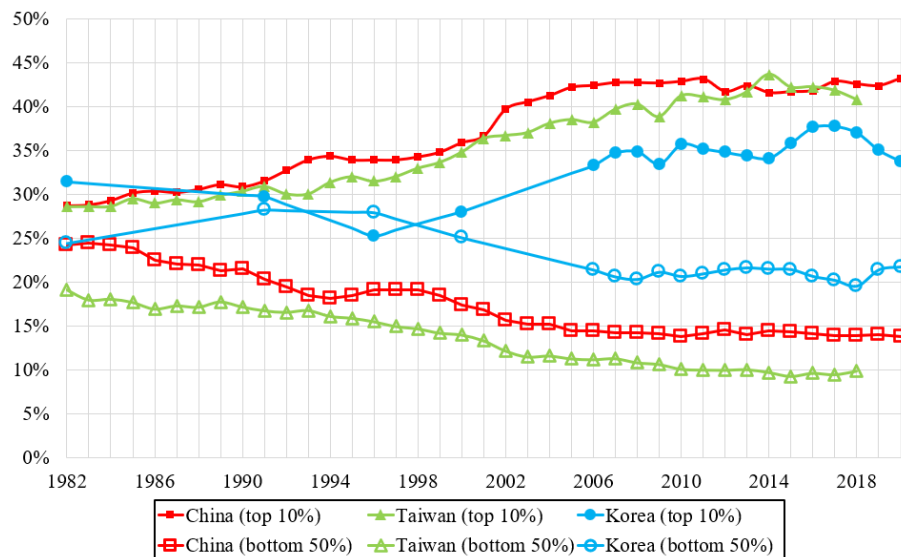


Figure 24: Top 1% income shares in East Asia, 1982-2020



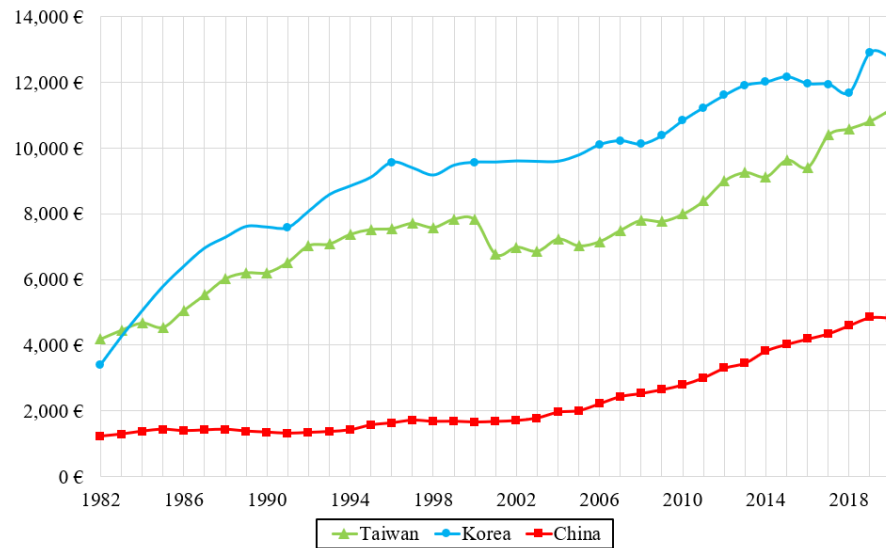
Notes: The equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Taiwan series is revised one of C. Chu et al. (2023) and China series are from WID. We linearly interpolated income shares for missing years.

Figure 25: Top 10% and bottom 50% income shares in East Asia, 1982-2020



Notes: The equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Taiwan and China series are from WID. We linearly interpolated income shares for missing years.

Figure 26: Bottom 50% real average income (2020 PPP €) in East Asia, 1982-2020



Notes: The equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Taiwan and China series are from WID. We linearly interpolated income shares for missing years.

et al. (2018), reveals that Korea’s annual growth pattern aligns more closely with France (termed the ‘French type’) than with the United States (‘US type’). Conversely, China and Taiwan exhibit trends more akin to the US type. While Taiwan’s economic growth appears relatively evenly distributed (C. Chu et al., 2023), it falls short of the equality observed in Korea within the context of East Asia, leading to disparities in bottom 50% income growth between these two nations. In Korea, income growth for the bottom 99% has been remarkably even, unlike in China and Taiwan. However, it is essential to note that over the past four decades, the benefits of economic growth have disproportionately favored the highest income groups in Korea, resulting in an increasing concentration of top income distribution in recent years.

The divergence in economic growth distribution among these neighboring countries, all experiencing substantial economic growth in East Asia, can be attributed to distinct policy approaches. In the late 1980s to early 1990s, Korea implemented various policies aimed at augmenting bottom 50% income and reducing top income shares, including initiatives such as public pension, minimum wage adjustments, unemployment insurance, and intensified financial income taxation. In contrast, China and Taiwan lacked similar policies,

with Taiwan having only a modest minimum wage policy. Consequently, this absence of policies contributed to a decline in bottom 50% income shares, and privatization processes during the 1980s and 1990s perpetuated this reduction in bottom 50% income share.

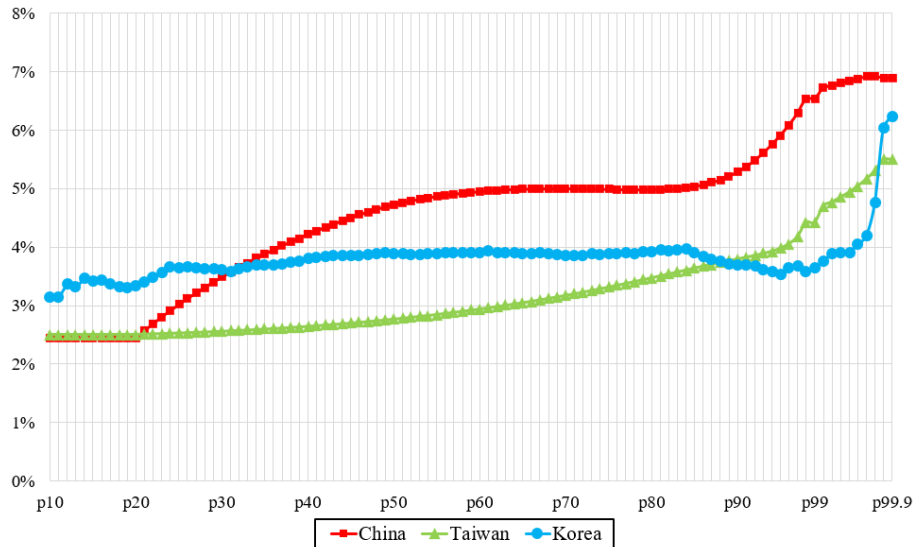
Exploring the discrepancy in pre-tax national income concentration at the top distribution between Taiwan and Korea, despite their similar economic backgrounds, requires an examination of fiscal income inequality. Notably, there exists a substantial gap in the top 1% fiscal income shares between the two countries. Figure 28 illustrates the top 1% fiscal income share in Korea and Taiwan from 1982 to 2018. While fiscal income inequality was higher in Korea than Taiwan in the 1980s, this trend reversed in the late 1990s, mirroring findings in DINA estimates. A major factor contributing to this shift is the difference in tax rates for top incomes. In Korea, prior to 1989, all financial income was subject to withholding taxation at a low flat tax rate of 15-20%. In contrast, Taiwan maintained a top marginal tax rate of 40% from the 1980s until 2015 (C. C. Chu et al., 2015). This lower top marginal tax rate in Korea allowed for a concentration of more capital income in the top distribution than in Taiwan. Subsequently, Korea increased its tax rate to 40% in 1989 and 60% in 1991, surpassing Taiwan by 20%. This lower top marginal tax rate in this period enabled Taiwan to experience higher concentration of capital income in the top distribution (Alvaredo et al., 2013; Piketty et al., 2014), creating a gap in fiscal income inequality since the 1990s.

Figure 29 further illustrates the distribution of capital income in Korea and Taiwan from 1996 to 2017, highlighting the greater concentration of capital income in Taiwan's top distribution compared to Korea. This inequality in capital income contributes to an unequal redistribution of retained earnings in DINA estimates, amplifying the gap in pre-tax national income inequality between Korea and Taiwan. However, it is crucial to note that this inequality gap has diminished in recent years across all capital income, fiscal income, and pre-tax national income distributions, coinciding with a reduction in the tax rate gap between the two countries after 1996.<sup>38</sup> Despite the evolving top income shares, Korea

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<sup>38</sup>After 1996, financial income has been taxed with 14% in the withholding taxation or around 35% in the

Figure 27: Annual real income growth in East Asia, 1982-2020



*Notes:* The total accumulated real pretax national income growth by percentiles. The equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Taiwan and China series are from WID (C. Chu et al., 2023; Piketty et al., 2019).

remains less unequal than Taiwan today, owing to the legacy of equality established in the 1990s. In summary, the unequal distribution of tax-exempted capital income, resulting from a high concentration of capital income at the top distribution, renders Taiwan more unequal than Korea. Recent increases in inequality in Korea have contributed to narrowing the gap in DINA estimates between the two nations.

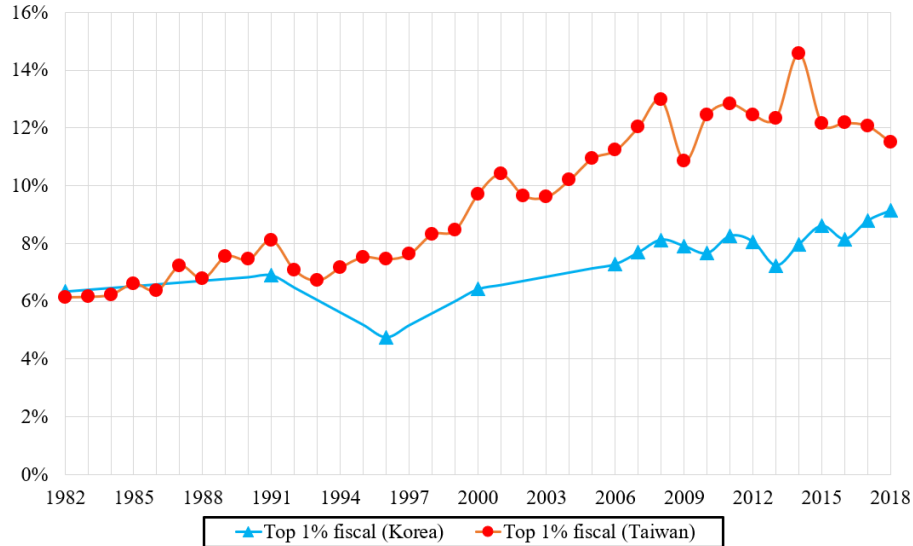
## 5 Conclusion

This paper presents a comprehensive analysis of the entire distribution of pretax national income in Korea spanning the years 1933 to 2020, making a substantial contribution to the understanding of income inequality in the country. Our examination extends beyond the overall adult population to encompass insights into gender, age, and income composition, providing a level of depth not found in previous literature. Despite this valuable contribution, it is essential to acknowledge the incompleteness of our long-run DINA se-

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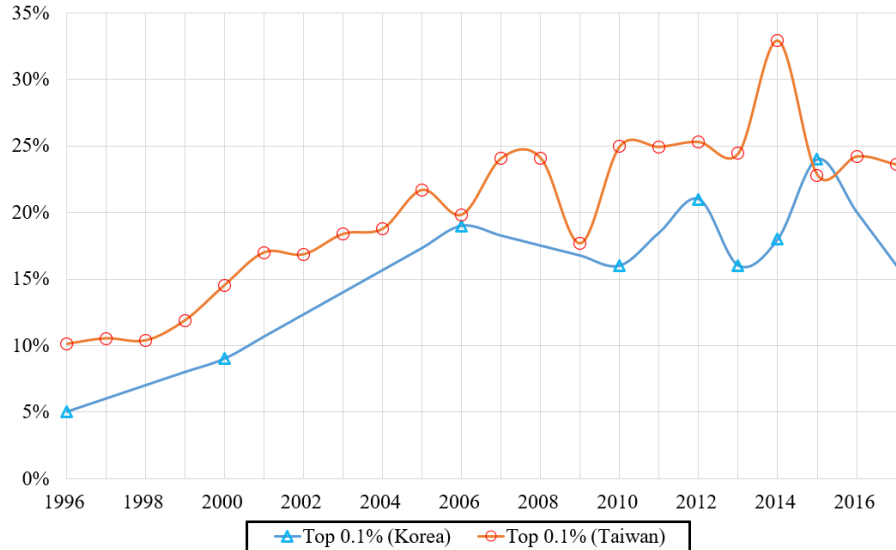
global taxation system in Korea. Either way, financial income has now been taxed at a lower rate in Korea than in Taiwan, which enabled Korea to have higher concentration of capital income at the top distribution.

Figure 28: Fiscal income inequality in Korea and Taiwan, 1982-2018



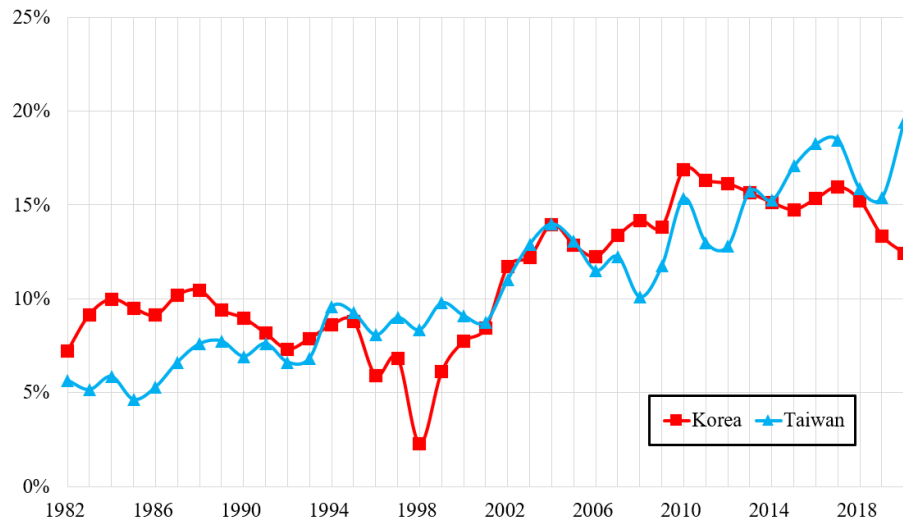
Notes: The fiscal income series is from the corrected survey data based on Blanchet, Flores, and Morgan (2022). The equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). We linearly interpolated income shares for missing years. Taiwan series is from WID (C. Chu et al., 2023).

Figure 29: Distribution of capital income in Korea and Taiwan, 1996-2017



Notes: We rank individuals by their pre-tax income and estimate how much each income group owns property income out of total property income in the country just as C. Chu et al. (2023) did. Please note that both series are based on the survey micro data. For Taiwanese series, please see C. Chu et al. (2023).

Figure 30: Retained earnings in Korea and Taiwan (% in NI), 1982-2020



Notes: The real retained earning comes from the private part of net primary income of corporation in National Accounts. It is expressed in billion 2015 KRW and the percentage of national income. Source: Bank of Korea. Taiwan series is from WID (C. Chu et al., 2023).

ries due to data limitations. Future improvements and refinements are necessary, relying on better data sources.

By offering a consistent and thorough comparative analysis among East Asian countries, this paper potentially paves the way for further research on inequality in the region. To the best of our knowledge, this is the inaugural study to conduct a comparative analysis of the long-term trend of entire national income inequality in East Asia in a systematic manner. Notably, even as Korea and Taiwan implemented similar economic development policies during rapid economic growth, the trends in pretax national income inequality diverged significantly. While our presentation of the long-run trend sheds light on the underlying reasons for this contrast, it is crucial to recognize that this comparative analysis is not exhaustive and should not be treated as definitive. A more comprehensive understanding requires rigorous policy treatment analysis and exploration of the political dimensions influencing inequality, potentially uncovering additional channels contributing to divergent trends.

It is important to note that this paper focuses on three East Asian countries and excludes

others, such as Japan, due to the unavailability of DINA series for those countries at present. As DINA series for additional East Asian countries become accessible for analysis in the future, it promises to offer a more complete and nuanced perspective, providing a comprehensive explanation for the diverse inequality trajectories in East Asia over the past four decades.

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# Appendix A: Data Issue

## Household survey micro data

### Year 1982

First of all, Statistics Korea does not provide HIES micro data for this year, but tabulation data are available. In fact, 1982 is the first year that contains income decile information in a tabulation. However, it does not give us any detailed information of income sources and individual characteristics, which means we cannot do labor and capital income analysis, gender, and age inequality analysis for 1982. Indeed, my capital and labor income analysis starts in 1991 and the other in-depth analyses start in 1996.

Then, 1982 HIES tabulation data does not cover several types of households. The type of households are not included in the sample in 1982 HIES are following:

- The farm and fishery household (26.6% of full population).
- single-member household (4.9% of full population).
- household whose head are non-wage earners. For example, if a household head is a business owner, it is excluded in the sample (32% of full population).

In this case, we use the income distribution of specific household from other years and merge the distributions to recover the distribution of full population, using generalized Pareto interpolation, without any parametric assumption (Piketty et al., 2019; Blanchet, Fournier, & Piketty, 2022). First, with generalized Pareto interpolation technique, we estimate income distribution using 1982 HIES tabulation data, along with the income distribution of each missing household from 1991.<sup>39</sup> Then, again using generalized Pareto interpolation, we merge the income distribution of HIES, the other 2 distribution from 1991 and farm and fishery household income distribution from 1996, assuming that income distribution of these population for these years changed as the main household type

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<sup>39</sup>We assume that the income distribution of the missing households changed during this period as same as the main household type. Farm and Fishery household distribution comes from 1996.

did in those years.

After we combine all of raw survey data, we tried to correct the top income distribution in the survey. Since it is only tabulation data, we cannot correct this survey with fiscal data, using BFM correction (Blanchet, Flores, & Morgan, 2022).<sup>40</sup> For this matter, we simply replace the top distribution of survey data with that of fiscal data available in 1982. This is not very uncommon (Blanchet, Flores, & Morgan, 2022) and in fact, China DINA is constructed using this replacement method to correct their top income distribution in survey. Unlike the Chinese case (top 0.5%), Korean tax tabulation data covers top 9% of population.<sup>41</sup>

For 1982 DINA series, when we adjust fiscal income to pretax national income, we allocate the tax-exempted income proportional to the distribution of property income in 1996 survey, assuming that the distribution of property income has not changed between 1982 and 1996. Although it is not perfect, this is the best approach possible, considering the data availability. Furthermore, given that tax-exempted income aggregates were very small in 1982, it should not cause a severe bias.

### **Year 1991 and year 2000**

Unlike 1982 HIES, 1991 HES does not have any problem regarding the coverage of household. However, we do not have an access to 1991 HES micro data. Hence, we have to follow the same procedure of survey correction and tax-exempted income redistribution as we did for 1982. Only big difference is Korean public pension started in 1988, so 1991 HES has this information on the tabulation data.

For the year 2000, we do not have reliable survey weights in the HES micro data. Hence, we decide to use HES tabulation data and follow the same procedure we did for 1991.

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<sup>40</sup>We chose the merging point, using their formula.

<sup>41</sup>Also, for the year 1982, 1991, and 2000, like China DINA, our household survey is based on equal-split unit, whereas the tax data is based on the individual adult. As Piketty et al. (2019) explained, our estimate might overestimate the inequality level compared to equal-split unit. With the better accessible data in the future, we hope we can produce the equal-split unit and individual unit separately for 1982, 1991, and 2000.

## Year 2017-2020

The last issue with HIES is that in the recent years (2017-2020), Statistics Korea does not provide the yearly HIES micro data, but only quarterly data. It can be solved simply by combining the 4 quarter datasets to one yearly data while adjusting its individual weights, following the methodology from [Friedman et al. \(2002\)](#).<sup>42</sup>

## Tax tabulation data

Since the taxpayers of global income taxation are often counted in the withhold income tax data because of their wage, these overlapped taxpayers must be removed in order to combine the two data. To remove this part overlapped, we need to do two tasks in advance. First, the definition of wage of the two data must be matched. The wage in the global income tax data is not total wage, but taxable wage, that is the result of subtracting the tax deduction from gross wage. So we need to turn this wage into the gross wage, estimating the ratio between taxable wage and gross wage from withholding tax data. Then, to remove the overlapped part and to add up two income tax data, we also have to make different income brackets of these two dataset matched. To do this second task, we have to split the brackets of one tax data with new thresholds set by using the other tax data. So, we use the Pareto interpolation method, following [N. Kim and Kim \(2015\)](#). After these two tasks, we can combine these two datasets and obtain fiscal income by income sources and by brackets of total income. Please see [Moriguchi and Saez \(2008\)](#), [N. Kim and Kim \(2015\)](#), and [N.-N. Kim \(2018\)](#) for the detailed description of this methodology.

It is important to note that income of daily workers, some pensions or other incomes are missing in this combined tax data. However, these missing incomes are mainly located in the middle and lower brackets, which does not affect top income distribution. Therefore, it should not matter much, given that this fiscal data are used to correct the representativeness of top income distribution in household surveys.

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<sup>42</sup>In practice, Statistics Korea shuffles the household ID, so we match the quarterly datasets, using individual characteristics. We could match 99.34% of samples. We dropped the 0.66% of samples. We ran a t-test between the original dataset and new dataset to check if it is okay to drop these variables. In 2017 data, for example, the mean values of two datasets are not statistically different at 5% level.

Additionally, before 2004, income tax data are not based on total income, but on a taxable income without tax exemptions and income deductions. To convert this data to the total income basis, it is necessary to rely on the assumption that the ratio of the total income to tax base by income bracket would not be different from the adjacent year. This rate may change due to changes in the taxation system such as the expansion of income deduction, but again this minor bias should be okay for DINA estimates, because the gap between the tax base and total income decreases as income brackets goes onto top income group.

Lastly, global taxation started in 1975 and its taxation data are available every year, whereas withholding taxation data are available only from 1979 to 1985 and again since 1995. In Korea DINA series, for the year 1991 we only could use global taxation data. Despite missing withholding taxation data, it really should not be a big issue because global taxation data covers top income earners,<sup>43</sup> and we use tax data to correct top income distribution of household survey data.

## Appendix B: Methodological Issues

There are still potential biases with survey data that cannot correct fully with fiscal data, using the BFM correction. [Blanchet, Flores, and Morgan \(2022\)](#) in fact kindly put the limitation of this correction method that you might face in practice. The most critical part is we cannot correct the potential non-representativeness of bottom incomes from the survey micro data. As previously mentioned, we combine tax data and survey data because tax data do not cover the bottom income distribution.<sup>44</sup> Therefore, using the tax data, it is difficult to correct the representativeness of bottom income.

Another issue is there exists the tax-exempted income, tax avoidance/evasion, so that we cannot capture the tax-exempted income or income that is missing in fiscal data, due to

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<sup>43</sup>The 1991 tax data cover top 2%, which is a lot smaller than the normal coverage (top 40%). Yet, it is not uncommon to have tax data that cover less than top 2% ([Blanchet, Flores, & Morgan, 2022](#)) and still what matters is we can correct the very top 2% income distribution from the survey.

<sup>44</sup>Normally, middle income are assumed to be well-represent by the survey.

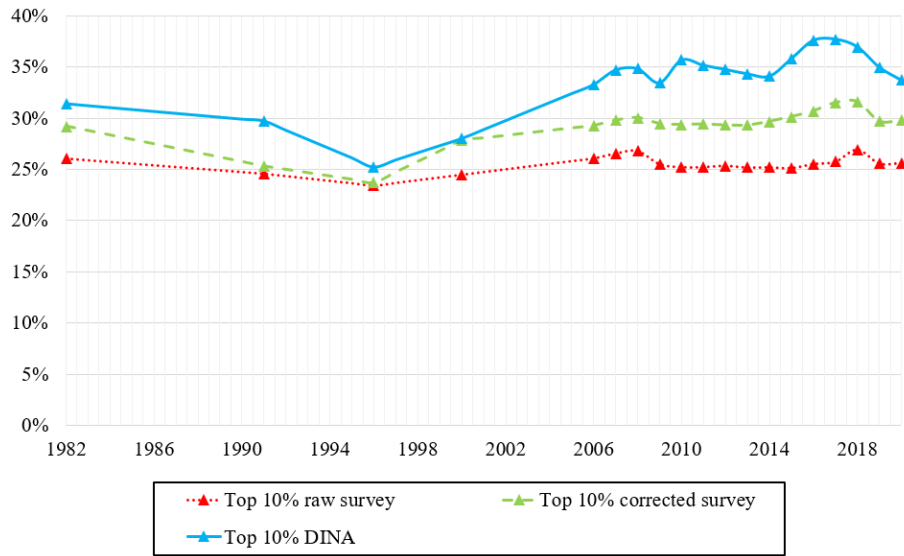
the tax evasion. This problem is not able to be fixed using BFM correction unfortunately. It means we do not know the real distribution of these incomes, so that we have to use assumption. However, these problems exist in all other DINA series ([Khalid & Yang, 2021](#)) and we need better-quality data and methodologies to solve this issue.

## **Appendix C: Survey Data Correction Results**

In this section, we present the top 10% income shares of raw survey, corrected survey with tax data and WID series, respectively. Additionally, we compare these correction results with the old WID fiscal income series. This WID series is based on [N.-N. Kim \(2018\)](#). The oldest year that both data are available is 1996. Please note that since the tax unit is individual in Korea, here we use the DINA series with the individual unit, not equal-split unit. [Figure 31](#) presents the result of every stage of DINA equal-split unit estimate. [Figure 32](#) shows how much BFM correction makes the survey top 1% income share similar to WID fiscal income series.

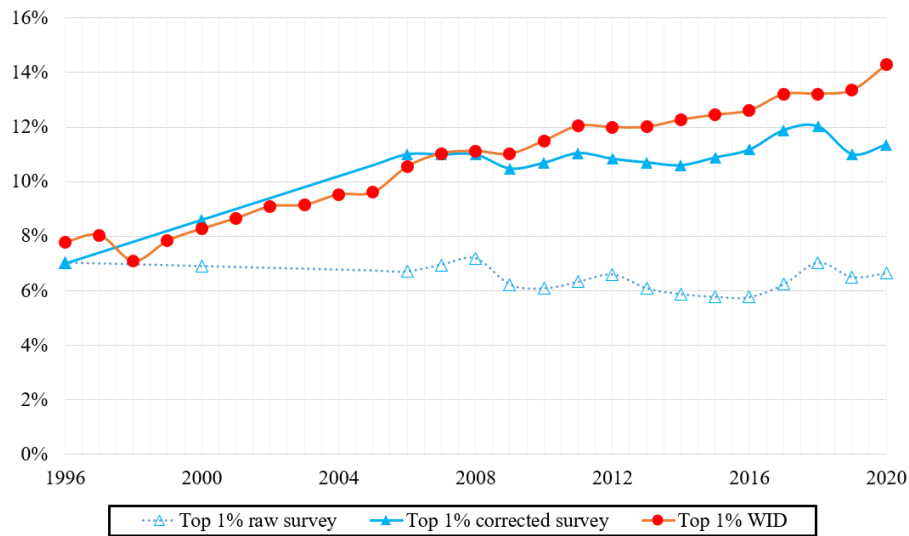


Figure 31: Correction: raw survey vs corrected survey vs DINA, 1982-2020



Notes: The series is based on the equal-split unit (aged 20-year-old and over; income of household is split equally into all adults in household). Survey data are corrected by the tax data using BFM correction except for 1982, 1991, and 2000. For 1982, 1991, and 2000, we replace the top income distribution of survey with that of tax data. We linearly interpolated income shares for missing years.

Figure 32: Top 1% survey corrected income: vs WID series



Notes: The individual unit. We linearly interpolated income shares for missing years.