TOP INCOMES IN KOREA, 1933-2010:
EVIDENCE FROM INCOME TAX STATISTICS

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Abstract

This paper constructs the long-term series of top income shares in Korea using income tax statistics. Top income shares dropped sharply after WWII, remained low during industrialization periods, and has ascended since the mid-1990s. We suggest that the fall in the top income shares after WWII can be explained by the economic collapse and political disruption after liberation. The rising income concentration in the last 15 years could be attributable to the drastic shift in industrial structure and the institutional factors such as the reduction in the marginal tax rate and the post-crisis changes in the corporate governance system.

Keywords: top income shares, income tax statistics, inequality, Korea
JEL Classification Codes: N10, O15

I. Introduction

The indices of income inequality such as Gini coefficients and poverty rates are constructed based on the Household Income and Expenditure Survey by the Korea Statistical Office.[1] Although the household survey is a suitable source to compute the indices of income inequality, it does not allow us to study the long-run trend in income inequality. The raw data

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  [1] To be exact, income inequality indices such as Gini Coefficients and income decile distributions are currently computed based on the Household Income and Expenditure Survey by the Korea Statistical Office and the Farm Household Economy Survey by the Ministry of Agriculture and Forestry.

of the household survey are available only since 1990 and do not cover single-person households prior to 2006.[2] Moreover, they provide household income data only for wage and salaried workers in the earlier years by excluding self-employed and family workers in the survey. In addition, Kim and Kim (2013) found that the household survey leaves out a considerable number of top income households in the sample and also severely understates household financial income. Due to the problem of under-coverage and under-reporting, the existing indices of income inequality do not allow us to study the evolution in income inequality in Korea because the homogeneous data are available only for a small number of recent years and even the available data may not adequately reflect the actual situation of income inequality.

Instead of using the indices based on the household survey, this paper constructs the long-term series of top income shares in order to study the evolution of income concentration in Korea. We estimate income shares for the top income groups, such as the top 1% of the income distribution, by using income tax statistics. Although the top income shares do not provide information about the income distribution of lower income groups, they allow us to construct a homogeneous long-term indicator of income concentration. They also enable us to study the evolution of income concentration in Korea in a comparative perspective as the top income shares have been constructed for many countries such as France (Piketty, 2003), the U.S. (Piketty and Saez, 2003), the U.K. (Atkinson, 2005), and Japan (Moriguchi and Saez, 2008).[3]

Income tax statistics in Korea go back to the colonial period. The global income tax system which taxes the aggregate income from various income sources of a taxpayer was introduced in 1934 for the first time in Korea.[4] Since then, there have been three major changes in tax system in addition to numerous minor revisions. Thus, available information from income tax statistics varies over time. Notwithstanding missing periods due to limited information from the data source, this paper investigates the long-term trend in income inequality in Korea from 1933 to 2010.

During this period, Korea underwent several different regimes. Korea was under Japanese colonial rule from 1910 to 1945 and experienced a wartime control system after 1937. After liberation in 1945, the Korean Peninsula was divided into two nations, the South and the North. Subsequently, the Korean War broke out in 1950 lasting for three years. After the war, South Korea achieved long and rapid economic growth although its growth rate subsided after the economic crisis in 1997. This paper will provide a starting point to discuss how income inequality has evolved under these different regimes.

The paper is organized as follows. Section II describes the data and outlines the estimation methods. Section III presents the findings from the construction of top income shares. Section IV explores the plausible causes for the changes in income concentration and section V provides the conclusion.

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[2] The Gini coefficients, decile income distributions, and poverty rates since 1990 are reported on the website (http://kostat.go.kr) of the Korea Statistical Office.

[3] Top income shares series of various countries can be obtained from Alvaredo, Atkinson, Piketty and Saez, the World Top Income Database (http://topincomes.g-mond.parisschoolofeconomics.eu). Top income shares series seem to become an alternative measure of income inequality as they are accumulated. The OECD report on income inequality paid attention to top income shares along with traditional indices of income inequality (OECD, 2011).

[4] The terminology of global income tax came from the English translation of *Chonghap Soduk Sae* in the Statistical Yearbook of National Tax published by the National Tax Service of Korea.

II.   *Data and Methodology*[5]

In this section, we will briefly introduce the nature of data and the methods of estimation and provide a detailed description as well as a complete set of results in Appendix.

Top income shares are computed by dividing the amount of income accruing to the specified top income groups by total income. We define income as a gross income earned by individuals before tax deductions and exemptions. It includes all types of income such as salaries, wages, bonuses, interest, dividends, rents, and business income including self-employment income. However, earnings from capital gains are not included in income.

We utilize information on the self-assessed income in the tabulation of the global income tax. Self-assessed income filed for global income tax returns includes various types of personal income, such as interest, dividends, and rents, as well as wage and business income. The global income tax system was first introduced in 1934 by the colonial government. The data on the number of taxpayers, the amount of income, tax paid, and tax rate by income brackets for the colonial period can be obtained from *Chōsen Zeimu Tōkeisho* [Statistical Tables of Public Revenue of Colonial Korea] and *Chōsen Sōtokufu Tōkei Nenpō* [Statistical Yearbook of the Government of Colonial Korea]. After liberation in 1945, the global income tax system was abolished. Instead, separate taxes were imposed at source on labor income, business income, rental income from real estate, and interest and dividends until 1975, when the global income tax system was reintroduced. Thus, the data on the total income earned by taxpayers are not available for this period of the separate tax system, although statistics on the amount of tax paid for each source of income are reported. The data after 1957 can be obtained from *Kuksae Tonggae Yonbo* [Statistical Yearbook of National Tax]. Unfortunately, our data source does not provide separate statistics on the tax withheld at source such as wage income for the period of 1976-1994. However, the data on wage income tax for 1979-85 can be obtained from an internal source of the National Tax Service.

Table 1 displays the major changes in the tax system since the colonial periods. During the period of 1933-1953, household's total amount of income (class III income following the terminology at that time, which is close to the current definition of global income) was taxed if a household, the tax unit at that time, earns more than the exemption point. For the period of 1954-1975, earnings from different sources were taxed separately because Korea did not adopt the global income tax system. Therefore, it is not possible to construct top income shares for this period because the tabulation of income tax does not allow us to extract data on the total amount of income of taxpayers. The global income tax system was reintroduced in 1975. However, a fraction of the top income groups are exempt from filing global income tax returns. Taxpayers with wage income which includes wages, salaries and bonuses do not have to file global income tax returns if the amount of income from sources other than wage income does not exceed a certain level. Thus, income accruing to this group of top income earners is not counted in the tables of global income tax returns. Therefore, we have to combine the tabulations of global income tax and wage income tax to make up for these missing top wage earners.[6]   We also need to take into account other types of income taxes withheld at source.

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[5] The detail description on data and methodology can be downloaded at the website of the Hitotsubashi Journal of Economics (http://hdl.handle.net/10086/27197).

However, these types of income do not affect our estimate of top income shares as much. Our data source allows us to estimate top income shares including other income items in addition to the wage income since 2009. However, we found that it does not make any significant difference. It is due to the fact that the income levels of taxpayers who have income tax withheld at source for these items are not high enough to be included in the top income groups.

TABLE 1.   EVOLUTION OF INCOME TAX SYSTEM IN KOREA, 1933-PRESENT

	1993-1953	1954-1975	1976-1995	1996-present
Global income taxation	Class III income tax (1933-1942)		Global income(1976-present)	
Separate income taxation	Class II income tax (interest)	Interest		(Financial income included in global income)
		Dibidends		
		Business income and rents		
		Wage income(1957-1974, 1979-1985, 1995-present)		
		Others		
Tax unit	Household	Individual		

Source: Authors' tabulation based on the Income Tax Law of Korea obtained from the website of the Ministry of Government Legislation (Available from URL: http://www.law.go.kr).
Notes: 1) Periods specified in the parentheses are those during which the tax statistics are available.
     2) Income tax statistics used in this paper are shaded.

Top income groups are defined relative to the total number of adults, defined as 20 years old and above, which can be computed from population statistics. Other candidates for the control total for the population could be the total number of taxpayers or total employment. Due to the tax exemption and withholding tax system, only a small fraction of individuals file income tax returns. Therefore, the total number of taxpayers is not a consistent control total for time-series and cross-section comparison because its scope varies among different tax systems. Total employment is too narrow as it excludes individuals relying on non-labor sources. Although the adult population, our control total, includes the economically inactive population, it provides a relatively proper reference for comparison over time and across countries.[7] We obtain the total number of adults from population statistics published by the Korea Statistical Office. For the period before 1945, we interpolate the data for missing years by using the rate of change between the population census in 1930, 1935, 1940 and 1944. The number of adults is presented in Table A1 in Appendix.

We cannot compute the control total for income from income tax statistics because the income tax statistics do not count the taxpayers who do not file income tax returns. Thus, we rely on National Accounts. We obtain the total amount of income after subtracting those items which do not belong to personal earnings from the income of households in the table of income account by institutional sectors. For the colonial period, we use the data constructed by Kim ed.

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[6] For the detail method, see Appendix A.3.3.
[7] Our definition is the same as that of Moriguchi and Saez (2008) who constructed the top income shares series for Japan.

(2012). Due to the fact that the income account by institutional sectors was not constructed in this study, we compute household income by subtracting imputed rents from the sum of compensation to employees and operating surplus. Our control total for income is presented in Table A1 in Appendix.

We estimate the top income shares by using the number of taxpayers and the amount of income by income brackets obtained from income tax statistics. To estimate the income shares of the top fractiles such as top 10%, 1%, 0.1%, and 0.01%, we use the same Pareto interpolation method as Piketty and Saez (2001: 39). The Pareto distribution has a cumulative distribution function specified as $F(y)=1-(k/y)^a$ in which k and a are constants and a is called the Pareto coefficient. The distribution has a property that the average income of taxpayers with income level above a threshold income, y, is proportional to y by the factor of b and $b=a/(a-1)$.

Table 2 shows the raw data from income tax statistics in 2010 which provide the number of taxpayers and their income by income brackets. Table 2 also presents the control totals for population and income as well as the cumulative rates for each income bracket. In 2010, the taxpayers earning more than 117 million won account for 0.66% of adult population and their income takes 9.73% of total personal income. Taxpayers earning more than 96 million won account for 1.21% of adults and their income accounts for 13.21% of total personal income. From this, we know that the top 1% income share in 2010 is in between 9.73% and 13.21%. By using the property of Pareto distribution as mentioned above, we can compute b and a for each income bracket from Table 2. To compute the top 1% income share, we use the Pareto coefficient for the income bracket with a cumulative rate of the population closest to 1%, which is 2.16 in Table 2. Once we get the Pareto coefficient, we can compute the threshold income for the top 1% by using the cumulative distribution function specified above. The average income for the top 1% income earners can be computed by multiplying the threshold income by b. The income shares for upper and lower income fractiles can be computed similarly by using the Pareto interpolation. According to Table 2, the estimated Pareto coefficient a decreases as

TABLE 2.   INCOME TAX STATISTICS, CONTROL TOTAL, AND PARETO COEFFICIENTS IN 2010

income branckets		taxpayers	reported income	average income	control total for population/income		cummulative rate (%)		Pareto coefficient	
lower limit	upper limit	thou.persons	tril.won	mil.won	thou.persons	tril.won	population	income	b	a
mil.won		A	B	B/A	C	D	Σ A/C	Σ B/D		
	21	5,060	56	11			31.47	67.23		
21	33	2,373	61	26			18.48	58.47	2.46	1.68
33	54	2,640	110	42			12.38	48.89	1.99	2.01
54	75	1,222	77	63			5.60	31.70	1.70	2.42
75	96	490	41	84			2.47	19.67	1.74	2.36
96	117	212	22	105			1.21	13.21	1.86	2.16
117	222	195	29	149			0.66	9.73	2.05	1.95
222	325	32	8	263			0.16	5.18	2.36	1.73
325	536	18	7	405			0.08	3.85	2.44	1.69
536		13	17	1,324			0.03	2.72	2.47	1.68
Sum		12,556	429		38,946	638				

Sources: Number of taxpayers and their reported income by income brackets are obtained from the Statistical Yearbook of National Tax in 2010. The control totals for population and income are obtained from population statistics and National Accounts, respectively.

the income level increases for the top income groups. It implies that the increase in the income level is accelerated in the top income group. However, it is not the case for the income groups lower than the top 10%. Thus, we cannot apply this method to these lower income groups. Thus, we do not report the income shares for lower income group similar to other studies.

Table 3 presents the estimated threshold and average income levels for top income groups in 2010. The size of the top 0.01% income group in 2010 was 3,895 and one should earn more than 1.10 billion Korean won (US$ 995,346) in order to belong to this group.[8] The average income of the top 0.01% was 2.73 billion won. The top 5-1% denoted in the table is the top 5% income group excluding the top 1% income earners. The size of this group is 1.55 million and its average income is 72.5 million won (US$ 62,747). Our estimates of the threshold and average income levels for the top income groups for other years are presented in Tables A2 and A3 in Appendix.

TABLE 3. THRESHOLD AND AVERAGE INCOME LEVELS FOR TOP INCOME GROUPS IN 2010

Percentile Threshold	Threshold income levels (thou.Won)	Income groups	Number of adults age (person)	Average income levels (thou.won)
		Full Population	38,946,431	16,383
Top 10%	36,201	Top 10-5%	1,947,322	46,724
Top 5%	57,063	Top 5-1%	1,557,857	72,535
Top 1%	104,948	Top 1-0.5%	194,732	113,443
Top 0.5%	135,564	Top 0.5-0.1%	155,786	173,557
Top 0.1%	283,886	Top 0.1-0.01%	35,052	467,515
Top 0.01%	1,104,380	Top 0.01%	3,895	2,730,837

Sources: Table A2, A3 in Appendix.
Notes: Top 10-5% is the top 10% excluding the top 5%. It is the same for others.

Because our estimates of top income shares rely on self-assessed income tax statistics which are based on the reported income, it is possible that the estimated top income shares based on global income tax statistics may be affected considerably by the trend in tax evasion. It is known that business income in general is quite subject to tax evasion.[9] Since we do not have the reliable information about tax evasion, we cannot make any adjustment for this. Instead, we compute the top wage income shares as a supplement. Compared to business income, tax evasion may not be significant for wage income, tax for which is withheld at source.

Therefore, top wage income shares are computed by dividing the wage income accruing to the top wage income groups by total wage income, similarly to top income shares. Top wage income groups are defined relative to the total number of employment. Our control total for wage income earners is consistent with the definition of employment in official statistics which include regular, temporary and daily workers. Because the income tax statistics exclude a large

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[8] The annual average market exchange rate in 2010 (1,156 Korean won per one US dollar) was used for conversion.

[9] When we compare National Accounts and income tax statistics, we discovered that approximately 26% of business income may evade tax. Other types of income such as interest, dividends, and wage, taxes on which are usually withheld at source, may be fully detected by income tax statistics. See Kim and Kim (2013).

proportion of workers earning below the exemption point, we cannot use the total sum of wage income in income tax statistics, except for that of recent years when the relevant information is provided. Therefore, we use the amount of wage and salaries in National Accounts in order to compute the control total for wage income. Thus, wage income in our definition includes wages, salaries, and bonuses. It allows us to compute the top wage income shares back to 1963, the earliest year for which the data for total employment are available. The data on the control total for total employment and wage income are presented in Table B1 in Appendix. We also used a Pareto interpolation method to estimate the threshold and average wage income levels, which are presented in Tables B2 and B3 in Appendix.

III. *Empirical Results*

Figure 1 displays three series of the top 1% income share; series 1 based on the global income tax statistics, series 2 based on wage income tax statistics, and finally, series 3 constructed after combining global income tax statistics and wage income tax statistics.[10] Series 3 is most comprehensive in coverage among the three series and could be considered as our final estimate of top income shares. The difference between series 3, which combines two income tax statistics and series 1, which is based on global income tax statistics, is the income share of the top 1% income group who earns wage income only and thus do not have to file global income tax returns.[11] Although we cannot directly compare the estimate of top wage income shares (series 2) and other estimates of top income shares (series 1 and 3) due to different definitions of the control total, the trend in top income shares series does not look much different from that in top wage income shares series.[12] Thus, from Figure 1, we may conclude that income concentration in Korea was very high during the pre-WWII period, dropped sharply after WWII, stayed stable during the period of high growth, and increased noticeably after the mid-1990s.[13]

We also compute the income shares of top fractiles other than top 1%, which are presented in Figure A1 in Appendix. The trends demonstrate that the income shares of upper income fractiles changed more in the long run. The top 1% income shares dropped sharply after WWII, whereas the top 5-1% income shares stayed with no significant change. In contrast, the top 1% income shares increased more rapidly than the top 5-1% income shares since the mid-1990s. It was also true when we decompose the top percentile into three subgroups, income shares series

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[10] For the pre-WWⅡ period, this procedure is not needed because the global income tax covers all the wage income above the exemption point.

[11] For income shares of smaller fractiles, such as the top 0.1% or 0.01%, the difference between the two estimates of top income shares decreases and becomes insignificant. The reason is that there are few who do not file global income tax returns among the upper income earners.

[12] The similarity of the two series implies that the tax evasion mentioned in section II does not affect the overall pattern of the long-term trend of the top income shares.

[13] One should note that both estimates of top income shares (series 1 and 3) were not adjusted for the inconsistent coverage of financial income over time. As explained in Appendix A.1, financial income over a certain amount began to be taxed as global income in 1996; however, this practice was suspended for 3 years (1998-2000) after the economic crisis. Therefore, our estimates of top income shares before 1995 and during 1998-2000 could be underestimated because the financial income was not counted during these periods. This factor partly explains the big drop of the top income shares in 1998.

Fig. 1.   Top 1% Income Shares in Korea, 1933-2010
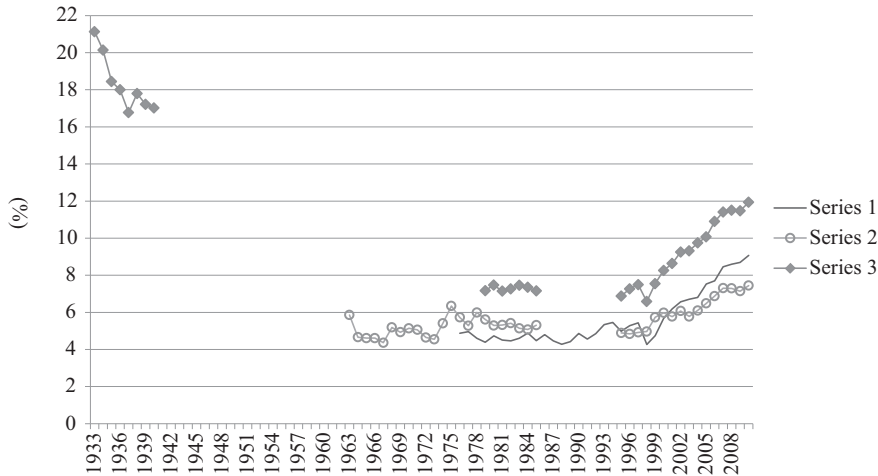
Note: 1) Top income shares series denoted as series 1 is constructed using global income tax
        statistics. Series 2 is constructed using the wage income tax statistics. Series 3 is estimated
        by combining the statistics of global income tax and wage income tax.
     2) Top income shares are for all Korea(North and South combined) before liberation and for
   South Korea after liberation.

of the top 0.1%, the next 0.4% (top 0.5-0.1%), and the bottom half of the top 1% (top 1-0.5%). The higher income fractile within the top 1% experienced a bigger drop in income share after WWII. With the rising top 1% income share since the mid-1990s, a similar pattern is observed in the opposite direction among the subgroups. All three subgroups have been rising in income shares since the mid-1990s; yet, the higher income fractiles exhibited a more rapid rise. The trend indicates that the deepening income concentration since the mid-1990s was accompanied by a sharp rise in the income of the upper income tails in the top percentile.

To better understand the mechanism that led to the shift of trend in income concentration in Korea, we compute the top income composition for the selected years of 1933-42 and 2007-2011, which is presented in Figure 2.[14] Before WWII, three major components of income included business income, wage income and rents, the sum of which accounts for more than 95% of total income during that time. The share of rents declined throughout 1933-1942 while those of other two sources rose. Rents before 1945 mostly consisted of farm rents paid to landlords.[15] Even if we take into consideration that some part of the interest income classified

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[14] In pre-WWII period, our data source allows us to compute the income composition of total taxpayers in the tabulation of class III income tax in Table 1. In post-WWII period, the annual report does not allow us to construct the top income composition before 2007.

[15] According to the findings from top income compositions in the U.S. and Japan, financial income, particularly dividends which took a large share of top incomes, fell sharply due to the negative effect of the Great Depression and WWII. It is different from the case of Korea where farm rents accounted for most capital income and dividends were insignificant. It reflects the backwardness of Korea in industrial development compared with other industrialized countries.

FIG 2.   TOP INCOME COMPOSITION IN KOREA
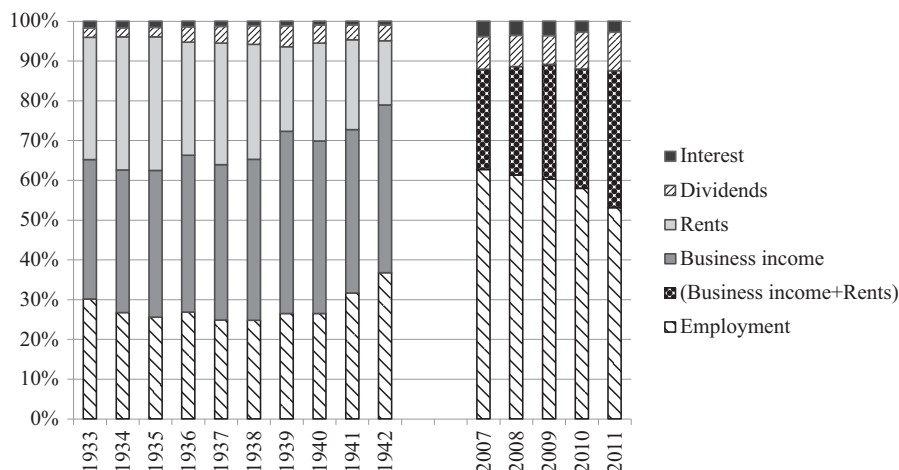
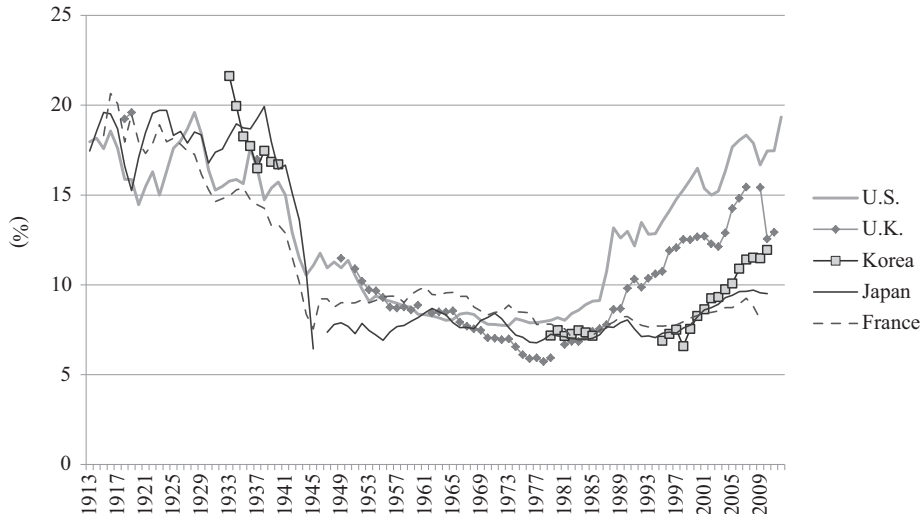*Source*: Table A5 in Appendix.

Notes: (1) The income composition for 1933-1942 is computed for total taxpayers in the tabulation of class III income tax statistics, which account for various groups from the top 1.4% in 1933 to the top 4.8% in 1942. For 2007-2010, the top income composition is for the top 1% income earners. (2) For 1933-1942, a portion of interest is excluded. (3) For 2007-2011, taxpayers whose financial income including interest and dividends is less than 40 million won are excluded. (4) Top income compositions are for all Korea (North and South combined) before liberation and for South Korea after liberation.

as class II income tax was not counted, the share of financial income was insignificant compared to the three types of income. According to the recent top income composition in 2007-2010, the share of wage income was the largest, although it decreased over time. The share of business income has increased fast instead. Comparing the income compositions of top income groups in 2007-2010 and the pre-WWII period, we find that the share of farm rents which was large in the pre-WWII period became nil in 2010 and those of wage income and financial income went up instead.

Figure 3 displays the top 1% income share series in Korea and other countries in order to provide a comparative perspective. Korea is not so much different from other countries in the overall pattern of the trend by showing a U-shaped pattern of income concentration. The top 1% income shares in Korea were as high as those in other countries during the pre-WWII period. Notwithstanding the missing years, we may guess that Korea's top income shares fell sharply as those of other countries after WWII and remained low until the mid-1990s.[16] In the mid-1990s when top income shares in Korea began to rise, the level of top income shares in Korea was similar to those in Japan and France and were much lower than the levels of the U.S. and the U.K. However, top income shares in Korea since the mid-1990s has ascended much faster than those in Japan and France. In terms of slope, a rising trend in Korea is similar to those in the U.S and the U.K. As a result, the top income share in Korea in 2010 was located in between those of two country groups which show diverging patterns in income

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[16] Our guess is based on the trend of top wage income shares in Figure 1.

FIG. 3.   TOP 1% INCOME SHARES IN KOREA AND SELECTED COUNTRIES

Source: Table A4 in Appendix for Korea; Alvaredo, Atkinson, Piketty and Saez, The World Top Income
        Database (Available from URL: http://topincomes.g-mond.parisschoolofeconomics.eu) for other
        countries
Note: 1) Tax unit for the U.K. is married couples and single adults until 1989 and adults afterwards.
      2) Top income shares are for all Korea (North and South combined) before liberation and for South
      Korea after liberation.

concentration.

The shares of the top 1% group in wage income were already displayed as series 2 in Figure 1. Unfortunately, the income tax statistics during the pre-WWII period do not provide the tabulation of wage income tax by income brackets and thus we confine our analysis to the period after WWII. Its overall pattern is not so much different from that of top income shares. The top 1% wage income share series remained low until 1997 but demonstrated a rapidly rising trend thereafter. Wage income concentration in Korea has been lower than that of total income throughout the period.[17]

Figure 4 presents the top 1% wage income shares series of Korea, Japan and the U.S.[18] The top 1% wage income shares in the U.S. were high in the pre-WWII period, fell sharply

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[17] One should note that top wage income shares and top income shares are different in terms of their control total. The former is relative to total employment and the latter is relative to total adult population. Therefore, top wage income shares tend to be lower than top income shares because the latter counts economically inactive population in the denominator. In addition, total income includes capital income which is more unevenly distributed than wage income.

[18] One should note that the top wage shares in Figure 4 are constructed with different definitions of control total for workers across countries. The top wage groups of the U.S. (Piketty and Saez, 2003) are relative to the total number of tax units with positive wages and salaries. The total number of tax units, which exclude female workers with a spouse, is different from the total number of individual workers used for Korea and Japan. However, for Japan (Moriguchi and Saez 2008), only regular workers are counted in the control total, which is different from the other two countries which count both regular and temporary workers. Therefore, to be exact, we cannot directly compare the levels of top wage shares across countries. However, such difference in the definition will not make much difference in the trends we observe in Figure 4.

during the war, and steadily declined until it began to ascend rapidly in the 1970s. As a result, the top wage share in the U.S ascended to a higher level than that of the pre-WWII period. The high wage income concentration in Japan also declined sharply several years ahead of the U.S. from 1935 to 1944, rose substantially from 1951 to 1961, then again declined gradually, and remained low relatively to that of the U.S.[19] As a result, wage income concentration in the U.S. became much higher than that in Japan in recent years. In terms of top wage income shares, Korea followed Japan with a time lag until the mid-1990s. Although the top wage income shares in the U.S. began to rise in the 1970s, those in Korea and Japan remained low. In terms of the level of wage income concentration, Korea was similar to Japan until the mid-1990s. Although we cannot observe the current trend in Japan in Figure 4, Korea appears to be

FIG. 4.   TOP 1% WAGE INCOME SHARES OF KOREA, JAPAN AND THE U.S.
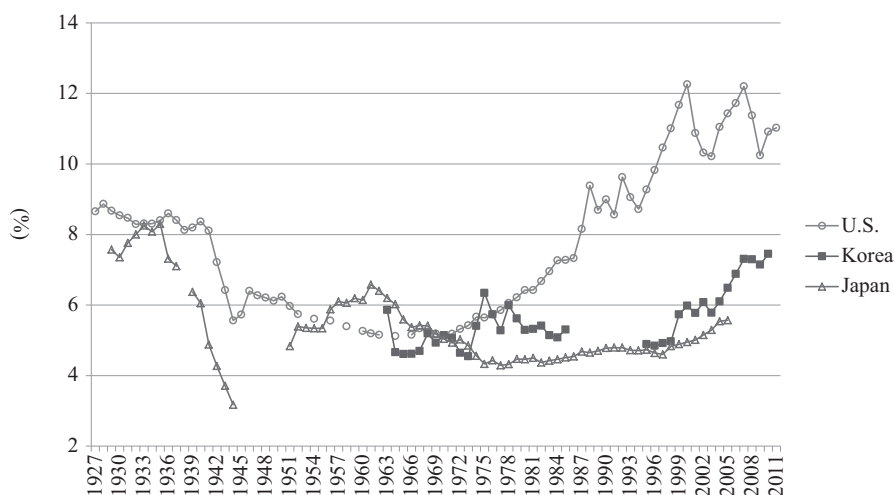
Sources: Table B4 in Appendix for Korea; Moriguchi and Saez (2008) for Japan; Piketty and Saez (2003) and updated estimates (Available from URL: http://elsa.berkeley.edu/~saez) for the U.S.

diverging from Japan in the past 15 years in terms of top wage income shares.

Figure 5 displays the average wage income (in 2010 constant price) of the top decile and the remaining bottom 90%. The top decile is decomposed into the top 0.1%, the top 0.1-1%, and the top 1-10%. First of all, we find the growth rate of the average wage income subsided after the economic crisis in 1997. However, average wage income series of top income groups do not show a distinguishable stagnation of growth unlike that of the bottom 90%. Until 1985, the average wage incomes of all income groups, including the bottom 90%, increased at similar rates. In contrast, the average wage incomes diverged after 1997 between the top 10% and the bottom 90%. In particular, the growth rate of the average wage income of the top 0.1% is distinguished from those of other income groups.

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[19] Moriguchi and Saez (2008) interpret the rise and fall of the top wage income shares in Japan around the 1960s as the phenomenon caused by the transition of Japan from the a labor-surplus to a labor-shortage economy with rapid industrialization.

FIG. 5.   AVERAGE WAGE INCOME BY INCOME GROUPS IN KOREA
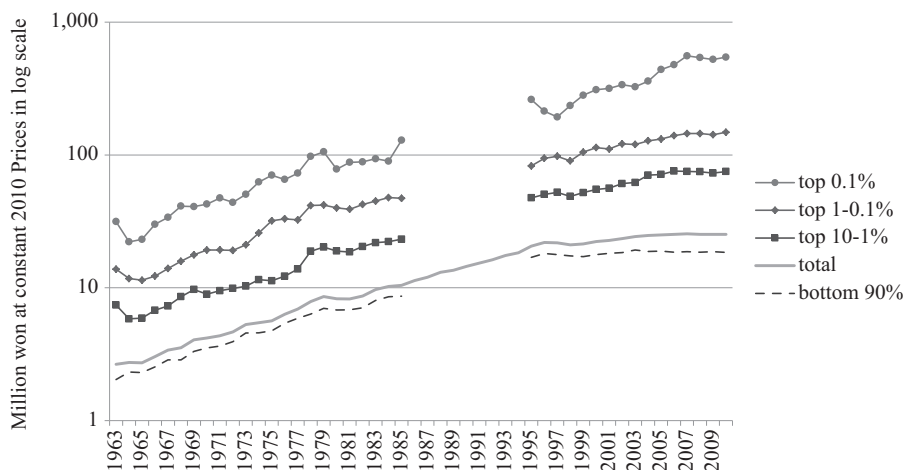
Source: Authors' calculation from Tables B1 and B4 in Appendix.

IV.   *Understanding the Evolution of Income Concentration in Korea*

We have found that (i) income concentration in Korea was as high as those in other countries in the pre-WWII period during 1933-40, (ii) it fell sharply after WWII and remained low until the mid-1990s, (iii) income concentration has increased in the last 15 years, and (iv) as a result, in terms of top income shares, Korea is now higher than Japan and France although it is lower than the U.K and the U.S. Let us briefly discuss the factors which may have influenced the trends in top income shares in Korea.

First, how can we explain the sharp fall of the top income shares after WWII? High income concentration in the pre-WWII period reflects the characteristics of the Korean economy during the colonial period. The Japanese colonizers in Korea played a dominant role with their comparative advantage in capital and technology. The Japanese in Korea contributed approximately 90% of starting capital to corporations in Korea and thus most executive officers in large corporations were Japanese.[20] The Japanese in Korea who accounted for 2.9% of the population in Korea (in 1940) also owned a sizeable area of land as large as 9.5% of cultivated land in Korea (in 1942).[21] It implies that many Japanese landlords in Korea were big landowners. Although we cannot provide statistical evidence from income tax statistics that do not distinguish the ethnicity of taxpayers, there is no doubt that the Japanese accounted for a large share of top income groups at that time.

After liberation, these Japanese colonizers withdrew from Korea and left their assets which were vested in the U.S. army military government in Korea. The military government in 1945-

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[20] According to Joo (1991), the Japanese in Korea contributed 84-88% of starting capital during 1926-39.

[21] The data for the population and landownership of Japanese in Korea are obtained from the population census and Huh (2005), respectively.

1948 transferred these assets to the Korean government. The Korean government nationalized the big enterprises in key industries such as electricity and distributed other assets to the private sector during the 1950s. Although we don't have evidence on the change in ownership distribution before and after liberation, the ownership distribution does not seem more concentrated after liberation. Regardless of asset concentration, the income earned from these assets decreased much after liberation, which could have affected the income concentration in Korea. The withdrawal of Japanese entrepreneurs as well as the severing of the Korean economy from the Japanese economic bloc made a disruptive impact on the Korean economy. The division of country into two nations and ensuing political chaos engendered economic disorganization in South Korea. In addition, vested properties were not well managed by the officially designated managers until they were transferred to Korean entrepreneurs. Therefore, it is not plausible that those who would replace the Japanese in top income groups after 1945 earned as much as the Japanese.

Income inequality among Koreans at that time may be mostly attributable to inequality in landownership. During the colonial period, landownership was concentrated in the hands of a small number of landlords and thus most farmers were small sharecropping tenants in Korea.[22] This landownership was de-concentrated by land reform. According to the Land Reform Act in 1949, the holdings of Korean landlords owning more than 3 chongbo (7.5 acres) were not allowed and the excess holdings were redistributed to the tenants. Although the landlords received securities for the land transfer, the real value of securities sharply dwindled with high inflation. Consequently, the landlords who accounted for a large proportion of the top income group lost their vital source of income after the land reform. De-concentration took place in the late 1940s even before the land reform because landlords expecting the land reform sold their land widely.

Second, why did income concentration stay relatively low throughout 30 years of rapid growth until the mid-1990s? Low income concentration during this period may be due to a rapid decrease of labor surplus in the Korean economy with a drastic expansion of modern industries. During the period of high growth, the non-agricultural sector expanded employment at rates as high as 4-8% per annum as Korea pursued industrialization by promoting labor-intensive export industries. It induced the labor movement from agriculture to other industries such as manufacturing. The decrease of farm household population by 4-5% per annum led to the end of a labor surplus and the ensuing wage increase in the rural areas.

During the initial period of industrialization, the impact of expansion of the non-agricultural sectors is too small to have a considerable effect on farm household income. Therefore, we often observe a polarizing pattern of income growth between the traditional sector and the modern sector during industrialization. Farm household population continued to increase until the mid-1960s after an initial spurt of economic growth because the high population growth overwhelmed the labor drain from the rural areas. Until the mid-1970s, Korea's rural areas were overpopulated with surplus of farmers. The overpopulation in the rural areas continued until high growth began to reduce the rural population. As rapid growth in Korea actively created jobs in non-agricultural sectors and induced the labor movement out of

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[22] According to the Statistical Yearbook of the Government of Colonial Korea, land under tenant farming accounted for 57.9% of total cultivated land in 1940 (67.6% in case of paddy field) and tenant farmers accounted for 76.4% of farm households.

agriculture, the overall earnings of workers increased in all sectors of the economy.[23]   In this respect, the benefits of economic growth during this period trickled down to the bottom income groups. Thus, Korea could maintain low income concentration even though it experienced a drastic structural change.

Third, why did income concentration rise since the mid-1990s? It may be the result from composite factors including the change in industrial and demographic structures and institutional changes in the tax system and corporate governance. First of all, job creation became stagnant after the mid-1990s, which weakened the trickle-down effect which we observed previously during the period of high growth. The growth rate of non-agricultural employment fell to approximately 2% in the 2000s from 5% in the early 1990s. It corresponds with the subsiding GDP growth rate as Korea enters a mature stage of development. In addition to the stagnant economic growth, the employment inducement effect of economic growth has been weakened since the 1990s as the industrial structure in Korea shifted toward technology-intensive industries from labor-intensive ones. This trend accelerated as Korea deepened its economic relationship with China after establishing diplomatic relations in 1992. In addition, Korean companies relocated their labor-intensive industries and production processes to sites in low-wage countries, which further reduced the demand for unskilled workers in Korea. It resulted in the reduction of manufacturing employment because the job creation in high-technology industries cannot compensate for the job destruction in low-skill labor-intensive industries. Korea's manufacturing sector, which actively absorbed the labor during the period of rapid growth, began to release its labor. Thus, polarizing demands for workers with different skill levels placed an end to the trickle-down effect of economic growth which had a favorable effect in income inequality until the mid-1990s.

This explanation which is based on the structural change in Korea may well account for the deterioration of income inequality in Korea, but may not fully explain the increase of top incomes. One of the plausible factors which might have contributed to this rising top incomes is the reduction of marginal tax rates (MTRs). The highest statutory MTR, which was as high as 70% in the 1970s, steadily declined to half of the peak level as presented in Table B5 in Appendix. Korea was no exception to the neoliberalism trend of public policy which many developed countries adopted in the early 1980. We estimate the MTR for the average taxpayer in the top 0.1% wage income group in order to see a true burden of tax for additional income.[24] As we can observe in Figure 6, it is lower than the top MTR because some individuals in the group do not pay tax at the top MTR. It was high in the late 1970s at 54% when the top MTR was 70%. It continued to fall and finally decreased to 35% in recent years.

Piketty, Saez, and Stantcheva (2011) suggested three channels in which the change in MTR could affect the top income shares. First, the tax cut may have a supply-side effect by incentivizing the economic activities of the top income groups. Second, it may reduce tax evasion or increase reported income for tax returns by a pass-through of income from other types of income (for instance, corporate income) to personal income. Third, CEOs may

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[23] According to Figure 5, the average wage income of all income groups including both the top and the bottom increased at similar rates during the period of high growth in Korea.

[24] To obtain the MTR of the average taxpayer in the top 0.1% group, we take the weighted average of the average taxpayers of the top 0.01% and the top 0.1-0.01%. See Appendix B4 for the estimation of MTR for the average taxpayer in the top wage income group.

intensify rent-seeking behaviors to influence their pay setting. Piketty, Saez, and Stantcheva (2011) found that the third channel was most important in the U.S.

How could the declining MTRs affect top income shares in Korea? The figure 6 does not show a close long-term relationship between MTRs and top income shares as the case of the U.S. in Saez (2004). However, there is a negative relationship between MTRs and top income shares in Korea after the mid-1990s. In addition, the capital income increased much faster than wage income among top income earners during the same period.[25] It implies that lowered MTRs may increase the saving capacity of top income groups which may help wealth accumulation and thus result in income increase.

FIG. 6.   TOP 0.1% WAGE INCOME SHARES AND MARGINAL TAX RATE IN KOREA
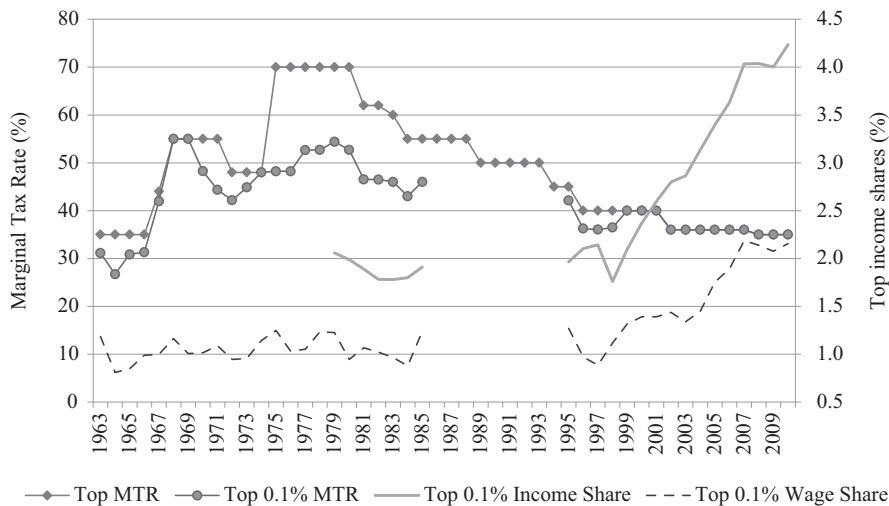
Source: Table B5 in Appendix for Top MTR; the MTRs for average Top 0.1% (Top 0.1% MTR) based on the authors' calculation.

Another factor which contributed to the rising top incomes may be the adoption of Anglo-Saxon corporate governance system in Korea after the 1997 economic crisis. Moriguchi and Saez (2008) point out Japan's highly developed internal labor markets as one of the important factors for the diverging trends between the U.S. and Japan. In Japan, the absence of competitive markets for corporate executives might have prevented the rise of wage inequality. According to Piketty and Saez (2003: Figure 11), the average compensation of the top 100 CEOs on the Forbes list has increased much faster than the average wage since the early 1970s. This contrasting divergence of compensation between top managers and average workers did not happen in Japan whose corporate culture emphasizes firm-specific human capital under the

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[25] Although the top 0.1% wage income share rose in Korea, other types of income including capital income increased much faster than wage income for the group. It is shown by widening gap between top income and top wage income shares in Figure 6. Thus, the positive effect of tax cuts on asset accumulation may have been substantial in Korea. It may not be true of the U.S. where wage income drove the rising income concentration.

internal promotion system.

Due to the fact that micro-data on top wage groups such as CEO compensation are not available in Korea, we instead investigate the average wage income of the top tails.[26] We discovered in Figure 5 that the growth rate of the top 0.1% average wage income was distinguished from those of other income groups. While the top 1% wage income share increased from 4.89% in 1995 to 7.45% in 2010, the top 0.1% wage income share increased faster from 1.27% to 2.16% during the same period.[27] It implies that the average wage of the top 0.1% wage earners in 2010 was 21.6 times greater than the average wage of all wage earners whereas it was just 12.7 times greater in 1995. In 1995, the wage level of top 0.1% wage earners relative to the average wage in Korea was similar to that of Japan (about 10 times of the average wage). However, it increased to more than 20 times of the average wage, higher than that of Japan, although it was much lower than that of the U.S. (about 40 times in 2010).

Although we cannot specify who belong to the top 0.1%, 16,971 taxpayers in 2010, we speculate that most executive officers of large corporations would belong to this group. After the economic crisis in 1997, many large corporations in Korea reformed their corporate structure and adopted selected elements of the Anglo-Saxon corporate governance system (Chung 2008: 156-189). Compared with the pre-crisis period, equity financing became a major method of raising capital for large corporations. Thus, the voice of shareholders became more influential. Large shareholders asked for further reform in order to align the management to investors' interests. The increasing share of foreign shareholders accelerated the transition toward Anglo-Saxon style shareholder capitalism in Korea. It increased the competitive pressures to the top management in Korea. In addition, large corporations that survived the economic crisis increased their scale and scope in business, which increased the demand for able professional managers. Without mature manager markets in Korea, large corporations, particularly Chaebols having many affiliated companies, activated the internal labor markets for corporate officers, delegated management to professional officers, and controlled them through monitoring and performance-based rewards. Many CEOs in large corporations received exceptional pay-raises along with stock options. That is, Chaebols developed highly competitive internal labor markets for managers of affiliated companies under the umbrella of family owners. In this respect, Korea appears to be located in between the U.S. and Japan in terms of the scope of manager markets and incentive systems. This type of performance-based incentive system for the top management was disseminated to the lower levels of management (Chung 2008: 248-259).

V.   *Conclusion*

In this paper, we constructed the long-term series of top income shares in Korea from 1933 to 2010. From this, we have obtained the following main findings on the evolution of income concentration in Korea.

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[26] We may obtain information on the compensation of executive officers from the report disclosed by corporations (http://dart.fss.or.kr) since 1999. However, the information is not so reliable enough to construct a consistent series of compensation of the top managers.

[27] The estimates of top wage income shares are presented in Table B4 in Appendix.

First, income concentration was very high prior to WWII when Korea was under a colonial rule and dropped drastically after WWII. This pattern is not so much different from what previous studies found for other industrialized countries such as Japan and the U.S. However, the cause for the change could be different. Unlike other countries where the falling capital income of top income groups played an important role, Korea's case is due to the collapse of the colonial system. After liberation, Japanese colonizers who accounted for a large share of the top income groups in Korea withdrew by leaving their businesses in Korea. The land reform after liberation reduced the rental income of the Korean top income groups who earned most of their income from land lease and personal business. Thus, the collapse of the top income share after liberation is attributable to the political chaos from regime change.

Second, top income shares series in Korea remained low throughout the period of rapid industrialization until it began to ascend in the mid-1990s. Income inequality in Korea has deteriorated with the rapidly rising top income shares after the economic crisis. Korea was able to maintain a low level of income concentration during the period of rapid growth because the economic growth accompanied active job creations and the steady increase of wage income. This trickle-down effect was weakened as Korea entered a mature stage of economic development. With globalization and deepening economic relationships with low-wage countries such as China, major companies in Korea accelerated the shift of their major business towards technology-intensive sectors by moving labor-intensive industries and production processes to other countries with abundant labor. This structural change reduced the demand for low-skilled workers while it increased the demand for high-skilled professionals. Consequently, the average wage income of the bottom income groups stayed stagnant in real terms for the last 15 years. Although the diverging demand for different types of workers in the labor market may explain the worsening income distribution in the overall economy, it is not enough to explain why top incomes increased so rapidly last 15 years.

Thus, third, we pay attention to two institutional factors for the rise of top incomes, the marginal tax rate (MTR) and the corporate governance structure. Falling MTRs since the 1980s helped the top income groups to accumulate capital and increase their capital income. In comparison with other countries, Korea belongs to the country group with big drop in MTRs and rapid increase in top income shares. In addition, the changes in the corporate governance structure after the economic crisis contributed to the big pay-raises of the top management in large corporations. After the economic crisis, large corporations in Korea relied on direct capital market instead of indirect finance and adopted some elements of the Anglo-Saxon style corporate system. Without mature outside CEO markets, large corporations, particularly Chaebols with many affiliated companies, activated internal labor markets for corporate officers and intensified competition among the top managers of affiliated companies through performance-based rewards. In this respect, Korea appears to be in between the U.S. and Japan in the scope of the CEO market and incentive system.

In this paper, we have studied the long-run evolution of top income shares in Korea by utilizing the income tax statistics instead of the household survey which suffers from the problem of under-reporting of top incomes. However, top income shares cannot provide detailed information on the situation of the bottom 90 % income groups. Thus, we may need to combine the income tax statistics and the household survey in order to achieve a deeper understanding of income distribution in Korea, which could be our next research topic.

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