

## Shrinking Middle Class and Changing Income Distribution of Korea: 1995-2005

Joonwoo NAHM\*

Sogang University  
Seoul, S. Korea

### <Summary>

This paper investigates the shrinking middle class hypothesis and reveals more details about recent trends in income distribution of Korea from 1995 to 2005. I find that the consensus view of a declining middle class is correct and the decline in the middle is split between the lower and upper classes equally in Korea. Furthermore, while the size and income share of the middle class declined, the share of upper class increased rapidly and the share of lower class is stable over time. I then move beyond cross-sectional analyses to look at how the mobility of worker and families changes over this period. I search for clues as to who moved out of the middle class and the source of such changes through an ordered probit regression model.

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\* Professor of Economics, Sogang University, 1 Sinsu-dong, Mapo-gu, Seoul 121-742, South Korea.  
Phone: 02-705-8509, E-mail: Jnahm@sogang.ac.kr.

## 1. Introduction

Over the last three decades, the economy of South Korea (hereafter simply “Korea”) achieved a remarkable economic growth rate of 7 percent per year. This has rendered Korea to be labeled as a “miracle economy.” This exceptional economic growth has been accompanied by an even more exceptional fall in labor income inequality.

However, recently, analyses of income distribution trends of Korea have repeatedly reported increasing inequality of income distribution and included discussions of the “disappearing middle class.” This relatively new concept is typically equated with the concept of increased income inequality.

At the heart of the fear of increasing disparity is a belief that the majority of the lost middle fell to the lower part of the income distribution. This paper investigates the shrinking middle class hypothesis and reveals more details about recent trends in income distribution of Korea. This paper is descriptive in the sense that it presents the withering of the middle class in Korea during 1995-2005. And then, I move beyond cross-sectional analyses to look at how the mobility of worker and families changes over this period. I then search for clues as to who moved out of the middle class and the source of such changes through a regression model.

## 2. The Overall Picture of Inequality and Polarization Trends

The data sets are the Household Income and Expenditure Survey (HIES) for 1995-2005, produced by Korea National Statistical Office (KNSO). I restrict our attention to households of urban salary and wage earners. Therefore, it should be borne in mind that the results in this paper are conditional on households with wage and salary earners.

Table 1 reports the summary measures of inequality and polarization of household labor income

in 1995-2005. Labor income is defined as the sum of wages and earnings over all family members.

All monetary variables have been deflated using the consumer price index of 2005.

<Table 1> Summary Measures of Labor Income: 1995-2005

	(Unit: million Korean Won for the top panel)			
	1995	1998	2002	2005
Mean	28.983	27.637	32.069	33.979
Median	26.874	24.192	28.745	30.596
Std. Dev.	13.222	13.564	17.442	20.587
Gini	0.246	0.261	0.288	0.328
	(0.235, 0.256)	(0.252, 0.269)	(0.279, 0.297)	(0.321, 0.335)
90/10 ratio	3.130	3.373	4.117	5.717
	(2.898, 3.361)	(3.185, 3.560)	(3.886, 4.347)	(5.369, 6.064)
Bipolarization	0.206	0.222	0.257	0.292
	(0.194, 0.219)	(0.212, 0.232)	(0.245, 0.269)	(0.282, 0.302)
Sample size	1,208	2,171	2,134	4,371

\* Bootstrap 95% confidence intervals are inside bracket.

The decade saw a shift in the income distribution of Korea; the situation is summarized in Table 1. I find that inequality in Korea over the decade increased over the entire period. Mean income fell from 29.0 million Korean won in the peak year of 1995 to a low of 27.6 million (Korean) won in the recession year of 1998 but rose during the recovery. There are two noticeable features. First, over the decade there was an increase in inequality according to all inequality indices. However, with the rise in inequality came an increase in average income except in 1998 in which mean income decreased due to the financial crisis mentioned before. This indicates that there may be losers in terms of redistribution, and gainers in terms of growth. Second, measures indicating the concepts of inequality and polarization move in the same direction over the period. Thus, while inequality unquestionably increased and the income distribution was more polarized, the size of the middle class declined. Over the decade, the labor income is more polarized than the income is unequalized. The Gini index increased by 33% from 0.246 to 0.328. In terms of polarization, I find that 2005 wage earners were 42% more polarized than in 1995. This increase in polarization was

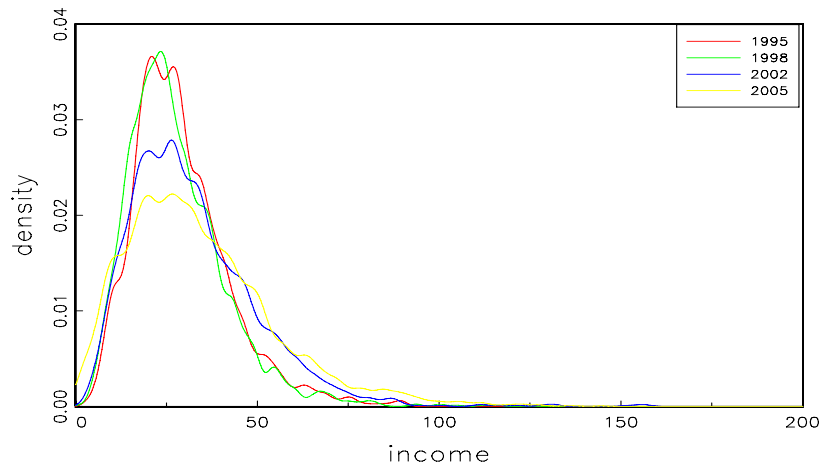
due to a big increase in the distance between extreme groups. The top 90 percentile income was 5.7 times than the low 10 percentile income in 1995. The values confirm that the increase in inequality and polarization is statistically significant, entailing non-overlapping confidence regions of 1995, 2002 and 2005 indices.

The polarization of income can be illustrated by distribution of income. Figure 1 shows how the income distribution changed between 1995 and 2005. As shown in Table 1, Figure 2-(a) shows that income inequality increased over the decade. However, the figure provides more insights into the movements underlying the increase in inequality than Table 1. A specific distributive change stands out in the figure showing a prominent shrinkage in the middle of the distribution and a mass shifting out from the center, while both extremes substantially increased in size as time passes. As the economy recovered from financial crisis of 1998, the distribution started to have longer right tails which indicates a few very rich households were appearing. At the same time, a significant percentage of households fell from the middle class. The shift in concentration away from the middle in both directions is strong evidence that the middle class had shrunk. In other words, the distribution became more polarized.

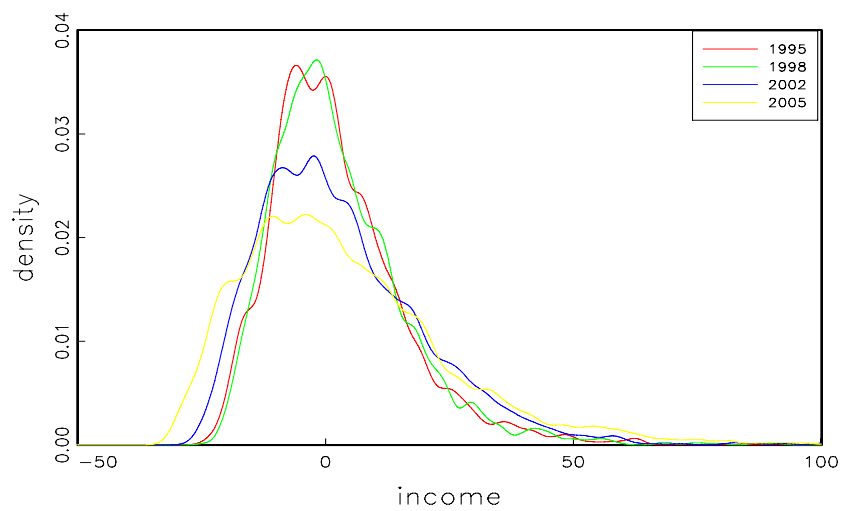
To investigate whether the shrinking middle class moved to the upper class or to the lower class, the distributions are expressed as deviations from the given year's median. In Figure 1-(b), the whole distributions shift to the left a little bit with the shrinking middle center, while a significant percentage of households fell from middle class to lower class, however, the right tail grew longer. This implies that the polarization develops, as a few households get a prominent amount of labor income while many households fell from middle to lower class.

<Figure 1> Income Distributions: 1995-2005

(a) Income Distributions Expressed as Raw Scale



(b) Income Distributions Expressed as Deviations from the Given Year's Median



### 3. Shrinking Middle Class

In deciding what percentage of persons and income lies in the lower, middle and upper class, I have to clarify the definitions of middle class and measure of income. For the units of analysis, I

consider individuals rather than households. It is widely accepted that individuals in households experience significant economies of scale in consumption. To derive distributions by individuals from households, I use OECD equivalence scale to account for differences in household size and composition. The equivalence scale recommended by OECD gives the first adult household member the weight of 1.0, the second adult member the weight of 0.7 and children the weight of 0.5. I define the middle income group to be all people whose labor income is 75-150% of the median labor income each year.

The results of the approach over 1995-2005 are summarized in Table 2 with their respective 95% bootstrap confidence intervals. In Table 2, I report percentage of the three classes at panel (a) for per capita income. Also in Table 2, at panel (b), the shares of per capita income held by the three classes are presented. In Table 2, I additionally report the relative size of two more fixed extreme (per capita) income intervals: 'under poverty line' and 'most affluent'. The 'under poverty line' measures the percentage of households whose per capita income is under 2005 poverty line<sup>1</sup>. The 'most affluent' measures the percentage of households whose per capita income is above 26.3<sup>2</sup> million won. The results support the declining middle class thesis. The argument of declining middle class is statistically significant because the 95% confidence intervals of 1995 are not overlapping with the ones of 2005. The key question however is where the middle went? Over the decade, the relative size of the lower class and upper class has been secularly increased. The size of middle group would have decreased slowly from the initial 56.3% of all households to 55.2%; however, after the financial crisis of 1998, it has decreased rapidly to 44.8% in 2005. The decrease of middle class has been accompanied by the increase of the lower and upper classes.

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<sup>1</sup> The single person poverty line was 4.82 million won (approximately U\$5,125) in 2005.

<sup>2</sup> The single person's income of 26.3 million won (approximately U\$27,940) is about top three percent in 1995 labor income basis.

&lt;Table 2&gt; Shrinking Middle Class

	1995	1998	2002	2005
<b>(a) Percentage of Persons</b>				
Lower class	27.4 (25.4, 29.4)	27.3 (25.8, 28.9)	28.1 (26.6, 29.7)	31.8 (30.8, 32.8)
Middle class	56.3 (53.5, 59.1)	55.2 (53.1, 57.3)	50.6 (48.5, 52.7)	44.8 (43.3, 46.3)
Upper class	16.3 (14.3, 18.3)	17.5 (16.0, 19.0)	21.3 (19.6, 23.0)	23.4 (22.3, 24.5)
Under poverty line	3.3 (3.29, 3.31)	4.3 (4.29, 4.31)	2.4 (2.40, 2.40)	3.4 (3.40, 3.40)
Most affluent	3.1 (3.09, 3.11)	2.3 (2.29, 2.31)	6.2 (6.20, 6.20)	10.6 (10.58, 10.62)
<b>(b) Share of Income</b>				
Lower class	14.3 (13.1, 15.6)	13.9 (13.0, 14.8)	13.5 (12.6, 14.4)	13.4 (12.9, 14.0)
Middle class	55.8 (52.4, 59.2)	53.9 (51.5, 56.4)	47.9 (45.2, 50.5)	42.8 (41.0, 44.5)
Upper class	29.8 (26.4, 33.2)	32.2 (29.8, 34.6)	38.6 (35.9, 41.3)	43.8 (42.0, 45.6)
Under poverty line	1.0 (1.00, 1.00)	1.4 (1.40, 1.40)	0.7 (0.70, 0.70)	0.8 (0.76, 0.84)
Most affluent	8.0 (7.98, 8.02)	6.5 (6.48, 6.52)	14.7 (14.68, 14.72)	23.7 (23.30, 24.10)

\* Bootstrap 95% confidence intervals are inside bracket.

What has happened to the share of income held by the three classes, especially the income held by the lower class? At the bottom panel of Table 2, while the share of middle class secularly declined, the share of upper class increased rapidly and the share of lower class is stable over time. Thus, the middle class while declining in size is receiving a declining share of the pie over time. A large number of incomes have slipped out of the middle class and into the upper class over the decade. While the size of 'under poverty line' is stable at around 3-4%, the size of most affluent rapidly increased from 3.1% in 1995 to 10.6% in 2005 with a small decrease in the financial crisis of 1998. The most affluent income also suffered during the financial crisis of 1998. Since then, however, the share of the most affluent increased with a remarkable speed. With shrinking middle class in size, while the share of middle class decreased, the share of upper class increased, and especially the share of the most affluent class increased sharply.

#### 4. Transition of Middle Class

##### (1) Transitions

In this section, I use data that follow individuals in consecutive years so that I can say something about how the mobility of specific individuals changed. Table 3 uses data to trace the household labor income in consecutive years. Because KNSO changes the entire sample every five years, over the period of 1995-2005, I can trace the same households only over 1998-2002. I divide the sample in each transition year into three classes: lower, middle and upper class. I then show the percentage of each class that remains in that class after one year. The rows of the intertemporal transition matrix are the income classes of households in the base years, and the columns are the corresponding income classes in the subsequent year. The entries in the transition matrix indicate what fraction of individuals with a given base year income end up, and thus each row sums to 100 percent.

<Table 3> Overall Markov Transition Probability

	Destination Year		
	Low	Middle	High
Low	0.777	0.220	0.003
Middle	0.096	0.822	0.082
High	0.002	0.213	0.785

In Table 3, I collect all year-to-year comparisons for all two consecutive years and calculate one year average mobility/immobility probabilities. I find that over all the one-year transition years of 1998-2002, the immobility rate is higher in the middle class and is about same at the two ends; 82.2 percent of households in the middle class were still there after one year, 17.8 percent moves to lower or upper class, with the probability going to lower is a little bit higher than the one going to upper.



## (2) Explaining Transitions: Winners and Losers

To understand better how the transition probability of a middle class household moving to the lower or upper class or staying in the middle class differs across household characteristics, I partitioned the population according to several categories.

Table 4 uses the same methodology but compares income transitions according to the categories. The result of Table 4 is based on the subpopulation whose status at the base year is middle class.

In Table 4, for household type, although I cannot find significant differences in probabilities of moving down to the lower class or moving up to the upper class across household characteristics, the households of 'single mom' in the middle class in the base year have higher probabilities of moving down to lower class in the following year. Also, the household whose head's final education was middle school and the households with an unskilled blue collar head frequently moved down to the lower class.

<Table 4> Overall Markov Transition Probability according to Household Characteristics

		Low	Middle	High
Household Type	Elderly	0.097	0.806	0.097
	Single Mom	0.118	0.863	0.020
	Double Earners	0.089	0.842	0.068
	General	0.103	0.812	0.084
Education Level	Elementary	0.127	0.753	0.120
	Middle School	0.155	0.799	0.046
	High School	0.099	0.835	0.066
	Community College	0.073	0.862	0.065
	College	0.091	0.856	0.054
Occupation	Government Official	0.070	0.900	0.030
	White Collar	0.100	0.826	0.074
	Skilled Blue Collar	0.107	0.818	0.075
	Unskilled Blue Collar	0.152	0.757	0.091

The analysis in Table 4 is partial in the sense that it did not control all other household characteristics. To decide the winner and the loser in income mobility, I have to control for all other

household characteristics through regression analysis.

Conditional on the fact that a household is in the middle class in the base year, whether moving down to the lower class, moving up to the upper class or staying in the same middle class can be estimated by an ordered probit model. The parameter estimates, their standard errors and t-statistics are presented in Table 5. The explanatory variables include the number of household members (NUMH), age (AGE) and age square (AGESQ) of household head, an indicator whether spouse presents or not (ISPOUSE), and the sex of household head (SEX). To describe the effect of the choice of occupation on income class, three dummies are considered: government official (GOVT), white collar worker (WHITE) and skilled blue collar worker (SKILLED). The reference group is unskilled blue collar worker. There are four educational dummies: middle school (MIDDLE), high school (HIGH), community college (COMM) and college degree and above (COLLEGE). The reference group is elementary school or lower. Also, household type dummies (elderly (ELDERLY), single mom (SINGMOM), and dual earning families (DUAL EARNER)) are included. The reference group is general workers.

These ordered probit estimates are consistent with a priori expectations. However, the dominant influence is the broad classification of occupation and education level and household type is the next. Government officials, white collar workers and skilled blue collar workers are associated with higher probabilities of moving to the upper class in the next year. As the education level gets higher, the probability of moving to the upper class gets increased significantly. Dual earning households lead to higher probabilities moving to the upper class while elderly and single mother households are both associated with moving down to the lower class but insignificantly. The age variable has a quadratic shape to probabilities of moving to the upper class as usual income equation estimates. The younger and elderly households have higher probabilities of moving down to the lower class

and the middle prime age households have higher probabilities of moving up to the upper class.

<Table 5> Regression Results of Ordered Response Model

	(Standard errors are in parentheses)				
	1998 -> 1999	1999 -> 2000	2000 -> 2001	2001 -> 2002	Total
# of Family	0.047 (0.051)	0.106** (0.049)	0.070 (0.051)	0.074 (0.056)	0.072** (0.025)
Spouse	-0.024 (0.226)	-0.256 (0.216)	0.196 (0.207)	-0.350 (0.220)	-0.086 (0.107)
Sex	0.282 (0.233)	0.343* (0.208)	-0.235 (0.196)	0.368* (0.215)	0.153 (0.104)
Age	0.077* (0.048)	0.155** (0.047)	0.119** (0.052)	0.127** (0.053)	0.120** (0.025)
Age Square	-0.001 (0.001)	-0.002** (0.001)	-0.001* (0.001)	-0.001** (0.001)	-0.001** (0.0003)
Gov't Official	0.760* (0.397)	1.195** (0.282)	0.960** (0.266)	1.084** (0.276)	0.992** (0.140)
White Collar	0.815** (0.387)	0.998** (0.264)	0.681** (0.246)	0.850** (0.247)	0.837** (0.131)
Skilled Blue Collar	0.402 (0.373)	0.675** (0.239)	0.521** (0.220)	0.521** (0.212)	0.540** (0.119)
Middle School	0.573** (0.251)	-0.340 (0.248)	0.666** (0.251)	0.467* (0.261)	0.325** (0.124)
High School	0.622** (0.226)	0.122 (0.239)	0.517** (0.230)	0.224 (0.241)	0.368** (0.116)
Comm.College	0.747** (0.276)	0.213 (0.288)	0.552** (0.273)	0.444 (0.294)	0.479** (0.140)
College	0.899** (0.259)	0.322 (0.272)	0.660** (0.261)	0.494* (0.278)	0.587** (0.132)
Elderly	-0.795 (0.735)	-0.056 (1.088)	0.230 (1.487)	0.414 (1.616)	-0.312 (0.514)
Single Mom	-0.570 (0.488)	-0.056 (0.515)	-0.192 (0.597)	0.043 (0.698)	-0.280 (0.272)
Dual Earner	0.228** (0.103)	0.164 (0.104)	0.067 (0.099)	0.216** (0.109)	0.170** (0.051)
Log-Likelihood	-492.6	-473.0	-511.5	-400.4	-1900.5
Pseudo R-Squared	0.070	0.083	0.052	0.069	0.059
Sample Size	865	864	872	811	3412

\*: Statistically significant at the 5% level.

\*\* : Statistically significant at the 1% level.

Note that moving to the upper class is recorded as 3 and I record 1 for moving to the lower class. According to the result in this section, government officials, white collar workers and skilled blue collar workers are winners and unskilled blue collar workers are losers. The household head with higher education is the winner. While elderly and single mother households are losers, dual earning

households are winners.

## 5. Summary and Conclusion

This paper investigates the shrinking middle class hypothesis using the recent data in Korea and confirms the consensus view of a declining middle class is correct. The decrease of the middle class has been accompanied by the increase of the lower and upper classes. However, during the sample period, while the size of the bottom low class is stable, the size of the top high class is rapidly increased; thus the income distribution of Korea is bi-polarized.

The analysis of Markov transition probabilities also confirms that disappearing middle class goes to the lower and upper class equally. Constructing the ordered probit model using the data of two consecutive years, it is explained that government officials, white collar workers and skilled blue collar workers are winners and unskilled blue collar workers are losers. The household head with higher education is the winner. While elderly and single mother households are losers, dual earning households are winners.

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