AN EXPLORATION ON THE MEASUREMENT OF THE SIZE OF MIDDLE-INCOME GROUP

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1. INTRODUCTION

- It was specified in the 20th CPC National Congress that the modernization of China is the modernization of the common prosperity of all the people. By 2050, China will be a modernized socialist country and common prosperity will be basically realized.

- The distinctive feature of common prosperity is to have a reasonable size of middle-income group, forming an “olive-shaped” income distribution pattern with a large middle and small ends.

- China’s middle-income group is still small, so the fifth Plenary Session of the 19th Central Committee of CPC proposed to “focus on raising the income of low-income groups and expanding the middle-income group” during the 14th Five-Year Plan period, and to “significantly expand the middle-income group” by 2035.
1. Introduction

So:

• What is the **definition** of middle-income group?

• How to **measure the size** of the middle-income group?

• What is a **reasonable structure** of high, middle and low income groups?

• Does “expanding the middle and raising the low” mean that **it is always better to have a larger middle-income group**?
2. **What is the Middle-income Group**

- **Based on statistical meaning**: The middle-income group is the group whose income level is *in the middle* among the social members (*e.g.*, classifying the middle 50% or 60% of residents as middle-income group based on income distribution).

- **Based on economic meaning**: The middle-income group refers to those who have reached a *medium standard of living* and have a *relatively stable social status* (*nearly similar to the middle class*).
2. **What is the Middle-income Group**

- When income distribution is *reasonable*, the statistical and economic meaning of the middle-income group should be *highly overlapping*. When the overall income level is not high or the income distribution is unreasonable, there will be a deviation between these two.

- While it is obvious that *a combination of statistical and economic meaning* is more relevant to understand the middle-income group, it also makes the *statistical measurement* more complex.
2. What is the Middle-income Group

- There are two main categories of middle-income group measurement criteria: absolute criteria and relative criteria.

- Based on different interpretations of “middle quality of life”, the middle income thresholds may differ significantly.
2. **What is the Middle-income Group**

- The *Absolute Criterion* is to set the income thresholds for middle-income groups based on the *income needed to maintain a corresponding standard of living*.

- Experts from World Bank, Milanovic & Yitzhaki (2002), ranked 114 countries according to the per capita income (1993 PPP), and used a per capita income between $3,470 (Brazil) and $8,000 (Italy, the poorest country in the G7) as the criteria for the global middle-income group.

- Banerjee & Duflo (2008) used the US poverty line of $10 per day (1993 PPP) as the upper limit for the global middle-income group and $2 or $4 per day based on 13 developing countries as the lower bound.
2. What is the Middle-income Group

- Ravallion (2010), also a World Bank expert, uses $2 (median of the poverty line in 70 developing countries, 2005 PPP) to $13 (US 2005 poverty line) per day for adults as a criterion for the middle income group.

- Kharas & Gertz (2010) give a scale of $10 (the average of the poverty line for Portugal and Italy) to $100 (two times the median income of Luxembourg, the most developed country) in daily consumption expenditure per capita.
2. **What is the Middle-income Group**

- With reasonable standard setting, the absolute criterion can accurately portray the characteristics of middle-income groups.

- However, this method mostly **fails to reflect the statistical meaning** of middle-income groups, and suffers from the shortcomings of **subjective** boundary setting, difficulty in reflecting **regional differences**, and inability to achieve **automatic adjustment**.
2. **What is the Middle-income Group**

- The *Relative Criterion* determines the lower and upper limits of the middle-income group based on the *relative income levels or positions* in the overall income distribution.

- Since the international relative poverty line is 50% or 60% of the median income, it is feasible and adopted by many scholars to use the *relative poverty line* as the *lower* limit for the middle-income group, at which point the low-income group is the relatively poor group.

- The *upper* limit of the middle income group, although more complex to define, is generally *some multiple of median income*, for example, 125% of median income (Thurow, 1984; Pressman, 2007), 150% (Grabka & Frick, 2008), 200% (Peichl et al., 2010), and three and four times (Brzezinski, 2010).
2. **What is the Middle-income Group**

- In addition, the relative criterion includes the *location interval* of the middle-income group, and reflects the change in the middle-income group by measuring the change in the population between the two quartiles of the income distribution.

- For the quintile population of income, Levy (1987) treats the middle three groups of the income distribution (i.e., the 20%-80% quintile population) as the middle income group;

- Zhuang Jian, and Zhang Yong-guang (2007) consider the population corresponding to the middle 60% of the cumulative social income as the middle income group.

- Bellettini & Giorgio (2007) identify the 40%-80% quartile population as the middle income group.
2. What is the Middle-income Group

- The *RELATIVE CRITERION* can consider both the *income level* and *distribution status*, and achieves the unification of the statistical and economic meaning of the middle-income group to a certain extent.
3. THEORETICAL MODEL OF INCOME DISTRIBUTION

• A reasonable income distribution pattern should be that the *middle-income group accounts for the majority of the total population*.

• In other words, the size of the middle-income group should be significantly higher than that of the low-income group and the high-income group, and the *proportion of the group should be kept above 50%* in order to maintain the "olive-shaped" structural characteristics steadily.
3. Theoretical Model of Income Distribution

- If the income of residents in the $\frac{1}{4}$ quartile of the income distribution corresponds to the lower limit of the middle living standard, and the income in the $\frac{3}{4}$ quartile corresponds to the upper limit of the middle living standard, then the residents whose real income is between the upper and lower quartiles are exactly in the middle 50% of the whole income distribution pattern, which refers the statistical meaning of the middle income group is highly consistent with the economic meaning.
3. THEORETICAL MODEL OF INCOME DISTRIBUTION

• Since the actual income distribution has obvious right-skewed characteristics, a perfectly symmetrical “olive” distribution pattern does not exist.

• In reality, the bottom of the income distribution pattern should be more rounded and the top should be more pointed, making the whole more like a short, fat “sunflower seed”.
3. THEORETICAL MODEL OF INCOME DISTRIBUTION

• If the income distribution gap of the overall society is *reasonable*, then the middle-income group in the economic meaning would not deviate much from the middle-income group in the statistical meaning, and its upper and lower income limits would be around the upper and lower quartiles of the income distribution.

• The proportion of the low- and high-income group are both around 25%, but the sum of the two is less than 50%, while the proportion of the middle-income group is above 50%, and the proportion of the low-, middle- and high-income groups is about **0.25:0.6:0.15**, forming an asymmetrical but more stable “olive-shaped” income distribution structure (*Fig.1-a*).
• If the income gap is large and the majority of people belong to the low-income class, then the statistical middle-income group will be *lower* in the “olive-shaped” pattern, and the gap between it and the economic middle-income group boundary will be larger (*Fig.1-b*).

• If the income disparity is so large that the overall income distribution pattern is a “pyramidal” structure with a small top and a large bottom, then it is difficult to produce the effect of clustering the residents to the middle income and to form a stable middle income group with a large share.
3. Theoretical Model of Income Distribution

- If the income gap is small, then the middle-income group in the statistical meaning will move closer to the middle of the “olive” pattern.

- However, if the income gap is too small and more egalitarian, then the share of middle-income groups in the economic meaning may exceed 50%, at which point the lower income boundary of the middle-income group will be below the 25% position quartile and the upper income boundary will be above the 75% position quartile (Fig. 1-c).
3. THEORETICAL MODEL OF INCOME DISTRIBUTION

Middle-income boundary in statistical meaning
Middle-income boundary in economic meaning

Income Distribution Patterns

- Reasonable olive shape (a)
- Pyramid shape (b)
- Discus shape (c)

Income Distribution Curve

- Middle-income boundary in statistical meaning
- Middle-income boundary in economic meaning

Population
Population
Population

Income
Income
Income

(а) Reasonable olive shape
(b) Pyramid shape
(c) Discus shape

Fig.1 Middle Income Boundaries under Different Income Distribution Patterns
3. THEORETICAL MODEL OF INCOME DISTRIBUTION

- For the following reasons, we believe that there is a *reasonable interval range* for the size of the middle-income group:

- While reducing the income gap can help expand the middle-income group, if the income gap is too small, it is not conducive to *creating effective incentives* and may lead to a disproportionately large group being at a low level of middle income, which does not utilize the goal of achieving common prosperity.
4. Estimation Methods and International Experience

• For the reasonable share of the middle-income group in the economic meaning of a reasonable income distribution pattern, an *interval estimation method* can be used to measure it, drawing on the experience of *OECD member countries*.

• Due to the limited sample size, the *bootstrap-t* method (*This approach is essentially a nonparametric Monte-Carlo method that can significantly improve the robustness of the sample estimate of the aggregate by resampling a finite sample of data*) can be used to estimate the quantitative characteristics of the “olive-shaped” rational income distribution pattern to improve the reliability of the estimation results.
4. **ESTIMATION METHODS AND INTERNATIONAL EXPERIENCE**

- Among the OECD member countries, 33 countries with reasonable income distribution are selected based on the principle of “*Gini coefficient between 0.2 and 0.4*” (Fig.2).

![Fig.2 Size of income groups in OECD member countries with Gini coefficients between 0.2 and 0.4](image-url)
4. Estimation Methods and International Experience

• In general, the income distribution pattern of the 33 sample countries is characterized by an “olive-shaped” structure with a large middle and small ends.

• The Gini coefficient of the 33 countries has a strong negative correlation with the share of the middle-income group, with an absolute-value of 0.95, which confirms that expanding the middle-income group is conducive to reducing income inequality or reducing the income distribution gap is conducive to forming a middle-income group.
4. Estimation Methods and International Experience

- The size of the income groups is relatively similar for all levels in this sample of 33 countries. For the middle income group, the average share of the 33 sample countries is 0.6192, which is very close to the golden ratio of 0.618.

- Slovakia, with the lowest Gini coefficient, has the highest share of middle-income groups, while the United States ranks last in the share of middle-income groups (but also reaches more than 50% and the size of high-income groups is close to 15%).

- In the vast majority of countries, the share of low-income groups is around 30% and the share of high-income groups does not exceed 15%.
4. Estimation Methods and International Experience

- Using the bootstrap-\(t\) method, based on the bootstrap sample obtained through 10,000 Monte-Carlo simulations, it is estimated that 59.55% to 64.23% of the residents belong to the middle-income group, 28.32% to 30.83% of the residents belong to the low-income group, and 7.35% to 9.72% of the residents belong to the high-income group.

- The size of the three income groups roughly shows the structural characteristics of 3:6:1, which is basically consistent with the aforementioned theoretical analysis.
4. Estimation Methods and International Experience

- 17 OECD member countries with Gini coefficients between 0.3 and 0.4 are used as a reference (Fig.3), and the same bootstrap-t method is used to simulate by 10,000 Monte-Carlo.

- It can be estimated that 54.86% to 59.90% of the inhabitants belong to the middle-income group; 30.63% to 33.26% belong to the low-income group, 9.42% to 12.14% of the inhabitants belong to the high income group, and the overall structure is basically the same.
Fig. 3 Size of income groups in OECD member countries with Gini coefficients between 0.3 and 0.4
Thanks for watching!

Please feel free to give any suggestion.