MEASURING TOP INCOMES USING TAX DATA: A CASE STUDY FROM MALAYSIA

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Abstract

Accurate measurement of income inequality is crucial for understanding economic disparities and designing effective policy interventions. However, traditional household surveys, including the Malaysian Household Income Survey (HIS), often underrepresent top incomes due to sampling limitations and underreporting by high earners. This study addresses these challenges by integrating HIS data from 2016 to 2022 with administrative tax records, applying a reweighting method to correct for biases in income distribution estimates. The results indicate that tax-adjusted data increases the Gini coefficient by about 2 percentage points, revealing a higher level of inequality than estimation from survey data alone.

Our analysis shows that in 2022, the top 1% of earners captured 11.4% of national income, while the top 10% accounted for 35.0%, marking a substantial concentration of wealth. In contrast, the middle 40% experienced a decline in their income share, highlighting increasing polarization within Malaysia's income distribution. Ethnic disparities remain pronounced: despite a gradual decline in their overall population share, Chinese Malaysians continue to dominate the highest income brackets, comprising 56.5% of the top 1%. Meanwhile, Bumiputera, the majority ethnic group, account for 70% of the bottom 50%, underscoring persistent socio-economic inequalities. Although Bumiputera representation among top earners has risen slightly, this trend is primarily driven by gains in self-employment income rather than structural shifts in wage employment or wealth creation through property ownership.

These findings underscore the importance of incorporating tax data into inequality assessments to obtain a more accurate and comprehensive picture of income distribution. Furthermore, the persistent ethnic and class-based disparities highlighted in this study emphasize the need for targeted policies that promote inclusive economic growth, equitable opportunities, and structural reforms to address long-standing inequalities in Malaysia's multi-ethnic society.

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Introduction

The topic of inequality and the unequal distribution of wealth has been widely discussed and remains a contentious issue globally. Many countries perceive that the income gap is widening, with the rich becoming richer while the poor and middle-class lag behind. This issue is particularly controversial in non-homogeneous societies. The benefits of economic growth are always debated, especially in plural societies like Malaysia with its multiracial, multi-religious, and multi-ethnic population. As of 2024, Malaysian society consists of approximately 70% Bumiputera[1], 22% Chinese, 7% Indian, and 1% others.

In Malaysia, there is a growing perception that the income gap is widening. In 2013, half of Malaysians perceived the income gap as either very wide or wide, a figure that surged to 70% by 2023. This perception remains consistent irrespective of ethnicity or income class. For instance, among the lowest income quintile, the proportion of individuals perceiving the gap as wide or very wide increased from 47% in 2013 to a striking 83% a decade later. Similarly, among the top income quintile, this figure rose from 55% to 61% during the same period. Public perception of widening inequality is consistent with official figures. The Gini coefficient, which measures income inequality, indeed increased from 0.425 in 2016 to 0.429 in 2022 (DOSM, 2023).[2]

However, measuring and comparing inequality is fraught with complications and difficulties. Many countries use consumption expenditures, while others rely on income data. Most measurements of inequality are typically based on survey data, while others sometimes use GDP per capita (Bourguignon & Morrisson, 2002; Sala-i-Martin, 2006). Both methods have weaknesses and gaps, necessitating adjustments to better represent actual income distribution. Importantly, these methods fail to capture significant changes in inequality at the very top. The top incomes in surveys are under-covered and

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[1] A Malaysian term describe Malays and other indigenous peoples of Southeast Asia, it literally translated as son of the soil in Sanskrit.

[2] Refers to Gini coefficient based on gross income per capita.

do not fully capture the very top of the distribution. For instance, in Latin America, survey income only covers about half of the national income (Alvaredo et al., 2022).

In Malaysia, inequality measurement is usually derived from the Department of Statistics Malaysia (DOSM) Household Income, Expenditure, and Basic Amenities (HIES/BA) and Labour Force Survey (LFS), which are nationally representative and provide excellent datasets for studying inequality in Malaysia. However, estimates derived from household surveys are limited by the coverage of such data (Alvaredo et al., 2022). This gap makes it challenging to assess how economic growth is distributed across the population and has other implications for inequality analysis, particularly because some populations and sources of income are poorly captured in surveys. Top incomes, or the incomes from the richest households, are one of those areas. A study by Khalid and Yang (2021) using data between 1984 and 2014 documented a substantial and growing gap in the top one percent share of income, highlighting that only 70%-80% of national income is covered by survey data.

To address these gaps, data from tax records can be used to more accurately measure inequality. This novel approach has been used in measuring inequality in a few countries (see Alvaredo et al 2016, Piketty et al 2017). In this study, we aim to replicate and update the work done by Khalid and Yang (2021) by deploying the same method using administrative tax records. A key contribution of this study is to contrast data from tax records with those from the HIES/BA to analyze the existing gap in household surveys (i.e., how much top incomes are missing from household surveys, what sources of income are most misrepresented) and assess how survey inequality estimates can be corrected to account for this. The analysis is expected to reveal significant under-reporting of top incomes in household surveys, leading to an underestimation of true income inequality. Preliminary findings from previous studies suggest that incorporating tax data can significantly alter the perceived distribution of income, providing a more accurate reflection of economic disparity.

This paper is organized as follows. The next section briefly describes the objectives, data sources, and methodology used in this study. Section three outlines the key findings, and section four concludes.

Objective, Methodology and Data Sources

In this paper, we **aim** to undertake the following:

      1) Study the income sources (including non-taxable ones) and demographics of those at the top using

administrative tax records

2) Contrast data from tax records with those from the HIES/BA to analyze the existing gap in household surveys

3) Evaluate how survey inequality estimates can be corrected to account for this under-representation.

In terms of income and income growth, this study analyzes who benefits from economic growth between major ethnic groups (Bumiputera vs. Chinese vs. Indians), and income groups (Top 1% vs Top 10% vs. Middle 40% vs. Bottom 50%).   We will focus the **time period of 2016-2022**, updating the work by Khalid and Yang (2022) that analyze income inequality for the period of 2002-2014. Unlike other studies that use household socioeconomic surveys, following Khalid and Yang (2022), we combine information obtained from household surveys and tax data, which will allow us to better understand inequality in Malaysia and is useful for cross-country comparisons (Piketty et al 2017, Garbinti et al 2017, Piketty et al 2018, Piketty et al 2019).

To address the under-coverage of top incomes in survey data, we correct the survey using fiscal data (administrative tax data). The basic idea is to adjust the weight of the survey using tax data in a nonparametric manner. We deploy a reweighting approach (see Blanchet, Flores, & Morgan (2018) which allows us to correct income distribution without losing the richness of information in surveys, such as information on ethnicity.

Our main data source is HIS survey (2016, 2019, 2022) focusing on individual incomes recipients and not at a household level (we include imputed rent), and tax tabulation and micro data on tax-payers with annual income of RM100,000 and above from Inland Revenue Board (IRB). We exclude the non-citizens taxpayers (who makes up of about seven percent of total taxpayers in Malaysia). The Household Income Survey (HIS) has been implemented twice every 5 years since 1973 by the Department of Statistics Malaysia[3] and is the most comprehensive survey in Malaysia. This survey provides detailed information on the income of households, as well as demographic characteristics across socioeconomic groups, i.e., gender, age, race, profession, industry, etc. The survey covers only Malaysian citizens. The sample size of the survey varies from 0.7% to 1.2% of Malaysian households in Malaysia (i.e., HIS 2002 covers 0.73% of households, and HIS 2016 covers

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[3] Starting in 1987, The Basic Amenities Survey was conducted together with the HIS and known as the Household Income/Basic Amenities Survey (HIS/BA).

1.25%, HIS 2022 covers 1.16%). The total number of the sample against the total number households in the country are as Table 1 below.

Table 1: Household Income Survey samples size and total number of households (2016-2022)

Year	Sample size	Total number of households
2016	78,297	6,947,700
2019	85,547	7,276,700
2022	92,000	7,909,200

Source: DOSM (various years)

The HIS data collected by the Department of Statistics is widely acknowledged as representative and of high quality. The methodology adopted for the HIS 2016 are as follows: personal interviewing approach covering households living in private quarters was used for a period of twelve months starting from May 2016 until April 2017, and the survey used probability samples that represent all Malaysian household in Malaysia. The sample selection is based on the Household Sampling Frame which consists of Enumeration Blocks (EB) where the EB are geographically contiguous areas of land, identifiable by boundaries which are created for the purpose of survey operation, which is on average, containing about 80 to 120 living quarters (LQ). Two-stage stratified sampling design was adopted, where the first level of stratification is primary strata which covered administrative district for all state in Malaysia. The second level of stratification is the secondary strata which covers urban and rural strata. By deploying probability sampling proportionate to size of all households in Malaysia, the sample for LQ were selected from the selected EB by using systematic method that generate random number and interval class to ensure every LQ have an equal probability to be selected in the sample. Therefore, the survey has unbiased sample and represent the entire population of households in Malaysia.

HIS data are normally available in two forms: household-level and individual-level data. In our case, HIS 2016-2022 provides data at the individual level.

The percentage of taxpayers in the total adult population in Malaysia varies from 17.8% to 19% for the period of 2016-2022. In Malaysia, the Inland Revenue Board of Malaysia publishes only the taxable income tabulations annually (see Yearbook of Statistics Malaysia). However, the latest available tax tabulation is published only up until year 2018, it has stopped publishing the figures since then. There is no tax tabulation publicly available for the year 2019 and 2022. Even for the Statistics Yearbook Malaysia 2022, the tax tabulation published is still based on the year 2018. In the recent publication of Statistics Yearbook Malaysia 2023, there is no more information on the tax tabulation. Therefore, tax tabulation for the year 2019 and 2022 is estimated based on the actual annual growth rate of number of assessment and income assessed for 2014-2016 period.

Our methodology of constructing income distribution follows two-steps approach:

      i)   Step 1: use data from HIS (individual data)

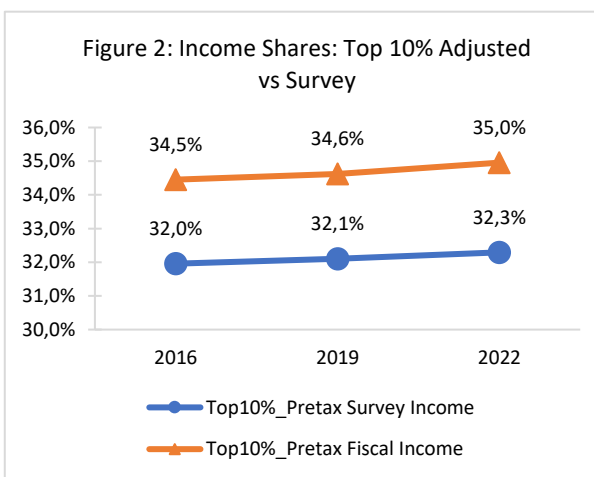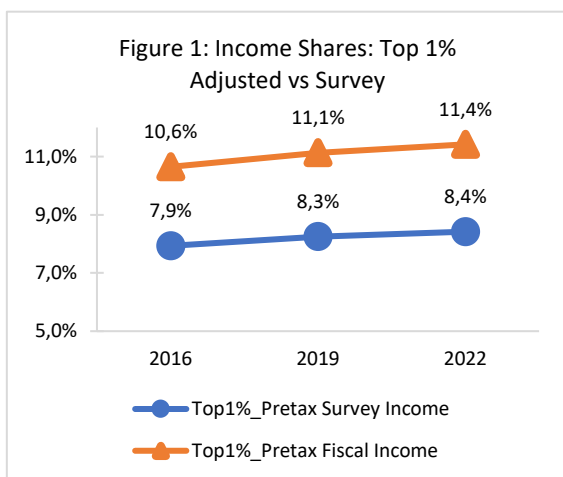   ii)   Step 2: correct the surveys using tax data

Step 1. We start by estimating the inequality series using the Malaysia HIS. As mentioned before, we first calculate pretax survey income adult individuals as unit of observations
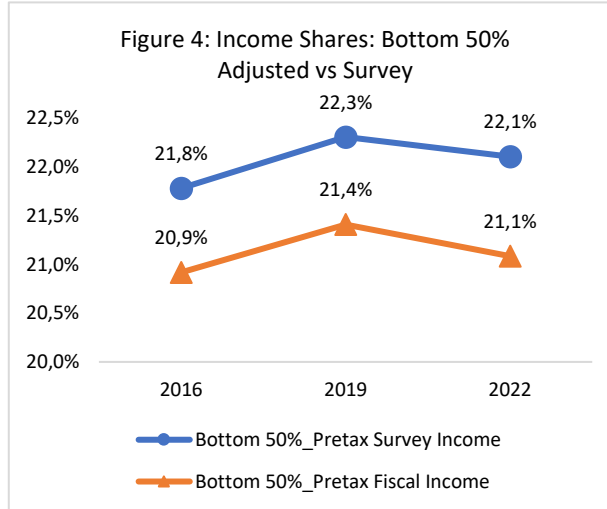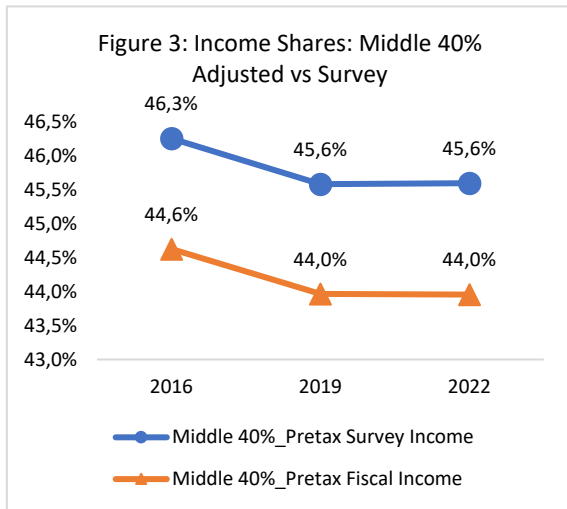
Step 2. To overcome the problem of missing survey data for the top incomes, we correct the survey using tax data by adopting the reweighting method proposed in Blanchet, Flores, Morgan (2018). The basic idea is to adjust the weight of the survey using tax data in a nonparametric manner which allows us to correct the income distribution without losing the richness of the information in surveys. Therefore, in the adjusted survey data, the representativeness in terms of age, gender, or ethnicity, in the case of this research, will be maintained.

Using the reweighting method, we find that the rich are getting slightly richer, the poor remain the same, while the middle class is getting poorer. The income share accrued to the top 1% and top 10% using pre-tax fiscal income has increased from 10.6% in 2016 to 11.4% in 2022, and from 34.5% to 35.0%, respectively, during the same period. The middle class, or the middle 40%, saw its income share decline from 44.6% in 2016 to 44.0% in 2022. Meanwhile, the income shares for the lowest income class (bottom 50%) remained almost unchanged at 21.1% in 2022, compared to 20.9% in 2016. In other words, despite the economy being larger in 2022 than in 2016, economic growth has not managed to increase the income share of the bottom 90% of the population.

Our findings align with other studies indicating that the income gap for the top 1% (Figure 1) and top 10% (Figure 2) income shares based on pre-tax fiscal income (corrected individual income from survey data using tax data) are slightly higher compared to pre-tax survey data. For instance, in 2016, the income shares for the top 1% using survey data were 2.7 percentage points less than using pre-tax fiscal data, while in 2022, the gap increased to 3.0 percentage points. Similarly, the income shares for the top 10% are higher after adjusting for tax data compared to survey data. In 2022, the income shares for the top 10% adjusted with tax data was 35.0%, slightly higher than the 32.3% using survey data sourced from the Household Income Survey (HIS).

Additional evidence from other countries supports the reliability of using tax data to correct survey data for more accurate income distribution measures. Alvaredo et al. (2013) demonstrated that incorporating tax data in countries like the United States, France, and the United Kingdom significantly altered the perceived distribution of income, often revealing higher levels of inequality than previously estimated using only survey data. For example, in 2014, the income shares for the top 1% from the ray survey data in the UK was 9.4%. However, the corrected income shares after taking into account the tax data was 13.7%. Similarly, a study by Piketty and Saez (2003) in the United States found that the top 1% income share was substantially higher when tax records were considered, compared to survey-based estimates.

Figure 1: Income Shares: Top 1% Adjusted vs Survey

Figure 2: Income Shares: Top 10% Adjusted vs Survey

Figure 3: Income Shares: Middle 40% Adjusted vs Survey

Figure 4: Income Shares: Bottom 50% Adjusted vs Survey

Our analysis, using the reweighting method, reveals that the adjusted income shares derived from tax data for the middle 40% and bottom 50% are lower than those obtained from survey data. This finding aligns with the observed trends at the top of the income distribution. Specifically, the difference between survey data and corrected survey data for the middle 40% ranges about 1.6 percentage points (Figure 3), while for the bottom 50%, the gap is about 1.0 percentage points during the period from 2016 to 2022 (Figure 4).

It is crucial to acknowledge that our method, while robust, is not without limitations. The absence of a complete repository of income tax data poses challenges. However, given the available data, we are confident that our approach provides a more accurate reflection of income distribution. The incorporation of tax return data is particularly advantageous for accurately capturing high earners, in contrast to studies that rely solely on survey data. Nevertheless, the results presented in this paper should be interpreted with caution.
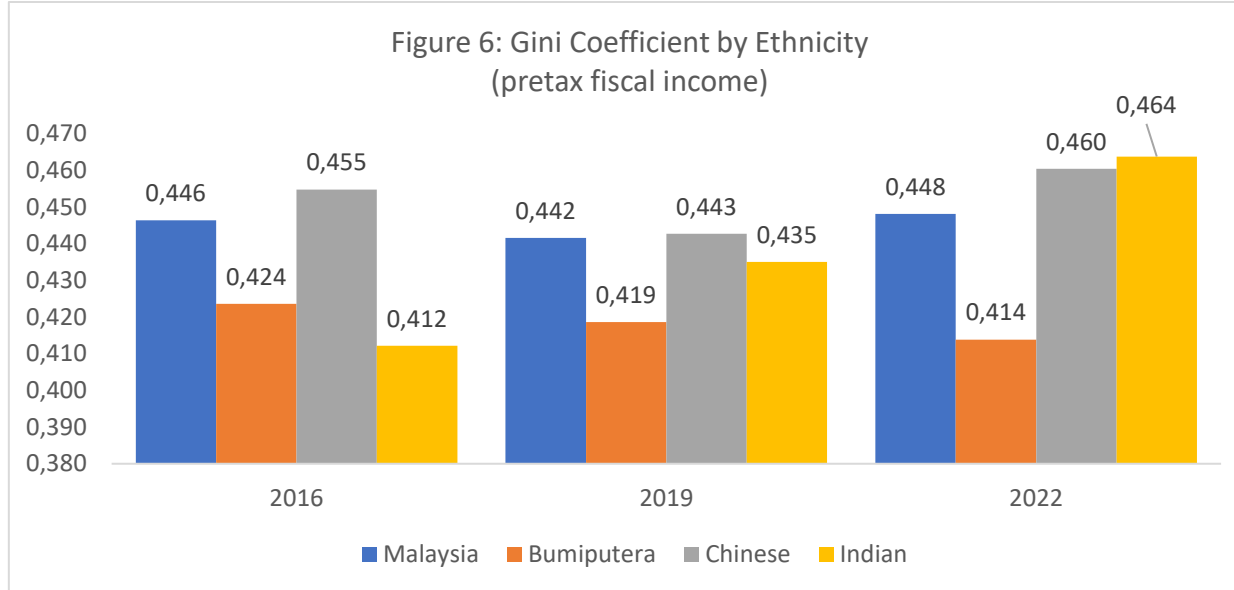
Key Findings

a. Overall Income Inequality

Between 2016 and 2022, the Malaysian economy has become less inclusive, with the income gap between the rich and the rest widening, albeit marginally. Income inequality, as measured by the Gini coefficient and adjusted for tax data, increased from 0.446 in 2016 to 0.448 in 2022 (Figure 5). Consistent with similar methodologies deployed elsewhere, income inequality in Malaysia is slightly higher when using tax-adjusted data compared to survey data. In 2022, the income inequality using adjusted tax data was 0.448, which is 2.4 percentage points higher than the inequality measure derived from survey data.

Figure 5: Gini Coefficient: Adjusted vs Survey
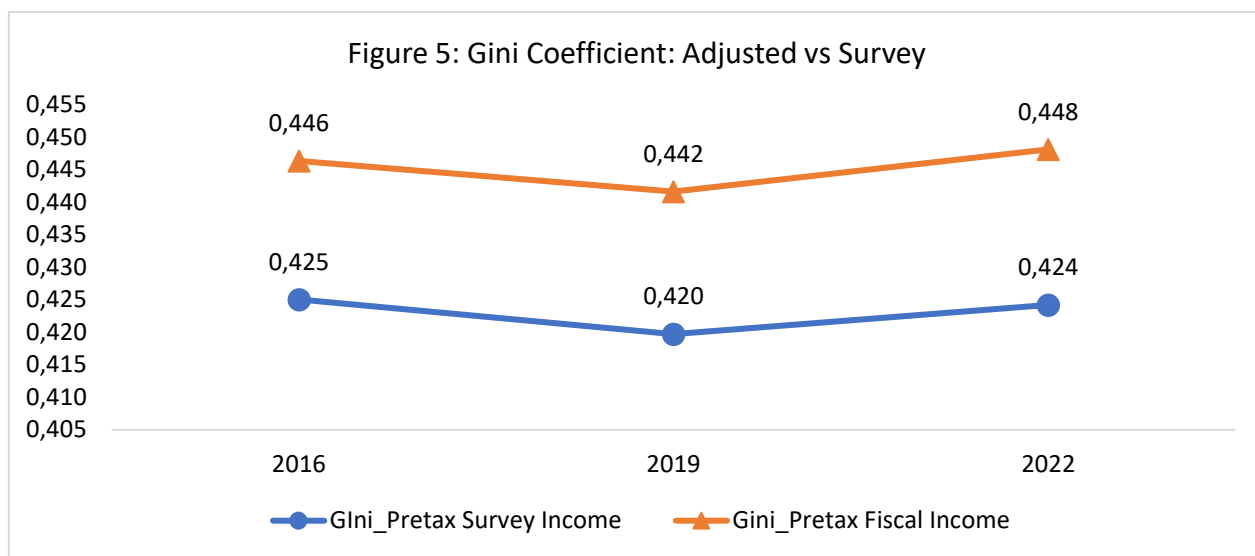
b. Income Inequality by Ethnicity

Given that discourse in Malaysia, and in many non-homogenous countries, often focuses on ethnicity, we estimate the income share by income classes accrued to various ethnic groups using pre-tax fiscal data. Our analysis indicates that income inequality is highest among Chinese and Indian ethnic groups compared to Bumiputera (Figure 6). The income gap among Indians rose sharply between 2016 and 2022, widening by 5.2 percentage points, compared to a 0.6 percentage points increase among the Chinese and a 1.0 percentage point decrease among the Bumiputera.

Figure 6: Gini Coefficient by Ethnicity
(pretax fiscal income)

Legend: Malaysia, Bumiputera, Chinese, Indian

2016: Malaysia 0,446, Bumiputera 0,424, Chinese 0,455, Indian 0,412
2019: Malaysia 0,442, Bumiputera 0,419, Chinese 0,443, Indian 0,435
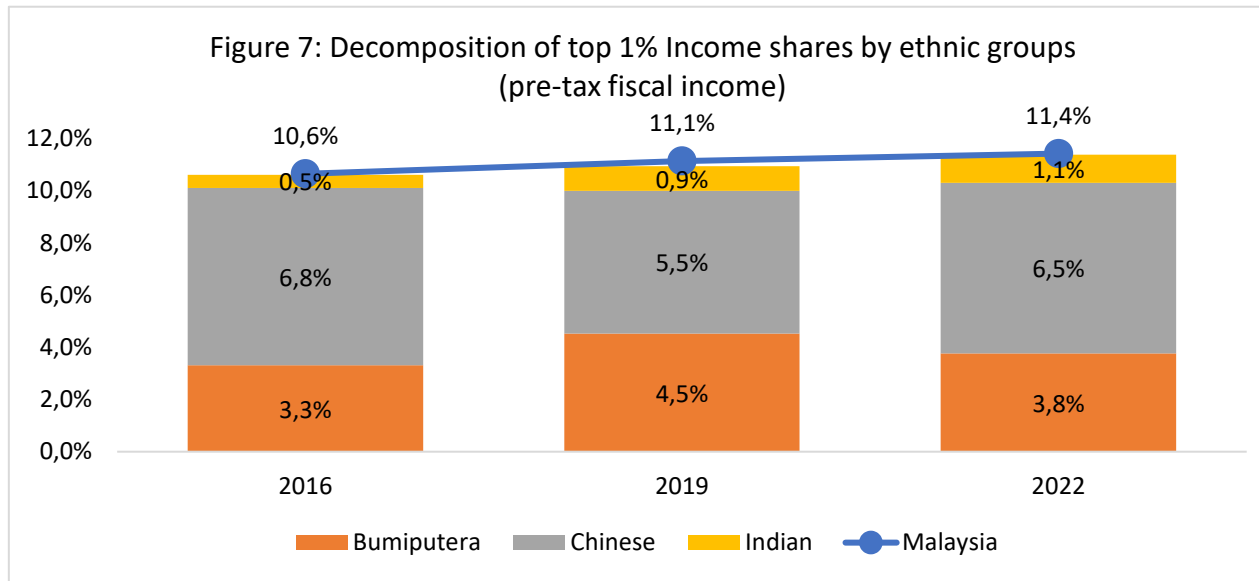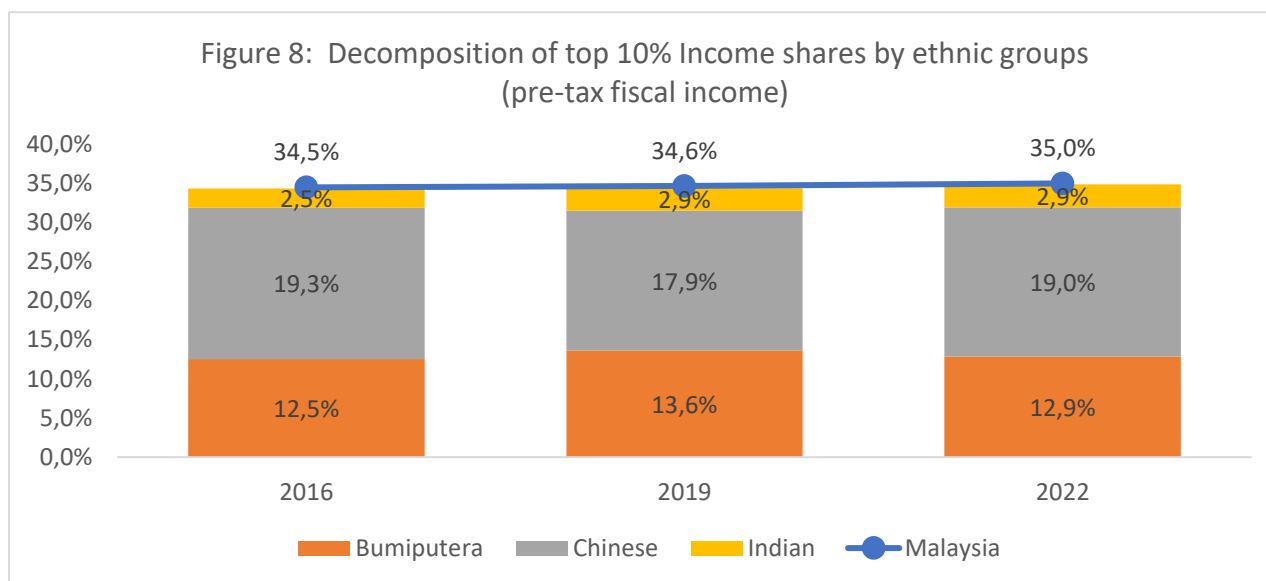2022: Malaysia 0,448, Bumiputera 0,414, Chinese 0,460, Indian 0,464

c. Income Inequality by Income Class and Ethnicity

In this section, we decompose the income share (e.g., the top 1%, the top 10%, the middle 40%, and the bottom 50%) by ethnic groups. As discussed previously, Malaysia's economic growth during the study period was not inclusive. Inequality widened, with income shares accruing to the top increasing, while remaining stagnant for the bottom and decreasing among the middle class.

We find that the income shares for the top 1% and top 10% increased between 2016 and 2022 (Figures 7 and 8). The majority of the income share in the highest income group belongs to the Chinese, followed by Bumiputera, and then Indians. Although the Chinese dominate the top of the income distribution, their income share has decreased marginally compared to other groups. The decline of the Chinese overall population can be attributed to lower fertility rate (0.8) compared to the Bumiputera (2.1) and Indians (1.1). However, the number of the Top1% Chinese population did increase during the 2016-

2022 period, although the Chinese Top1% population growth is slower (1.2% per year) compared to Bumiputera (2.6% per year).

Figure 7: Decomposition of top 1% Income shares by ethnic groups (pre-tax fiscal income)

Year	Bumiputera	Chinese	Indian	Malaysia
2016	3,3%	6,8%	0,5%	10,6%
2019	4,5%	5,5%	0,9%	11,1%
2022	3,8%	6,5%	1,1%	11,4%

Figure 8: Decomposition of top 10% Income shares by ethnic groups (pre-tax fiscal income)

This increase in income for the wealthy has come at the expense of the middle class (M40). The income shares of the middle 40% (M40) has declined slightly, particularly among the Chinese (-1.1 percentage points) and Indians (-0.2 percentage points) between 2016 and 2022 (Figure 9). In contrast, the income shares for Bumiputera, who constitute the majority of the middle class, have marginally increased by 0.7 percentage points.

While the income share of the wealthy has increased and that of the middle class has declined, the income shares for the bottom 50% (B50) have remained relatively stagnant between 2016 and 2022 (Figure 10). Within the B50 group, the income shares for Bumiputera increased slightly by 0.7 percentage points, while it declined by 0.4 percentage points for Chinese and 0.1 percentage points for Indians. Despite this increase, Bumiputera income still constitutes the majority of those in the low-income class.

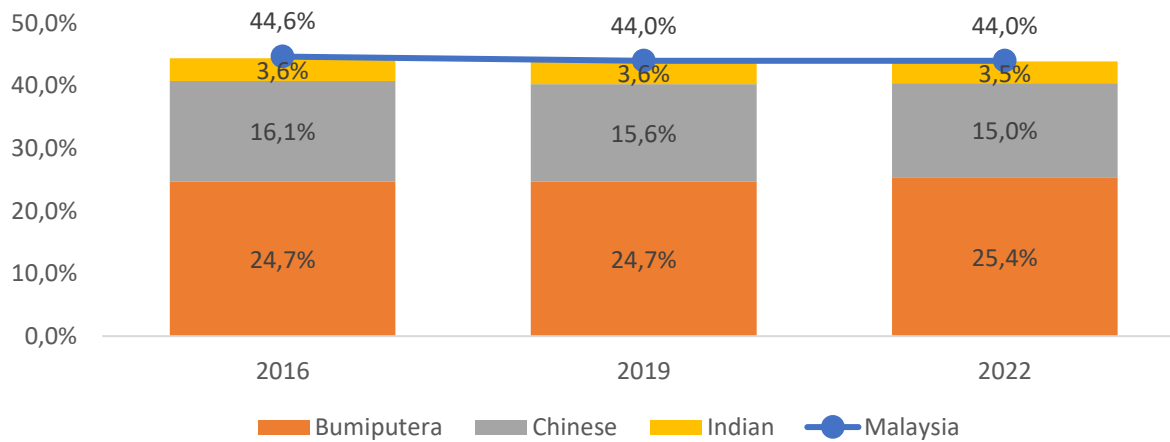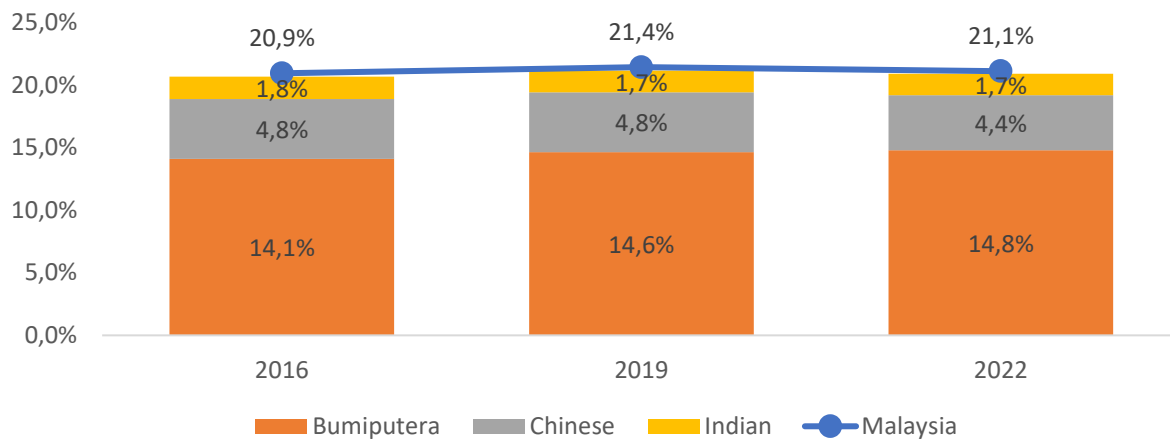Figure 9: Decomposition of middle 40% Income shares by ethnic groups (pre-tax fiscal income)

Figure 10: Decomposition of bottom 50% Income shares by ethnic groups (pre-tax fiscal income)

Decomposition of income by ethnicity

There have been demographic changes between the period of 2016-2022 where the share of Bumiputera has increased and the share of Chinese declined (Figure 11). During the same period, the share of Indians in Malaysia remains almost the same. The share of Bumiputera population increased from 66% to 68%, while the Chinese and Indian population remained unchanged at around 24% and 8% respectively from 2016.

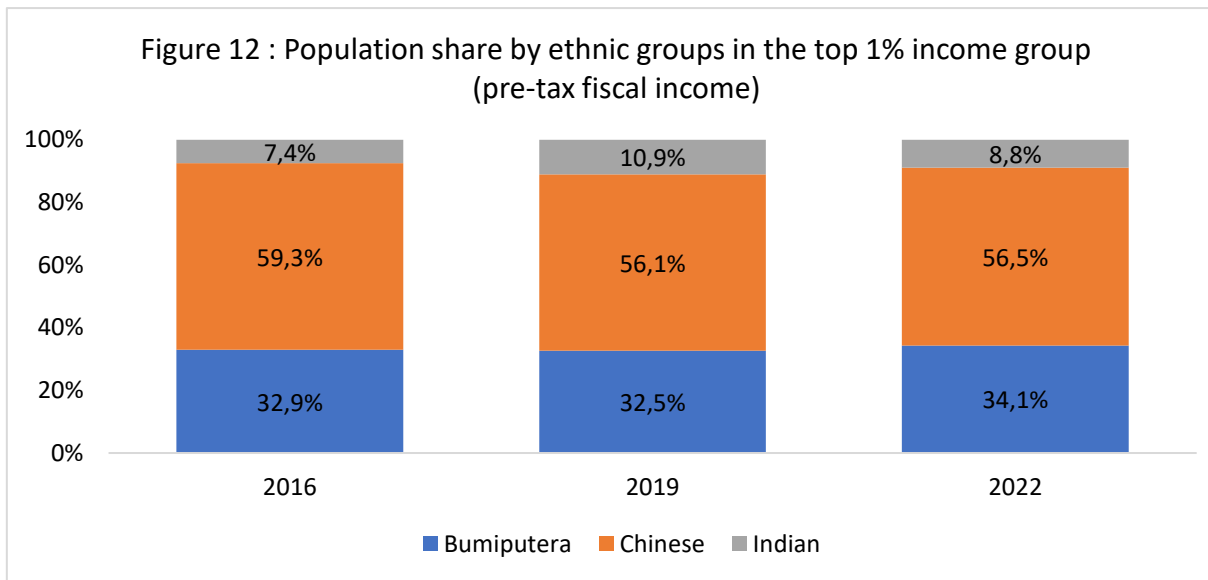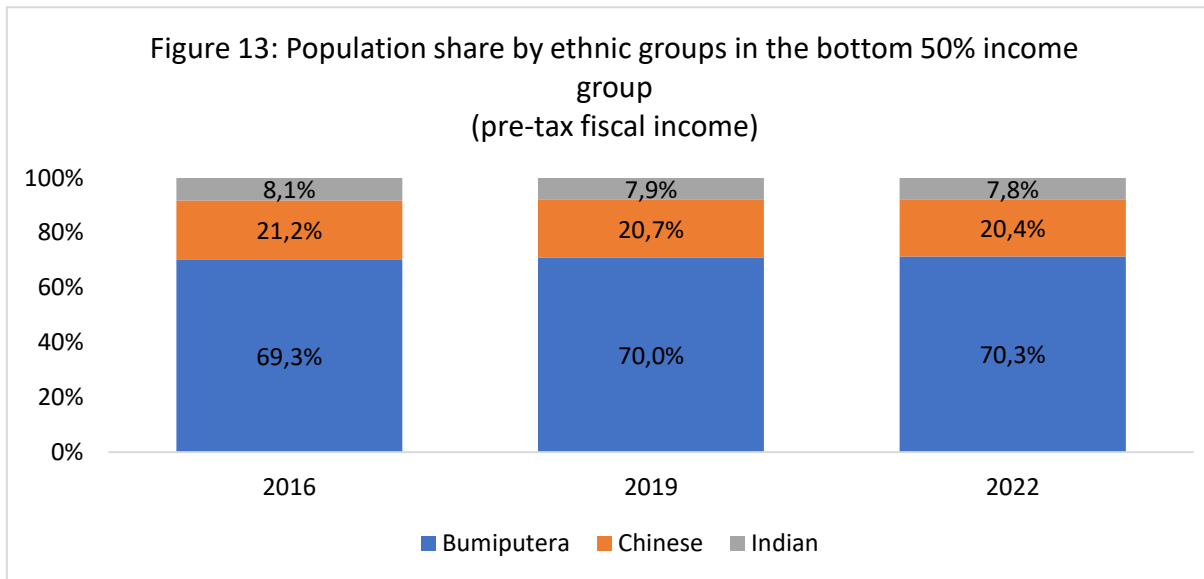Figure 11: Population share of income recipients by ethnic groups
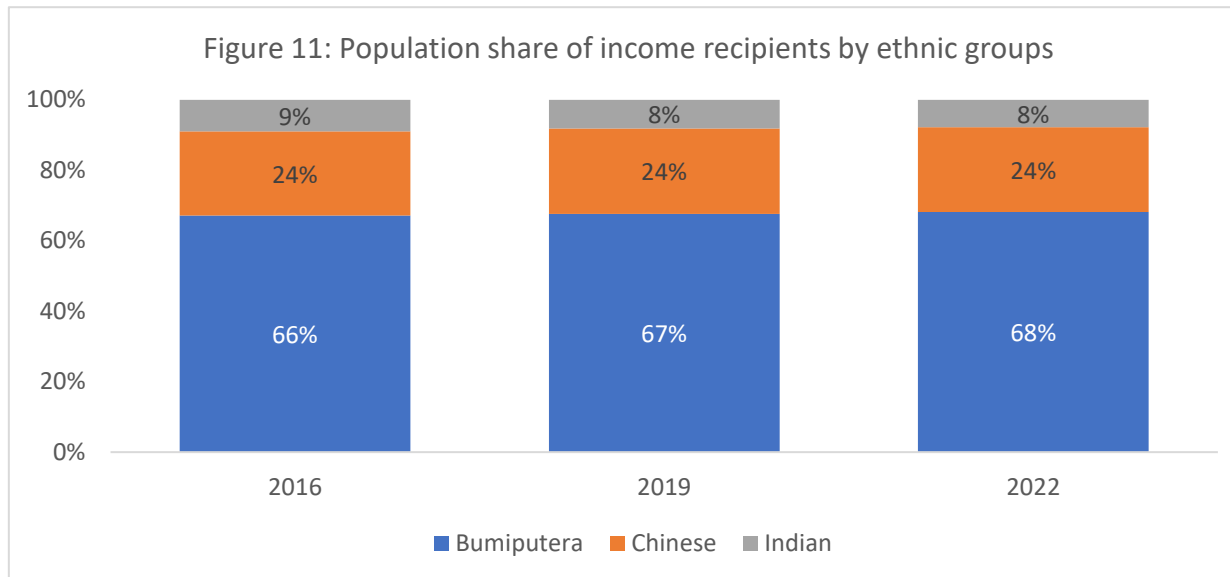
The composition of the top 1% of income earners does not mirror population structure and reveals a significant ethnic disparity in 2022. The Chinese constitute the majority of this group, making up about 56%, followed by Bumiputera at 34%, and Indians comprising the remaining 9% (Figure 12). However, compared to 2016, the share of Chinese in the top 1% has declined from 59% to 56% in 2022. Conversely, more Bumiputera have ascended to the top 1% by 2022, increasing from

33% in 2016. Despite this shift, the Chinese remain over-represented among the wealthy, though their dominance has slightly decreased compared to other ethnic groups.
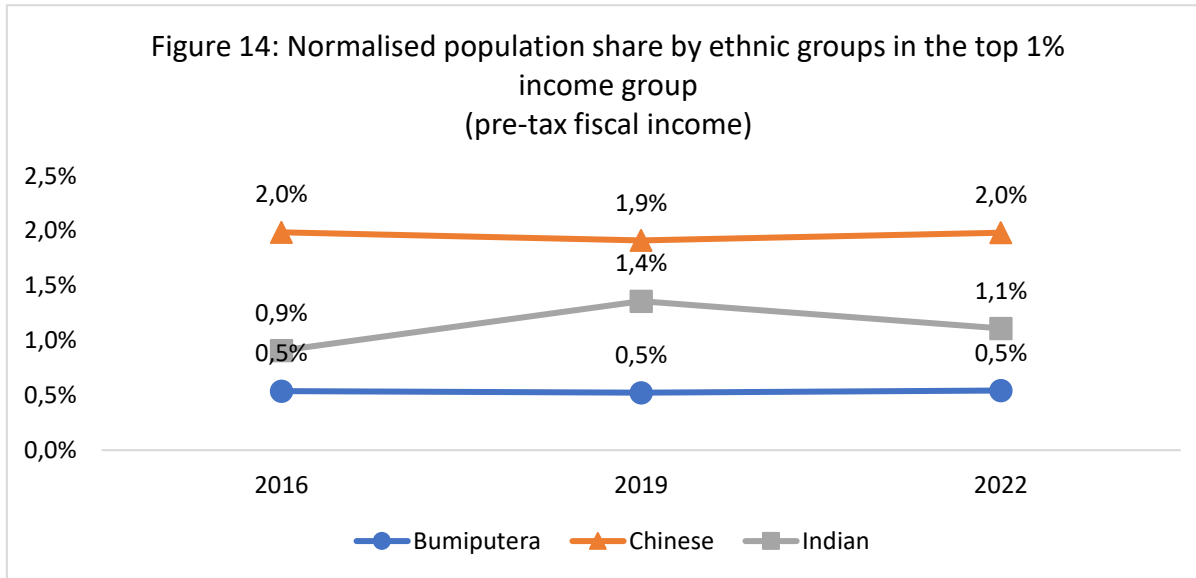
At the opposite end of the income distribution, the majority of those in the bottom 50% are Bumiputera. Their share in this income group has slightly increased from 69% in 2016 to about 70% in 2022 (Figure 13). During the same period, the percentage of Chinese and Indians in this lower income class has declined. This indicates that Bumiputera are over-represented in the lowest income class, while the Chinese are under-represented.

These findings highlight significant ethnic disparities in income distribution in Malaysia. The over-representation of Bumiputera in the lower income brackets and the continued dominance of Chinese among the wealthy suggest a need for targeted policy interventions that would allow for a more inclusive economic opportunities for all ethnic groups.

Figure 12 : Population share by ethnic groups in the top 1% income group (pre-tax fiscal income)

Figure 13: Population share by ethnic groups in the bottom 50% income group (pre-tax fiscal income)

In order to visual the over-representation and under-presentation by ethnic groups, we normalize the share of each ethnicity within an income class. For instance, to understand how much Chinese are over-represented (and Bumiputera and Indians are under-represented) at the top of income distribution, we normalize the share of Top 1% Chinese within total Chinese adults (the same treatment is used for Bumiputera and Indians). The results are shown in Figure 14. In 2016, 2.0% of the total Chinese population are in the top 1%, compared to 0.5% of total Bumiputera and 0.9% of total Indians (the benchmark is 1%, meaning all ethnic groups are equally represented). Compared to the Bumiputera and Indians, the Chinese are significantly over-represented. By 2022, the situation remains unchanged among Chinese (2.0%), Indian (1.1%), and Bumiputera (0.5%).

Figure 14: Normalised population share by ethnic groups in the top 1% income group (pre-tax fiscal income)

d. Decomposition of Income

To understand the dynamics of income, share among ethnic groups over time, particularly the reduction in the share of Chinese at the top and the increase in the share of Bumiputera at both the top and bottom, we need to decompose the pre-tax personal income share by income sources, such as wage income, self-employment income, property income, and transfer income.

For the top 1% income earners in 2022, wages and self-employment are the two primary income sources, contributing 5.2% and 4.7%, respectively (Figure 15). This contrasts with the situation in 2016, where self-employment contributed slightly more than wages. However, among the bottom 50%, wages and transfers remain the main income sources (Figure 16).

Figure 15: Decomposition of top 1% Income shares by income sources (pre-tax fiscal income)
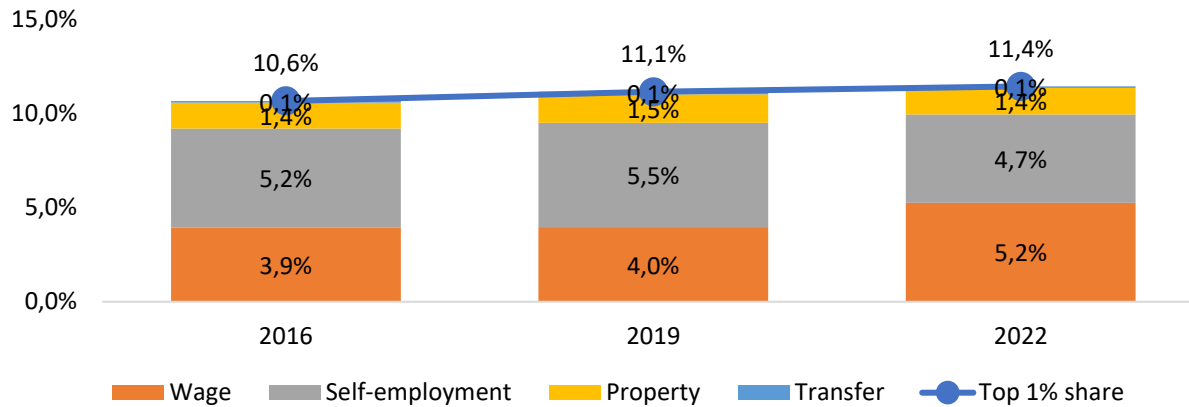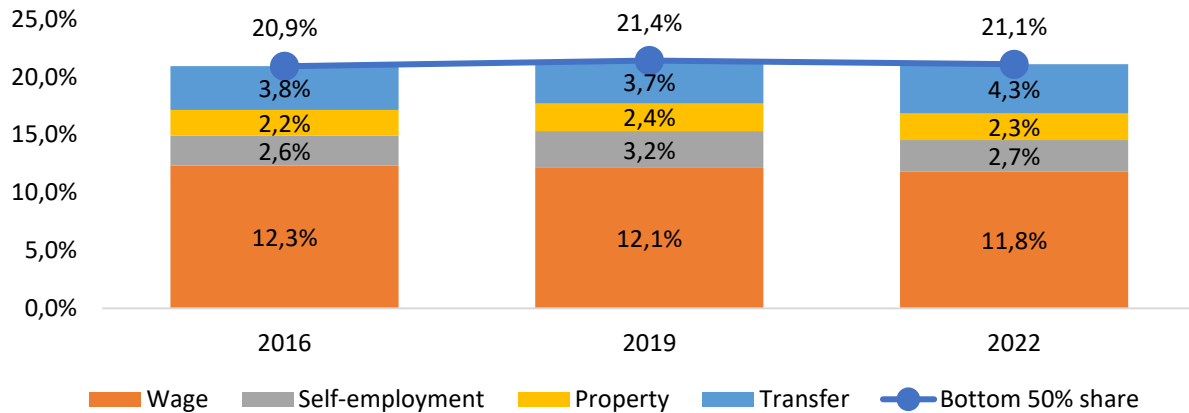

Figure 16: Decomposition of bottom 50% Income shares by income sources (pre-tax fiscal income)

What then contribute to the decline of Chinese in the top income class (top 1%) compared to the Bumiputera between 2016 and 2022? The increase in the share of Bumiputera in the top 1% between 2016 and 2022 is driven primarily by a significant rise in self-employment income, although wages still constitute a significant portion of their overall income (Figure 17). For the bottom 50%, the increase in Bumiputera income shares is driven by an uptick in transfer income. However, in 2022, the majority of income sources for this group remained wages, followed by transfers, self-employment, and property income (Figure 18).

Figure 17: Decomposition of Bumiputera income shares in the top 1% by income sources (pre-tax fiscal income)
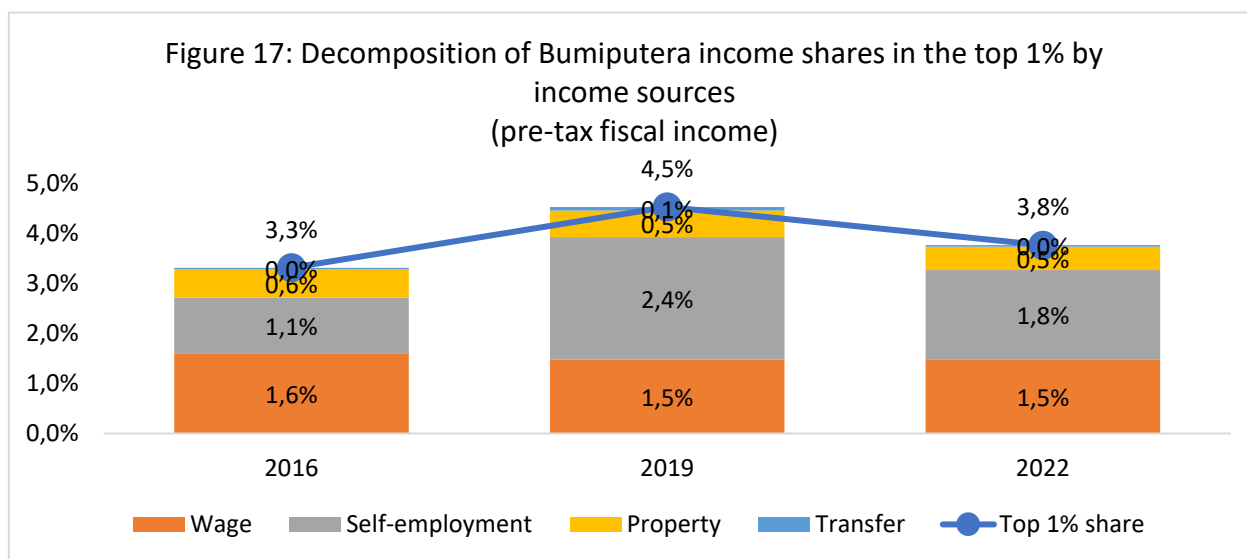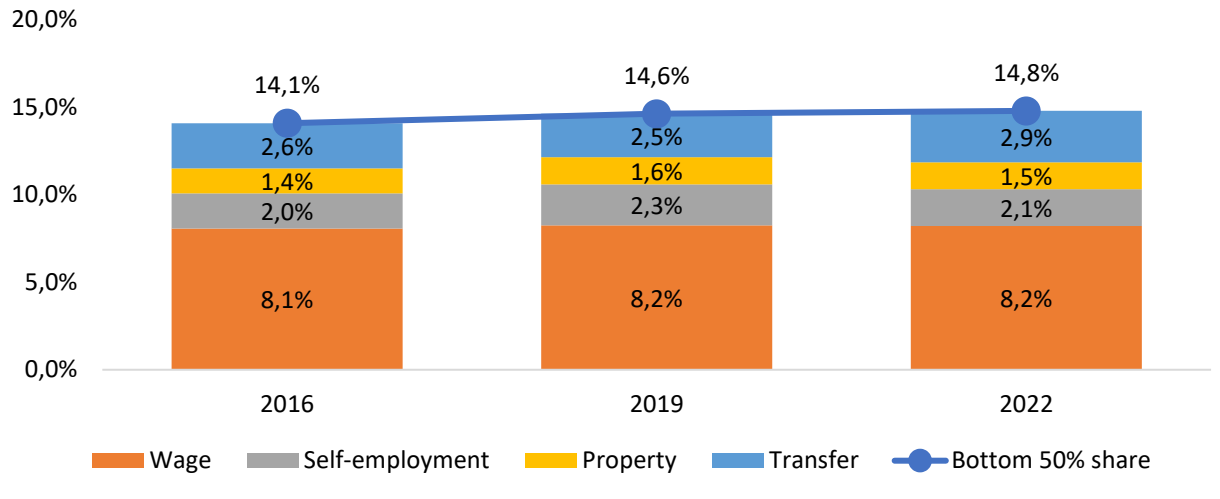
Figure 18: Decomposition of Bumiputera income shares in the bottom 50% by income sources (pre-tax fiscal income)

As shown in Figure 19, the income shares of the Chinese in the top 1% declined from 6.8% to 6.5% between 2016 and 2022, and these reductions are driven by the decline of self-employment income from 4.0% to 2.3% in the span of 6 years. While self-employment was the largest contributor to the pre-tax income of wealthy Chinese in 2016, by 2022, wages had become the dominant source of pre-tax income, different from the pattern observed among wealthy Bumiputera where the Bumiputera's main source of income has shifted from wages to self-employment income during the same period.

Unlike the bottom 50% of Bumiputera, who saw higher income shares between 2016 and 2022, the income shares for the bottom 50% of the Chinese declined from 4.3% to 3.8% during the same period. This decline was significantly influenced by the reduction in the share of wages contributing to their total pre-tax income (Figure 20).

Figure 19: Decomposition of Chinese income shares in the top 1% by income sources
(pre-tax fiscal income)

Figure 20: Decomposition of Chinese income shares in the bottom 50% by income sources (pre-tax fiscal income)
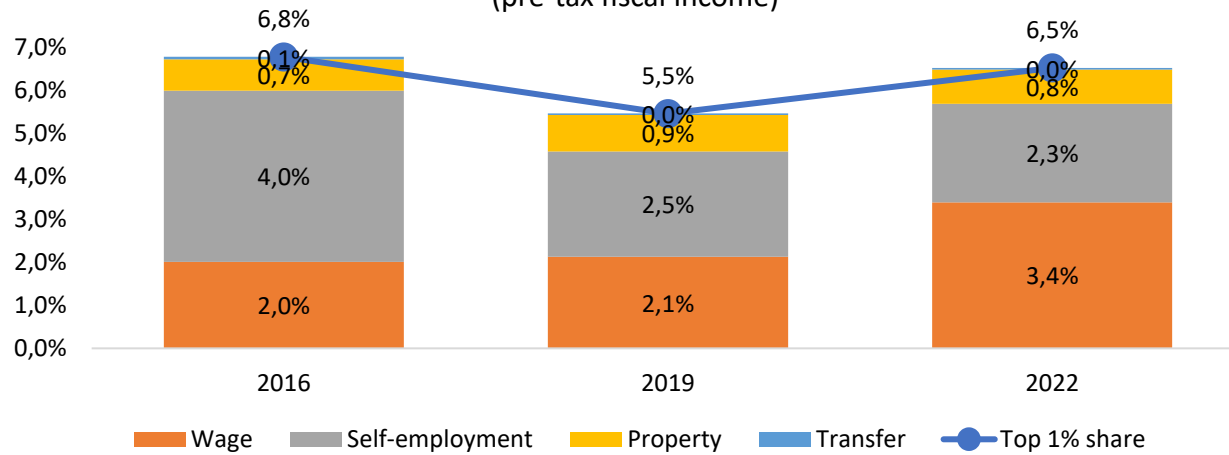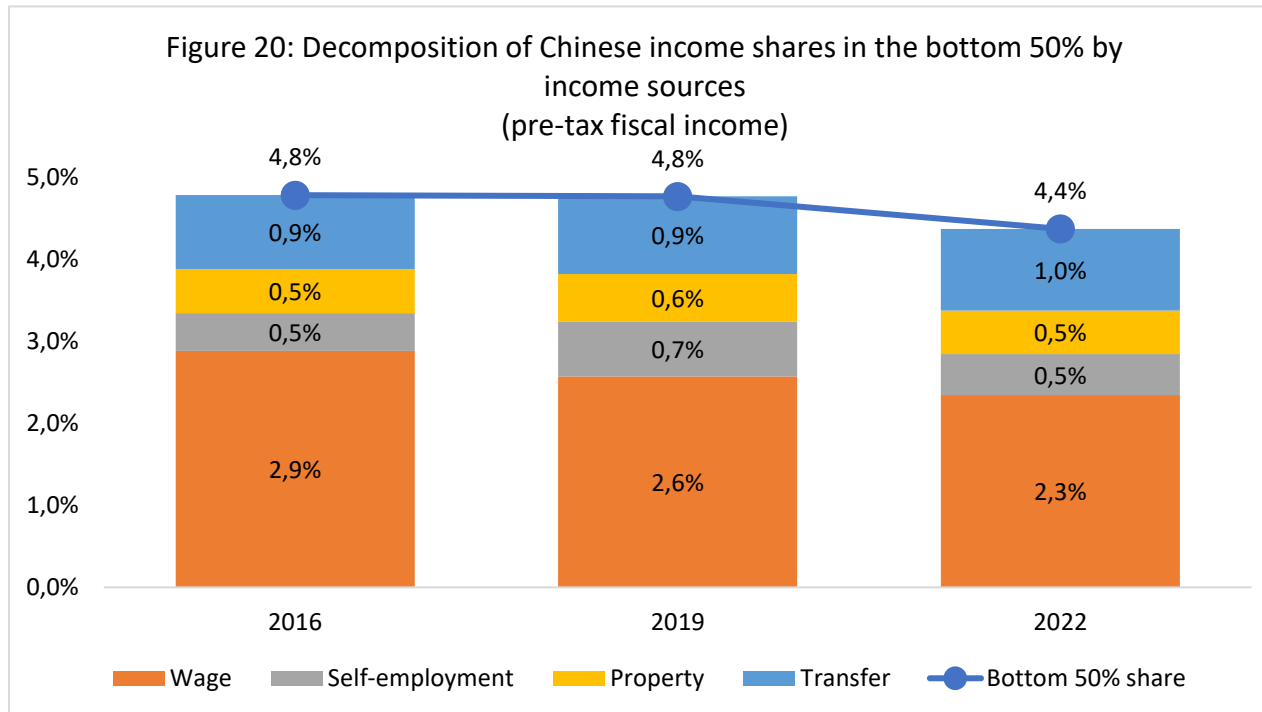
Concluding Comments and Perspectives

This study successfully documents the trends of income inequality in Malaysia from 2016 to 2022, not only at the national level but also by ethnic groups. By combining data from household surveys, tax records, and demographic statistics, we offer a comprehensive analysis that improves upon traditional methods relying solely on survey data. Such data often underestimates the income accrued by the very top earners. By employing the methodology of Khalid & Yang (2021), which integrates tax data into survey data, we more accurately reflect the income distribution, particularly among the wealthy.

In this paper, we obtain several important findings:

First, our analysis using fiscal income for the period of 2016-2022 confirms that traditional survey-based measures underestimate income inequality in Malaysia. The Gini coefficient, when calculated using pre-tax fiscal data, is about 2 percentage points higher than when using survey data. For instance, in 2022, the Gini coefficient using fiscal data was 42.4, compared to 44.8 using survey data. The share of income across income class and ethnic groups also show similar trends. This discrepancy highlights the importance of incorporating tax data to capture the true extent of income inequality.

Second, the analysis reveals that the Malaysian economy has become less inclusive over the study period. The income shares for the very wealthy (top 1%) increased from 10.6% to 11.4% between 2016 and 2022. Similarly, the income shares for the top 10% rose from 34.5% to 35.0%. In contrast, the income shares for the bottom 50% remained almost unchanged, at 20.9% in 2016 and 21.1% in 2022. The middle 40% saw their share decline from 44.6% to 44.0%. Among ethnic groups, the Chinese and Indians remain the most unequal, with significant disparities compared to Bumiputera.

Third, the decomposition of income by ethnicity and class shows persistent disparities. On average, Malaysian Chinese are significantly wealthier than Bumiputera or Malaysian Indians. In 2022, 2.0% among Chinese were in the top 1% income group, which are over-represented: compared to 0.5% among Bumiputeras and 1.1% among Indians (benchmark 1%). Chinese remain over-represented at the top, while Bumiputera are over-represented at the bottom. Although there has been a slight increase in Bumiputera representation at the top income levels, they remain the majority in the lower income brackets.

Fourth, the study finds a notable shift within the Bumiputera population, with a slight increase in their representation among the top income earners. However, this trend is primarily driven by gains in self-employment income rather than broader systemic changes in wage employment or wealth creation through property ownership. Regardless, the increase in the Bumiputera representation at the top shows that the economic growth during the study period has benefited Bumiputera in the top income groups (top 1%) more than other ethnic groups.

While our current estimations of inequality provide some insights, they remain tentative due to limited access to detailed statistics on income tax and financial asset ownership. Enhanced data accessibility and transparency are crucial for developing a more accurate and comprehensive understanding of economic disparities. Such improvements are essential for crafting effective policies that address and mitigate inequality, ensuring inclusive growth that leaves no one behind.

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