



## Educational & income disparities among ethnic minorities of China



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### ABSTRACT

While disparities between Han and non-Han groups are well established in China, little is known about which ethnic minorities experience the greatest disparities or how these have changed over time. This study examines disparities in income and educational attainment across six of China's largest ethnic minority populations and how they have changed over the past two decades. Analyses included 66,077 observations over ten waves (1989–2015) of the China Health and Nutrition Survey (CHNS) which also includes information on specific ethnic identification. We found substantial disparities between ethnic minorities in both their income and educational attainment, and these disparities either persisted or grew over time. These disparities also remained when controlling for rural residence. These results suggest that despite years of explicit government efforts to create equality among ethnic groups, such disparities persist and have in some cases grown.

### 1. Introduction

Worldwide, ethnic minorities often enjoy fewer socioeconomic opportunities than majority groups within a country. For these reasons, ethnic minorities frequently experience disparities in educational outcomes—in grades, test scores, dropout rates, and graduation rates, as well as income (Mickelson, 2003; Alesina et al., 2016).

China has 56 officially recognized ethnic groups, including the dominant Han Chinese. Before the People's Republic of China was founded in 1949, ethnic minorities were often a part of serf and slave systems, where they served as vassals of different feudal lords and nobles with no true personal freedom (Houdi, 1997). However, after the People's Republic of China was officially established, democratic reforms created in the late 1950s abolished these practices and gave tens of thousands of minorities the right to own land and have personal freedom. Despite progress towards equal rights for ethnic minorities, the Cultural Revolution of the 1960s and 1970s again disregarded the rights and practices of minorities through forced assimilation under the demands of former Chinese President Mao Zedong. The following Chinese President, Deng Xiaoping, would recognize this unfair treatment and passed a historical resolution document in 1981 to promise such an event never occurs again. Current Chinese President Xi Jinping has clear goals of modernization and assimilation which some have argued takes away the personal freedom of ethnic minorities (Debata, 2022).

Although the Chinese constitution states that “all ethnic groups in China have the freedom and right to use and develop their own spoken

and written languages,” the CCP has eliminated the use of minority languages in many schools across the country. In an attempt to increase national unity, Beijing recently released a revised blueprint for childhood development that denies the right of minority children to be taught in their native language (Pace, 2012).

Although President Xi had vowed to eliminate poverty by the year 2020, there are still several minorities, especially in the Yunnan province, facing such issues (Smith, 2018).

In China, several studies have shown ongoing disparities between Han Chinese and non-Han minorities (Ouyang and Pinstrup-Andersen, 2012). For instance, while the overall health and nutrition of the Chinese population have generally improved with economic growth, the health and nutrition gap between minorities and the Han drastically widened (Ouyang and Pinstrup-Andersen, 2012). This health and nutrition gap faced by minorities indirectly affects future generations of these minority groups. For example, studies show that minority children are often worse off due in part to intergenerational transmission of educational and economic barriers (Ouyang and Pinstrup-Andersen, 2012). An example of this are differences in the level of per-student educational spending between minority and non-minority regions (Tsang and Ding, 2005).

Despite numerous studies on general Han and non-Han distinctions, we know very little about disparities that exist between specific minorities. Limited studies in heavily minority-concentrated regions, however, give us some information about specific ethnic groups. For example, Xinjiang, an autonomous region in Northwestern China with a

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large Uyghur population, is a very low-income region and therefore lacks resources in education regarding teaching materials and teacher training (Leibold, Chen, 2014). Furthermore, due to language policies implemented by the People's Republic of China (PRC), those living in minority regions such as Xinjiang are forced to use English and Chinese along with their own ethnic minority language when in school (Adamson and Feng, 2009). The Zhuang, Uyghur, and Yi are only some of the groups said to be negatively affected by this trilingual education system (Adamson and Feng, 2009).

Outside of these coarse-grained regional comparisons, there is little information about disparities between China's many ethnic groups at the individual level. To address this gap, this paper examines disparities between 5 ethnic groups (e.g., Miao, Buyi, Man, Tujia, and Han) in both educational outcomes and income. It also examines how educational and economic disparities have changed over a 25-year period (1989–2015).

## 2. Methods

### 2.1. Sample

The China Health and Nutrition Surveys (CHNS) surveyed samples from eight Chinese provinces over ten waves, from 1989 to 2015. The eight provinces vary dramatically in economic development, demographic factors, and health. To ensure diversity within provinces, surveyed areas were organized by income (low, middle, and high), where a weighted sampling scheme was then used to randomly select four different counties in each province. Additionally, villages, townships, and urban/suburban neighborhoods were randomly selected within those counties. The fifteen regions used in the survey include: Beijing, Chongqing, Guangxi, Guizhou, Heilongjiang, Henan, Hubei, Hunan, Jiangsu, Liaoning, Shaanxi, Shandong, Shanghai, Yunnan, and Zhejiang. The education and income data set used in this study did not include participants from the three regions added in 2015 (Shanxi, Yunnan, and Zhejiang). The study also did not use data from Heilongjiang (added in 1997), Beijing, Chongqing, or Shanghai (all added in 2011) since they were not included since the beginning of the survey. This did not, however, stop the survey from gathering educational and income data from the other nine regions in 2015. The CHNS is the only publicly available data set concerning individual demographic background and socioeconomic status in China, making it especially useful when it comes to comparing factors of education and income among ethnic groups in the country. The data set also includes a wide range of socioeconomic factors (health, modernization, employment, etc.) for each individual, which become useful when investigating possible contributors to different disparities.

In order to refine the results of the study, filters were applied to the data set. For instance, those who did not provide an answer for "Nationality" in the questionnaire (4.1 %, 3461 participants) were not included in the final observations. Those who did not provide an answer for their education level, 3.0 % of respondents (2524 participants), were also filtered from the education data set. Participants were also filtered by age (21+ years old) in the data set during each wave to ensure that they have had the chance to obtain each education level at the time of them taking the survey. These filters narrowed the number of observations from 83,813 to 77,828 in the data set. No filters were used regarding income since every individual in the survey reported some form of revenue during each wave.

The dataset (Table 1) included sufficiently large samples of five ethnic groups for individual analysis—Han Chinese, Miao, Buyi, Man, and Tujia. Of the 1.4 billion people that live in the country, the Han Chinese constitute about 92 % of China's overall population. They have also been regarded as the most economically, culturally, and politically dominant group since the beginning of China's history (Chua, 2000). The Man, consisting of people deriving from the historical region of Manchuria, make up 10.4 million of the country's population (Vollmer,

**Table 1**  
CHNS sample sizes by survey year and ethnic group.

Year	Han	Miao	Buyi	Man	Tujia
1989	6183	246	172	178	135
1991	6705	263	179	196	152
1993	6500	254	194	173	157
1997	5947	250	263	2	147
2000	5862	205	262	123	126
2004	5478	201	218	196	120
2006	5265	207	187	180	109
2009	5586	228	197	199	112
2011	5522	184	179	194	105
2015	5833	196	189	201	117

2002). They are the fourth largest ethnic group in China. While they are the largest minority group without an autonomous region, most Man today reside in Liaoning. Socioeconomically, the Man are advanced and not viewed too differently from the majority Han. Because of this, they face a minimal amount of discrimination. The Miao refers to a group of linguistically related people (Hmu, Qo Xiong, A-Hmao, and Hmong), mainly residing in Southern regions such as Guizhou, Yunnan and Sichuan (Michaud, 1997; Bilik et al., 2004). They are the 6th largest ethnic group in China. Of the 9 million Miao living in China, one-third of the group classifies as Hmong. Although many Miao are in the general labor force, tourism is a major economic contribution to the group's economic success. The Tujia inhabit the Wuling Mountains with a population of just over 8 million people. They mostly reside in the Chongqing, Hubei, Hunan, and Guizhou regions. They are the 8th largest ethnic group in China. Although they are one of the officially recognized minority groups in China, many still identify as Han Chinese (McLaren, 2020). The Tujia often rely on agriculture for their economic livelihood. The Buyi, consisting of 2.5 million members, reside primarily in Southern China. The Buyi are one of the country's oldest ethnic groups, occupying the Guizhou area for more than 2000 years (Chen et al., 2007). They are China's 11th largest ethnic group. A large majority of Buyi in the country rely on agricultural practices to make a living in the Guizhou and Yunnan regions of the country. The Buyi people also often serve as merchants (Chen et al., 2007).

Minority groups that were individually analyzed all had at least 100 participants during each wave. These groups include the Miao, Buyi, Man, and Tujia. When making Han and non-Han comparisons, other minority groups (Zhuang, Mongolian, Hui, Tibetan, Vaguer, Yi, Korean, Dong, Yao) that did not meet the participant criteria were included in the "non-Han" category when being compared to the majority Han. While the Han have a large presence in every region included in this survey, that is not the case for minority groups. The Miao, Buyi, and Tujia are concentrated in Guizhou, while the Man are mostly located in Liaoning (as seen in Table 2).

### 2.2. Measured variables

#### (a) Ethnic group

Participants were categorized by ethnic group depending on their "Nationality" response to the questionnaire. All nationality

**Table 2**  
Ethnicity/Region Observations.

Region	Han	Miao	Buyi	Man	Tujia
Liaoning	5315	0	0	1608	0
Jiangsu	9530	2	0	14	0
Shandong	7835	0	0	0	0
Henan	7956	0	0	0	0
Hubei	8836	3	0	0	37
Hunan	6846	605	0	6	88
Guangxi	8665	4	0	7	0
Guizhou	3898	1620	2040	7	1155

information was taken from the master individual identification data set which contained information regarding topics such as date of birth, gender, and ethnic identification. Possible ethnic group identifications include Han, Mongolian, Hui, Tibetan, Vaguer, Miao, Yi, Zhuang, Buyi, Korean, Man, Dong, Yao, and Tujia.

(b) Education level

Within the education portion of the questionnaire, the highest education level attended by each participant was recorded during each wave. Options regarding attended education level included: no school, primary school, middle school, technical school, and college. We focused on three outcomes—(1) no schooling, (2) middle school or higher, and (3) college—with substantial variation that represent extreme poles and a middle level of educational trajectories.

(c) Income

The individual net income from all non-retirement wages of each survey participant was also recorded for each wave. Sources of income in the questionnaire include business, farming, fishing, gardening, and livestock. Individual net income was constructed as the sum of income from each of these sources. The calculated income values of every individual during each wave were then inflated to the 2015 Chinese Yuan value to compensate for the fluctuating value of the Chinese Yuan since 1989. In the case that households would report negative net income from any of these sources, individual income for that activity would also be negative for any participant living in that household.

(d) Rural/Urban residence

Whether an individual resided in a rural or urban area was also considered during both education and income analyses. During each wave, participants would have a choice to mark whether they lived in a rural or urban community. This could change over time if a survey participant moved to a different location and continued their participation. Ultimately, this measure was added to check for confounding regarding income and education levels in relation to ethnicity.

(e) Response rate

Response rates were calculated for the Han, Miao, Buyi, Man, and Tujia during each wave. The accumulative response rates for all minority groups under the “non-Han” category were also calculated. These response rates assist in making sure that results gathered from the questionnaire are truly representative of the ethnic groups included in the study. Low response rates also allow for exploration regarding why certain ethnic groups did not participate as much during certain years.

$$\text{Response Rate} = \frac{\text{Number of completed survey responses}}{\text{Total number of survey respondents}} * 100$$

### 2.3. Analytical process

All survey data are processed and analyzed in the integrated development environment RStudio (v1.4.1717). Packages used for pulling and manipulating data include gapminder (v0.3.0), dplyr (v1.0.7), and tidyverse (v1.3.1).

(a) Educational comparisons

To examine historical changes in educational outcomes, we plotted the proportion in each ethnic group having at least some middle school education for each of the ethnic groups across all survey waves. We also stratified plots by urban and rural residence.

A logistic regression was also used to examine the impact of ethnicity on middle school attainment, controlling for survey year, province, and rural residence. This was ultimately used to investigate what effect ethnicity had on the education levels of

the Han vs. non-Han categories over time. Whether or not an individual lived in an urban or rural area was added as an independent variable in the logistic regression model to check for possible confounding.

(b) Income comparisons

Average net income values of each ethnic group were plotted from year to year using line graphs. We also stratified plots by urban and rural residence.

A linear regression was used to examine the effect of ethnicity on income controlling for rural residence, province, and survey year.

## 3. Results

### 3.1. Response rates

Response rates for education generally see an increase and are mostly 100 % from 2004 to 2015 (Fig. 1). It was typical for ethnic groups to have their lowest response rates in 1997 or 2000. This is mainly due to a major flooding event that caused ~25 % of the rural population sample to move away in a scattered fashion. It would take years of major housing redevelopment for the sample population of these provinces to restabilize. Other factors for low response rates during these times include missing people, large numbers of children being sent to boarding schools, and migrant work for those aged  $\geq 16$  years.

Response rates of the Man are noticeably smaller than that of other groups in the years 1997 and 2000. Combined with reasons such as natural disasters and migrant labor, this is more than likely a consequence of the survey not including the province of Liaoning in the 1997 survey. Liaoning is home to about half of the Man population, so many Man (105 participants) were missing when the survey continued during those years. Liaoning was readded to the survey in 2000, but it was not until 2004 that Liaoning had a stable population of participants to continue taking the survey.

### 3.2. Minority-Han comparisons in education

(a) Individual ethnic group education levels

Fig. 2 and Fig. 3 show the education levels of the Han, Miao, Buyi, Man, and Tujia from 1989–2015. Across all of these ethnic groups, we saw a general upward trend in middle school attainment or higher and a general downward trend in no schooling.

All ethnic groups showed improvement in educational outcomes during the 25 year period (1989–2015). Notably, one of the minority groups, the Man, had both the lowest no-school rates and the highest attainment of at least middle school. The Han followed the Man, and then the Miao, Buyi, and Tujia generally had lower educational outcomes than the Han. This stays true for

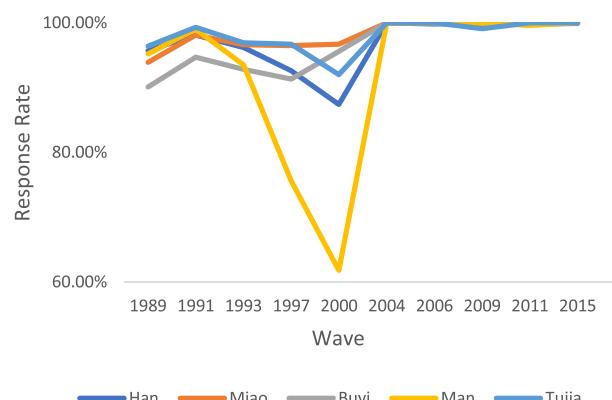


Fig. 1. Longitudinal response % of all ethnic groups.

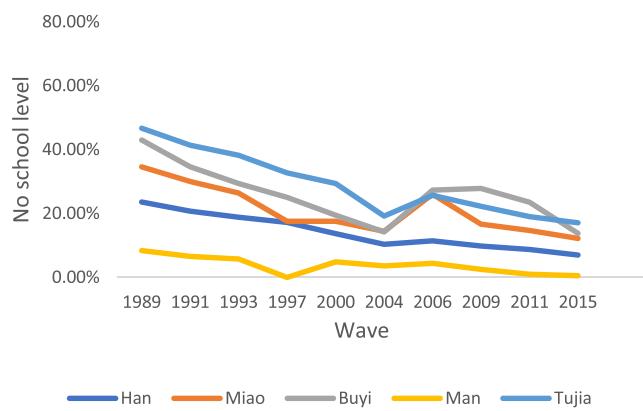


Fig. 2. % with no school among all ethnic groups.

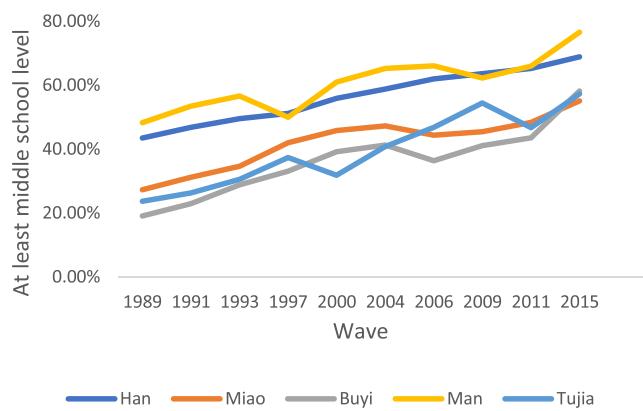


Fig. 3. % with at least middle school among all ethnic groups.

higher education comparisons as the Han and Man all had growing levels of college attainment as time went on in comparison to the Buyi and Miao (Fig. 4).

#### (b) Han vs non-Han education rates

When considering all minorities versus Han (Fig. 5), we found that both Han and non-Han groups showed improvements in educational outcomes over the 25 year period. However, the Han maintained a persistent advantage in both attainments of at least some schooling and at least some middle school. The Han also have a growing advantage of college attainment since the start of the study (Figs. 6 and 7).

More distinctions also arose when searching for possible confounding regarding where participants resided. For example, minorities residing within urban areas faced larger disparities in

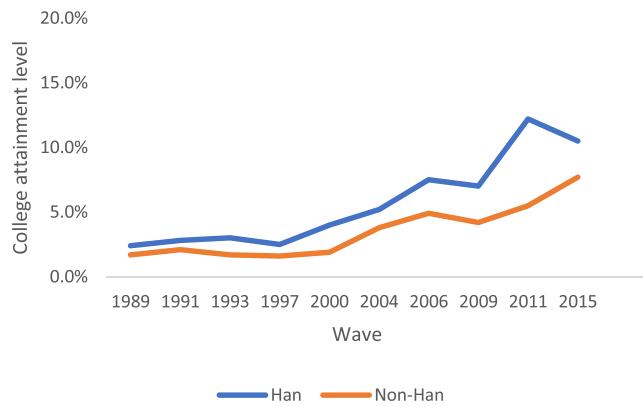


Fig. 4. % college attainment among all ethnic groups.

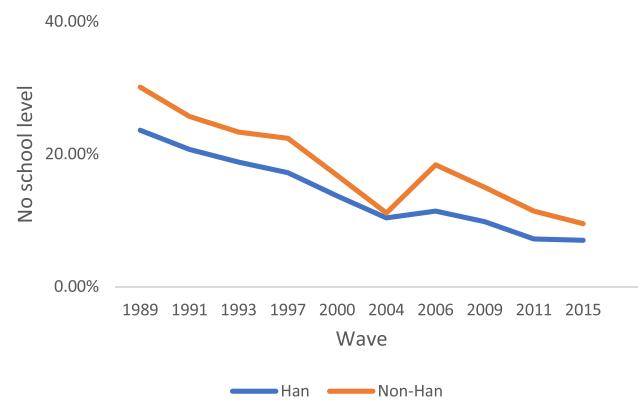


Fig. 5. % with no school between Han versus minorities.

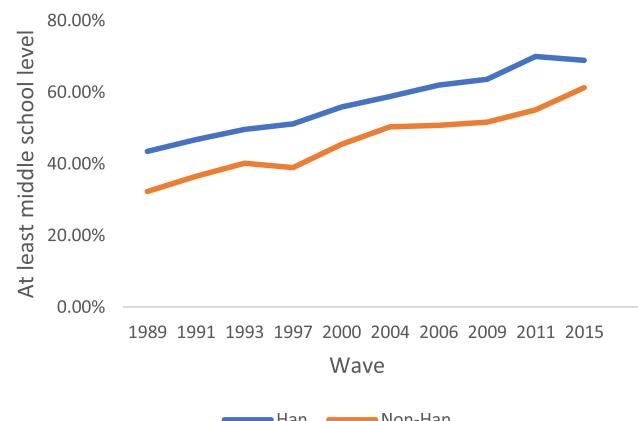


Fig. 6. % at least middle school between Han versus minorities.

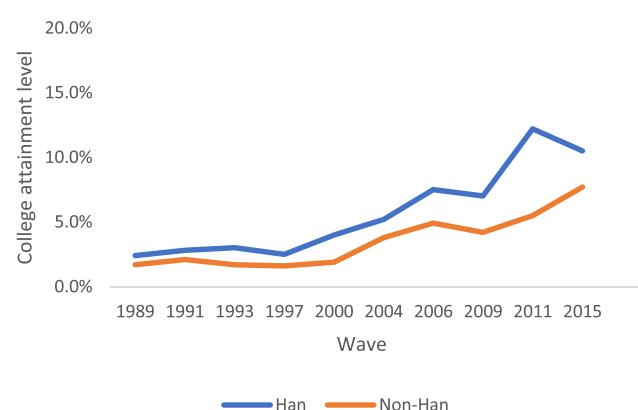


Fig. 7. Longitudinal college attainment % of Han versus minorities.

the attainment of some middle school education compared to Han than did minorities in rural areas (Fig. 8 & Fig. 9). Although not as large, minorities in rural areas also faced income disparities in comparison to the majority Han.

#### (c) Regression analysis

After adjusting for survey year and province, middle school attainment is significantly higher in urban areas than in rural areas (Table 3). There is also significant variation between ethnic groups in their educational attainment relative to Han Chinese. The Man have a significant educational attainment advantage over the Han. The Buyi have roughly equivalent educational attainment with Han Chinese, and Tujia and Miao have lower educational attainment (Table 4).

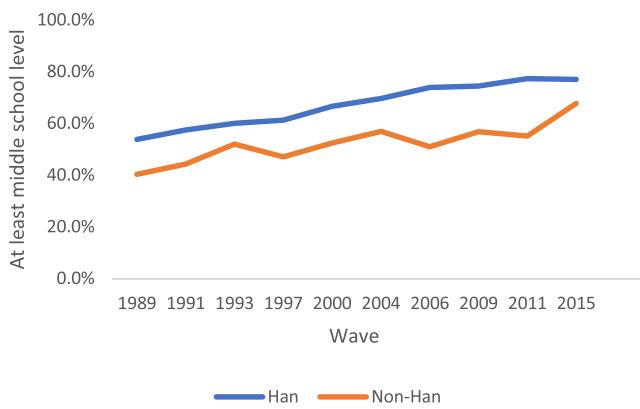


Fig. 8. Longitudinal at least middle school % of Han versus minorities (Urban).

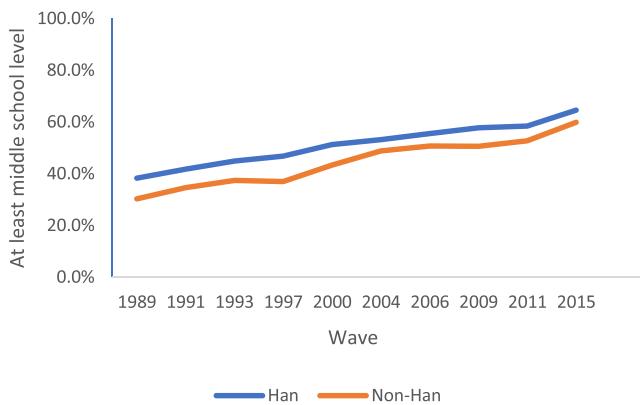


Fig. 9. Longitudinal at least middle school % of Han versus minorities (Rural).

Table 3

Education-ethnicity logistic regression data, controlling for survey year and province.

Variables	Coefficient	95 % CI
Urban	0.401***	[0.382, 0.421]
Miao	-0.176***	[-0.220, -0.133]
Buyi	-0.011	[-0.055, 0.033]
Man	0.220***	[0.104, 0.484]
Tujia	-0.214***	[-0.263, -0.164]

\*\*\*p < 0.01,

\*\*p < 0.05,

\*p < 0.1.

Table 4

Income-ethnicity linear regression data, adjusting for survey year and province.

Variables	Coefficient	95 % CI
Urban	3550.7 ***	[3392.4, 3708.9]
Miao	-1172.5 ***	[-1576.6, -768.4]
Buyi	-1886.0 ***	[-2329.8, -1442.2]
Man	-808.1 ***	[-1320.1, -296.2]
Tujia	-1436.0 ***	[-1943.6, -928.4]

\*\*\* p < 0.01,

\*\* p < 0.05,

\* p < 0.1.

### 3.3. Minority-Han comparisons in income

#### (a) Individual ethnic group income data

The average net income of the five analyzed ethnic groups from 1989 to 2015 is listed above in Fig. 10. The average income of all

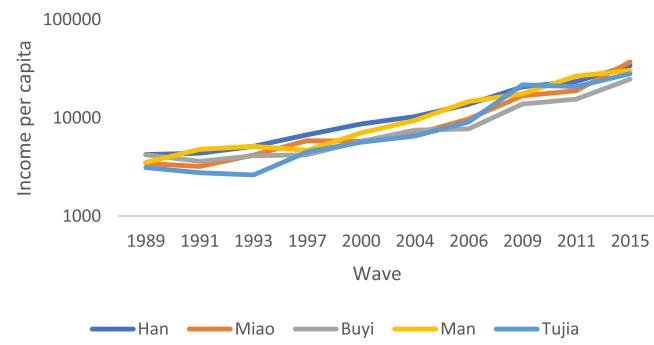


Fig. 10. Longitudinal income of all ethnic groups.

groups has generally trended upward since the survey started. However, it is also apparent that some groups have been better off than others in terms of the rate of these changes. Again, the Man and Han have the highest income across the 25 years, while the other three ethnic groups maintained lower levels. (Fig. 11).

#### (b) Han vs. non-Han comparison of income

When comparing Han vs. non-Han groups, the Han had a persistent advantage in income over minority groups combined.

Minorities in urban areas faced larger disparities regarding income than minorities in rural areas (Fig. 12 & Fig. 13). In rural areas, there were smaller disparities in income between Han and non-Han minorities.

#### (c) Regression analysis

After controlling for province and survey year, living in an urban area is associated with a higher income. Unlike the findings for educational attainment, all ethnic minorities had lower incomes than Han Chinese. However, there was substantial variation in the disadvantage experienced by different ethnic groups, with the Man showing the least disadvantage and Buyi showing the greatest disadvantage.

## 4. Discussion

This study examined differences in education levels and income among five ethnic groups in China between 1989 and 2015. Despite improvements in both education and income across all ethnic groups, substantial educational and economic disparities persist among the ethnic minorities of China. When comparing Han Chinese and non-Han minorities, the Han advantage in educational attainment and income was substantial and persisted over time. However, simply comparing Han to non-Han minorities misses important differences in the experience of each minority group. For example, while Han have higher educational and economic attainment than all minorities combined, after adjusting for province and survey year, one minority group—the

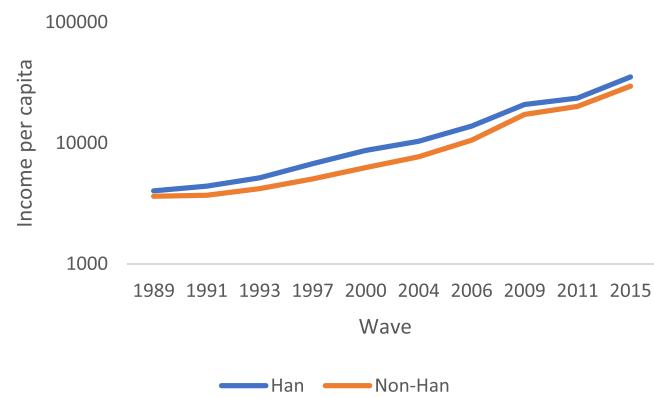


Fig. 11. Longitudinal income of Han versus minorities.

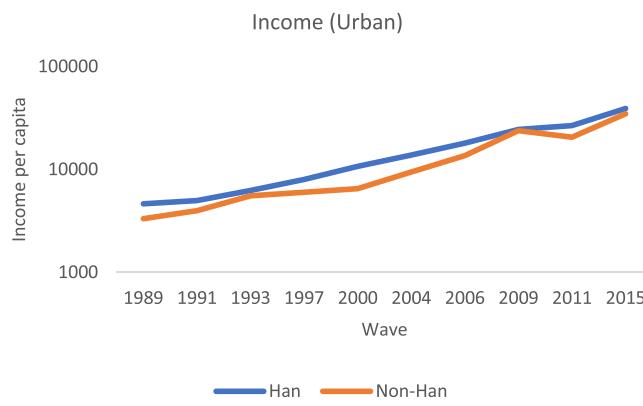


Fig. 12. Longitudinal income of Han versus minorities (Urban).

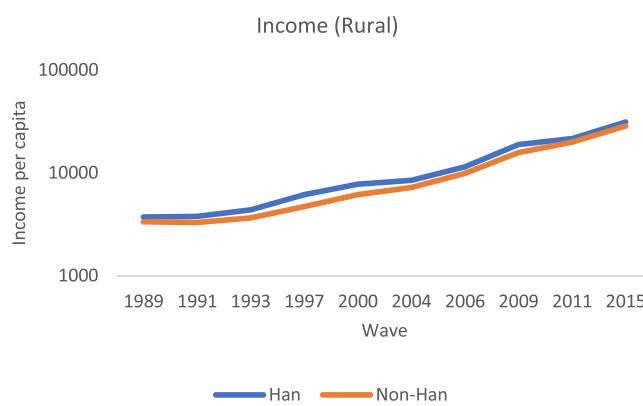


Fig. 13. Longitudinal income of Han versus minorities (Rural).

Man—have generally higher attainment than Han, one minority group—the Buyi—have comparable educational attainment, and two—Miao, Buyi, and Tujia—have lower attainment. While all four minorities had lower average incomes than Han Chinese, there was still substantial variation with Man having the least disadvantage and Buyi having the most.

Potential mechanisms for persistent differences between Han and non-Han in both education and income could be the increasing prominence and assertion of Han nationalism since 1995 (Minority Rights Group, 2017). This has reportedly led to an increased limitation in the areas of official use of minority languages as there is an increasing sense of monolingualism in the country. As a result, minorities have had fewer educational and employment opportunities. Economic development in the heavily minority-concentrated regions of the country could also have a role. The Buyi and Miao are some of the groups said to have faced such relocation (Minority Rights Group, 2017). Additionally, the long-established history of the Man in China, such as their rule and control of the country during the Qing Dynasty (1636–1912) could be a mechanism for their high levels of educational attainment and income. No other minority group has ever held such power in the country, perhaps explaining the disparities seen.

The current study has several limitations. First, there were a very limited number of minorities (7500 total observations) in the study

compared to the Han Chinese (69,143 total observations) throughout the ten waves. The CHNS survey only sampled 9 of China's 31 provinces, and included one of the minority autonomous regions—the Guangxi minority autonomous zone. For these reasons, the CHNS sample does not include some of China's largest minorities. Future work focusing on other samples, such as the 1 % mini census, would help explore ethnic disparities across the full range of China's ethnic groups. Future work CHNS and the 1 % mini census, should also explore the potential reasons (e.g., language advantage, poverty alleviation programs) have played in both long-term changes in educational and income outcomes and ongoing ethnic disparities.

The results of this study indicate a general improvement in education levels among the ethnic groups of China. However, disparities have persisted, despite government efforts to reduce ethnic inequalities in educational and economic opportunities. Not only can this create future quality of life issues for disadvantaged groups (Ouyang and Pinstrup-Andersen, 2012), but this can also lead to a serious wage difference between the groups, which is consistent with the results of this study. Analysis from this study shows the Man and Han also have the highest income across the 25 years of the survey.

#### CRediT authorship contribution statement

**Thomas Chia:** Conceptualization, Methodology, Software, Formal analysis, Investigation, Data Curation, Writing – Original Draft, **Daniel Hruschka:** Supervision, Conceptualization, Methodology, Software, Formal analysis, Investigation, Data Curation, Writing – Original Draft, Resources.

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