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Outsider ethnic minorities and wage determination in China

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Abstract. *While some studies on urban ethnic minorities in China indicate that they earn lower wages relative to the Han majority, others show little evidence of this gap. To understand this contradiction, the authors propose that the primary issue is a failure to fully disaggregate ethnic minority groups' labour market experiences. Leveraging a large data set looking at China's ethnic minorities, findings suggest that "outsider minorities", such as Tibetans and Turkic groups, suffer a significant wage penalty when controlling for covariates, while minorities in aggregate do not. These findings are robust across various specifications and have notable theoretical and policy implications.*

Urban ethnic minorities often report difficulties in securing jobs or fitting into the workplace due to their ethnic status (see Hasmath, 2008 and 2011a; Hasmath and Ho, 2015). Nevertheless, quantitative studies looking at urban minorities in China generally have not found a significant earnings gap between the ethnic Han majority and these minorities. To account for this discrepancy we leverage a new large-scale data set of urban ethnic minority residents in China, which allows us to conduct a refined disaggregation by minority type.

Ethnic minorities in China encompass groups of people that have vastly different cultural practices, demographic profiles and perceived status in the eyes of the Han majority (see Hasmath, 2010; Maurer-Fazio and Hasmath, 2015). These groups can range from the stereotyped, hard-working Korean ethnic minority in north-east China (Jeong, 2014) to the exoticized Dai (Thai) minority in southern China (Gladney, 1994) and the "fearsome" western minorities (Gladney, 2004). These various portrayals and the perceived status of

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ethnic minorities in China have waxed and waned over time. In urban settings, many minorities that are considered non-threatening to Han citizens (for example, the Zhuang people) are relatively well integrated into modern Chinese working life. On the other hand, those that are culturally speaking the furthest from the Han and most easily identifiable as different, such as Tibetans and Turkic ethnic groups (e.g. Uyghurs, Kazakhs, Salars, Kyrgyz and Tajiks), continue to be viewed as outsiders and perhaps unassimilable (see Hasmath, 2014).

Suffice it to say, such outsider minorities can be perceived by the State and the Communist Party of China as a threat to their legitimacy given their potential to incite national disintegration (see Hasmath, 2019). In fact, negative portrayals of some outsider minorities have, in recent years, been reinforced in the media due to the actions of various ethnic-oriented, social movements within China. Repeated instances of ethnic minority social unrest, attributed to Uyghurs and Tibetans in particular, have generated significant negative coverage in Chinese media. Minorities from these groups have reported finding it difficult to get along with Han residents in urban settings (see Baranovitch, 2003; Hasmath, 2014 and 2019), and Han residents report feeling that, among the 55 ethnic minority groups in China, these particular minorities are the least like them (Mercille, 2005). Such attitudes have attracted a lot of attention from sociologists, anthropologists and media outlets attempting to understand minority–majority cultural dynamics (see Kolås, 2008). However, the concrete differences in socio-economic outcomes that result from perceived cultural "otherness" have not been thoroughly investigated (for an exception, see Wu and Song, 2014).

To address this problem and explore the position of outsider minorities in the labour market, we test, first, whether outsider minorities differ from other minorities (hereinafter "insider minorities"), controlling for relevant covariates in labour market outcomes; and, second, whether insider and outsider minorities show significant differences in labour market outcomes compared to Han residents. The results of this investigation will shed light on contemporary urban ethnic minority experiences in the labour market and bridge the gap between previously divergent qualitative and quantitative research findings.

The remainder of this article is organized into six sections. In the first, we examine previous research in this area and the questions that it raises. In the second section, we set out our methodology. The third section presents an analysis of summary statistics based on our data set, further developed through regression analysis in the fourth. In the fifth section, we present the robustness tests applied to our results and in the sixth section we discuss the implications and conclusions that can be drawn from our findings.

Literature review

Much of the early literature on ethnic minorities in the labour market focuses on the experiences of minorities in rural or peri-rural China. Most scholars have found that minority earnings are much lower than Han earnings. How-

ever, scholars have been split on whether minorities face systemic discrimination or simply tend to be located in places with particularly poor job and educational prospects (see Hasmath, 2011b and 2019).[1] Hannum and Xie (1998) inferred systematic biases toward minorities in their study of minorities in Xinjiang. They find that minorities have less access to education, which hurts their job prospects. Controlling for geography and education has found that minorities have significant earnings gaps in various occupational fields, a fact attributed to persistent discrimination against minorities.

Other studies argue that rural minorities are poorer primarily on account of their geographic circumstances.[2] Gustafsson and Shi (2003) found that while the incomes of ethnic minorities have grown at a slower pace than those of the Han, this gap disappeared when comparing minorities and Han in the same area. The problem, in their view, is that minorities live in areas experiencing less economic growth. On the basis of their study of rural poverty rates, Gustafsson and Sai (2009a) concluded that minorities are much more likely to enter poverty due to their disadvantageous geographic location, but are as likely as the Han to exit poverty following a poverty shock. In a separate study, Gustafsson and Sai (2009b) found that minority villages tend to be as well situated as Han villages in the north and east, but in worse locations in the west and south of the country. Given the bleak economic prospects of many minority villages, long-distance migration becomes economically attractive. However, due to cultural and language barriers, such migration was observed to take place at a lower rate than would be expected at their level of poverty.

Existing research on urban minorities finds that earnings are at parity between this cohort and the Han, but this should be taken with caution as most studies have treated ethnicity as a dichotomous control variable between the Han and a singular, agglomerated ethnic minority category (rather than disaggregating between heterogeneous ethnic minority groups). In a wide-ranging study on the determinants of urban earnings, Appleton, Song and Xia (2005) found that ethnic minority status affords workers a modest earnings premium. However, their research was primarily interested in the impact of education and experience on wages, and did not test how specific ethnic groups performed in the urban labour market. In an investigation of returns to education in urban environments, Yang (2005) found no linkages between ethnicity

[1] Both may be true given that endowment and treatment effects need not be mutually exclusive.

[2] Historically, Han settlers gradually pushed minorities out of relatively central areas to more remote peripheral and unproductive lands. Interestingly enough, the Han saw those living in peripheral areas as the "other" – irrespective of their cultural and historical linkages to the Han – which fostered the development of an ethnic minority consciousness. These two processes led to a situation in which many official minorities in China found themselves in poor, undeveloped areas at the start of the Communist era. Arguably, these same processes have continued through the post-market reform period, especially in Xinjiang and Tibet, generating significant tension between the Han and most local minority groups (see Harrell, 1995; Hasmath, 2019; Hasmath and Hsu, 2007). The Korean ethnic group is one of the few groups to buck this trend (see Jeong, 2014).

and earnings, although the author was again not interested in exploring the precise and disaggregated impact of ethnic status on the dependent variable.

More recent research has generally reinforced the finding that minorities residing in urban areas do not suffer from a significant earnings differential. Using geographic data, Cao (2010) observed that the urban-to-rural income disparities in Xinjiang were primarily driven by the concentration of minorities in poor areas, implying that the incomes of minorities are determined, at least in part, by geographic location. Applying an econometric approach, using data collected by the Chinese Household Income Project (CHIP) surveys, Hasmath and Ho (2015) did not find a statistically significant relationship between minority status and income in urban areas. Shi and Sai (2013) concluded, through their study of the Hui and Han peoples in Ningxia, that the Hui earned the same or perhaps even slightly more than the Han when controlling for geographic location.

While not directly contradicting these studies, Maurer-Fazio, Hughes and Zhang (2007) found that male minority participation in the labour force was equal between working-age male minorities and male Han, but substantially lower among minority women as compared to Han women. After controlling for geography and education, Cherng, Hasmath and Ho (2019) find that ethnic minority women earn comparable wages to Han women. Moreover, in another study, Maurer-Fazio (2012) found significant evidence of discrimination against certain ethnic groups (although not against others) in job-board posting responses, suggesting that discrimination, if it does exist, may be at a more granular level than simple minority versus majority distinctions. In a study of Uyghur self-selection into certain economic sectors, Wu and Song (2014) and Hasmath (2019) find that Uyghurs self-select into different economic sectors and that this selection affects their earnings potential.

Further qualitative research on minorities in urban areas reports that minorities still face persistent barriers and discrimination in the job market. Bian (2002) found that social networks play an important role in job search success, and minorities typically lack key connections to obtain highly sought-after jobs. Zang's (2008) analysis of state sector workers found a significant penalty for Hui minorities in the city of Lanzhou when they tried to obtain coveted public sector jobs. Huang's (2008) research echoes Bian's (op. cit.) findings with regard to the importance of social networks. Hasmath (2011a) found that minorities tend to self-select into poorer jobs in large urban areas on the basis of expected and perceived discrimination by employers – particularly minorities that employers tend to view as "troublesome".

However, the literature on the determinants of urban minority wage earnings seems to present an unresolved puzzle. Quantitative studies on minorities in urban areas have found no significant difference in earnings between Han and minorities, whereas qualitative research has found minorities reporting significant difficulties in obtaining similar employment and wage levels as Han residents. There is no clear theoretical expectation as to how these findings could simultaneously be accurate, pointing to a need for new theory-building on the determination of urban minority earnings. We propose

that the primary problem with the existing literature, and a potential answer to this riddle, lies in the failure to fully disaggregate urban labour market experiences by ethnic minority group.

Methodology

Data from the 2011 China Household Ethnicity Survey (CHES) were used to analyse ethnic minority earnings in urban areas. Data gathered during the survey included household characteristics and basic personal demographic information. The survey captured 34 ethnic groups in seven provinces: Inner Mongolia, Ningxia, Qinghai, Xinjiang, Hunan, Guangxi and Guizhou. Within these provinces, local areas were drawn from the National Bureau of Statistics' (NBS) Urban Household Survey pools, and areas that contained significant numbers of Han and minority residents were selected. Therefore, CHES does not use a simple random sample, meaning that population sample weights were needed to correct for the potential over-representation of certain subgroups.

The weights are constructed to adjust the shares of urban Han and minority respondents to match those found in China's national population. The weights used bring together the probability of a particular province being selected (A), the probability of a particular urban area being selected (B), and the probability of a particular household in that urban area being selected (C). This probability formulation can be written as $P(A \cap B \cap C)$ or rewritten as $P(C|A \cap B)P(A|B)P(B)$. Data from the 2010 census were used to compute the specific probabilities for each weight calculation separately for both Han and minorities, and this was then combined into one master weight file.

When employing the weights, non-biased estimation of true population parameters is possible. However, because the weights (and underlying census data) are differentiated based on Han and minority status, and not further refined by specific minority group, comparisons between individual minority groups should be interpreted with caution. Additionally, several of the variables have specific definitions that are important to keep in mind when interpreting the results. The sample includes both urban residents and rural-to-urban migrants, or rural *hukou* holders.[3] Outsider minorities were defined as minorities with significantly different patterns of cultural practice from the Han and include Tibetans and Turkic minority groups. Insider minorities were defined as all other minority groups (see the table in the Appendix for the exact ethnic group categorizations).[4] The percentage of professional jobs is determined by whether the respondent indicated that he or she had a typical white-collar job. Conversely, the percentage of government jobs is determined by whether the respondent indicated that he or she worked for a state-run or collective-run work unit, or under some other state-owned structure.

[3] The *hukou* is a household registration system that identifies a person as a legal resident of a particular locale.

[4] The conclusions drawn from the outsider minority group were not particularly sensitive to the inclusion or exclusion of any specific outsider group.

The summary statistics presented in the following section suggest that minorities may overachieve relative to Han residents, although the returns to overachievement in wage terms are unclear.

Summary statistics

Table 1 indicates that minorities are generally not disadvantaged on most demographic measures, particularly outsider minorities. However, whether these favourable demographic characteristics translate into expected payoffs in household income is a question best resolved through regression estimations.

Individual statistics

The summary statistics reveal some surprising sample characteristics. The individual working-age sample statistics indicate that age, percentage of male workers, and the percentage working in general seem to be equal across all demographic subgroups. However, both insider and outsider minorities are

Table 1. Summary statistics of the working-age (18–59 years) sample by ethnic group type

	Han	All minorities	Insider minorities	Outsider minorities
Individual characteristics				
Average age	40	39***	39***	38***
Male (%)	51	48*	49*	47
Working (%)	74	73	73	73
Male working (%)	81	79	79	75
Female working (%)	66	67	66	71
Professional job (%)	52	60***	59***	68***
Government job (%)	46	56***	55***	64***
Fluency in Mandarin (%)	57	57	59	45***
Party membership (%)	30	36***	37***	36
Urban *hukou* (%)	89	88	87**	97***
Average years of education	11.1	11.8***	11.6***	13.2***
N	3,886	3,107	2,529	578
Household characteristics				
Family size	3.1	3.2	3.1	3.4***
Household income (Chinese yuan)	32,360	37,240***	36,520***	41,940***
Income per working-age household member	14,900	17,680***	17,264***	20,400***
Spouse's years of education	8.3	9.7***	9.3***	11.8***
N	1,570	1,175	959	216

*, ** and *** indicate statistical test of means difference with reference category (Han) at the 10, 5 and 1 per cent levels, respectively.

Source: Authors' calculations based on 2011 CHES data.

also more likely to have a professional job (categorized as management or office work) and to be working for a state-run work unit than the Han subgroup.[5] Outsider minorities are almost 20 per cent more likely to work for such a unit than a working-age Han. These results are consistent with Wu and Song's (2014) findings that ethnic minorities tend to congregate in public sector jobs. Average years of education are also higher among outsider minorities than among Han workers. These work choice and education statistics generally support the conclusion that outsider minorities experience the labour market differently than insider minorities and Han residents, although the direction of the effect on wages is unclear.

The liminal position of outsider minorities becomes even clearer when examining language statistics. Outsiders are much less likely to be proficient in Mandarin but are much more likely to have an urban *hukou*. This last statistic implies that a much lower percentage of minorities are rural migrants who have moved to the cities. As discussed in Gustafsson and Sai (2009b), minorities – particularly minority groups with considerable cultural and language differences with the Han majority – are less likely to migrate to cities.

This raises the possibility that Han migrants from rural areas, where there are fewer educational and job experience opportunities, lower the salary and education averages compared to the largely non-migrant minority population. However, even when excluding agricultural *hukou* holders from the calculation, most of the educational gap remains, meaning that the large number of Han migrants only partially explains why minorities pursue education for longer than the Han. One tentative explanation is that outsider minorities are compensating for closed-off opportunity pathways by pursuing alternative, more formal channels of success through additional education and government jobs. However, to be fully persuasive, this would need to be buttressed by additional research.

Household statistics

All minority and outsider minority households show significant differences with Han households, although the magnitude of the difference is greater for outsider minorities. All subgroups have a similar household size; outsider groups have a slightly bigger household size but the difference, while statistically significant, is not large in terms of magnitude. One of the most striking results of the summary statistics is the wide gap in household income and income per working-age household member between both minority categories and the Han. Outsider minority families earned over 30 per cent more per household than Han families, and over 35 per cent more per

[5] This includes state-owned or urban collective-owned work units.

working-age household member. Insider minorities earned more than the Han as well, although the gap was narrower. These statistics are partially explained by the significant differences in job type and educational attainment levels highlighted above. Overall, there is some evidence that minorities experience the labour market differently, and clear evidence that outsider minorities have different labour market outcomes. The key issue is whether the increased earnings evident in summary statistics for minority households remain visible when running a fully controlled model that accounts for the increased educational attainment and other relevant characteristics of each household. In the next section, we conduct regression estimations in an attempt to answer this question.

Regression results

To construct a useful regression test, there are several important points to consider. Income in the survey was measured at the household level, but many of the variables of interest are at the individual level.[6] To account for this, the demographic information is taken from the head of household (defined as one of the two chief income earners, generally the husband or the wife), who in this survey is usually male. However, we also account for the possibility that the spouse's or other family members' contributions may be an important component of household income in the regressions that follow. Households were marked as minority if anyone in the family was coded as a minority.[7]

To estimate earnings, we employ a variation on a Mincer wage equation (see Mincer and Jovanovic, 1979; Johnson and Chow, 1997; Heckman, Lochner and Todd, 2003). Mincer wage equations use aspects of human capital, entered into an ordinary least squares (OLS) regression model, to predict wage outcomes. However, our data set contains only income at the household level and, as described above, we treat the household as one unit, applying the human capital characteristics of the chief income earner and then controlling for the presence of other income earners in the household. While not ideal, our wage equation is robust to specification changes in accounting for extra wage earners within the household, which supports this approach.

Given these considerations, our OLS wage equation has the following form:

$$\ln(Y) = \beta_0 + \beta_1 S + \beta_2 E + \beta_3 E^2 + \beta X + u$$

[6] The income measured includes only earned income and does not include items like rent or transfer subsidies. Analyses of these other types of income would rely upon a much wider set of factors and logics than there is space to investigate in this article.

[7] We also examined whether the results were impacted by coding the household as a minority only if the household head had minority status. Doing so slightly changed some of the coefficients, but did not change any of the substantive results.

where Y stands for income,[8] S for the years of schooling, E for experience, and E^2 for the quadratic term of experience. X is the vector of independent variables of interest and u is the error term. Work experience is calculated as *age – years of schooling – 6*, indicating the years of potential experience in the job market. Minority status, years of schooling, experience and the quadratic term of experience are therefore all included in the regression. Other independent variables that have shown relevance in previous work include whether the head of the household is married, is male, fluent in Mandarin, holds Communist party membership, and the number of his or her dependants (both young and old). The variable for the number of working-age household members is also included and helps to account for the influence of the spouse's or other income earners' salary on household income. In addition, the relevant demographic characteristics of the spouse are included to control for their contribution to wages. We further consider the hypothesis that years of education and Communist party membership may have a differential effect on wages depending on minority status. In this scenario minorities may take advantage of additional returns to education or party membership to increase their incomes.[9] Table 2 shows the regression results for log of household income with these independent variables and provincial dummies added iteratively.

In model (1), minority status alone does not appear to be correlated with any significantly different wage outcome. In the base Mincer wage equation model shown in (2), this does not change, nor does adding additional covariates in models (3), (4) and (5). The years of schooling has the expected positive sign, but experience and the quadratic term of experience does not appear to have a significant impact on wages. This result is somewhat surprising and inconsistent with literature in other contexts, suggesting that job experience is highly relevant for salary outcomes. However, the puzzle here is solved by looking at the subsamples aged over and under 40 separately. None of the relevant variables change in significance when disaggregating by age, except that experience and the quadratic term of experience become significant for the under-40s cohort (results available upon request). The likely explanation for

[8] One of the practical problems in estimating the Mincer wage equation is that some subsets of households earn a wage of zero and taking the log of zero results in categorizing such potential household's earnings as missing in most statistical programs. There are a number of possible solutions to this problem, but all are fraught with interpretability or bias issues. Therefore, zero-earnings households are excluded from the regressions in this section. The results should therefore be seen as the expected earnings of the head of household, *conditional* on the household having earned income. We regressed the key independent variables on a dichotomous variable, indicating whether a household had any earnings, and found no effect for the minority variable and the coefficient to be substantively insignificant, suggesting that the exclusion of the zero-earnings cases does not unduly bias the results presented in this section. However, a useful follow-up to this work could explore what types of households are likely to participate in the job market.

[9] We also considered adding marriage to the regression specification, but decided against doing so since over 90 per cent of the respondents reported being married, making it very difficult to assess whether marital status has any independent effect on wages. Including marriage did not change the size or magnitude of any of the regression coefficients of interest.

Table 2. Wage determinants for total sample on log household income

	(1)	(2)	(3)	(4)	(5)
Minority	0.0161 (0.700)	–0.0324 (0.452)	–0.0257 (0.540)	–0.0320 (0.448)	0.0425 (0.830)
Years of schooling		0.0760*** (0.000)	0.0671*** (0.000)	0.0630*** (0.000)	0.0640*** (0.000)
Experience		0.0286 (0.187)	0.0132 (0.426)	–0.00266 (0.889)	–0.00278 (0.883)
Experience^2		–0.000433 (0.322)	–0.000186 (0.577)	0.000245 (0.568)	0.000243 (0.567)
Female			–0.0841 (0.315)	–0.0315 (0.677)	–0.0333 (0.661)
Number of working-age household members			0.199*** (0.001)	0.189*** (0.002)	0.191*** (0.002)
Fluency in Mandarin			0.232*** (0.003)	0.223*** (0.003)	0.223*** (0.003)
Party membership			0.0642 (0.418)	0.0431 (0.535)	0.0242 (0.746)
Spouse's education				0.0133 (0.309)	0.0138 (0.287)
Spouse's experience				0.0244 (0.135)	0.0238 (0.140)
Spouse's experience^2				–0.000585 (0.135)	–0.000575 (0.136)
Minority * Party membership					0.257*** (0.008)
Minority * Years of schooling					–0.0160 (0.349)
N	2,315	1,877	1,797	1,774	1,774
R^2	0.071	0.160	0.248	0.284	0.286

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.
Notes: *p*-values in parentheses. Province dummies and constant not displayed.
Source: Authors' calculations based on 2011 CHES data.

this finding is that the under-40s cohort largely came of age after the opening up and reform of the Chinese economy that began in 1979. Accordingly, job searches should follow similar patterns to other market economies (see Hasmath, 2011a). The over-40s would have begun their career in an environment where high achievers would generally select career paths in state-owned enterprises – a career path that would not necessarily lead to transferable skills in the current market economy (Naughton, 2007).

With respect to the other covariates, as expected, the number of working-age household members and fluency in Mandarin both increase expected wages. The spouse's characteristics do not have a statistically significant impact on household wages as any contribution that those factors might have is captured by the variable relating to the number of working-age household members. The interaction term of minority and party membership proved to be

significant, meaning that minorities see a disproportionate benefit from being party members, whereas interaction with years of schooling did not prove to be significant. These results suggest that most minorities do not experience a wage differential in the labour market after controlling for relevant covariates.

However, viewing regression results on subsamples of the population leads to different conclusions, as can be seen in tables 3a and 3b relating to outsider and insider minorities, respectively. In models (1)–(4) in table 3a, the coefficient for minority is statistically significant, implying that outsider minority households do – all other things being equal – earn less when controlling for all relevant characteristics, contrary to insider minorities, as shown in table 3b. In model (5) in table 3a, including the interaction terms increases the magnitude of the coefficient but also the standard error, rendering it insignificant. This result is largely driven by the interaction term of minority and

Table 3a. Wage determinants for outsider minority on log household income

	(1)	(2)	(3)	(4)	(5)
Minority	–0.193***	–0.258***	–0.179**	–0.211**	–0.441
	(0.007)	(0.000)	(0.047)	(0.026)	(0.145)
Years of schooling		0.0769***	0.0690***	0.0666***	0.0665***
		(0.000)	(0.000)	(0.000)	(0.000)
Experience		0.0309	0.0140	–0.00223	–0.00225
		(0.180)	(0.429)	(0.910)	(0.909)
Experience^2		–0.000471	–0.000195	0.000242	0.000241
		(0.307)	(0.578)	(0.581)	(0.581)
Female			–0.0976	–0.0459	–0.0463
			(0.265)	(0.565)	(0.562)
Number of working-age household members			0.202***	0.195***	0.196***
			(0.001)	(0.002)	(0.002)
Fluency in Mandarin			0.228***	0.218***	0.219***
			(0.006)	(0.006)	(0.006)
Party membership			0.0486	0.0266	0.0228
			(0.565)	(0.721)	(0.762)
Spouse's education				0.0116	0.0117
				(0.397)	(0.394)
Spouse's experience				0.0253	0.0253
				(0.132)	(0.132)
Spouse's experience^2				–0.000602	–0.000601
				(0.130)	(0.130)
Minority * Party membership					0.305*
					(0.054)
Minority * Years of schooling					0.00662
					(0.809)
N	1,521	1,252	1,209	1,194	1,194
R^2	0.074	0.168	0.255	0.291	0.292

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: *p*-values in parentheses. Province dummies and constant not displayed.

Source: Authors' calculations based on 2011 CHES data.

Table 3b. Wage determinants for insider minority on log household income

	(1)	(2)	(3)	(4)	(5)
Minority	0.0455 (0.324)	0.00711 (0.883)	0.000777 (0.987)	–0.000238 (0.996)	0.0628 (0.761)
Years of schooling		0.0761*** (0.000)	0.0673*** (0.000)	0.0631*** (0.000)	0.0639*** (0.000)
Experience		0.0291 (0.183)	0.0133 (0.428)	–0.00227 (0.906)	–0.00242 (0.899)
Experience^2		–0.000441 (0.317)	–0.000186 (0.580)	0.000240 (0.577)	0.000239 (0.575)
Female			–0.0855 (0.309)	–0.0341 (0.654)	–0.0354 (0.643)
Number of working-age household members			0.201*** (0.001)	0.192*** (0.002)	0.194*** (0.002)
Fluency in Mandarin			0.231*** (0.004)	0.220*** (0.004)	0.221*** (0.004)
Party membership			0.0601 (0.454)	0.0377 (0.592)	0.0230 (0.759)
Spouse's education				0.0138 (0.299)	0.0142 (0.283)
Spouse's experience				0.0242 (0.139)	0.0237 (0.142)
Spouse's experience^2				–0.000583 (0.135)	–0.000575 (0.136)
Minority * Party membership					0.238** (0.019)
Minority * Years of schooling					–0.0146 (0.405)
N	2,135	1,711	1,635	1,614	1,614
R^2	0.071	0.161	0.248	0.285	0.287

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: *p*-values in parentheses. Province dummies and constant not displayed.

Source: Authors' calculations based on 2011 CHES data.

years of schooling; omitting it and keeping only the interaction term of minority and party membership returns the coefficient on minority to an estimate similar to model (4). The estimates for the rest of the control variables in table 3a are similar to those found in tables 2 and 3b, with years of schooling, number of working-age household members, fluency in Mandarin and the interaction term of minority and party membership all attaining statistical significance. In substantive terms, when using the model (4) minority coefficient in table 3a, the predicted wages for outsider minorities are about 23 per cent lower than the predicted wages for Han residents in a fully controlled model. According to model (5) in tables 3a and 3b, party membership gives both insider and outsider minorities a 25–30 per cent boost in wages relative to the effect of party membership on Han households. Comparing tables 3a and 3b, the same coefficients are significant in both tables, except the minority coefficient. This suggests

that the same demographic characteristics matter for wage determination in the case of both outsider and insider minorities except – importantly – minority status (outsider minority status is penalized while insider minority status is not).

The results from tables 2, 3a and 3b therefore confirm that insider and outsider minorities have different outcomes in the labour market when controlling for demographic and life background characteristics. As expected, insider minorities experience similar outcomes to Han residents, while outsider minorities do seem to suffer a wage differential in the labour market. In the next section, we conduct a series of robustness checks to confirm the validity of these findings.

Robustness checks

We employ two types of robustness checks: multiple imputation and treatment effect estimators. Both of these strategies largely confirm the findings set out above.

Multiple imputation

Regressions averaged across a multiply imputed data set largely reconfirm the findings set out in tables 2, 3a and 3b. Table 4 presents the results of multiply imputing missing data (a way to fill in missing values, as the pattern of missing values can skew the results) on the same regression equation presented in tables 3a and 3b.[10]

The results largely reconfirm the previous findings – insider minorities are not predicted to have any wage differential compared to Han households, while outsider minorities expect to experience a 20–25 per cent wage differential after controlling for relevant covariates. The one variable that changed significance was the interaction term of minority and party membership, suggesting that the previous finding may have been spurious due to missing data.

Treatment effect estimators

Another method of trying to move beyond standard regression to estimate causal effects applies treatment effect estimators. These attempt to consider the counterfactual case of what the outcome value would have been for an

[10] One of the problems with the standard regressions conducted in table 3a and 3b is that for any observation that has a missing value on any of the independent or dependent variables, the observation is listwise deleted from the regression, potentially biasing the result. King et al. (2001) propose using multiple imputation, whereby each missing value is estimated according to its likely distribution, filling in all of the missing values. This process is repeated multiple times and a regression is run on each imputed data set and then averaged according to Rubin's Rules (Graham, Olchowski and Gilreath, 2007). We used the Stata command *mi* to produce 50 imputations and the results of the same models from tables 2, 3a and 3b across these imputations are presented in table 4. In particular, we used a chained imputation model as recommended by White, Royston and Wood (2011), including all of the regression terms as predictors for missing values. Interaction and quadratic terms have to be handled with care during the imputation process or else bias will result (Von Hippel, 2009). Seaman, Bartlett and White (2012) recommend treating these terms as just another variable, but in this case such approach leads to unrealistic distributions for the interaction term of minority and years of schooling. Instead, we conditionally imputed the interaction terms as recommended by Bartlett et al. (2015).

Table 4. Multiple imputation regressions on log household income

	All minorities		Insider minorities		Outsider minorities	
	(1)	(2)	(3)	(4)	(5)	(6)
Minority	–0.0209 (0.590)	0.0755 (0.704)	0.00385 (0.927)	0.0889 (0.667)	–0.196** (0.018)	–0.320 (0.305)
Years of schooling	0.0422** (0.012)	0.0431** (0.015)	0.0421** (0.013)	0.0429** (0.016)	0.0444** (0.014)	0.0444** (0.015)
Experience	0.00198 (0.867)	0.00196 (0.868)	0.00207 (0.862)	0.00205 (0.863)	0.00207 (0.868)	0.00206 (0.868)
Experience^2	0.0000799 (0.757)	0.0000798 (0.758)	0.0000792 (0.760)	0.0000792 (0.761)	0.0000822 (0.761)	0.0000823 (0.761)
Female	–0.0563 (0.440)	–0.0565 (0.439)	–0.0580 (0.429)	–0.0580 (0.428)	–0.0706 (0.356)	–0.0707 (0.355)
Number of working-age household members	0.169*** (0.001)	0.169*** (0.001)	0.170*** (0.001)	0.171*** (0.001)	0.170*** (0.002)	0.171*** (0.002)
Fluency in Mandarin	0.255*** (0.001)	0.254*** (0.001)	0.253*** (0.001)	0.253*** (0.001)	0.253*** (0.001)	0.253*** (0.001)
Party membership	0.148** (0.032)	0.140* (0.058)	0.146** (0.037)	0.139* (0.059)	0.140* (0.056)	0.139* (0.061)
Spouse's education	0.0211 (0.106)	0.0213 (0.104)	0.0214 (0.105)	0.0216 (0.103)	0.0198 (0.153)	0.0199 (0.153)
Spouse's experience	0.0159 (0.256)	0.0158 (0.261)	0.0158 (0.263)	0.0156 (0.268)	0.0166 (0.261)	0.0166 (0.261)
Spouse's experience^2	–0.000416 (0.171)	–0.000414 (0.174)	–0.000414 (0.175)	–0.000412 (0.177)	–0.000426 (0.184)	–0.000426 (0.184)
Minority * Party membership		0.134 (0.152)		0.121 (0.213)		0.166 (0.282)
Minority * Years of schooling		–0.0134 (0.442)		–0.0122 (0.502)		0.00369 (0.893)
N	2,312	2,312	2,132	2,132	1,519	1,519
Imputations	50	50	50	50	50	50

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Notes: *p*-values in parentheses. Province dummies and constant not displayed.

Source: Authors' calculations based on 2011 CHES data.

observation had it not been treated. In this case, we are attempting to estimate what the household wage income would have been had a household not been a minority, but otherwise had the same demographic characteristics.[11]

[11] Matching estimators are most useful when the covariate averages of the treatment and control do not have a high degree of overlap, as is the case with outsider minorities and Han in this investigation. For matching, we used the *nnmatch* Stata command that attempts to match by using the Mahalanobis distance measurement as recommended by King and Nielsen (2019). One advantage of the *nnmatch* command is that it accepts probability weights. While there is no direct evidence that using weights in a nearest neighbour matching algorithm is statistically correct, research on propensity score matching suggests that employing sample weights is a highly recommended step in matching sample data (DuGoff, Schuler and Stuart, 2014; Ridgeway et al., 2015).

Table 5. Nearest neighbour matching estimated treatment effect

	Unimputed		Imputed	
	(1)	(2)	(3)	(4)
	All minorities	Outsider minorities	All minorities	Outsider minorities
SATT	–0.0758**	–0.191**	–0.0572*	–0.216***
	(0.013)	(0.017)	(0.091)	(0.007)
N	1,774	1,194	2,312	1,519

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.

Note: *p*-values in parentheses.

Source: Authors' calculations based on 2011 CHES data.

The first treatment effect estimator that we employ is a matching estimator that attempts to pair each minority observation with a Han resident that is most similar in covariate values, except for not having minority status (nearest neighbour matching). We run the match algorithm on both the original, unimputed data and the multiply imputed data sets. The results are shown in table 5.

Using the original data set, the matching estimator predicted that the sample average treatment effect on the treated (SATT) was negative for both insider and outsider minorities, although the magnitude was much larger for outsider minorities. Using the imputed data sets, the estimate of the treatment effect for all minorities shrinks and becomes marginally significant, while the estimated treatment effect for outsider minorities remains relatively stable, at a predicted 24 per cent wage penalty.

The second treatment effect estimator we employ is an inverse probability weighted regression adjustment (IPWRA) estimator.[12] It attempts to estimate the regressions for both the treated and non-treated cases separately and then uses the difference in regression-predicted outcomes across the observations to obtain the average treatment effect. As with the matching estimator, we run the command across both the unimputed and imputed data sets. The results are shown in table 6.

The estimator did not converge on the unimputed data set restricted to outsider minorities, but otherwise provides a very similar set of estimates when compared to the nearest neighbour matching results in table 5. All minorities do not appear to have a statistically significant wage differential compared to the Han, while outsider minorities have a predicted 21 per cent wage differential. While matching estimators are not a silver bullet for finding treatment effects, the fact that the estimates obtained from these commands largely coincide with the multiple imputation and regular regression results, further bolsters our findings.

[12] IPWRA regressions differ from matching in that they are weighed to give additional weight to observations that help better predict counterfactual outcome cases. We used the Stata command *teffects ipwra* to estimate the treatment effect.

Table 6. IPWRA-estimated treatment effect

	Unimputed		Imputed	
	(1) All minorities	(2) Outsider minorities	(3) All minorities	(4) Outsider minorities
SATT	–0.0357	—	–0.0231	–0.190**
	(0.400)	—	(0.548)	(0.022)
N	1,774	—	2,312	1,519

*, ** and *** indicate statistical significance at the 10, 5 and 1 per cent levels, respectively.
Note: *p*-values in parentheses.
Source: Authors' calculations based on 2011 CHES data.

Implications and conclusions

Our analyses suggest that most minorities do not suffer serious wage differentials in comparison to similarly situated Han workers. However, outsider minorities are more likely to suffer an income earnings gap given similar demographic characteristics. These results are consistent across standard regressions, multiple imputation regressions and treatment effect estimators. Taken as a whole, they help bridge the gap between previous findings that a dichotomous treatment of minorities leads to a no-effect finding of wage differences with the Han majority, and qualitative work that shows significant hurdles for minorities in the job market.

In other words, there appears to be no significant wage gap between Han and average minority households, but a difference in wages exists between Han and outsider minorities in the order of 20–25 per cent in a fully controlled model. In summary data, outsider minorities obtain higher levels of education and better quality jobs to offset the wage differential in achieving highly paid jobs. This key finding explains why the existing literature had not come to a consensus regarding qualitative studies that found significant self-reported discrimination, while quantitative-oriented studies had not found an earnings gap between minorities and their Han counterparts. Most urban minority households do not experience any difference in wage outcomes given a set of demographic covariates, yet this clearly does affect outsider minorities across a range of specifications.

Our results can only speak directly to the stratum of minorities in the sample, but our study has significant implications for ethnic minority development strategies in other subnational jurisdictions within China. Perceived "otherness" will likely vary depending on a minority's location. For instance, an urban Kazakh minority in western China may not seem particularly "other" in a local employment setting, but that same minority may be seen very differently in Beijing or Shanghai. We suggest that those including ethnic minorities as an explanatory variable in their studies on China pay close attention to the context of their study, and how different ethnic minority groups may be perceived at their exact location.

From a public policy standpoint, these results suggest that policies pertaining to ethnic minorities should be more narrowly targeted at the neediest minorities, and reduced, if not eliminated, for most minority groups (see also Hasmath and MacDonald, 2018). Seemingly, many ethnic minorities in the subgroup that does not experience significant wage gaps are able to use their minority status to increase their educational attainment and boost their future potential earnings, despite receiving similar wages for the same level of education and experience. Nevertheless, for the outsider minority groups, such preferential treatment in public policies is essential for reaching wage parity and long-term integration with the majority Han population.

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Appendix

Ethnic group categorization in sample

Ethnic group	Census %*	Sample %	Remarks
Dominant ethnic group			
Han	91.6	56.3	
Insider minority groups			
Hui+	0.8	8.93	Predominantly Muslim
Miao	0.7	7.6	Ethnic Hmong
Mongolian	0.4	5.8	
Dong	0.2	3.8	Predominantly Buddhist
Zhuang	1.3	3.3	Predominantly Buddhist
Tujia	0.6	2.7	
Yao	0.2	1.5	
Manchu	0.8	0.4	
Bouyi	0.2	0.3	
Tu	0.0	0.3	
Yi	0.7	0.1	
Chaoxian	0.1	0.1	Ethnic Korean
Bai	0.1	0.1	
Hani	0.1	0.1	
Dai	0.1	0.1	Ethnic Thai
Li	0.1	0.1	
Lisu	0.1	0.1	
She	0.1	0.1	
Gaoshan	0.0	0.1	
Dongxiang	0.0	0.1	Mongolian / predominantly Muslim
Jingpo	0.0	0.1	
Daur	0.0	0.1	
Mulao	0.0	0.1	
Gelao	0.0	0.1	
Xibe	0.0	0.1	
Jino	0.0	0.1	
Oroqen	0.0	0.1	
Subtotal	6.6	36.3	
Outsider minority groups			
Uyghur	0.8	5.2	Turkic / predominantly Muslim
Kazakh	0.1	2.0	Turkic / predominantly Muslim
Tibetan	0.5	1.1	
Salar	0.1	0.1	Turkic / predominantly Muslim
Uzbek	0.0	0.1	Turkic / predominantly Muslim
Yugur	0.0	0.1	Turkic / predominantly Muslim
Subtotal	1.5	8.6	

Notes: Figures may not add up to 100.0 per cent due to rounding. * 0.0s indicate negligible percentage of national population. + The Hui group is generally viewed as the most integrated Muslim-oriented ethnic group and we therefore do not include it in our category of outsider ethnic minority groups (see Hasmath, 2014; Maurer-Fazio and Hasmath, 2015).

Source: 2010 Chinese National Census and 2011 CHES data.