Does the Production Efficiency of Minority Tujia Ethnic Enterprises Differ from Han Enterprises? A Case Study of Wufeng in China

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Summary

This paper describes a case study exploring the determinants of the production efficiency of China's ethnic enterprises as they relate to the Tujia ethnic minority versus the Han Chinese ethnic majority. It is based on our survey data for the Wufeng Tujia Autonomous County for 2010. Our econometric analysis reaches several conclusions. First, bank loans play a role in the development of private enterprises, and the returns to bank loans favor Han enterprises over Tujia enterprises. Second, education levels of entrepreneurs have a positive effect on production efficiency of enterprises, and the returns to education for Tujia entrepreneurs are greater than for Han entrepreneurs. Third, there is a tendency for the production efficiency of Tujia enterprises to be lower than Han enterprises after controlling for other determinants.

Key Words

ethnic enterprise; Han enterprises; production efficiency; Tujia ethnic minority

1. Introduction

Since the reform and opening up, China's private enterprises have developed rapidly. According to the latest statistics from China's State Administration for Industry and Commerce, by the end of 2008, the number of registered private enterprises in China reached 6.57 million, 73 times the number in 1989, while the proportion in total enterprises increased to 67%, 38 times that in 1989. As an important aspect, the development of enterprises in ethnic areas cannot be ignored. In Western China[1], the major residential area of ethnic minorities, private enterprises reached 905,100 in 2008,

accounting for 13.8% of China's private enterprises; most of these were founded by local ethnic minorities. With respect to distinguishing them from Han enterprises, they are defined as ethnic enterprises.

In spite of long-term integration, ethnic minorities still differ from Han Chinese in several aspects, such as culture, customs and religious beliefs. Some ethnic groups, for example, Uygur, even use their own languages. The distinctive cultural backgrounds and characteristics of ethnic minorities inevitably affect their business practices. Furthermore, the Chinese government has long implemented preferential policies for ethnic minorities, such as family planning, school admission and business financing. These special supports placed ethnic minorities and Han Chinese at different positions

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in market competition.

China's ethnic enterprises became hot issue recently and attracted increasing public attention. Many studies described the status of ethnic enterprises in various regions, such as Aba (Li and Yang, 2006), Qinghai (Guo and Chen, 2006), Ganzi (Wang et al., 2008), and Enshi (Chen, 2010). Tao (2010) summarized four development patterns of small and medium-sized enterprises (SMEs) in ethnic areas. Zhou and Xu (2006) attributed the development gap of the private enterprises in ethnic areas and coastal areas to variations in cultures and government behaviors. Among the few studies which provide quantitative analysis, Yang (2006) found that firm size and technical characteristics are the main factors that influence access to finance of the private enterprises in ethnic areas. Some scholars also conducted research from the perspective of ethnic entrepreneurs. Heberer (2008) argued that the entrepreneurs of Yi (the seventh largest of the 55 ethnic minority groups in China) are both carriers of ethnic symbols and agents of modernization. Omarjan and Onishi (2008) found that, in Xingjiang, generally the education level of ethnic entrepreneurs' families is very high, whereas it is not commonly so for Han. All of the above studies help us in furthering research on China's ethnic enterprises. However, most of the previous studies were still limited in descriptive or merely list statistics. Moreover, Chinese scholars mainly choose the enterprises in ethnic areas as subject regardless of entrepreneurs' ethnic background. In other words, the ethnicity influence on production efficiency was ignored. And for their regression analyses, only one or two aspects of ethnic enterprises were considered such as financing problems. Given that, it is still lack of formal production function model

which can help to describe China's ethnic enterprises.

In this study, a production function model was proposed to reveal the determinants of production efficiency of China's ethnic enterprises. Through this model, we examined not only the impact of traditional factors on production efficiency, such as bank financing and education, but we also considered the impact of some other factors, including ethnicity. Moreover, we explored the different impact of bank financing and education on returns to ethnic enterprises and Han enterprises through interacted variables.

Tujia ethnic minority was taken as a case study to explore the subtle differences between ethnic enterprises and Han enterprises. Although affected by the Han Chinese since exchanges for many years, the Tujia differ from Han Chinese on culture and economic development. The economic situation faced by Tujia ethnic minority is very important for ethnic minority policies in China. First, compared to Uygur or Tibetan that have significant ethnic differences from Han Chinese, the Tujia is more likely at transitional stage. It is moderately but different from Han Chinese. Second, the Tujia people mainly reside in central China while other ethnic minorities generally are concentrated in border regions. For these ethnic groups, the policy makers should also consider political factors while promoting economic development, but for the Tujia, they just need focus on economic development. The data used in this paper are firm-level micro data from the survey on private enterprises in Wufeng Tujia Autonomous County. To our knowledge, this is the first survey of private enterprises in a Tujia ethnic area.

The remainder of the paper is organized as

follows. Section 2 introduces the background of this research. Section 3 explains the empirical model and the estimation methodology. Section 4 describes the data used and includes some descriptive statistics. Section 5 considers the results of our econometric analysis, and Section 6 presents the conclusions.

2．Background of the research

Tujia ethnic minority, as the sixth largest ethnic minority in China，has a population over eight million according to the fifth national census in 2000. They are mainly distributed around Wuling Mountains in central China, straddling the common borders of Hubei, Hunan, and Guizhou Provinces, and the Chongqing Municipality. As a result of many years of exchanges with the neighboring Han, the Tujia ethnic minority is inevitably affected by the Han Chinese; today the vast majority of Tujia people use a dialect of Chinese. However, the Tujia ethnic minority clearly differ from Han Chinese. They still keep many distinctive traditional cultures such as weddings and funerals, diets and etiquette. Besides, the economic development level in Tujia ethnic areas is generally lower than that of Han, currently 91.7% of the Tujia (and Miao) Autonomous Regions are designated as the national poverty-stricken counties[2].

Wufeng Tujia is selected for a case study since its highest proportion of Tujia population (nearly 85%) among all the Tujia Autonomous Regions. Wufeng, located in the southwest of Hubei Province and adjoins Hunan Province in the south, has been defined as a Tujia Autonomous County since 1984 (see Figure 1). By the end of 2009, it had a total population of about 210,000. There are 13 ethnic minorities distributed in Wufeng, and Tujia is the largest one, making up 84.8% of the total population. While

Figure 1　Wufeng's location and administrative division

the Han Chinese constitute 15.1% of the total, ranked second.

In terms of economic development, Wufeng is a relatively backward area, with a per capita GDP of 49.7% of the national average in 2009, giving it a rank of 28th of the 64 counties and county-level cities in Hubei Province. The per capita disposable income of urban residents was ranked 61st of the 64 regions, and the per capita net income of rural residents ranked 54th. As a typical agricultural area, the value of agricultural output accounted for a large proportion of GDP of Wufeng. In 2009, the proportion of primary, secondary and tertiary industries was 32.1: 28.2: 39.6 in 2009[3].

The private enterprises in Wufeng have experienced rapid development during past two decades. In 1989, the first year for registration of private enterprises in China, only four enterprises have registered in Wufeng, with a total registered capital of 339,000 yuan. By the end of 2010, the number of registered private enterprises had increased to 267, with a total registered capital of 703 million yuan. These enter-

prises were mainly concentrated in secondary industries, accounting for about 62%. By taking advantage of local natural resources, many enterprises engaged in refined tea manufacturing, hydropower industry, and mining industry. In general, the private enterprises in Wufeng are small scale. At the end of 2010, the enterprises above the designated size[4] accounted for less than 9% of the total in Wufeng.

3．Model and methodology

The model established in this paper is based on a linear Cobb-Douglas production function. The dependent variable is the annual value-added of the enterprise, denoted by Y. It is given by:

$$\ln Y = \alpha_0 + (\alpha_1 + \alpha_2 Secondary + \alpha_3 Tertiary)^* \\ \ln L + (\alpha_4 + \alpha_5 Secondary + \alpha_6 Tertiary)^* \\ \ln K + \alpha_7 Secondary + \alpha_8 Tertiary + \alpha_9 Ethinicity \\ + (\alpha_{10} + \alpha_{11} Ethinicity)^* Financing \\ + (\alpha_{12} + \alpha_{13} Ethinicity)^* Eyears + \varepsilon \qquad (1)$$

where L and K represent the labor input and capital input of the enterprise in a year, respectively. Here, L is all of the labor, and K is measured as the net value of fixed assets. α_0, and ε in our equations represent constant and error terms, and the coefficients α_1, α_2, α_3, $\cdots \alpha_{12}$, and α_{13} are unknown parameters that are to be estimated. To control for different technologies across industries, we use $Secondary$ dummy variable and $Tertiary$ dummy variable to indicate in which industry the enterprise is engaging. They are used as constant term dummy variables added to α_0 and coefficient dummies to lnL and lnK, which represent interaction terms with lnL or lnK.

Our key independent variable is $Ethnicity$ dummy variable. It is included in the model to test whether ethnic status brings about any differences in production efficiency when other characteristics are the same. If the $Ethnicity$ dummy variable is on (value one), then the enterprise is owned by a Tujia entrepreneur.

The $Financing$ variable represents bank financing of the enterprise. The rationale of this variable is based on Lin and Li (2001) who confirmed the positive influence of bank loans on the development of private enterprises. Here we use two methods to measure bank loans. First, we use a $Debt$ dummy variable to indicate whether the enterprise has access to bank loans. If the $Debt$ dummy variable is on (value one), then the enterprise obtained bank loans. Second, we use the proportion of bank loans in the total financing package of the enterprise, denoted by $Proportion$. In addition, interaction term of $Financing$ variable and the $Ethnicity$ dummy variable are used to examine the difference in returns to bank loans for Tujia enterprises and Han enterprises.

Hannum and Xie (1998) argued that the educational gap between Han Chinese and ethnic minorities largely explained the ethnic gap in occupational attainment. Consequently, the education level of entrepreneur is taken into account in this study, which is measured by education years the entrepreneur has completed, denoted by $Eyears$. To simplify the calculation, we counted this as six years of primary school, nine years through junior high school, 12 years through senior high middle school and vocational school, 15 years through college, and 16 years through university. We also interact the $Eyears$ variable with the $Ethnicity$ dummy variable to examine the difference in returns to education for Tujia enterprises and Han enterprises.

Finally, we obtain the empirical model. As we used two proxies to measure bank loans, the model includes two forms of equation, labelled

equation (2) and equation (3).

$$\ln Y = \alpha_0 + (\alpha_1 + \alpha_2 Secondary + \alpha_3 Tertiary)^*$$
$$\ln L + (\alpha_4 + \alpha_5 Secondary + \alpha_6 Tertiary)^*$$
$$\ln K + \alpha_7 Secondary + \alpha_8 Tertiary + \alpha_9 Ethinicity$$
$$+ (\alpha_{10} + \alpha_{11} Ethinicity)^* Debt$$
$$+ (\alpha_{12} + \alpha_{13} Ethinicity)^* Eyears + \varepsilon \qquad (2)$$

$$\ln Y = \alpha_0 + (\alpha_1 + \alpha_2 Secondary + \alpha_3 Tertiary)^*$$
$$\ln L + (\alpha_4 + \alpha_5 Secondary + \alpha_6 Tertiary)^*$$
$$\ln K + \alpha_7 Secondary + \alpha_8 Tertiary + \alpha_9 Ethinicity)$$
$$+ (\alpha_{10} + \alpha_{11} Ethinicity)^* Proportion$$
$$+ (\alpha_{12} + \alpha_{13} Ethinicity)^* Eyears + \varepsilon \qquad (3)$$

Because the data used in this analysis is cross section one, we use the method of weighted least squares (WLS)[5] to avoid heteroskedasticity. Furthermore, we add the independent variables behind the *Ethnicity* dummy variable in the equations one by one to enable us to examine the changes in the coefficient of the *Ethnicity* dummy variable. The possible changes will indicate the different returns in respect of these variables to Tujia enterprises and Han enterprises.

4．Data and descriptive statistics

This study employed stratified random sampling to collect data from 110 private enterprises for 2010, using interviews and question-naires. All 267 private enterprises in Wufeng were divided into three strata by industry, and then we applied proportionate stratification based on the stratum's share of the total enterprises to derive the sample in each stratum. The actual enterprises surveyed were selected by using simple random procedures to draw the sample from each stratum. From our survey of 150, 110 private enterprises responded to our questionnaires with a response rate of 73.3%.

Table 1 shows the composition of the respondent enterprises. The vast majority of them are small scale. Only nine enterprises are above the designated size, accounting for 8.2% of the respondent enterprises. This follows the general trend of private enterprises in Wufeng.

From the perspective of the ethnicity of entrepreneurs, 76 enterprises were owned by Tujia people, and the other 34 were owned by Han Chinese. This is understandable, as the Tujia comprise nearly 85% of the total county population. Mean values of variables in Table 2 shows that the labor and capital input as well as bank loans of Tujia enterprises seem to be lower than that of Han enterprises; and the average education level of Tujia entrepreneurs is numerically lower than the Han counterparts'. Further, we

Table 1　Number and composition of the sampled enterprises

	Primary Industry	Secondary Industry		Tertiary Industry	Total	Percentage (%)
		Industry	Construction			
Total sample	8	64	3	35	110	100
Large enterprises	0	0	0	0	0	0
Medium enterprises	0	4	0	2	6	5.4
Small enterprises	3	26	2	10	41	37.3
Micro enterprises	5	34	1	23	63	57.3

Note: The sampled enterprises were divided by firm size according to "Classification Standards for SMEs in China (2011)". Compared to the previous classification standards in 2003, the main changes are: small enterprises are further subdivided into micro enterprises, and industry classification standards are increased to reflect industry differences.

Table 2　Descriptive statistics

	Tujia	Han	Tujia-Han[2]	P-value[3]
Numerical variables (Mean)[1]				
Y (10,000 Yuan)	150.776 (382.162) [10,3000]	489.412 (1165.323) [10,5000]	−338.636	0.107
L (Persons)	44 (101.334) [9,750]	64 (70.689) [9,300]	−20	0.253
K (10,000 Yuan)	247.868 (695.991) [3,5000]	707.500 (1749.456) [10,8000]	−459.632	0.151
Proportion	0.168 (0.236) [0, 0.5]	0.194 (0.245) [0, 0.6]	−0.026	0.674
Eyears	12 (2.029) [6, 16]	13 (1.788) [9, 16]	−1	0.006***
Dummy variables (Proportion)				
Secondary	60.5%	61.8%	−1.3%	0.822
Tertiary	30.3%	35.3%	−5%	0.564
Debt	34.2%	41.2%	−7%	0.548
Obs. No.	76	34		

Note: 1) The numbers denote mean values; parentheses, standard deviations; and square brackets, minimum and maximum values.
  2) The result of Tujia minus Han shows the difference between Tujia enterprises and Han enterprises.
  3) The P-value is the probability value of two-sample t-test. First we conduct homogeneity of variance test (F-test), and we further conduct t-test for two-sample assuming unequal variances when the null hypothesis of F-test (variances of the two samples are homogeneous) is rejected, otherwise, we are conducting t-test for two-sample assuming equal variances. Variables of Y, L, and K are for two-sample t-test assuming unequal variances, the other variables are for two-sample t-test assuming equal variances.
  *Significant at 10%. **Significant at 5%. ***Significant at 1%.

conduct t-test to examine whether the differences between ethnic and Han enterprises are statistically significant or not. The results reported in Table 2 show that the average education years of Tujia entrepreneurs are significantly less than that of Han. This confirms the findings of previous studies that the average education level of Tujia people is less than Han (Xu and Li, 2009). However, other variables do not show any significant difference between Tujia enterprises and Han enterprises.

To examine more carefully whether the industrial distribution of Tujia enterprises differ from that of Han enterprises, industry classification is further subdivided into finer details. The comparison of Tujia enterprises and Han enterprises are presented in Table 3. It shows that most Tujia enterprises are concentrated in Manufacturing, Wholesale and retail trade, and Mining industry, as the same trend as Han enterprises; and there is no observed difference in their distribution of industries.

Table 4 shows the dependent and independent variables used in our empirical models.

5．Results and discussion

Table 5 shows the estimates of the expressions for lnY in equation (2), and Table 6 the estimates for lnY in equation (3). For both of them, we use the WLS method.

In our results, output elasticity of capital is estimated to 0.28-0.65, and the output elasticity

Table 3   Industrial distribution

Percentage (%)	Tujia	Han
Agriculture, Forestry, Animal Husbandry & Fishery	9.2%	3.0%
Mining	11.9%	8.8%
Manufacturing	35.5%	44.1%
Production & supply of electricity, gas and water	10.5%	5.9%
Construction	2.6%	3.0%
Wholesale & retail trade	17.1%	23.5%
Real estate, renting & business activities	6.6%	8.8%
Financial intermediation	0.0%	2.9%
Transport, storage & communications	5.3%	0.0%
Hotels & restaurants	1.3%	0.0%
Total	100%	100%

Table 4   Data list

	Mean	Max	Min	Std. Dev.	Obs. No.
Dependent variable					
lnY	4.236	8.517	2.303	1.410	110
Independent variables					
lnL	3.299	6.620	2.197	0.961	110
$Secondary*lnL$	2.168	6.620	0	1.930	110
$Tertiary*lnL$	0.933	4.248	0	1.412	110
lnK	4.309	8.987	1.099	1.707	110
$Secondary*lnK$	2.953	8.987	0	2.742	110
$Tertiary*lnK$	1.097	6.215	0	1.735	110
$Secondary$	0.609	1	0	0.490	110
$Tertiary$	0.318	1	0	0.468	110
$Ethnicity$	0.691	1	0	0.464	110
$Debt$	0.364	1	0	0.483	110
$Ethnicity*Debt$	0.236	1	0	0.427	110
$Proportion$	0.176	0.600	0	0.238	110
$Ethnicity*Proportion$	0.116	0.500	0	0.211	110
$Eyears$	12.591	16	6	2.011	110
$Ethnicity*Eyears$	8.473	16	0	5.937	110

of capital is higher than that of labor. It is well supported empirically, as it was found in works by Chow and Li (2002) and also by Mankiw et al. (1992). In addition, as we explained in section 3, the statistical significances of industry dummy variables added to the constant term and their coefficient dummies added to lnL and lnK have controlled the differences of produc-

tion technologies across industries.

In the specifications 4 to 6 of Tables 5 and 6, the coefficients of the *Debt* dummy variable and the *Proportion* variable are significantly positive at 1%. This result has two implications. First, the Han enterprises that are able to obtain bank loans have higher production efficiencies. Second, a higher proportion of bank loans in the to-

Table 5   Estimates of equation (2)

Independent variables	1	2	3	4	5	6
C	1.671***	1.580***	1.277***	1.594***	0.865***	1.024***
	(15.386)	(11.656)	(11.978)	(10.918)	(4.507)	(4.711)
lnL	0.117*	0.148**	0.357***	0.091	0.166*	0.162*
	(1.817)	(2.030)	(4.975)	(0.941)	(1.948)	(1.906)
$Secondary*lnL$	0.301***	0.245***	0.045	0.307***	0.234**	0.239**
	(4.393)	(2.986)	(0.596)	(2.939)	(2.568)	(2.592)
$Tertiary*lnL$	0.341***	0.309***	-0.143*	0.220**	0.144	0.167*
	(4.678)	(3.837)	(-1.758)	(2.067)	(1.500)	(1.763)
lnK	0.464***	0.459***	0.280***	0.392***	0.373***	0.373***
	(17.224)	(16.230)	(7.665)	(8.859)	(11.919)	(12.310)
$Secondary*lnK$	0.143***	0.168***	0.245***	0.136***	0.135***	0.135***
	(4.582)	(4.610)	(6.892)	(2.960)	(4.429)	(4.529)
$Tertiary*lnK$	0.164***	0.175***	0.371***	0.224***	0.241***	0.221***
	(4.274)	(4.357)	(9.061)	(4.611)	(7.333)	(6.800)
$Secondary$	-1.553***	-1.487***	-0.898***	-1.274***	-1.083***	-1.092***
	(-12.588)	(-10.812)	(-7.629)	(-7.975)	(-6.599)	(-6.439)
$Tertiary$	-1.390***	-1.333***	-0.452***	-0.976***	-0.789***	-0.791***
	(-9.560)	(-8.402)	(-3.720)	(-6.007)	(-4.407)	(-4.387)
$Ethnicity$		0.033	-0.025	0.069***	0.110***	-0.175
		(1.337)	(-1.434)	(3.544)	(5.310)	(-1.344)
$Debt$			0.520***	0.604***	0.617***	0.624***
			(13.219)	(15.808)	(10.821)	(12.779)
$Ethnicity*Debt$				-0.237***	-0.221***	-0.241***
				(-5.847)	(-4.011)	(-4.988)
$Eyears$					0.045***	0.034***
					(7.303)	(4.013)
$Ethnicity*Eyears$						0.022**
						(2.307)
Adj.R^2	0.895	0.894	0.906	0.906	0.908	0.907
F-statistic	117.352	103.290	106.279	98.143	91.427	83.533
Obs. No.	110	110	110	110	110	110

Note: The table presents regression coefficients. The t statistics are reported in parentheses.
*Significant at 10%. **Significant at 5%. ***Significant at 1%.

tal financing package results in higher production efficiency for the Han enterprise. These conclusions are also tenable for Tujia enterprises when we conducted Wald Test for the significance of Tujia's *Financing* variable namely (α_{10} + $\alpha_{11}Ethnicity$)*Debt* in equation (2) and (α_{10} + + $\alpha_{11}Ethnicity$)*Proportion* in equation (3) (See Table 7). Therefore, it confirms the results of

previous studies of the role of bank loans in the development of private enterprises.

The significantly negative coefficients of the interacted terms of *Ethnicity*, *Debt*, and *Proportion* show that the returns to bank loans favor Han enterprises over Tujia enterprises. As is well known, the Chinese government has long provided support for enterprises in ethnic trade

Table 6   Estimates of equation (3)

Independent variables	1	2	3	4	5	6
C	1.671***	1.580***	1.302***	1.613***	0.989***	1.317***
	(15.386)	(11.656)	(11.467)	(9.071)	(4.755)	(4.944)
lnL	0.117*	0.148**	0.321***	0.070	0.118	0.083
	(1.817)	(2.030)	(4.412)	(0.625)	(1.251)	(0.868)
$Secondary^*lnL$	0.301***	0.245***	0.089	0.335***	0.282***	0.331***
	(4.393)	(2.986)	(1.150)	(2.810)	(2.778)	(3.197)
$Tertiary^*lnL$	0.341***	0.309***	−0.095	0.259**	0.184*	0.238**
	(4.678)	(3.837)	(−1.169)	(2.259)	(1.863)	(2.302)
lnK	0.464***	0.459***	0.308***	0.409***	0.394***	0.407***
	(17.224)	(16.230)	(8.654)	(8.730)	(11.110)	(12.005)
$Secondary^*lnK$	0.143***	0.168***	0.219***	0.121**	0.122***	0.105***
	(4.582)	(4.610)	(6.074)	(2.500)	(3.512)	(3.210)
$Tertiary^*lnK$	0.164***	0.175***	0.340***	0.212***	0.228***	0.190***
	(4.274)	(4.357)	(8.508)	(3.991)	(6.607)	(5.616)
$Secondary$	−1.553***	−1.487***	−0.959***	−1.317***	−1.175***	−1.250***
	(−12.588)	(−10.812)	(−7.967)	(−6.899)	(−6.576)	(−6.549)
$Tertiary$	−1.390***	−1.333***	−0.507***	−1.060***	−0.865***	−0.899***
	(−9.560)	(−8.402)	(−4.178)	(−6.160)	(−4.784)	(−4.534)
$Ethnicity$		0.033	−0.016	0.075***	0.109***	−0.331**
		(1.337)	(−0.789)	(3.934)	(5.028)	(−2.102)
$Proportion$			0.947***	1.143***	1.221***	1.259***
			(13.294)	(10.764)	(11.170)	(12.751)
$Ethnicity^*Proportion$				−0.474***	−0.488***	−0.577***
				(−3.882)	(−4.479)	(−5.593)
$Eyears$					0.041***	0.020*
					(5.981)	(1.658)
$Ethnicity^*Eyears$						0.036***
						(2.973)
Adj.R^2	0.895	0.894	0.905	0.906	0.907	0.907
F‑statistic	117.352	103.290	106.279	96.882	90.227	83.533
Obs. No.	110	110	110	110	110	110

Note: The table presents regression coefficients. The t statistics are reported in parentheses.
*Significant at 10%. **Significant at 5%. ***Significant at 1%.

counties[6)] (minzu maoyi xian), and one of the key policies is preferential interest rate policy for enterprises engaging in ethnic trade and production of ethnic articles. Wufeng is one of the ethnic trade counties benefiting from this policy. In the survey, we found that the Tujia enterprises that enjoyed this policy accounted for 50% of the Tujia enterprises that obtained bank loans in 2010, whereas the proportion for Han enterprises was 35.7%. This suggests that the preferential interest rate policy had less impact on Han enterprises. Therefore, although Tujia enterprises were far more likely to benefit from this form of affirmative action policy (Gross, 1977), the policy produced unintended consequences. It was likely to overprotect Tujia

Table 7   Wald Test (H$_0$:$\alpha_{10}+\alpha_{11}=0$; H$_1$:$\alpha_{10}+\alpha_{11}\neq0$)

Equation (2)				Equation (3)			
specification 4				specification 4			
Test Statistic	Value	df	Prob.	Test Statistic	Value	df	Prob.
Chi-square	78.871	1	0.000	Chi-square	60.207	1	0.000
specification 5				specification 5			
Test Statistic	Value	df	Prob.	Test Statistic	Value	df	Prob.
Chi-square	135.025	1	0.000	Chi-square	98.816	1	0.000
specification 6				specification 6			
Test Statistic	Value	df	Prob.	Test Statistic	Value	df	Prob.
Chi-square	121.690	1	0.000	Chi-square	80.927	1	0.000

Table 8   Wald Test (H$_0$: $\alpha_{12}+\alpha_{13}=0$; H$_1$: $\alpha_{12}+\alpha_{13}\neq0$)

Equation (2)				Equation (3)			
pecification 6				specification 6			
Test Statistic	Value	df	Prob.	Test Statistic	Value	df	Prob.
Chi-square	80.280	1	0.000	Chi-square	73.661	1	0.000

enterprises from the realities of marketplace to some extent, and result in their lower returns to bank loans. However, even though the policy effect differed between Tujia enterprises and Han enterprises, we discovered that the returns to bank loans were still positive for both of them.

The coefficients of the *Eyears* variable are positive and significant for all the specifications. It confirms the positive effect of education level of entrepreneurs on the production efficiency of the Han enterprises. The Tujia enterprise can also enjoy positive return of education, this is statistically evidenced by Wald Test for the significance of Tujia's *Eyears* variable namely (α_{12} + α_{13}*Ethnicity*)* *Eyears* (See Table 8). Besides, the significantly positive coefficients of *Ethnicity*Eyears* variable implies that, with the same education years, Tujia entrepreneurs receive

greater returns from education than Han counterparts. The results also show that the average total returns to education of Tujia enterprises are greater than for Han enterprises. For Tujia enterprises, this was 0.672 (results from 0.056 *12), whereas for Han enterprises, this was 0.442 (results from 0.034*13) in Table 5. In Table 6, the result for Tujia enterprises was 0.672 (results from 0.056*12), whereas for Han enterprises it was 0.260 (results from 0.020*13)[7].

One possible reason for the greater returns to education for Tujia entrepreneurs is the overall diminishing returns to education. Due to lower average levels of education for Tujia people, the marginal improvement from education is likely to result in a correspondingly greater return for the Tujia entrepreneurs. Therefore, the current policy for improving education is very effective, not only for the Tujia,

but also for other ethnic groups with lower education levels than the Tujia, such as Uygur, Zhuang, and Dong (Xu and Li, 2009). The positive impact from improving education for the Tujia will disappear in the near future because their education level is now quite close to that of the Han. However, other ethnic groups with lower education levels than the Tujia will continue to benefit from this policy for longer periods than the Tujia. And they will eventually catch up with the education levels of the Han.

Our survey showed that the Tujia entrepreneurs generally were more highly educated than the other Tujia people. The higher education levels of these people were due in large part to their higher levels of intelligence and to their families having good economic conditions at the right time. Therefore, the selection mechanism for Tujia entrepreneurs was likely to work. The more gifted Tujia children could have access to higher education only if they were supported by a family enjoying good economic conditions during their formative years. When these more gifted people with higher education levels became entrepreneurs, they received higher returns to education. If we can rely on this interpretation, a policy implication can be drawn as follows; if the government provides gifted Tujia children from poor families with more subsidies for education, there will be a likelihood that more Tujia people will become entrepreneurs.

To examine the possible changes of the coefficient of *Ethnicity* dummy variable, we added the independent variables behind the *Ethnicity* dummy variable in equations one by one. Our results show that the coefficients of the *Ethnicity* dummy variable became significantly positive at 1% for specifications 4 and 5, in both Tables 5 and 6. However, when we added the

Ethnicity*Eyears variable for specification 6, the coefficients of the *Ethnicity* dummy variable turned to negative. Therefore, specifications 4 and 5 present spurious higher production efficiency levels for Tujia enterprises. It can be explained by the higher returns to education for Tujia enterprises.

For specification 6, the coefficients of the *Ethnicity* dummy variable are negative in both Tables 5 and 6, and significant at 5% in Table 6. This implies that, after controlling for other determinants, there is a tendency for the production efficiency of Tujia enterprises to be lower than for Han enterprises. Therefore, we cannot attribute the differences in production efficiencies of Tujia enterprises and Han enterprises to the lower return in bank loans to Tujia enterprises, or to the lower average education level of Tujia entrepreneurs. There must be other factors outside the model that might be affecting the production efficiency of Tujia enterprises. Due to data limitations, we need to explore that further in future studies.

6．Conclusions

Using the firm-level micro data of Wufeng private enterprises, we performed an analysis of the ethnicity effect on the production efficiency of private enterprises. Our econometric analysis reaches several conclusions.

First, our econometric evidence verified the previous studies in confirming the role of bank loans in the development of private enterprises. Further, we found that the returns to bank loans favor Han enterprises over Tujia enterprises. This was because the preferential interest rate policy may overprotect Tujia enterprises to some extent, so it seemed to be counterproductive.

Second, it proved that education level of en-

trepreneurs has positive effect on production efficiency of enterprises, and with the same education years, Tujia people receive greater returns to education than Han people. Moreover, the average total returns to education of Tujia enterprises are greater than Han enterprises. The greater returns to education for Tujia entrepreneurs may be due to the diminishing returns to education applicable to them, or may stem from the selection mechanism of Tujia entrepreneurs.

Third, we found that the production efficiency of Tujia enterprises tend to be lower than Han enterprises after controlling for other determinants. Therefore, we cannot attribute their different production efficiencies to the lower returns on bank loans to Tujia enterprises, or the lower average education level of Tujia entrepreneurs.

These observations suggest a necessity for government to develop policies for providing financial services to private enterprises. Bank financing is of great significance in improving the production efficiency of private enterprises, but at the same time, the bank loans should be used efficiently. We should note that any further preferential interest rate subsidies favoring Tujia enterprises are likely to have a decreasing benefit to them. Moreover, it is very helpful for government to improve education of Tujia and other ethnic minorities to enable them to benefit from the current higher returns to education. It is possible that that more subsidies for education, targeting poor Tujia families, would work well to foster more Tujia entrepreneurs.

Finally, we should concede to some data limitations, in that the present data are derived from a single region. Therefore, further research using the data from all the Tujia Autonomous Regions would be valuable, and it is necessary to continue exploring the reasons for the difference in production efficiencies between Tujia enterprises and Han enterprises.

Notes

1 ）It comprises: Chongqing Municipality; Gansu, Guizhou, Qinghai, Shaanxi, Sichuan, and Yunnan Provinces; Ningxia Hui, Tibet, and Xinjiang Uygur Autonomous Regions.

2 ）The latest standards for China's national poverty-stricken counties are: per capita income of 1,300 yuan, for base areas, ethnic minority border areas of 1,500 yuan; per capita GDP of 2,700 yuan; per capita revenue of 120 yuan.

3 ）Data source: *Hubei Statistical Yearbook*. Beijing: China Statistics Press, 2010.

4 ）The enterprises above designated size referred to in this paper are defined in the statistical standard of 2010. The enterprises above designated size include industrial enterprises with annual revenue from their principal business of over five million yuan, enterprises in wholesale trades with annual revenue from their principal business of over 20 million yuan, enterprises in retail trades with annual revenue from their principal business of over five million yuan, and enterprises in hotels and catering services

with annual revenue from their principal business of over two million yuan.

5） The weight used for WLS is the reciprocal of the absolute value of residuals, which comes from the estimation of equation through the method of ordinary least squares (OLS).

6） Ethnic trade counties are those regions that have a preferential policy for ethnic trade. At present, there are a total of 435 ethnic trade counties designated by the State Council of China.

7） The values of 12 and 13 are the average number of years of education of Tujia entrepreneurs and Han entrepreneurs, as calculated in Table 2.

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『統計学』第11号（1963年3月）以来，発売にご尽力いただいてきた産業統計研究社の廃業にともない，本号から発売所が音羽リスマチック株式会社に変更になりました。50年間にわたり発売をお引き受けいただいてきた産業統計研究社に心から感謝いたします。
また，投稿の少なさ等々の要因で発行が遅れて申し訳ありません。会員諸氏の，より活発な研究と多数の投稿をお待ちしています。

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