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Language and Consumption

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Abstract:

We examine the relationship between proficiency in Mandarin and consumption in China. We find that proficiency in Mandarin has a positive effect on an individual's total consumption expenditure as well as most categories of consumption expenditure. We also find considerable heterogeneity in the effects of Mandarin proficiency on consumption across subsamples. In addition, we find that proficiency in Mandarin has a positive effect on relative consumption, irrespective of the manner in which the reference group is defined. Our results have important policy implications for debates on the promotion of a national language and, in particular, recent debate about the promotion of speaking Mandarin in China.

Keywords: Mandarin proficiency; consumption; human capital; China

JEL Classification Numbers: D12; E21; I26; I28

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1. Introduction

Language skills are a significant component of human capital and play an important role in determining an individual's social and economic status (Chiswick and Miller 2001). A large body of research suggests that proficiency in the primary spoken language in the location in which one is living can significantly enhance one's labour market earnings and that this occurs through several channels. For instance, proficiency in the primary spoken language can expand job opportunities, improve efficiency in job search, enhance skill-based productivity through improving an individual's cognitive and communicative abilities and reduce customer and employer discrimination (see eg. Stöhr 2015, Chiswick and Miller 2014, Gao and Smyth 2011).

While the effect of language proficiency on earnings has been extensively studied following the pioneering work of Chiswick (1978), we know very little about the effect of language proficiency on consumption. There are several studies showing that language proficiency enhances productivity in the labour market. Chiswick and Miller (2003, p.469) suggest that "language proficiency is presumably also productive in consumption activities, although we do not know of empirical research on this issue". More than a decade after making this observation, Chiswick and Miller (2014) note that there continues to be very little research on language and consumption and suggest that addressing this gap in the literature be a research priority.

There are several channels through which language proficiency and consumption are potentially related. Language proficiency lowers the cost of consumption and enhances the spectrum of consumption options (Saiz and Zoido 2005, Chiswick and Miller 1995, Chiswick and Miller 2001). Chiswick and Miller (1995, p.248) state: "As with other forms of human capital, economic incentives can be expected to be an important determinant of language capital acquisition. The economic incentives arise in part from the increment in the market wage rate, a higher rate of employment and the decrease in the cost of consumption (including search costs) associated with a higher level of fluency". As an important dimension of one's cultural and social identity, language could also affect one's consumption of cultural and social goods and services (Schild and Wrede 2015, Salzmann et al. 2014, Chen et al. 2014).

We examine whether, and to what extent, proficiency in Mandarin affects an individual's consumption expenditure in China. To do so, we use the 2012 China Family Panel Studies (CFPS) dataset. We situate our study of the relationship between language proficiency and consumption in China for two reasons.

First, with rising incomes, China is increasingly becoming a more materialistic society in which patterns of consumption have changed rapidly (Min 2009, Xu et al.

2008). There is now considerable heterogeneity in consumption across subgroups and locations in China, which can be used to examine the relationship between language and consumption. Second, China has many ethnic and linguistic groups. There are seven major Chinese dialects and many sub-dialects spoken in mainland China (Leung and Ruan 2012). Recently three more major dialects were recognized (Dong and Blommaert 2009). Each linguistic group has several regional dialects that are not intelligible in other parts of China. For instance, it has been noted that in China that people who are just 100 kilometers away from their homes can encounter a different, and largely unintelligible, dialect (Gong et al. 2011). To address this problem, the Chinese government has promoted the use of standard Mandarin in communication (Dong and Blommaert 2009). While individuals from different parts of the country often cannot communicate in their own dialects, they usually can communicate using standard Mandarin. This is particularly important given that China has an estimated 145 million rural-to-urban migrants who have come from all over the country to work in predominantly cities on the coastal seaboard (Chen et al., 2015).

As a benchmark, we begin with the ordinary least squares (OLS) estimates, which suggest that proficiency in Mandarin is associated with 3.94 per cent higher consumption. This amount is equivalent to almost three years of additional schooling. We employ several econometric methods to address potential unobserved heterogeneity, endogeneity issues and potential measurement error associated with language. The instrumental variable (IV) estimates are very similar to the propensity score matching (PSM) estimates, which are almost three times the size of the OLS estimates. The quantile regression analysis shows that the association between Mandarin proficiency and consumption is slightly non-linear along the consumption distribution. The results are robust, irrespective of whether we use self-assessed or interviewer-assessed measures of the participant's proficiency in Mandarin.

We find that Mandarin proficiency is positively related with most categories of consumption expenditure, except for insurance and mortgage consumption. There is considerable heterogeneity in the effects of Mandarin proficiency on consumption across groups. The effects are higher for females, urban locals, young people, those with lower education and those who live in the countryside or in the south and southwest regions. Moreover, proficiency in Mandarin has a significant effect on relative consumption, irrespective of whether the reference group is defined at the community or county levels, or is constructed based on age, education and gender.

We contribute to the literature on economics of language in several important ways. First, economists have started to examine the manner in which language use influences economic behavior (Chen, 2013), but, as far as we are aware, this is the first econometric study of the effect of language proficiency on consumption. Second,

we employ a range of approaches to address endogeneity and measurement error associated with estimating the causal effect of language proficiency on consumption. We adopt IV and PSM to control for individual unobserved heterogeneity and use quantile regression to examine potentially unobserved characteristics. We use self-assessed, and interviewer-assessed, Mandarin ability as an objective measure of Mandarin proficiency to minimize measurement error and find our results are robust.

Third, we examine not only the manner in which Mandarin proficiency is related to total consumption, but also how Mandarin proficiency is associated with specific components of consumption expenditure as well as relative consumption in China. There are a few studies in the health literature on how language proficiency affects consumption of medical services (Flores, 2006; Harmsen et al., 2008), but we know little about how language ability affects other forms of consumption. Considering the effect of language proficiency on relative consumption is important given evidence that people are more concerned with their relative standing in terms of consumption, income and socioeconomic status and may feel deprived if they do not fare as good as their peers (Ravallion and Lokshin 2010, Ferrer-i-Carbonell 2005).

We examine the effects of Mandarin proficiency on consumption across subsamples. This deserves greater research attention because previous studies find that there are significant differences in Mandarin proficiency and consumption structure across different groups (Chamon and Prasad 2010). Finally, our results help to inform debate on the importance attached to promoting standard Mandarin to stimulate domestic consumption, as China aims to shift to a more consumption-driven economy.

2. How does language ability affect consumption?

As an important form of human capital, language skills can be regarded as being productive in consumption activities (Chiswick and Miller 2003). In addition, scholars have long argued that language, culture, identity and values intertwine (Salzmann et al. 2014). Previous studies suggest that there are several potential channels through which language ability could affect an individual's consumption. First, consumers tend to consume more in stable and familiar consumption environments in which they form their consumer habits (Verplanken and Aarts 1999). Some of the returns from learning a second language consist of the direct consumption of services produced by the individual's knowledge of the language, such as speaking a second language while traveling abroad, asking an immigrant shopkeeper for a product in her native language, and relating to foreign friends (Saiz and Zoido 2005). It is reasonable to assume that proficiency in a national language in large countries such as China, in which there are many dialects and widespread internal migration, carries similar implications.

Second, proficiency in a national language may enlarge the set of consumption options available to consumers, improve access to higher quality products and services and reduce the transaction costs of undertaking consumption. Findings from previous research show that people with higher language proficiency are more likely to rely on the print media, social media and television to obtain information on consumption (Li 2014). Since a large proportion of the mass media are in Mandarin in China, consumers with lower Mandarin proficiency may face more difficulties (incur higher costs) in finding suitable products and services. Similar to a common currency, proficiency in a common language reduces trading costs and decreases uncertainty in undertaking transactions (Ku and Zussman, 2010, Melitz 2008, McManus 1985).

Third, language plays an essential role in the formation of cultural and social identity (Aspachs-Bracons et al., 2008, Constant and Zimmerman, 2008), which, in turn, affects an individual's consumption of cultural, economic, political and social activities (Falck et al. 2012, Schild and Wrede 2015). Lameli et al. (2015) found that similarities in the local dialect have a significant positive impact on regional trade. They interpret this finding as evidence of the trade-promoting effect of culture, because linguistic similarities likely reflect cultural ties across regions, rather than lower costs of communication or similar institutions. Similarly, Heblich et al. (2015) found that, in a laboratory experiment, participants tend to cooperate more often in cognitive tests with an opponent who speaks the same accent as that of the participant; and that participants are more likely to compete when matched with someone with an accent from outside of their home region. The authors interpreted this result as participants feeling cognitively superior compared with linguistic 'outsiders'.

Fourth, consumers require both internal resources (e.g. biological and cognitive resources) and external resources (e.g. economic and social resources) to develop consumption habits and patterns (Bourdieu 1984, Üstüner and Holt 2007). Proficiency in a national language is an important cognitive resource derived from education, life and work experience. Language skills also contribute to individuals' economic and social resources by facilitating interpersonal interaction. Consumers with higher cognitive resources are more tolerant towards ambiguity and more likely to experiment with novel products and brands (Foxall and Bhate 1993). A study in China finds that cognitive, economic and social resources have positive effects on rural-urban migrant workers' adoption of urban consumer habits (Chu et al. 2015).

Fifth, the literature on consumer confidence suggests that the implicit wage rate and employment prospects can predict how much consumers will spend in the near future. Language skills are an important form of human capital and they complement other human capital to create better labour market outcomes (Chiswick and Miller 2003). In China people who speak better Mandarin are more likely to have better jobs with

higher incomes (Gao and Smyth, 2011), and thus have more consumer confidence. Higher proficiency in Mandarin can reduce employer discrimination. For example, bilingual rural-urban migrants may speak the national language with an accent and hence face discrimination or bilingual speakers might be concentrated in ethnic enclaves and have fewer labour market opportunities (Gao and Smyth 2011). In urban China, it has been estimated that rural-urban migrants, who do not hold an urban household registration, consume 16 to 20 per cent less than locals (Chen et al. 2015).

3. Data

We use data from the 2012 CFPS, which is an annual longitudinal survey launched in 2010 by the Institute of Social Science Survey in Peking University, China (Xie and Hu 2014).[1] It covers 25 of the 31 mainland provinces and municipalities (excluding Inner Mongolia, Xinjiang, Tibet, Hainan, Ningxia and Qinghai). Each subsample in the CFPS is drawn through three stages: county, then village, then household. In total, 35,727 valid responses were received in the 2012 wave. The CFPS 2012 survey collects information on consumption, self-assessed and interviewer-assessed Mandarin proficiency and a wide range of personal and family characteristics.

Table 1 presents summary statistics for Mandarin proficiency and total consumption per capita for the full sample and subsamples. Self-assessed Mandarin proficiency is measured on a six-point Likert scale (0=cannot speak; 5=very fluent). Interviewer-assessed Mandarin proficiency is measured on an eight-point Likert scale (0=cannot speak; 7=very fluent). For the full sample, the self-assessed Mandarin proficiency score is 2.28 and the interviewer-assessed Mandarin proficiency score is 3.24.

Males, urban residents and urban locals have higher Mandarin proficiency than females, rural residents and rural-urban migrants respectively for both measures. The Mandarin proficiency of respondents increases with educational attainment and decreases with age. Respondents from the northeastern region of China have the highest mean proficiency score (3.49), followed by those from the three coastal regions and middle Yangtze River region. Respondents from the middle Yellow River region and western region have the lowest Mandarin proficiency.

[Table 1 here]

The survey collects information on annual total consumption expenditure per capita (in thousands of RMB), as well as per capita consumption expenditure for eleven categories: food, clothing, housing, necessities, medical treatment and fitness, transportation and communication, education and entertainment, transfers, welfare

[1] For more details about the CFPS, also see the project website at http://www.isss.edu.cn/cfps.

(including insurance premiums), mortgage and other expenditure. Mean total consumption expenditure for the full sample is 10,710 RMB. Urban residents and urban locals consume considerably more than rural residents and rural-urban migrants respectively, while consumption expenditure by females is slightly higher than that for males.

Consumption expenditure increases dramatically with educational attainment, while it is relatively smooth over age, which is consistent with the life cycle theory of consumption (Fernandez-Villaverde and Krueger 2011). Consumption expenditure in the east coastal region is the highest (20,660 RMB), which is almost double that in most other regions (8,000-13,000 RMB). A Kwallis chi-squared test shows that significant differences exist in both mean Mandarin proficiency scores and consumption expenditure between males and females, rural residents and urban residents, urban locals and rural-urban migrants as well as between age groups, educational levels and regions.[2]

4. Econometric methods

We estimate the following consumption function:

$$C_i = \alpha_i + \beta MP_i + Y_i + X_i + \varepsilon_i \qquad (1)$$

where *C* is the natural log of total, or specific, consumption expenditure per capita or relative consumption for the *i*th respondent, depending on the exact specification. Relative consumption is defined as the ratio of an individual's own consumption expenditure to the reference group's mean consumption expenditure. *MP* is self-assessed, or interviewer-assessed, Mandarin proficiency, depending on the specification. *Y* is the natural log of household income per capita. *X* is a vector of control variables, including personal characteristics, employment characteristics, family characteristics and a vector of dummy variables to capture location fixed effects. In addition to the common control variables that the existing literature suggests are correlated with household consumption, we also include variables measuring the respondent's self-confidence, socioeconomic status, standardized memory and inferential ability test results as well as father's education that seek to at least partly capture unobservable characteristics, such as cognitive and non-cognitive ability and the effects of household social networks (Saiz and Zoido 2005).

Following studies of the returns to language (see e.g. Lang and Siniver 2009, Di Paolo and Tansel 2015), we also control for the respondent's English ability. We do so in order to examine the extent to which unobserved ability bias is responsible for the effect of Mandarin proficiency on consumption. This approach assumes that if speaking different languages is correlated with unobserved ability, there will be a

[2] Kwallis chi-squared test results are available from the authors upon request.

change in the estimated coefficient for Mandarin proficiency when indicators of different language proficiency are simultaneously included in the specification.

We first estimate equation (1) using OLS and assume that an individual's Mandarin proficiency is exogenous. However, OLS estimates of the coefficient on Mandarin proficiency may be biased for several reasons. First, although we include a full set of control variables to mitigate selection bias due to unobserved individual ability, there might be still be unobserved heterogeneity affecting both Mandarin proficiency and consumption (Berman et al. 2003). Second, there might be reverse causality through which higher spending individuals can invest more in improving their Mandarin proficiency, and have more opportunities to practise Mandarin in the process of consumption (Chen et al. 2014). Third, self-assessed measures of Mandarin proficiency might contain measurement errors that bias the coefficient on Mandarin proficiency downwards. Measurement error is potentially serious in self-assessed language proficiency that is measured by a scale with limited points. Dustmann and Van Soest (2001) find that more than half of the within individual variation in language response is due to measurement error. Results from studies of the relationship between language proficiency and wages suggest that downward bias induced by measurement error may be more severe than the upward bias induced by unobserved heterogeneity (Bleakley and Chin 2004, Dustmann and Van Soest 2002).

We address the potential bias in the OLS estimates by adopting several complementary approaches. First, we employ PSM to reduce the bias generated by unobserved heterogeneity. This method first estimates the propensity score as the probability of being assigned to a treatment, conditional on a full set of covariates. The treatment in our context is proficiency in Mandarin. It then matches each relatively good Mandarin speaker to one or more non- and poor speakers on the given propensity score, using the kernel, nearest neighbor and stratification functions separately. Finally, it compares the average difference in consumption for all matched pairs. It is important to note that PSM also has its limitations for our purposes. In particular, this method cannot completely rule out the bias generated by unobservable compounding factors under conditions in which truly random sources of variation in Mandarin proficiency are not available in observational data (Duncan and Mavisakalyan 2015). Other concerns with PSM are that, similar to OLS, it only takes into account the selection biases based on observed characteristics, and it only compares the matched observations while it ignores unmatched observations.

Second, we adopt an IV approach to address the potential endogeneity of Mandarin proficiency. We instrument for self-assessed Mandarin proficiency using whether the respondent's language of conversation with family members is Mandarin and the dialect language concentration. We instrument for interviewer-assessed Mandarin

proficiency using whether the respondent used Mandarin during the survey interview and Mandarin language concentration. The rationale for using whether respondents use Mandarin in their conversations with family members or to converse in their interviews as IVs is that if respondents communicate with family members or answer the interview questions in Mandarin, this is independent objective evidence of their level of proficiency in Mandarin. It is reasonable, however, to assume that these IVs are unlikely to affect consumption at the individual level through unobserved channels. Many studies have used similar exclusion restrictions to examine language proficiency on labor market outcomes (Shields and Price 2002, Lindley 2002).

Language concentration has been used extensively as an IV for language proficiency in the literature on economic returns to language proficiency (Chiswick and Miller 1992, Chiswick and Miller 1995, Chiswick and Miller 2003, Chiswick and Miller 2014, Li 2013). Language concentration captures the intensity of exposure per unit of time in an exogenous linguistic environment in which people converse in the same tongue. Chiswick and Miller (1995) suggest that immigrants in areas of high ethnic concentration will be less proficient in the host language, or major language spoken in that locale, simply because there is less necessity to acquire language skills. We define the Mandarin/dialect concentration as the proportion of the population that reports speaking Mandarin/dialect in the province in which the respondent lives. Mandarin concentration can be expected to be positively correlated with an individual's Mandarin proficiency, while the dialect concentration can be expected to be negatively correlated with one's Mandarin proficiency.

Third, we use interviewer-assessed Mandarin proficiency to deal with measurement error and compare results based on subjective and objective indicators of Mandarin proficiency. A large body of literature on language proficiency has relied on self-assessed measures, which may result in misclassification bias (Toomet 2011, Chen et al. 2014). Some have suggested that a possible solution to this problem is to use interviewer-assessed language proficiency levels or a combination of self-assessed and interviewer-assessed language proficiency levels (Akresh and Frank 2011, Hamilton et al. 2008). Such studies find that there is a higher return to language proficiency when using the interviewer assessment, and suggest that studies based on interviewer-assessed measures may be more indicative of the actual relationship between language proficiency and labor market outcomes than self-assessed measures.

Fourth, we adopt a quantile regression approach to further check the existence of heterogeneous effects of Mandarin proficiency on consumption with respect to unobserved ability. The quantile regression analysis can be used to compare the earnings/consumption function at different points along the conditional wage/consumption distribution (Gerry and Li 2010, Wang et al. 2015).

5. Results

5.1 Mandarin proficiency and total consumption

We first examine the relationship between Mandarin proficiency and total consumption. Table 2 presents the OLS, IV and PSM estimates for the full sample. For each method we only report the coefficient on Mandarin proficiency, although each specification includes a full set of controls. The OLS estimates suggest that Mandarin proficiency has a positive effect on an individual's consumption, after controlling for other factors potentially correlated with consumption. A one unit increase in self-assessed Mandarin proficiency score is associated with a 3.94 per cent increase in consumption. The effect of Mandarin proficiency on consumption is slightly higher than that of education, while much lower than that of household income. Our results show that an additional year of schooling is associated with consumption being 1.38 per cent higher and a one per cent increase in household income is associated with 13.75 per cent higher consumption. Hence, the effect of Mandarin proficiency is equivalent to almost three years of additional schooling.

[Table 2 here]

As discussed above, the OLS estimates of the coefficient on Mandarin proficiency may be biased due to unobserved heterogeneity, endogeneity issues and measurement error. To address these potential problems, we employ several methods to obtain consistent estimates of coefficients. First, we add an individual's English proficiency in the full specification, which could partially control for unobserved ability. The results show that the coefficient on Mandarin proficiency is not affected by the inclusion of English proficiency.[3] This result is consistent with findings from previous studies that investigate the impact of language skills on earnings that have added English as a second language (Lang and Siniver 2009, Di Paolo and Tansel 2015).

Second, we adopt an IV approach to investigate the causal relationship between Mandarin proficiency and consumption. The IVs pass the Cragg-Donald test for weak instruments and the Hansen J statistic requirement for over-identification, which indicate that they are valid instruments. The results show that the effect of Mandarin proficiency on consumption is still significant at the 1 per cent level. However, there is a sizable increase in the IV coefficient on Mandarin proficiency compared to the equivalent OLS estimate. An increase in the self-assessed Mandarin proficiency score is associated with 12.01 per cent higher consumption, which is more than three times the size of the estimate obtained using OLS. This result is consistent with studies that found large estimates for the economic returns to language fluency using the IV approach (Chiswick and Miller 1995, Casale and Posel 2011). For instance, Gao and

[3] Regression results are available from the authors.

Smyth (2011) instrumented Mandarin proficiency by the number of children living with the respondent and the number of children of primary school age, and found that the economic returns to speaking standard Mandarin among rural-urban migrants in China's urban labour market was 42.1 per cent, which was almost nine times the size of the OLS estimate. A large body of literature on economic returns to fluency in English in many countries suggests that the variation in the ratio of IV to OLS estimates ranges from 2.4:1 to 9.1:1 (Chiswick and Miller 2010, Ginsburgh and Prieto-Rodriguez 2011). Our results imply that measurement error might be more important than omitted variable bias, which is consistent with previous findings that have estimated the relationship between language fluency and the wage rate (see e.g. Bleakley and Chin 2004, Dustmann and Van Soest 2001).

Third, as an additional check on the sensitivity of our results to unobserved heterogeneity, we use PSM. To do so, we collapse the five-category Mandarin proficiency variable into a dichotomous variable coded 1 for good language skills or above. This approach has been widely employed (Dustmann and Van Soest 2002). We use a full set of controls to compute propensity scores using the kernel, nearest neighbor and stratification methods separately and then compare the average difference in consumption for all matched pairs. The results are presented in Table 2. The findings from all three matching methods suggest that overall proficiency in Mandarin is associated with 10 to 12 per cent higher consumption, depending on the estimator. The PSM estimates are similar to the IV estimates. While the assumption of selection on observables using PSM is strong, Dehejia and Wahba (1999) find that PSM gives estimates of the treatment effect that are closer to using experimental data than do traditional econometric methods for non-experimental data.

Fourth, to address measurement error, we substitute interviewer-assessed Mandarin proficiency for self-assessed proficiency and re-estimate equation 1 using OLS, IV and PSM. Interviewer-assessed proficiency is likely to more accurately reflect the respondent's language ability (Hamilton et al. 2008). The OLS estimates suggest that a one unit increase in the interviewer-assessed Mandarin proficiency score is associated with a 2.73 per cent increase in consumption. To compare the magnitudes of the estimated effects between self-assessed and interviewer-assessed Mandarin proficiency, we normalize both subjective and objective measures with zero mean and standard deviation of one. The regression results show that the effect of interviewer-assessed Mandarin proficiency on consumption is higher than that of self-assessed Mandarin proficiency, which is consistent with previous findings (Akresh and Frank 2011, Hamilton et al. 2008).[4] The IV estimates show that proficiency in Mandarin is associated with 4.16 per cent higher consumption, which is 1.5 times the size of the OLS estimate. This result further reinforces our conclusion that measurement error is

[4] Regression results for normalized Mandarin proficiency scores are available from the authors.

more important than omitted variable bias in estimating the effect of language fluency on consumption in China. The PSM estimates indicate that interviewer-assessed Mandarin proficiency is associated with 6 to 9 per cent higher consumption.

The results for the quintile regression are reported in Table 3. The findings suggest that the association between proficiency in Mandarin and consumption is slightly non-linear along the distribution of consumption. Mandarin ability is more valued at the bottom of the consumption distribution. An increase in Mandarin proficiency score is associated with more than 4 per cent higher consumption at the bottom of the distribution, while the effects of Mandarin proficiency at higher consumption levels are slightly lower at around 3.5 per cent. Our results imply that Mandarin proficiency is a substitute for unobserved ability. This finding is consistent with the results from previous studies to examine the relationship between language proficiency and the wage rate that have used similar methods (Isphording 2013, Toomet 2011).

[Table 3 here]

5.2 Heterogeneous effects of Mandarin proficiency on consumption

Table 4 presents the effect of proficiency in Mandarin on various components of consumption expenditure. The results suggest that Mandarin proficiency is positively related with most categories of consumption expenditure except for consumption of welfare (e.g. insurance) and mortgage products. Proficiency in Mandarin is most valued in education and entertainment consumption. An increase in the Mandarin proficiency score is associated with an 18.32 per cent increase in spending on education and entertainment. This likely reflects the fact that all educational institutions in China, excluding those of minority groups, must use Mandarin as the teaching language (Feng 2009). The impact of Mandarin proficiency on other categories of consumption is relatively lower and in the range 6-10 per cent. The relatively higher effects of Mandarin proficiency on transportation and communication consumption and consumption of transfers are consistent with findings that language ability increases individual's involvement in cultural and social activities that have been shown to be associated, in part, with higher consumption expenditure (Myles and Cheng 2003, Laroche et al. 2015, Jun et al. 2014).

[Table 4 here]

We consider heterogeneity in effects of Mandarin proficiency on consumption of different groups. The results in Table 5 show that proficiency in Mandarin is positively related to consumption for males, females, urban residents, rural residents and urban locals, while it has an insignificant relationship with consumption for rural-urban migrants. Proficiency in Mandarin is associated with 3.62 per cent higher consumption for males and 4.16 per cent higher consumption for females. This result

is consistent with self-assessed and interviewer assessed proficiency in Mandarin being lower for females than males, which increases the marginal return to consumption for those fewer females that speak Mandarin well. Our results are consistent with previous studies that have also found that females with higher levels of human capital are likely to consume more than males in China (see eg.Bhandari and Smith 2000). In addition, Gao and Smyth (2011) found that females with higher Mandarin proficiency had a higher earning capacity than males, which could result in higher consumption through increased consumer confidence.

[Table 5 here]

Mandarin proficiency has a higher effect on consumption among rural residents than urban residents. An increase in the Mandarin proficiency score is associated with 4.15 per cent higher consumption for rural residents and 3.22 per cent higher consumption for urban residents. One explanation for the result is similar to that offered for the gender differential. The Mandarin proficiency of rural residents is lower than that of urban residents, which would be consistent with those rural residents who have better language skills being able to attract a higher premium in consumption.

Another explanation for this result is that there is a significant difference in consumption structure between urban residents and rural residents. According to the CFPS dataset, the proportion of food consumption for rural residents (36.80 per cent) is considerably higher than that of urban residents (29.91 per cent). Besides food, rural residents also consume relatively higher proportions of clothing, medical treatment and fitness, transportation and communication and other items than their urban counterparts. Each of these categories of consumption have been shown to be significantly affected by an individual's Mandarin proficiency in Table 4. In contrast, the proportion of mortgage expenditure for urban residents, which is not affected by Mandarin proficiency, is more than twice that of rural residents.

Our results also suggest that overall proficiency in Mandarin is associated with 3.24 per cent higher consumption for urban locals, while its effect on consumption for rural-urban migrants is not significant. This could be due to the fact that rural-urban migrants are socially and/or residentially segregated from urban locals by living in migrant enclaves in the suburbs of major cities (Song et al. 2008, Zhang and Xie 2013). These enclaves, such as Xinjiangcun, Zhejiangcun and Wenzhoucun in Beijing, are characterized by a high concentration of rural-urban migrants from the same place of origin and have independent schools, shops and medical services (Jeong 2011). For these people, their cultural and social identity is tied up with their local dialect, rather than in speaking Mandarin. Migrants in these enclaves primarily use their local dialects rather than Mandarin in daily life, which could weaken the effect of Mandarin ability on consumption. Most migrants have very little interaction with urban locals at

all. Hence, there is very little opportunity to practice Mandarin with urban locals. Moreover, their consumption environment is often neither stable nor familiar, with migrants moving between their hometown and host city. In addition, migrants who speak Mandarin with a pronounced accent may face higher customer discrimination in consumption. Our results suggest that this negative effect may be large and that essentially it offsets the positive effect of Mandarin ability on consumption.

Table 6 reports the effect of Mandarin proficiency on total consumption across age groups. The results suggest that Mandarin proficiency has a significant effect on consumption in all age brackets. An increase in the Mandarin proficiency score is associated with 6.13 per cent higher consumption in the 15-29 bracket, while only 1.89 per cent higher consumption in the 50-59 bracket. A potential explanation for this result is that younger people are more likely to rely on mass media to obtain information on consumption and to experiment with new products, brands and consumption patterns (Boynton-Jarrett et al. 2003, Yoon et al. 2009). Most young people in China prefer to shop in the online consumer-to-consumer (C2C) markets, such as Taobao and Tmall. Internet-based electronic commerce makes the purchasing process more convenient because it provides a forum to discuss, and evaluate products with other customers (Degeratu et al. 2000). Mandarin proficiency facilitates these activities as precursors to making consumption choices. A second plausible explanation for the results is that the consumption structure undergoes a dramatic change over the life cycle. Young people tend to spend more on services such as education and entertainment, which have shown to be positively related to proficiency in Mandarin, while older people spend more on welfare and medical treatment.

[Table 6 here]

Table 7 shows the relationship between Mandarin proficiency and consumption for individuals with different educational attainment. Proficiency in Mandarin is associated with a 4.43 per cent increase in consumption for those with 6 or less years of education and a 2.42 per cent increase for those with 9 to 12 years of education, while its relationship with consumption for those with 15 years of education or more is insignificant. These results reinforce our conclusion that there is a substitution relationship between proficiency in Mandarin and other forms of human capital, including education and unobserved ability. The results are consistent with findings from previous studies that language skills and some forms of post-immigration human capital appear to be substitutes in the labor market (Chiswick and Miller 2003).

[Table 7 here]

We examine whether the effects of proficiency in Mandarin on consumption vary across regions in Table 8. The results suggest that the effects are significant and positive in all regions except for the northeastern region. Overall, proficiency in

Mandarin is associated with 6.54 per cent higher consumption in the south coastal region and 6.06 per cent higher consumption in the southwestern region. In contrast, the effect of Mandarin proficiency on consumption in the north coastal region is the lowest. An increase in the Mandarin proficiency score is associated with only 2.24 per cent higher consumption. A plausible explanation for this result is that dialects are mostly concentrated in the southern and eastern regions in China and some interior areas such as Hunan and Sichuan provinces, while Mandarin is widely spoken in northern and western China (Gong et al. 2011). Meanwhile, a large number of people with diverse linguistic or dialect backgrounds have moved from the less developed hinterland to the more advanced coastal areas as a result of uneven regional development. This makes the languages in these regions even more diverse and the problem of communicating across dialects more pronounced. Therefore, as a lingua franca, Mandarin is more valued in economic activities in the advanced coastal areas than in the northern and western regions. This result is compatible with our findings that the returns to consumption from Mandarin proficiency is higher in rural areas, in which average Mandarin ability is lower, than in urban areas.

[Table 8 here]

5.3 Mandarin proficiency and relative consumption

We examine whether one's proficiency in Mandarin has a significant effect on relative consumption. Previous studies have shown that social comparisons are localized in both space and time (Knight and Gunatilaka 2010; Ferrer-i-Carbonell 2005). An extensive body of literature on the effects of income/consumption comparisons calculates comparison income/consumption as the cell average by region, gender, age or education (Oshio et al. 2011, Huang et al 2015a, Huang et al. 2015b). Knight et al. (2009) found that in China almost 70 per cent of respondents defined their main reference group as being within their own village. We define reference groups at both the community level and rural county/urban district level, separately. To check the robustness of our results, we further construct a reference group along three dimensions: age, education and gender. Age and educational attainment are divided into five and three categories respectively as specified in Table 1. Pulling all of this together, this gives us thirty-six groups in total ($2\times3\times5=30$).

[Table 9 here]

Table 9 presents the results for the effect of Mandarin proficiency on relative consumption. Proficiency in Mandarin is positively associated with all three indicators of relative consumption. The effect on relative consumption when the reference group is based on age, education and gender is the highest. In this case, an increase in one's Mandarin proficiency score increases relative consumption by 0.0318 points, while it increases relative consumption by 0.0085 points and 0.0132 points when the comparator is defined at the community and county levels

respectively. Our results imply that proficiency in Mandarin does exacerbate disparity in people's consumption, especially for those of the same gender, age and education attainment. An explanation is that individuals of the same age, gender and education may be similarly likely to rely on the mass media to obtain information about consumption possibilities and have the same proclivity to experiment with new brands. Hence, differences in language ability are most likely to be reflected in differences in consumption productivity for those with similar characteristics.

6. Conclusion

We have examined the relationship between proficiency in Mandarin and an individual's consumption expenditure in China using a variety of methods. While each of them has their limitations, they point in the one direction. We find that proficiency in Mandarin has a significant and positive effect on an individual's consumption. There are several channels through which this potentially occurs. For instance, language proficiency may reduce customer discrimination, lower search costs, increase consumption of cultural and social activities and promote future earning ability. We also observe that Mandarin proficiency is positively related with most categories of consumption expenditure. As an official language of learning and teaching, Mandarin is most valued in education and entertainment consumption. The relatively higher effect on transportation, communication and transfers consumption reinforce the idea that language ability may promote consumption through its effect on an individual's cultural and social activities.

There is considerable heterogeneity in the effects of Mandarin proficiency on consumption across groups. Our results suggest that proficiency in Mandarin increases consumption for males, females, urban residents, rural residents and urban locals, while its effect on the consumption of rural-urban migrants is not significant. One explanation for the latter is that rural-urban migrants are segregated from urban locals. They tend to live in local enclaves with independent schools, shops and medical services and do jobs shunned by urban locals. This means that they have very little interaction with urban locals and primarily use their local dialect rather than Mandarin in daily life. This reduces the effect of Mandarin ability on consumption and also reinforces their own dialect, rather than Mandarin, as a marker of social identity. Many migrants are only transient and hence their environment is neither stable, nor conducive, to investing in Mandarin language skills. Moreover, urban residents typically attach negative stereotypes to rural-urban migrants, based on their accent, appearance and dress in public areas (Gan, 2014). Migrants who speak Mandarin with a noticeable accent may face higher customer discrimination in consumption, meaning they prefer to live, and consume, in their enclaves.

Mandarin proficiency has a significant effect on consumption in all age brackets. Reflecting higher exposure to mass media and having a higher proportion of education and entertainment consumption, Mandarin proficiency has more effect on the consumption of younger people. The effects of Mandarin proficiency on consumption are relatively higher in regions with more diversified dialects and more pronounced mutual intelligibility problems. We find that Mandarin proficiency effects relative consumption, irrespective of whether the reference group is defined at the community or county levels or constructed based on age, education and gender.

Our results have some important policy implications for the debate in China about whether the Chinese government should promote Mandarin at the expense of linguistic and cultural diversity. Opponents argue that languages are fundamental resources for both cultural and identity production. Linguists in China have long been concerned that Mandarin promotion has typically been associated with cultural and ethnic assimilation (Feng 2012, Gong et al. 2011). However, findings from this study suggest that proficiency in Mandarin could significantly increase individual's consumption expenditure. In recent years, while the Chinese government has decided to shift from an investment and export-driven growth pattern to a more consumption-driven growth path, the share of consumption in GDP has fallen sharply. The relative importance of consumption as a source of economic growth has diminished substantially compared with that of investment (Lardy and Subramanian 2011).

Given that Mandarin has not been widely used in many dialect areas of China, a strong policy implication of our findings is that the Chinese government should further promote Mandarin in order to stimulate domestic consumption and, in turn, economic growth. Our finding that the effects of Mandarin proficiency on consumption are heterogeneous across groups suggest that the government should target the promotion of Mandarin ability for young people, those with low educational attainment and those who live in the countryside and in the south and southwest regions. While we find that there is no significant effect of Mandarin proficiency on migrants' consumption, this group cannot be ignored because of their high proportion in the overall population (Chan 2013). Migrants still face great linguistic challenges in adapting to the social life in the host community (Gong et al. 2011).

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Table 1. Summary statistics for Mandarin proficiency and consumption

	Mandarin proficiency				Total consumption	
	Self assessment		Interviewer assessment			
	Mean	SD	Mean	SD	Mean	SD
Full sample	2.28	1.59	3.24	2.44	10.71	17.17
By demographic or socioeconomic group						
Male	2.40	1.52	3.31	2.42	10.61	16.98
Female	2.18	1.65	3.17	2.46	10.82	17.35
Urban residents	2.65	1.54	3.58	2.53	14.78	22.79
Rural residents	1.98	1.57	2.95	2.33	7.52	9.26
Urban locals	3.33	1.21	4.75	2.12	25.17	36.52
Rural-urban migrants	2.60	1.55	3.49	2.53	14.01	21.20
By age group						
15-29	3.18	1.22	3.94	2.45	10.30	16.22
30-39	2.69	1.46	3.65	2.47	11.70	19.15
40-49	2.14	1.52	3.20	2.42	11.33	17.73
50-59	1.92	1.60	2.98	2.35	10.80	16.36
60+	1.58	1.59	2.52	2.28	9.69	16.56
By education						
6 years or less	1.69	1.61	2.65	2.33	8.51	12.92
9-12 years	2.68	1.37	3.62	2.41	11.67	16.93
15 years or more	3.69	0.99	4.75	2.67	24.10	34.16
By region						
Northeast region	3.49	1.10	5.77	1.08	12.90	19.50
North coastal region	2.37	1.51	3.42	2.48	9.83	13.06
East coastal region	2.77	1.45	3.78	2.30	20.66	28.08
South coastal region	2.19	1.50	2.37	2.27	9.18	11.72
Middle Yellow River region	1.91	1.58	2.47	2.20	7.96	10.76
Middle Yangtze River region	2.31	1.47	3.22	2.35	11.48	14.97
Southwest region	1.45	1.53	2.15	2.26	8.60	13.30
Northwest region	1.92	1.58	2.76	2.21	8.30	18.69

Notes: total consumption expenditure is in thousands of RMB;
Self-assessed mandarin proficiency: 0 = cannot speak, 5 = very fluent; Interviewer-assessed mandarin proficiency: 0 = cannot speak, 7 = very fluent.

Table 2. OLS, IV and PSM results for effects of Mandarin proficiency on total consumption

	Self-assessed Mandarin		Interviewer-assessed Mandarin	
Panel A: OLS and IV	OLS	IV	OLS	IV
Language proficiency	0.0394***	0.1201***	0.0273***	0.0416***
	(10.54)	(5.90)	(11.89)	(8.92)
Cragg-Donald Wald F statistic		578.281		4733.980
		(0.0000)		(0.0000)
Hansen J statistic		0.022		0.216
		(0.8833)		(0.6421)
N	31094	31094	31084	31084
adj. R^2	0.275	0.255	0.276	0.267
Panel B: PSM				
Nearest neighbor matching	0.107***	(3.80)	0.062**	(2.03)
Kernel matching	0.120***	(6.91)	0.090***	(6.91)
Stratification matching	0.117***	(6.39)	0.077**	(2.40)
N	30958		30984	

Notes: * p < 0.1, ** p < 0.05, *** p <0.01; *t*-values in parenthesis. All specifications include a full set of controls.
IVs for self-assessed Mandarin proficiency: whether respondent's conversation language in family is Mandarin, dialect language concentration;
IVs for interviewer-assessed Mandarin proficiency: whether respondent's interview language is Mandarin, Mandarin language concentration;
PSM in Mandarin: Treatment = 1 if self-assessed Mandarin proficiency = 3, 4 or 5; otherwise treatment = 0; treatment = 1 if the interviewer-assessed Mandarin proficiency = 4, 5, 6 or 7; otherwise treatment = 0.

Table 3. Quintile regression results for effects of Mandarin proficiency on distributional total consumption

Quantile	Coefficient		R^2
0.1	0.0464***	(6.54)	0.269
0.2	0.0446***	(8.50)	0.272
0.3	0.0406***	(9.53)	0.273
0.4	0.0351***	(8.29)	0.274
0.5	0.0327***	(7.99)	0.274
0.6	0.0332***	(7.74)	0.274
0.7	0.0328***	(7.82)	0.274
0.8	0.0384***	(7.60)	0.272
0.9	0.0383***	(5.89)	0.267
N	31094		

Notes: * *p* < 0.1, ** *p* < 0.05, *** *p* <0.01; *t*-values in parenthesis. All specifications include a full set of controls.

Table 4. Effects of Mandarin proficiency on various components of consumption

	Food	Clothing	Housing	Necessities	Medical treatment & fitness	Transportation & communication
Mandarin	0.0573***	0.0171*	0.0671***	0.0699***	0.0640***	0.0722***
	(5.58)	(1.83)	(9.26)	(7.34)	(5.58)	(9.30)
N	31094	31094	31094	31094	31094	31094
adj. R^2	0.062	0.128	0.138	0.104	0.060	0.151
	Education & entertainment	Transfers	Insurance	Mortgage	Other	
Mandarin	0.1832***	0.0991***	-0.0181	-0.0019	0.0688***	
	(10.32)	(6.56)	(-1.30)	(-0.22)	(4.24)	
N	31094	31094	31094	31094	31094	
adj. R^2	0.103	0.103	0.098	0.035	0.105	

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *t*-values in parenthesis. All specifications include a full set of controls.

Table 5. Effects of Mandarin proficiency on total consumption by demographic or socioeconomic group

	Males	Females	Urban residents	Rural residents	Urban locals	Rural-urban migrants
Mandarin	0.0362***	0.0416***	0.0322***	0.0415***	0.0324***	0.0245
	(6.74)	(7.90)	(5.49)	(8.54)	(5.39)	(0.88)
N	15156	15938	13996	17098	13028	968
adj. R^2	0.270	0.280	0.288	0.141	0.277	0.356

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *t*-values in parenthesis. All specifications include a full set of controls.

Table 6. Effects of Mandarin proficiency on total consumption by age group

	15-29	30-39	40-49	50-59	60+
Mandarin	0.0613***	0.0291***	0.0305***	0.0189**	0.0380***
	(6.41)	(2.93)	(4.06)	(2.20)	(4.72)
N	6565	4837	7121	5653	6918
adj. R^2	0.248	0.324	0.269	0.268	0.302

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *t*-values in parenthesis. All specifications include a full set of controls.

Table 7. Effects of Mandarin proficiency on total consumption by education

	6 years or less	9-12 years	15 years or more
Mandarin	0.0443***	0.0242***	0.0129
	(8.23)	(4.33)	(0.66)
N	14807	14021	2266
adj. R^2	0.197	0.238	0.290

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *t*-values in parenthesis. All specifications include a full set of controls.

Table 8. Effects of Mandarin proficiency on total consumption by region

	Northeast region	North coastal region	East coastal region	South coastal region	Middle Yellow River region	Middle Yangtze River region	Southwest region	Northwest region
Mandarin	-0.0011	0.0224**	0.0394***	0.0654***	0.0574***	0.0408***	0.0606***	0.0315***
	(-0.10)	(2.07)	(2.92)	(5.00)	(6.65)	(3.10)	(6.33)	(3.25)
N	4415	3631	3491	3093	5759	2671	4303	3731
adj. R^2	0.244	0.198	0.222	0.236	0.182	0.277	0.194	0.135

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *t*-values in parenthesis. All specifications include a full set of controls.

Table 9. Effects of Mandarin proficiency on relative consumption

	Community	County	Gender, age and education
Mandarin	0.0085*	0.0132**	0.0318***
	(1.86)	(2.28)	(5.16)
N	31094	31094	31094
adj. R^2	0.041	0.054	0.094

Notes: * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$; *t*-values in parenthesis. All specifications include a full set of controls.