Social Identity and Inequality: The Impact of China's *Hukou* System

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Abstract

We conduct an experimental study to investigate the causal impact of social identity on individuals' performance under incentives. We focus on China's household registration (*hukou*) system, which favors urban residents and discriminates against rural residents in resource allocation. Our results show that making individuals' *hukou* identity salient significantly reduces the performance of rural migrant students, relative to their local urban counterparts, on an incentivized cognitive task, and consequently significantly lowers their relative ranking in the earnings distribution under the piece rate regime. However, the impact of *hukou* identity salience is insignificant in the tournament regime, suggesting that its negative effect on migrant students' performance may be mitigated when competition is introduced. The results demonstrate the impact of institutionally imposed social identity on individuals' economic performance, and potentially on inequality.

Keywords: social identity, inequality, field experiment, *hukou*, China
JEL Classification: C93, D03, O15, P36

1. Introduction

A large body of literature documents significant and increasing economic inequality in the emerging economies of the world (in *China*: Kanbur and Zhang, 1999; Chen, 2002; Yao, Zhang and Hanmer, 2004; Ravallion and Chen, 2007; in *India*: Deaton and Dreze, 2002; Datt and Ravallion, 2002). Akerlof and Kranton (2000) incorporate individuals' social identity into a theoretical model of poverty and show that social exclusion can lead to equilibria in which the 'excluded' individuals avoid economic activities that are remunerative. Thus, if we incorporate the psychology and sociology of an individual's identity into economic models of behavior the implications for economic inequality may be much wider.

This paper extends the literature on social identity by investigating whether individuals' identification with an institutionally created underclass can contribute to widening the income gap between them and the privileged. We focus on China's household registration system – the *hukou* institution. This system categorizes citizens into urban (non-agricultural) and rural (agricultural) residents of a particular location. The urban residents in that location (say a municipality) are favored in resource allocation compared to the rural residents and migrants. We design a framed field experiment (Harrison and List, 2004) to study whether individuals' identities created by this institution affect their performance under incentives, and the distribution of earnings among these different socio-economic groups.

To introduce an exogenous variation in identity salience we adopt a methodology from psychology called priming (Bargh, 2006). Specifically, we randomly assign primary school students in Beijing, with different *hukou* backgrounds, to two treatments. In the identity salience treatment we prime students' *hukou* identity and make it salient through a pre-experiment questionnaire followed by a public verification of their *hukou* status (Shih, Pittinsky and Ambady, 1999; Hoff and Pandey, 2006, 2012). In the control treatment students' *hukou* identity is kept

private. We then investigate the causal impact of *hukou* identity salience by comparing the difference in the performance of local urban students and students from rural migrant families in incentivized puzzle-solving tasks between the two treatments, i.e., by using a difference-in-difference approach. We also examine how the impact of *hukou* salience on the performance of the two groups translates into widening the experimental earnings gap between them.

Our experimental design follows Hoff and Pandey (2006, 2012) who were the first to explore how social identity contributes to inequality through its impact on individuals' performance on incentivized tasks in India. This paper extends their investigation to China – the world's most populous country and fastest growing economy – and more importantly, to a broader horizon in several ways. First, we explore the impact of identity within a socio-political system that is almost polar opposite of India's. Unlike India, China is an ethnically homogeneous society – its population is 91.5 percent ethnic Han (National Bureau of Statistics 1994-2003). While the caste system is based on factors that include ethnicity and occupation, the rural-versus-urban categorization by China's *hukou* system is less complex. The relatively simple social categorization by *hukou*, therefore, provides cleaner evidence on how powerful institutional exclusion can be, even in an ethnically homogeneous society, in influencing labor market outcomes through individuals' social identities. Second, like the caste system, *hukou* is an ascriptive order (i.e. it is assigned by birth) but unlike caste or ethnicity, migrant identity in China is administratively created to control spatial labor mobility and reinforced through merely decades of differential administrative treatment of rural-urban residents. We, therefore, have an opportunity to test whether systemic disparity between households over a short period of time (compared to thousands of years for caste and ethnic disparities) can affect performance under incentives. This provides us with more powerful evidence on the impact of institutions and social exclusion in creating identities. Finally, as a policy

intervention in the domestic labor market, China's *hukou* system was initially designed to prevent potential problems that may be caused by massive rural-urban labor migration. By focusing on migrant identity created by such a policy this paper carries broader implications for policy making in other economies where regional labor migration or global immigration may pose challenges in the labor markets.

Our results indicate that when *hukou* identity is made salient, the performance of rural migrant students declines substantially by 11.96 percent in the overall sample, and by 17.57 percent under piece rate payments, compared to local urban students. In addition, migrant students' average ranking of experimental earnings declines by 13.5 percentiles relative to local urban students under piece rate payments. These effects are, however, insignificant under the tournament regime, suggesting that competition may mitigate the debilitating effect of the salience of migrants' inferior identity.

Our findings indicate that identities created by the *hukou* system may affect individuals' economic performance but its impact varies by the payment regime. The negative impact of *hukou* salience under piece rate payments suggests that *hukou* identity salience may exacerbate the widening income gap between migrants and non-migrants in urban China (Ravallion and Chen, 2007). Policy interventions based on categorization of citizens and differential treatments by those categories may lead to unintended effects on individuals' economic behavior, and, thereby, have wider economic consequences.

There exists a large literature on the impact of the *hukou* system on children's health and educational outcomes in *rural* China. Our research extends this literature to the relatively unexplored urban context with two broad implications.[1] First, existing literature suggests that high

[1] Studies suggest that educational attainment of potential migrants in rural areas is lowered due to occupational segregation in cities (deBrauw and Giles, 2008); the health and educational attainment of children is adversely affected

levels of inequality may have adverse implications for labor productivity (Cohn et al., 2011). This in turn may have adverse consequences for sustaining economic growth (Berg, Ostry, and Zettelmeyer, 2012; Berg and Ostry, 2011). Our results, thus, highlight the importance of avoiding discriminatory social and economic policies in order to ensure inclusive and sustainable economic growth in developing countries. Second, the results underline the need for more research on the impact of social exclusion on individual behavior and the effectiveness of existing redistributive policies that aim at reducing social exclusion. For instance, while affirmative action has generated tremendous policy debate, there is limited evidence of its impact on social cohesion as well as economic efficiency.

The remaining sections of the paper are organized as follows. Section 2 places this study in the context of existing literature. Section 3 provides a brief background on China's *hukou* system. Section 4 describes the experimental design and the data. The results of the analysis and its discussion are presented in Section 5. Section 6 concludes.

2. Literature Review

The importance of incorporating social identity into economic analyses is stressed by Akerlof and Kranton (2000). An expanding theoretical (Shayo, 2005; Fang and Loury, 2005; Benabou and Tirole, 2007; Horst, Kirman and Teschl, 2006) and a growing number of experimental economics studies show that social identity has an impact on preferences and economic behavior (Eckel and Grossman 2005; Goette, Huffman and Meier 2006; Charness, Rigotti and Rustichini 2007; Chen and Li 2009; Benjamin, Choi and Strickland, 2010; Benjamin, Choi and Fisher, 2013; Chen and Chen 2011). To the best of our knowledge, only two studies investigate the impact of social identity

due to the absence of parents who have migrated to the cities (Lee and Park, 2011; Meng and Yamauchi, 2012). Unlike this existing literature the focus of our study is migrant children in *urban* areas.

on economic outcomes in developing countries experimentally. Hoff and Pandey (2006, 2012) find that social identity – a product of history and culture – shapes one's belief system and has a pronounced impact on an individual's performance under incentives. They show that making caste salient to middle school male students in rural India lowers the performance of low-castes relative to high-castes even when rewards for performance depend solely on individual effort. Hoff and Stiglitz (2010) discuss why ideologies of social unworthiness, as cognitive frames, can be so powerful.

Concerns about rising inequality accompanying rapid economic growth have been growing in recent years. In China, income inequality has risen significantly since economic reforms were initiated in 1978 (Ravallion and Chen, 2007; Yao, Zhang and Hanmer, 2004; Chen, 2002; Kanbur and Zhang, 1999). Seventy percent of the overall income inequality in China was accounted for by rural-urban inequality during 1983-1995. Further, the contribution of intra-urban inequality to overall inequality increased by 96 percent over the same period (Kanbur and Zhang, 1999). Behind these inequality statistics lie rapid urbanization (Ravallion and Chen, 2007) and the accompanying labor migration from rural to urban areas – the largest in world history. Because of the *hukou* institution, migrant workers, most being unskilled rural laborers, are treated as outsiders with limited access to economic resources and opportunities (Liu, 2005).

Research suggests that on average those with a rural *hukou* are socio-economically worse-off than those with an urban *hukou* in China.[2] However, due to confounding unobservable individual characteristics, *causality* between self-perceptions of *hukou* status and economic

[2] Liu (2005) finds that compared to urban residents those who obtained urban *hukou* later in their lives have significantly lower educational attainment and healthcare benefits. Lu and Song (2006) find that local urban workers earn substantially higher hourly wage than those without local urban *hukou*. Whalley and Zhang (2007) show that removing *hukou* barriers to domestic labor mobility will significantly reduce inequality and increase economic efficiency gains.

behavior is hard to establish using survey data or direct field observations. Hence, the current literature almost entirely focuses on restricted labor mobility and discrimination in resource allocation in the *hukou* system to explain rural-urban and intra-urban economic inequality (Liu, 2005; Lu and Song, 2006; Whalley and Zhang**,** 2007).[3]

3. The *Hukou* System and Social Identity in China

The modern-day household registration or *hukou* system evolved gradually following the success of the communist revolution in China in 1949. Under this system every citizen was legally bound to register her or his single permanent place of residence (*hukou suozaidi*) say city *x* in province *y*, and the type of *hukou* (*hukou leibie*) which was either agricultural (rural) or non-agricultural (urban). Strict controls were imposed on mobility of rural *hukou* holders to urban areas, perpetuating discrimination against them in several ways. Employment opportunities favored urban *hukou* holders in cities (Chan and Zhang, 1999). Urban *hukou* holders, but not rural *hukou* holders, were eligible for the ration stamps that guaranteed subsidized products (Liu, 2005). Urban residents (particularly employees of the state-owned enterprises) were granted generous fringe benefits including subsidized housing, health services and education. In contrast, such benefits to rural residents were provided by their communes or villages, which were usually of inferior quality and of highly varying reliability (Lin, Cai and Li 1996; Cheng and Selden, 1994). A household's *hukou* was (and continues to be) inherited by the next generation. *Hukou* status and thereby educational attainment and eventually employment opportunities of the next generation of rural populace was restricted by birth.[4]

[3] Some recent studies use survey data on both migrants and local residents in urban China to explain earnings differentials based on the observed characteristics of the two groups (Qu and Zhao, 2012).
[4] Before 1998, children of rural-urban marriages had to follow the mothers' *hukou* type (Chan and Zhang, 1999). They are now allowed to inherit either the fathers' or the mothers' *hukou*.

Following China's transition from a centralized to a market economy starting in the late 1970s, the number of people migrating in search of jobs surged after market reforms (and abolition of communes) and an easing of government regulations on spatial migration. The past three decades have, thus, witnessed a drastic increase in the number of temporary non-local *hukou* residents (either registered or non-registered) in urban centers. However, these migrants are not entitled to urban benefits unless their *hukou* is converted to a full urban one. Rural-urban *hukou* conversion is possible but only through very limited channels.[5] Thus the *hukou* system transitioned from an institution of direct to indirect control over spatial migration.

As of when this study was conducted, the following major and persistent gaps between rural migrants and urban residents existed in large urban centers: (1) labor market and occupational segregation: employment in government offices and state-owned enterprises in cities continued to be unavailable to rural migrant workers unless they converted to an urban *hukou*; (2) lack of social insurance and social welfare benefits for rural migrant workers such as unemployment and health benefits. In addition, government subsidized low-rent housing in large cities is only available for local urban *hukou* holders.[6]

It is important to realize that these factors, along with the resulting social segregation of migrants, suggest that the experience of a rural migrant in China is *not* transitory as in other developing countries (Chan, 1996; Solinger, 1999). Geographical control of rural populace until

[5] Possible channels for rural-urban *hukou* conversion include recruitment by state-owned enterprises, enrollment in higher education institutions, and land acquisition by government (Chan and Zhang, 1999). Since 1992 urban *hukous* are also sold at a high fee to eligible investors, property buyers and professionals.

[6] On July 30, 2014, China's government issued a circular announcing that it would reform the *hukou* system (http://www.gov.cn/zhengce/content/2014-07/30/content_8944.htm). New government regulations will remove the limits on *hukou* registration in townships and small cities, relax restrictions in medium-size cities, and set qualifications for registration in big cities. However, for mega-cities with more than five million residents (including Beijing), the government will continue to enforce strict control on the influx of migrants (http://www.chinadaily.com.cn/china/2014-07/30/content_18216278.htm).

the 1970s has been replaced by economic and social divisions between rural and urban *hukou* holders *within* the urban areas of China.

The Hukou System and Schooling in Urban China

Chinese citizens are entitled to subsidized public education only in the area of their legal permanent residency. In most cities non-local *hukou* holders cannot enroll their children in local schools unless the schools have quotas for 'guest' students. These 'guests' usually have to pay higher fees than local *hukou* holders, and the fees can be a significant proportion of migrants' incomes (Xinhua News Agency, July 10, 2002).[7] Slum schools built by migrant workers exclusively for their children are typically opposed by local authorities, or stringent physical and financial requirements are imposed on them to obtain a legal status.

During China's urbanization process, the newly developed urban areas contain both non-agricultural and agricultural population because of the *hukou* classification system (Chan and Zhang, 1999). Thus the population in large municipalities such as Beijing and Shanghai usually consist of four different *hukou* categories: local urban (residents of the urban areas of municipality), non-local urban (migrants who are urban residents of less-developed cities), local rural (residents of the rural areas of municipality), and non-local rural *hukou* holders (migrants from rural areas of provinces outside municipality). The local urban residents are considered to be at the top of the social hierarchy while the migrants from rural areas are typically at the bottom. But the comparison of socio-economic status between local rural and non-local urban is not clear. Due to this ambiguity

[7] According to the report, "..... These (migrant) schools teach between 20 and 3,000 students each and charge about ¥300 (36.1 US dollars) each term. When migrant children go to public schools, their parents have to pay ¥500 (60.2 US dollars) in tuition fees each term, plus ¥1,000 (120.5 US dollars) for selection of the school and ¥1,000 to ¥30,000 (3614.5 US dollars) as sponsorship."(http://www.china.org.cn/english/China/36594.htm).
Migrant laborers in Chinese cities earn an average of ¥966 per month in 2006 according to a National Bureau of Statistics Survey Report. (http://english.peopledaily.com.cn/200610/22/eng20061022_314208.html).

and the limited number of students in these two categories in our sampled schools, we excluded the local rural and non-local urban *hukou* holders from this study, and focused on the two sharply disparate groups. Since our experiment was conducted in Beijing, this study includes Beijing urban (hereafter **H**igh) and non-Beijing, rural (hereafter **L**ow) *hukou* holders.

4. Experimental Design and Implementation

Our experiment adopts the design of Hoff and Pandey (2006, 2012). We manipulate *hukou* salience – subjects' *hukou* identity is made salient and public in the identity salience treatment, and is kept private in the control treatment. We also vary the payment regime by using piece rate and tournament in each of the treatments.

Incentivized cognitive task The experiment was conducted using paper and pencil in a standard classroom setting with six subjects (3 H and 3 L types) seated at separate desks with fairly large distance from one another. Randomly assigned subject ID numbers were used to ensure anonymity of decisions throughout the experiment. Before the experiment started participants were greeted by a female experimenter and each paid 3 Chinese yuan (¥3) participation fee upon arrival. The experimenter then explained the tasks and rules. We used level-2 maze puzzles from Yahoo! games (Gneezy, Niederle, and Rustichini, 2003; Niederle and Vesterlund, 2007; Hoff and Pandey, 2006). The task was to find a path through the field from one side to the other without crossing the solid lines (Appendix A). The experimenter explained the rules using a simple maze, and showed how to solve another one of similar difficulty level as those used in the experiment. [8] Subjects were given five minutes to practice with an additional maze, then participated in two 15-minute rounds of experiment. In each round, they were given a booklet of 15 mazes, and had up to 15 minutes to

[8] The instructions are adopted from Hoff and Pandey (2006, 2012). The English translation of the experimental instructions is included in Appendix B.

solve as many as possible. All thirty mazes were of identical difficulty level.

The homogeneous reward system (hereafter the Pure Piece Rate (PP) treatment) used piece rate compensation in both rounds – subjects were rewarded with ¥1 for each maze solved correctly. The heterogeneous reward system (hereafter the Mixed Tournament (PT) treatment) consisted of piece rate in the first round (¥1 per maze), and tournament in the second round in which only the winner (who solved the most number of mazes in the session) was rewarded with ¥6 per maze and other subjects received zero.[9] In the case of a tie, each of those who solved the highest number of mazes was rewarded with ¥6 per maze.

Subjects were told that the task consisted of two rounds. But the instruction for the second round, including the payment scheme, was not given until after round one. Therefore, the payment structure was identical in round one for the PP treatment and the PT treatment. At the end of each round, maze booklets were collected and left outside the classroom by the experimenter for the graders. Since the experimenters did not leave the classroom at any point of time during the session, subjects were aware that their mazes were not graded by their experimenters. A survey was conducted at the end to collect demographic information. Thereafter, the grading results were left outside the classroom and picked up by the experimenters. Subjects were then informed about their performance (and results of the tournament, if applicable), paid individually in private, and dismissed. Throughout the process, neither the subjects could see the graders nor the graders could associate the booklets with individual subjects.

Identity manipulation There were two treatments in our experiment – the identity salience treatment and the control treatment. The identity salience treatment differs from the control treatment by manipulating the salience of one's *hukou* identity before the incentivized tasks.

[9] To avoid zero payoffs we did not use tournament in both rounds.

Priming, a technique often used in psychology, introduces certain stimuli ('primes', including image, audio, or text such as a questionnaire and an article) to activate subjects' knowledge of social structures. As shown in a large literature in psychology (see Bargh, 2006 for a review) and a few recent economic studies (Hoff and Pandey, 2006, 2012; Benjamin, Choi and Strickland, 2010; Benjamin, Choi and Fisher, 2013), priming social identities may influence behavior and attitudes.

In this study, we made *hukou* identity salient in the identity treatment by using a survey and publicly verifying subjects' *hukou* identity at the beginning of the experiment, while in the control treatment subjects' *hukou* identity was kept private and not primed. In the pre-experiment survey, used to prime *hukou* identity (see Appendix C), subjects were asked where they were born, whether they spoke Beijing dialect at home, whether they (their classmates or teachers) considered themselves (them) as a Beijing local, and how much miscellaneous fees they were charged by the school at the beginning of the semester. They were also asked to compare Beijing local students with 'guest' students on diligence in academic study, class participation, extracurricular activities, and attitude towards money in daily spending. After the survey, individuals' *hukou* was publicly verified by the experimenter along with other factual information in the following order: name, date and month of birth, and *hukou*.[10] This procedure simulated some real life scenarios that these students experience in school. For example, to determine the amount of miscellaneous fees due, students' *hukou* status needs to be verified, sometimes in public.[11] In the control treatment, the sessions started with neither the survey nor public verification of *hukou*, and proceeded directly to the incentivized cognitive task.[12]

[10] The experimenter said in public, "According to the information from the school's registrar's office, your *hukou* belongs to [province/city] and it is a(n) [agricultural/non-agricultural] *hukou.*" Student's year of birth was not revealed to avoid affecting their self-confidence given that they were from different grades.

[11] Unlike in many western countries, date of birth, students' grades, and similarly *hukou* type are not treated as confidential information in Chinese culture.

[12] Note that there is a subtle difference in the experimental design, and therefore the interpretation of findings, between our study and Hoff and Pandey (2006, 2012). In the latter study all subjects' castes were verified privately before they

The experimental intervention (survey and public verification) might have had effects on subjects that are unrelated to *hukou* salience. For instance, subjects' attention may have been diverted from (viz. by responding to a survey, independent of its content) or, conversely, drawn to (viz. by calling out their names) the maze task. Such direct effects could be incorrectly construed as the impact of *hukou* salience on performance if we focus solely on the difference between the control and salience treatments for each *hukou* type. Fortunately, our experimental design allows any such effect to be differenced out empirically when we compare the effect of the salience treatment on the L subjects to its effect on the H subjects. We, therefore, follow a difference-in-difference empirical strategy to measure the causal impact of *hukou* salience by comparing the effect of the experimental intervention on the L subjects' performance to that on the H subjects'.

Selection of subjects Subjects in our experiment were 8-12 years old students, randomly selected from four elementary public schools in Beijing. These schools suited the requirements of our experiment on several fronts. On average, one-third of enrolled students in the sampled schools had a non-Beijing *hukou*. The proportion of students from migrant families was comparable to the migrant population of the Beijing metropolitan area, and these schools were located in districts where per capita GDP was comparable to the average in the Beijing municipal area. We obtained individual *hukou* records, in advance, from the schools' registrar's offices for assigning subjects to the experimental sessions.

The study focuses on primary school students rather than adults for several reasons. First, focusing on young individuals allows us to avoid using selective samples of people whose decision

were assigned to different treatments. Hence caste identity was made privately salient irrespective of the treatment condition. In our study subjects' *hukou* identity was made privately salient through the pre-experiment survey only in the salience treatment. This was followed by public verification in the salience treatment as discussed above. Thus any identity effects we observe would be attributable to the overall salience of *hukou* identity - public as well as private.

to migrate to cities may be systematically correlated with their abilities and intrinsic preferences.[13] Second, using adult subjects may introduce potential confounds since their accent and clothing usually provide clues to where they originate from and give away their *hukou* identity even in the absence of the *hukou* identity prime. Since our subjects wore identical school uniforms and, relative to adults, the young tend to pick up local accents easily, the choice of subject pool ensured that it was difficult to observationally infer one's *hukou* type. Third, a study that identifies potential adverse impact of the *hukou* system on young migrants would suggest the importance of policy interventions starting at young ages. Although our sample was young, almost all participants understood what their *hukou* type was. Last but not least, school children of this age are expected to respond to monetary incentives given that they tend to receive pocket money or allowances from their parents.[14]

Subjects were randomly selected from among 3-6 graders at three schools and among 3-5 graders in one (see details on the random sampling and assignment procedure in Appendix E.) Each session of the experiment consisted of six subjects of the same gender with three from each of the H and L *hukou* types. To minimize the probability that students knew one another *a priori*, we obtained student rosters and stratified students by gender, grade, class section, and *hukou* type. Three students of the same *hukou* type were randomly selected, each from a different grade. Two students from the same grade (with different *hukou* types) were randomly selected, each from a different class section. The sessions in both treatments were formed in the same way. Consent for student participation was obtained from their teachers. All selected students were informed, before

[13] One may be concerned that since parents of children who migrate to urban areas are a selective sample, the L type could still be subject to this bias. Even if this were the case, the potential selection should not affect the internal validity of our experimentally identified effects since our treatments are randomized.

[14] A study conducted jointly by the China Youth and Children Research Center (CYCRC) and the Bank of China (2010) shows that 47.1 percent of primary school age children living in urban areas receive pocket money for doing household chores (http://www.cycs.org/Article.asp?Category=1&Column=444&ID=16893). Liu (2011, chapter 4) also discusses sources of children's pocket money.

the experiment started, that they were free to choose to or not to participate in the experiment. However, all selected students chose to participate. In some instances, sessions with fewer than 6 students occurred when a selected student happened to be absent from school on the day of the experiment.

The experiment was conducted in May and December 2007, and December 2008. At each school the experiment included four treatments including the PP and PT control treatments as well as the PP and PT identity salience treatments. Table 1 summarizes the features of experimental sessions. Experimental sessions were conducted separately for boys and girls during class breaks on school days. In total, we conducted 72 sessions (418 subjects) with mixed *hukou* types, including 61 full sessions (40 male and 21 female sessions with 3H and 3L subjects each) and 11 sessions with fewer than 6 subjects. Average earnings per subject were ¥19.70 in the control treatment and ¥19.60 in the identity salience treatment, about three times the average weekly allowance that these students received from their parents.

As mentioned above, pre and post-experiment surveys were conducted to elicit subjects' self-perceptions and demographic characteristics.[15] The summary statistics of the pre-experiment survey to prime identity in the salience treatment (Table 2) show that H subjects were both more likely to have been born in Beijing and lived longer in Beijing if born elsewhere, relative to L subjects (rows 1-2). The L subjects were less likely to speak in the Beijing local dialect at home (row 3). Their self-image was highly correlated with their *hukou* type: only 9.3 percent of L subjects (compared to 86.4 percent of H subjects in row 4) considered themselves Beijing locals; only 23.1 percent of L subjects compared to 81.7 percent of H subjects expected to be considered Beijing locals by their fellow students (row 5), while 23.6 percent of L subjects compared to 90

[15] The survey questionnaires are included in Appendices C and D. Appendix F summarizes the responses, by students' *hukou* type, from the post-experiment survey in both treatments.

percent of H subjects had a similar expectation of their teachers (row 6). As shown in the last column of Table 2, all these comparisons between L and H subjects are statistically significant at 1 percent level. Subjects were also asked about their perceptions of local and migrant students on four aspects, including how hard they worked, their involvement in classroom and extra-curricular activities, and attitude towards money (rows 8-15). Take rows 8-9 as an example, 16.4 percent of L subjects and 13.5 percent of H subjects thought that Beijing local students were more hardworking than their rural migrant counterparts while 32.7 percent of L subjects and 36.9 percent of H subjects thought the opposite. It shows both L and H subjects shared very similar perceptions ($p = 0.552$ in row 8, $p = 0.511$ in row 9.) In addition, the proportion of L subjects (H subjects alike) who thought migrant students were more hardworking significantly exceeds those who thought Beijing local students were more hardworking (32.7 percent in row 9 vs. 16.4 percent in row 8 for L, $p = 0.005$; 36.9 percent in row 9 vs. 13.5 percent in row 8 for H, $p = 0.000$). These patterns manifest themselves in subjects' responses to other perception questions (rows 10-15, with only one exception in row 10), which shows that migrant students were generally perceived to be more hardworking, less active participants in class and in extracurricular activities, but more careful with money, compared to their Beijing local counterparts.[16] These perceptions are not surprising given the relatively disadvantaged background of migrant families as indicated by the summary statistics from the post experiment survey in Appendix F: parents of the migrant families were less likely to be employed in private or public enterprises (considered prestigious in Chinese society, as opposed to being non-salaried and self-employed) and were less likely to have college or graduate degrees, all statistically significant differences at 1 percent level as shown in rows 1-4 in Appendix F. The perceived own academic performance is slightly, but insignificantly, poorer by

[16] In row 10, 24.5 percent of L subjects, compared to 41.4 percent of H subjects, thought that Beijing local students were more active participants in class ($p = 0.008$.)

the L subjects than by the H subjects (row 5 in Appendix F, $p = 0.149$). These survey responses suggest that the L subjects may have perceived themselves as inferior to the H subjects, confirming the negative stereotype of rural migrants in Chinese society.

Table 3 presents subjects' characteristics by *hukou* type and treatment. For each *hukou* type it shows insignificant differences across treatment in almost all observable characteristics, including participants' average age, grade, proportion born in Beijing, number of years of local residence, prior experience with the maze game, prior acquaintance with other participants, the amount of pocket cash given by parents, and their parental characteristics such as education and occupation.[17] This indicates successful randomization of subjects across treatment. In addition, we run an F test of the hypothesis that these observable characteristics, listed in Table 3, are jointly zero by regressing the salience treatment dummy on these variables, including a dummy for missing values. The P-values of the F test are 0.316 for H and 0.298 for L subjects, so the null hypothesis that these variables are jointly zero cannot be rejected for either *hukou* type. In the regression analysis in section 5, we also conduct a robustness check of our results by including these individual and parental observable characteristics as additional control variables.

5. Results

In this section, we investigate whether and how the activation of *hukou* identity salience influences individual's performance in the maze games. We first present the descriptive statistics and then discuss the regression analysis, which incorporates individual and school characteristics. The analysis excludes 11 sessions which had fewer than 6 subjects due to school absence of pre-

[17] Marginal significance is found in 3 out of 22 across-treatment comparisons in Table 3. Specifically, the proportion of H subjects who were born in Beijing was marginally higher in the salience treatment than in the control treatment ($p = 0.056$). The proportion of L subjects who had prior experience with the maze games before the experiment was marginally higher in the control treatment than in the salience treatment ($p = 0.054$). H subjects in the control treatment received slightly more pocket money than those in the salience treatment ($p = 0.069$).

selected subjects on the day of the experiment. We, therefore, have 366 subjects in our sample. Robustness checks, including analysis based on the entire sample, are conducted and discussed later in this section.

Recall that the Pure Piece Rate (PP) treatment consists of piece rate in both rounds whereas the Mixed Tournament (PT) consists of piece rate in round 1 and tournament in round 2. In the analyses, we first show results by pooling the data across payment methods (piece rate and tournament) and gender groups. We then split the sample on one dimension, either by payment (with piece rate including both rounds of PP and the first round of PT, and with tournament including only the second round of PT) or gender. We further split the sample on two dimensions, by payment *and* gender group.

As discussed in section 4, since both L and H subjects were subject to the pre-experiment intervention, our experimental design allows us to empirically difference out any potentially confounding effects of the experimental intervention (which are unrelated to *hukou* salience) by comparing the treatment effects across the two *hukou* types. Therefore, our discussion of results will focus on the *differential* effect of the experimental treatment on L and H subjects, i.e., the difference-in-difference estimates. For the sake of completeness and ease of interpreting the difference-in-difference estimates, we will also discuss single difference estimates, i.e., the treatment effects on L and H, separately. However our conclusions on the *causal* impact of the salience of *hukou* identity will be drawn based on the difference-in-difference estimates.

Figure 1 shows the average number of mazes solved by treatment and *hukou* type. Panels 1a-1c in the first row describe the data for all payment methods pooled, piece rate, and tournament, respectively. Panels 2a-2c in the second row and 3a-3c in the third row describe the data in the

same sequence for boys and girls separately.[18] As shown in Panels 1a-1c (with the summary statistics detailed in Table A1 of Appendix G), when *hukou* is made salient, L's performance worsens by 0.528 mazes in the pooled sample ($p = 0.071$) and by 0.708 in piece rate ($p = 0.028$), but slightly improves by 0.181 in tournament ($p = 0.756$), compared to the control treatment. H's performance in the salience treatment, on the other hand, improves by 0.369 mazes in the pooled sample ($p = 0.250$) and by 0.594 in piece rate ($p = 0.089$) but worsens by 0.173 in tournament ($p = 0.792$), compared to the control treatment. Therefore, we observe a significant decrease in L's performance, relative to H's, due to *hukou* salience in the pooled sample (0.897, $p = 0.039$) and in piece rate (1.302, $p = 0.006$), and an insignificant increase in L's relative performance in tournament (0.355, $p = 0.686$). Disaggregating the sample by gender, Panels 2a-2c, 3a-3c and the difference-in-difference results in the lower panel of Table A1 show that when *hukou* is made salient as opposed to the control treatment, both L boys and L girls perform worse relative to their H counterparts in the pooled sample (-0.661 for L boys, $p = 0.238$; -1.102 for L girls, $p = 0.087$) and in piece rate (-1.051 for L boys, $p = 0.091$; -1.641 for L girls, $p = 0.017$), but both perform insignificantly better than their H counterparts in tournament (0.504 for L boys, $p = 0.645$; 0.667 for L girls, $p = 0.621$).

Figure 2 focuses on the comparison of experimental earnings distributions by treatment. In each payment regime and treatment, subjects, regardless of their gender and *hukou* background, are ranked based on their experimental earnings (excluding the ¥3 participation fee). The cumulative distribution functions (CDFs) of the ranking percentiles are then plotted by treatment in the pooled sample (Panels 1a-1b), in piece rate (Panels 2a-2b), and in tournament (Panels 3a-3b) for each *hukou* type. In Panels 1a-1b of the pooled sample, we find that compared to the control

[18] Summary statistics are reported in the upper panel of Table A1 in Appendix G. The treatment effects on L and H as well as the difference-in-difference estimates, along with *p* values, are reported in the lower panel of Table A1.

treatment, the H subjects' average ranking in earnings distribution increases by 4.99 percentiles (p = 0.169), and the L's average ranking decreases by 4.29 percentiles (p = 0.195) in the salience treatment, leading to a marginally significant 9.28-percentile decrease in L's *relative* ranking (p = 0.059). In Panels 2a-2b (piece rate), the average ranking in earnings distribution increases by 6.82 percentiles (p = 0.065) for H but decreases by 7.42 percentiles (p = 0.031) for L in the salience treatment, leading to a significant fall in L's *relative* ranking by 14.24 percentiles (p = 0.005), compared to the control treatment. Interestingly, in Panels 3a-3b (tournament), the average ranking decreases by 2.84 percentiles for H (p = 0.734) but increases by 2.85 percentiles for L (p = 0.633), therefore L's *relative* ranking increases insignificantly by 5.69 percentiles (p = 0.579) in the salience treatment compared to the control treatment. These observations confirm those in Figure 1.

5.1 *Effects of Hukou Salience*

We next use the following school fixed-effects model to analyze the impact of *hukou* salience on individual performance:

$$Y_{is} = \beta_0 + \beta_1 L_{is} + \beta_2 salience\ treatment_{is} + \beta_3 (L_{is} \cdot salience\ treatment_{is}) + \Gamma \vec{X} + \alpha_s + \eta_{is}$$

The dependent variable of interest (Y_{is}) is the number of mazes solved by individual i in school s. The independent variables include low *hukou* type (L) (H type is in the omitted category), dummy variables for the identity salience treatment (*salience treatment*), and their interaction to allow the treatment effects to differ by *hukou* type. The coefficient estimate β_1 measures the difference in performance between L and H in the control treatment. β_2 and $(\beta_2 + \beta_3)$ measure the treatment effects on the performance of H and L subjects, respectively. As discussed in section 4, β_3, the difference-in-difference of the treatment effects between L and H, identifies the causal effect of

the salience of *hukou* identity, and hence is the main coefficient of research interest. The control variables in $\vec{X}$ include gender (male), grade, whether the student had played similar or the same maze games before. In the analysis we also include round or payment regime specific effects (i.e., round 2 of piece rate or tournament) wherever appropriate.[19] School fixed effects, α_s, capture unobservable, school-specific characteristics. η_{is} is the error term. Standard errors are clustered at the individual level.[20] In the bottom panel of the result tables, we also report the treatment effect on L, i.e.,$(\beta_2 + \beta_3)$, and tests of equality of coefficients across specifications.

Table 4 focuses on individual performance in the maze game. Column 1 shows the results for the pooled sample. We find that while the salience treatment has an insignificant effect on the H type's performance (β_2 = 0.167, p = 0.643), it significantly reduces L's performance ($\beta_2 + \beta_3$ = -0.714, p = 0.018, row (a) of the bottom panel). As a result, the L type perform worse by 0.880 mazes (β_3, p = 0.059) relative to the H type when *hukou* identities are made salient. Given that the L type solved 7.361 mazes on average in the control treatment for the pooled sample, the result suggests that identity salience leads to an 11.96 percent decrease in the L type's performance relative to H's.

In piece rate (column 2), L's performance significantly decreases by 0.913 mazes (p = 0.005, row (a) of the bottom panel), and H's performance insignificantly increases by 0.329 (p = 0.381) in the salience treatment compared to the control treatment. Thus the L type's performance worsens, relative to H's, by 1.241 mazes (p = 0.012) when *hukou* identities are made salient. Compared to L's average performance of 7.065 mazes in the control treatment in the piece rate regime, this

[19] There is a significant correlation of 0.7 between grade and subjects' age. Using age or grade does not affect the results. In the pooled analysis, fixed effects of round 2 for piece rate and tournament are included separately. Additional analysis in Table A2 of Appendix G shows no significant differences in the experimental effects (β_2 and β_3) between the two rounds in PP, or between round 1 of PP and round 1 of PT.

[20] Using the same specification, we also analyze effects on two additional outcomes, the likelihood of solving the most mazes and experimental earnings. These results are reported in Tables A6 and A7 of Appendix G.

impact is equivalent to an economically substantial decrease of 17.57 percent in L's relative performance in piece rate due to *hukou* salience. In tournament (column 3), the treatment effects on the performance of H and L types (-0.258, p = 0.667 for H; -0.114, p = 0.823 for L) and the difference-in-difference estimate β_3 (0.144, p = 0.857) are all statistically insignificant. In addition, row (d) shows that the difference-in-difference estimate β_3 in tournament (0.144 in column 3) is marginally significantly different (p = 0.084) from its counterpart in piece rate (-1.241 in column 2). This interesting result, further discussed at the end of this section, suggests that the negative impact of *hukou* salience on L observed in the piece rate regime may be mitigated by competition among subjects in tournament.

The results by gender in columns 4-5 in Table 4 show no statistically significant differences in the treatment effects or the difference-in-difference estimate β_3 across gender in the pooled sample (rows (b)-(d) of the bottom panel). Columns 6-9 display results disaggregated by gender and payment regime. In the piece rate regime (columns 6-7), the identity salience treatment leads to an insignificant increase in performance by 0.139 for H boys (p = 0.780) and 0.643 for H girls (p = 0.256), while it reduces the performance by 0.823 for L boys (p = 0.055) and 1.043 for L girls (p = 0.030). Hence, the impact of identity salience on subjects' performance, measured by β_3, is -0.963 (p = 0.139) for L boys and -1.686 (p = 0.024) for L girls, relative to their H counterparts. In tournament (columns 8-9), the treatment effects and the difference-in-difference estimate β_3 are statistically insignificant for both boys and girls.

Comparing results across columns 6-9, a few observations emerge. First, conditional on the payment regime, we again find insignificant differences in both the treatment effects and the difference-in-difference estimate β_3 across gender groups (columns 6 vs. 7, 8 vs. 9, rows (b)-(d)). Second, conditional on gender, we find that the treatment effects and the estimate for β_3 are not

statistically different across payment regimes (columns 6 vs. 8, 7 vs. 9, rows (b)-(d)) in all cases with one exception – the treatment effect on L girls' performance in piece rate is significantly different from that in tournament (-1.043 in row (a) of column 7 vs. 0.780 in row (a) of column 9, $p = 0.025$ in row (c)). We also observe that the impact of *hukou* identity salience on L's relative performance (β_3) changes from negative in piece rate to positive in tournament (from -0.963 to 0.374, $p = 0.184$ for boys; from -1.686 to 0.278, $p = 0.143$ for girls). Although these changes are statistically insignificant, they echo our previous observation on the marginally significant difference in β_3 between the piece rate and tournament regimes (-1.241 in column 2 vs. 0.144 in column 3, $p = 0.084$ in row (d)). These observations again could imply that the negative impact of *hukou* identity salience on the L type in piece rate might be mitigated by competition in the tournament regime.[21]

Overall, results in Table 4 indicate that making *hukou* identity salient reduces L's performance, relative to H's, marginally significantly in the pooled sample and significantly in the piece rate regime, while this negative impact is absent in the tournament regime. This implies that one's *hukou* identity, when made salient, may influence individual's performance on incentivized tasks depending on the payment scheme.

What does this impact entail regarding the income distribution for different *hukou* groups?

[21] Across all columns in Table 4, the effects of other covariates are generally as expected. The large positive coefficients of the 'piece rate round 2' and 'tournament' dummies suggests substantial improvement in performance over time. Boys solved more mazes than girls as shown in columns 1-3. The higher the grade, the better is the individual's performance. Previous experience with similar or the same maze games does not increase one's performance in most cases. Additional analyses, as robustness checks, are conducted and presented in Appendix G: Table A3 reports analysis based on the *entire* sample (rather than the full sessions). Table A4 reports analysis by adding other control variables, such as the number of others known in the session, pocket money received, parental education and occupation. In Table A5, we disaggregate the data by session type (i.e., PP vs. PT) rather than payment regime (i.e., piece rate vs. tournament). Table A6 reports logit analysis on the likelihood of solving the most mazes in the session. We find that our main results hold throughout except that in Table A6 the impact of *hukou* salience becomes insignificant in the pooled sample and marginally significant in the piece rate regime. The results in Table A6 are statistically insignificant mainly because of the reduced statistical power when we use the likelihood to win as the outcome measure. In addition, we include all the analyses based on the ***entire*** sample in Part II of the online appendix.

We investigate this question by examining the impact of *hukou* salience on the experimental earnings gap between the H and L subjects in Table 5. Using the same empirical specification as in Table 4, our dependent variable here is individuals' earning percentile in an experimental round. We find that in the pooled sample (column 1) the salience treatment insignificantly increases the H type's ranking (2.546, $p = 0.550$) and marginally significantly decreases the L type's ranking (-6.364, $p = 0.064$) in the distribution of earnings. Hence, making *hukou* identity salient results in a decline in L's ranking, relative to H's, by 8.911 percentiles (β_3 , $p = 0.105$) in the earning distribution in the pooled sample. In piece rate (column 2), *hukou* salience leads to a significant 13.500 percentile decline ($p = 0.018$) for L subjects, relative to H. In contrast, the estimate for β_3 is 4.096 ($p = 0.700$) in tournament (column 3). Although β_3 in tournament (4.096) is not significantly different from that in piece rate (-13.50) (test of equality of coefficients in row (d)), the statistical significance of this difference is just above the 10 percent level ($p = 0.101$). In addition, the impact of identity salience by gender (columns 4 – 5) or by gender and payment regime (columns 6 – 9) is largely in line with those in Table 4. Interestingly, the negative impact of *hukou* salience on L girls' relative ranking in piece rate (-19.52 in column 7) becomes positive and insignificant in tournament (8.825 in column 9, $p = 0.076$ in row (d)). This result, *albeit* marginally significant, might suggest that L girls' performance may not be adversely affected by the salience of their *hukou* identity under competition as opposed to under the piece rate regime. We revisit this point in the discussions in subsection 5.2.[22]

Overall, results in Table 5 indicate that making *hukou* identity salient significantly decreases the L type's average ranking, relative to H's, in the earnings distribution in the piece rate regime,

[22] Results for another outcome variable 'experimental earnings' are reported in Table A7 in Appendix G. Note that the results for piece rate (in columns 2, 6 and 7) are identical to those for piece rate in Table 4 since subjects received ¥1 per correct maze. There are no significant results for the pooled sample or for tournament, which might be due to the lack of variations in earnings under tournament.

but the impact is again absent in tournament. These findings further confirm the previous results on individuals' performance.[23]

5.2 Discussion of Results

Our results indicate that individuals' behavior is influenced by the *hukou* identity salience in terms of their performance on incentivized tasks, under piece rate, and this impact may be absent when competition is introduced. This suggests that the practice of permanently assigning households to a rural status and discriminating against them for half a century has profoundly shaped citizens' social identities, especially for the socially excluded *hukou* groups in China.

Our findings in the piece rate regime may be explained by stereotype threat, a well-established finding in social psychology and recently formalized in an economic model by Dee (2014). The stereotype threat literature in psychology shows that making social identity salient in the laboratory often makes subjects behave consistently with the stereotypes associated with that social group, and hence may activate the *negative* stereotypes and hurt subjects' performance in relevant tasks. Most of these studies use tasks without economic incentives (Steele and Aronson, 1995; Aronson, Quinn and Spencer, 1998; Croizet and Claire, 1998). In China rural migrants are generally stereotyped to be "uneducated, ignorant, dirty and having higher propensities to be criminals" (Wang and Zuo, 1999). Migrant children are stereotyped to be less intelligent and have low academic achievement. These negative stereotypes, confirmed by subjects' response in the pre

[23] In addition, we conduct a simulation exercise to analyze the possible impact of *hukou* salience on income inequality. We first calculate the Gini coefficient using the subjects' realized experimental earnings in the control treatment. We then add the estimated treatment effects on H and L from our regression analysis (reported in Table A7) to their realized earnings in the control treatment to generate the simulated earnings, and calculate the Gini coefficient of the simulated earnings. The difference in the Gini coefficients can be inferred as a measure of the impact of *hukou* salience on income inequality. The results show that when the *hukou* identity is made salient, the Gini coefficient increases by 0.0134 in the pooled sample ($p = 0.810$), increases by 0.0133 in the piece rate regime ($p = 0.149$), but decreases by 0.0847 in the tournament regime ($p = 0.300$). These findings are qualitatively in line with those reported in Figure 2 and Table 5. Details on the simulation exercise are included in Appendix H.

and post experiment surveys as discussed in Section 4, may be reinforced repeatedly and influence economic performance by the migrant students. This self-image may be activated for migrant students following the priming of their inferior *hukou* background in this study, and may prevent them from performing to their full potential in the assigned tasks even in the presence of economic incentives.

There is another possible explanation for the identity impact we observe: the intimidation effect (Hoff and Pandey, 2006, 2012), i.e., knowing that they are evaluated along with their local urban counterparts may hurt migrant students' self-confidence in the identity salience treatment. This is unlikely to be the driver of the results in this paper. Our subjects were randomly selected from schools where migrant students and their local urban counterparts studied and interacted on a daily basis. All the experimental sessions were conducted at subjects' regular schools during school days. Therefore, the intimidation factor, if any, is held constant across the control and the identity salience treatments because subjects were randomly assigned to the sessions. Thus, the findings based on the comparison across the two treatments should be net of the intimidation effect. We further investigate any potential intimidation effect by comparing L's performance in the presence of H (in sessions with H and L subjects) with that in the absence of H (in sessions with only L subjects). We conducted four, pure L *hukou* sessions with the PT identity salience treatment (3 all-male and 1 all-female sessions). If a public announcement of *hukou* type in the presence of H type truly intimidated the L type, then the performance of the L subjects in the mixed-*hukou* sessions would have been worse relative to their performance in the pure-*hukou* sessions. However, as shown in Table A8 of Appendix G, in both rounds of the PT salience treatment we find no significant differences in the performance of the L subjects (girls, boys or pooled) between the

mixed and pure-*hukou* sessions.[24] We, therefore, conclude that our results are unlikely to be explained by an intimidation effect.[25]

Recall the difference-in-difference estimates β_3 in columns 2-3 of Tables 4 and 5 show that making *hukou* identities salient results in a significant decrease in the L type's relative performance and their relative ranking in the earnings distribution in the piece rate regime, but this impact becomes positive and insignificant in tournament. The difference in β_3 between piece rate and tournament is marginally significant ($p = 0.084$) in Table 4 and insignificant ($p = 0.101$) in Table 5. These findings, although not statistically precise, suggest that the impact of *hukou* salience may differ between the two payment regimes, i.e., compared to the piece rate regime competition may mitigate the adverse effects of negative stereotyping of migrants.[26] Our conjecture is that the offer of a strong incentive in tournament may have triggered substantially higher effort from the L type, compensating for the negative shock on their performance due to the stereotype threat. This conjecture is also discussed by Dee (2014), who suggests that individual performance may increase

[24] For completeness, similar analysis of pure and mixed *hukou* sessions for the H type are reported in Table A9 in Appendix G. Note that the statistical power of the comparisons in Tables A8 and A9 is limited because of the small sample sizes.

[25]Another possible explanation of our results is experimenter discretion, i.e., in our case, L subjects may expect to be discriminated against by the experimenters, all of whom spoke Chinese Mandarin with an urban accent and hence were perceived as Beijing locals. We discount this possibility. As pointed out in the discussion of experiment design, only the experimenters knew the *hukou* types of the students in their sessions. The experimental procedure was designed in such a way that neither the subjects could see the graders nor the graders could associate the booklets with individual subjects. The experimenters did not leave the classroom throughout the session, so the subjects should have been aware, particularly in round 2, that the experimenters were unlikely to influence the grading process. An alternative design would have been to announce to the subjects in advance that the maze booklets would be graded by helpers who would have no knowledge of who the subjects were. We did not choose this design in order to avoid distracting subjects from their assigned task, and to minimize potential, invalid concerns with the grading process. To illustrate, under piece rate if our results were driven by experimenter discretion we would observe a *lower* degree of performance reduction (when identity is made salient) by L subjects in round 2 than in round 1, since in round 2 the L subjects knew for certain that the experimenters were unlikely to influence the grading process. Nevertheless, we observe the opposite, i.e., the reduction in performance by the L type is marginally *greater* in round 2 (1.044; $p = 0.070$) compared to round 1 (0.599; $p = 0.066$) when *hukou* identity is made salient. This suggests it is unlikely that subject's perception of experimenter discretion drives our results.

[26] Note that the lack of the statistical precision in the comparison between piece rate and tournament may be due to the smaller number of observations in tournament (174) relative to piece rate (558). Further research may help pin down the impact of identity under different payment regimes.

in response to negative stereotype threat if an increase in effort substitutes for a negative ability shock.

Another interesting question is whether the divergence in the impact of *hukou* salience, β_3, between piece rate and tournament exists for each gender group. We find that the impact of *hukou* identity salience on girls' relative ranking of earning distribution is marginally significantly different between piece rate and tournament ($p = 0.076$, row (d), Table 5), but all other comparisons of β_3 between piece rate and tournament within each gender group do not show any significant difference in Tables 4 and 5. Although a few studies (Oswald and Harvey (2000), Jamieson and Harkins (2007), Fryer, Levitt, and List (2008)) also find an increase in performance by women who are exposed to gender stereotype priming, research is limited on how social identity and competition interact to affect economic behavior, and how the impact may manifest itself differently for men and women. Unraveling the interplay among social identity, competition and gender in economic decision-making is an interesting research agenda, but outside the scope of this paper.[27]

6. Conclusion

We conduct an experimental study to investigate the causal impact of social identity on individuals'

[27] Table 4 also shows that the treatment effect on L girls' performance significantly differs in piece rate from tournament (-1.043 vs. 0.780 in row (a), $p = 0.025$ in row (c)) while this difference is absent for L boys, H boys and H girls. Some readers may find it intriguing, since the gender gap literature shows that a competitive environment enhances performance for men but not for women, compared to a non-competitive environment (Gneezy, Niederle, and Rustichini, 2003; Gneezy and Rustichini, 2004). One possible explanation is L girls' twin identities of being female and having an inferior *hukou* identity. In Chinese society boys are preferred to girls and parents are likely to invest more in boys' education than girls'. This gender bias is more apparent in the rural areas than in the urban areas (Park and Rukumnuaykit, 2004) and in rural migrant families than in local urban families. In addition, rural families are more likely to have an additional child if the first child is a girl (either legally with government approval or illegally). Therefore, compared to other students, migrant girl students are likely to have more siblings (and these siblings are more likely to be girls - Yamaguchi, 1989; Jensen, 2002) and thereby may face greater competition in intra-household resource allocation. Therefore, it is possible that the combination of a competitive environment with a reminder of their inferior identity increased L girls' effort, offsetting the adverse impact of stereotype threat.

performance on economically incentivized tasks. We answer this question in the context of the role of the household registration or *hukou* system in generating different social identities in urban China. Specifically, we compare the economic performance under incentives of two groups of students who share different *hukou* identities: rural migrant students who are lower ranked *hukou* holders in urban Beijing and their local urban counterparts who are higher ranked *hukou* holders. We find that making individuals' *hukou* identity salient significantly reduces the relative performance of rural migrant students, compared to their local urban counterparts, in the piece rate regime. In addition, migrant students' average ranking of experimental earnings significantly declines relative to local urban students under piece rate. This impact of *hukou* salience, however, is insignificant in the tournament regime.

Our results are comparable to Hoff and Pandey (2012) who find that publicly revealing young *male* students' caste significantly decreases the responsiveness of low castes to incentives in rural India. While they focus on male students this study shows that low status male and female students are affected in a similar way.

Our study broadens perspectives on the impact of the *hukou* system on the rural-urban divide to its impact on income gaps in urban areas of China through a hitherto unexplored channel. The evidence in this paper underlines the causal effect of administratively created social identity in distorting individuals' performance on incentivized tasks and potentially exacerbating existing inequities in the distribution of gains from economic growth. It shows that even in an ethnically homogeneous society like China, several-decades-long systemic policy of social exclusion can play a powerful role in creating identities and in turn influence individual behavior.

As suggested by Akerlof and Kranton's (2000) identity model of social exclusion, the negative impact of social exclusion is unlikely to disappear unless citizens are fully integrated into

a community. Future research should, thus, study the long-term impact of identity on educational attainment and labor market outcomes of low status individuals. This strand of research could provide critical insights for designing redistributive and inclusive policies that aim to achieve more cohesive communities.

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Table 1: Experimental Design

Treatments	Primed *hukou*?	Reward per maze		Number of sessions		Number of full sessions*	
		Round 1	Round 2	Male	Female	Male	Female
1. Pure Piece Rate (PP) control treatment	No	¥1	¥1	9	6	7	5
2. Mixed Tournament (PT) control treatment	No	¥1	¥6; winner takes all	9	5	7	5
3. Pure Piece Rate (PP) *hukou* salience treatment	Yes	¥1	¥1	15	7	14	6
4. Mixed Tournament (PT) *hukou* salience treatment	Yes	¥1	¥6; winner takes all	15	6	12	5

Note: *****The experiment consisted of 418 subjects in a total of 72 sessions, and 366 subjects in 61 full sessions (six subjects in each session). There were 11 sessions with fewer than six subjects since some of the randomly selected students happened to be absent from school on the day of the experiment.

Table 2: Summary Statistics of Pre-Experiment Survey Questions

Row No.	Variables [Survey Question No.]	L	H	Difference (P-value)
1	Born in Beijing [Q1]	0.202 (0.030)	0.705 (0.034)	0.000
2	Years lived in Beijing [Q3]	5.713 (0.255)	7.342 (0.666)	0.006
3	Speak Beijing dialect at home [Q4]	0.716 (0.043)	0.946 (0.022)	0.000
4	Consider yourself as Beijing local [Q5]	0.093 (0.028)	0.864 (0.033)	0.000
5	Classmates consider you as Beijing local [Q6]	0.231 (0.041)	0.817 (0.037)	0.000
6	Teachers consider you as Beijing local [Q7]	0.236 (0.041)	0.900 (0.029)	0.000
7	Charged rural guest student fee [Q8]	0.600 (0.048)	0.036 (0.018)	0.000
8	Local Beijing students are more hardworking than rural migrant students[Q10a]	0.164 (0.035)	0.135 (0.032)	0.552
9	Rural migrant students are more hardworking than local Beijing students [Q10a]	0.327 (0.045)	0.369 (0.046)	0.511
	Difference (row 9-8)	0.164 (0.058)	0.234 (0.058)	0.440
	p value (row 9-8)	*0.005*	*0.000*	
10	Local Beijing students are more active participants in class than rural migrant students [Q10b]	0.245 (0.041)	0.414 (0.047)	0.008
11	Rural migrant students are more active participants in class than local Beijing students [Q10b]	0.136 (0.033)	0.171 (0.036)	0.473
	Difference (row11 – 10)	-0.109 (0.053)	-0.243 (0.061)	0.140
	p value (row11 – 10)	*0.040*	*0.000*	
12	Local Beijing students participate more in extracurricular activities than rural migrant students [Q10c]	0.391 (0.047)	0.486 (0.048)	0.152
13	Rural migrant students participate more in extracurricular activities than local Beijing students [Q10c]	0.145 (0.034)	0.144 (0.033)	0.978
	Difference (row 13-12)	-0.245 (0.060)	-0.342 (0.062)	0.309
	p value (row 13-12)	*0.000*	*0.000*	
14	Local Beijing students are more careful with money than rural migrant students [Q10d]	0.101 (0.029)	0.126 (0.032)	0.556
15	Rural migrant students are more careful with money than local Beijing students [Q10d]	0.633 (0.046)	0.595 (0.047)	0.558
	Difference (row 15-14)	0.532 (0.065)	0.468 (0.064)	0.497
	p value (row 15-14)	*0.000*	*0.000*	

Note: This pre-experiment survey, as part of the experimental intervention, was conducted at the beginning of the salience treatment. Each row is cross-referenced in square brackets to a specific survey question in Appendix C. All variables are reported as proportions (except row 2). Rows (3)-(6) are coded '1' if the response to the question was 1, otherwise '0'. Row (7) is coded '1' if the categorical response was '1', otherwise '0'. Rows (8) – (15) are coded '1' if the response to the question is as defined by the variable, otherwise '0'. For example, row (8) is coded '1' if the response is 1, i.e., "[l]ocal Beijing students are more hardworking," to Q10a. Two-sided t test of differences in means is used for row (2), and two-sided tests of proportions are used for all other comparisons. Missing responses are excluded throughout. Standard errors are in parentheses.

Table 3: Summary Statistics

Variables	H			L		
	Control N=72	Salience Treatment N=111	Difference (P value)	Control N=72	Salience Treatment N=111	Difference (P value)
	(1)	(2)	(1) vs. (2)	(3)	(4)	(3) vs. (4)
Grade	4.389	4.495	0.507	4.167	4.171	0.978
	(0.124)	(0.101)		(0.122)	(0.104)	
Age (years)	9.778	9.856	0.663	9.944	9.658	0.170
	(0.147)	(0.108)		(0.169)	(0.127)	
Born in Beijing	0.625	0.757	0.056	0.208	0.198	0.868
	(0.057)	(0.041)		(0.048)	(0.038)	
Years of local residence [a]	8.063	6.818	0.364	5.617	5.780	0.756
	(1.082)	(0.844)		(0.438)	(0.309)	
Father has college/graduate degree	0.422	0.336	0.259	0.074	0.147	0.143
	(0.062)	(0.045)		(0.032)	(0.034)	
Mother has college/graduate degree	0.381	0.373	0.914	0.087	0.120	0.484
	(0.061)	(0.046)		(0.034)	(0.031)	
Father in public/private enterprise	0.714	0.764	0.459	0.514	0.559	0.561
	(0.054)	(0.041)		(0.060)	(0.047)	
Mother in public/private enterprise	0.667	0.727	0.387	0.507	0.577	0.363
	(0.057)	(0.042)		(0.060)	(0.047)	
Played similar/same games before	0.653	0.748	0.167	0.750	0.613	0.054
	(0.056)	(0.041)		(0.051)	(0.046)	
Number of other subjects known	1.338	1.468	0.492	1.586	1.252	0.132
	(0.162)	(0.111)		(0.188)	(0.129)	
Pocket money given by parents	2.859	2.418	0.069	2.443	2.270	0.474
	(0.196)	(0.147)		(0.197)	(0.145)	

Notes: Two-sided t tests of differences in means are used for grade, age, years of local residence in Beijing, number of other subjects known and pocket money given by parents. Two-sided tests of proportions are used for all other variables. See coding details for all variables in Appendix F. Standard errors are reported in parentheses. We run the F-test of the hypothesis that all variables are jointly zero by regressing the salience treatment dummy on all the listed variables here, including a dummy for missing values. The P-value of the F test of the joint significance of these variables is 0.316 for H and 0.298 for L subjects.

Table 4: Effects of the *Hukou* Salience Treatment on Performance (OLS)

Sample	**Pooled**	**One-way split**				**Two-way split**			
Payment regime	**Piece rate & tournament**	**Piece rate**	**Tournament**	**Piece rate & tournament**		**Piece rate**		**Tournament**	
Gender group	**All**	**All**	**All**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
L (β_1)	0.323	0.583	-0.466	0.0779	0.712	0.445	0.822	-1.131	0.477
	(0.364)	(0.386)	(0.588)	(0.506)	(0.493)	(0.526)	(0.532)	(0.790)	(0.875)
salience treatment (β_2)	0.167	0.329	-0.258	-0.142	0.642	0.139	0.643	-0.838	0.502
	(0.359)	(0.374)	(0.599)	(0.477)	(0.538)	(0.498)	(0.564)	(0.730)	(1.066)
L*salience treatment (β_3)	-0.880*	-1.241**	0.144	-0.615	-1.208*	-0.963	-1.686**	0.374	0.278
	(0.466)	(0.490)	(0.800)	(0.622)	(0.696)	(0.649)	(0.740)	(1.025)	(1.332)
piece rate round 2	2.285***	2.266***		2.447***	1.980***	2.427***	1.965***		
	(0.167)	(0.167)		(0.213)	(0.267)	(0.213)	(0.266)		
tournament	2.508***			2.594***	2.339***				
	(0.173)			(0.208)	(0.308)				
male	1.186***	1.179***	1.240***						
	(0.250)	(0.272)	(0.422)						
grade	0.853***	0.766***	1.131***	0.970***	0.612***	0.897***	0.515***	1.207***	0.898***
	(0.101)	(0.108)	(0.170)	(0.128)	(0.160)	(0.135)	(0.173)	(0.212)	(0.279)
played before	-0.304	-0.0543	-1.059**	-0.172	-0.548	0.0907	-0.322	-1.037*	-1.122
	(0.245)	(0.251)	(0.438)	(0.313)	(0.376)	(0.320)	(0.389)	(0.541)	(0.749)
Constant	1.956***	2.002***	4.122***	2.709***	2.886***	2.546***	3.131***	5.657***	4.618***
	(0.604)	(0.677)	(0.962)	(0.697)	(0.877)	(0.771)	(0.960)	(1.064)	(1.350)
Observations	732	558	174	480	252	366	192	114	60
R-square	0.335	0.300	0.284	0.329	0.273	0.290	0.235	0.300	0.235
(a) Treatment effect	-0.714**	-0.913***	-0.114	-0.757*	-0.566	-0.823*	-1.043**	-0.464	0.780
on L ($\beta_2 + \beta_3$)	(0.301)	(0.323)	(0.508)	(0.404)	(0.429)	(0.426)	(0.476)	(0.681)	(0.735)
Test of equality of coefficients (P values):		(2) vs. (3)		(4) vs. (5)		(6) vs. (7)	(6) vs. (8)	(8) vs. (9)	(7) vs. (9)
(b) Treatment effect on H (β_2)		0.320		0.275		0.502	0.173	0.296	0.892
(c) Treatment effect on L ($\beta_2 + \beta_3$)		0.130		0.746		0.730	0.599	0.214	0.025
(d) Difference in difference (β_3)		0.084		0.524		0.461	0.184	0.954	0.143

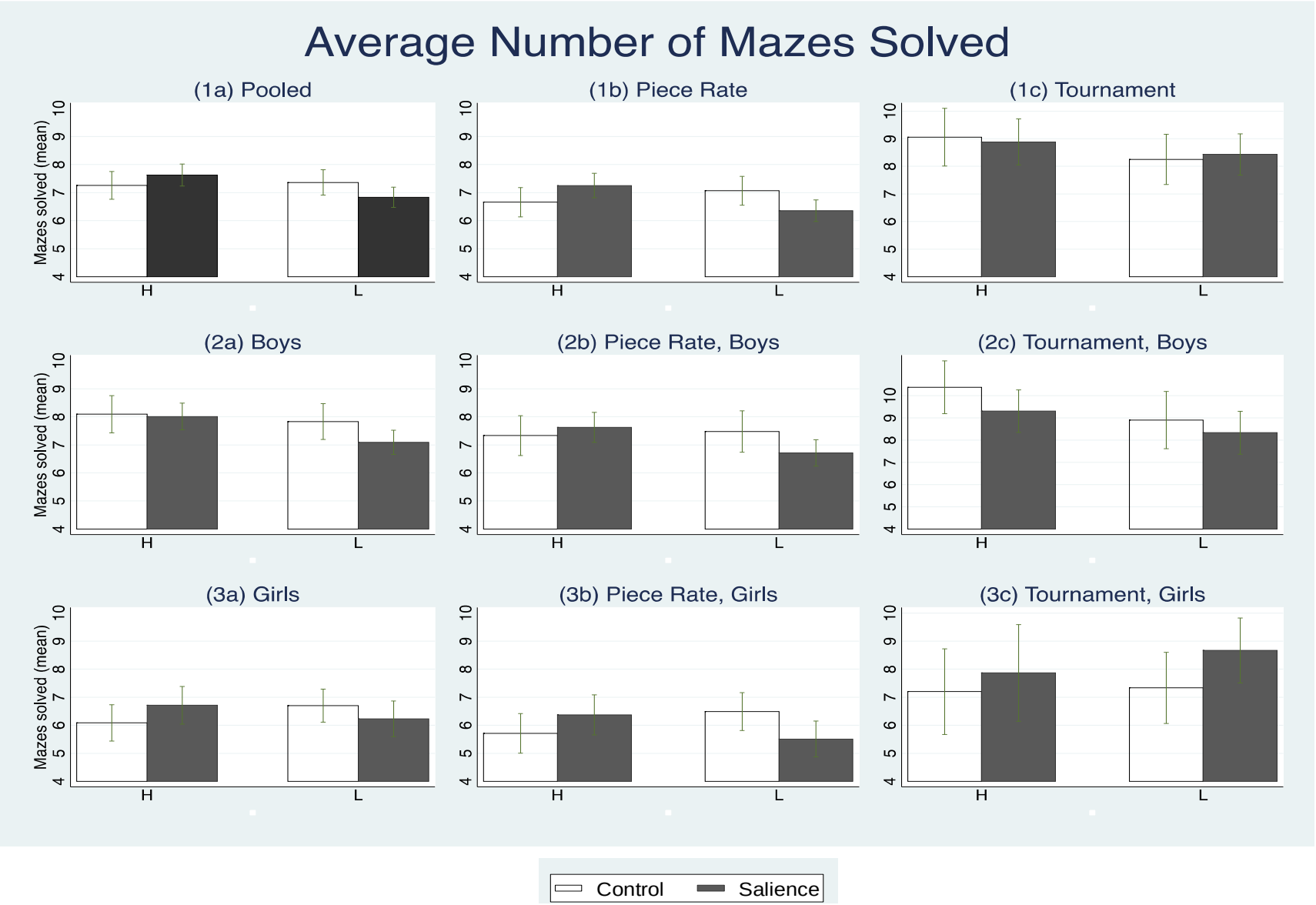
Notes: School fixed effects are included throughout. Standard errors clustered at the individual level are in parentheses. * $p < 10\%$, ** $p < 5\%$, and *** $p < 1\%$.

Table 5: Effects of the *Hukou* Salience Treatment on Experimental Earnings Distribution (OLS)

Sample	**Pooled**	**One-way split**				**Two-way split**			
Payment regime	**Piece rate & tournament**	**Piece rate**	**Tournament**	**Piece rate & tournament**		**Piece rate**		**Tournament**	
Gender group	**All**	**All**	**All**	**Boys**	**Girls**	**Boys**	**Girls**	**Boys**	**Girls**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
L (β_1)	1.500	6.084	-12.32	2.784	0.0812	4.477	8.816	-2.906	-25.59**
	(4.303)	(4.456)	(7.780)	(5.908)	(6.111)	(6.116)	(6.144)	(10.67)	(11.01)
salience treatment (β_2)	2.546	4.258	-2.063	1.912	4.407	1.955	8.176	2.115	-7.570
	(4.255)	(4.269)	(8.223)	(5.532)	(6.671)	(5.751)	(6.326)	(10.33)	(14.01)
L*salience treatment (β_3)	-8.911	-13.500**	4.096	-7.799	-12.24	-9.931	-19.52**	-1.722	8.825
	(5.479)	(5.660)	(10.61)	(7.312)	(8.197)	(7.531)	(8.502)	(14.00)	(15.72)
piece rate round 2	2.200	2.149		2.781	1.156	2.784	1.020		
	(1.715)	(1.708)		(2.165)	(2.822)	(2.165)	(2.796)		
tournament	-28.51***			-32.98***	-20.09***				
	(2.436)			(3.011)	(4.034)				
male	11.03***	14.05***	1.445						
	(2.959)	(3.138)	(5.581)						
grade	8.759***	8.918***	8.311***	9.618***	7.365***	10.32***	6.222***	7.497**	10.56***
	(1.161)	(1.255)	(2.378)	(1.484)	(1.867)	(1.556)	(2.094)	(3.166)	(3.607)
played before	-2.262	-0.457	-7.942	-0.689	-5.069	1.254	-3.760	-7.305	-7.699
	(2.833)	(2.883)	(5.776)	(3.674)	(4.384)	(3.620)	(4.709)	(7.244)	(8.875)
Constant	-0.249	-5.505	-12.73	6.249	8.435	2.052	7.904	-13.48	-6.133
	(7.083)	(7.791)	(13.69)	(8.269)	(10.70)	(8.934)	(11.26)	(17.08)	(18.66)
Observations	732	558	174	480	252	366	192	114	60
R-square	0.258	0.179	0.110	0.272	0.189	0.154	0.107	0.065	0.265
(a) Treatment effect	-6.364*	-9.242**	2.033	-5.886	-7.832*	-7.976	-11.349**	0.393	1.254
on L ($\beta_2 + \beta_3$)	(3.420)	(3.766)	(6.237)	(4.754)	(4.525)	(4.931)	(5.614)	(8.940)	(6.044)
Test of equality of coefficients (P values):		(2) vs. (3)		(4) vs. (5)		(6) vs. (7)	(6) vs. (8)	(8) vs. (9)	(7) vs. (9)
(b) Treatment effect on H (β_2)		0.433		0.773		0.466	0.988	0.575	0.229
(c) Treatment effect on L ($\beta_2 + \beta_3$)		0.097		0.767		0.651	0.358	0.937	0.143
(d) Difference in difference (β_3)		0.101		0.686		0.398	0.555	0.615	0.076

Notes: The dependent variable is individual's earning percentile in the corresponding experimental round. Standard errors clustered at the individual level are in parentheses. School fixed effects are included throughout. * $p < 10\%$, ** $p < 5\%$, and *** $p < 1\%$.

Figure 1: Performance by Treatment and *Hukou* Type



Note: Bars represent 95% confidence intervals.

Figure 2: CDFs of Experimental Earnings by Treatment and *Hukou* Type