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IMPACT OF INTERNAL MIGRATION DIVERSITY ON CHILD WELFARE: EVIDENCE FROM VIETNAM*

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Abstract

This study uses the Vietnam Living Standards Households Survey 2018 to document the relationship between birthplace diversity and child welfare in Vietnam. To address the endogeneity issue of birthplace diversity, we construct an instrumental variable. The endogeneity-corrected estimates show that a 1 percent increase in birthplace diversity significantly increases education expenditure per capita for children aged 2 to 18 by 0.9 percent and health expenditure for children aged 6 to 11 by 0.5 percent. We document an income channel through which birthplace diversity affects child welfare. Our instrumental variable estimation provides consistent results when we use an alternative instrumental variable. Our findings suggest that promoting migration is likely to be an effective way of enhancing the welfare of children and increasing economic prosperity.

Keywords: birthplace diversity, welfare, children's education and health, instrumental variable, Vietnam
JEL Classification Codes: I1, I3, J1, O1

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I. *Introduction*

People born in different countries are more likely to have different educational backgrounds, different life experiences, and thus have developed different productive skills. Existing studies utilize birthplace diversity to illustrate the heterogeneity in intrapopulation and posit that birthplace diversity captures skill complementarity effects. However, existing studies on the impact of birthplace divesity of people, who were born, raised, and educated in the same country but in different provinces, are rare.

The main objective of this study is to shed light on two important questions: Does birthplace diversity affect children's health and education expenditure in Vietnam? How does birthplace diversity affect children's health and education spending? The subject has not received much attention in diversity literature. This study utilizes the Vietnam Households Living Standards Survey 2018 to answer those questions. To address the endogeneity issue, we leverage the lagged birthplace diversity at the province level in 2016 as an instrumental variable for birthplace diversity at the district level in 2018. Our findings show a robust positive relationship between birthplace diversity and child education expenditure. The results are consistent across different age groups. A 1 percent increase in birthplace diversity significantly increases education expenditure per capita for children aged 2 to 18 by 0.9 percent and expenditure for extra classes for children aged 6 to 18 by 1.7 percent. Likewise, we find that a 1 percent increase in birthplace diversity causes an increase in health expenditure for children aged 6 to 11 by 0.5 percent and health expenditure for children aged 12 to 18 by 0.4 percent. We document an income channel through which birthplace diversity affects children's health and education expenditure. Birthplace diversity has a positive impact on the growth of annual salaries of workers. Meanwhile, households in districts with 1 percent higher birthplace diversity have 0.96 percent higher expenditure per capita. Those findings suggest that birthplace diversity increases the living standards of households. Our estimation results are robust for different instrumental variables.

Vietnam is a particularly interesting case for studying the impact of birthplace diversity on child health and education. First, in the 1980s, the Vietnamese government discouraged migration from rural to urban areas, especially to the major cities like Hanoi, Haiphong, and Ho Chi Minh, and directly organized migration programs from the populous to less densely settled regions. The government provided free transportation, housing, and basic necessities for the migrants at the destinations (Dang, 1999). However, this migration policy was not successful due to financial and practical issues (Banister, 1993). In 1989, Vietnam shifted from a centrally planned to a market economy. Cooperative agricultural land was allocated to individual households. In the 1990s, markets were gradually liberalized. In the 2000s, Vietnam integrated into the world market and attracted a significant inflow of foreign direct investment. These factors have led to the apparent shift from organized migration to spontaneous migration in Vietnam. According to the 2015 National Internal Migration Survey, 13.6% of the Vietnamese population were migrants, and of those aged 15-59, migrants occupied 17.3%. The number of inter-district migrant population increased by more than half, from about 1.1 million in 1999 to 1.7 million people in 2009 (GSO, 2011). Second, Vietnam still maintains a household registration system to restrict workers moving from rural to urban areas and workers moving between cities.

Birthplace diversity creates different socio-economic backgrounds in particular geographic areas. This promotes innovation, entrepreneurship, productivity, wage, and economic growth. Previous studies focused on developed countries and used birthplace diversity with respect to nationalities. Alesina and Ferrara (2005) argue that birthplace diversity involves a variety of abilities and knowledge. This leads to innovation and creativity. Specifically, birthplace diversity boosts patent applications per million inhabitants in European regions (Ozgen et al. 2013), and increases the probability of introducing new product innovations in London (Nathan và Lee, 2013). Niebuhr (2010) shows that the cultural diversity of workers enhances the performance of regional R & D sectors and matters for innovation activity.

Also, birthplace diversity boosts entrepreneurship. Birthplace diversity is positively associated with technology-oriented start-ups in Germany (Audretsch et al. (2010), increases new firm formation in the United States (Cheng and Li, 2012), and enhances entrepreneurship in financial and business services in Denmark (Marino et al. 2012). Similarly, productivity would be higher in areas with higher birthplace diversity. Trax et al. (2015) show that birthplace diversity increases the total factor productivity in German manufacturing plants. Parrotta et al. (2014) indicate that labor diversity in ethnicity has a positive impact on firm productivity in Denmark. Buchholz (2021) finds that the diversity of a city's foreign-born population in the USA is positively associated with worker productivity. Likewise, previous studies have shown that birthplace diversity improves wages in the United States (Ottaviano and Peri, 2006; Kemeny, 2012), in Germany (Suedekum et al. 2014), in the United Kingdom (Nathan, 2011), in Australia (Boeheim et al. 2012; Elias and Paradies, 2016), and in the Netherlands (Bakens et al. 2013). Birthplace diversity is also positively associated with GDP per capita in European countries (Bellini et al. 2013), county-level output per capita in the US (Ager và Bruckner, 2013), and country-level GDP per capita (Alesina et al. 2016).

This study adds to the unexplored literature. First, little is known about the relationship between birthplace diversity and child education expenditure, and child health expenditure. Most previous studies, as mentioned above, focus on the impact of birthplace diversity on productivity and wages. There is a missing link between birthplace diversity and child education expenditure, and child health expenditure. To the best of our knowledge, this is the first study attempting to document the relationship between birthplace diversity and child education expenditure, and child health expenditure. Second, previous studies focused on the birthplace diversity of foreign-born people in developed countries, while we examine the birthplace diversity of people living in a district and born in a different province in a developing country-Vietnam. In other words, unlike previous studies which examined international immigration, we investigate internal migration. Finally, we attempt to establish the causal relationship between birthplace diversity and child education expenditure, and child health expenditure using the instrumental variable method. To get around the endogeneity issues, we follow Card (2001), who relies on the supply-push framework to construct instruments. We find that the instrumental variable estimation provides a consistent story.

Our paper is organized as follows: Section 2 provides the data source. Section 3 presents the research methodology. Section 4 reports the relationship between birthplace diversity and interest outcomes in graphs, and supplies the empirical results. Section 5 concludes and issues policy implications.

II. *Data*

This study uses the Vietnam Households Living Standards Survey 2018, which was surveyed by the General Statistics Office of Vietnam. There are two types of samples in this survey: the income sample (large sample) and the expenditure sample (small sample). The income sample includes 70,563 households. The expenditure sample includes 9,396 households. This survey contains rich information at the individual level, such as: age, gender, education, marital status, income, employment, and at the household level, such as: household size, household expenditure, durables, and assets. Note that the income sample includes all household information except for information on household expenditure, while the expenditure sample covers all household information. We use the income sample when our variables are available in that sample, and we use the expenditure sample for expenditure regressions. Both surveys are nationally representative. These surveys are useful when they contain information on the birth province of an individual. This information allows us to construct a variable on birthplace diversity.

Meanwhile, we exploit the Vietnam Households Living Standards Survey 2016, which includes 46, 410 households in a large sample. We leverage this survey to construct the instrumental variable.

III. *Method*

To investigate the impact of birthplace diversity on child outcomes and other outcomes, we specify the econometric model as follows:

$$Y_{ijp}=\beta_1+\beta_2 G_j+\beta_3 X_{ijp}+\beta_4 M_j+\varepsilon_{ijp} \quad (1)$$

where Y_{ijp} is the interest outcomes of an individual i living in district j and in province p, including education and health expenditure of children, annual salary, and welfare of workers. G_j is the birthplace diversity index in district j, which is measured by a fractionalization index. Specifically, $G_j=1-\sum_{p=1}^{n} s_{jp}^2$ where n is the number of provinces in Vietnam; s is the proportion of residents in district j who were born in province p. This index varies between 0 and 1. Birthplace diversity decreases as the index approaches zero, and heterogeneity increases when birthplace diversity approaches one. X_{ijp} is control variables containing age of an individual and gender of an individual (female versus male with female as the reference group), the household head's education (i.e., primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion, and college degree or above), household size, dummy variable for Kinh or Chinese ethnic group, and dummy variable for urban area. M_j is district characteristics in 2016 such as: share of children aged 0 to 5, share of people aged 19 to 55, share of people completing primary education, share of people completing lower secondary education, share of people completing upper secondary education, and share of people completing vocational training or above. The error term is reflected by ε_{ijp}. All standard errors are clustered at the province level to allow for arbitrary correlations within

provinces.

The OLS estimation of equation (1) would provide biased results due to endogeneity issues. Households living in wealthy districts would have better opportunities to find good jobs and have better living conditions. They would spend more on children's education and health. Also, wealthy districts attract more labor. This means that migrants tend to move to districts with better wages, leading to more birthplace diversity in those districts. Meanwhile, unobservable factors may affect children's education and health, and birthplace diversity simultaneously. Migrants tend to concentrate in larger cities. Agglomeration forces may be behind a positive association between wages and birthplace diversity. Agglomeration forces may increase productivity and lead to higher wages, while agglomeration forces increase birthplace diversity. Put differently, agglomeration forces affect wages and birthplace diversity simultaneously. While workers with better wages would spend more on their children's education and health. Therefore, the relationship between children's education and health, and birthplace diversity may be spurious.

To address this endogeneity issue, we need to have two groups with similar characteristics, but one group has higher birthplace diversity and the other group has lower birthplace diversity. In reality, it is very difficult to generate the laboratory environment in the social sciences as in the natural sciences. Another way to address the endogeneity issue is to find an instrument for the endogenous variable-birthplace diversity. This instrument must be strongly correlated with birthplace diversity and does not correlate with error terms. For instance, Trax et al. (2015) study the impact of cultural diversity (a diverse mix of foreign workers from different countries) on plant-level productivity in Germany. They use System GMM methods, which rely on internal instruments constructed from lagged variables. Following Card (2001), Ottaviano and Peri (2006) construct the share of foreign-born people among US residents in the initial year as an instrument for cultural diversity.

Our instrument is constructed based on a modified version of the shift-share instrument by Card (2001). Migrants tend to settle, at least initially, where other migrants from the same province already reside. The instrumental variable approach by Card (2001) was applied successfully by Zhao (2020) in China, Ottaviano and Peri (2006), and Tabellini (2020) in the United States. Our instrumental variable is birthplace diversity at the province level. We use the lagged birthplace diversity at the province level in 2016 as an instrumental variable for birthplace diversity at the district level in 2018. In the literature on migration, migration networks play an important role in migration. People born in the same province tend to migrate to the same district in another province. However, a potential threat is that the factors at the district level may affect birth diversity at the district level, and have direct and lasting impacts on interest outcomes. To address these concerns, we control for observable factors at the district level-M_j as decribed above. Specifically, our first-stage equation is as follows:

$$G_j = \alpha_1 + \alpha_2 Q_p + \alpha_3 X_{ijp} + \alpha_4 M_j + \phi_{ijp} \quad (2)$$

where Q_p is the birthplace diversity at the province level in the previous survey period (two years ago). Specifically, $Q_p = 1 - \sum_{m=1}^{n} s_{mp}^2$, n is the number of provinces in Vietnam; s is the proportion of residents in province m who were born in province p. Table 1 of the Appendix provides the descriptive statistics on dependent variables, instrumental variables, and independent variables.

FIGURE 1. THE CORRELATION BETWEEN BIRTHPLACE DIVERSITY AT THE PROVINCE IN 2016 AND BIRTHPLACE DIVERSITY AT THE DISTRICT LEVEL IN 2018

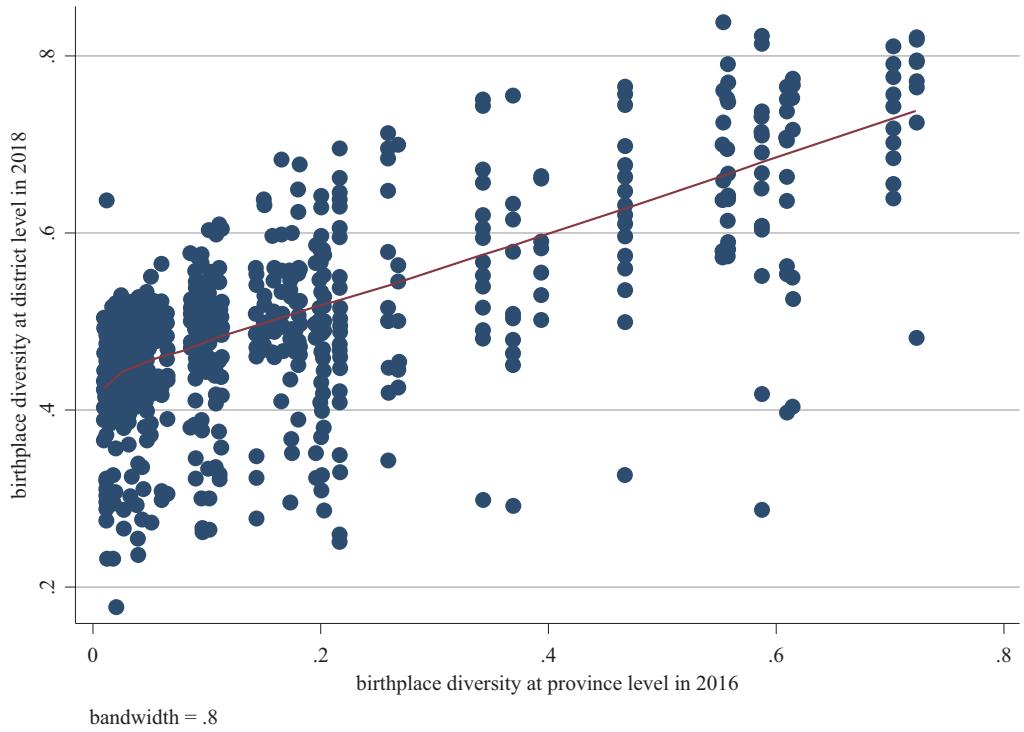


Figure 1 provides the locally weighted regression of birthplace diversity at the district level in 2018 over birthplace diversity at the province level in 2016. We find a strong correlation between birthplace diversity at the district level in 2018 and birthplace diversity at the province level in 2016.

First-stage estimation results with and without control variables X_{ijp} and M_j are reported in Table 1. Both estimation results with and without control variables are highly statistically significant at the 1 percent level (Columns 1 and 2). The magnitude of the coefficient of the impact of birthplace diversity at the province level in 2016 on birthplace diversity at the district level in 2018 in the regressions with and without control variables is similar. The coefficient on the association between the excluded instrument and the endogenous regressor is also economically sensible. A 1 percent increase in birthplace diversity at the province level in 2016 increases birthplace diveristy at the district level in 2018 by about 0.4 percent. The size of the coefficient of the first-stage regression in this study is very similar to that of the coefficient of the first-stage regression by Ager and Bruckner (2013), who also use the supply-push inflow of immigrants as an instrumental variable. Those results suggest that our instrument is relevant.

TABLE 1. FIRST-STAGE REGRESSIONS (DEPENDENT VARIABLE IS BIRTHPLACE DIVERSITY AT THE DISTRICT LEVEL IN 2018)

	(1)	(2)
Birthplace diversity at the province level in 2016	0.440***	0.424***
	(0.012)	(0.018)
Age		-0.000*
		(0.000)
Dummy variable for gender		0.000
		(0.000)
Dummy variable for primary education of household head		0.005**
		(0.002)
Dummy variable for lower school education of household head		0.003
		(0.002)
Dummy variable for upper school education of household head		0.002
		(0.002)
Dummy variable for vocational training of household head		0.005*
		(0.003)
Dummy variable for college or above of household head		0.005
		(0.003)
Household size		-0.002***
		(0.001)
Dummy variable for Kinh or Chinese ethnic groups		0.004
		(0.007)
Dummy variable for urban area		0.011**
		(0.005)
Share of children aged 0 to 5		0.015
		(0.140)
Share of people aged 19 to 55		0.078
		(0.086)
Share of people completing primary education		0.002
		(0.074)
Share of people completing lower secondary education,		-0.002
		(0.051)
Share of people completing upper secondary education		-0.170
		(0.113)
Share of people completing vocational training or above		0.235***
		(0.053)
Constant	0.425***	0.371***
	(0.003)	(0.058)
N	136292	136292
adj. R^2	0.551	0.600

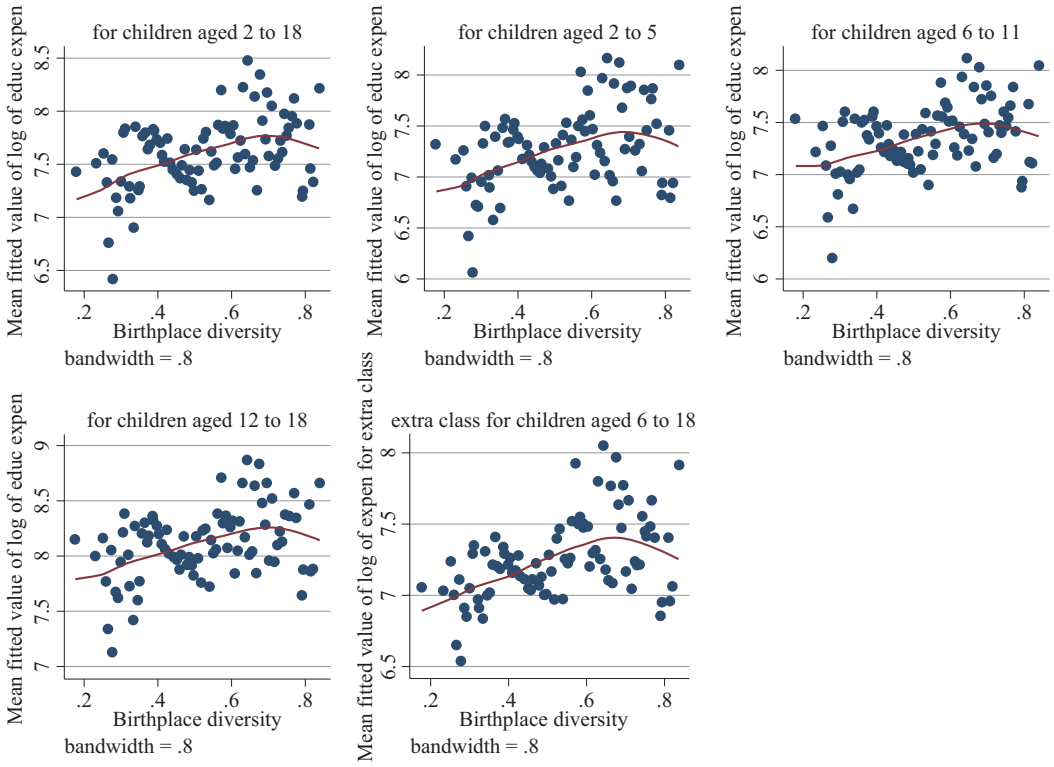
Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. Standard errors are clustered at the province level.

IV. *Empirical Results*

1. Non-Parametric Relationship

We begin our analysis by graphically illustrating the relationship between birthplace

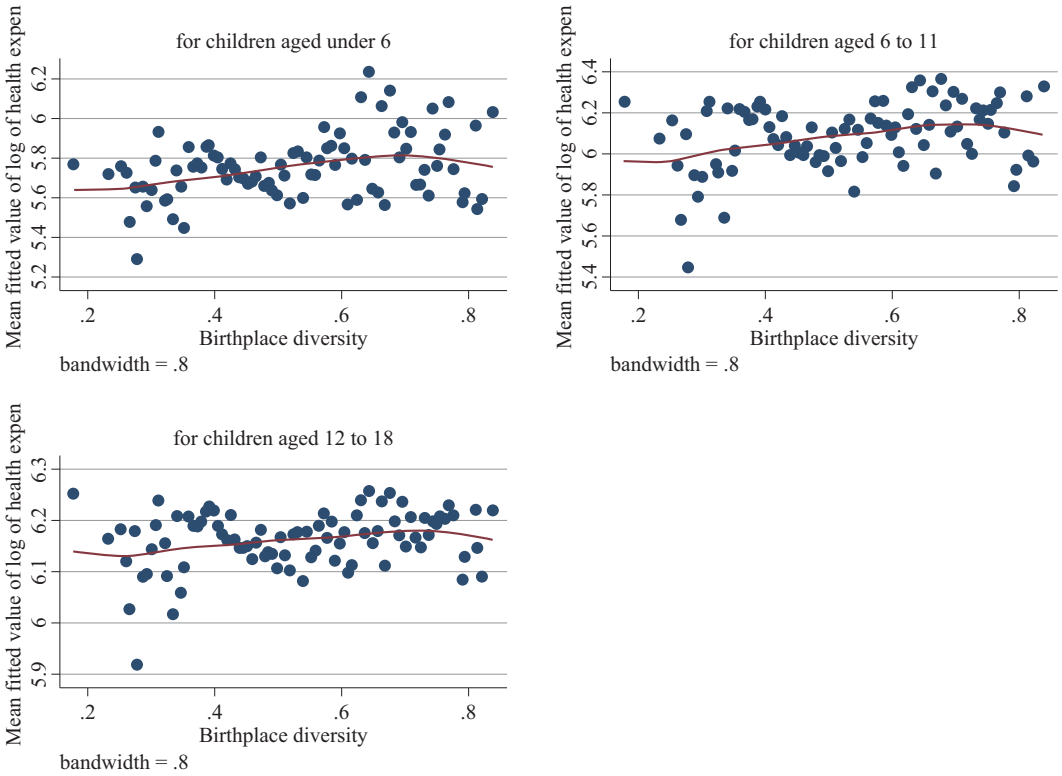
FIGURE 2. RELATIONSHIP BETWEEN BIRTHPLACE DIVERSITY AND CHILD EDUCATION EXPENDITURE



diversity and children's welfare (education and health). We do regessions of education expenditure for children on control variables-X_{ijp}-including age of a child and gender of a child (female versus male with female as the reference group), the household head's education (i.e., primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion, and college degree or above), household size, dummy variable for Kinh or Chinese ethnic group, and dummy variable for urban area. We also cluster standard errors at the province level. We then predict the fitted values of education expenditure for children. Next, we carry out the locally weighted regressions of the fitted values of education expenditure for children on birthplace diversity-G_j. Education expenditure for children includes tuition fees, contributions to school construction, parents' and class funds, uniforms, textbooks, learning tools, expenses for extra classes and other expenses for education. However, due to the large number of observations, the figures are not easy to read. To make figures easier to read, we divide the variable on birthplace diversity into 100 values with an equal interval and calculate the mean value of these discretized horizontal and vertical values. We run the locally weighted regressions on these 100 observations.

Figure 2 provides the relationship between birthplace diversity and the mean fitted value of

FIGURE 3. RELATIONSHIP BETWEEN BIRTHPLACE DIVERSITY AND CHILD HEALTH EXPENDITURE

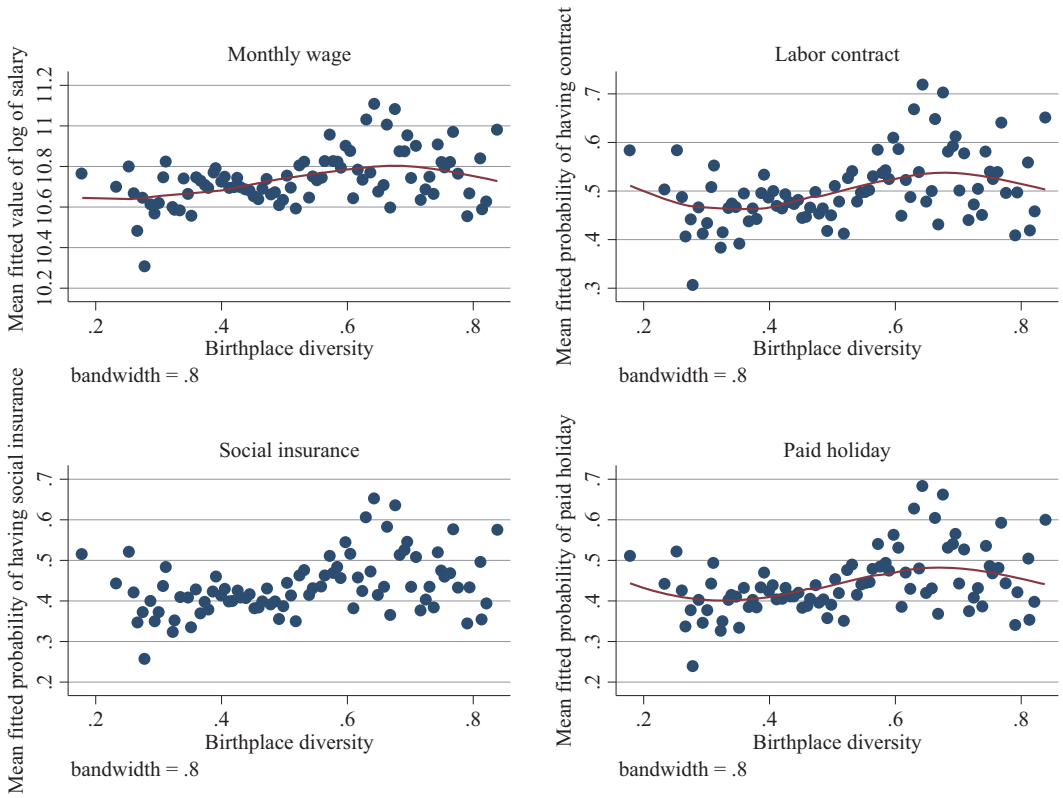


education expenditure for children by different age groups. We find a positive association between birthplace diversity at the district level and education expenditure for children aged 2-18. When we break the sample into different sub-samples, we find similar results. In particular, birthplace diversity causes an increase in education expenditure for children aged 2 to 5. Also, birthplace diversity is positively associated with education expenditure for children aged 6 to 11 and children aged 12 to 18. In a similar vein, we find a positive relationship between birthplace diversity and expenses for extra classes for children aged 6 to 18.

Similarly, we perform a locally weighted regression of the mean fitted values of child health expenditure on birthplace diversity. Child health expenditure covers expenses for outpatient and inpatient treatment, and expenses for buying health insurance in the past 12 months. Figure 3 shows the positive association between birthplace diversity and the fitted value of health expenditure for children aged under 6, for children aged 6 to 11, and for children aged 12 to 18.

Now, we investigate the relationship between birthplace diversity and the welfare of workers. We use several indicators to reflect the welfare of workers, including annual salary, labor contracts, social insurance, and paid holidays. A labor contract is a dummy variable that equals 1 if a worker has a labor contract and 0 otherwise. Social insurance is a dummy variable

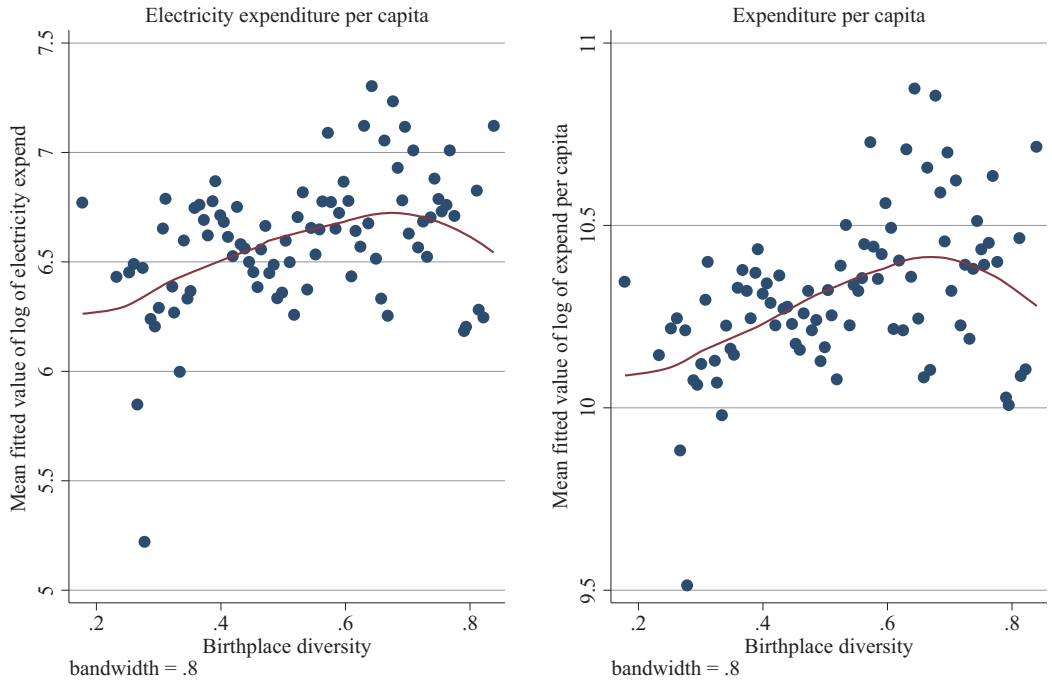
FIGURE 4. RELATIONSHIP BETWEEN BIRTHPLACE DIVERSITY AND WELFARE OF WORKERS



that equals 1 if a worker has social insurance and 0 otherwise. Paid holiday is a dummy variable that equals 1 if a worker has paid holidays and 0 otherwise. We do regressions of annual salary, labor contract, social insurance and paid holiday to obtain the predicted values or predicted probability. We use probit model for dummy variables such as labor contracts, social insurance, and paid holidays. Figure 4 indicates the relationship between birthplace diversity and the welfare of workers. Birthplace diversity has a positive relationship with the fitted value of log of annual salary. Also, birthplace diversity is positively associated with the fitted probability of workers having labor contracts, having social insurance, and paid holidays in most observations.

To examine whether birthplace diversity is correlated with the living standards of households, we use electricity expenditure per capita and expenditure per capita to measure the living standards of households. We also take a turn regressing the log of electricity expenditure per capita and expenditure per capita on control variables-X_{ijp} to obtain the fitted value of log of electricity expenditure per capita and expenditure per capita. Also, we calculate the mean value of discretized horizontal and vertical values based on 100 values with an equal interval. Then, we perform locally weighted regressions of the fitted value of log of electricity

FIGURE 5. RELATIONSHIP BETWEEN BIRTHPLACE DIVERSITY AND ELECTRICITY EXPENDITURE AND EXPENDITURE PER CAPITA



expenditure per capita and the fitted value of log of expenditure per capita on birthplace diversity. Figure 5 shows the positive relationship between birthplace diversity and the fitted value of log of electricity expenditure per capita in most observations. Similarly, birthplace diversity is positively correlated with the fitted value of log of expenditure per capita in most observations.

2. Instrumental Variable Results

We now turn to the formal analysis of the impact of birthplace diversity on children's education and health. Table 2 provides the estimation results for both the OLS and instrumental variable regressions. Panel A provides the OLS estimates, which show that birthplace diversity has a positive impact on the growth of education expenditure for children aged 2 to 18 (Column 1). The estimation results are also statistically significant at the 1 percent level when we divide the sample into three sub-samples: children aged 2 to 5, children aged 6 to 11, and children aged 12 to 18 (Columns 2 to 4). Further, birthplace diversity is statistically significant and positively associated with the growth of education expenditure for extra classes for children aged 6 to 18 (Column 5). Using instrumental variable estimation, Panel B shows the positive relationship between birthplace diversity and education expenditure for different age groups and education expenditure for extra classes for children aged 6 to 18. The magnitude of the coefficient of the impact of birthplace diversity using instrumental variable estimates is higher

TABLE 2. IMPACT OF BIRTHPLACE DIVERSITY ON CHILD EDUCATION

	Log of education expenditure for children aged 2 to 18	Log of education expenditure for children aged 2 to 5	Log of education expenditure for children aged 6 to 11	Log of education expenditure for children aged 12 to 18	Log of education expenditure for extra class for children aged 6 to 18
	(1)	(2)	(3)	(4)	(5)
Panel A. OLS regressions					
Birthplace diversity	0.598***	0.673***	0.517**	0.634***	0.723**
	(0.184)	(0.240)	(0.227)	(0.187)	(0.308)
adj. R^2	0.522	0.438	0.474	0.501	0.242
Panel B. IV regressions					
Birthplace diversity	0.948***	0.931**	0.816**	1.104***	1.678***
	(0.276)	(0.395)	(0.323)	(0.278)	(0.471)
F test of excluded instruments	511.53	605.36	455.94	475.93	788.31
N	30663	5337	12796	12530	11856

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions control for age, gender, dummy variable for ethnic majority groups (Kinh and Chinese), dummy variables for education of household head (i.e. primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion and college completion or above), household size, and dummy variable for urban area. The regressions also add district characteristics in 2016 such as: share of children aged 0 to 5, share of people aged 19 to 55, share of people completing primary education, share of people completing lower secondary education, share of people completing upper secondary education, share of people completing vocational training or above. All standard errors are clustered at the province level.

than that of the coefficient of the impact of birthplace diversity using the OLS estimates. For example, a 1 percent point increase in birthplace diversity significantly increases education expenditure per capita for children aged 2 to 18 by 0.9 percent for instrumental variable estimation and 0.6 percent for OLS estimation.

Panel B of Table 2 shows that in all instrumental variable regressions, the F test of excluded instruments is larger than the rule of thumb cut-off of 10 (Staiger and Stock, 1997), implying that we can reject the hypothesis that our instrumental variable is weak.

Table 3 presents the estimation results on the impact of birthplace diversity on health expenditure for different age groups. Panel A shows the OLS estimation. The OLS estimation results are not statistically significant for log of health expenditure for children under age 6 and for log of health expenditure for children aged 6 to 11. The result is statistically significant for log of health expenditure for children aged 12 to 18 at the 10 percent level. Using instrumental variable estimation, Panel B indicates that birthplace diversity is statistically significant for both the log of health expenditure for children aged 6 to 11 at the 5 percent level and the log of health expenditure for children aged 12 to 18 at the 1 percent level (Columns 2 and 3). However, the result is not statistically significant for the log of health expenditure for children under age 6 (Column 1). The Health Insurance Law (No. 25/2008/QH12, approved by the National Assembly) became effective on 1st July, 2009. The Health Insurance Law includes children under 6 with premiums fully subsidized by the government. This is why we observe the insignificant relationship between birthplace diversity and health expenditure for children

TABLE 3. IMPACT OF BIRTHPLACE DIVERSITY ON CHILD HEALTH EXPENDITURE

	Log of health expenditure for children under age 6	Log of health expenditure for children aged 6 to 11	Log of health expenditure for children aged 12 to 18
	(1)	(2)	(3)
Panel A. OLS regressions			
Birthplace diversity	0.282	0.134	0.212*
	(0.439)	(0.139)	(0.110)
adj. R^2	0.063	0.084	0.020
Panel B. IV regressions			
Birthplace diversity	0.713	0.454**	0.416***
	(0.614)	(0.200)	(0.160)
F test of excluded instruments	694.51	686.99	617.52
N	4348	8908	10024

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions control for age, gender, dummy variable for ethnic majority groups (Kinh and Chinese), dummy variables for education of household head (i.e. primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion and college completion or above), household size, dummy variable for urban area. The regressions also add district characteristics in 2016 such as: share of children aged 0 to 5, share of people aged 19 to 55, share of people completing primary education, share of people completing lower secondary education, share of people completing upper secondary education, share of people completing vocational training or above. All standard errors are clustered at the province level.

under age 6. The magnitude of the coefficient of the impact of birthplace diversity on health expenditure with instrumental variable estimation is nearly two times as large as that of the coefficient of the impact of birthplace diversity on health expenditure with OLS estimation. Using instrumental variable estimation, a 1 percent increase in birthplace diversity causes an increase in health expenditure for children aged 6 to 11 by 0.5 percent and health expenditure for children aged 12 to 18 by 0.4 percent.

3. Channels

In this section, we document the income channels through which birthplace diversity affects child health and education expenditure. We hypothesize that households with better incomes would spend more on children's health and education. We use a variety of indicators to measure the living standards of households. We expect that workers living in districts with higher birthplace diversity will earn a higher income and have better working conditions. We also use electricity expenditure per capita and expenditure per capita to measure the living standards of households. We expect that households living in districts exposed more to birthplace diversity will have better living conditions.

Table 4 reports the estimation results with and without the instrumental variable for the welfare of workers. Both the OLS and instrumental variable estimation results are not statistically significant for all dependent variables, except for annual salary in IV estimation. The magnitude of the coefficient of the impact of birthplace diversity on the welfare of workers is higher in instrumental variable estimation than in OLS estimation. For instance, a 1 percent

TABLE 4. IMPACT OF BIRTHPLACE DIVERSITY ON WELFARE OF WORKERS

	Log of annual salary	Dummy variable for having a labor contract	Dummy variable for having social insurance	Dummy variable for paid holiday
	(1)	(2)	(3)	(4)
Panel A. OLS regressions				
Birthplace diversity	0.252	0.068	0.133	0.163
	(0.181)	(0.109)	(0.116)	(0.112)
adj. R^2	0.203	0.258	0.272	0.261
Panel B. IV regressions				
Birthplace diversity	0.637**	0.166	0.258	0.269
	(0.324)	(0.169)	(0.175)	(0.176)
F test of excluded instruments	458.31	458.31	458.31	458.31
N	33677	33677	33677	33677

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions control for age, gender, dummy variable for ethnic majority groups (Kinh and Chinese), dummy variables for education of household head (i.e. primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion and college completion or above), household size, dummy variable for urban area. The regressions also add district characteristics in 2016 such as: share of children aged 0 to 5, share of people aged 19 to 55, share of people completing primary education, share of people completing lower secondary education, share of people completing upper secondary education, share of people completing vocational training or above. All standard errors are clustered at the province level.

TABLE 5. IMPACT OF BIRTHPLACE DIVERSITY ON HOUSEHOLD EXPENDITURE

	Log of electricity expenditure per capita	Log of expenditure per capita
	(1)	(2)
Panel A. OLS regressions		
Birthplace diversity	0.339	0.409***
	(0.212)	(0.134)
Panel B. IV regressions		
Birthplace diversity	0.499	0.783***
	(0.337)	(0.233)
F test of excluded instruments	605.58	605.58
N	9168	9168

Standard errors in parentheses. * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions control for age of household head, gender of household head, dummy variable for ethnic majority groups (Kinh and Chinese) of household head, dummy variables for education of household head (i.e. primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion and college completion or above, household size, and dummy variable for urban area. The regressions also add district characteristics in 2016 such as: share of children aged 0 to 5, share of people aged 19 to 55, share of people completing primary education, share of people completing lower secondary education, share of people completing upper secondary education, and share of people completing vocational training or above. All standard errors are clustered at the province level.

rise in birthplace diversity increases annual salary by 0.3 percent for OLS estimation and 0.6 percent for instrumental variable estimation (Column 1). These findings suggest that the results without instrumental variable estimation would be downward biased.

Table 5 reports the results of the impact of birthplace diversity on household expenditure using OLS and IV regressions. Both the OLS and instrumental variable results are highly statistically significant for expenditure per capita, the results are not for electricity expenditure per capita. Again, the size of the coefficient of instrumental variable estimation is larger than that of the coefficient of OLS estimation. Using instrumental variable estimation, households in districts with 1 percent higher birthplace diversity have 0.8 percent higher expenditure per capita. Those findings suggest that birthplace diversity increases the living standards of households.

4. Robustness Checks

We are concerned that our instrumental variable used in Tables 1 to 4 may not be relevant. To test the instrumental variable estimation, we construct an alternative instrumental variable. Card (2001) relies on an initial distribution of immigrants from many different countries to construct the instrument. Migration is driven by supply shocks in the sending country rather than labor demand in the receiving country. Thus, we argue that our instrument, based on Card's instrument, is exogenous to the labor demand of destination provinces. Based on Card (2001), we construct an alternative instrumental variable, which is the share of migrants from other provinces to a district out of total working-age people of the district in 2016. We re-run regressions for Tables 2 to 5 using a new instrumental variable. Table 6 reports the estimation results of Tables 2 to 5 using a new instrumental variable. The new instrument-share of migrants from other provinces to a district to total working-age people of the district in 2016-is positively and significantly associated with birthplace diversity in the first-stage regressions (unreported). Table 6 shows that the F test of excluded instruments is greater than 10 for all interest outcomes. This suggests that our instrument is strong. All estimation results using the new instrumental variable are quite similar to those using the previous instrumental variable in Tables 2 to 5, however the magnitude of the coefficients of the impact of birth diversity using the new instrumental variable is close to that of the coefficients of the impact of birth diversity using OLS estimations.

The instrumental variable estimation would be violated if our instrument is correlated to the error terms in the second stage regressions. That is, the birthplace diversity at the province level in 2016 and the share of migrants from other provinces to a district to total working-age people of the district in 2016 should be exogenous to the interest outcomes such as child health and education expenditure, the welfare of workers, electricity expenditure per capita and expenditure per capita. A standard way to empirically test exclusion restrictions is to use two instrumental variables, such that the instrumental variable regression is overidentified. Table 7 reports the estimation results using two instrumental variables. The p-values of the Hansen-J statistic are statistically insignificant for education expenditure for children aged 2 to 5, education expenditure for children aged 6 to 11, health expenditure for children under age 6, health expenditure for children aged 12 to 18, dummy variable for having a labor contract, dummy variable for having social insurance, and dummy variable for paid holiday. Also, the estimation results using two instrumental variables are quantitatively similar to those using one

TABLE 6. ROBUSTNESS CHECKS WITH ALTERNATIVE INSTRUMENTAL VARIABLE

No	Dependent variables	Birthplace diversity	F test of excluded instruments	N
1	Log of education expenditure for children aged 2 to 18	0.681***	1018.99	30663
2	Log of education expenditure for children aged 2 to 5	0.613*	711.82	5337
3	Log of education expenditure for children aged 6 to 11	0.604*	741.24	12796
4	Log of education expenditure for children aged 12 to 18	0.817***	1360.45	12530
5	Log of education expenditure for extra class for children aged 6 to 18	1.018***	1100.43	11856
6	Log of health expenditure for children under age 6	0.562	737.23	4348
7	Log of health expenditure for children aged 6 to 11	0.278	1038.88	8908
8	Log of health expenditure for children aged 12 to 18	0.313**	1255.02	10024
9	Log of annual salary	0.326	566.68	33677
10	Dummy variable for having a labor contract	0.08	566.68	33677
11	Dummy variable for having social insurance	0.16	566.68	33677
12	Dummy variable for paid holiday	0.14	566.68	33677
13	Log of electricity expenditure per capita	0.252	1033.39	9168
14	Log of expenditure per capita	0.478***	1033.39	9168

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions control for age, gender, dummy variable for ethnic majority groups (Kinh and Chinese), dummy variables for education of household head (i.e. primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion and college completion or above), household size, dummy variable for urban area. All standard errors are clustered at the province level.

instrumental variable. Those findings corroborate the robustness and relevance of our instrumental variable. It means that the estimation results based on the instrumental variable method are reliable.

V. *Conclusion*

Using the Vietnam Households Living Standards Survey 2018, this study examines the effect of birthplace diversity on children's health and education expenditure. First, we graphically analyze this relationship. We perform locally weighted regressions. We find that birthplace diversity has a positive relationship with both child health expenditure and education expenditure. Graphical analysis also shows that birthplace diversity is positively associated with annual salary, the probability of workers with a labor contract, social insurance and paid holidays, electricity expenditure per capita and expenditure per capita. Next, we use econometric models to evaluate the impact of birthplace diversity on children's health and

TABLE 7. ROBUSTNESS CHECKS WITH TWO INSTRUMENTAL VARIABLES

No	Dependent variables	Birthplace diversity	F test of excluded instruments	Hansen-J statistic (p-value)	N
1	Log of education expenditure for children aged 2 to 18	0.744***	668.84	0.024	30663
2	Log of education expenditure for children aged 2 to 5	0.700**	484.09	0.106	5337
3	Log of education expenditure for children aged 6 to 11	0.658**	550.42	0.133	12796
4	Log of education expenditure for children aged 12 to 18	0.876***	831.26	0.017	12530
5	Log of education expenditure for extra class for children aged 6 to 18	1.154***	763.65	0.007	11856
6	Log of health expenditure for children under age 6	0.591	401.44	0.594	4348
7	Log of health expenditure for children aged 6 to 11	0.313*	598.65	0.051	8908
8	Log of health expenditure for children aged 12 to 18	0.335**	736.98	0.26	10024
9	Log of annual salary	0.385	374.54	0.024	33677
10	Dummy variable for having a labor contract	0.096	374.54	0.253	33677
11	Dummy variable for having social insurance	0.179	374.54	0.200	33677
12	Dummy variable for paid holiday	0.165	374.54	0.100	33677
13	Log of electricity expenditure per capita	0.3	618.26	0.085	9168
14	Log of expenditure per capita	0.536***	618.26	0.01	9168

Notes: * $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$. All regressions control for age, gender, dummy variable for ethnic majority groups (Kinh and Chinese), dummy variables for education of household head (i.e. primary education incompletion as the reference group, primary education completion, lower secondary education completion, upper secondary education completion, vocational education completion and college completion or above), household size, dummy variable for urban area. We also add observable factors at the district level including share of workers working in production to total workers, share of workers working in services to total workers, share of people aged 0 to 5, share of people aged 6 to 15, share of people completing primary education, share of people completing lower secondary education, share of people completing upper secondary education, share of people completing vocational education or above All standard errors are clustered at the province level.

education expenditure. However, there is an endogeneity issue of birthplace diversity. This suggests that without correcting endogeneity, our estimation results would be biased. To get around the endogeneity issue, we use the initial distribution of birthplace diversity as an instrumental variable. In other words, we utilize lagged birthplace diversity at the province level in 2016 as an instrumental variable for birthplace diversity at the district level in 2018. Our findings are consistent with graphical analysis. Specifically, birthplace diversity has a significant and positive impact on child education expenditure. The estimation results hold for different samples. A 1 percent increase in birthplace diversity significantly increases education expenditure per capita for children aged 2 to 18 by 0.9 percent and expenditure for extra classes for children aged 6 to 18 by 1.7 percent. Also, a 1 percent increase in birthplace diversity causes an increase in health expenditure for children aged 6 to 11 by 0.5 percent and

health expenditure for children aged 12 to 18 by 0.4 percent. We find no evidence of the impact of birthplace diversity on health expenditure for children under age 6. This can be because of the Health Insurance Law, which took effect on 1st July, 2009, covers full health expenses for children under age 6.

A large body of literature shows that birthplace diversity promotes innovation, entrepreneurship, productivity, and wage and economic growth. Therefore, we hypothesize that birthplace diversity may affect child health and education expenditure through income channels. The estimation results using instrumental variables indicate that birthplace diversity has a positive impact on the growth of annual salaries of workers. Meanwhile, a 1 percent higher birthplace diversity increases expenditure per capita by 0.78 percent. Our estimation results are strong and robust for an alternative instrumental variable. Our findings suggest that promoting migration is likely to be an effective way of enhancing the welfare of children and increasing economic prosperity. The current policy on household registration, which prevents migration, should be considered to be removed.

Conflict of interest

There is no conflict of interest in this study.

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Appendix

Table 1. Descriptive Statistics

Variables	Obs	Mean	Standard deviation	Min	Max
Dependent variables					
Log of education expenditure for children aged 2 to 18	30663	30663	7.635	1.124	2.303
Log of education expenditure for children aged 2 to 5	5337	5337	7.286	1.165	2.303
Log of education expenditure for children aged 6 to 11	12796	12796	7.306	1.004	2.303
Log of education expenditure for children aged 12 to 18	12530	12530	8.120	1.043	2.996
Log of education expenditure for extra class for children aged 6 to 18	11,856	11,856	7.464	1.079	0.000
Log of health expenditure for children under age 6	4,348	5.801	1.590	0.000	13.385
Log of health expenditure for children aged 6 to 11	8,908	6.191	0.774	1.099	11.699
Log of health expenditure for children aged 12 to 18	10,024	6.206	0.696	1.609	13.171
Log of annual salary	33,677	10.812	0.719	4.605	13.627
Dummy variable for having a labor contract	33,677	0.508	0.500	0	1
Dummy variable for having social insurance	33,677	0.439	0.496	0	1
Dummy variable for paid holiday	33,677	0.454	0.498	0	1
Log of electricity expenditure per capita	9,168	6.590	1.075	0.000	10.479
Log of expenditure per capita	9,168	10.303	0.652	7.809	13.234
Instrumental variables					
Birthplace diversity at the province level in 2016	136,292	0.178	0.192	0.010	0.723
Share of migrants from other provinces to a district over total working-age people of the district in 2016	136,292	0.120	0.174	0	1
Independent variables					
Age	136,292	34.666	21.999	0	113
Dummy for gender	136,292	0.492	0.500	0	1
Dummy variable for primary education of household head	136,292	0.250	0.433	0	1
Dummy variable for lower school education of household head	136,292	0.262	0.440	0	1
Dummy variable for upper school education of household head	136,292	0.092	0.290	0	1
Dummy variable for vocational training of household head	136,292	0.093	0.290	0	1
Dummy variable for college or above of household head	136,292	0.074	0.262	0	1
Household size	136,292	4.438	1.693	1	17
Dummy variable for Kinh or Chinese ethnic groups	136,292	0.799	0.400	0	1
Dummy variable for urban area	136,292	0.295	0.456	0	1