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The long-lasting effect of feudal human capital: Insights from Vietnam

Trung Xuan Hoang*

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Abstract

This study investigates the long-term effect of the density of the elite - the highest educated - during the period 1075-1919 on today's educational attainment and economic performance in Vietnam. Using nearly 20,000 elites, including 17,061 junior bachelors and bachelors, and 2,895 doctors who passed the imperial examination (1075-1919), and the distance to the nearest examination centers as an instrumental variable, we find that elite density has persistent effects on the present-day educational attainment, income, poverty, and night-time light intensity. The impact of the elite density on schooling years tends to be higher in urban areas than in rural areas. Our findings are robust to a variety of model specifications.

Keywords: Human capital, historical legacy, economic growth, household income.

JEL classifications: I25; O12; E24, N35.

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1. Introduction

A body of empirical studies over the past two decades has shown that a significant portion of the differences in economic prosperity that we see today can be traced back to historical events (Nun, 2020). Growing evidence suggests the intergenerational transmission of human capital. Valencia Caicedo (2019) shows that in municipalities where Jesuits carried out their apostolic activities from 1609 to 1767, educational attainment is higher in the present day in Guarani (present-day Argentina, Brazil, and Paraguay). Chen et al. (2020) find that the higher density of Chinese imperial elites in the Ming-Qing period (1368–1905) leads to higher years of schooling in 2010. Vu and Yamada (2023) find that the number of successful imperial test takers (1075–1919) has a positive impact on educational attainment today in Vietnam.

In this study, we examine the persistent effects of the elite – the highest educated people – during the feudal period (1075-1919) in Vietnam on today’s human capital and economic performances. To address endogeneity bias, we employ the distance from districts of elite individuals to the nearest examination centers as an instrumental variable for the density of elite individuals. Our objectives are twofold. First, we attempt to identify the causal effect of feudal elite density on present-day educational attainment and employment. Second, we endeavor to provide evidence of the impacts of the elite density on economic outcomes through education channels.

Our study differs from Vu and Yamada (2023). Specifically, we utilize the rich data on nearly 20,000 elites, including 17,061 junior bachelors and bachelors, and 2,895 doctors who passed the imperial examination in the period 1075-1919, while Vu and Yamada (2023) only use the data on doctors. Without considering the number of junior bachelors and bachelors, the count of doctors might underestimate feudal human capital. Second, our study

examines the effect of human capital accumulation during the feudal period not only on education, as in Vu and Yamada (2023), but also on employment, wages, and income of individuals, and poverty and nighttime light density of districts today.

Our paper is structured into 5 sections. Section 2 presents datasets used in this study. Sections 3 and 4 discuss the estimation method and empirical results, respectively. Section 5 concludes.

2. Dataset

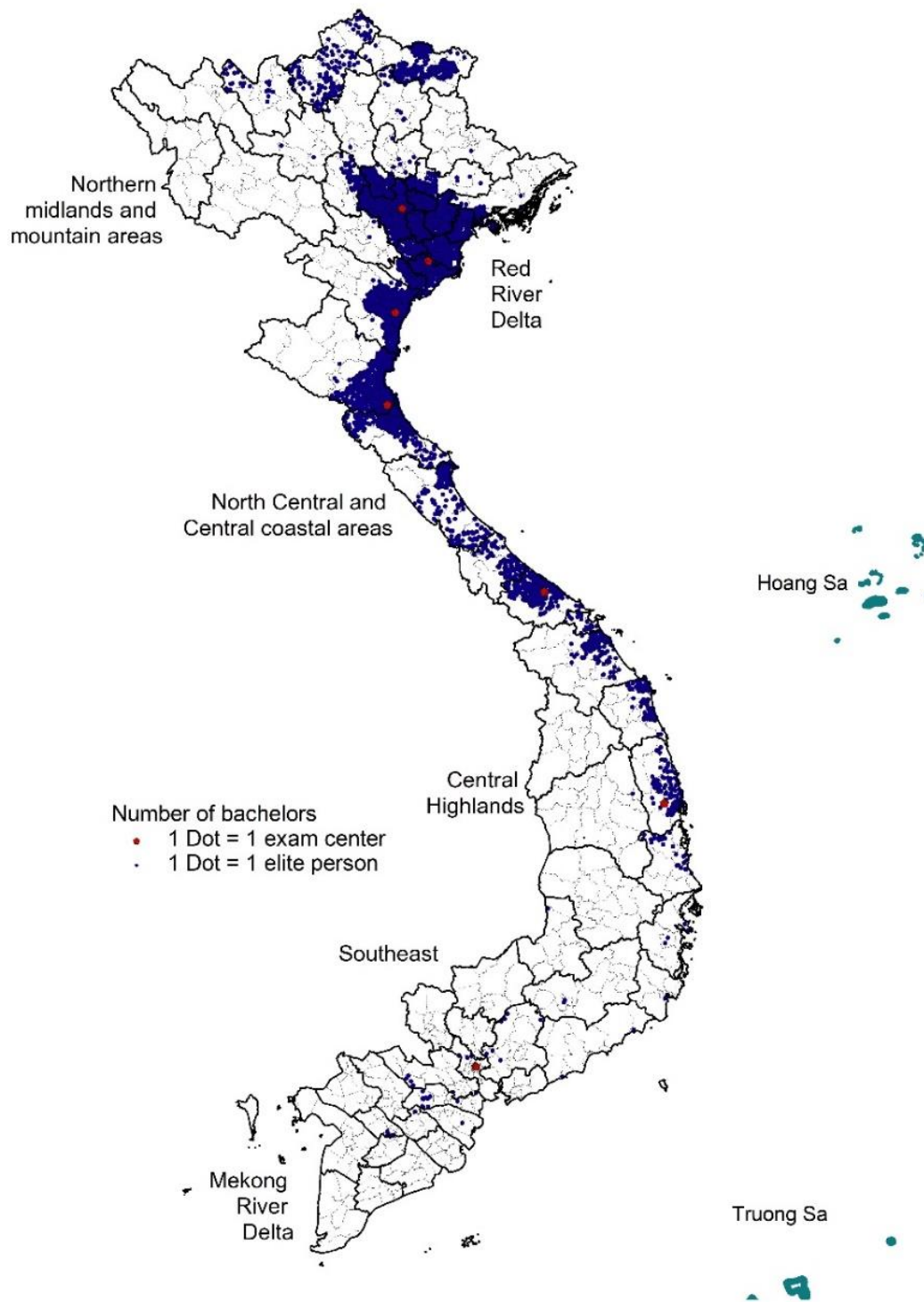
In 968, Vietnam became an independent, feudal country. The first examination system was introduced in 1075 and continued until 1919. There were four levels of exams, including: the primary test; preliminary exams; intermediate exams; and advanced exams or palace exams (Ly, 2021). People who passed the advanced exams or palace examinations were awarded a doctorate. Those who passed the preliminary examinations or intermediate examinations were awarded a junior bachelor's or bachelor's degree, respectively. State officials and local celebrities were chosen based on their performance in the examinations. The examination system in Vietnamese history was instrumental in enabling people from lower social classes to ascend to positions of power based on their merits rather than their social status.

In this study, we manually conducted data entry for 17,061 junior bachelors and bachelors, as well as 2,895 doctors during the 1075-1919 period from a series of books by Ngo et al. (2006) and Nguyen et al. (2019). The total number of elites in this study is 19,956. Data on the birth district of elites is available. Figure 1 shows the number of elites at the district level.¹

¹ In Vietnam, there are 63 provinces, further subdivided into 713 districts.

The second dataset is the Vietnam Household Living Standard Surveys (VHLSS), collected by the General Statistics Office of Vietnam every two years from 2010 to 2020. Each VHLSS covers around 45,000 households sampled from 3,000 communes throughout the country. The VHLSSs contain information on demography and employment of individuals. We focus the sample on adults aged 15-64. Additionally, we use district-level data, including nighttime light intensity from 2015 to 2018 (obtained from the Visible Infrared Imaging Radiometer Suite), per capita expenditure, and poverty indexes in 2009 and 2019 (sourced from Lanjouw et al., 2017, and Nguyen, 2024).

Figure 1: The number of elite people in districts and the location of exam centers during the 1075–1919 period



Source: Authors' preparation using the data on the elite people

3. Method

We estimate the effect of the elite density on individual-level outcomes using the following model:

$$y_{idpt} = \alpha + Elite_d\beta + X_{idpt}\delta + D_{dpt}\theta + P_p + T_t + \varepsilon_{idpt}, \quad (1)$$

where y_{idpt} is an outcome of individual i in district d in province p in year t . $Elite_d$ is the inverse hyperbolic sine transformation (asinh) of the number of elite people (junior bachelors, bachelors, and doctors) per 100 km² of district i .² X_{idpt} and D_{dpt} denote individual-level and district-level control variables, respectively. We control for province and year fixed effects (P_p and T_t).

To address the selection bias, we use the instrumental variable regression. The first-stage regression is expressed as follows:

$$Elite_d = \pi + Distance_d\mu + X_{idpt}\varphi + D_{dpt}\tau + P_p + T_t + u_{idpt}, \quad (2)$$

where $Distance_d$ is the distance from the district centroid to the location of the nearest examination venues. There are 7 examination centers located in 7 provinces (Hanoi, Nam Dinh, Thanh Hoa, Nghe An, Thua Thien Hue, Binh Dinh, and Ho Chi Minh City). Travel was extremely difficult and expensive during the feudal period. As a result, living close to the examination centers increases the probability of obtaining a junior bachelor.

One issue with the instrument is that the location of examination centers is non-random and may be correlated with living standards. We address this problem by including numerous district-level control variables. During the feudal period, people depend heavily on agricultural production for living standards. Thus, we control for soil types, mean

² The asinh transformation can address the zero value and allow for the interpretation of the coefficients as percentage changes. However, estimates using the asinh transformation are sensitive to the unit choice (Aihounton and Henningsen, 2020; De Brauw and Herskowitz, 2021). For robustness checks, we also use the transformation $\log(x+1)$ and the original variable without transformation.

elevation, annual average temperature, and precipitation. Additionally, we control for province fixed-effects and the distance to Hanoi and Ho Chi Minh City (the main hubs of northern and southern Vietnam, respectively). Within the same provinces, the variation in the instrument across districts is considered more exogenous. To account for the influence of Hanoi and Ho Chi Minh City, we exclude these cities from the analysis.

We employ a similar model to estimate the impact of elite density on district-level outcomes. For individual-level data, we cluster standard errors at the commune level - the primary sampling unit level in the VHLSSs (Abadie et al., 2023). For district-level data, standard errors are clustered at the district level.

4. Empirical result

Columns 1-6 of Table 1 present the estimated impacts of the elite density on the education and employment of individuals aged 15-64 using IV regressions. The last column of Table 1 reports the impact of per capita income of households. The full regression results are reported in the online Appendix. The first-stage regression shows a strong and negative correlation between the elite density and the distant from districts to the nearest exam venues (Appendix Table A.2). The Cragg-Donald Wald F statistic and effective F statistic are very high, suggesting the strength of the instrument (Olea & Pflueger, 2013). We also estimate the OLS regression for comparison (Appendix Tables A.3, A.6, and A.7). Overall, the IV estimates and the OLS ones have the same sign, but the IV estimates are higher than the OLS ones. We use the IV estimates for interpretations.

Consistent with Vu and Yamada (2023), we find a positive and significant effect of the density of imperial elites at the district level on educational attainment. A 1% increase in the elite density increases the number of schooling years by 0.039 (equivalent to 0.05% of

the average).³ The effect of the elite density on labor force participation as well as working hours is of small magnitude and not statistically significant. A possible reason is that the work rate in Vietnam is quite high. People are easily able to find an informal or self-employed job. The proportion of employed people among working people decreased over time but is still relatively high, at 45% in 2020.

Importantly, we find significant effects of the elite density on wage employment. A 1% increase in the elite density increases the probability of having a wage job by 0.058 percentage points (equivalent to 0.14% of the mean). There is also a significant positive effect of the elite density on formal jobs. In this study, we defined formal jobs as those with social insurance benefits (health insurance, unemployment allowances, and pensions). A 1% increase in the elite density increases the probability of having a wage job by 0.072 percentage points (equivalent to 0.52% of the mean). Better formal jobs result in higher monthly wages for people in districts with a higher elite density. The elasticity of wages with respect to the elite density is estimated at 0.067. Finally, the positive effect on education and employment is translated into a positive effect on income. A 1% increase in the elite density leads to a 0.11% increase in the per capita income of households.

We perform various robustness checks to assess the impact estimates of elite density on education and employment. The results, reported in Appendix Tables A.10 to A.21, show the robustness of our estimates across different regression specifications, different transformation ways of the elite density, sampling weights, different samples (the full sample and a sample excluding provinces with exam centers), and different ways of clustering standard errors. We explore alternative measures for elite individuals, including those with a

³ The means of outcomes are reported in Appendix Table A.1.

doctorate degree (excluding those with only bachelor's degrees), and focus on individuals from the last dynasty (1802-1919). The results are very similar to those presented in Table 1.

Table 1: IV regressions of individual- and household-level outcomes

Explanatory variables	Dependent variables						
	Schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage	Log of per capita income of households
asinh(elite density)	0.3890*** (0.1281)	-0.0084 (0.0065)	0.0578*** (0.0132)	0.0720*** (0.0089)	0.0030 (0.0177)	0.0670*** (0.0217)	0.1092*** (0.0357)
Control variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.3187*** (1.1264)	-0.5404*** (0.0521)	0.3321*** (0.1102)	0.2402*** (0.0734)	4.0056*** (0.1642)	6.4219*** (0.2372)	9.8357*** (0.3785)
Observations	657,508	657,508	657,508	657,508	545,602	214,371	255,968

Robust standard errors (clustered at the commune level) in parentheses.

The full regression results are reported in Appendix Tables A.4 and A.6.

*** p<0.01, ** p<0.05, * p<0.1.

In Table 2, we examine the impact of elite density on nighttime light intensity, per capita expenditure, and FGT poverty indexes. A 1% increase in elite density results in a 0.11% increase in nighttime light and a 0.17% increase in the per capita expenditure of districts. Districts with higher elite density exhibit lower poverty rates as well as reduced poverty gaps and severity indexes.

Table 2: IV regressions of district-level outcomes

Explanatory variables	Dependent variables				
	asinh(night-time light)	asinh(per capita expenditure)	asinh(poverty rate)	asinh(poverty gap index)	asinh(poverty severity index)
asinh(elite density)	0.8159** (0.3270)	0.1671* (0.0907)	-0.3603** (0.1453)	-0.6778** (0.2749)	-0.5030** (0.2262)
Control variables	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	3.3530 (2.1548)	10.5763*** (0.5681)	4.0526*** (0.8401)	4.3142*** (1.6597)	2.9399** (1.4309)
Observations	2,512	1,265	1,265	1,265	1,265

Robust standard errors (clustered at the district level) in parentheses.

The full regression results are reported in Appendix Table A.8.

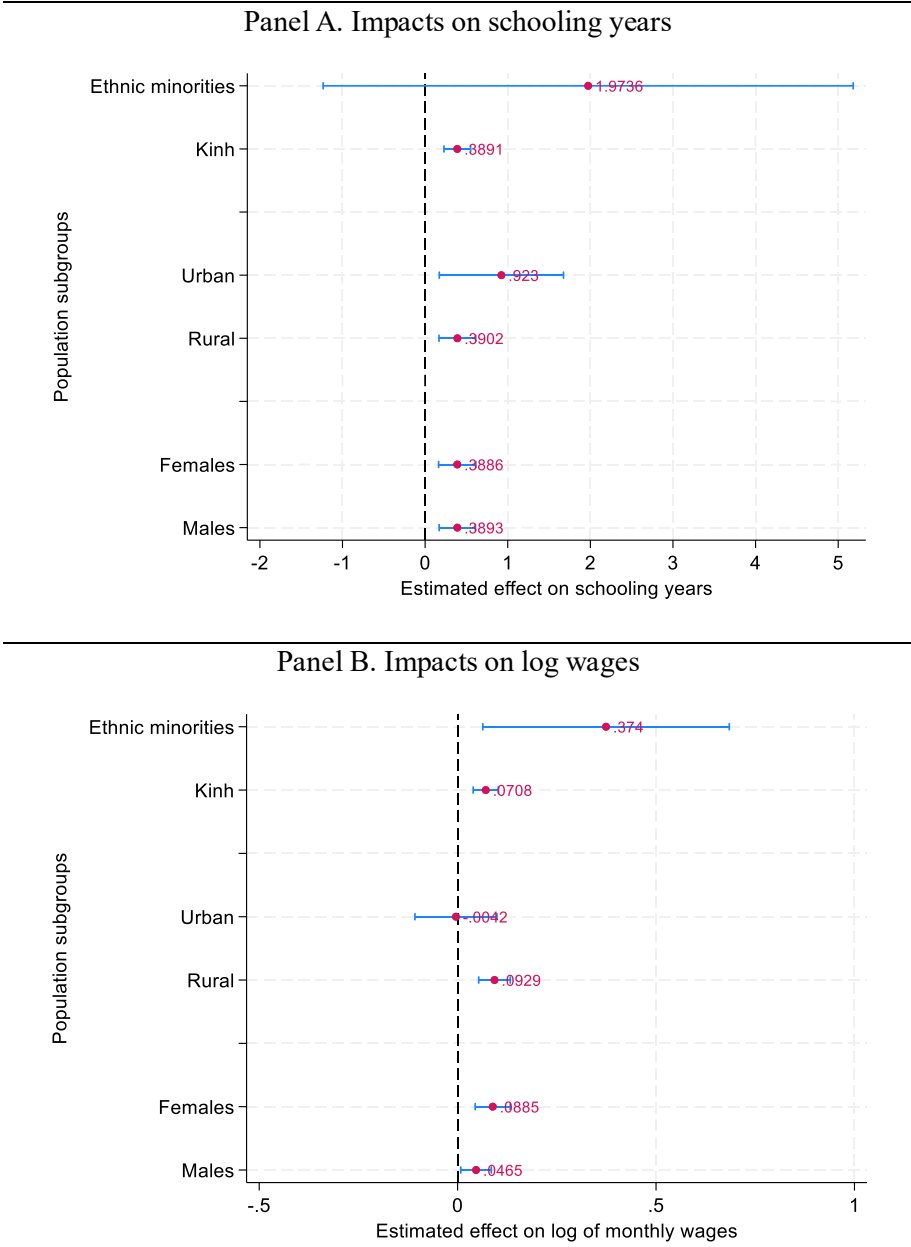
*** p<0.01, ** p<0.05, * p<0.1.

Reduced-form regressions of the outcome variables on the distance to the nearest examination center are reported in the Appendix (Tables A.5, A.6, and A.9) We find that districts in proximity to the examination centers exhibit a higher economic level and lower poverty compared to those farther away from the examination centers. Individuals in these closer districts tend to have higher levels of education, better jobs, and higher wages.

Finally, we examine the heterogeneous effects of elite density by running regressions of schooling years and log wages on the elite density for different population subgroups. Figure 2 shows that the elite density has a similar effect on both males and females. When considering urban and rural areas, the impact of the elite density on schooling years tends to

be higher in urban than rural areas. On the other hand, the impact on wages tends to be higher in rural and ethnic minorities than in rural and Kinh groups, respectively.

Figure 2: Heterogenous effects on log of per capita income



Note: This figure graphs the estimates and their 95% confidence intervals of the effect of asinh(elite density) for different population subgroups.

5. Conclusions

We find a significant and positive long-lasting effects of the elite density during the feudal period 1075-1919 on education, formal employment, wages and per capita income of households in Vietnam. At the district level, a higher elite density increases per capita expenditure and nighttime light intensity while decreasing poverty indexes. Our findings sharpen insights into factors of comparative development and suggest the importance role on human capital accumulation in economic performance.

References

- Abadie, A., Athey, S., Imbens, G. W., & Wooldridge, J. M. (2023). When should you adjust standard errors for clustering?. *The Quarterly Journal of Economics*, 138(1), 1-35.
- Aihounon, G. B., & Henningsen, A. (2021). Units of measurement and the inverse hyperbolic sine transformation. *The Econometrics Journal*, 24(2), 334-351.
- Bellemare, M. F., & Wichman, C. J. (2020). Elasticities and the inverse hyperbolic sine transformation. *Oxford Bulletin of Economics and Statistics*, 82(1), 50-61.
- Chen, T., Kung, J.K., Ma, C., 2020. Long live Keju! The persistent effects of China's civil examination system. *Economic Journal*. 130 (631), 2030–2064.
- Foster, J., Greer, J., & Thorbecke, E. (1984). A class of decomposable poverty measures. *Econometrica* 52(3), 761-766.
- Lanjouw, P., Marra, M., & Nguyen, C. (2017). Vietnam's evolving poverty index map: Patterns and implications for policy. *Social Indicators Research*, 133, 93-118.
- Ly, T, H. (2021). Impacts of Confucianism on Vietnamese culture, *International Communication of Chinese Culture*, 8, 347-361.
- Ngo, D.T, Nga, T, N, and Nguyen, H, M. (2006). List of Vietnamese imperial Elites 1075-1919 (Các Nhà Khoa Bảng Việt Nam in Vietnamese). Edited by Ngo Duc Tho, Literature Publishing House: Hanoi.
- Nguyen, C. (2024), Combining Samples in Small Area Estimation: An Application to Poverty Mapping in Vietnam, *Economics of Transition and Institutional Change*, forthcoming.
- Nguyen, T, N., Vu, T, L, A., Nguyen, V, T., Nguyen, T, N., & Nguyen, V, N. (2019). Vietnamese Examinations, Bachelors during Le Dynasty (Khoa cử Việt Nam, Hương Cống triều Lê in Vietnamese), Hanoi National University Publishing House, Hanoi.
- Nguyen, T, N., Vu, T, L, A., Nguyen, V, T., Nguyen, T, N., & Nguyen, V, N. (2019). Vietnamese Examinations, Bachelors during Nguyen Dynasty (Khoa cử Việt Nam, Cử nhân triều Nguyễn in Vietnamese), Hanoi National University Publishing House, Hanoi.
- Nguyen, T, N., Vu, T, L, A., Nguyen, V, T., Nguyen, T, N., & Nguyen, V, N. (2019). Vietnamese Examinations, Junior Bachelors during Le, Nguyen, and Tay Son Dynasty (Khoa cử Việt Nam, Sinh đồ triều các chúa Nguyễn, Lê và Tây Sơn in Vietnamese), Hanoi National University Publishing House, Hanoi.
- Nguyen, T, N., Vu, T, L, A., Nguyen, V, T., Nguyen, T, N., & Nguyen, V, N. (2019). Vietnamese Examinations, Junior Bachelors during Nguyen Dynasty (Khoa cử Việt Nam, Tú tài triều Nguyễn in Vietnamese), Hanoi National University Publishing House, Hanoi.
- Nunn, N, (2020), The historical roots of economic development, *Science*, 367.

Olea, J. L. M., & Pflueger, C. (2013). A robust test for weak instruments. *Journal of Business & Economic Statistics*, 31(3), 358–369.

Valencia Caicedo, F., 2019. The mission: human capital transmission, economic persistence, and culture in South America. *Quarterly Journal of Economics*, 134 (1), 507–556.

Vu, T. M., & Yamada, H. (2023). Legacies of Vietnam's imperial examinations, 1075–1919: More investment in education and better educational outcomes. *Journal of Comparative Economics*, 51(1), 2-14.

Online Appendix

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Table A. 1. Summary statistics of variables

Variable	Obs.	Mean	Std. dev.	Min	Max
<i>Individual-level variables</i>					
Number of schooling years	657,498	8.562	4.005	0	16
Currently working (yes=1, no=0)	657,499	0.828	0.377	0	1
Having a wage job (yes=1, no=0)	657,500	0.404	0.491	0	1
Having a formal job (yes=1, no=0)	657,501	0.138	0.345	0	1
Number of monthly working hours	657,502	128.85	87.09	0	580
Monthly wage (thousand VND)	657,504	1699.0	3089.5	0	148097
Gender (male=1, female=0)	657,505	0.494	0.500	0	1
Age	657,506	37.565	13.937	15	64
Ethnicity (Ethnic minorities=1, Kinh=0)	657,507	0.170	0.376	0	1
Urban area (urban=1, rural=0)	657,508	0.265	0.441	0	1
<i>Household-level variables</i>					
Per capita income of households (thousand VND)	255,968	37,210.3	159,784.9	0	5,996,598.0
<i>District-level variables</i>					
Nighttime light intensity	2,756	14.85	16.11	0	63
Per capita expenditure	1,397	27,763.2	19,141.3	4,147.5	129,495.6
Poverty rate (in percent)	1,397	13.36	20.68	0.00	92.82
Poverty gap index (in percent)	1,397	4.92	7.79	0.00	51.10
Poverty severity index (in percent)	1,397	2.03	3.94	0.00	31.20
Elite density (number of elite people per 100km ²)	696	33.65	155.05	0.00	2525.59
Distance to the nearest examination center (km)	696	106.12	78.77	0.00	741.98
Distance to Hanoi capital (km)	696	600.08	478.82	0.00	1569.88
Distance to HCM city (km)	696	666.38	474.58	0.00	1387.41
Mean elevation (m)	696	192.98	285.32	0.24	1520.27
Average daily temperature (degree Celsius)	6,581	24.86	2.36	14.61	28.72
Average daily precipitation (mm)	6,581	5.23	1.94	0.88	16.96

Table A.2. OLS first-stage regression of asinh(elite density)

Explanatory variables	The sample excluding Hanoi and HCM city	The sample excluding provinces with exam venue
Distance to the nearest examination center	-0.0068*** (0.0010)	-0.0063*** (0.0008)
Gender (male=1, female=0)	-0.0068*** (0.0017)	-0.0036** (0.0016)
Age	-0.0023*** (0.0007)	-0.0012* (0.0006)
Age squared	0.0029*** (0.0009)	0.0016* (0.0009)
Ethnicity (Ethnic minorities=1, Kinh=0)	-0.2938*** (0.0352)	-0.1472*** (0.0292)
Urban area (urban=1, rural=0)	0.0231 (0.0433)	0.1098*** (0.0400)
Average daily temperature	-0.0285** (0.0121)	-0.0287** (0.0119)
Average daily precipitation	-0.0179** (0.0072)	-0.0134* (0.0071)
Mean elevation (100m)	-0.1237*** (0.0146)	-0.1309*** (0.0149)
Distance to Hanoi capital (100km)	-0.2785*** (0.0816)	-0.4230*** (0.0654)
Distance to HCM city (100km)	0.5896*** (0.0874)	0.6776*** (0.0900)
Control variables	Yes	Yes
Province fixed effects	Yes	Yes
Year fixed effects	Yes	Yes
Constant	-0.9067 (1.2126)	-2.4354** (1.2293)
Observations	657,508	587,468
R-squared	0.818	0.825
Weak identification test (Cragg-Donald Wald F statistic)	8121.2	7338.1
(Kleibergen-Paap rk Wald F statistic)	229.0	257.1

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.3. OLS regression of individual outcomes

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.0632*** (0.0127)	-0.0036*** (0.0007)	0.0064*** (0.0011)	0.0094*** (0.0010)	0.0046** (0.0018)	0.0132*** (0.0022)
Gender (male=1, female=0)	0.4622*** (0.0085)	0.0538*** (0.0010)	0.1592*** (0.0014)	-0.0147*** (0.0009)	0.1046*** (0.0017)	0.2117*** (0.0030)
Age	-0.1035*** (0.0025)	0.0742*** (0.0003)	0.0556*** (0.0003)	0.0256*** (0.0003)	0.0610*** (0.0006)	0.0670*** (0.0009)
Age squared	0.0302*** (0.0032)	-0.0869*** (0.0004)	-0.0768*** (0.0004)	-0.0365*** (0.0004)	-0.0835*** (0.0008)	-0.0900*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.7819*** (0.0449)	0.0847*** (0.0022)	0.0538*** (0.0045)	-0.0599*** (0.0026)	-0.0296*** (0.0060)	-0.2557*** (0.0106)
Urban area (urban=1, rural=0)	1.7475*** (0.0314)	-0.0698*** (0.0016)	0.0473*** (0.0027)	0.1044*** (0.0025)	0.0981*** (0.0036)	0.1712*** (0.0051)
Average daily temperature (degree Celsius)	-0.0416*** (0.0112)	0.0016*** (0.0005)	-0.0036*** (0.0011)	-0.0046*** (0.0008)	-0.0004 (0.0016)	-0.0002 (0.0020)
Average daily precipitation (mm)	-0.0013 (0.0088)	0.0009* (0.0005)	-0.0023*** (0.0009)	-0.0020*** (0.0006)	-0.0008 (0.0013)	-0.0011 (0.0018)
Mean elevation (100m)	-0.0959*** (0.0139)	0.0047*** (0.0006)	-0.0117*** (0.0014)	0.0001 (0.0008)	-0.0022 (0.0021)	0.0032 (0.0033)
Distance to Hanoi capital (100km)	-0.0946 (0.0644)	-0.0051* (0.0031)	-0.0526*** (0.0062)	-0.0030 (0.0039)	-0.0053 (0.0091)	0.0780*** (0.0132)
Distance to HCM city (100km)	-0.5427*** (0.0654)	0.0003 (0.0031)	-0.0809*** (0.0063)	-0.0534*** (0.0041)	0.0122 (0.0096)	0.0050 (0.0143)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	18.6980*** (0.9823)	-0.5605*** (0.0465)	0.5497*** (0.0947)	0.5053*** (0.0618)	3.9990*** (0.1453)	6.7304*** (0.2063)
Observations	657,508	657,508	657,508	657,508	545,602	214,371
R-squared	0.266	0.281	0.141	0.116	0.107	0.283

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.4. IV regression of individual outcomes

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.3890*** (0.1281)	-0.0084 (0.0065)	0.0578*** (0.0132)	0.0720*** (0.0089)	0.0030 (0.0177)	0.0670*** (0.0217)
Gender (male=1, female=0)	0.4646*** (0.0086)	0.0538*** (0.0010)	0.1596*** (0.0014)	-0.0143*** (0.0009)	0.1046*** (0.0017)	0.2125*** (0.0030)
Age	-0.1027*** (0.0025)	0.0742*** (0.0003)	0.0557*** (0.0003)	0.0257*** (0.0003)	0.0610*** (0.0006)	0.0671*** (0.0009)
Age squared	0.0292*** (0.0032)	-0.0869*** (0.0004)	-0.0770*** (0.0004)	-0.0367*** (0.0004)	-0.0835*** (0.0008)	-0.0901*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.6839*** (0.0600)	0.0833*** (0.0029)	0.0693*** (0.0062)	-0.0411*** (0.0039)	-0.0301*** (0.0081)	-0.2397*** (0.0126)
Urban area (urban=1, rural=0)	1.7366*** (0.0322)	-0.0697*** (0.0017)	0.0456*** (0.0029)	0.1023*** (0.0028)	0.0981*** (0.0036)	0.1690*** (0.0053)
Average daily temperature (degree Celsius)	-0.0329*** (0.0120)	0.0014*** (0.0006)	-0.0022* (0.0012)	-0.0029*** (0.0009)	-0.0005 (0.0017)	0.0003 (0.0021)
Average daily precipitation (mm)	0.0032 (0.0092)	0.0008* (0.0005)	-0.0016* (0.0009)	-0.0012* (0.0007)	-0.0008 (0.0013)	-0.0004 (0.0019)
Mean elevation (100m)	-0.0493** (0.0228)	0.0040*** (0.0011)	-0.0043* (0.0023)	0.0091*** (0.0015)	-0.0024 (0.0032)	0.0115** (0.0048)
Distance to Hanoi capital (100km)	0.0881 (0.0954)	-0.0078 (0.0048)	-0.0238** (0.0097)	0.0322*** (0.0067)	-0.0062 (0.0130)	0.1185*** (0.0209)
Distance to HCM city (100km)	-0.5929*** (0.0705)	0.0011 (0.0034)	-0.0888*** (0.0071)	-0.0630*** (0.0052)	0.0124 (0.0099)	0.0026 (0.0145)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.3187*** (1.1264)	-0.5404*** (0.0521)	0.3321*** (0.1102)	0.2402*** (0.0734)	4.0056*** (0.1642)	6.4219*** (0.2372)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.5. OLS reduced-form regression of individual outcomes

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
Distance to the nearest examination center (km)	-0.0026*** (0.0008)	0.0001 (0.0000)	-0.0004*** (0.0001)	-0.0005*** (0.0001)	-0.0000 (0.0001)	-0.0006*** (0.0002)
Gender (male=1, female=0)	0.4619*** (0.0085)	0.0538*** (0.0010)	0.1592*** (0.0014)	-0.0148*** (0.0009)	0.1046*** (0.0017)	0.2116*** (0.0030)
Age	-0.1036*** (0.0025)	0.0742*** (0.0003)	0.0556*** (0.0003)	0.0256*** (0.0003)	0.0610*** (0.0006)	0.0670*** (0.0009)
Age squared	0.0304*** (0.0032)	-0.0869*** (0.0004)	-0.0768*** (0.0004)	-0.0365*** (0.0004)	-0.0835*** (0.0008)	-0.0900*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.7982*** (0.0446)	0.0858*** (0.0022)	0.0523*** (0.0045)	-0.0623*** (0.0026)	-0.0310*** (0.0060)	-0.2593*** (0.0106)
Urban area (urban=1, rural=0)	1.7456*** (0.0315)	-0.0699*** (0.0016)	0.0469*** (0.0027)	0.1040*** (0.0025)	0.0982*** (0.0036)	0.1708*** (0.0051)
Average daily temperature (degree Celsius)	-0.0440*** (0.0111)	0.0017*** (0.0005)	-0.0038*** (0.0011)	-0.0050*** (0.0007)	-0.0005 (0.0016)	-0.0004 (0.0020)
Average daily precipitation (mm)	-0.0038 (0.0088)	0.0010** (0.0005)	-0.0026*** (0.0008)	-0.0025*** (0.0006)	-0.0008 (0.0013)	-0.0016 (0.0018)
Mean elevation (100m)	-0.0974*** (0.0140)	0.0050*** (0.0006)	-0.0115*** (0.0014)	0.0002 (0.0008)	-0.0028 (0.0021)	0.0027 (0.0034)
Distance to Hanoi capital (100km)	-0.0202 (0.0723)	-0.0055 (0.0036)	-0.0399*** (0.0071)	0.0121*** (0.0046)	-0.0069 (0.0102)	0.0916*** (0.0150)
Distance to HCM city (100km)	-0.3635*** (0.0837)	-0.0039 (0.0040)	-0.0548*** (0.0082)	-0.0206*** (0.0049)	0.0141 (0.0124)	0.0466** (0.0189)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	16.9660*** (1.1576)	-0.5328*** (0.0547)	0.2797** (0.1127)	0.1749*** (0.0675)	4.0034*** (0.1706)	6.3144*** (0.2537)
Observations	657,508	657,508	657,508	657,508	545,602	214,371
R-squared	0.266	0.281	0.141	0.116	0.107	0.282

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.6. OLS regression of per capita income of households

Explanatory variables	OLS	IV	OLS (reduced-form)
asinh(elite density)	0.0159*** (0.0044)	0.1262*** (0.0419)	
Distance to the nearest examination center (km)			-0.0009*** (0.0003)
Gender of household heads (male=1, female=0)	0.0381*** (0.0046)	0.0400*** (0.0048)	0.0378*** (0.0046)
Age of household heads	0.0348*** (0.0009)	0.0349*** (0.0009)	0.0348*** (0.0009)
Age of household heads squared	-0.0004*** (0.0000)	-0.0004*** (0.0000)	-0.0004*** (0.0000)
Ethnicity (Ethnic minorities=1, Kinh=0)	-0.5298*** (0.0140)	-0.4988*** (0.0185)	-0.5335*** (0.0139)
Urban area (urban=1, rural=0)	0.3581*** (0.0101)	0.3544*** (0.0114)	0.3571*** (0.0101)
Average daily temperature (degree Celsius)	-0.0091** (0.0039)	-0.0064 (0.0042)	-0.0097** (0.0039)
Average daily precipitation (mm)	-0.0050** (0.0021)	-0.0034 (0.0024)	-0.0058*** (0.0021)
Mean elevation (100m)	-0.0295*** (0.0051)	-0.0134* (0.0075)	-0.0292*** (0.0050)
Distance to Hanoi capital (100km)	-0.0385* (0.0223)	0.0267 (0.0331)	-0.0087 (0.0243)
Distance to HCM city (100km)	-0.0769*** (0.0215)	-0.0943*** (0.0255)	-0.0136 (0.0270)
Soil types	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes
Constant	10.3052*** (0.3356)	9.8356*** (0.3785)	9.6559*** (0.3750)
Observations	255,968	255,968	255,968
R-squared	0.347		0.346

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.7. OLS regression of district-level outcomes

Explanatory variables	Dependent variables				
	asinh(nighttime light)	asinh(per capita expenditure)	asinh(poverty rate)	asinh(poverty gap index)	asinh(poverty severity index)
asinh(elite density)	0.1193*** (0.0259)	0.0348*** (0.0101)	-0.0579*** (0.0160)	-0.1037*** (0.0229)	-0.0715*** (0.0174)
Average daily temperature (degree Celsius)	-0.0235 (0.0178)	-0.0107 (0.0085)	0.0205** (0.0105)	0.0206 (0.0191)	0.0259 (0.0165)
Average daily precipitation (mm)	-0.0291*** (0.0098)	-0.0178*** (0.0045)	0.0175** (0.0088)	0.0203* (0.0117)	0.0190* (0.0100)
Mean elevation (100m)	-0.1356*** (0.0240)	-0.0683*** (0.0091)	0.0884*** (0.0132)	0.1030 (0.0744)	0.1155* (0.0655)
Distance to Hanoi capital (100km)	-0.0064 (0.0892)	-0.0542* (0.0279)	0.0143 (0.0383)	-0.0495 (0.0803)	-0.0529 (0.0706)
Distance to HCM city (100km)	-0.1878** (0.0920)	-0.0418 (0.0299)	0.0155 (0.0408)	0.2215*** (0.0240)	0.2006*** (0.0194)
Soil types	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	5.9706*** (1.4212)	11.0044*** (0.4617)	3.0735*** (0.6333)	2.4556** (1.2202)	1.5432 (1.0814)
Observations	2,512	1,265	1,265	1,265	1,265
R-squared	0.657	0.890	0.940	0.824	0.792

Robust standard errors in parentheses (clustered at the district level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from district-level data

Table A.8. IV regression of district-level outcomes

Explanatory variables	Dependent variables				
	asinh(nighttime light)	asinh(per capita expenditure)	asinh(poverty rate)	asinh(poverty gap index)	asinh(poverty severity index)
asinh(elite density)	0.8159** (0.3270)	0.1671* (0.0907)	-0.3603** (0.1453)	-0.6778** (0.2749)	-0.5030** (0.2262)
Average daily temperature (degree Celsius)	0.0165 (0.0312)	-0.0055 (0.0099)	0.0087 (0.0141)	-0.0019 (0.0269)	0.0090 (0.0227)
Average daily precipitation (mm)	-0.0256 (0.0156)	-0.0141** (0.0059)	0.0091 (0.0104)	0.0042 (0.0170)	0.0069 (0.0136)
Mean elevation (100m)	-0.0280 (0.0555)	-0.0472*** (0.0160)	0.0402 (0.0253)	-0.1160 (0.1396)	-0.0492 (0.1108)
Distance to Hanoi capital (100km)	0.2703 (0.1887)	-0.0037 (0.0477)	-0.1011 (0.0781)	0.0674 (0.1101)	0.0350 (0.0869)
Distance to HCM city (100km)	-0.3128** (0.1511)	-0.0688* (0.0377)	0.0771 (0.0636)	0.1300*** (0.0474)	0.1318*** (0.0385)
Soil types	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	3.3530 (2.1548)	10.5763*** (0.5681)	4.0526*** (0.8401)	4.3142*** (1.6597)	2.9399** (1.4309)
Observations	2,512	1,265	1,265	1,265	1,265

Robust standard errors in parentheses (clustered at the district level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from district-level data

Table A.9. OLS reduced-form regression of district-level outcomes

Explanatory variables	Dependent variables				
	asinh(nighttime light)	asinh(per capita expenditure)	asinh(poverty rate)	asinh(poverty gap index)	asinh(poverty severity index)
Distance to the nearest examination center (km)	-0.0044*** (0.0012)	-0.0010** (0.0005)	0.0021*** (0.0007)	0.0039*** (0.0012)	0.0029*** (0.0011)
Average daily temperature (degree Celsius)	-0.0336* (0.0176)	-0.0127 (0.0084)	0.0241** (0.0102)	0.0271 (0.0186)	0.0305* (0.0161)
Average daily precipitation (mm)	-0.0349*** (0.0100)	-0.0193*** (0.0046)	0.0202** (0.0090)	0.0252** (0.0120)	0.0225** (0.0103)
Mean elevation (100m)	-0.1446*** (0.0241)	-0.0718*** (0.0088)	0.0933*** (0.0126)	0.2298*** (0.0235)	0.2059*** (0.0190)
Distance to Hanoi capital (100km)	0.1420 (0.1068)	-0.0225 (0.0367)	-0.0607 (0.0502)	-0.0401 (0.0961)	0.0072 (0.0830)
Distance to HCM city (100km)	0.0830 (0.1099)	0.0220 (0.0414)	-0.1187** (0.0547)	-0.3009*** (0.1141)	-0.2384** (0.1019)
Soil types	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes
Constant	3.5722** (1.5431)	10.4567*** (0.5642)	4.3104*** (0.7466)	4.7993*** (1.5736)	3.2999** (1.4205)
Observations	2,512	1,265	1,265	1,265	1,265
R-squared	0.650	0.888	0.940	0.821	0.790

Robust standard errors in parentheses (clustered at the district level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from district-level data

Table A.10. IV regression of individual outcomes on the elite density

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
The elite density	0.0153*** (0.0053)	-0.0003 (0.0003)	0.0023*** (0.0006)	0.0028*** (0.0005)	0.0001 (0.0007)	0.0021*** (0.0007)
Gender (male=1, female=0)	0.4652*** (0.0092)	0.0538*** (0.0010)	0.1597*** (0.0014)	-0.0142*** (0.0011)	0.1046*** (0.0018)	0.2138*** (0.0033)
Age	-0.1027*** (0.0027)	0.0742*** (0.0003)	0.0557*** (0.0004)	0.0257*** (0.0003)	0.0610*** (0.0007)	0.0672*** (0.0010)
Age squared	0.0294*** (0.0036)	-0.0869*** (0.0004)	-0.0769*** (0.0005)	-0.0366*** (0.0005)	-0.0834*** (0.0008)	-0.0905*** (0.0014)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.8668*** (0.0516)	0.0872*** (0.0024)	0.0421*** (0.0055)	-0.0750*** (0.0041)	-0.0315*** (0.0067)	-0.2695*** (0.0117)
Urban area (urban=1, rural=0)	1.2393*** (0.1822)	-0.0590*** (0.0087)	-0.0283 (0.0203)	0.0103 (0.0170)	0.0941*** (0.0241)	0.0854*** (0.0310)
Average daily temperature (degree Celsius)	-0.0897*** (0.0206)	0.0027*** (0.0010)	-0.0106*** (0.0023)	-0.0134*** (0.0020)	-0.0009 (0.0027)	-0.0110** (0.0045)
Average daily precipitation (mm)	0.0094 (0.0119)	0.0007 (0.0005)	-0.0007 (0.0014)	-0.0000 (0.0015)	-0.0007 (0.0014)	0.0010 (0.0025)
Mean elevation (100m)	-0.0991*** (0.0154)	0.0050*** (0.0006)	-0.0117*** (0.0018)	-0.0001 (0.0015)	-0.0028 (0.0021)	0.0001 (0.0036)
Distance to Hanoi capital (100km)	0.1297 (0.1111)	-0.0087 (0.0054)	-0.0176 (0.0121)	0.0398*** (0.0100)	-0.0057 (0.0152)	0.1187*** (0.0223)
Distance to HCM city (100km)	-0.6300*** (0.0805)	0.0019 (0.0037)	-0.0944*** (0.0086)	-0.0699*** (0.0076)	0.0120 (0.0106)	0.0021 (0.0156)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	19.8279*** (1.1372)	-0.5944*** (0.0504)	0.7050*** (0.1217)	0.7045*** (0.1072)	4.0263*** (0.1514)	6.8536*** (0.2261)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.11. IV regression of individual outcomes on log of elite density

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
Log of the elite density	0.4471*** (0.1471)	-0.0096 (0.0075)	0.0664*** (0.0152)	0.0827*** (0.0102)	0.0035 (0.0203)	0.0769*** (0.0249)
Gender (male=1, female=0)	0.4644*** (0.0086)	0.0538*** (0.0010)	0.1596*** (0.0014)	-0.0143*** (0.0009)	0.1046*** (0.0017)	0.2125*** (0.0030)
Age	-0.1028*** (0.0025)	0.0742*** (0.0003)	0.0557*** (0.0003)	0.0257*** (0.0003)	0.0610*** (0.0006)	0.0671*** (0.0009)
Age squared	0.0293*** (0.0032)	-0.0869*** (0.0004)	-0.0770*** (0.0004)	-0.0367*** (0.0004)	-0.0835*** (0.0008)	-0.0901*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.6945*** (0.0577)	0.0835*** (0.0028)	0.0677*** (0.0059)	-0.0431*** (0.0037)	-0.0302*** (0.0077)	-0.2415*** (0.0123)
Urban area (urban=1, rural=0)	1.7301*** (0.0326)	-0.0695*** (0.0017)	0.0446*** (0.0029)	0.1011*** (0.0028)	0.0981*** (0.0037)	0.1676*** (0.0054)
Average daily temperature (degree Celsius)	-0.0347*** (0.0118)	0.0015*** (0.0006)	-0.0024** (0.0012)	-0.0033*** (0.0009)	-0.0005 (0.0016)	0.0000 (0.0021)
Average daily precipitation (mm)	0.0038 (0.0092)	0.0008* (0.0005)	-0.0015 (0.0009)	-0.0011 (0.0007)	-0.0008 (0.0013)	-0.0003 (0.0019)
Mean elevation (100m)	-0.0533** (0.0218)	0.0041*** (0.0010)	-0.0049** (0.0022)	0.0084*** (0.0014)	-0.0025 (0.0031)	0.0107** (0.0046)
Distance to Hanoi capital (100km)	0.0923 (0.0964)	-0.0079 (0.0049)	-0.0231** (0.0098)	0.0329*** (0.0068)	-0.0061 (0.0131)	0.1189*** (0.0210)
Distance to HCM city (100km)	-0.5944*** (0.0707)	0.0011 (0.0034)	-0.0891*** (0.0071)	-0.0633*** (0.0051)	0.0124 (0.0099)	0.0024 (0.0145)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.4652*** (1.1047)	-0.5436*** (0.0510)	0.3539*** (0.1081)	0.2673*** (0.0721)	4.0067*** (0.1612)	6.4479*** (0.2332)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.12. IV regression of individual outcomes without control variables

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.8860*** (0.0180)	-0.0059*** (0.0008)	0.0358*** (0.0015)	0.0372*** (0.0013)	0.0153*** (0.0021)	0.0681*** (0.0039)
Constant	7.3509*** (0.0305)	0.8363*** (0.0013)	0.3550*** (0.0022)	0.0869*** (0.0014)	5.0681*** (0.0035)	8.2392*** (0.0060)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.13. IV regression of individual outcomes with province and year fixed effects

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.9907*** (0.0503)	-0.0250*** (0.0020)	0.0539*** (0.0041)	0.0542*** (0.0030)	0.0245*** (0.0053)	0.0666*** (0.0088)
Soil types	No	No	No	No	No	No
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	4.1309*** (0.2269)	0.9640*** (0.0062)	0.1474*** (0.0122)	-0.0447*** (0.0094)	5.0558*** (0.0237)	8.0142*** (0.0387)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.14. IV regression of individual outcomes with control for province-by-year fixed effects

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.3915*** (0.1266)	-0.0086 (0.0064)	0.0565*** (0.0129)	0.0691*** (0.0085)	0.0017 (0.0174)	0.0684*** (0.0208)
Gender (male=1, female=0)	0.4652*** (0.0086)	0.0538*** (0.0010)	0.1596*** (0.0014)	-0.0143*** (0.0009)	0.1045*** (0.0017)	0.2133*** (0.0030)
Age	-0.1027*** (0.0025)	0.0742*** (0.0003)	0.0557*** (0.0003)	0.0257*** (0.0003)	0.0611*** (0.0006)	0.0669*** (0.0009)
Age squared	0.0290*** (0.0033)	-0.0869*** (0.0004)	-0.0770*** (0.0004)	-0.0367*** (0.0004)	-0.0835*** (0.0008)	-0.0899*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.6767*** (0.0597)	0.0823*** (0.0028)	0.0692*** (0.0061)	-0.0421*** (0.0037)	-0.0284*** (0.0079)	-0.2333*** (0.0119)
Urban area (urban=1, rural=0)	1.7501*** (0.0321)	-0.0702*** (0.0016)	0.0454*** (0.0028)	0.1015*** (0.0027)	0.0984*** (0.0036)	0.1706*** (0.0051)
Average daily temperature (degree Celsius)	-0.0312** (0.0122)	0.0013** (0.0006)	-0.0033*** (0.0012)	-0.0036*** (0.0008)	-0.0004 (0.0017)	0.0007 (0.0021)
Average daily precipitation (mm)	0.0106 (0.0109)	0.0012** (0.0005)	-0.0016 (0.0011)	-0.0012 (0.0008)	-0.0003 (0.0015)	-0.0023 (0.0022)
Mean elevation (100m)	-0.0484** (0.0226)	0.0040*** (0.0011)	-0.0046** (0.0023)	0.0087*** (0.0015)	-0.0028 (0.0031)	0.0114** (0.0046)
Distance to Hanoi capital (100km)	0.0967 (0.0948)	-0.0084* (0.0047)	-0.0246*** (0.0095)	0.0309*** (0.0065)	-0.0074 (0.0128)	0.1233*** (0.0201)
Distance to HCM city (100km)	-0.5916*** (0.0700)	0.0009 (0.0033)	-0.0898*** (0.0069)	-0.0620*** (0.0050)	0.0129 (0.0096)	0.0031 (0.0139)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province-by-year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	16.8698*** (1.1742)	-0.4960*** (0.0519)	0.3467*** (0.1099)	0.2863*** (0.0724)	3.7679*** (0.1644)	6.3391*** (0.2492)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.15. IV regression of individual outcomes

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(the density of doctors)	0.5272*** (0.1721)	-0.0113 (0.0088)	0.0783*** (0.0177)	0.0976*** (0.0116)	0.0041 (0.0241)	0.0844*** (0.0276)
Gender (male=1, female=0)	0.4639*** (0.0085)	0.0538*** (0.0010)	0.1595*** (0.0014)	-0.0144*** (0.0009)	0.1046*** (0.0017)	0.2131*** (0.0030)
Age	-0.1031*** (0.0025)	0.0742*** (0.0003)	0.0557*** (0.0003)	0.0256*** (0.0003)	0.0610*** (0.0006)	0.0670*** (0.0009)
Age squared	0.0298*** (0.0032)	-0.0869*** (0.0004)	-0.0769*** (0.0004)	-0.0366*** (0.0004)	-0.0835*** (0.0008)	-0.0901*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.7590*** (0.0474)	0.0849*** (0.0023)	0.0581*** (0.0048)	-0.0550*** (0.0029)	-0.0307*** (0.0063)	-0.2536*** (0.0110)
Urban area (urban=1, rural=0)	1.7169*** (0.0335)	-0.0692*** (0.0017)	0.0426*** (0.0030)	0.0987*** (0.0028)	0.0980*** (0.0038)	0.1662*** (0.0055)
Average daily temperature (degree Celsius)	-0.0392*** (0.0115)	0.0016*** (0.0005)	-0.0031*** (0.0011)	-0.0041*** (0.0008)	-0.0005 (0.0016)	-0.0002 (0.0021)
Average daily precipitation (mm)	0.0056 (0.0093)	0.0008 (0.0005)	-0.0012 (0.0009)	-0.0007 (0.0006)	-0.0008 (0.0013)	0.0003 (0.0020)
Mean elevation (100m)	-0.0707*** (0.0177)	0.0044*** (0.0008)	-0.0075*** (0.0018)	0.0051*** (0.0011)	-0.0026 (0.0026)	0.0070* (0.0039)
Distance to Hanoi capital (100km)	0.0874 (0.0945)	-0.0078 (0.0048)	-0.0239** (0.0094)	0.0320*** (0.0064)	-0.0061 (0.0130)	0.1158*** (0.0205)
Distance to HCM city (100km)	-0.6185*** (0.0725)	0.0016 (0.0035)	-0.0927*** (0.0071)	-0.0678*** (0.0050)	0.0122 (0.0102)	-0.0013 (0.0148)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	18.6629*** (0.9970)	-0.5694*** (0.0464)	0.5318*** (0.0967)	0.4889*** (0.0648)	4.0164*** (0.1455)	6.6503*** (0.2116)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.16. IV regression of individual outcomes

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(the density of elite people in Nguyen dynasty)	0.4747*** (0.1562)	-0.0102 (0.0079)	0.0705*** (0.0162)	0.0878*** (0.0111)	0.0037 (0.0217)	0.0819*** (0.0263)
Gender (male=1, female=0)	0.4648*** (0.0086)	0.0538*** (0.0010)	0.1597*** (0.0014)	-0.0142*** (0.0009)	0.1046*** (0.0017)	0.2127*** (0.0030)
Age	-0.1026*** (0.0025)	0.0742*** (0.0003)	0.0558*** (0.0003)	0.0257*** (0.0003)	0.0610*** (0.0006)	0.0672*** (0.0009)
Age squared	0.0290*** (0.0033)	-0.0869*** (0.0004)	-0.0770*** (0.0004)	-0.0367*** (0.0004)	-0.0835*** (0.0008)	-0.0903*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.7215*** (0.0526)	0.0841*** (0.0025)	0.0637*** (0.0054)	-0.0481*** (0.0034)	-0.0304*** (0.0070)	-0.2462*** (0.0115)
Urban area (urban=1, rural=0)	1.7263*** (0.0328)	-0.0694*** (0.0017)	0.0440*** (0.0030)	0.1004*** (0.0029)	0.0980*** (0.0037)	0.1668*** (0.0054)
Average daily temperature (degree Celsius)	-0.0406*** (0.0116)	0.0016*** (0.0005)	-0.0033*** (0.0011)	-0.0044*** (0.0009)	-0.0005 (0.0016)	-0.0019 (0.0022)
Average daily precipitation (mm)	0.0009 (0.0091)	0.0009* (0.0005)	-0.0019** (0.0009)	-0.0016** (0.0007)	-0.0008 (0.0013)	-0.0010 (0.0019)
Mean elevation (100m)	-0.0437* (0.0243)	0.0039*** (0.0012)	-0.0035 (0.0025)	0.0101*** (0.0017)	-0.0024 (0.0034)	0.0123** (0.0049)
Distance to Hanoi capital (100km)	0.0185 (0.0799)	-0.0063 (0.0040)	-0.0341*** (0.0082)	0.0193*** (0.0057)	-0.0067 (0.0110)	0.1068*** (0.0180)
Distance to HCM city (100km)	-0.6170*** (0.0729)	0.0016 (0.0035)	-0.0924*** (0.0074)	-0.0675*** (0.0054)	0.0122 (0.0101)	-0.0030 (0.0146)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.9617*** (1.0428)	-0.5543*** (0.0481)	0.4276*** (0.1026)	0.3592*** (0.0711)	4.0100*** (0.1538)	6.5630*** (0.2175)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.17. IV regression of individual outcomes using the full sample including Hanoi and HCM city

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.5188*** (0.0977)	-0.0114** (0.0049)	0.0518*** (0.0098)	0.0771*** (0.0073)	0.0000 (0.0133)	0.1347*** (0.0180)
Gender (male=1, female=0)	0.4434*** (0.0082)	0.0589*** (0.0010)	0.1548*** (0.0013)	-0.0059*** (0.0010)	0.0970*** (0.0016)	0.2147*** (0.0028)
Age	-0.0726*** (0.0026)	0.0789*** (0.0003)	0.0587*** (0.0003)	0.0304*** (0.0003)	0.0584*** (0.0006)	0.0698*** (0.0009)
Age squared	-0.0061* (0.0034)	-0.0937*** (0.0004)	-0.0808*** (0.0004)	-0.0430*** (0.0004)	-0.0799*** (0.0008)	-0.0931*** (0.0012)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.5716*** (0.0547)	0.0809*** (0.0026)	0.0691*** (0.0056)	-0.0351*** (0.0036)	-0.0326*** (0.0072)	-0.2032*** (0.0121)
Urban area (urban=1, rural=0)	1.8369*** (0.0315)	-0.0703*** (0.0016)	0.0461*** (0.0028)	0.1075*** (0.0029)	0.0865*** (0.0034)	0.1924*** (0.0057)
Average daily temperature (degree Celsius)	-0.0374*** (0.0119)	0.0015*** (0.0006)	-0.0024** (0.0011)	-0.0029*** (0.0009)	0.0004 (0.0016)	0.0007 (0.0023)
Average daily precipitation (mm)	-0.0141 (0.0095)	0.0009* (0.0005)	-0.0004 (0.0009)	-0.0002 (0.0009)	-0.0003 (0.0012)	-0.0023 (0.0019)
Mean elevation (100m)	-0.0285 (0.0201)	0.0036*** (0.0009)	-0.0047** (0.0020)	0.0101*** (0.0014)	-0.0032 (0.0028)	0.0214*** (0.0047)
Distance to Hanoi capital (100km)	0.0330 (0.0861)	-0.0065 (0.0043)	-0.0364*** (0.0084)	0.0176*** (0.0064)	-0.0102 (0.0114)	0.1204*** (0.0204)
Distance to HCM city (100km)	-0.6735*** (0.0696)	0.0016 (0.0033)	-0.0798*** (0.0067)	-0.0568*** (0.0052)	0.0200** (0.0096)	-0.0139 (0.0148)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.9232*** (0.9434)	-0.6669*** (0.0445)	0.1347 (0.0905)	0.0245 (0.0665)	3.9458*** (0.1359)	6.3017*** (0.2101)
Observations	711,985	711,985	711,985	711,985	586,169	240,651

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.18. IV regression of individual outcomes using the sample excluding provinces with examination centers

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.2912** (0.1432)	0.0014 (0.0076)	0.0397*** (0.0146)	0.0853*** (0.0100)	0.0073 (0.0204)	0.0852*** (0.0253)
Gender (male=1, female=0)	0.4668*** (0.0090)	0.0609*** (0.0011)	0.1528*** (0.0014)	-0.0143*** (0.0010)	0.1030*** (0.0018)	0.2101*** (0.0031)
Age	-0.1078*** (0.0027)	0.0746*** (0.0003)	0.0550*** (0.0003)	0.0258*** (0.0003)	0.0568*** (0.0006)	0.0670*** (0.0010)
Age squared	0.0322*** (0.0035)	-0.0878*** (0.0004)	-0.0765*** (0.0004)	-0.0371*** (0.0004)	-0.0789*** (0.0008)	-0.0901*** (0.0013)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.9004*** (0.0521)	0.0873*** (0.0025)	0.0656*** (0.0051)	-0.0538*** (0.0033)	-0.0304*** (0.0070)	-0.2492*** (0.0120)
Urban area (urban=1, rural=0)	1.7004*** (0.0366)	-0.0676*** (0.0019)	0.0434*** (0.0033)	0.0923*** (0.0032)	0.0960*** (0.0045)	0.1592*** (0.0063)
Average daily temperature (degree Celsius)	-0.0399*** (0.0123)	0.0018*** (0.0006)	-0.0017 (0.0012)	-0.0030*** (0.0009)	-0.0023 (0.0017)	-0.0030 (0.0023)
Average daily precipitation (mm)	-0.0043 (0.0098)	0.0017*** (0.0005)	-0.0023** (0.0009)	-0.0016** (0.0007)	0.0003 (0.0014)	-0.0022 (0.0021)
Mean elevation (100m)	-0.0607** (0.0251)	0.0047*** (0.0013)	-0.0029 (0.0026)	0.0098*** (0.0017)	-0.0025 (0.0036)	0.0112** (0.0054)
Distance to Hanoi capital (100km)	0.0592 (0.1219)	-0.0045 (0.0064)	-0.0311** (0.0124)	0.0567*** (0.0084)	-0.0091 (0.0171)	0.1468*** (0.0278)
Distance to HCM city (100km)	-0.6201*** (0.0833)	0.0016 (0.0042)	-0.0823*** (0.0080)	-0.0889*** (0.0064)	-0.0025 (0.0111)	-0.0292* (0.0162)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	18.8518*** (1.0739)	-0.6021*** (0.0499)	0.3264*** (0.1011)	0.5458*** (0.0760)	4.3183*** (0.1509)	6.8698*** (0.2269)
Observations	587,468	587,468	587,468	587,468	487,496	191,583

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.19. IV regression of individual outcomes without using the sampling weight of individuals

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.1883 (0.1287)	-0.0055 (0.0065)	0.0452*** (0.0130)	0.0639*** (0.0086)	0.0154 (0.0176)	0.0492** (0.0218)
Gender (male=1, female=0)	0.4954*** (0.0086)	0.0540*** (0.0009)	0.1588*** (0.0013)	-0.0107*** (0.0008)	0.1013*** (0.0016)	0.2095*** (0.0027)
Age	-0.1087*** (0.0025)	0.0731*** (0.0003)	0.0550*** (0.0003)	0.0254*** (0.0002)	0.0604*** (0.0006)	0.0683*** (0.0008)
Age squared	0.0346*** (0.0032)	-0.0858*** (0.0004)	-0.0760*** (0.0004)	-0.0360*** (0.0003)	-0.0826*** (0.0007)	-0.0911*** (0.0011)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.8322*** (0.0546)	0.0864*** (0.0026)	0.0552*** (0.0053)	-0.0520*** (0.0034)	-0.0231*** (0.0070)	-0.2456*** (0.0115)
Urban area (urban=1, rural=0)	1.8382*** (0.0317)	-0.0711*** (0.0016)	0.0511*** (0.0027)	0.1060*** (0.0026)	0.0954*** (0.0036)	0.1735*** (0.0050)
Average daily temperature (degree Celsius)	-0.0481*** (0.0125)	0.0012** (0.0006)	-0.0023* (0.0012)	-0.0024*** (0.0008)	-0.0015 (0.0017)	-0.0017 (0.0021)
Average daily precipitation (mm)	-0.0031 (0.0090)	0.0010** (0.0004)	-0.0020** (0.0009)	-0.0012** (0.0006)	-0.0001 (0.0012)	0.0004 (0.0018)
Mean elevation (100m)	-0.0853*** (0.0236)	0.0047*** (0.0011)	-0.0048** (0.0023)	0.0076*** (0.0015)	-0.0004 (0.0032)	0.0075 (0.0048)
Distance to Hanoi capital (100km)	-0.0492 (0.0921)	-0.0089** (0.0045)	-0.0332*** (0.0092)	0.0322*** (0.0061)	-0.0087 (0.0122)	0.1196*** (0.0208)
Distance to HCM city (100km)	-0.6256*** (0.0682)	0.0030 (0.0032)	-0.0777*** (0.0065)	-0.0554*** (0.0047)	0.0112 (0.0093)	0.0004 (0.0139)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	19.5564*** (1.1187)	-0.5503*** (0.0497)	0.2833*** (0.1048)	0.1858*** (0.0680)	3.9985*** (0.1549)	6.5660*** (0.2227)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.20. IV regression of individual outcomes using heteroskedasticity-consistent standard errors

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.3890*** (0.0478)	-0.0084* (0.0043)	0.0578*** (0.0062)	0.0720*** (0.0041)	0.0030 (0.0080)	0.0670*** (0.0118)
Gender (male=1, female=0)	0.4646*** (0.0090)	0.0538*** (0.0008)	0.1596*** (0.0012)	-0.0143*** (0.0009)	0.1046*** (0.0016)	0.2125*** (0.0026)
Age	-0.1027*** (0.0018)	0.0742*** (0.0002)	0.0557*** (0.0002)	0.0257*** (0.0002)	0.0610*** (0.0005)	0.0671*** (0.0008)
Age squared	0.0292*** (0.0024)	-0.0869*** (0.0003)	-0.0770*** (0.0003)	-0.0367*** (0.0002)	-0.0835*** (0.0006)	-0.0901*** (0.0011)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.6839*** (0.0224)	0.0833*** (0.0019)	0.0693*** (0.0029)	-0.0411*** (0.0018)	-0.0301*** (0.0037)	-0.2397*** (0.0063)
Urban area (urban=1, rural=0)	1.7366*** (0.0116)	-0.0697*** (0.0011)	0.0456*** (0.0015)	0.1023*** (0.0012)	0.0981*** (0.0019)	0.1690*** (0.0029)
Average daily temperature (degree Celsius)	-0.0329*** (0.0044)	0.0014*** (0.0004)	-0.0022*** (0.0006)	-0.0029*** (0.0004)	-0.0005 (0.0007)	0.0003 (0.0012)
Average daily precipitation (mm)	0.0032 (0.0034)	0.0008*** (0.0003)	-0.0016*** (0.0005)	-0.0012*** (0.0003)	-0.0008 (0.0006)	-0.0004 (0.0010)
Mean elevation (100m)	-0.0493*** (0.0084)	0.0040*** (0.0007)	-0.0043*** (0.0011)	0.0091*** (0.0007)	-0.0024* (0.0014)	0.0115*** (0.0025)
Distance to Hanoi capital (100km)	0.0881** (0.0361)	-0.0078** (0.0032)	-0.0238*** (0.0046)	0.0322*** (0.0030)	-0.0062 (0.0059)	0.1185*** (0.0116)
Distance to HCM city (100km)	-0.5929*** (0.0255)	0.0011 (0.0022)	-0.0888*** (0.0032)	-0.0630*** (0.0022)	0.0124*** (0.0042)	0.0026 (0.0077)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.3187*** (0.4043)	-0.5404*** (0.0343)	0.3321*** (0.0510)	0.2402*** (0.0328)	4.0056*** (0.0672)	6.4219*** (0.1325)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.

Table A.21. IV regression of individual outcomes with standard errors clustered at the district level

Explanatory variables	Dependent variables					
	The number of schooling years	Currently working (yes=1, no=0)	Having a wage job (yes=1, no=0)	Having a formal job (yes=1, no=0)	Log of monthly working hours	Log of monthly wage
asinh(elite density)	0.3890*** (0.1455)	-0.0084 (0.0081)	0.0578*** (0.0173)	0.0720*** (0.0129)	0.0030 (0.0237)	0.0670** (0.0279)
Gender (male=1, female=0)	0.4646*** (0.0108)	0.0538*** (0.0014)	0.1596*** (0.0018)	-0.0143*** (0.0012)	0.1046*** (0.0022)	0.2125*** (0.0036)
Age	-0.1027*** (0.0034)	0.0742*** (0.0005)	0.0557*** (0.0004)	0.0257*** (0.0005)	0.0610*** (0.0008)	0.0671*** (0.0010)
Age squared	0.0292*** (0.0042)	-0.0869*** (0.0006)	-0.0770*** (0.0006)	-0.0367*** (0.0006)	-0.0835*** (0.0010)	-0.0901*** (0.0013)
Ethnicity (Ethnic minorities=1, Kinh=0)	-2.6839*** (0.0713)	0.0833*** (0.0036)	0.0693*** (0.0076)	-0.0411*** (0.0052)	-0.0301*** (0.0103)	-0.2397*** (0.0157)
Urban area (urban=1, rural=0)	1.7366*** (0.0354)	-0.0697*** (0.0019)	0.0456*** (0.0034)	0.1023*** (0.0034)	0.0981*** (0.0041)	0.1690*** (0.0060)
Average daily temperature (degree Celsius)	-0.0329** (0.0149)	0.0014** (0.0007)	-0.0022 (0.0015)	-0.0029** (0.0013)	-0.0005 (0.0023)	0.0003 (0.0028)
Average daily precipitation (mm)	0.0032 (0.0113)	0.0008 (0.0006)	-0.0016 (0.0013)	-0.0012 (0.0011)	-0.0008 (0.0017)	-0.0004 (0.0025)
Mean elevation (100m)	-0.0493* (0.0258)	0.0040*** (0.0014)	-0.0043 (0.0029)	0.0091*** (0.0021)	-0.0024 (0.0042)	0.0115* (0.0062)
Distance to Hanoi capital (100km)	0.0881 (0.1112)	-0.0078 (0.0062)	-0.0238* (0.0125)	0.0322*** (0.0103)	-0.0062 (0.0179)	0.1185*** (0.0278)
Distance to HCM city (100km)	-0.5929*** (0.0833)	0.0011 (0.0043)	-0.0888*** (0.0097)	-0.0630*** (0.0079)	0.0124 (0.0138)	0.0026 (0.0189)
Soil types	Yes	Yes	Yes	Yes	Yes	Yes
Province fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Year fixed effects	Yes	Yes	Yes	Yes	Yes	Yes
Constant	17.3187*** (1.3183)	-0.5404*** (0.0643)	0.3321** (0.1404)	0.2402** (0.1079)	4.0056*** (0.2258)	6.4219*** (0.2963)
Observations	657,508	657,508	657,508	657,508	545,602	214,371

Robust standard errors in parentheses (clustered at the commune level).

*** p<0.01, ** p<0.05, * p<0.1.

Source: Estimations from VHLSSs 2010-2020.