

Appendix

Appendix A Validity test of instrumental variable

| | Cultivation | Household income | Farm income | Off-farm income | The number of migrant workers |
|---------------------------------|-------------------------------|-------------------------------|-------------------------------|------------------------------|-------------------------------|
| Age | 0.009 (0.049) | -0.118 (0.095) | 0.050 (0.063) | 0.061 (0.060) | 0.107 (0.033) ^{***} |
| Square of age | 0.000 (0.000) | 0.001 (0.001) | -0.000 (0.001) | -0.001 (0.001) [*] | -0.001 (0.000) ^{***} |
| Education | 0.031 (0.022) | 0.110 (0.048) ^{**} | 0.060 (0.027) ^{**} | 0.047 (0.032) | 0.043 (0.013) ^{***} |
| Household size | 0.018 (0.047) | -0.356 (0.099) ^{***} | -0.229 (0.058) ^{***} | 0.040 (0.070) | 0.279 (0.028) ^{***} |
| Farm size | 0.026 (0.012) ^{**} | 0.052 (0.038) | 0.168 (0.097) [*] | -0.044 (0.021) ^{**} | -0.018 (0.009) ^{**} |
| Cooperative membership | 1.602 (0.205) ^{***} | 0.252 (0.487) | 0.764 (0.411) [*] | -0.151 (0.275) | -0.034 (0.102) |
| Road condition | 0.069 (0.161) | 1.206 (0.370) ^{***} | 0.378 (0.265) | 0.545 (0.218) ^{**} | 0.123 (0.095) |
| Sales help | -0.267 (0.214) | 0.232 (0.377) | 0.201 (0.293) | -0.274 (0.243) | 0.012 (0.095) |
| Migration help | 0.682 (0.239) ^{***} | 0.479 (0.413) | 0.915 (0.307) ^{***} | -0.156 (0.312) | -0.029 (0.102) |
| Hubei | -1.599 (0.308) ^{***} | 1.182 (0.554) ^{**} | -0.511 (0.265) [*] | 0.990 (0.421) ^{**} | -0.154 (0.140) |
| Hunan | 2.157 (0.242) ^{***} | 0.580 (0.472) | 0.552 (0.381) | 0.095 (0.317) | -0.018 (0.136) |
| Chongqing | -0.734 (0.263) ^{***} | 1.860 (0.680) ^{***} | 0.085 (0.389) | 1.266 (0.513) ^{**} | -0.287 (0.160) [*] |
| Infrastructure investment (log) | 0.273 (0.065) ^{***} | 0.150 (0.109) | 0.089 (0.059) | 0.083 (0.083) | 0.028 (0.027) |
| Constant | -2.836 (1.480) [*] | 5.178 (2.886) [*] | -0.715 (1.644) | -0.154 (1.849) | -4.560 (0.901) ^{***} |
| Observations | 730 | 730 | 730 | 730 | 730 |

Note: Household income, farm income and off-farm income are measured in 1,000 Yuan/capita. The reference region is Guizhou. Standard errors are in parentheses, ^{*} $p < 0.1$,

^{**} $p < 0.05$, ^{***} $p < 0.01$.

Appendix B Determinants of cash crop cultivation and its impact on farm income

| | ETR for continuous variable ^a | | OLS |
|--|--|-------------------------------|-------------------------------|
| | Selection equation | Farm income | Farm income |
| Cultivation | | 2.958 (0.558) ^{***} | 1.031 (0.493) ^{**} |
| Age | 0.016 (0.049) | 0.054 (0.076) | 0.051 (0.063) |
| Square of age | -0.000 (0.000) | -0.001 (0.001) | -0.001 (0.001) |
| Education | 0.027 (0.022) | 0.051 (0.039) | 0.057 (0.027) ^{**} |
| Household size | -0.004 (0.047) | -0.215 (0.080) ^{***} | -0.226 (0.058) ^{***} |
| Farm size | 0.067 (0.016) ^{***} | 0.151 (0.016) ^{***} | 0.163 (0.097) [*] |
| Cooperative membership | 1.502 (0.203) ^{***} | -0.089 (0.378) | 0.468 (0.465) |
| Road condition | 0.049 (0.160) | 0.302 (0.291) | 0.340 (0.265) |
| Sales help | -0.250 (0.208) | 0.354 (0.294) | 0.184 (0.274) |
| Migration help | 0.736 (0.235) ^{***} | 0.710 (0.334) ^{**} | 0.852 (0.309) ^{***} |
| Hubei | -1.625 (0.310) ^{***} | 0.118 (0.452) | -0.373 (0.280) |
| Hunan | 2.033 (0.246) ^{***} | -1.202 (0.548) ^{**} | -0.104 (0.462) |
| Chongqing | -0.875 (0.264) ^{***} | 0.144 (0.511) | 0.117 (0.382) |
| Infrastructure investment (log) | 0.282 (0.064) ^{***} | | |
| Constant | -3.005 (1.488) ^{**} | -1.009 (2.183) | -0.520 (1.594) |
| $Ath(\rho_{\mu\varepsilon})$ | -0.391 (0.088) ^{***} | | |
| $\rho_{\mu\varepsilon}$ | -0.372 (0.112) ^{***} | | |
| $\ln(\sigma)$ | 1.203 (0.028) ^{***} | | |
| Log pseudolikelihood | -2,094.728 | | |
| Wald test of indep. Eqns. ($\rho_{\mu\varepsilon}=0$): $\chi^2(1) = 8.98$, Prob = 0.003 | | | |
| Observations | 730 | | 730 |

Note: Farm income is measured in 1,000 Yuan/capita. The reference region is Guizhou. Standard errors are in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

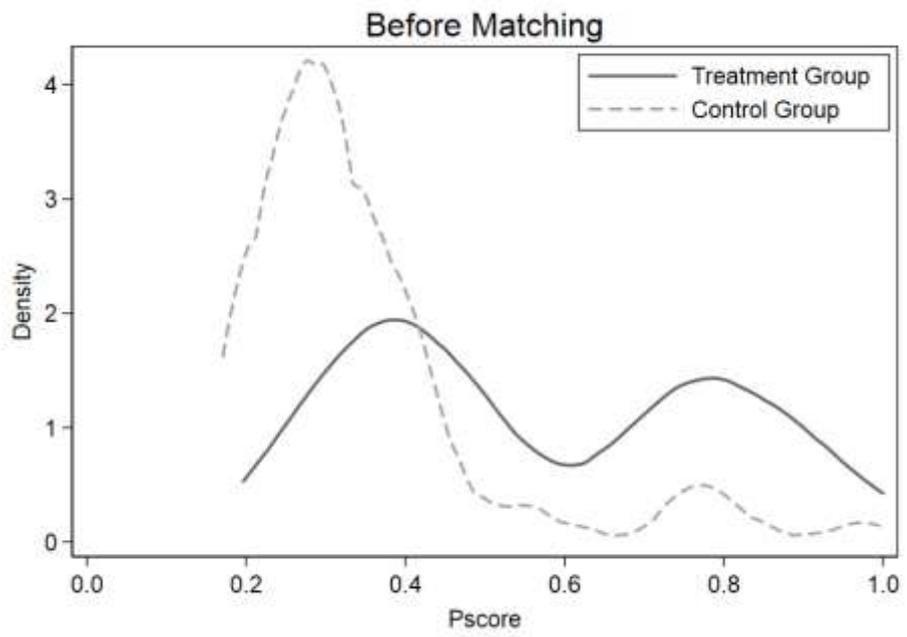
^a STATA commands *etregress* is used to estimate the results of the ETR model for continuous variable (StataCorp 2017).

Appendix C Determinants of cash crop cultivation and its impact on off-farm income

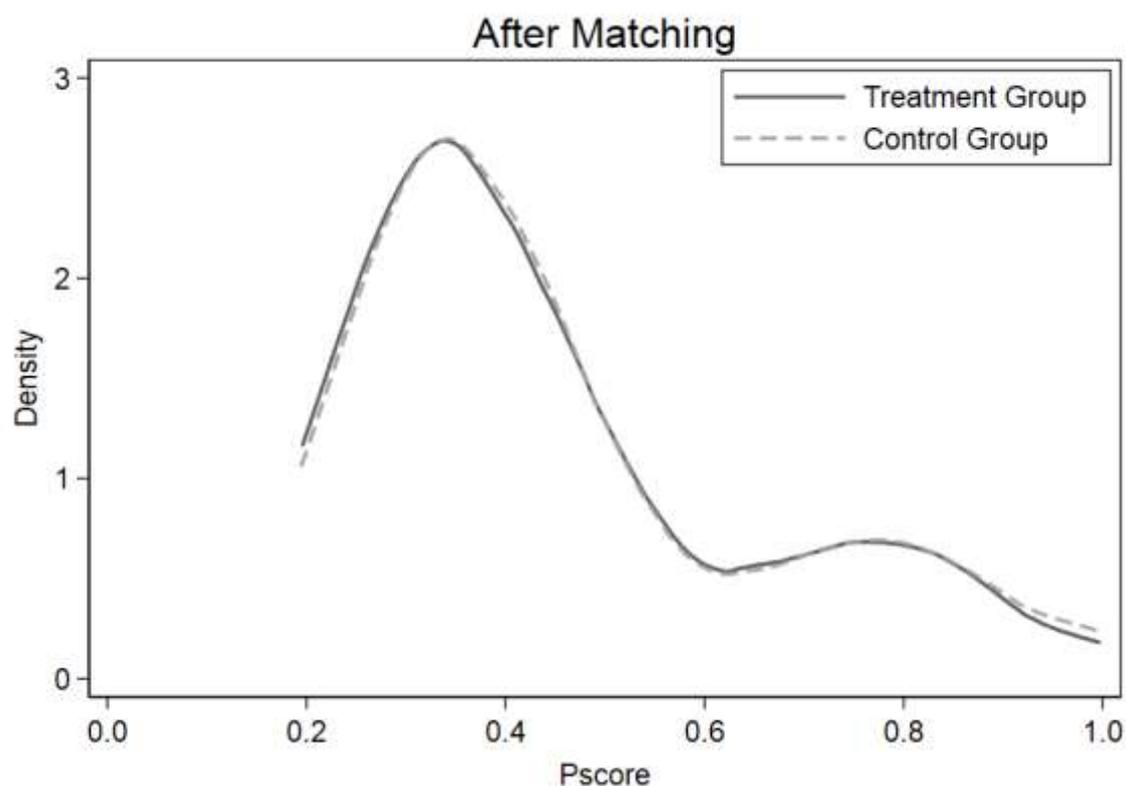
| | ETR for continuous variable ^a | | OLS |
|--|--|------------------|-----------------|
| | Selection equation | Off-farm income | Off-farm income |
| Cultivation | | -1.274 (0.638)** | -0.402 (0.285) |
| Age | 0.005 (0.048) | 0.058 (0.071) | 0.060 (0.059) |
| Square of age | 0.000 (0.000) | -0.001 (0.001) | -0.001 (0.001)* |
| Education | 0.031 (0.022) | 0.051 (0.036) | 0.049 (0.032) |
| Household size | 0.022 (0.047) | 0.032 (0.075) | 0.036 (0.070) |
| Farm size | 0.029 (0.014)** | -0.035 (0.015)** | -0.040 (0.021)* |
| Cooperative membership | 1.603 (0.205)*** | 0.219 (0.370) | -0.033 (0.252) |
| Road condition | 0.068 (0.162) | 0.553 (0.273)** | 0.536 (0.214)** |
| Sales help | -0.265 (0.218) | -0.487 (0.278)* | -0.410 (0.229)* |
| Migration help | 0.678 (0.240)*** | -0.050 (0.314) | -0.114 (0.314) |
| Hubei | -1.662 (0.319)*** | 0.549 (0.435) | 0.771 (0.355)** |
| Hunan | 2.143 (0.244)*** | 0.758 (0.554) | 0.261 (0.374) |
| Chongqing | -0.741 (0.261)*** | 1.263 (0.480)*** | 1.276 (0.511)** |
| Infrastructure investment (log) | 0.275 (0.066)*** | | |
| Constant | -2.774 (1.472)* | 0.595 (2.051) | 0.374 (1.701) |
| $Ath(\rho_{\mu\varepsilon})$ | 0.177 (0.106)* | | |
| $\rho_{\mu\varepsilon}$ | 0.175 (0.103)* | | |
| $\ln(\sigma)$ | 1.140 (0.027)*** | | |
| Log pseudolikelihood | -2,062.997 | | |
| Wald test of indep. Eqns. ($\rho_{\mu\varepsilon}=0$): $\chi^2(1)=1.72$, Prob = 0.189 | | | |
| Observations | 730 | | 730 |

Note: Off-farm income is measured in 1,000 Yuan/capita. The reference region is Guizhou. Standard errors are in parentheses, * $p < 0.1$, ** $p < 0.05$, *** $p < 0.01$.

^a STATA commands *etregress* is used to estimate the results of the ETR model for continuous variable (StataCorp 2017).



Appendix D Distribution of propensity scores between treated group and control group before matching



Appendix E Distribution of propensity scores between treated group and control group after matching

Appendix F Average treatment effects on the treated (ATT) of cash crop cultivation using PSM method

| Group | Household income | | The number of migrant workers | |
|-------------|------------------|-------|-------------------------------|-------|
| | ATT^{PSM} | S.E. | ATT^{PSM} | S.E. |
| Full sample | 0.919** | 0.480 | -0.087 | 0.154 |

Note: Household income is measured in 1,000 Yuan/capita. Nearest neighbor matching method is employed. ** $p < 0.05$.