Supplementary Material

**Supplementary Table**

Referring to the research practice of Lin et al.(2024) this paper uses the methods of replacing the threshold variables and adjusting the sample size to test the robustness of the threshold effect model, respectively, by adopting a one-period lag for the level of AI and the level of human capital, and Winsorizing the level of financial development and re-substituting them respectively. The results are shown in Supplementary Table 1 and 2, the thresholds are all significant at the 1% level.

**Supplementary Table 1. Threshold effect existence test**

|  |  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- | --- |
|  | Threshold | BS | Fstat | Prob | threshold value | Critical value | | |
| L.AI | Single | 500 | 585.45\*\*\* | 0.000 | 8.158 | 39.830 | 49.129 | 103.388 |
| L.HC | Single | 500 | 137.25\*\* | 0.016 | 0.056 | 70.804 | 90.055 | 148.386 |
| Fin | Single | 500 | 230.53\*\*\* | 0.000 | 3.865 | 54.994 | 68.213 | 100.325 |

**Supplementary Table 2 . Robustness test results for threshold effects**

|  |  |  |  |
| --- | --- | --- | --- |
|  | (1) | (2) | (3) |
| Threshold variable | L.AI | L.HC | Fin |
| POP | 0.348\*\*\* | 0.368\*\*\* | 0.351\*\*\* |
|  | (8.225) | (8.399) | (8.072) |
| Ope | -0.980\*\*\* | -1.462\*\*\* | -1.187\*\*\* |
|  | (-2.892) | (-4.181) | (-3.407) |
| Gov | -0.778\*\*\* | -0.907\*\*\* | -1.059\*\*\* |
|  | (-6.883) | (-7.769) | (-9.124) |
| FI | 0.010\*\* | -0.000 | 0.004 |
|  | (2.164) | (-0.011) | (0.926) |
| ，ST | 4.914\*\*\* | 7.011\*\*\* | 7.298\*\*\* |
|  | (8.421) |  |  |
| AI×I1(AI≤8.158) | 0.111\*\*\* |  |  |
|  | (6.357) |  |  |
| AI×I1(AI>8.158) | 0.202\*\*\* |  |  |
|  |  | (11.852) |  |
| AI×I2(HC≤0.056) |  | 0.096\*\*\* |  |
|  |  | (5.296) |  |
| AI×I2(HC>0.056) |  | 0.182\*\*\* |  |
|  |  |  | (12.479) |
| AI×I3(Fin≤3.865) |  |  | 0.115\*\*\* |
|  |  |  | (6.416) |
| AI×I3(Fin>3.865) |  |  | 0.184\*\*\* |
|  | (11.206) | (9.476) | (9.781) |
| \_cons | -1.766\*\*\* | -1.821\*\*\* | -1.760\*\*\* |
|  | (-7.217) | (-7.194) | (-6.997) |
| year | Yes | Yes | Yes |
| city | Yes | Yes | Yes |
| Obs | 5149 | 5149 | 5149 |
| R2 | 0.476 | 0.440 | 0.446 |

**Reference**

Lin, C.Y., Wang, M.Y., Lan, X.J., Wen, C.H. (2024). Impact of Environmental Protection Tax on Regional Green Competitiveness: A Study Based on Market Integration Background. Resources and Environment in the Yangtze Basin 33(04):728-741.